APPENDIX C: DOCUMENTS PRODUCED BY AMAZON

United States Senate
COMMITTEE ON HEALTH, EDUCATION, LABOR, AND PENSIONS
WASHINGTON, DC 20510–6300

June 20, 2023

Andy Jassy
Chief Executive Officer
Amazon.com, Inc.
410 Terry Ave. North
Seattle, WA 98109-5210

Dear Mr. Jassy,

I write to initiate an investigation into the dangerous and illegal conditions at Amazon's warehouses. The company's quest for profits at all costs has led to unsafe physical environments, intense pressure to work at unsustainable rates, and inadequate medical attention for tens of thousands of Amazon workers every year. Amazon is well aware of these dangerous conditions, the life-altering consequences for workers injured on the job, and the steps the company could take to reduce the significant risks of injury. Yet the company has made a calculated decision not to implement adequate worker protections because Jeff Bezos, Amazon's founder, and you, his successor as Chief Executive Officer, have created a corporate culture that treats workers as disposable. At every turn—from warehouse design and workstation setup, to pace of work requirements, to medical care for injuries and subsequent pressure to return to work—Amazon makes decisions that actively harm workers in the name of its bottom line.

These practices have not gone unnoticed. The Department of Labor's Occupational Safety and Health Administration (OSHA) and state regulators have repeatedly cited the company for egregious violations of workplace safety laws.[1] Amazon is also currently under investigation by the United States Attorney's Office for the Southern District of New York for potentially misrepresenting the scope of workplace injuries.[2] Yet Amazon has made no effort to change its illegal practices. Instead, the company has used its outsized power as the country's second largest private-sector employer to deny workers their right to a safe workplace.

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[1] *See, e.g.,* Press Release, U.S. Dep't Labor, US Department of Labor finds Amazon failed to provide injured employees proper medical treatment at Castleton, New York, fulfillment facility (Apr. 28, 2023), https://www.osha.gov/news/newsreleases/national/04282023; Press Release, U.S. Dep't Labor, US Department of Labor Finds Amazon exposed workers to unsafe conditions, ergonomic hazards at three more warehouses in Colorado, Idaho, New York (Feb. 1, 2023), https://www.osha.gov/news/newsreleases/national/02012023; Press Release, Wash. Dep't Labor & Indus., Amazon cited for unsafe work practices at Kent fulfillment center (Mar. 21, 2022), https://lni.wa.gov/news-events/article/22-08.

[2] Press Release, U.S. Att'y Off., S.D.N.Y., Amazon Cited By OSHA Based On SDNY Referrals For Serious Violations That Exposed Workers To Safety Hazards (Jan. 18, 2023), https://www.justice.gov/usao-sdny/pr/amazon-cited-osha-based-sdny-referrals-serious-violations-exposed-workers-safety.

That is unacceptable. Amazon is one of the most valuable companies in the world worth $1.3 trillion and its founder, Jeff Bezos, is one of the richest men in the world worth nearly $150 billion.[3] Amazon should be one of the safest places in America to work, not one of the most dangerous.

If Amazon can afford to spend $6 billion on stock buybacks last year, it can afford to make sure that its warehouses are safe places to work.[4] If Amazon can afford to pay you $289 million in total compensation over the past two years, it can afford to treat all of its workers with dignity and respect, not contempt.[5]

The time has come for Amazon to stop willfully violating workplace safety laws with impunity and commit to changing its operations to protect the health and safety of its workers.

Amazon's warehouses are uniquely dangerous.

Every day, hundreds of thousands of people across the country work at Amazon warehouses. And every day, the company pushes them past their limits while monitoring their every move.

The work is physically demanding. Workers in Amazon warehouses are always on their feet. Some walk up and down narrow aisles pulling products from bins, logging upwards of 10 miles a day. Others stand at tables packing boxes, making the same repetitive movement for the entirety of their 10-hour shift. And others are constantly bending and twisting to lift boxes—some light, some dangerously heavy—with few meaningful breaks.

Warehouse workers have to complete these tasks as quickly as possible. Amazon requires workers to meet aggressive productivity goals, but rarely tells workers exactly what these goals are. What workers do know is that they will be disciplined or terminated if they cannot keep up. Afraid to lose their jobs, warehouse workers move as fast as they can to try to meet these goals—a process referred to by Amazon workers as "making rate."

Amazon has made sure that workers know that slowing down is not an option. From the moment workers arrive for their shifts to the moment they leave the building, the company monitors their every move. Amazon knows how quickly they pick up, package, and move items. Amazon knows when they step off the floor to go to the bathroom or pause to catch their breath. And Amazon uses this information to pressure and intimidate workers into working as hard and fast as possible, pushing their bodies to—and in many cases, past—the breaking point.

The result is that Amazon's warehouses are uniquely dangerous. In 2022 alone, Amazon warehouse workers suffered nearly 39,000 injuries, 95 percent of which were so serious that they

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[3] *Amazon.com, Inc. Common Stock*, NASDAQ, https://www.nasdaq.com/market-activity/stocks/amzn (last accessed June 16, 2023); *Profile: Jeff Bezos*, FORBES, https://www.forbes.com/profile/jeff-bezos/?sh=6a29c3a61b23 (last accessed June 16, 2023).
[4] *Annual Report (2022)*, AMAZON.COM, INC., at 36 (Feb. 2, 2023), https://s2.q4cdn.com/299287126/files/doc_financials/2023/ar/Amazon-2022-Annual-Report.pdf.
[5] *Notice of 2023 Annual Meeting of Shareholders & Proxy Statement,* AMAZON.COM, INC., at 95-96, 101-104 (Apr. 13, 2023), https://s2.q4cdn.com/299287126/files/doc_financials/2023/ar/Amazon-2023-Proxy-Statement.pdf.

required workers to either lose time at work or switch to modified duty.[6] Amazon's rate of serious injuries at its warehouses, at 6.6 injuries per 100 workers, was more than double the rate at non-Amazon warehouses.[7] And despite constituting only a little more than a third of the warehouse workers in the country, Amazon workers suffered more serious injuries than all of the other warehouse workers in the United States combined.[8]

These injuries often leave workers with chronic pain and permanent disabilities. Mark Takakura's story is just one example. Mr. Takakura, a former Army medic, started working at an Amazon warehouse in DuPont, Washington in the fall of 2020.[9] His job was to pull carts loaded with hundreds of pounds of merchandise to different locations around the warehouse at a pace he found "grueling."[10] After just six months, Mr. Takakura started experiencing back pain. About a year after he started the job, X-rays showed he had mid-spine degeneration.

As his injury worsened, Mr. Takakura struggled to meet Amazon's productivity goals. Although the company told workers that they could slow down if they needed to, Mr. Takakura quickly learned that was not the case. When workers tried to move at a safer pace, managers would approach them and say, "You guys need to start picking up. What can we do to improve productivity?"[11] And when Mr. Takakura slowed down to protect his back, he received a warning from his manager that his performance was subpar.

Mr. Takakura expects he will have to manage chronic back pain, and the medical bills that come with it, for the rest of his life. In discussing his experience at the company, Mr. Takakura told a reporter, "Me and my veteran buddies always say, the military was hard, but it was nothing compared to Amazon."[12]

Mr. Takakura is far from alone. For tens of thousands of workers, the cost of just a few years at an Amazon warehouse is a lifetime of pain. My staff and I have heard concerning stories from workers around the country about the toll that working at Amazon warehouses takes on their bodies. One worker injured both of her wrists within a month of starting at Amazon and had to use her vacation time to recover when the company would not let her slow down to heal. Another worker, who had to stand on concrete floors for 12 hours at a time, needed foot surgery after just two years at Amazon. And a third worker injured her knee so severely she could barely walk the distance from the warehouse parking lot to her workstation, where she had to be on her feet for her entire shift; she has since left Amazon, and now needs workplace accommodations because of her experience at the company. Her story is part of a broader pattern of Amazon treating its

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[6] The Strategic Organizing Center, *In Denial: Amazon's Continuing Failure to Fix Its Injury Crisis*, at 3 (Apr. 2023), https://thesoc.org/wp-content/uploads/2023/04/SOC_In-Denial_Amazon-Injury-Report-April-2023.pdf.
[7] *Id.* at 4, 7-8.
[8] *Id.* at 2.
[9] Katherine Long, *Amazon workers say minor aches suddenly became debilitating as they raced to meet speed targets,* BUSINESS INSIDER (Oct. 19, 2022), https://www.businessinsider.com/warehouse-injuries-amazon-chronic-pain-speed-risk-productivity-targets-employees-2022-10.
[10] *Id.*
[11] *Id.*
[12] *Id.*

employees as disposable: the company has regularly seen turnover rates of 150% per year.[13] At every one of Amazon's approximately 1,200 warehouses in the United States, and in the homes of too many former employees, there are similar stories of workers who suffered workplace injuries and are now living with chronic pain and disabilities—each of which is a stunning indictment of Amazon's treatment of its workers.

But the clearest proof of Amazon's indifference toward its employees is that the company knows how to protect warehouse workers and chooses not to. Warehouses do not have to be dangerous places to work. There are proven methods to make them safe.[14] Most of these methods are straightforward, such as regularly cycling tasks to avoid repetitive strain injuries and using motorized tools so workers do not have to lift and move heavy items themselves. But instead of making the changes necessary to ensure a safer workplace, Amazon allows the unsafe conditions at its warehouses to persist and forces workers to suffer the consequences. Indeed, the reason Mr. Takakura had to pull hundreds of pounds of products to different locations around his warehouse was that Amazon did not provide industry-standard electric pallet jacks and powered cart tuggers to workers at his facility.[15]

Amazon even proved that it could reduce worker injuries: in early 2020, COVID-19 precautions forced the company to slow the pace of work at its facilities, leading to a nearly 27 percent decline in injury rates from 2019 to 2020.[16] When the pace of work increased as pandemic precautions lifted, the injury rates increased as well—in one warehouse by more than 40 percent.[17]

Federal and state regulators have raised serious concerns about Amazon's practices, which the company has consistently ignored. Since 2015, OSHA has issued Amazon at least 30 hazard alert letters, as well as at least 50 citations for violating workplace health and safety laws.[18] Those letters and citations regularly note inspectors' observations about unsafe conditions at Amazon warehouses, including workstations that are designed in ways that strain workers' bodies and employees who "face immense pressure to meet pace of work and production quotas at the risk of sustaining musculoskeletal injuries."[19] OSHA has offered Amazon a number of ways to

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[13] Jodi Kantor, Karen Weise, & Grace Ashford, *The Amazon That Customers Don't See*, N.Y. TIMES (June 15, 2021), https://www.nytimes.com/interactive/2021/06/15/us/amazon-workers.html.

[14] Occupational Safety and Health Admin., *Warehousing – Hazards and Solutions*, U.S. DEP'T LABOR, https://www.osha.gov/warehousing/hazards-solutions (last visited June 16, 2023).

[15] *See* Long, *supra* note 9; Wash. Dep't Labor & Indus., Div. Occupational Safety and Health, Citation and Notice of Assessment to Amazon.com Services LLC, Inspection No. 317961850 at 3 (May 4, 2021) (on file with the Senate HELP Committee Majority staff).

[16] *See* The Strategic Organizing Center, *The Injury Machine: How Amazon's Production System Hurts Workers*, at 3 (Apr. 2022), https://thesoc.org/wp-content/uploads/2022/04/The-Injury-Machine_How-Amazons-Production-System-Hurts-Workers.pdf.

[17] *Id.* at 2.

[18] List on file with the Senate HELP Committee Majority staff.

[19] Letter from David G. Kearns, Area Dir., Occupational Safety and Health Admin., to Nick Govin, Site WHS Manager, Amazon.com Services, LLC, dba Amazon Fulfillment Center BOI2 at 1 (Jan. 31, 2023), https://www.dol.gov/sites/dolgov/files/OPA/newsreleases/2023/02/OSHA20230163a.pdf; Letter from Amanda Kupper, Area Dir., Occupational Safety and Health Admin., to Anthony Spinelli, Gen. Manager, Amazon.com

address these unsafe conditions, such as making workstations adjustable and reducing the pace of work.[20] But Amazon has chosen to disregard the vast majority of OSHA's recommendations.

Similarly, Washington State's Division of Occupational Safety and Health found that at Amazon warehouses, "pressure is put on workers to maintain [a very high] pace without adequate recovery time" and that there is "a direct connection between Amazon's employee monitoring and discipline systems and workplace musculoskeletal disorders."[21] But Amazon has failed to adequately address these safety hazards at its warehouses in Washington and around the country—paving the way for thousands more stories like Mr. Takakura's.[22]

Mr. Jassy, there is only one explanation for Amazon's repeated failure to protect its warehouse workers: unacceptable corporate greed.

Amazon's on-site medical clinics undertreat and underreport workers' injuries.

When workers are inevitably injured at Amazon's dangerous warehouses, they go to one of the company's on-site medical clinics. Amazon operates these clinics as part of the company's Administering Medical Care to Amazonians Responsibly and Effectively (AMCARE) program. But contrary to the program's name, the medical care these clinics provide is abysmal.

AMCARE clinics are designed to undertreat and underreport injuries and to get workers back on warehouse floors as soon as possible. Not surprisingly, the way workers are treated at these clinics is appalling. At one New York warehouse, a worker was injured when a falling box struck their head while working the night shift. The worker visited an AMCARE clinic with blood coming out of their ear—a sign of a skull fracture—but was sent back to work. AMCARE staff did not bother to consult a doctor or even monitor the worker once they were back on the floor.[23]

As disturbing as this worker's experience is, it is not atypical. Workers have shared numerous stories with me and my staff about the substandard care at these clinics and the pressure put on workers to return to work. One of those individuals, Patrick O'Rourke, worked as a "picker" at an Amazon warehouse in Maryland—retrieving items from shelves and walking upwards of 10 miles a day.[24] After less than a year of this work, Mr. O'Rourke started experiencing severe pain in his right ankle. When he told his manager about this pain, he was instructed to go to an AMCARE clinic. But staff at the clinic paid him little attention: instead of thoroughly examining him, they gave him Icy Hot and sent him back to work. When the pain persisted and spread to his

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Services LLC, dba DEN5 Amazon Sortation Center at 1 (Jan. 31, 2023), https://www.dol.gov/sites/dolgov/files/OPA/newsreleases/2023/02/OSHA20230163a.pdf.

[20] Letter from David G. Kearns to Nick Govin, (Jan. 31, 2023), *supra* note 19, at 3-4.

[21] Wash. Dep't Labor & Indus., Inspection No. 317961850 (May 4, 2021), *supra* note 15, at 2.

[22] Haleluya Hadero, *Amazon sues Washington's labor agency over alleged hazards*, AP NEWS (Oct. 4, 2022), https://apnews.com/article/technology-business-new-york-lawsuits-washington-4b207b1ec0c9dd387bee54ac5be4554a.

[23] U.S. Dep't Labor, Occupational Safety and Health Admin., Citation and Notification of Penalty to Amazon.com Services LLC – ALB1 Fulfillment Center, Inspection No. 1610874 at 7 (Apr. 18, 2023), https://www.dol.gov/sites/dolgov/files/OPA/newsreleases/2023/04/23-785-NAT.AmazonCitations%2C042623.pdf.

[24] Statement on file with Senate HELP Committee Majority staff.

left ankle, Mr. O'Rourke used his vacation time to seek outside medical help. His doctors told him that his injuries were caused by walking miles on concrete floors, and that he would need to get off his feet to fully recover. Continuing to walk on concrete floors—as AMCARE staff had instructed him to do—would only exacerbate his injuries and compound his pain.

This shockingly inadequate medical care is by design. OSHA requires companies to record only those injuries that call for "medical treatment beyond first aid."[25] By treating workers' injuries, even serious ones, with no more than ice packs and over-the-counter pain relievers, Amazon evades responsibility for any long-term consequences workers suffer as a result of these injuries.[26] And because Amazon is not interested in providing workers with adequate medical care, AMCARE facilities are typically staffed not by nurses or doctors, but by Emergency Medical Technicians (EMTs) and athletic trainers. These EMTs and athletic trainers are not equipped to handle the types of injuries that warehouse workers suffer. Nor are they given sufficient assistance: when presented with serious injuries—which happens tens of thousands of times each year—AMCARE staff have to place calls to Amazon's Physician Hotline for consultations with medical professionals.[27] The result is that AMCARE staff are forced to operate with little guidance other than the pressure they receive from the company to undertreat injuries.

This substandard care is combined with a pattern of pressuring workers not to seek medical attention from practicing physicians, effectively making workplace injuries that would otherwise have to be recorded and shared with OSHA disappear.[28] Investigators have repeatedly found evidence of EMTs and their supervisors discouraging workers from seeking medical care.[29] And current and former AMCARE staff have confirmed that the directions came from Amazon, telling reporters that the company encouraged them to "send injured employees back to the warehouse floor when they likely needed additional medical attention."[30]

The company's efforts to avoid responsibility for workplace injuries have an obvious result: employees' injuries are exacerbated when they are forced to return to work, leading to longer recovery times and higher medical costs—both of which fall on workers. For too many of those workers, the consequences of their injuries extend far beyond their time at Amazon and lead to chronic pain and disabilities.

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[25] Recording and Reporting Occupational Injuries and Illnesses, 29 C.F.R. § 1904.7; *see also* Occupational Safety and Health Admin., *OSHA Injury and Illness Recordkeeping and Reporting Requirements*, U.S. DEP'T LABOR, https://www.osha.gov/recordkeeping (last visited June 16, 2023).
[26] Tonya Riley, *She Injured Herself Working at Amazon. Then the Real Nightmare Began*, MOTHER JONES (Mar. 19, 2019), https://www.motherjones.com/politics/2019/03/amazon-workers-compensation-amcare-clinic-warehouse.
[27] H. Claire Brown, *How Amazon's On-Site Emergency Care Endangers the Warehouse Workers it's Supposed to Protect*, THE INTERCEPT (Dec. 2, 2019), https://theintercept.com/2019/12/02/amazon-warehouse-workers-safety-cyber-monday.
[28] *Id*.
[29] Will Evans, *Leaked documents show how Amazon misled the public about warehouse safety issues,* PBS NEWSHOUR (Oct. 13, 2020), https://www.pbs.org/newshour/show/leaked-documents-show-how-amazon-misled-the-public-about-warehouse-safety-issues.
[30] Brown, *supra* note 27.

In one story shared with my staff, Amazon steered a worker experiencing severe back pain to a doctor who told her that her back was fine and that she should return to work. When she got a second opinion from a doctor not affiliated with the company, she learned that three discs in her back were injured and that she needed immediate treatment. She had to fight Amazon for months to receive this treatment, worsening her injury and leaving her with long-term pain.

Amazon has also systematically underreported injuries at its facilities and encouraged those providing medical care to do the same.[31] AMCARE staff have said that the company has pressured them "to underreport or misclassify injuries," [32] and outside medical providers who have treated Amazon's workers have described being similarly "pressured to keep Amazon's injuries off the books."[33] Although OSHA has repeatedly cited Amazon for underreporting injuries, the company has dismissed these citations.[34]

Amazon also intentionally delays or fails to process required paperwork for worker's compensation, return-to-work, and reasonable accommodation requests, further ensuring the company avoids responsibility for workplace injuries and leaving workers to shoulder the burdens. Patrick O'Rourke, the picker in Maryland, tried to return to work after he recovered from his ankle injuries. But Amazon delayed his return-to-work paperwork for months, repeatedly sending the same forms back to his doctor and refusing to respond to Mr. O'Rourke's inquiries. Left without an income, Mr. O'Rourke was forced to apply for another job. In his words, "Amazon's unsafe pace of work means we push our bodies to their breaking point, and when we do get hurt, we get little support or care from our employer. Instead, Amazon puts up a million hurdles for workers trying to return to work, and seems to want nothing to do with workers that have, or are requesting, workplace accommodations."[35]

Amazon must stop pushing workers past their limits and discarding them when they are no longer useful. In its endless pursuit of profits, Amazon sacrifices workers' bodies under the constant pressure of a surveillance system that enforces impossible rates. When faced with worker injuries, Amazon provides minimal medical care while hiding those injuries from regulators and workers' compensation programs. This system forces workers to endure immeasurable long-term pain and disabilities while Amazon makes incredible profits from their labor. That cannot be allowed to continue.

As the Chairman of the Senate Committee on Health, Education, Labor, and Pensions, I am conducting an investigation into the egregious health and safety violations at Amazon. As part of that investigation, I request the following information by July 5, 2023:

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[31] U.S. Dep't Labor, Occupational Safety and Health Admin., Citation and Notification of Penalty to Amazon.com Services LLC – ALB1 Fulfillment Center, Inspection No. 1610874 at 6-9 (Dec. 15, 2022), https://www.dol.gov/sites/dolgov/files/OPA/newsreleases/2022/12/OSHA20222343.pdf; Evans, *supra* note 29.
[32] Brown, *supra* note 27.
[33] Evans, *supra* note 29.
[34] U.S. Dep't Labor, Inspection No. 1610874 (Dec. 15, 2022), *supra* note 31, at 6-9; Katherine Long, *Amazon slammed by US government for failing to record warehouse-worker injuries. The investigation is ongoing*, BUSINESS INSIDER (Dec. 16, 2022), https://www.businessinsider.com/amazon-warehouse-workers-injuries-failed-to-report-osha-2022-12.
[35] Statement on file with Senate HELP Committee Majority staff.

1. Regulators have repeatedly identified straightforward measures Amazon could take to improve worker safety in its warehouses, including fulfillment centers, sortation centers, receive centers, specialty centers, delivery stations, and any other facility serving a warehousing function (herein, collectively, "warehouses"). Please explain why Amazon's injury rates continue to be significantly higher than the warehouse industry average despite identification of those measures.

2. Amazon claims that the use of robotics in some of its facilities improves safety.[36] However, data shows that the injury rates at the company's robotic facilities are 28 percent higher than at its non-robotic facilities.[37] Please explain the higher injury rates at Amazon's robotic facilities.

3. An internal Amazon report from 2021 highlighted the company's high turnover rate and looming labor crisis, stating, "If we continue business as usual, Amazon will deplete the available labor supply in the US network by 2024."[38] Please provide the following:
    a. That report, and any subsequent internal or third-party studies, analyses, or reports on turnover or available labor.
    b. An explanation of how the report was created, who commissioned it and for what purpose, and a list of all individuals who received a copy or a presentation regarding its findings.

4. Please provide the following information and documents related to each of the following safety measures recommended by federal and state regulators to address hazards in Amazon's warehouses: vacuum lifts; spring-platform carts; powered cart tuggers; electric or powered pallet jacks; and height-adjustable carts, platforms, and workstations:
    a. The estimated cost of implementation in all applicable Amazon warehouses, broken down by the estimated cost per warehouse;
    b. For each applicable warehouse, the number currently in use; and
    c. All communications, including but not limited to phone call records, text or SMS messages, internal messages such as those exchanged on channel-based platforms and ephemeral messaging applications, emails, and any records, memoranda, or notes in Amazon's possession that relate to those communications (herein, collectively, "communications") and all documents, including but not limited to spreadsheets, notes, working papers, reports, studies, reviews, analyses, and presentations (herein, collectively, "documents") that include or were provided to any member of Amazon's Board of Directors, or Amazon's Chief Executive Officer, Chief Financial Officer, General Counsel, Senior Vice President of Worldwide Operations, or Vice President of Worldwide Workplace Health and Safety (herein, collectively, "executive leaders") related to the consideration or implementation of the safety measure in the last five years.

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[36] *New technologies to improve Amazon employee safety*, AMAZON.COM (June 13, 2021), https://www.aboutamazon.com/news/innovation-at-amazon/new-technologies-to-improve-amazon-employee-safety.
[37] The Strategic Organizing Center, *supra* note 16, at 8-9.
[38] Jason Del Rey, *Leaked Amazon memo warns the company is running out of people to hire*, VOX (June 17, 2022), https://www.vox.com/recode/23170900/leaked-amazon-memo-warehouses-hiring-shortage.

5. For each safety measure listed in #4 not currently in use in at least half of Amazon's warehouses, please provide a written explanation of why Amazon has chosen not to fully implement the safety measure.

6. Has Amazon ever examined, internally or through a third party, the connection between the pace of work of its warehouse workers and the prevalence or cost of injuries at its warehouses? If so, provide all communications and documents related to such an examination, including all audits, analyses, reviews, or studies, that include or were provided to executive leaders in the last five years.

7. Provide the following information and documents related to output from facilities BFI9, BHM1, and STL8 between July 12-19, 2022 and between December 16-23, 2022:
    a. All communications and documents regarding expected or actual output, including but not limited to any goals, targets, expectations, or quotas for employees, positions, departments, or warehouses;
    b. All communications and documents regarding any incentives or bonuses tied to expected or actual output;
    c. All data related to the rate, pace, takt, or speed at which employees completed tasks;
    d. All data related to employee time spent not completing tasks, including but not limited to idle time and time off task;
    e. Any automated performance analyses or flags; and
    f. Any adverse employment actions, including but not limited to warnings, reprimands, write-ups, improvement plans, changes in position or responsibilities, demotions, or terminations.

8. Provide the following information and documents regarding AMCARE for each calendar year from 2019-2023:
    a. The total number of employees or contractors who have treated workers under AMCARE, or provided any other on-site first aid or medical care to warehouse workers (herein, "on-site care");
    b. A summary table of all on-site care workers organized by credential;
    c. A summary table of the average ratio of on-site care workers to on-site care program supervisors; and
    d. All onboarding, training, instruction, and reference materials, including but not limited to any handbooks, manuals, or guides, provided to on-site care workers or to on-site care program supervisors.

9. Provide the following regarding calls to the Physician Hotline available to on-site care workers:
    a. A list of all individuals who have staffed the Physician Hotline from January 1, 2022, including their credentials and area of medical training or specialty;
    b. A summary table listing the number of calls placed to Amazon's Physician Hotline from each warehouse from January 1, 2019;

c. The percentage of calls placed to the Physician Hotline from January 1, 2019 that were answered, not answered, or reached a busy signal; and
d. For all calls placed to the Physician Hotline that were answered from January 1, 2019, the 25th, 50th, and 75th percentiles of the call lengths.

Thank you for your very prompt attention to this request.

Sincerely,

Bernard Sanders
Chair
U.S. Senate Committee on Health, Education, Labor, and Pensions

Delivered with Care

Amazon's 2022 Safety, Health, and Well-Being Report

Contents

Executive Summary

One of the most important factors behind Amazon's success is our Leadership Principles—a set of values that drives everything we do. The Leadership Principle "Strive to be Earth's Best Employer" challenges us to create "a safer, more productive, higher performing, more diverse, and more just work environment," and reinforces that nothing is more important than the safety and well-being of our teams.

Our goal is to be the safest workplace within the industries that we are typically designated: the General Warehousing and Storage and Couriers and Express Delivery Services industries. This report gives an update on our progress towards achieving this goal. While we still have work to do, you'll see that from the beginning of 2019 to the end of 2022—even with the addition of nearly 900,000 new employees—we saw our worldwide recordable incident rate improve by almost 24%, and our lost time incident rate improve by 53% (you can find more about these metrics and what they mean later in this report). These are substantial improvements and a solid foundation from which to build, and we are committed to continuing this trend.

In our last Delivered with Care report, we shared our performance for 2019 and 2020. This second edition takes our safety reporting further to share performance over four years so readers can see safety trends across Amazon operations—because the trends help explain how we inform our decision-making.

These results have come during an unusual time for most companies, including Amazon. Over the last few years, the macro environment, and the way people work within it, has been disrupted and continues to evolve. The pandemic, the war in Ukraine, and economic uncertainty affecting people across the globe have challenged business as we know it.

For Amazon, this meant—among other things—a sudden and sharp increase in customer demand during the COVID-19 pandemic, which resulted in onboarding many new people very quickly. From the very start of the pandemic, teams across Amazon took decisive action to protect our people—working closely with world health and safety experts and scientists to keep our teams safe—all while delivering an unprecedented number of essential goods to customers around the world. You can learn more about our response to the COVID-19 pandemic on our corporate website, www.aboutamazon.com.

When examining Amazon's safety performance from 2019 to 2022, we see significant improvement—a trend that continued from 2021 to 2022 where we improved our recordable incident rate by 11% and our lost time incident rate by 14%.

We believe this positive trend is the result of a long-term strategy to continuously improve. Many safety efforts that were underway prior to the pandemic—including employee engagement and addressing both physical and mental health and well-being—continue to be a solid part of our foundation. And we've continued building on them with new technologies, including artificial intelligence, robotics, sensors, wearables, and innovative engagement tools and learning methodologies.

By sharing our safety practices and progress, we're able to help clarify misconceptions while holding ourselves accountable for the work we still must do to be the best in our designated industry groups.

While the metrics we're sharing apply only to Amazon employees, the report also details initiatives, programs, and improvements that advance safety for our business partners within our fulfillment, freight, and delivery networks and help protect the communities we serve.

As we continue to engage with our employees, partners, customers, stakeholders, and the safety industry, we're inspired by the potential to further reduce incidents at our sites and on the road, as we strive to be safer every day.

Safety at a Glance

↓24%

From 2019 to 2022, we saw our recordable incident rate improve by almost 24%.

↓11%

From 2021 to 2022, we improved our recordable incident rate by 11%.

↓53%

Since 2019, we reduced the number of injuries resulting in employees needing to take time away from work by 53%.

↓14%

From 2021 to 2022, we improved our lost time incident rate by 14%.

1.5M

Our workforce has more than doubled in size since the beginning of 2019, growing to over 1.5M people globally.

1.4M

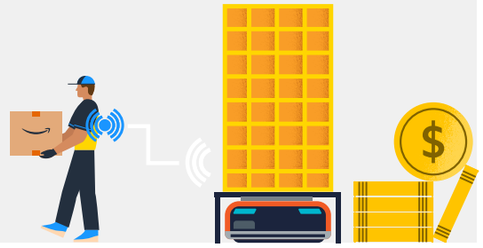
In 2022, we engaged with over 1.4M employees to understand safety sentiment and areas of improvement.

$1B

From 2019 to 2022, we invested $1 billion in safety initiatives unrelated to COVID-19.

$550M

In 2023, we are investing another $550 million in safety initiatives.



$1B

We have invested $1 billion in our trailer fleet, raising the bar on safety.

↓35%

We have reduced collision rates in our U.S. Delivery Service Partner network by 35%.

Our Operations

Across our operations, we have two distinct working environments: activities that occur in our buildings that make up our fulfillment network, and activities that occur on the road in our freight and delivery networks.

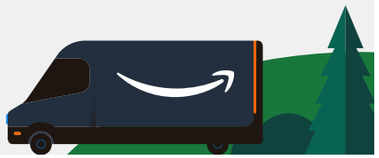
Seeing is believing. We encourage anyone interested in seeing our facilities to sign up for one of our tours, offered both virtually and in person. More than 1M people experienced our tours in 2021 and 2022.

In our Buildings

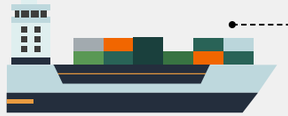
Our fulfillment network consists of fulfillment centers, delivery stations, sortation centers, Amazon-branded physical stores, and air hubs. Most people who work in our buildings are full-time, seasonal, or temporary Amazon employees, as well as contractors who help maintain our sites.

On the Road

Our transportation network is made up of an extensive freight network that transports products from suppliers to Amazon buildings, and a robust delivery network that delivers packages to our customers around the world. We have a small number of Amazon-employed freight drivers who manage movement within our yards and also travel between local sites; however, our partners account for the majority of our transportation network.



Employees and partners work collaboratively to get packages from suppliers to customers.



01. Suppliers
Small and medium-sized businesses and traditional retail suppliers ship their products to Amazon.

02. Inbound Cross Docks
Employees receive products from suppliers, combine them, and send them to fulfillment centers.

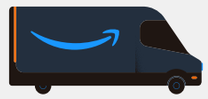
03. Fulfillment Centers
Orders are picked, packed, and shipped.

04. Truck Driver Partners
Semi-tractors and trailers move inventory and packages between our buildings.

05. Sortation Centers
Customer orders are sorted by destination and loaded onto trucks for distribution.

06. Delivery Stations
Packages are divided into shipments for drivers who deliver them to customers.

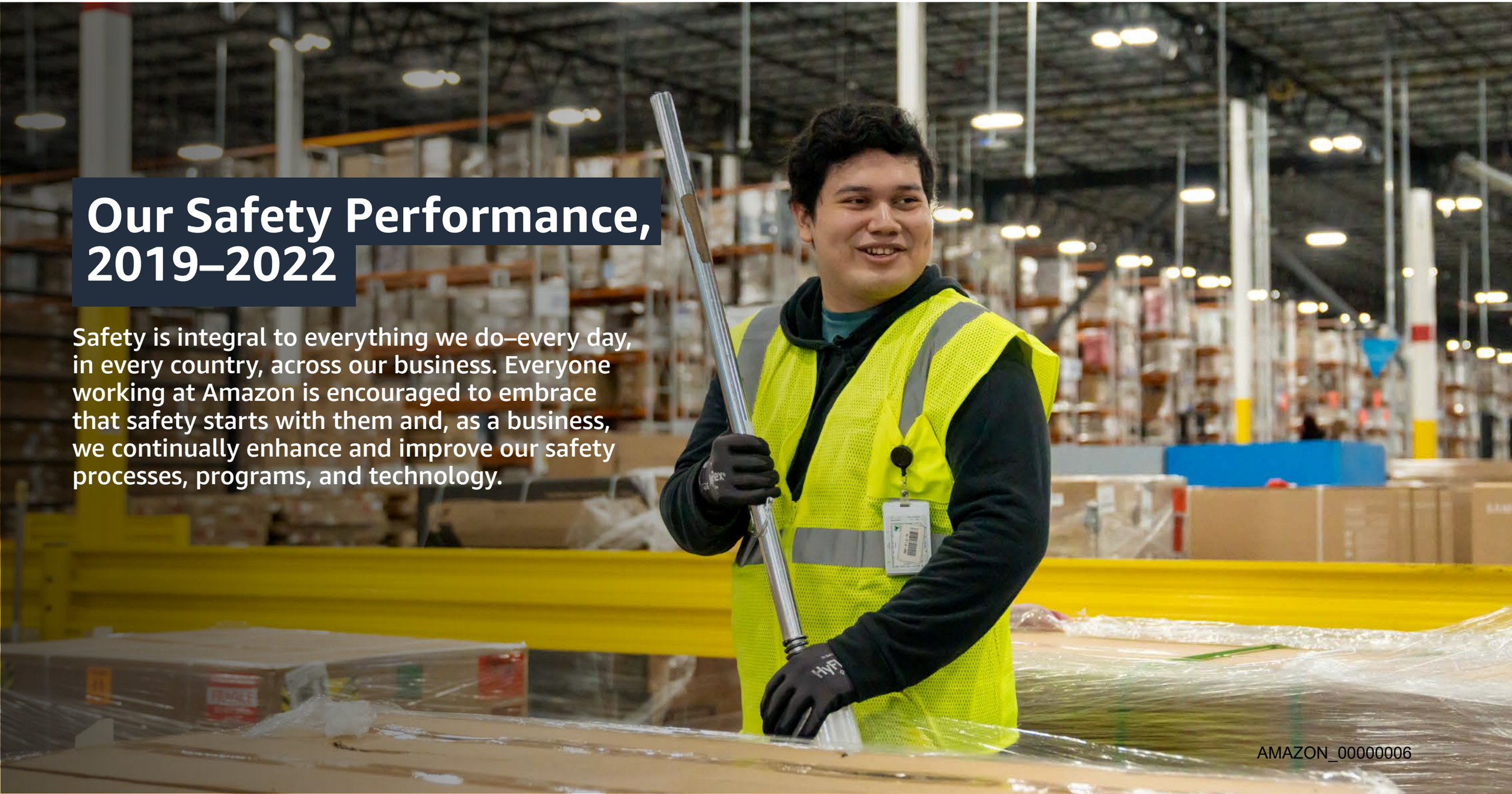
07. Delivery Network
Partners in box trucks, cargo vans, and passenger vehicles deliver packages to customers.



08. Customer
Smiles delivered.

Our Safety Performance, 2019–2022

Safety is integral to everything we do–every day, in every country, across our business. Everyone working at Amazon is encouraged to embrace that safety starts with them and, as a business, we continually enhance and improve our safety processes, programs, and technology.



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At Amazon, we obsess over data because it helps us assess the effectiveness of our efforts, identify where we can improve, and continue to innovate.

Data provides operations leaders and safety professionals with measurable, objective facts and numbers that allow us to detect and mitigate risks, solve safety problems, and guide technical decisions.

We start every meeting and shift across our operations with a discussion focused on safety—including safety tips, updates on safety performance, and recaps on safety controls for tasks being carried out on that shift. Risk mitigation is incorporated into routine business reviews, strategic planning meetings, and discussions at all levels of the company—including with our Board of Directors.

We measure progress by balancing inputs we generate from leading indicators, which are preventive measures, and lagging indicators, such as incident rates. Leading indicators at Amazon include data from inspections, assessments, and audits, as well as data from employee and leader surveys, one-to-one conversations, focus groups, and observations of actual on-site activities provided by our employees. We recognize that some lagging indicators are publicly available, and while industry group comparisons are imprecise approximations, these lagging indicators are sometimes used to provide a comparison of our performance against those in our industry groups.

Our commitment to improve is embedded in a safety management system that is aligned to the ISO 45001:2018 international standard for health and safety management—a voluntary framework that's generally considered the best in the world.[1]

A core part of our system is using a risk management approach to guide prioritization and decision-making, which includes: identifying and removing hazards; evaluating our adherence to standards through audits; and continually improving safety in our operations. We use a variety of risk mitigation measures and prioritize them according to a hierarchy of controls. Also, we invest in high-impact solutions that reduce risk and make our machines, equipment, and processes safer, while at the same time implementing a variety of preventive measures such as training, standard operating procedures, and personal protective equipment.

Our Global and U.S. Performance

Throughout the past four years, our commitment to safety remained unwavering; but the global pandemic presented operational challenges that affected most retail and transportation businesses. The combination of government-mandated policies and additional internal process changes—based on medical advice—created a unique work environment.

We accelerated the growth of new buildings in the network and hired hundreds of thousands of additional people to help us meet unforeseen demand and deliver essential products and supplies to customers quickly and safely. By bringing in new and less tenured employees, many of whom were performing job tasks for the first time, our percentage of employees who had been in their roles for less than six months increased from 39% to 51%.

Like other companies in the industry, we saw an increase in our recordable injuries between 2020 and 2021. However, when examining 2019 through 2022, we're proud to report **our global Recordable Injury Rate (RIR) improved by 24% and our global Lost Time Injury Rate (LTIR) improved by 53%. And, between 2021 and 2022, we improved our recordable incident rate by 11%, and our lost time incident rate by 14%.**

"Quickly adapting to changes is in every Amazonian's DNA. With the commitment to safety as a goal and our team working together, we are able to create one of the safest environments. Really proud of what we have achieved!"

Miguel Gómez Leal, Inbound Dock/Receive Area Manager, Murcia, Spain

[1] ISO 45001:2018 specifies requirements for an occupational health and safety management system and gives guidance for its use. It is maintained by the International Organization for Standardization (ISO), a global organization that develops and publishes international standards. As of December 2022, Amazon's reporting boundary has four sites that are ISO 45001:2018 certified. All other Amazon sites are implementing processes that are aligned to these standards.

Our Safety Performance

We've made meaningful and measurable progress over the last four years—but there's more to do.

↓11%

From 2021 to 2022, we improved our recordable incident rate by 11%.

↓14%

From 2021 to 2022, we improved our lost time incident rate by 14%.

↓24%

From 2019 to 2022, we saw our worldwide recordable incident rate improve by almost 24%.

↓53%

Since 2019, we have reduced the number of injuries resulting in employees needing time away from work by 53%.

1.5M

Since the beginning of 2019, our workforce has more than doubled in size, growing nearly 140% to 1.5M employees.

Recordable Incident Rate (RIR)

RIR denotes how often an injury or illness occurs at work—measured in injuries per 200,000 working hours—according to local occupational safety and health reporting requirements. In 2022, about 55% of all recordable injuries at Amazon were a result of work-related musculoskeletal disorders (MSDs). The majority of the remaining 45% were largely due to slips, trips, falls, and occasional objects that came loose and fell.

MSDs are the leading cause of workplace injury across transportation and warehousing industries. These injuries include strains, sprains, and lower back injuries and are sometimes caused by repetitive motion, such as lifting and lowering objects or improper posture when reaching or twisting. According to the U.S. National Safety Council, MSDs affect one-quarter of the global population and can occur at work or at home.

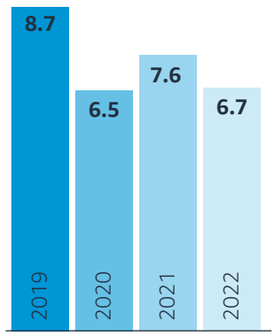
Our data indicates that MSDs are more likely to occur during an employee's first six months on the job, as many people might be performing a physical task in the workplace for the first time and are learning how to accomplish their work safely. To improve this, we are developing tools and technology specifically for new employees to help reduce risk.

Lost Time Incident Rate (LTIR)

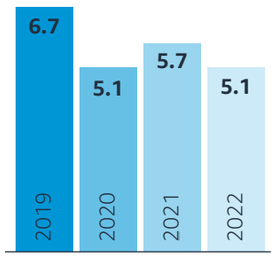
LTIR measures the number of injuries and illnesses that result in time away from work. LTIR allows us to analyze the injuries that have the most significant impact on employees. In the U.S., a Lost Time Incident (LTI) is work-related and results in one or more days away from work, excluding the date of the injury and including the days the employee was scheduled to work, weekend days, holidays, vacation days, or other days off.[2]

Since 2019, we have reduced the number of injuries resulting in employees needing to take time away from work by half. While we seek to avoid injuries and illness from occurring in the first place, providing an injured employee with a temporary work assignment that safely accommodates their injury—following their treating physician's instructions—can allow the individual to continue generating an income while they recover. One of the drivers in our reduction of time off work due to injury is Amazon's Return to Work (RTW) program. RTW facilitates safe and appropriate temporary work placements so employees can continue to work while recovering from work-related injuries or illnesses, and while managing disabilities, non-work related medical conditions, or pregnancy.

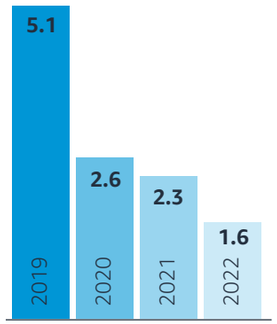
U.S. RIR:
23% improved



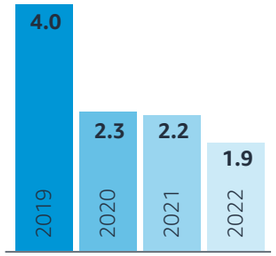
Worldwide RIR:
24% improved



U.S. LTIR:
69% improved



Worldwide LTIR:
53% improved



While we measure safety across all of Amazon, the safety performance rates reported here are based on data for our global operations—fulfillment centers, sortation centers, delivery stations, and Amazon-branded physical stores. This is where approximately two-thirds of our employees work and where we see the majority of our incidents. For the purposes of this report, we removed performance data from our corporate offices, call centers, and Amazon Web Services.

We work every day to help prevent injuries and tragedies, such as fatalities, in our workplaces. Sadly, sometimes they do occur from personal health causes, natural disasters and work-related activity. In 2022, we lost three Amazon employees in the U.S. to work-related fatalities, which is defined as an occupational injury or disease sustained or contracted during an employee's tenure with their employer. Members of the community and other members of our Amazon family—including some drivers and individuals who deliver packages for us—were also impacted by tragedy last year during fatal incidents. While we continue to provide support and counseling to any employee who may need it, our thoughts and condolences remain with the families, friends, and coworkers impacted by tragedy this year.

Following each employee fatality, we conduct thorough, internal investigations, implement corrective actions to enhance safety, and work with regulatory authorities as they conduct their own independent reviews.

[2] Outside of the U.S., lost time varies by country and we follow local laws and recordkeeping requirements.

Reporting Safety in the U.S.

Comparing injury and illness data across businesses can be done using two primary sources: the U.S. Occupational Safety and Health Administration (OSHA) publicly available data and the U.S. Bureau of Labor Statistics (BLS) industry benchmarks. At a glance, it seems logical that safety data would be the best way to compare the safety credentials of various organizations. In reality, however, it's near impossible to establish a truly accurate comparison.

Federal U.S. law requires some employers, including Amazon, to submit annual workplace injury and illness data to OSHA, which then becomes publicly available once the reporting period closes annually in March (i.e., 2022 data is available in April 2023). OSHA does not require employers to file under specific North American Industry Classification System (NAICS) codes, leaving employers to use their best judgment as to the codes under which they will report.[3] This is one reason why industry comparisons are often imprecise. Most of our operations occur within two NAICS code categories: "General Warehousing and Storage" and "Couriers and Express Delivery Services."

Discussions of injury rates often focus on the OSHA RIR, which measures how often an injury or illness occurs at a job site. The OSHA recordkeeping definitions were designed for general surveillance of illness and injury prevalence, not for measuring safety performance.[4] This is why RIR does not tell the whole story. RIR does not differentiate between a minor injury and a more serious one that should result in greater scrutiny. For example, in calculating RIR, a cut that requires stitches, a recordable event under the OSHA recordkeeping definition, is given the same weight as a serious injury, such as a fractured bone. Without more specificity, RIR contributes little understanding of which prevention strategies work and which do not work.

BLS annually reports on workplace injuries and illnesses, with the most recent data being 2021 (i.e., 2021 data was released in November 2022). Due to the nature and size of our operations, we compare ourselves against two NAICS categories: 493110 - General Warehousing and Storage for establishments with more than 1000 employees, and 492100 - Courier and Express Delivery Services for establishments between 250 and 999 employees.

Our goal is to be the best when compared to peers of similar industries, size, and nature of operations, and we will not be satisfied until we have reached that goal.

[3] North American Industry Classification System (NAICS) is a system used by the United States, Canada, and Mexico to classify and categorize businesses based on their type of economic activity. The system is designed to be used for data collection and analysis, and to help businesses identify their competitors and potential customers. The NAICS system organizes businesses into 20 sectors, with each sector further broken down into industries and sub-industries. Each industry is assigned a unique six-digit code, which can be used to identify the industry for various data-related purposes. The NAICS system is updated every five years to reflect changes in the economy and business landscape.

[4] See "Measuring Health and Safety Performance Globally: ASTM Standard E2920-14 for Recording Occupational Injuries and Illnesses," Dee Woodhull and Steve Newell, ORCHSE Strategies, Inc., paper presented at the ASSE Professional Development Conference and Exposition, Atlanta, Georgia, USA, June 2016.

Comparing RIR

According to the BLS[5], in 2021, large establishments (those with more than 1,000 employees) in the General Warehousing and Storage industry group had an average RIR of 6.7. Amazon's RIR for Warehousing and Storage in the U.S. was 7.6 in 2021 and 6.9 (a 9% reduction) in 2022.[6] Reporting to the BLS follows the similar conditions as reporting to OSHA, meaning that selecting which portions of the business reports under which NAICS code is at the discretion of the organization.

Compared to the Couriers and Express Delivery industry group (for establishments between 250 and 999 employees), Amazon achieved an RIR of 8.5 in 2021 and 7.0 in 2022 (18% reduction), against a 2021 BLS benchmark of 9.7. This industry category reflects data for Amazon employees who work in sort centers and delivery stations.[7]

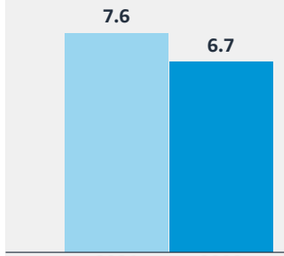
Comparing LTIR

Amazon's LTIR for the establishments that report under the General Warehousing and Storage industry group was 1.7 in 2021 and 1.1 (a 35% reduction) in 2022. Comparatively, the 2021 LTIR BLS Average for a large establishments (those with more than 1,000 employees) in the General Warehousing and Storage industry group was 2.5.

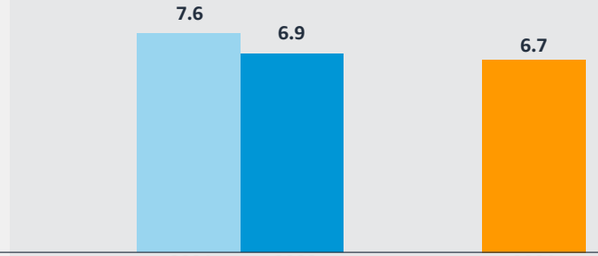
Within the Couriers and Express Delivery industry group (for establishments between 250 and 999 employees), Amazon achieved an LTIR of 4.7 in 2021 and 3.6 in 2022 (23% reduction), against a 2021 BLS benchmark of 4.1.

BLS annually reports on workplace injuries and illnesses, with the most recent data being 2021 (i.e., 2022 data will be released in November 2023).

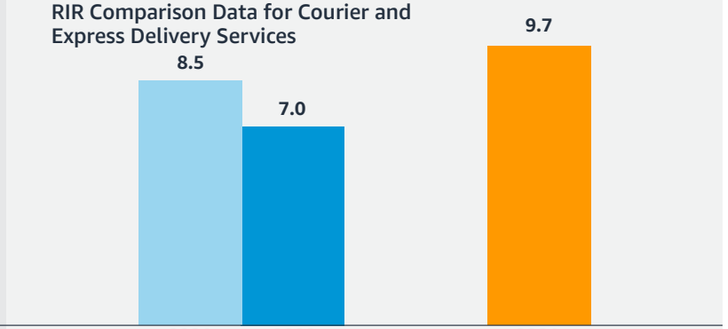
RIR All Amazon U.S. Operations



RIR Comparison Data for General Warehousing and Storage

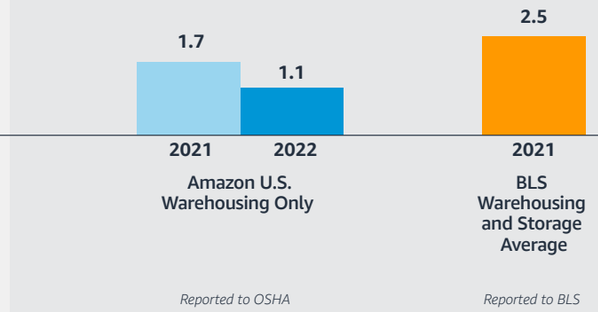


RIR Comparison Data for Courier and Express Delivery Services

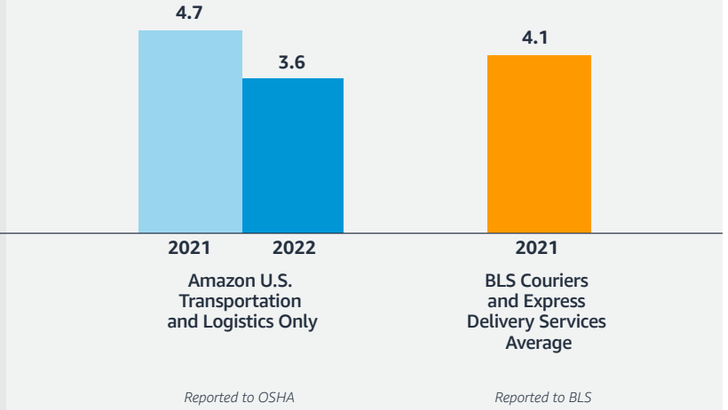


LTIR All Amazon U.S. Operations

LTIR Comparison Data for General Warehousing and Storage



LTIR Comparison Data for Courier and Express Delivery Services



Industry-wide and other inter-business safety metric comparisons are inherently imprecise given the many and various differences across businesses even within the same industry or sector. We understand, however, that such comparisons are one way that we and the public might assess our safety performance.

[5] https://www.bls.gov/iif/nonfatal-injuries-and-illnesses-tables.htm#summary

[6] We reported into Warehousing and Storage (NAICS code 493110) for all U.S. operations until 2021, but we are providing the Courier and Express Delivery data for these now-covered operations for 2017-2020 for benchmarking purposes.

[7] Data excludes contractors and external Delivery Service Providers (DSP) as Amazon does not submit data for them to OSHA or BLS.

Leading Indicators

Leading indicators are proactive metrics used as early predictors of safety performance. They help safety professionals and operations leaders identify potential risks that may cause incidents or injuries before they occur. By examining leading indicators and addressing hazards proactively, we are able to create a safer environment for our employees, partners, and communities.

Inspections and Audits

We perform audits and inspections to assure that effective resources and protocols are in place for identifying, eliminating, or controlling safety hazards.

Inspections

During inspections, we check that our safety measures and controls are working to reduce or mitigate potential risk, as designed. This includes checks of critical safety controls focusing on high-risk operations such as contractor maintenance works, machinery use, maintenance and repair, dock and yard safety, and powered industrial truck operations. In 2022, we conducted more than 5.5 million inspections globally, an increase from 2.5 million conducted in 2020.

Audits

Auditing verifies our compliance with national and international regulations and standards in over 150 jurisdictions globally. We audit in the areas of occupational health, safety management, and facility and technical safety. Audit findings are tracked to completion using our management system and used to identify root causes, improve compliance, and update our internal standards and procedures.

Safety Leadership Index

Getting unvarnished feedback about safety from both our employees and our front-line managerial leaders at our sites around the world is crucial to continuous improvement. We invented the Safety Leadership Index (SLI) in 2018 to measure employee and leader perceptions of safety and maintain a pulse on the people who know our safety efforts the best.

SLI enables Amazon to get ahead of safety risks by soliciting information from employees through a monthly rotation of questions that pop up on employees' scanners and computers when they log in for work. Feedback is anonymous, confidential, and intended to drive improvement. Employees are asked questions relating to various safety themes, including their leaders' safety commitment, awareness, structures, involvement, and accountability. These responses provide our leadership with a deeper understanding of safety sentiment, safety issues, and suggested potential solutions so managers can be better prepared to identify risks and take proactive steps towards a safer work environment.

In 2022, through SLI, we engaged over 1.4 million operations employees across more than 3,300 sites in 34 countries. Globally, 86% of employees said they felt they worked in a safe workplace. In 2023, we are expanding SLI by introducing two new components that target increasing employee knowledge retention about how to stay safe, and assessing leader accountability.

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5.5M

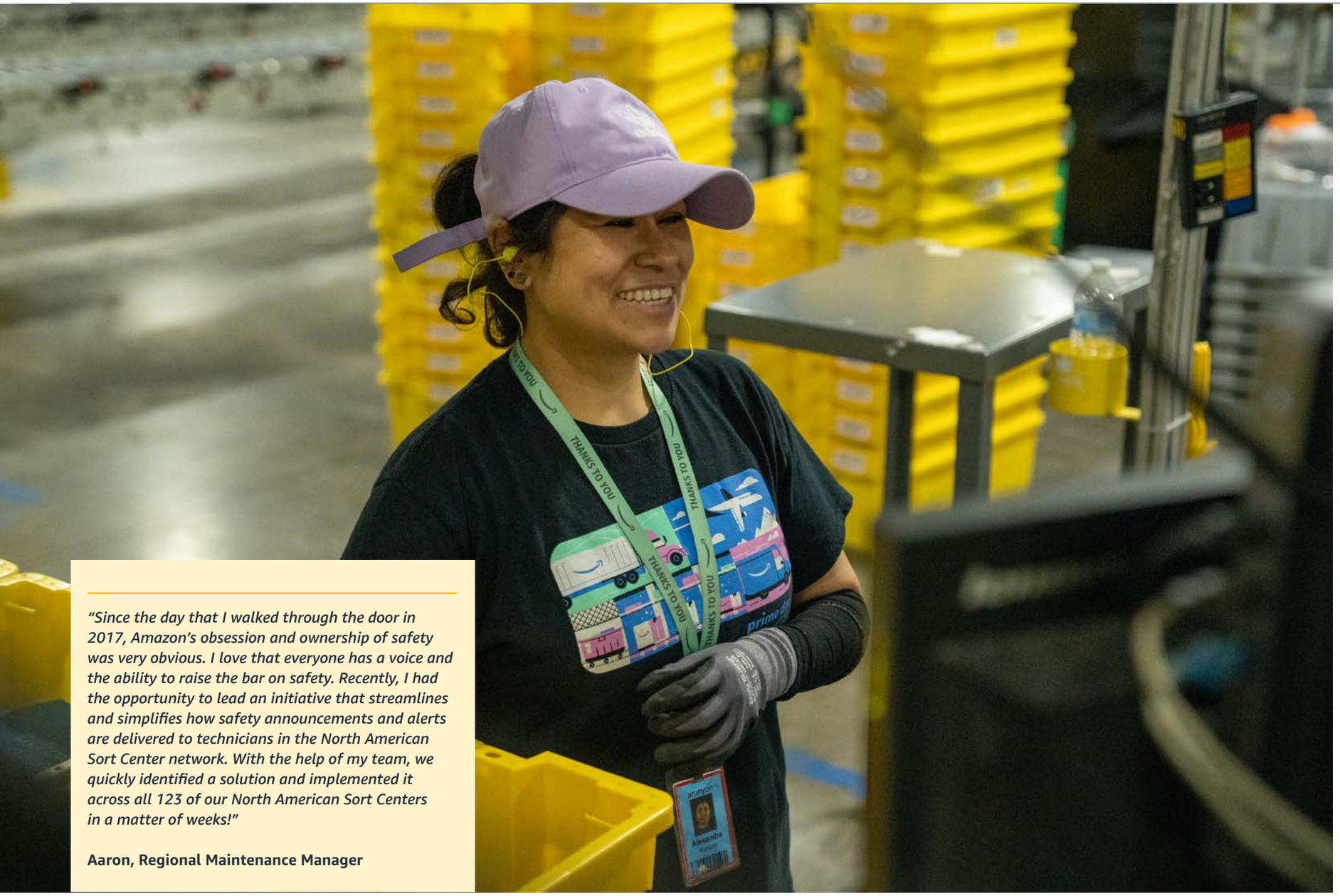
In 2022, we conducted almost 5.5 million inspections globally.

440

In 2022, we completed site assessments at over 440 sites across Amazon.

"Auditing has helped make our safety culture stronger by improving our safety program and policies, improving our root cause analysis investigation process, creating a stronger, more robust job hazard analysis process, and creating a stronger communication process that benefits both Crown and Amazon."

Keith, Health and Safety Manager, Crown (powered industrial truck manufacturer)



"Since the day that I walked through the door in 2017, Amazon's obsession and ownership of safety was very obvious. I love that everyone has a voice and the ability to raise the bar on safety. Recently, I had the opportunity to lead an initiative that streamlines and simplifies how safety announcements and alerts are delivered to technicians in the North American Sort Center network. With the help of my team, we quickly identified a solution and implemented it across all 123 of our North American Sort Centers in a matter of weeks!"

Aaron, Regional Maintenance Manager

Employee Safety Observations

In 2022, we improved our employee-led safety observation program to make it easier for employees to report safety suggestions and concerns. This proactive approach gives us another leading indicator to track.

We are educating and enabling employees to rectify and report safety issues specific to their work area. We are encouraged that our employees feel empowered to respond to minor items so they can be fixed more quickly. By actively looking for potential hazards, our employees become more aware of safety and feel engaged and empowered to speak up about safety concerns. Our managers have told us that the observation program has facilitated timely and meaningful safety conversations with employees, leading to increased leadership engagement. We are encouraged by the preliminary results we are seeing and the potential reduction to lagging indicators as a result of this program.

10,000

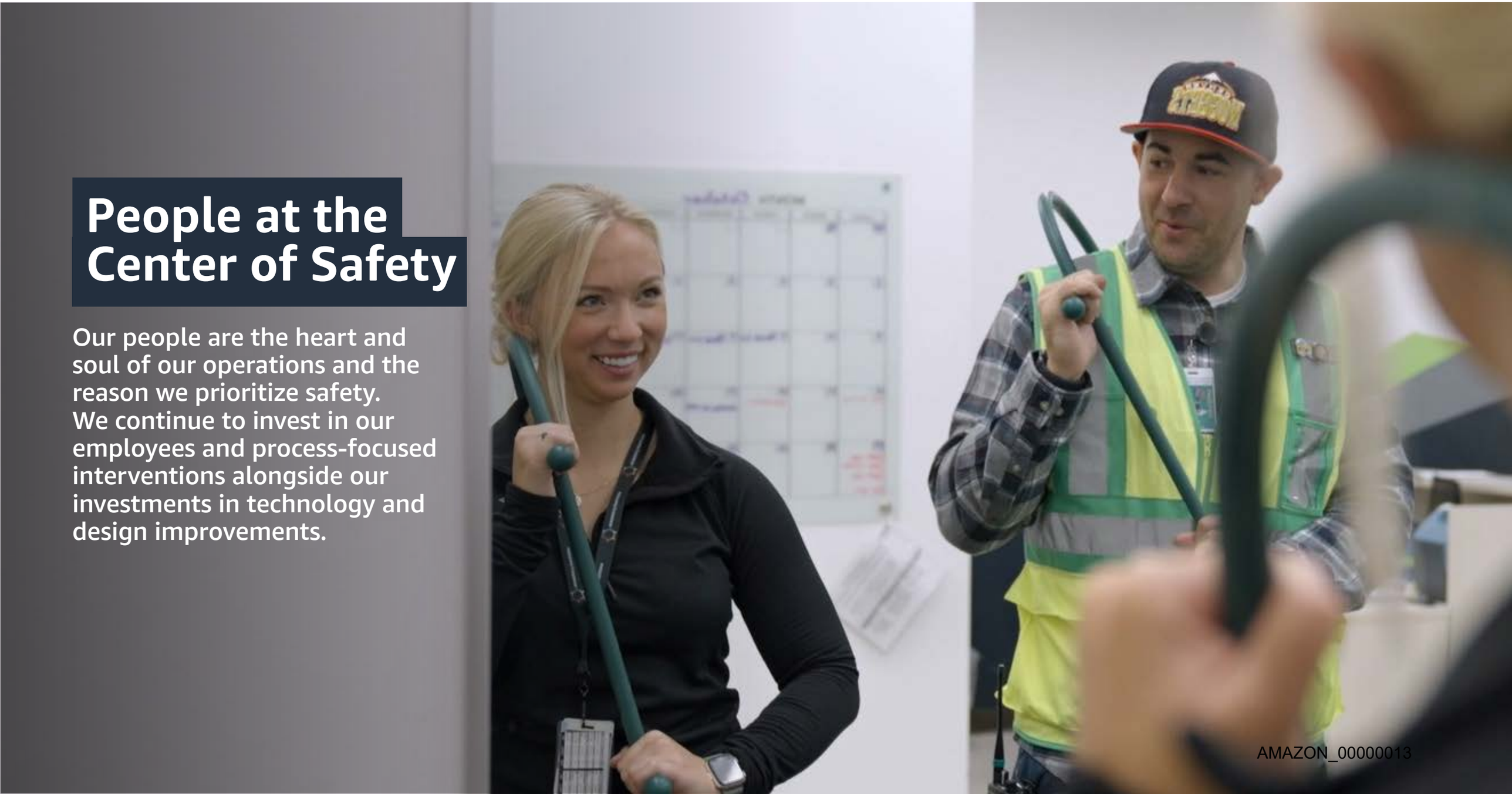
In 2022, nearly 200,000 Amazon employees participated in over 10,000 safety meetings held at Amazon sites.

25,000

In 2022, Associate Safety Committees at Amazon developed nearly 25,000 actions to increase safety at their sites.

People at the Center of Safety

Our people are the heart and soul of our operations and the reason we prioritize safety. We continue to invest in our employees and process-focused interventions alongside our investments in technology and design improvements.



Mental Health

We are committed to providing resources and support for employee mental health. We have an established team of mental health experts, including clinicians and public health experts, who lead our global strategy and programs. Having a dedicated team means that Amazon can move quickly to provide our employees with world-class programs that are closely vetted and customized to align to industry and clinical best practices.

Comprehensive Support Services

Amazon offers a range of mental health support services, including the Employee Assistance Program (EAP), health plan benefits for mental health and substance use conditions, and mental health awareness training for managers and employees. In 2022, mental health awareness training was delivered to tens of thousands of managers to provide guidance on what to do if mental health concerns arise at work. We expanded and enhanced our global EAP in 2022 to offer Amazon employees and their families additional mental health resources, including guided programs, mental health coaching, and free counseling sessions—both in person and virtually.

Self-Guided Mental Health

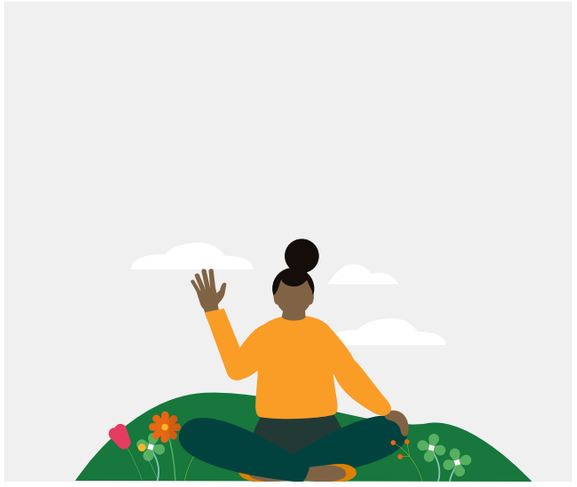
Employees can also find supplemental mental health tools at any time through a new partnership with Twill—a self-guided mental health app. Twill provides mood tracking, science-backed games aimed at reducing stress, and activities designed to help employees and their family members work through negative thoughts, build confidence, and manage anxiety.

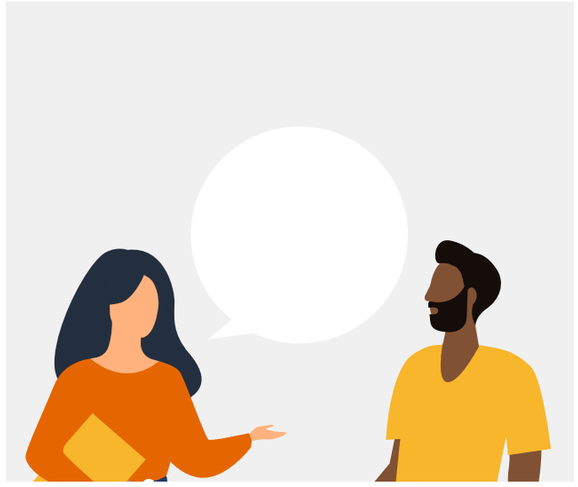
Suicide Prevention

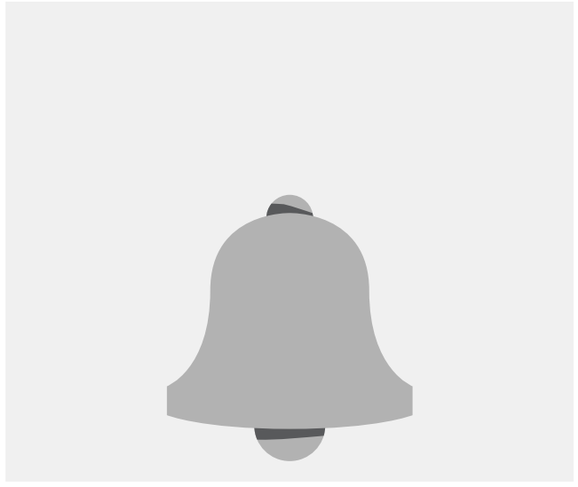
Employees have 24/7 access to industry-leading suicide prevention best practices, including evidence-based screening and risk assessment, detailed safety planning, referral for follow-up treatment, and caring contacts. These practices align with recommendations from the U.S. National Action Alliance for Suicide Prevention.

Platinum Bell Seal

In October 2022, in recognition of our commitment to promoting mental health support, Amazon was awarded the Platinum Bell Seal for 2023 by Mental Health America (MHA). This award is granted to employers who provide access to mental health resources, promote a culture of wellness, and implement policies and practices that support the mental health of employees. The Platinum Bell Seal is the highest level of recognition offered by MHA.







Body Mechanics Training and Conditioning

WorkingWell is an Amazon-created training and conditioning initiative that empowers employees to achieve their best physical health and well-being. In addition to ongoing body mechanics training, WorkingWell includes a two-week, in-person course centered around educating and guiding our employees on how to work safely through proper body movements, health, and wellness. To support our new hires, we also offer a graduated integration onboarding schedule to help them smoothly adjust to our working environment and prevent MSDs.

We also developed a safety product called Mind & Body Moments. These are short, informal, guided physical and mental wellness exercises offered to employees during a shift to help reduce muscle fatigue and stress, and to avoid injuries. Research shows that pauses and exercises that occur earlier in the work shift lead to gains in employees' energy and concentration, and are associated with reduced mental fatigue and increased job satisfaction.

"The health and safety of workers is Amazon's top priority. By investing in new technologies, Amazon shows commitment to safety within the business. I feel fortunate to be in an organization that commits so much time, effort, and investment into new ideas to improve the safety of all Amazonians."

Dave Edwards, WHS Specialist, Belfast, Ireland

Learning and Development

A key part of striving to be Earth's best employer is creating learner-centered safety training that empowers our employees and leaders to take ownership of safety, succeed and grow in their roles, and understand how to stay safe on the job.

Learn more about how we support our employees with education to advance their careers.

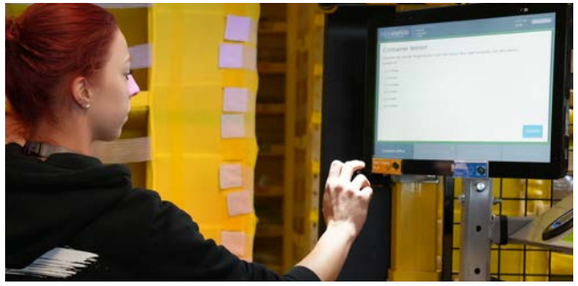
"What I enjoyed most about my training experience is the knowledge I received. My trainer excelled at properly preparing me for the road as well as any situation that may occur while driving over the road through my trainer's experiences. Active listening and applying what my trainer taught me is what helped me pass my training."

Marcelino Ortiz, Jr., Transportation Associate, New York, USA

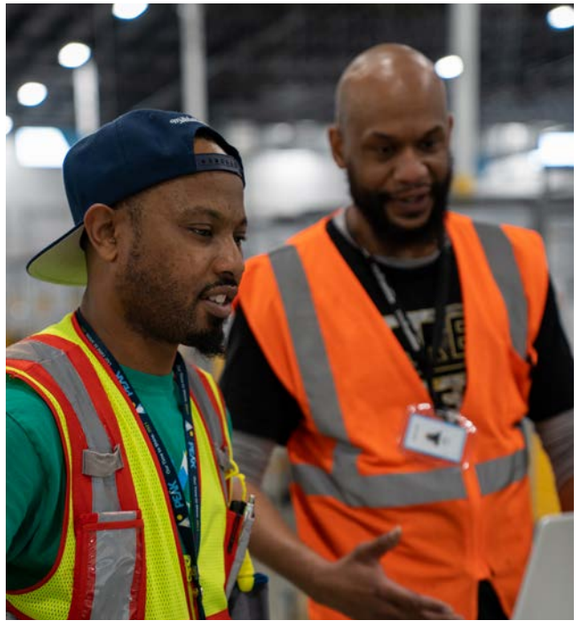
Engaging and Empowering Employees

In 2022, we reinvigorated the employee learning experience to focus on scenario-based learning that fosters higher engagement and promotes practical skills. This approach provides a safe and supportive environment for employees to practice their knowledge and abilities, helping to solidify their competencies. Employees are provided with critical safety information on their first day of employment, followed by job and process path-specific training throughout the next few months. We cover a broad range of topics including incident reporting, seeking first aid treatment, avoiding hazardous equipment, and proper personal protective equipment use.

Also in 2022, we enhanced our worldwide Emergency Response Preparedness (ERP) training program with realistic emergency scenarios. The training has been further strengthened with an on-site tour that highlights visible cues throughout the facility, providing clear guidance in case of a shelter or evacuation event.



In 2023, our employee annual safety refresher—Compliance Awareness Safety Training (CAST)—is being distributed in multiple smaller-scale training sessions to enhance the learner experience and increase knowledge retention. CAST is a refresher on potential workplace hazards, how to avoid them, what to do if they are encountered, and how to seek help if a safety incident occurs.



Operational Leaders

As a crucial component of our leader onboarding initiatives, safety is among the top three pillars covered for all levels of leadership, from recent university graduates to experienced general managers.

In 2023, we are placing a strong emphasis on advancing and fostering the growth of our operational leaders by strengthening their safety leadership skills. To achieve this, we redesigned our Safety Operations Annual Refresher (SOAR) program using realistic, scenario-based training to evaluate and enhance safety leadership competencies on an annual basis. Through SOAR, our leaders learn about having safety-centered conversations, how to engage employees in finding the best solution to common safety challenges, and which experts to engage when faced with equipment needing repair or visits from regulatory agencies.

Driver Training

Although most drivers are not Amazon employees, we are committed to investing in training to continually enhance their safety performance. In 2022, we increased the amount of training time given to each driver and introduced additional hands-on and interactive training. We enhanced our practical behind-the-wheel training, improved training for severe weather, and shifted the curriculum towards a more facilitator-led model to increase classroom interaction.

Our driver training program provides a more interactive onboarding experience that incorporates in-classroom training as well as hands-on, real-life delivery scenarios and practical vehicle maneuvers. We also invested in our first centralized driver training facility, the Last Mile Driver Academy and incorporated virtual reality to simulate conditions that better reflect the real-world scenarios drivers face. A fully simulated neighborhood prepares drivers to better handle safety situations ranging from pet engagement and driving in wet weather to slip and trip hazards.

In our freight network, we also expanded the commercial driver simulator program. The simulators provide drivers with advanced simulations for adverse conditions (ice, snow, heavy rain, wind, mechanical and tire failures) and common transport events on public roadways.

Learn more about the support we provide our drivers to pay for education, build better businesses, and save for the future.

Buildings, Vehicles, and Technology

We continue to invest in capital improvements, new safety technology, vehicle safety controls, and engineered ergonomic solutions that aim to reduce and eliminate risks for our employees, partners, and communities.

Investing in Safety

As we continue our investment in safety-related projects across Amazon, this funding will be divided among our global fulfillment, freight, and delivery networks.

$550 million

In 2023, we will invest over $550 million in safety-related projects and initiatives across Amazon.

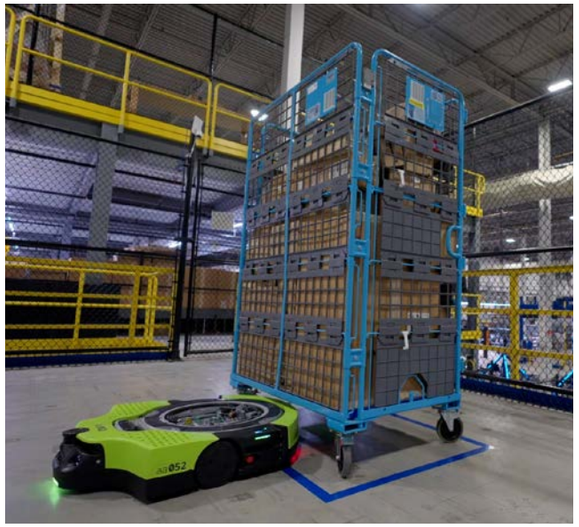
AMAZON_00000018

In Our Buildings

In our buildings, employees pick, pack, and ship customer orders for everything from books, toys, and housewares to gardening equipment, TVs, and groceries. With items of all shapes, weights, and sizes, we continue to find ways that improve our operations and process paths to create safer and more productive ways to work.

Amazon's Global Robotics is innovating in computer vision, robotic manipulation, pack automation, autonomous mobility, and product identification to provide safer and more ergonomic workstations and equipment to employees.

With the help of robotic technology, we are exploring new and enhanced safety advancements that simplify everyday tasks for our employees. These robots reduce the need for employees to reach, bend, or climb when storing and retrieving inventory items. They also reduce the need for employees to push heavy carts or trolleys between areas in our buildings. Our goal is to automate container handling and allow employees to focus on other tasks. For example, in some of our fulfillment centers, we are deploying a robot equipped with advanced safety, perception, and navigation technology. This robot autonomously lifts and transports carts of packages, operating in a way that allows for safe interaction with employees. The robot emits a light beam and stops if someone steps in front of it.



Package handling powered by artificial intelligence.

Another way we are reducing the risk of injury is through a robotic arm that automates package handling. In locations where this is possible, the arm uses artificial intelligence and computer vision to sort packages by reading their labels and placing them in the correct cart, thus reducing the need for employees to lift heavy packages or maneuver heavy carts. We are currently testing a prototype that's able to lift boxes up to 50 pounds and, where feasible, expect to continue deploying this technology to robotic fulfillment centers.

Reducing the need for repetitive motion.

For some of our fulfillment centers, we also developed a robotic containerized storage system that reduces the need for employees to bend, climb, or reach for inventory items. When a customer orders an item, the system locates the container with the needed product and either grabs the item from the container autonomously or presents the container directly to the employee in an ergonomically friendly position. In tandem, we developed a system that helps handle individual products in our inventory by detecting and selecting them. Working with the containerized storage system, it minimizes the need for repetitive motion by automating frequently occurring tasks.

Smart job rotation to minimize stress.

Another ergonomic risk reduction initiative is our automated job rotation program. Rotation to different tasks and positions minimizes fatigue and ergonomic stress, helping reduce the potential for MSDs in the workplace. In select buildings where the program has been deemed feasible and deployed, the job rotation program matches employees with complementary jobs to reduce repetitive motion by using opposite muscle groups. We continue to evaluate process paths that can be added to the job rotation program.

Learn more about how robotics are improving our safety and efficiency.

750,000

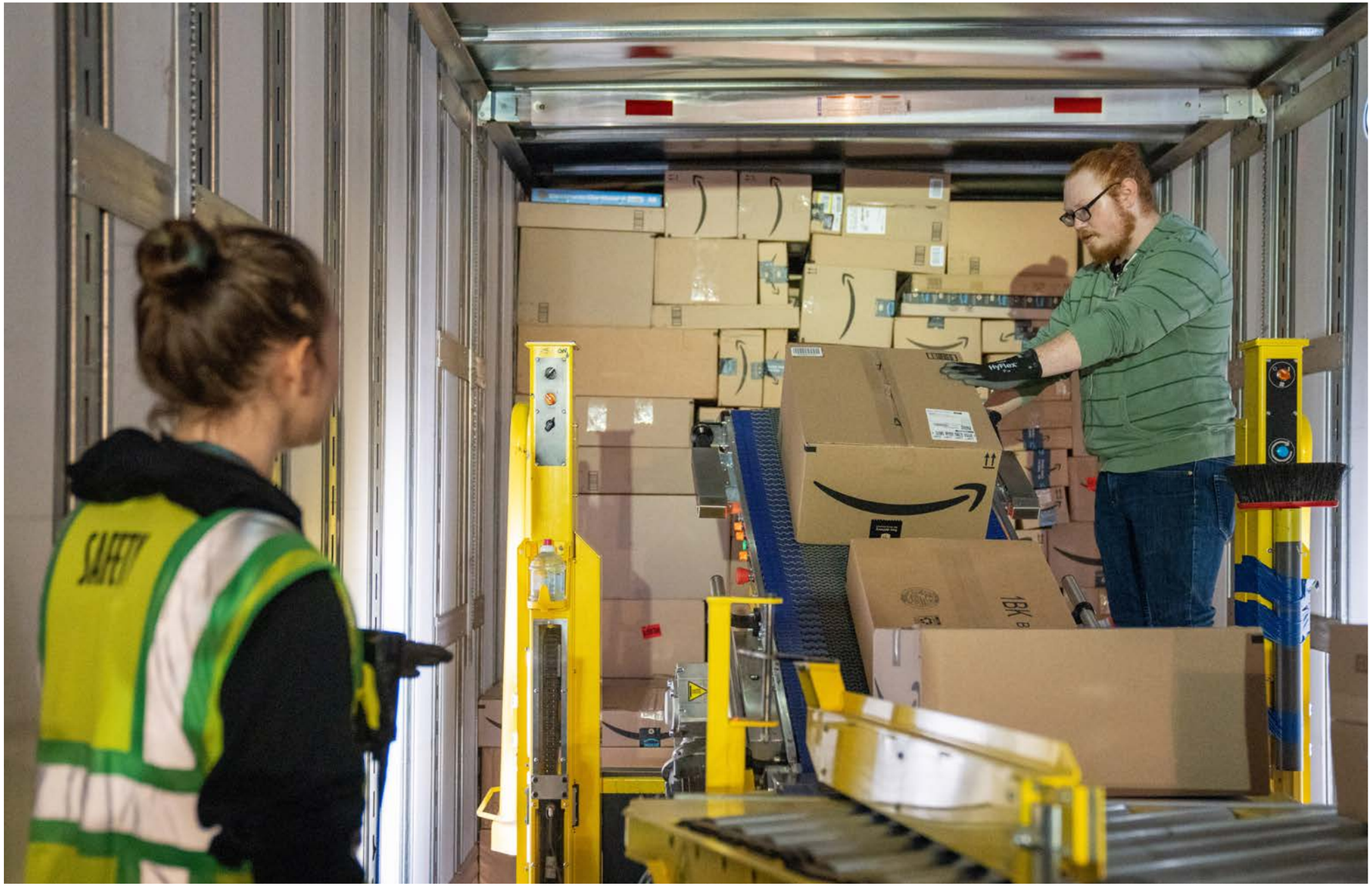
We deployed over 750,000 mobile robots and added hundreds of thousands of jobs since 2012.

Beyond robots, our professional ergonomists, safety professionals, and engineers work every day to reimagine and redesign our work environments, stations, and tools.

We are investing in technology at pack stations that reduces risks associated with lifting and twisting as employees prepare products for shipment. We are finalizing conveyance and equipment that will bring ready-to-ship products in containers directly to the employee. In select buildings, this will eliminate the need for an employee to lift the container, rotate, and physically move it to the pack station.

We are committing $100 million in 2023 to improve universal fork truck safety.

Across our network, many of our employees use fork trucks to move pallets and other large items across our racking system. We are working to eliminate or reduce risks with a goal of zero serious incidents involving fork trucks. Partnering with manufacturers, we developed and deployed collision avoidance technology
which uses light detection and ranging, and a real-time locating system, to sense and avoid collisions. We're continuing to implement this collision avoidance technology across select sites and exploring additional ways to reduce potential risk due to powered industrial vehicles.



On the Road

Our transportation operations blend Amazon's advanced technology and safety initiatives to transport packages across our network of fulfillment centers, sortation centers, and delivery stations—and to our customers.

For the most part, drivers operating within our freight and delivery networks are small business owners, traditional freight and delivery companies, and individuals delivering packages according to their flexibility and availability. Although most of our freight and delivery partners are not Amazon employees, we are committed to investing in technology, training, and communication mechanisms that continually enhance their safety performance.

We have invested more than $1 billion to create a best-in-class fleet. We will continue to build on our trailer and truck fleet with commitments to supporting safety, sustainability, and automation, which includes implementing trailer sensors, digital side camera mirror technology to reduce blind spots, lane-keeping assist, front collision warning (including automatic emergency braking), stability control, side-object detection, adaptive cruise control, and speed limiters.

While our trucks and vans are essential in getting packages to customers, our priorities are the safety of our partners, the safety of the communities where we deliver, and having a sustainable operation. A challenge as complex as roadway safety requires strong partnership across the public and private sectors.

Amazon is partnering with the U.S. Department of Transportation (USDOT) to improve roadway safety. Our commitments include developing new mapping and routing technology for delivery network vehicles that address common roadway issues, such as construction and accurate lane navigation, as well as potentially unsafe maneuvers like U-turns. We are implementing this technology in 2023 to enhance the on-road experience and eliminate navigational challenges. In addition, we are continuing to invest in other safety measures, such as driver training programs, to make deliveries safer and more seamless for customers.

$1B

We invested $1 billion in our trailer fleet, raising the bar on safety features such as sensors, blind spot detection, and speed limiters.

Freight Network

Amazon's freight network guides the flow of goods from selling partners into our fulfillment network, and then to facilities including sortation centers, delivery stations, and third-party facilities. To make all of this work, we use a variety of partners, vehicle types, and technology.

Amazon works with nearly 60,000 registered motor carriers across the U.S., providing growth opportunities to small businesses. For small carriers looking to expand but needing support and guidance along the way, we offer the Amazon Freight Partner program (AFP). With AFP, small business owners can grow their trucking companies by utilizing Amazon-branded trucks and trailers with the latest safety technology.

Since 2015, we have actively invested in advanced technologies in our freight network. Safety optimizations include automated route planning navigational systems, real-time tracking solutions, and trailer sensors that allow us to better monitor our fleets for safety and efficiency.

Our freight operations use cutting-edge technology to keep drivers safe.

At the core of Amazon's freight network is Relay, a transportation management system that connects carriers and drivers to Amazon's services and technology. This technology is designed to help drivers perform their work safely, with features such as alerts for speeding and inclement weather. Relay also provides intelligent automation for authenticating and checking drivers in, providing access to documentation, and keeping them updated on the status of a load. Additionally, location-based proximity alerts keep drivers aware of nearby hazards, disruptions, and restrictions such as low-clearance bridges in the U.S.

"As an AFP partner, Amazon is just so innovative. There's always something new to try to be better, safer, more productive, more efficient. It's things that we would never think about that we didn't even know was possible that help us do what we do, better, and to bring a better experience to our customers."

Jarvaris Anderson, Unity Transport Service. SCAC: UYTS

Advanced safety technology for network fleet.

Amazon's freight network fleet includes advanced safety technology such as front-collision warning (including automatic emergency braking), stability control, side-object detection, adaptive cruise control, and speed limiters. We are also investigating the feasibility of digital mirror systems. These investments aim to mitigate driver errors, such as attentiveness, decision-making, and performance variables, which—according to the Federal Motor Carrier Safety Administration's (FMCSA) large truck crash studies—can lead to safety incidents.

Video technology helps reduce unsafe behaviors.

In 2022, we grew our AFP program to service roughly half of our day trips—each equipped with video camera safety technology. This alerts drivers of potentially unsafe behaviors, like following too closely or distracted driving, thereby encouraging safer operations over the road. We are promoting this through an incentive program where drivers and carriers who demonstrate safe practices on the road can earn additional financial incentives.

Delivery Network

Our delivery network completes the final leg of a package's journey from one of our facilities to the customer's doorstep. Amazon uses a variety of methods to handle delivery, including third-party carriers through programs like Amazon Flex and Amazon Delivery Service Partners (DSPs).

Our delivery network is powered by thousands of small businesses and hundreds of thousands of drivers who leverage Amazon's technology to improve on-road safety every day.

Our DSP program empowers entrepreneurs to build small businesses delivering Amazon packages while our Amazon Flex program provides opportunities for individuals to work as independent contractors, delivering packages for Amazon using their own vehicles.

Real-time safety alerts for drivers.

DSPs regularly inspect and maintain vehicles according to industry standards and use advanced tracking technologies to monitor the performance of delivery vehicles in real time, allowing any potential issues to be addressed quickly.

In the U.S. Amazon-branded fleet, we use a progressive set of alerts and notifications to reinforce safe driving behaviors. These vans are equipped with third-party technology that measures and monitors speeding, stop sign and light violations, distracted driving, following distance, and seatbelt compliance. If a threshold is reached, drivers receive a notification as soon as they stop their vehicle for their next delivery. Related notifications are also sent to their DSP manager who is encouraged to coach the driver to develop safe driving habits. Implementing these alerts and notifications has resulted in a 35% reduction in collision rates by our U.S. network drivers, along with an 89% reduction in distracted driving occurrences, 81% reduction in following distance events, 92% reduction in sign/signal violation events, 83% reduction in speeding events, and 95% reduction in seatbelt-off events.

↓35%

Implementing alerts and notifications has resulted in a 35% reduction in collision rates by drivers in the U.S. DSP network.

89% ↓

Reduction in distracted driving occurrences.

83% ↓

Reduction in speeding events.

92% ↓

Reduction in sign/signal violation events.

95% ↓

Reduction in seatbelt-off events.

| **Learn more** about how our delivery network is fighting global hunger.

In 2022, we launched our electric delivery vehicles (EDV) produced by Rivian and scaled the fleet to more than 3,000 vehicles in support of The Climate Pledge, our commitment to reach net zero carbon by 2040.

The vehicle is equipped with more than 12 advanced driver assistance systems, including blind spot warning, rear cross traffic alert, manual park assist, and other alert-based features. The EDVs are also equipped with assist features, such as lane keep assist to gently nudge the driver back in lane, adaptive cruise control to maintain safe cruising distance from vehicles on the road, and automatic emergency braking to mitigate or prevent collisions with road users, vehicles, and other types of objects on the road.

In addition to these advanced driver assistance features, we've also equipped the EDVs with a surround view system to provide a top, "birds-eye" view and rear camera view which are projected over a large centered driver display.

| **Learn more** about our EDVs by taking an online tour.

"We have 40 beautiful, modern, safe, sustainable vehicles to help us with our goal of keeping our customers happy. Our drivers are very happy driving comfortable vans with heated and cooled seats and steering wheels. We are now safer, cleaner, and environmentally friendly!"

Eugene Krel, Operations Manager, New Jersey, USA

Amazon Air

Amazon Air (AIR) helps deliver packages through its dedicated air cargo networks in the U.S., Canada, Europe, and India. We have nine AIR-operated air hubs across the U.S. and EU, as well as a network of over 50 third-party managed gateways. We have made significant investments in these facilities to ensure safety throughout our network.

"As a member of the WHS team, I always want to do my part to ensure that our employees are working at a safe workplace. I appreciate Amazon's commitment to implement various forms of technology when it comes to safety."

Berill Csanadi, WHS Program Manager, Cambridge, UK

Amazon Air has established industry-leading safety standards across our network

Air cargo tractors are designed to automatically reduce their maximum speed of 10 miles per hour on the airport ramp to five miles per hour when they enter the cargo building. To enhance safety in the more confined space inside of the facility, our team added limiters to the battery-operated tractors that are activated by a beacon at the building doors which automatically reduces their speed upon entering.

We have implemented a vehicle access control system for all powered ground support equipment (GSE). This safeguard requires operators to swipe their employee badge to validate their training and qualifications prior to enabling the use of GSE. Our GSE is equipped with telematics software that tracks its location, speed, and other relevant vehicle inputs. We have also reduced the potential for aircraft ground damage events by training our employees with a mock Boeing 767 aircraft fuselage at select sites. This mobile B767 training platform allows new GSE operators to practice their skills and build confidence prior to working their first live aircraft operation.

Delivered with Care

We're constantly striving to be safer for our employees, partners, and communities every day, and we're proud of the progress we made over recent years. At the same time, we know there's more work to do on our journey to become the safest employer in our industries.

Our commitment to safety has never been stronger—and it will only continue to grow.

Safety

Primary Contact jannese (user) *How do I change this value?*

Last modified 8 months ago by ayushiga.

GSOC Incidents:

Under "Major events" published in the first page of WBR we collect SEV1/SEV2 incidents from Global Security Operations Center's Redshift DB.

The "Get-Report" PS script will query the DB for relevant EU incidents every week and lookup the corresponding Incident Summary from the Incident Manager. Script and query can be found here: \\ant\dept-eu\LUX5-2\Operations \eu_ops_finance_intern\Metrics\WBR\FC\Ops WBR 2.0\GSOC

> Before you run the script make sure you have a "GSOC_priv" DSN set for user gsoc_dw_priv.

Our PoC from GSOC is @chakin.

RME Incidents

Under "Major events" published in the first page of WBR we collect SEV1/SEV2 incidents from Reliability Maintenance Engineering's MSSQL DB.

RME Email Scraper:

The RME incidents are reported in the WBR by scraping through the weekly RME emails.
A Python script automatically filters the .pdf for SEV1/SEV2 incidents, producing a .txt output.
To run the script:

- Download the .pdf RME report to the main folder (\\ant\dept-eu\LUX5-2\Operations\eu_ops_finance_intern\Metrics\WBR\FC\Ops WBR 2.0\RME) and name it "RME.pdf".
- Run *RME_Report.py.*
- Open *RME_SEV1_SEV2_incidents.txt* to find the incident summaries.

Note that a *RME_all_incidents.txt* file will be also produced, including unfiltered incidents.
The Python code is fully commented to make future changes implementations easier.

DB Query alternative:

Query can be found here: \\ant\dept-eu\LUX5-2\Operations\eu_ops_finance_intern\Metrics\WBR\FC\Ops WBR 2.0\RME
The query looks for every RME TT raised which reached at least SEV2 once (maximum SEV) since the time it was open pulling event code, description, date, site, TT link as well as severity.
Column EVT_UDFCHAR01 stores the TT link ID (i.e. tt.amazon.com/[EVT_UDFCHAR01]).
Column EVT_UDFCHAR21 stores the maximum severity ever assigned to the ticket.
EVT_TYPE = 'JOB' is used to filter out engineering maintenance tasks from RME incidents.

A PowerShell script which downloads the data to a csv file is available in the same folder.

Our PoC from RME is @carrodol.

Pan-EU Incident Rate:

Pan-EU Incident Rate (PIR) - a new reactive performance measure looking at 22 specific work-related injuries that may occur on site, that are all types that would be visible, obvious, and clear to determine without the need for professional medical diagnosis. PIR excludes some high frequency, cumulative and repetitive injuries (including Musculoskeletal Disorders) that are sometimes open to abuse.

List of 22 identified common Injury Types for 'Pan-EU Incident Rate' (PIR) metric

- Amputation
- Asphyxiation/strangulation/drowning
- Avulsion (incl. finger/toe nail)
- Burn, chemical
- Burn, electrical
- Burn/scald (heat)
- Concussion
- Connective tissue injury/tear/disorder
- Death
- Degloving
- Dislocation
- Electrical Shock
- Foreign body/puncture (e.g. splinter)
- Fracture
- Hernia
- Herniated/displaced/ruptured disc
- Laceration/cut/open wound
- Loss of consciousness
- Needle stick
- Punctured eardrum
- Respiratory irritation
- Tooth chip/break

Musculo-Skeletal Disorders (MSDs):

Within the occupational setting, the definition of ergonomic MSDs (MSDs) vary between regulators and industry bodies (NIOSH, HSE-UK, CDC, EU-OSHA, US-OSHA, BLS-US) and peer reviewed scientific literature. Amazon has defined the term Musculo-Skeletal Disorders (MSDs) (previously called Soft Tissue Injury) as an injury caused by a work event or exposure which causes accumulative tissue damage and results in an MSD, such as repeated or sustained exposure of muscles, tendons, ligaments, bone and nerves to repetitive motion, force, vibration, awkward postures and contact with temperature extremes within the workplace. MSDs excludes traumatic acute injuries of the muscles, tendons and nerves due to workplace incidents (e.g. slips and trips, fall from height, box landing on arm causing bone fracture).

Classification within Gensuite, the following **three items** deem an injury to classified as a Musculoskeletal Disorder

1. Extracted from I&M (denotes work related)
2. Incident type is one or more of the following gensuite incident types: 1. Body position/posture;bend/lean/twist; 2. Lowering/lifting/carrying; 3. Forceful exertion/pushing/pulling; 4. Repetition; 5. Contact with temperature extremes AND
3. Injury/illness type, as listed below

Injury/Illness type

- Carpal Tunnel Syndrome
- Connective tissue injury/tear/disorder
- Cyst (e.g. ganglion, synovial)
- Hand-arm vibration Syndrome
- Hernia
- Herniated/displaced/ruptured disc
- Musculoskeletal disorder, not otherwise listed
- Nerve injury/compression/impingement
- Plantar fasciitis
- Sciatica/low back pain/disorder
- Sprain and strain
- Tendonitis, Tenosynovitis

Musculo-Skeletal Disorder metrics

- MSD recordable incident rate (200,000 hours worked, or per 100 full-time employees) = *# of MSD recordable incidents by date made recordable ÷ hours worked × 200,000*
- MSD first aid incident rate (200,000 hours worked, or per 100 full-time employees) = *# of MSD first aid incidents ÷ hours worked × 200,000*

Recordable / Lost Time Incidents:

All EU fulfillment centers (FCs) must investigate, deep dive and document in the Health and Safety online tool Gensuite all work related and non-work related injuries and illnesses that are reported:

a. Work Related: an injury or illness is considered work-related, if an event or exposure in the work environment causes or contributes to the condition or significantly aggravates a pre-existing condition. Work relatedness is presumed for injuries and illnesses that result from events or exposures that occur in the workplace, unless a specific exception applies.
b. Non-work related: an injury or illness is not considered work related, if the injury or illness meets Occupational Safety and Health Administration (OSHA) as non-work related criteria.

Documenting, even what might be perceived to be the most minor of incidents/injuries/illnesses, ensures that our duty of care to our employees as an employer is met. This also means corrective actions are captured. The FC is deals with various hazards and risk in the building and preventative measures should be designed and implemented, if and where necessary.

The more serious work related injuries or illnesses are categorized as either Recordable Incidents (RI) or Lost Time Incidents (LTI) in accordance with OSHA regulatory requirements and Amazon policy. Additionally, all countries must have a process for recording and reporting all notifiable injuries and illnesses in accordance with their own country's legislative requirements.

In FC safety, incidents are classified according to severity and one of two categories are applied to the more serious

a. RI - This classification refers to a workplace incident that results in
    a. death,
    b. days away from work,
    c. restricted work or transfer to another job,
    d. medical treatment beyond first aid,
    e. loss of consciousness,
    f. significant injury or illness diagnosed by a physician or other licensed health care professional, even if it does not result in death, days away from work, restricted work or job transfer, medical treatment beyond first aid, or loss of consciousness.
b. LTI - This classification refers only to an injury or illness that forces the associate to remain away from his or her work beyond the day of the accident or for the next shift. A LTI is a sub-classification of a RI.

Incident Rates

Because Amazon has many different buildings, all of different sizes and with different headcount numbers that generate vastly different labor hours, the number of incidents that occur at a FC may not be very meaningful in itself if looked at in isolation. Instead, one needs to level out the results of each building by looking at the rate of incident occurrence in relation to the amount of time people spend working at a FC. Amazon uses the OSHA calculation to measure incident rates in FCs.

Calculation

*Incident Rate = (number of incidents over a specific time period / labor hours for the same specific time period) * 200,000*

The reason for multiplying by 200,000 is because simply dividing the number of incidents by the number of labor hours would result in very small number that are more difficult to display and interpret.

When counting the number of incidents, one can include all RIs, or just LTIs. This gives us two similar but distinctly different safety incident rates: Recordable Incident Rate (RIR) and Lost Time Incident (LTI), which are displayed in Gensuite database and in the EU CF WBR. The EU CF WBR reports the following metrics:

Recordable Incidents	CY RecInc. 4wk	PY RecInc. 4wk	YoY % RecInc. 4wk H/(L)	RecInc. RR 52 weeks CY	RecInc. RR 52 weeks PY	YoY % RecInc. RR 52wk H/(L)	RecInc. RR 13 weeks CY	RecIncs RR 13 weeks PY	YoY % RecIncs RR 13wk H/(L)	CY LTI 4wk	LTI RR 52 wk CY	LTI RR 13 wk CY

Key Safety Requirement (KSR) Audits

Launched in Q2 2015, KSR audits were launched to replace both Floor Safety Inspections (FSI) and 5S audits. A brand new standard set of 19 audits were created to cover all key departments / process path areas in an EU FC, with the question sets of each audit limited to typically 10-11 questions. These weekly audits provide more focus on the Key Safety Risks in each area and allows Operational managers to spend more time on identified priority risks (ones with high frequency, or severity, or both), talking to associates about Safety and building a better safety culture in their teams. The EU CF WBR reports the following metrics:

Site Minimum Commitment	# of Audits completed	% of Audits completed	# of Actions generated	# of Actions per Audit	# of Calibration Audits completed	# of Calibration Actions generated	# of Actions per Calibration Audit	# of unique employees spoken to	Active employees spoken to YTD %

Safe Handling Audit Activity

Safe Handling audits are the audits of SMART manual handling principles as conducted by associates in our FCs. They are a measure of the training and retention of knowledge and are necesary monitoring how many audits are being conducted as well as how many positive and constructive feedback actions are delivered – both regular and calibration audits (i.e. conducted by leadership):

Site Minimum Commitment	# of Audits completed	% of Audits completed	# of Actions generated	# of Actions per Audit	# of Calibration Audits completed	# of Calibration Actions generated	# of Actions per Calibration Audit	# of unique employees spoken to	Active employees spoken to YTD %

Housekeeping Audit Activity

Housekeeping audits are the audits of everyday hazards and risks in our FCs in terms of area readiness, organization, cleanliness, and adherence to 5S standards.

Site Minimum Commitment	# of Audits completed	% of Audits completed	# of Actions generated	# of Actions per Audit	# of Calibration Audits completed	# of Calibration Actions generated	# of Actions per Calibration Audit

All of these audits are critical to make sure that the health and safety of our associates are held at the highest standards in all FCs.

Dataflow and aggregation

Recordables and LTIs

Source Database	Main queries	Source Table	Measure	Dax Description
Gensuite	There are two main queries for pulling Recordables and LTIs. The first one pulls the values for Recordables and LTIs from Gensuite. The second one queries the total labor hours worked from DAT_SAFETY_V2. Full query can be found here.	standard_reporting. DAT_SAFETY_V2	Recordable Incidents	sum(Safety_Gensuite[RECORDABLES])
			CY Recordable Incidents 4wk Rolling	DIVIDE(CALCULATE([Recordable Incidents], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -28, day))*200000, CALCULATE([CY Total Hours], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -28, day)),BLANK())
			CY RecInc 4wk	[CY Recordable Incidents 4wk Rolling]
			PY Recordable Incidents 4wk Rolling	DIVIDE(CALCULATE([Recordable Incidents PY], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -28, day))*200000, CALCULATE([PY Total Hours], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -28, day)),BLANK())
			PY RecInc 4wk	[PY Recordable Incidents 4wk Rolling]
			CY Lost Time Incidents 4wk Rolling	DIVIDE(CALCULATE([CY Lost Time Incidents], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -28, day))*200000, CALCULATE([CY Total Hours], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -28, day)),BLANK())
			CY LTI 4wk	[CY Lost Time Incidents 4wk Rolling]
			YoY % RecIncs 4wk H/(L)	-([PY RecInc 4wk]-[CY RecInc 4wk])/[PY RecInc 4wk]*100
			RecIncs RR 52 weeks CY	DIVIDE(CALCULATE([Recordable Incidents], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -(7*52), day))*200000, CALCULATE([CY Total Hours], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -(7*52), day)),BLANK())

			RecIncs RR 52 weeks PY	DIVIDE(CALCULATE([Recordable Incidents PY], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -(7*52), day))*200000, CALCULATE([PY Total Hours], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -(7*52), day)),BLANK())
			YoY % RecIncs RR 52wk H/(L)	-([RecIncs RR 52 weeks PY]-[RecIncs RR 52 weeks CY])/[RecIncs RR 52 weeks PY]*100
			RecIncs RR 13 weeks CY	DIVIDE(CALCULATE([Recordable Incidents], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -(7*13), day))*200000, CALCULATE([CY Total Hours], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -(7*13), day)),BLANK())
			RecIncs RR 13 weeks PY	DIVIDE(CALCULATE([Recordable Incidents PY], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -(7*13), day))*200000, CALCULATE([PY Total Hours], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -(7*13), day)),BLANK())
			YoY % RecIncs RR 13wk H/(L)	-([RecIncs RR 13 weeks PY]-[RecIncs RR 13 weeks CY])/[RecIncs RR 13 weeks PY]*100
			LTI RR 52 weeks CY	DIVIDE(CALCULATE([CY Lost Time Incidents], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -(52*7), day))*200000, CALCULATE([CY Total Hours], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -(52*7), day)),BLANK())
			LTI RR 13 weeks CY	DIVIDE(CALCULATE([CY Lost Time Incidents], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -(13*7), day))*200000, CALCULATE([CY Total Hours], DATESINPERIOD(Calendar[CALENDAR_DAY], LASTDATE(Calendar[CALENDAR_DAY]), -(13*7), day)),BLANK())

KSR, Safe Handling (SH) & Housekeeping Audit Activity

Source Database	Main queries	Source Table	Measure	Dax Description
Gensuit SAFETY_REPORTING_DDL (targets) fcfinance	There four main queries. The first one pulls the actual numbers of KSR, SH as well as House and depends on several unions for each measure (e.g. KSR Complete, SH Complete, House Complete, KSR Complete Calibration, SH Complete Calibration, House Complete Calibration ect.). It aggregates KSR, SH and Housekeeping into Audit_Type_Short. Calibration or Original is determined with Report_Type_Orignal = 'TRUE'/'FALSE' or Report_Type_Calibration = 'TRUE'/'FALSE'. Finally count 'auditrecno' is pulled from Gensuite as 'Completed'. Other metric-specific filters are applied (e.g.: House Complete: Audit_Type = 'Area Readiness Inspection'). The second query pulls the data from SAFETY_REPORTING_DDL.EU_REGIONS to get the targets for KSR, SH and Housekeeping. The third one is in place to pull the Associate Hours to be able to calulate Minutes per Audit (Target is 10-20). The fourth query pulls data from fcfinance.DAT_WEEKLY_FUNCTION_DATA to be able to calculate the metrics 'active employees spoken to'.	([CC_AMAZON].[dbo]) .[PIT_COMPLETIONS], ([CC_AMAZON].[dbo]) [ATS_Findings] EU_REGIONS (targets) DAT_WEEKLY_FUNCTION_DATA_EU	KSR Site Minimum Commitment per Week	sum([TARGET_KSR])
			# of Audits completed	sumx(Filter(HS_Audits, [Report_Type_Original]="TRUE"),HS_Audits[COMPLETED])
			% of KSR Audits Completed	[# of Audits completed]/[KSR Site Minimum Commitment per Week]*100
			# of Actions Generated	sumx(Filter(HS_Audits, [Report_Type_Original]="TRUE"),HS_Audits[Findings])
			# of Actions per Audit	[# of Actions Generated]/[# of Audits completed]
			# of Calibration Audits completed	sumx(Filter(HS_Audits, [Report_Type_Calibration]="TRUE"),HS_Audits[Completed])
			# of Calibration Actions Generated	sumx(Filter(HS_Audits,[Report_Type_Calibration]="TRUE"), [Findings])
			# of Actions per Calibration Audit	[# of Calibration Actions Generated]/[# of Calibration Audits completed]
			Associate Hours	sum([HOURS])
			Minutes per Audit (Target is 10-20)	[Associate Hours]/[# of Audits completed]*60
			Average_Audit_Duration_per_unique_audited_Associate	AVERAGE([Minutes])
			Number_of_unique_employees_spoken_to	DISTINCTCOUNT([EmployeeID])
			Active employees spoken to YTD %	[Number_of_active_unique_employees_spoken_to_YTD]/[Total HC]*100

Tags:

NETWORK ACTION

February 23, 2022

Workplace Health & Safety

Building Type: **Customer Fulfillment – All** Geos Impacted: **North America** Action Due Date: **March 3, 2022**

Reporting ALL Injuries Within Austin Regardless of Severity

Brief Description

To ensure that all injuries are accurately reported and documented within Austin, General Managers/Site Leads and WHS Managers need to communicate the following messages to all site Area Managers, Operations Managers, Sr. Operations Managers, and WHS teams:

1. When associates report an injury to a leader, it will be brought to the attention of the Wellness Center/Amcare for treatment and documentation.
    a. This includes experiencing discomfort, no matter how minor, and incidents that do not have a specific Mechanism of Injury (MOI).
2. When associates report an injury, the WHS team will ensure it is documented within Austin appropriately.
    a. This includes experiencing discomfort, no matter how minor, and incidents that do not have a specific Mechanism of Injury (MOI).
    b. Associates do not determine whether a case in AUSTIN is opened or not. Operations and/or WHS team members will submit a case on behalf of the associate, irrespective of the severity of the injury. Once a case is opened, associates may decide whether to accept treatment.
3. Site must not implement targeted First Aid Injury Rate (FAIR) reduction plans.
    a. FAIR is an indicator of a healthy injury reporting culture and not indicative of an overall improvement in a WHS culture or injury reduction.
    b. FAIR is not a standard metric utilized in NACF.

Actions

Action 1: Communicate to all Operations Leadership that all injuries, including experiencing discomfort, no matter how minor, should be reported to AMCARE/Wellness Center for treatment and documentation in Austin.

Owner: General Manager Due Date: March 3, 2022 Verification: Austin

Action 2: Ensure the WHS team documents all injuries, regardless of severity including experiencing discomfort, as a case within Austin. Communicate this message to the WHS team.

Owner: WHS Manager Due Date: March 3, 2022 Verification: Austin

Action 3: Ensure the site is not implementing actions to target a reduction in First Aid Injury Rate (FAIR).

Owner: General Manager and WHS Manager Due Date: March 3, 2022 Verification: Austin

Q&A/Additional Resources

WHS Incident Reporting & Investigation Procedure NA
Please contact your Regional WHS Manager with questions.

WHS Ergonomics Procedure NA

Published: 25-Apr-23
Effective: 25-Apr-23
Version: 1.1
Doc ID: 36698

Contents

1. Purpose

Amazon strives to provide a safe and healthful workplace for all associates. This procedure addresses Ergonomics--fitting a job to a person--which helps lessen muscle fatigue and reduces the number and severity of Musculoskeletal Injuries or Disorders (MSDs). This procedure outlines Amazon's methods for minimizing MSDs at Amazon facilities, with a focus on worksite evaluation, control of exposures that could cause MSDs, and associate training.

2. Scope

BUSINESS/GEOGRAPHY SCOPE																				
Global					NA					EU					RoW				
AMZL	ATS	CF	GSF	Retail	AMZL	ATS	CF	GSF	Retail	AMZL	ATS	CF	GSF	Retail	AMZL	ATS	CF	GSF	Retail
Other:					*Other: AMXL, Pillpack*					*Other:*					*Other:*				

PERSONNEL APPLICABILITY*					
Blue-Badge	Yellow-Badge	Green-Badge	Non-Yellow Badge Contractor	Visitors	*Other:*

**for questions on personnel applicability, see badge descriptions here*

This procedure is not intended to supersede or replace any applicable regulatory requirements. In case of conflict, the most stringent requirements shall prevail.

This Procedure does *not* apply to Global Real Estate and Facilities (GREF) or Amazon Web Services (AWS). However, for office ergonomic considerations within Amazon World Wide Operations & Customer Service (on-site or work from home), please refer to the office ergonomics resources available on the global Corporate EHS page.

3. Introduction

MSD risk management involves applying the methodology of ergonomics to mitigate risk. MSD risk assessment is an examination and evaluation of anything that may present or increase the risk of an MSD during the course of work and is used to identify and prioritize risk mitigation actions.

4. Terms and definitions

Refer to Global WHS Glossary.

- **Dragonfly** – Tool used to educate associates on how to identify safety hazards and opportunities for improvement, and how to escalate them to their manager when necessary. Dragonfly will provide managers with a mechanism to deliver feedback to associates on concerns or suggestions raised.
- **Ergonomics** - the scientific study of how the equipment, job and working environment are matched to a person's size, strength, capability, and other attributes.
- **Gemba -** Japanese term meaning "actual place," often used for the site floor, shop floor, or any place where identification and observation of value-created work occurs.
- **General Risk Assessment (GRA) –** Initial high-level screening of MSD risk within a process path and/or activity.
- **Musculoskeletal injury or disorder (MSD) -** an injury or disorder caused by a work event or exposure which causes cumulative tissue damage, such as repeated or sustained exposure of muscles, tendons, ligaments, bone, and nerves to repetitive motion, force, vibration, awkward postures, and extreme temperatures (cold) within the workplace. MSDs can include injuries like sprains, strains, tears, or hernias that result from a single discrete movement. MSDs exclude traumatic injuries of the muscles, tendons, and nerves due to workplace incidents (e.g., slips and trips, falls from height, box landing on arm causing bone fracture).
- **MSD risk factors** - conditions that can cause occupational soft tissue injuries and illnesses and/or reduce work effectiveness include:

  - Primary risk factors, including the physical demands of work activities: awkward/ static postures, excessive force, repetition/ duration, local contact stresses.
  - Secondary risk factors: poor work environment (cold/hot temperature, vibration, and inadequate lighting), individual circumstances (age, gender, and health status), and psychosocial conditions (stress, pressure, and confidence), aspects of the layout and condition of the workplace or workstation (working reaches, working heights, seating, floor surfaces), the characteristics of objects handled (size and shape, load condition, weight distribution, container, tool and equipment handles), characteristics of the organization of work (work-recovery cycles, task variability).
- **RICE Model –** Work effort prioritization mechanism that considers Reach [R], number of entities that the initiative will reach, Impact [I], quantitative goal or qualitative objective of the project, Confidence [C], assess the confidence of the inputs, and Effort [E], considers resources needed to reach the project's goal.
- **Technical Risk Assessment (TRA) –** Follow-up assessment on an activity having an MSD uncontrolled risk that is Substantial or High following the completion of an MSD GRA.

5. Roles and responsibilities

For top management/leadership responsibilities and commitment, refer to WHS Management System (WHSMS) Standard Global.

Where a listed role is not available at a site level, the superior role assumes the responsibilities. For example, where a WHS Manager does not exist at a site, a member of the Site Leadership Team shall assume the site-level duties and the regional safety manager (RSM) shall provide support.

5.1 Business Unit WHS

1. Support Regional WHS in implementing the ergonomics procedure.
2. Understand and assume accountability for this procedure.
3. Assign responsibility to implement and oversee effectiveness of this procedure within the business unit.
4. Allocate an appropriate budget and/or resources to enable the implementation of this procedure across sites.

5.2 Senior/Regional WHS

1. Facilitate the implementation and effectiveness of the ergonomics program consistent with this procedure.
2. Coordinate discussions to identify and implement control measures with stakeholders (Operations, Reliability and Maintenance Engineering (RME), Change Manager).
3. Ensure a communication mechanism is in place for the management of MSD risks and inform associates about changes made to their workstation or area.
4. Encourage associate engagement and contribution to efforts associated with MSD risk identification and solutions.
5. Endorse the inclusion of ergonomic guidelines into change approval requests and kaizen events.
6. Follow the guidance in this procedure to understand the Ergonomics Process (see section 6).
7. Ensure compliance to completion of the required training courses (see section 7).
8. Ensure WHS management reviews include a review of ergonomics as required by WHS Performance Evaluation Procedure Global.

5.3 Site Leadership Team (General Manager, Ops, WHS Leaders, and Site Ergonomics Lead)

1. Implement and maintain a site ergonomics program consistent with this procedure, using Appendix C, Site Implementation Checklist, as a guide.
2. Ensure the Ergonomics process (section 6) is executed as applicable upon site launch and annually thereafter.
3. Complete and assign required training courses (section 7).
4. Encourage and complete prompt reporting of MSDs, when signs and symptoms are identified.
5. Support discussions to identify and implement control measures with stakeholders (Operations, RME, change manager).
6. Partner with Worldwide Ergonomics and Safety Experience (WESE) team to evaluate ergonomic impacts when introducing new equipment or process into your site.
7. When ergonomics support beyond site-level capability is needed, consult the WESE Engineering team.

5.4 Associates

1. Report signs and symptoms of an MSD promptly to management or WHS personnel.

2. Propose solutions to a potential MSD risk to management using available means of communications, including but not limited to, Gemba, voice of associates (VOA) boards, Dragonfly or Associate Safety Committee (ASC).
3. Comply with training and instruction on ergonomics, including safe work practices, proper body mechanics, and MSD prevention methods.

5.5 Worldwide Ergonomics and Safety Experience (WESE) Engineering and Programs

5.5.1 NA WESE Programs team

1. Ensure this procedure aligns with the Global Ergonomics Standard and is reviewed/updated as required.
2. Complete baseline MSD General Risk register or Assessments (GRAs) in AUSTIN (Generation/Site type), where available.
3. Complete baseline MSD Technical Risk Assessments (TRA[1]) in DigiTools/AUSTIN as needed.
4. Provide support across NA to enable sites to identify, address, and manage MSD risk.
5. Respond to requests and offer ergonomics advice concerning training, resources, methodology, and general guidance (via SIM).
6. Manage platforms for storage of ergonomics assessments, solutions, and training.
7. Provide and manage dashboards to track MSD-related metrics.

5.5.2 NA WESE Engineering team

1. Respond to requests regarding ergonomics advice for design, layout, and equipment issues in legacy sites (via SIM), prioritizing as necessary based on the RICE[2] model.
2. Focus on projects to address issues associated with high MSD risks to identify engineered solutions, working with sites, and regional teams, prioritizing as necessary based on the RICE model.

6. Ergonomics process

MSD risks may exist and vary across business unit (BU), building type, region, site, or process path. Risk identification can occur through gathering information from MSD data and observation. This includes reviewing tasks or jobs with the highest contribution to MSD count/rates of injuries. The site will identify, assess, and manage MSD risk factors for existing, changing, or new process paths. This includes any change to tasks, working conditions, work stations, and equipment. For existing process paths, assess MSD Risk by validating/completing MSD GRA in AUSTIN, where available, or by reviewing the ergonomics GRA risk register applicable to your building and generation type. Validate/complete the TRAs as required for activities resulting in an uncontrolled risk rating of Substantial or High risk (Appendix A). Investigate and implement feasible solutions and controls in a timely manner to reduce MSD risk. Prioritize opportunities to reduce MSD using the results of the MSD GRAs and subsequent TRAs. Complete ergonomic improvements and evaluate site controls using the plan-do-check-act (PDCA) cycle.

6.1 Site Ergonomics Leaders designation

The Site Leader or General Manager, in consultation with the site or Regional Workplace Health and Safety Manager, shall designate Site Ergonomics Leaders (SELs). The SEL can be and is not limited to any of the following recommended roles: An L4 or higher Injury Prevention Specialist (IPS), Wellness Specialist, WHS Specialist, OMR, or member of the Site Leadership Team.

6.2 MSD risk identification

In conformance with the risk assessment requirements in the WHS Risk Management Procedure Global, the SELs shall review MSD risk assessments on all processes, ensuring a broad range of persons are involved, including representatives from those persons affected by the risks. If required, the WESE Engineering and Programs team can provide technical support. The risk assessment should draw upon information from associate participation and consultation, as well as previous risk assessments of operations that have taken place. SELs shall:

1. When the site opens and annually thereafter, reference baseline MSD GRAs in AUSTIN, where available, or the ergonomics GRA risk register applicable to your building and generation type.

[1] MSD Technical Risk Assessments (TRA) – REBA, RULA, Snook, ART, MAC
[2] Reach [R] = number of entities that the initiative will reach. Impact [I] = quantitative goal or qualitative objective of the project. Confidence [C] = assess the confidence of the inputs. Effort [E] = considers resources needed to reach the project's goal.

a. Verify applicability of baseline MSD GRAs and, as necessary, make appropriate corrections to MSD GRAs to reflect discrete site conditions.
b. Review and update discrete site MSD GRAs whenever a change (process, equipment, workstation) is introduced that may alter the result of the existing MSD GRA. This includes any workstation modifications driven by network or Engineering Change Management (ECM) action.
c. In the event that an activity is deemed to present Substantial, High, or Critical MSD risk in the GRA, coordinate with WESE to conduct a TRA in DigiTools (see section 6.3)
d. Verify applicability of baseline MSD TRAs as needed.

2. SELs and the Site Leadership Team should review injuries and incidents at the site and within similar building types to identify MSD injury trends.
3. SELs and the Site Leadership Team should also consider assessing other non-standard work tasks where opportunities for MSD risk reduction exist and include ergonomics observations as part of daily work (e.g., Gemba walks, spot audits).

As a result of these baseline assessments, SELs and Site Leadership Team may create or use a current MSD risk register that prioritizes processes or activities at the site that require further observation, evaluation, or corrective action, with consideration for:

1. MSD risk factors identified in GRAs and TRAs;
2. Similar exposure groups (SEGs) (e.g., stress on particular body part (legs, arms, etc.), similarity of task (trailer load/unload, etc.); and
3. Review of MSD-related incident data.

6.3 MSD risk assessment

Available TRA tools used to quantify MSD risk are identified in Table 1. Choose the appropriate tool(s) from Table 1 and use the resulting risk score for any tool utilized to assist in prioritizing the hazards/risk factors that need mitigation. See Appendix A for scoring guides.

Table 1: TRA tools and their selection criteria

MSD Risk Assessment Tool	Whole Body	Upper Body	Lift/Lower	Push/Pull	Carry	Repetition
REBA (Rapid Entire Body Assessment)	✓	✓				
RULA (Rapid Upper Limb Assessment)		✓				
SNOOK			✓	✓	✓	
MAC (Manual handling Assessment Charts)			✓			
ART (Assessment of Rapid Tasks)		✓				✓
VAMRA (Video Analysis MSD Risk Assessment)	When available					

Artificial Intelligence (AI) Video Analysis MSD Risk Assessment (VAMRA) software allows users to quickly and accurately quantify MSD risk as an alternative to traditional methods and tools used for baseline general/technical MSD risk assessments. This section is informational at the time of writing. No action is required by the site for this paragraph.

6.4 MSD control measures

6.4.1 Investigate and implement controls to reduce risk

When an assessment results in a score that indicates a possible need for change, SELs should work to investigate and implement feasible solutions and controls in a timely manner to reduce risk or identify and support, where possible, other risk reduction projects related to the assessed job or task. When implementing solutions and controls, the SELs shall consider the physical dimensions (height, reach, access) and strength capability of the affected population and seek input from associates in affected

process paths. SELs shall follow the Business Unit's Change Management (CM) process to document all approvals and changes at the site level. When assessing the implementation of controls to reduce risk, the Hierarchy of Controls should be considered.

The Hierarchy of Controls, in order of efficacy includes:

1. **Elimination or Substitution** involves physically removing the risk factor from the workstation or replacing the hazard with a safer alternative.
2. **Engineering Controls** involves implementing adequate design, tools or equipment to isolate people from the hazard. See Appendix B, General Engineering controls.
3. **Administrative Controls** change the way people work through procedures or training and can include:
    a) Job rotation plans and work schedules focused on promoting the use of different muscle groups, and appropriate rest and recovery periods.
    b) Floor Safety Inspection Audits or similar behavioral audits to enforce safe behaviors.
    c) Work Practice Controls include training associates on specific behaviors, to perform work in a specific manner, and perform the task consistently each time. Work Practice controls include:
        i. Training to increase associate awareness about body mechanics and stretching exercises, including wearables with haptic feedback;
        ii. In-Process Safety School- Body Mechanics, Safe Lifting, and situational awareness training; and
        iii. Manual Handling procedures (Appendix E).
4. **Personal Protective Equipment (PPE)** is equipment worn by an associate to protect them from MSD risk exposure, such as knee pads or padding to reduce contact stress. PPE should only be used as a substitute for engineering or administrative controls if it is used in circumstances in which those controls are not practicable.

6.4.2 Evaluate site controls

The SEL, in coordination with WESE, shall evaluate any controls implemented specifically at the SEL's site to reduce MSDs post-implementation to evaluate effectiveness and ensure no new risks were introduced. All levels of control should be evaluated using the Plan-Do-Check-Act (PDCA) cycle.

Plan: Recognize an opportunity and plan a change to reduce MSD risk.

Do: Test the change. Carry out a small-scale Proof of Concept or site-level pilot. Seek associate input.

Check: Review the Proof of Concept or pilot, analyze the results, verify MSD risk reduction, and confirm a new risk has not been introduced.

Act: If the change was successful, incorporate what you learned to scale changes. If the change was not successful, go through the cycle again with a different plan. Use what you learned to plan new improvements, beginning the cycle again.

6.4.3 Incorporate ergonomic design and manual handling principles into change requests

The SEL or Site Leadership Team shall incorporate an ergonomics review into any site change requests that could impact the assessments or controls developed under this Procedure. Information on appropriate ergonomic design and manual handling principles that should be referenced in evaluating changes are included in Appendix E.

6.5 Associate communication and feedback

The SELs shall also establish a mechanism to intake and respond to associate MSD risk concerns and requests for an individual assessment. The SELs shall ensure that associate concerns and individual assessments are considered during the evaluation process. Site Leadership Team shall inform associates about changes made to their workstation or area.

7. Training requirements and learning resources

Training requirements for associates and SELs are set forth in Table 2.

Refer to the Safety & Environmental Training Matrices NA for the latest training requirements (found in on Amazon Policy 2.0).

Table 2: Awareness and competency matrix			
Job description	**Type**	**Training content**	**Required frequency**
• Site Operations Leaders • Site Operations associates	Awareness	• Cast (Compliance Awareness Safety Training) Session 2: Incident Prevention, Response and Reporting Awareness: Ergonomics and/or • Safer Year: Ergonomics Awareness Training ○ Soft Tissue Injuries & MSDs – what they are and how they may occur. ○ Exposure to risk factors in the workplace. ○ Safe work practices, including proper body mechanics, control measures and MSD prevention methods. ○ Importance of early reporting of MSD symptoms to enable early intervention. ○ Identification of factors that could lead to an MSD. ○ The early signs and symptoms of MSDs and their potential health effects. ○ Preventive measures including, where applicable, the use of altered work procedures and procedures, mechanical aids, equipment and personal protective equipment.	• Annual
• Site Leadership Team • Site Operations Leaders • Site Ergonomics Lead (SEL) • WHS Personnel	Awareness	• Level 1: Ergonomics Awareness ○ Basic introduction to MSDs. ○ Explanation of ergonomics principles. ○ How to identify MSD risk factors and the importance of early reporting.	• Initial • Annual
• Site Ergonomics Lead (SEL) • WHS Personnel	Authorized	• Level 2: Risk Assessment Overview which includes: ○ Introduction to ergonomics risk assessment. ○ Understand why MSD risk reduction is critical to associates, your role/site, and Amazon. ○ Apply ergonomics principles to identify, assess and control MSD risks. ○ Select and use ergonomics assessment tools to aid the development of site solutions.	• Initial • Annual
• Site Ergonomics Lead (SEL) • WHS Personnel	DigiTools	• Level 2: Assessment Tools: ○ REBA ○ RULA ○ SNOOK	• As needed for access to DigiTools
• WHS Personnel	Additional	• Level 2: Assessment Tools: ○ MAC ○ ART • Self-directed learning using: ○ Quick Guides for MSD assessment tools ○ DigiTools How To	• As needed

8. Reporting

Reporting of MSDs should meet the requirements in WHS Incident Reporting and Investigation Procedure Global.

9. Continual improvement

For continual improvement methods and principles, refer to the Global WHS Continual Improvement Procedure.

10. Audit

For auditing methods and principles, refer to the Global WHS Performance Evaluation Procedure.

Audits, inspections, and evaluations can be performed using several different methods depending on the audited area. To collect the information, the following methods should be included:

1. Performing interviews with top management and associates at different levels of the organization;
2. Pre-peak and prime assessments;
3. Observing activities (processes and behaviors); and
4. Reviewing documentation.

11. Documented information

Records related to this procedure must be managed in conformance with Amazon's Document and Record Retention and Destruction Policy and all legal requirements.

Classify WHS documents in conformance with Amazon's Information Security Data Classification Catalog.

At a minimum, the SELs shall complete all GRA validations and track the completed validations using a provided AUSTIN action item, and TRAs (from section 6.3) validation in DigiTools. All other documentation shall be uploaded to AUSTIN or DigiTools as feasible, or stored in a secure location on the Amazon network, such as WorkDocs.

Table 2: Documented information retention schedule

Record type	Retention period minimum
Risk Assessments	Three (3) Years

12. References

11.1 Internal references

- Global WHS Glossary: https://w.amazon.com/bin/view/EHS_GEMS_Wiki/EHSGlossary/
- WHS Management System (WHSMS) Standard Global: https://policy.amazon.com/standard/32135
- Global WHS Metric Definitions Handbook: https://w.amazon.com/bin/view/GlobalEHS/metrics/
- WHS Personal Protective Equipment (PPE) Standard Global: https://policy.amazon.com/standard/34224
- WHS Management System (WHSMS) | Ergonomics: https://w.amazon.com/bin/view/EHS_GEMS_Wiki/Ergonomics/
- Ergonomics forms: https://w.amazon.com/bin/view/Whs/Ergonomics/Assessment_Tools_and_Forms/

11.2 External references

- California Repetitive Motion Injury Rule (Title 8, §5110): https://www.dir.ca.gov/title8/5110.html
- British Columbia Occupational Health and Safety Regulation (Sections 4.46 – 4.53): OHS Regulation
- Alberta Occupational Health and Safety Code (Section 211): https://www.canlii.org/en/ab/laws/regu/alta-reg-191-2021/latest/alta-reg-191-2021.html
- Quebec Regulation Respecting Occupational Health and Safety – Division XX, Special Ergonomic Measures: https://www.legisquebec.gouv.qc.ca/en/document/cr/S-2.1,%20r.%2013
- Manitoba Regulation 217/2006 - Workplace Safety and Health Act Regulation (Part 8): https://www.gov.mb.ca/labour/safety/pdf/whs_workplace_safety_act_and_regs.pdf
- Newfoundland and Labrador's Occupational Health and Safety Regulations (Sections 50-54): https://www.assembly.nl.ca/legislation/sr/regulations/rc120005.htm
- Saskatchewan Occupational Health and Safety Regulations (Section 6-18): https://www.canlii.org/en/sk/laws/regu/rrs-c-s-15.1-reg-10/latest/rrs-c-s-15.1-reg-10.html?docType=txt

13. Change management and document history

Table 3: Document change history				
Version	**Description**	**Published**	**Effective**	**Next review**
1.0	Initial Document	15-Mar-23	15-Mar-23	15-Mar-26
1.1	• Added link for Cast training to section 7	25-Apr-23	25-Apr-23	15-Mar-26

Appendix A – Scoring Guides

MSD General Risk Assessments (GRA) in AUSTIN

1.0 Severity

			FORCE			
			Low effort, light work.	Moderate effort, within capability.	High effort, approaching maximum capability.	Strenuous effort, at or exceeding maximum capability.
			1	2	3	4
POSTURE	Optimal posture. No reaching or bending.	1	1 (Negligable)	2 (Minor)	3 (Significant)	4 (Major)
	Slightly awkward postures. (e.g. reaching between knees & shoulder).	2	1 (Negligable)	2 (Minor)	3 (Significant)	4 (Major)
	Awkward postures. (e.g. working above shoulder, below knees or over-reaching; twisting)	3	2 (Minor)	3 (Significant)	4 (Major)	4 (Major)
	Very awkward postures, at or beyond max. range of motion	4	3 (Significant)	4 (Major)	4 (Major)	4 (Major)

2.0 Probability

			DURATION				
			Activity performed for less than 20% of total shift	Activity performed for 20-40% of total shift	Activity performed for 40-60% of total shift	Activity performed for 60-80% of total shift	Activity performed for 80-100% of total shift
			1	2	3	4	5
REPETITION	Activity performed *infrequently*.	1	1 (Highly Unlikely)	1 (Highly Unlikely)	2 (Unlikely)	2 (Unlikely)	3 (Possible)
	Activity performed *occasionally*, repeating similar movements	2	1 (Highly Unlikely)	2 (Unlikely)	2 (Unlikely)	3 (Possible)	4 (Likely)
	Activity performed *often*, repeating similar movements	3	2 (Unlikely)	2 (Unlikely)	3 (Possible)	4 (Likely)	5 (Very Likely)
	Activity performed *frequently*, repeating	4	2 (Unlikely)	3 (Possible)	4 (Likely)	5 (Very Likely)	5 (Very Likely)
	Activity performed *very frequently*, repeating identical movements.	5	3 (Possible)	4 (Likely)	5 (Very Likely)	5 (Very Likely)	5 (Very Likely)

3.0 Uncontrolled Risk Value

Table is for reference only.

SEVERITY RATING		PROBABILITY OF OCCURANCE				
		1 HIGHLY UNLIKELY Can assume will not occur; and/or control measures are in place and conform to best practices and standards.	2 UNLIKELY Could occur at some time; event already recorded once in the industry; and/or control measures are in place but do not meet best practices.	3 POSSIBLE Can reasonably be expected to occur sometime to an individual item or person; event already recorded several times within the industry; and/or control measures are in place but are insufficient.	4 LIKELY Expected to occur several times to an individual item or person; event already recorded once within Amazon; and/or few control measures in place, rely only on behavior.	5 VERY LIKELY Likely to occur within a short period of time; event is already recorded more than once within Amazon; and/or no control measure in place.
1 Negligible	**PEOPLE:** Minor non-reportable injury or illness; first aid treatment required, no LTI. **ENVIRONMENT:** Slight Impact. No sensitive impact on ground/air/water.	NEGLIGIBLE 1	NEGLIGIBLE 2	LOW 3	LOW 4	MEDIUM 5
2 Minor	**PEOPLE:** Minor recordable injury requiring medical treatment; may lead to LTI but without physical consequences. **ENVIRONMENT:** Minor impact on localized ground, spill contained.	NEGLIGIBLE 2	LOW 4	MEDIUM 6	SUBSTANTIAL 8	SUBSTANTIAL 10
3 Significant	**PEOPLE:** Significant injury requiring medical treatment e.g. fracture, stiches, reportable. **ENVIRONMENT:** Localized effect; Regional stakeholder concern or 1-2 years for natural recovery, or 1 week for cleanup. Spill <100 m3.	LOW 3	MEDIUM 6	SUBSTANTIAL 9	HIGH 12	HIGH 15
4 Major	**PEOPLE:** Permanent incapacity (amputation, loss of eye/permanent serious illness). **ENVIRONMENT:** National Impact. National stakeholder concern or 2-5 years for natural recovery or up to 5 months for clean up or threat to biodiversity or impact on areas of interest for science. Spill <1000m3.	LOW 4	SUBSTANTIAL 8	HIGH 12	HIGH 16	CRITICAL 20

Technical Risk Assessments (TRA)

REBA

REBA risk scores		
Purple	11+	Implement change
Red	8 to 10	Investigate further, implement change
Orange	4 to 7	Investigate further, change soon
Yellow	2 to 3	Investigate further, change may be needed
Green	1	Acceptable, negligible risk

RULA

RULA risk scores		
Red	7	Investigate further, implement change
Orange	5 to 6	Investigate further, change soon
Yellow	3 to 4	Investigate further, change may be needed
Green	1 to 2	Acceptable, negligible risk

SNOOK (Tables)

SNOOK assessment		
Red	Exceeds threshold limit	Unacceptable. Investigate and implement change
Green	Within threshold limit	Acceptable

MAC

MAC risk scores		
Red	13+	Unacceptable. Action must be taken to reduce score
Green	0 to 12	Acceptable

ART

Exposure scores		**Proposed exposure level**
Red	22+	High. Further investigation required urgently
Yellow	12 to 21	Medium. Further investigation required
Green	0 to 11	Low. Consider individual circumstances

Appendix B – General Engineering Controls

Purpose:

After MSD risk factors are identified using the assesment tools, the guidelines below can be used and adapted for the site to help generate ideas for possible solutions.

Procedure:

Use the below table to identify the risk factors or non-optimal postures identified in the Ergonomic Assessment Tools that correspond to the recommended general solutions. These are broad ideas and are meant to generate ideas that can be further adapted to fit specific site needs.

When the manual moving of loads or persons compromises the associate's safety, mechanical devices should be put at his/her disposal.

Primary Work Zone - Work performed at or near waist level; avoiding or eliminating leaning, bending, reaching, and twisting of the body/arms.

Risk Factor	Possible Controls
Upper Arm in extension or in flexion above 90°	• Place frequently handled items in the primary work zone in front of the associate
Shoulder is raised	• Lower storage height of object • Provide tools such as stepstools to raise employee to correct height
Upper arm is abducted	• Place items to be worked on/packed at a lower work surface height • Utilize a scanner or tool with a vertical handle on a horizontal work surface • Utilize a scanner or tool with a horizontal handle on a vertical work surface • Tilt box or work surface toward associate
Wrist position is flexed/extended	• Vertical/horizontal pushing with neutral hand/wrist postures • Keyboard/input device at the proper angles and height to keep associate's wrists in neutral position
Wrist is outside of midline	• Place items within easy reaching distance (i.e. primary work zone, before working on/packing) • Angle the box towards you (i.e. slightly tilt the box to allow for a neutral hand/wrist posture when packing/unloading boxes) • Rotate the item on the countertop/work surface instead of lifting, whenever possible
Wrist twist is present	• Modify carts to be push/pulled carts with a neutral hand/wrist posture
Neck position is extended/flexed or twisted	• Place the workstation, work surface, and/or computer monitor directly in front of the associate (i.e. associate faces the area in the direction he/she is working/going) • Allow for adequate vertical space between the associate's head and the ceiling, conveyor, etc.

Trunk position is extended/flexed	• Modify the container to allow for utilizing proper body mechanics
Trunk is twisted	• Allow for plenty of vertical space between the associate's head and the ceiling, conveyor, etc.
Trunk is side bending	• Raise the height of the workstation, work surface, and/or computer monitor and/or make sure the item or monitor is not angled • Proper placement of tools in workplace (within good reach for the employee)
Standing for long periods of time	• If it won't impact the work being done, provide associates with reasonable opportunities to sit and provide suitable seating, including appropriate meal and rest breaks • Where an associate is required to stand for long periods of time, provide an antifatigue mat, footrest, or other suitable device to provide relief

Appendix C – Site Implementation and Compliance Checklist

Instructions for Use: Use this document as an aid during the implementation process, initially and annually. Note the items that will appear in AUSTIN's Compliance Activities Module.

	Austin Compliance Module	Completed
1. In consultation with the site or Regional Workplace Health and Safety Manager, GM assigns SEL.	-	
2. SELs reads and understands the requirements of the WHS Ergonomics Procedure and all supporting documents. *Review and understand the requirements of the procedure and supporting documents: https://policy.a2z.com/docs/36698/publication*	*Yes*	
3. SELs ensure completion of required trainings (See Section 7). *Review training and qualification requirements of this procedure, and audit to completion on site. Assign trainings as needed.*	*Yes*	
4. SELs supports site Learning team and ensures associate awareness training is completed initially and annually. *Review training and qualification requirements of this procedure, and audit to completion on site. Assign trainings as needed.*	*Yes*	
5. *Analyze MSD safety incident and RIR data for jobs or process paths for the prior year*	*Yes*	
6a. *Verify applicability of baseline MSD General Risk Assessments (GRAs) in AUSTIN. Verify a GRA or baseline GRA has been performed on each process path within the building and retained in AUSTIN.*	*Yes*	
6b. *Verify Technical Risk Assessments (TRAs) have been completed on activities of processes identified as substantial, high, or critical risk and are retained in DigiTools.*	*Yes*	
7. Generate solutions to implement utilizing the Hierarchy of Controls and present to site leadership. *Verify that controls are planned or have been implemented to reduce risk.*	*Yes*	
8. Implement controls as agreed to by necessary parties (Safety manager, Regional Safety Manager, General Manager) utilizing the CM procedure.	-	
9. Evaluate efficacy of controls and plan additional improvements using the plan-do-check-act (PDCA) cycle.	-	
10. *Share the results of training status, MSD safety incident review, risk assessment status, and controls implemented with Site Leadership at SRB (or equivalent mechanism) for understanding.*	*Yes*	

Appendix D – Canadian Provincial Requirements

The following provincial requirements apply in addition to the referenced requirements of this Procedure:

Section 5.3(g): Where a risk of MSD is identified, inform each associate who may be at risk of developing musculoskeletal injury of that risk and of the signs and common symptoms of any musculoskeletal injury associated with that associate's work and provide effective protection for each associate who may be at risk, which may include (i) equipment designed, constructed, positioned and maintained to reduce the harmful effects of an activity, (ii) appropriate work practices and procedures to reduce the harmful effects of an activity, and (iii) work schedules that incorporate rest and recovery periods, changes in workload or other arrangements for alternating work to reduce the harmful effects of an activity. (*Section 6-18(3) of the Saskatchewan Occupational Health and Safety Regulations*)

Section 5.5(a): The annual review must occur in consultation with the joint health and safety committee. (*Section 6-18(2) of the Saskatchewan Occupational Health and Safety Regulations*)

Section 6.3: SELs, when conducting a risk assessment, should consult with: a) associates with signs or symptoms of MSD; and b) a representative sample of the associates who are required to carry out the work being assessed. (*Section 4.53(2) of British Columbia's Occupational Health and Safety Regulation*)

Section 6.4.1: The investigation and implementation of controls must occur without undue delay. Where the introduction of permanent controls is delayed, interim control measures must be implemented without delay. (*Section 4.50(3) of British Columbia's Occupational Health and Safety Regulation*)

Section 6.5: In addition to other checklist items, SELs should consult the joint health and safety committee/occupational health and safety committee or the worker health and safety representative/designate, as applicable, with respect to:

a) risk identification, assessment and control;
b) the content and provision of worker education and training; and
c) the evaluation of the compliance measures taken. (*Section 4.53(1) of British Columbia's Occupational Health and Safety Regulation*)

Section 8: If an associate reports to the SEL what the associate believes to be work-related symptoms of an MSD, the SEL must promptly:

a) review the activities of that associate, and of other associates doing similar tasks, to identify work-related causes of the symptoms, if any; and

b) take corrective measures to avoid further injuries if the causes of the symptoms are work-related. (*Section 211 of the Alberta Occupational Health and Safety Code*)

In Saskatchewan, in addition to the above two actions, the SEL must also advise the associate to consult a physician or a registered health care professional. (*Section 6-18 (5)(a) of Saskatchewan's Occupational Health and Safety Regulations*)

Appendix E – Ergonomic Design and Manual Handling Principles

Improvement of work paths, stations, and processes

Consistent with Amazon WW Design Standards, process paths, tasks, working conditions, work stations, and equipment should incorporate appropriate ergonomic design principles as appropriate. As a result, changes to existing work paths, stations, and processes shall follow a change approval process that evaluates how the change impacts the existing risk assessment. The below principles are intended to guide the evaluation of a change against appropriate design parameters. SELs needing assistance applying these principles should consult with the WESE Engineering team.

Ergonomic design principles

Work paths, stations, and processes should fit the characteristics of the associates. These designs should consider the nature of the tasks and potential impacts to associates performing them, including any differences between how a task is designed and how it is actually performed. Ergonomically designed work:

1. can be performed safely and effectively by associates in both the short and long term; and
2. does not result in acute or chronic occupational injuries or illnesses.

Anthropometry

Identify the target population (i.e., associates using the work station, or following the work path/process) and any characteristics relevant to the design (e.g., body size, visual abilities, literacy). Design work paths to accommodate the largest percentage of the target population (country-specific), considering both male and female anthropometric data. Ideally, the design should accommodate associates from the 5th percentile of females to the 95th percentile of males, although these values may be raised or lowered based on the cost, need, population characteristics (i.e., use of region or country-specific data), or other variables.

Design for adjustability

Provide adjustable work stations and equipment where reasonably practicable to eliminate the need for associates to adopt awkward postures. For example, the height of a desk should be high enough for leg clearance for a 95th percentile male. However, height adjustment on the seating should allow a seated 5th percentile female to assume neutral wrist positions.

Design to limit static posture

Consider the use of chairs, sit-stand stools, sit-stand workstation design, where static posture is identified as a risk factor, to relieve worker fatigue from prolonged stationary body position.

Design for extremes

In certain situations, design and equipment selection should consider the extremes. For example, overhead obstructions should be evaluated against the tallest person to determine whether the obstruction could be moved or protected. Similarly, when selecting ladders, the load capacity should be strong enough to hold the heaviest person (above the 95th percentile).

Design specifications

Amazon ergonomic design guidelines should be followed when designing or revising existing workstations, equipment, and processes.

Risk factors

Evaluate the following MSD risk factors, at a minimum, during the design phase:

1. the physical demands of work activities including:
    b) force required;
    c) repetition;
    d) duration;
    e) work posture; and
    f) local contact stresses.
2. physical aspects of the layout and conditions of the work environment including:
    a) working reaches;
    b) working heights;
    c) seating;

    d) floor surfaces;
    e) temperature and humidity; and
    f) lighting.
3. the characteristics of objects handled (e.g., hand scanners, tools, totes, product), including:
    a) size and shape;
    b) load condition and weight distribution;
    c) container, tool, and equipment handles; and
    d) vibration.
4. organizational characteristics of the work including:
    a) work-recovery cycles; and
    b) task variability
5. characteristics of the working population relative to, for example:
    a) language;
    b) vision;
    c) literacy; and
    d) color blindness.

Work environment and footwear

Ensure walking and working surfaces conform to the WHS Walking and Working Surfaces Standard Global, and, at a minimum:

1. are designed with a coefficient of friction (COF) to associates' shoes of at least 1.0;
2. are constructed of material able to be maintained clean and free of slip/trip hazards; and
3. do not require a modification to footwear in accordance with the WHS Personal Protective Equipment (PPE) Procedure NA.

Hand tools selection and use

Select hand tools that minimize MSD risk factors.

1. appropriate for the specific work being done (e.g., a wrench is not an appropriate striking tool);
2. appropriately sized/shaped to allow the user to maintain a neutral posture in the space available (e.g., long handled tools are not appropriate for tight workspaces as they force the user to adopt an awkward hand position);
3. appropriately fit to the associate's hand and grip orientation (i.e., left-handed vs. right-handed);
4. designed to reduce the force required for use (e.g., weight-balanced); and
5. designed to minimize contact pressure on the hand.

High-force tasks

High-force tasks (e.g., hammering) should be designed to promote the comfortable use of a power-grip (i.e., neutral wrist, all fingers wrapped around the handle). If used with one hand only, the tool selected should weigh no more than 3 lbs. (1.4 kg).

For high-force tasks that require a single-handle tool (e.g., hammer) the handle diameter of the selected tool should be between 1.25 – 2 inches (3.2 – 5 cm).

For high-force tasks that require a double-handle tool (e.g., pliers), the grip span of the tool selected should be at least 2 inches (5 cm) when fully closed and no more than 3.5 inches (8.9 cm) when fully open.

Precision tasks

Precision tasks should be designed to promote the comfortable use of a pinch grip (i.e., neutral wrist, tool gripped between thumb and fingers). If used with one hand only, the tool selected should weigh no more than 1 lb. (0.5 kg).

For precision (low-force) tasks that require a single-handle tool (e.g., precision screwdriver) and the handle diameter of the selected tool should be between 0.25 – 0.5 inches (0.64 – 1.27 cm).

For precision (low-force) tasks that require a double-handle tool (e.g., tweezers), the grip span of the tool selected should be at least 1 inch (2.5 cm) when fully closed and no more than 3 inches (7.6 cm) when fully open.

Power tools

Power tools selected should have features in their design that reduce an associate's exposure to vibration. Such features may include, but are not limited to:

1. a counter-balance mechanism (to control intensity of the vibration); and
2. vibration-absorbing materials or housings (e.g., dampening handles).

Ensure power tools are maintained per the manufacturer's recommendation. Prohibit the use of damaged or poorly maintained power tools.

Manual handling procedures

Enforce safe manual handling procedures in accordance with the following:

Lifting/lowering/carrying

Lifting/lowering and carrying tasks should be:

1. designed to take place within the power zone between mid-thigh and mid-chest;
2. performed with good body mechanics:
    a) face the object, bend at the knees;
    b) keep a straight back, use abdominal and leg muscles to facilitate lift/lower;
    c) avoid twisting;
    d) hold the load close to the body for the duration of the lift/lower; and
3. performed using both hands whenever feasible, especially with heavy or awkward shaped objects.
    a) if use of a scanner interferes with the two-handed technique, a wrist strap or holder should be provided to allow both hands to hold the object; or
    b) if lifting/lowering small objects with one hand (e.g., a single can of dog food, a book), a neutral hand position and appropriate grip (e.g., a "C" grip for cylindrical shaped object) should be applied.

Heavier objects and objects requiring frequent lifting/lowering should be stored within the power zone to minimize excessive bending or reaching (i.e., over-shoulder or over-head).

Prohibit carrying of loads that obstruct the view of the person carrying them.

Prohibit throwing or swinging objects into place as this adds an additional force and acceleration to the load.

Alternative lifting/lowering methods

The following circumstances may require an alternative lifting/lowering method (e.g., a lower lifting weight maximum, engineering control, or team lift/lower):

1. awkward shaped packages;
2. no handles or damaged handles;
3. unsteady load that may shift;
4. unstable footing;
5. constrained or difficult environments for movement (e.g., cold environments, lifting from a seated or kneeling position); and
6. high-frequency (greater than 360 lifts per hour) or long duration lifting.

Evaluate the task using an applicable ergonomics assessment tool to define the safest method.

Team lifting/lowering (two or more persons)

When performing a team lift/lower:

1. choose lifting/lowering partner(s) of approximately the same height and strength;
2. identify a team lift/lower leader who will coordinate the lift/lower and be the one to give directions during the lift/lower;
3. check the lifting/lowering path to be clear of obstacles;
4. plan the lift/lower before starting; and
5. make eye contact while communicating the lift/lower instructions to ensure attention to task.

Lifting/lowering during pregnancy

Safety programs for lifting/lowering during pregnancy should be developed in accordance with local regulatory requirements.

Pushing/pulling

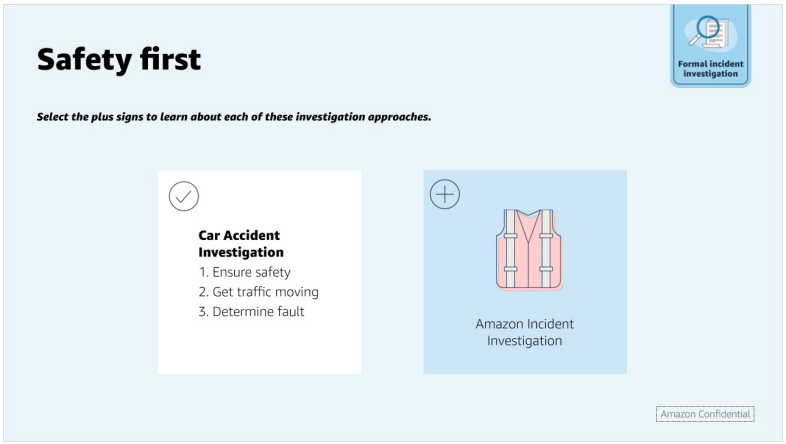
Pushing/pulling tasks should be designed to:

1. push (rather than pull), wherever possible;
2. minimize the amount of force required to move the load; and
3. avoid uneven or rough surfaces, stairs, and sharp inclines.

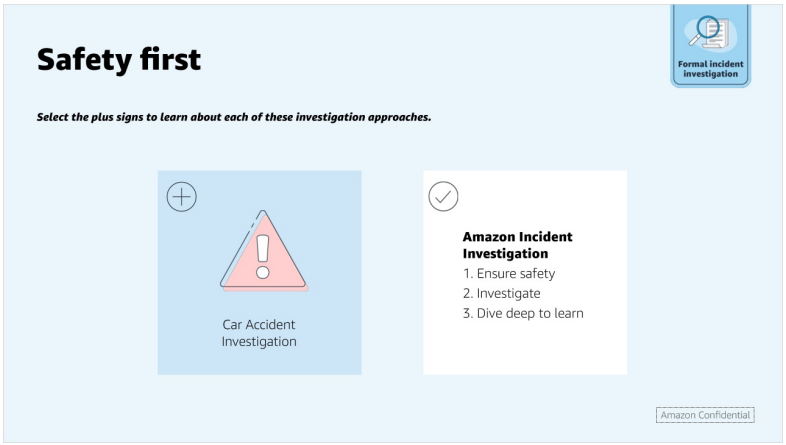
If you are in a fender-bender or a serious accident in your vehicle, the police or emergency services on the scene will first ensure that everyone is safe. Then, they will get traffic moving. After that, they will start asking questions to determine who is at fault for the accident.

At Amazon, we dive deep to learn, rather than investigate to find fault. Why? When we investigate an incident at Amazon, finding fault is not the goal. If someone is injured or could have been injured, our job is to determine why that incident happened so that it will not happen again. Our number one goal is to keep everyone safe.

Car check (Slide Layer)



Incident Check (Slide Layer)



1098: United States (US) Employee Gifts and Rewards

https://policy.a2z.com/docs/1098/publication

1.

Purpose

The purpose of this document is to communicate approved employee gifts, swag, rewards, or prizes (to be referred to simply as Gift throughout the remainder of the policy), to suggest alternatives when a Gift is not approved, and to communicate the tax withholding requirements for the approved Gift provided to employees in the United States and how to report these to Payroll.

2.

Scope and Intended Audience

The specifics of this policy apply to all (US) Amazon employees. This policy applies to all types of gifts, swag, rewards, and prizes including physical gifts, points, and gift cards or vouchers that have not already been declared in the Internal Orders Ordering Portal in the United States.

3.

Policy

Only discretionary Gifts are approved under the policy. Amazon strictly prohibits the distribution of Gifts for non-discretionary purposes.

3.1 Non-discretionary: promised in advance, based on hours worked, units produced, production efficiency, accuracy, or the quality of work. Earned by meeting performance goals, attendance benchmarks, or any other type of goal that had been promised, announced, or agreed to by the employer (e.g. manager) beforehand. Non-discretionary Gifts are strictly prohibited. Under no circumstances should Gifts be distributed to (US) Amazon employees for non-discretionary purposes.

- 3.2 Prohibited Non-discretionary Gift examples:
  - Given as an incentive reward – to encourage an employee to work more steadily, rapidly or efficiently, or to remain with the facility (e.g. promised ongoing meals or Gifts).
  - Given as a result of an action such as achieving a predefined goal (employee does X so they get Y).

- Given based on expressed or implied contract – participating in a program that has established a historical expectation that the employee receives a Gift if they participate. It is more likely that not the employee will receive a Gift.
- Given in lieu of a cash bonus, raise, or any other form of earned compensation.

3.3 Discretionary: given at random to the employee at the discretion of the employer (e.g. manager) and not agreed upon, announced, or promised in advance. Not awarded based on hours worked, units produced, production efficiency, accuracy, or work quality. Not earned by meeting performance goals, attendance benchmarks, or any other type of goal. The employee has no contractual right, expressed or implied, to any amount. Only discretionary Gifts are approved under the policy. Please see section 4 (Process) below to ensure you are following proper Gift reporting procedures.

- 3.4 Approved Discretionary Gift examples:
  - Surprise, not expected, on-the-spot "Thank you for all your hard work during peak" or "Great job on launching a new product"
  - Contests and Drawings, provided the prize to participant ratio cannot be diluted where every participant expects to win (winners should represent less than 10% of the total eligible population)
  - Employee of month awards, but only if the award is given subjectively
  - One off participation in Amazon beta programs, assuming the program does not rollup through the recipient's Amazon business organization (please see Section 6, FAQ iii for more information)

3.5 Suggested Alternatives: It is not the *WHAT* you choose to give an employee as a Gift, but *HOW* the Gift is given that makes the difference. The same Gift can either adhere to the policy or violate the policy depending on the reason and manner in which it is provided to the employee. Providing Gifts to employees for non-discretionary purposes puts Amazon at risk with the United States Department of Labor regulatory requirements. It is every Amazonian's responsibility to help protect Amazon from regulatory risks that could have negative (financial or reputational) implications.

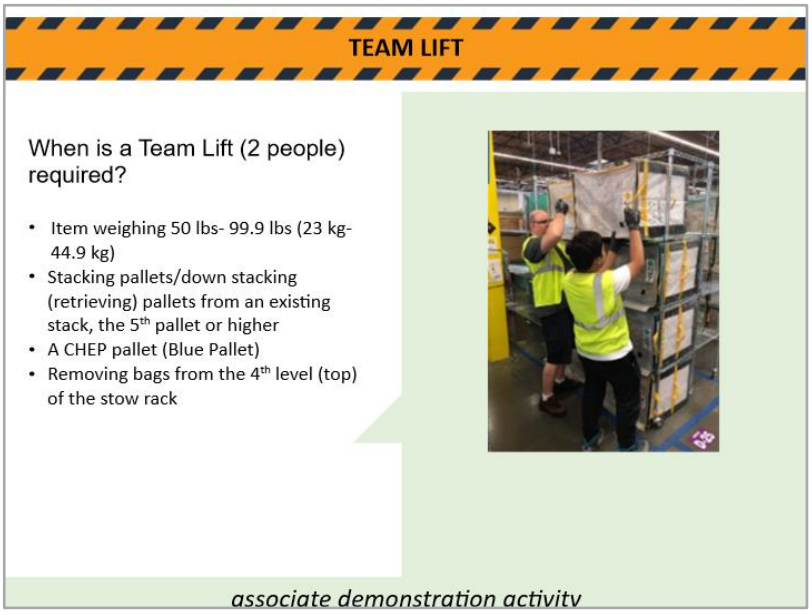
If at any time, you are thinking of giving a Gift to an employee in lieu of cash to compensate the employee for a non-discretionary purpose, **STOP!** Try one of the following alternatives instead.

- Make changes to your proposed program to make it an approved discretionary program.
  - Make it random – remove guarantee or expectation

    - Make it subjective – remove achievement requirements and restrictions
    - Convert to a contest or drawing system that limits the number of winners to less than 10% of the eligible population.
- Request as a cash bonus through Payroll except NA operations.
    - To submit a cash bonus request via quicklink.
    - Approvals for cash bonus follow the S&TP Approval Matrix.

Important Note: The use of Gift Cards within NA Operations (CF, ATS, PS, AMZL, and GSF) is no longer permitted. Alternatively, NA Operation teams should refer to the NA Operations Cash Bonus SOP for specific cash bonus instructions.

- Request as a cash bonus through Payroll.
    - To submit a cash bonus request via quicklink.
    - Approvals for cash bonus follow the S&TP Approval Matrix.

Slide ID	9e0cba63-74e9-4e0c-b0d1-e898e59323f7
Preview Image	

ID	Type	Source Text	Translation
DNs	Slide name	TEAM LIFT	TEAM LIFT
NVI	Text Box	**TEAM LIFT**	**TEAM LIFT**
WQA	Text Box	1When is a Team Lift (2 people) required?	When is a Team Lift (2 people) required?
WQA		• 2Item weighing 50 lbs- 99.9 lbs (23 kg- 44.9 kg)	Item weighing 50 lbs- 99.9 lbs (23 kg- 44.9 kg)
WQA		• 3Stacking pallets/down stacking (retrieving)	Stacking pallets/down stacking (retrieving) pallets from an existing stack, the 5th pallet or higher
WQA			A CHEP pallet (Blue Pallet)

Preview Image	

ID	Type	Source Text	Translation
ZWc	Slide name	STEP STOOL/LADDER/STAIR USAGE	STEP STOOL/LADDER/STAIR USAGE
z7k	Text Box	**STEP STOOL/LADDER/STAIR USAGE**	**STEP STOOL/LADDER/STAIR USAGE**
Atk	Text Box	1**Safe Behaviors for Step Stool/Ladder**	**Safe Behaviors for Step Stool/Ladder**
Atk		• 2Use to prevent from reaching out of power zone	Use to prevent from reaching out of power zone
Atk			take one step at a time, do not rush, and face forward
Atk		• 3take one step at	Never overextend to reach

NA ATS Safety Basics
Ambassador Guide for AIR

transportation

Workplace Health & Safety
Safety Learning & Development

Trainer Note

Please ensure that all associates in your group are being labor tracked under the appropriate CALM Code for this portion of training. All initial training of new starts, not in a specific path. Includes NHO, NA ATS Safety Basics, initial Safety Rodeo or Safer Year, DG, initial AIR FLY SMS and Site Tour. All classroom except Safety Training which is conducted on floor will be tracked under the following CALM Code..

ORTR

Start Time	12/01/2022 09:32:00
End Time	12/01/2022 12:05:00
Current Process / Role	Admin Master Sessions Learning
Warehouse	KRIV
New Process	Onboarding
New Role	Orientation
Save Reassignment	

About This Guide

This Ambassador Guide is formatted for Kindle use and is not intended for presenting in a classroom setting. The training must be conducted on the floor, in the associates' real work environment, or in a designated training location (on the floor) with access to the equipment that's referenced.

To conduct this training, please explicitly follow the instructions provided to you (the Ambassador) in this guide.

'ATS Safety Basics' will serve as your trainee(s) primary introduction to Safety at Amazon. Once you have conducted this training, your trainee(s) should understand how to operate safely in their new work environment.

This Ambassador Guide is a resource for you. Your trainee(s) do not need to view the content as you will be communicating, demonstrating, and observing your trainee(s) as they practice the safety topics covered in this course.

...NOW LET'S GET STARTED!

Using This Guide

Each topic in this guide is structured in '**Communicate this**' (verbal instruction from the Ambassador), '**Demonstrate this**' (Ambassador-led demonstration), and '**Observe this**' (Ambassador observation of trainee(s) correctly practicing the action/behavior that was introduced). Let's review each of these sections in detail.

Communicate this

The '**Communicate this**' label indicates that you should read aloud the information marked in quotations (“ “). Read slowly and speak clearly.

Demonstrate this

The **‘Demonstrate this’** label indicates that you must demonstrate the action shown in the image/described on the page to your trainee(s), following instructions provided.

Observe this

The **‘Observe this’** label indicates that you should ask your trainee(s) to perform the task that you previously demonstrated to verify their understanding. Identify opportunities to re-emphasize points mentioned, point out corrections, and acknowledge actions that are performed correctly.

Introduction to ATS Safety Rules

Communicate this

"Amazon is committed to being Earth's safest place to work. We value our personal safety and the safety of those around us and make it the top priority in everything that we do.

To sustain a safe work place for everyone, Amazon Transportation Services (ATS), which includes Amazon Sort Centers and Amazon AIR, has embedded ATS Safety Rules into our culture. These safety rules target activities where failure to comply has the highest potential for serious injury. Compliance with the ATS Safety Rules are considered a condition of employment which means that you must follow them at all times.

The purpose of Safety Training is to give you the knowledge and skills needed to avoid injuring yourself and others. I will introduce you to each ATS Safety Rule and will communicate, demonstrate, and then ask you to demonstrate back to me how to safely handle certain tools, equipment, and other safe practices expected from all Amazon employees."

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Table of Contents

Always Work Safely

Always Work Safely

Communicate this

ACTION: Read the information below aloud.

“At a high level, **Always Work Safely** means:

- To protect yourself and others, always stop what you are doing and intervene if you see a safety hazard.
- If you believe some behaviors or actions might be unsafe, please escalate to your manager immediately.
- You should report all injuries, near misses (aka **close calls**), and safety hazards as soon as you are aware of them.

I will explain practices which you must follow to ensure that you **always work safely** during your shift.”

Start of Shift Stretching

Communicate this

ACTION: Read the information below aloud.

“Warmup Guidelines: Start of shift stretching can help keep your body warmed up and fit throughout the day. Stretches are typically conducted during standup meetings with your manager or process assistant (PA) at the beginning of your shift. While stretches during standup meetings are guided, you are encouraged to stretch throughout your shift whenever you feel it is necessary. (For example: After breaks)

- When performing start of shift stretching, ensure you are in a comfortable range that prepares your body for activity.
- Make sure that the movement is continuous, controlled, and intentional.
- Start of shift stretching increases blood flow, lubricates joints, and warms up the muscles to prepare them for work.
- Perform 10 reps of each stretch.

Start of Shift Stretching

Demonstrate this

ACTION: Demonstrate the stretches below and ask the learners to perform them with you.

1. Wrist Circles

1. Hold both hands in front of you
2. Slowly rotate each hand in clockwise circles
3. Repeat, moving counterclockwise
4. Perform 10x

2. Hand Squeezes

1. Hold both hands in front of you
2. Squeeze fingers together, making a fist
3. Open hand back up and repeat
4. Perform 10x

Start of Shift Stretching

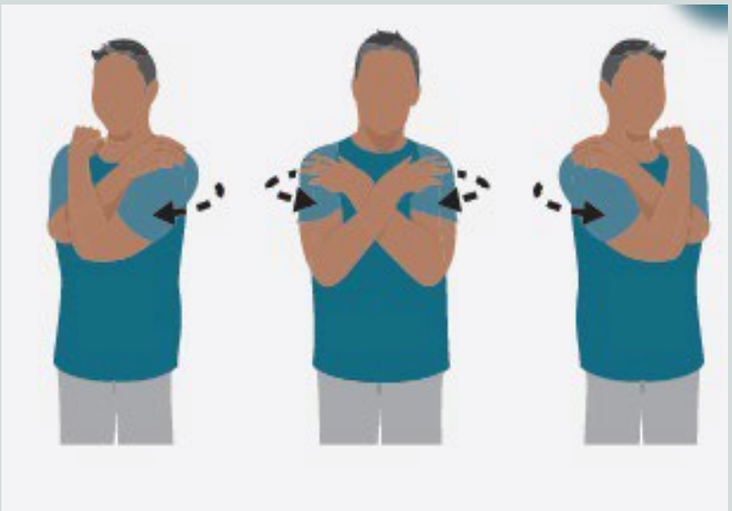
Demonstrate this

ACTION: Demonstrate the stretches below and ask the learners to perform them with you.

3. Neck Turns

1. Stand with your head facing forward
2. Slowly turn head to the left, then turn head to the right
3. Return to the start position and repeat
4. Perform 10x

4. Lumbar Rotations



1. Stand tall with your back straight and hands on the opposite shoulders
2. Slowly twist to one side, then return back to the start position
3. Alternate sides and repeat
4. Perform 10x

Start of Shift Stretching

Demonstrate this

ACTION: Demonstrate the stretches below and ask the learners to perform them with you.

5. Ankle Rolls

1. Stand tall and shift your weight to one foot
2. Roll unweighted ankle in small circles
3. Repeat and alternate sides
4. Perform 10x (on each side)

6. Standing Hamstring Curl

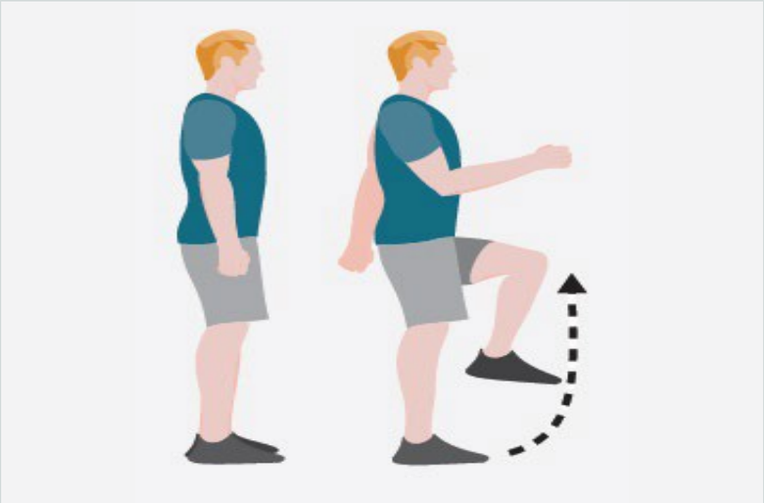
1. Stand tall with both of your feet on the ground
2. Bend one knee and lift your heel backwards
3. Straighten knee and lower your heel back to the ground
4. Alternate sides and repeat
5. Perform 10x

Start of Shift Stretching

Demonstrate this

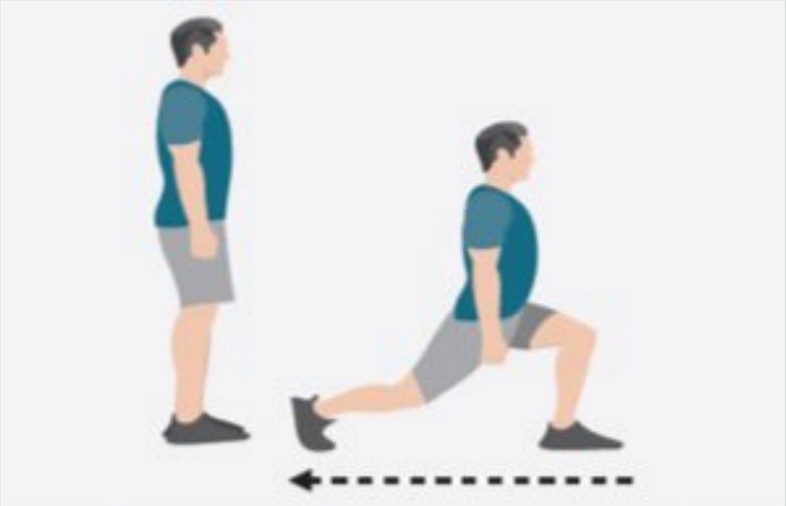
ACTION: Demonstrate the stretches below and ask the learners to perform them with you.

7. Marches



1. Stand tall with both of your feet on the ground
2. Bend one knee and lift it up and forward, by lifting your foot off the ground
3. Lower your foot back down and straighten the knee
4. Alternate sides and repeat
5. Perform 10x

8. Reverse Lunge Step Back



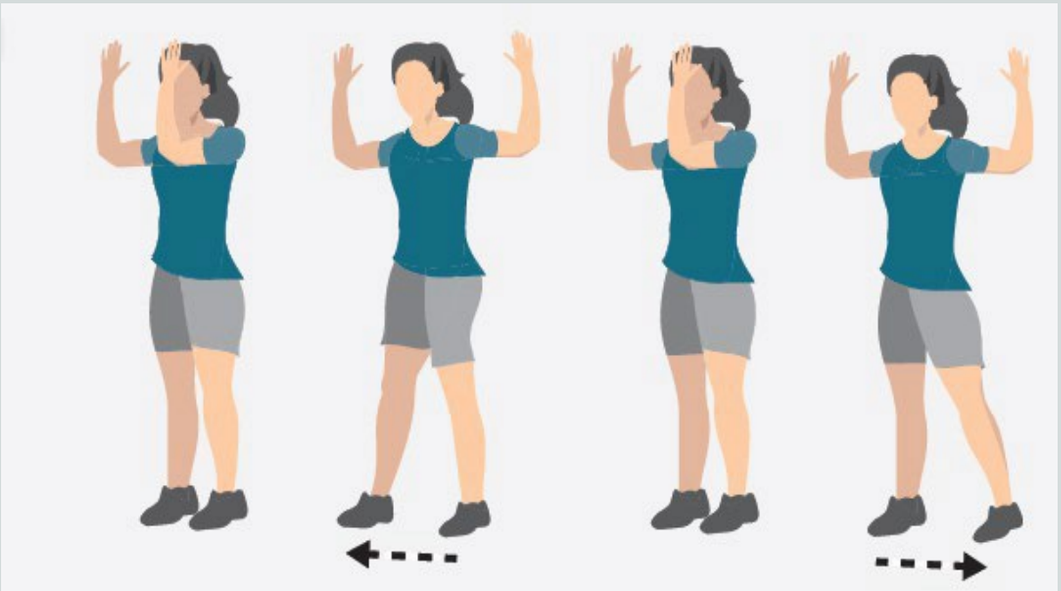
1. Stand tall with both of your feet on the ground
2. Bend one knee and step your opposite foot back
3. Make sure that your front knee does not go below 90 degrees
4. Swing arm to the opposite side of the forward bent leg
5. Perform 10x

Start of Shift Stretching

Demonstrate this

ACTION: Demonstrate the stretches below and ask the learners to perform them with you.

9. Side Stretch Shoulder Blade Squeeze



1. Stand with both of your feet together and arms raised forward with your elbows bent.
2. Elbows should be bent at 90 degree angle for clarity.
3. Step your right foot to the right and open your arms.
4. Step your right foot back to the center and close your arms.
5. Repeat this time stepping to the left and then back to center.
6. Repeat series and continue to alternate sides.
7. Perform 10x.

Start of Shift Stretching

Observe this

ACTION: Watch learners as they repeat the stretches along with you to verify understanding.

Key things to watch out for and reiterate are:

1. Learners are performing stretches within a comfortable range and are not overextending themselves or engaging in any painful movements.
2. Learners are making continuous movements while performing each activity (movements shouldn’t be too fast or too slow).
3. Learners are not bouncing when they stretch. This can injure their muscle and contribute to muscle tightness.
4. Learners are not holding their breath while stretching.
5. Learners are holding their stretch for a minimum of 10 seconds.

End of Shift Stretching

Communicate this

ACTION: Read the information below aloud.

“Here are some stretching guidelines that will be helpful to use at the end of the shift.

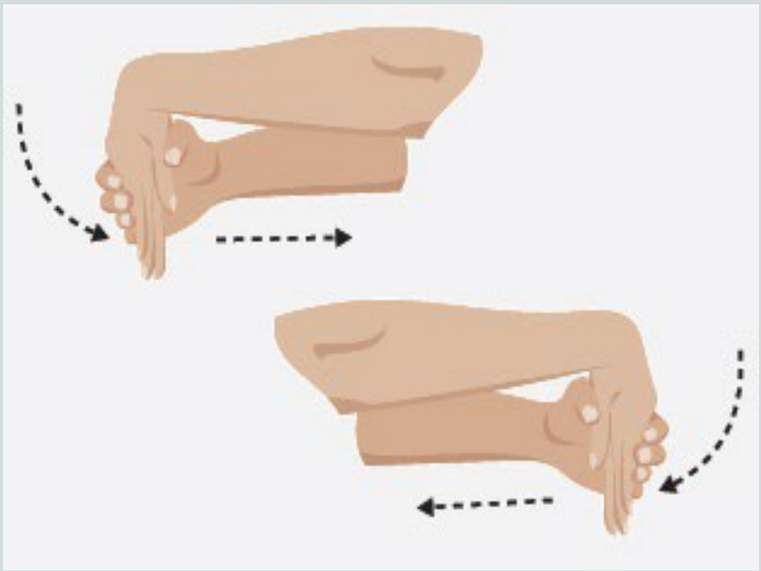
- Each stretch should be held in a challenging but comfortable position at the end of a muscle’s range of motion.
- Each stretch is sustained and held for typically 10-30 seconds.
- Don’t bounce when you stretch.
- Stretching should be felt as a slight pulling sensation in the muscle. No pain should be felt.
- If pain is felt during stretching alert your PA/Manager.
- Stretches are most effective immediately following an activity or after an active warm up, to target specific muscles.”

End of Shift Stretching

Demonstrate this

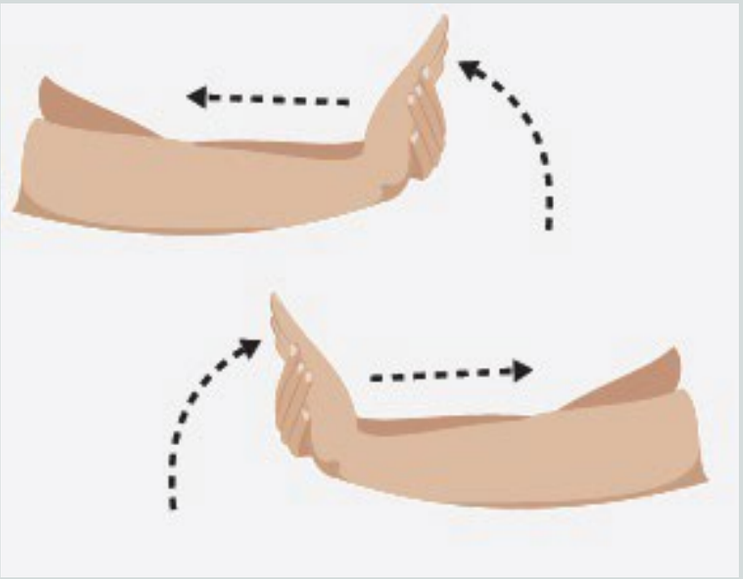
ACTION: Demonstrate the stretches below and ask the learners to perform them with you.

1. Forearm Stretch Extensors



1. Straighten your arm with palm facing downwards
2. Use your other hand to pull your fingers down
3. Hold this position for 10 seconds
4. Switch sides and repeat the same instructions

2. Forearm Stretch Flexors



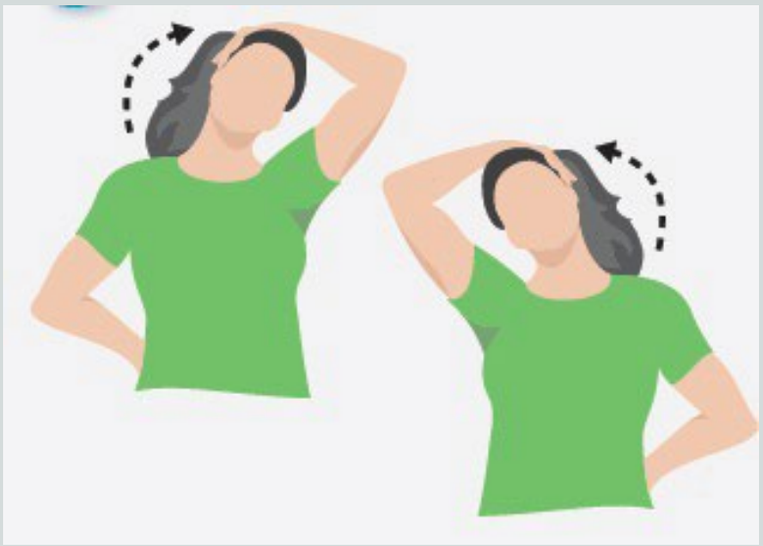
1. Straighten your arm with palm facing away from you
2. Use your other hand to pull fingers slightly closer to your body
3. Hold this position for 10 seconds
4. Switch sides and repeat the same instructions

End of Shift Stretching

Demonstrate this

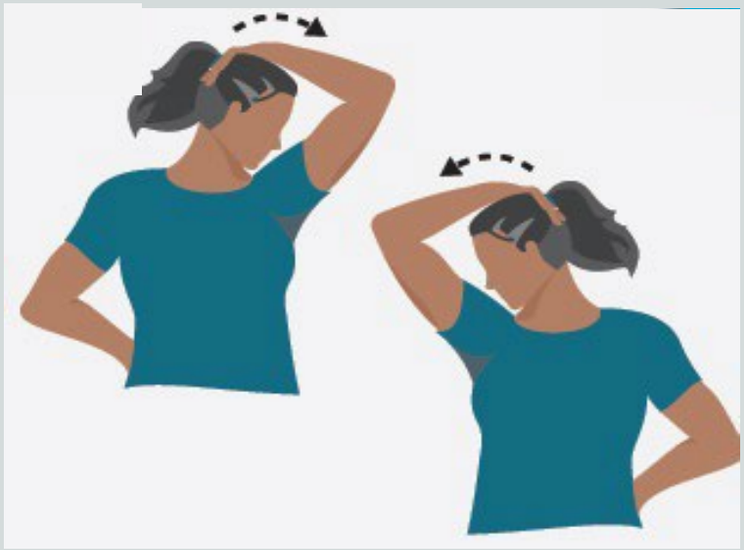
ACTION: Demonstrate the stretches below and ask the learners to perform them with you.

3. Upper Trap Stretch



1. Place one hand on the top of your head
2. Using that hand, tilt your head towards your shoulder
3. Hold this position for 10 seconds
4. Switch sides and repeat the same instructions

4. Levator Stretch



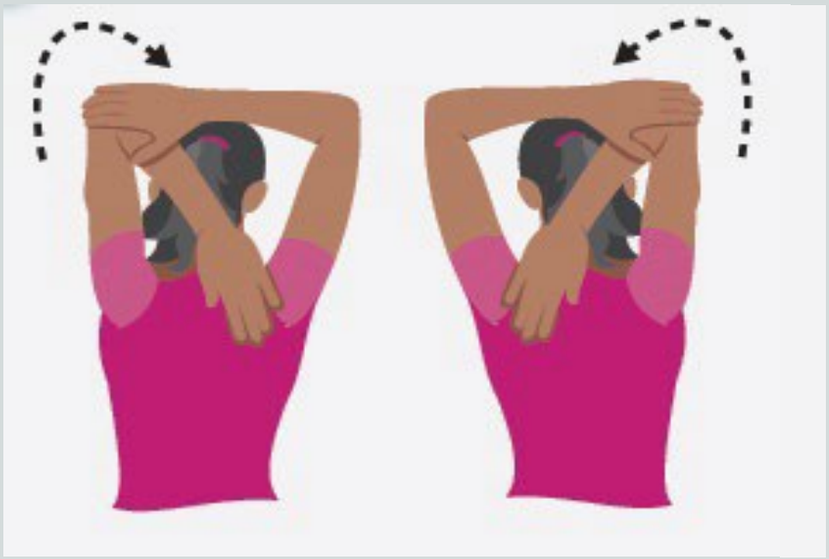
1. Place one hand on the top of your head
2. Turn your head towards the raised hand
3. Use that hand to tilt your head towards your shoulder
4. Hold this position for 10 seconds
5. Switch sides and repeat the same instructions

End of Shift Stretching

Demonstrate this

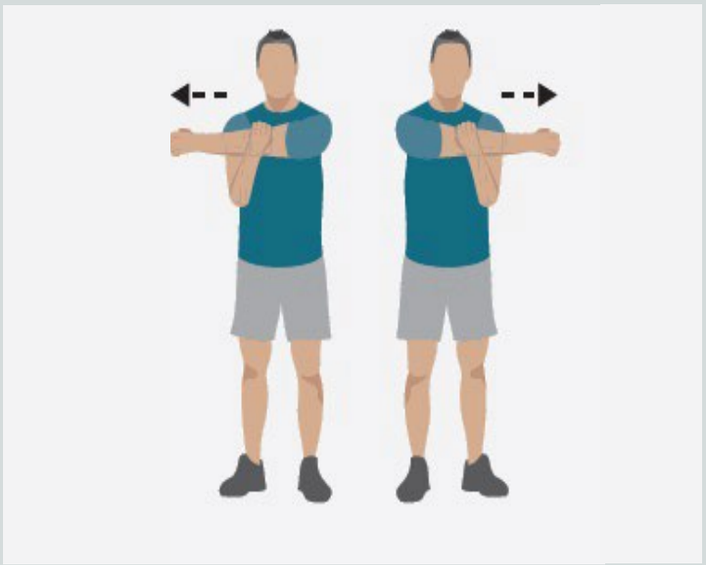
ACTION: Demonstrate the stretches below and ask the learners to perform them with you.

5. Triceps Stretch



1. Place your arm behind your head
2. Grab your elbow with your other hand and pull the elbow towards your head
3. Hold this position for 10 seconds
4. Switch sides and repeat the same instructions

6. Crossbody Stretch



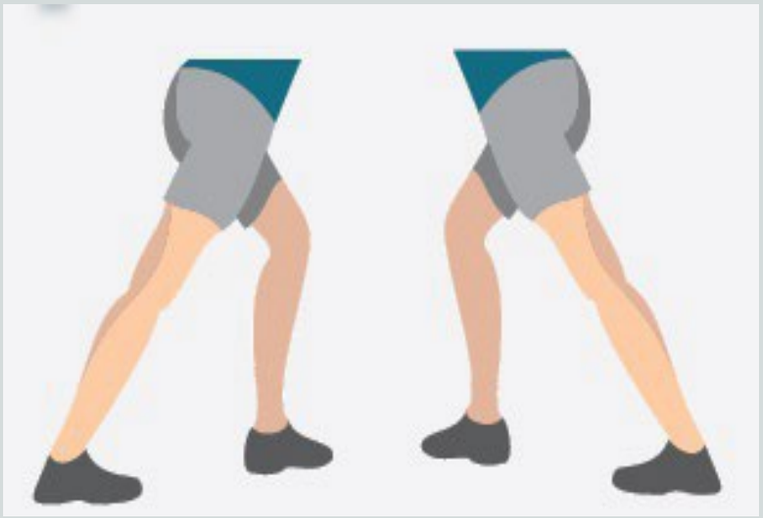
1. Hold your arm straight
2. Use your other hand to pull the arm across your chest
3. Hold this position for 10 seconds
4. Switch sides and repeat the same instructions

End of Shift Stretching

Demonstrate this

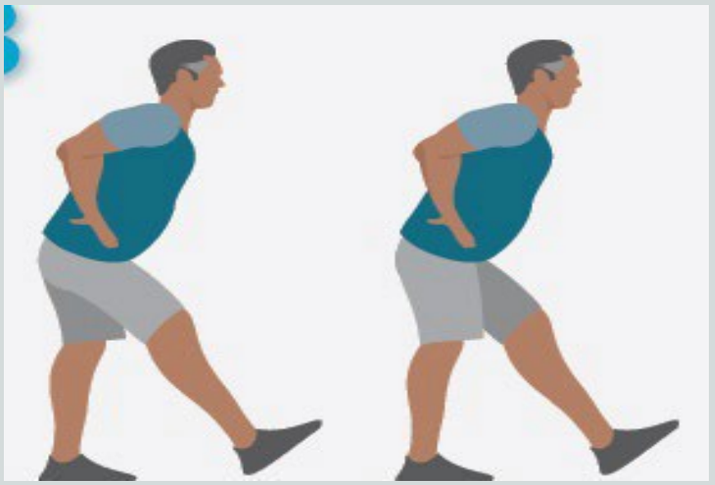
ACTION: Demonstrate the stretches below and ask the learners to perform them with you.

7. Calf Stretch



1. Step one of your feet back and point your toes straight
2. Bend your front knee and shift the weight forward
3. Hold this position for 10 seconds
4. Switch sides and repeat

8. Hamstring Stretch



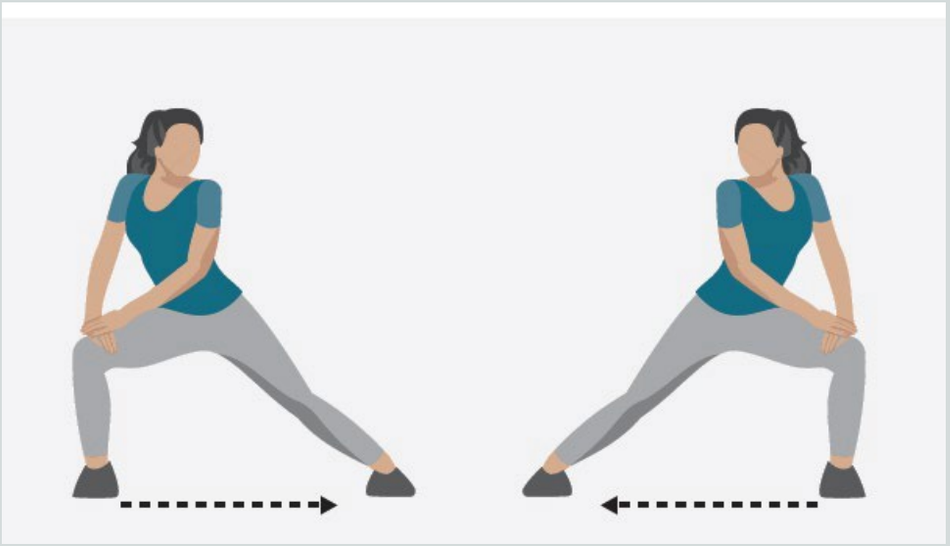
1. Step one of your feet forward, flex the foot up and straighten your leg
2. Bend forward at the waist, keeping the front leg and back leg straight
3. Hold this position for 10 seconds
4. Switch your sides and repeat

End of Shift Stretching

Demonstrate this

ACTION: Demonstrate the stretches below and ask the learners to perform them with you.

9. Adductor Stretch



1. Stand with your feet apart, then bend and place both of your hands on one knee
2. Shift knee to your left while shifting the hips back
3. Hold this position for 10 seconds
4. Switch sides and repeat

End of Shift Stretching

Observe this

ACTION: Watch learners as they repeat the stretches along with you, to verify understanding.

Key things to watch out for and reiterate are:

1. Learners are performing stretches within a comfortable range and are not overextending themselves/engaging in any painful movements.
2. Learners are making continuous movements while performing each activity (movements shouldn’t be too fast or too slow).
3. Learners are not bouncing when they stretch. This can injure their muscle and actually contribute to muscle tightness.
4. Learners are not holding their breath while stretching.
5. Learners are holding their stretch for a minimum of 10 seconds.

Box Cutter/Knife Handling

Communicate this

ACTION: Read the information shown below aloud.

- “Always wear gloves when using a box cutter or knife.
- Before use, ensure that the box cutter/knife is in good condition.
- Never attempt to use a damaged box cutter/knife. Discard of any damaged box cutter/knife properly in a designated bucket or give it to a member of the site's Safety team and get the box cutter/knife replaced.
- A hook knife should be used to cut shrink wrap off of a pallet (using the ‘hook’ side of the knife). A hook knife should not be used to cut corrugate (aka cardboard).
- Always cut away from your body keeping fingers, arms, and other body parts out of the path of the knife.
- If the blade of a knife is dull, do not attempt to replace the blades.
- A corrugate knife should be used to cut corrugate and it should not be used to cut plastic wrap.
- Corrugate knives must be replaced after a minimum of 7 days use (dispose in a proper receptacle), as the plastic can begin to melt after a week of usage.

Box Cutter/Knife Handling

Demonstrate this

ACTION: Show learners real life examples of a hook knife and a corrugate knife.

1. Hook Knife

2. Corrugate Knife

Box Cutter/Knife Handling

Demonstrate this

ACTION: Demonstrate the activities below.

3. Cutting Wrap

- Using a hook knife, demonstrate cutting wrap from a pallet

4. Opening a Box

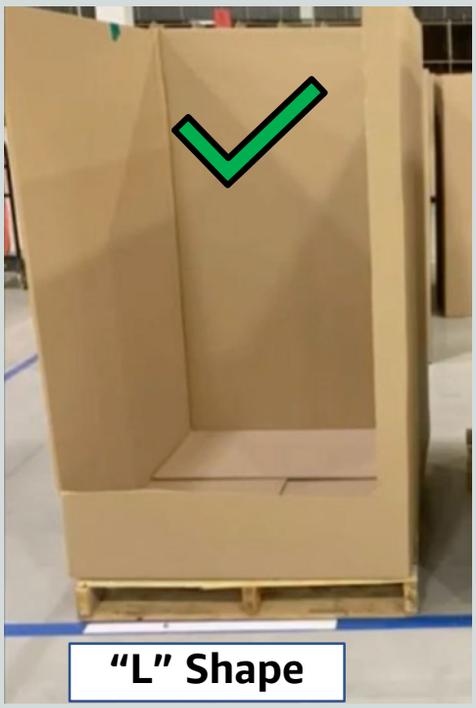
- Using a corrugate knife, demonstrate cutting away from your body when opening a box

Box Cutter/Knife Handling

Demonstrate this

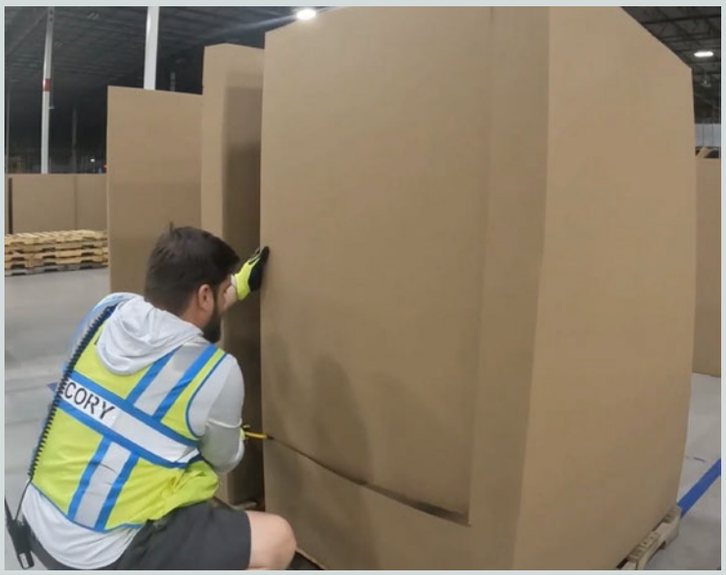
ACTION: Demonstrate the activities below.

3. Cutting a Shuttle in an “L” or “U” Shape



“L” Shape

“U” Shape



- Using a corrugate knife, demonstrate a Shuttle in an “L” shape and a “U” shape and securing the "door" against the side of the Shuttle (or with tape if not staged directly next to another Shuttle)

Box Cutter/Knife Handling

Observe this

ACTION: Observe learners using a hook knife to cut plastic wrap from a pallet and using a corrugate knife to open a box, to verify understanding.

Key things to watch out for/reiterate are:

1. Learners are wearing gloves while using a box cutter/knife.
2. Learners are cutting away from their body.
3. Learners are not attempting to change the blade of the knife.
4. Learners are only using the hook side of the knife to cut plastic wrap from a pallet.
5. Learners are using the appropriate knife for the respective tasks:
    - Hook knife to cut shrink wrap off of a pallet.
    - Corrugate knife should be used to cut corrugate/cardboard shuttles.
6. Learners inspect the knife for damages like bent blades, cracked handles, and jamming of blades before attempting to use.

Step Stools

Communicate this

ACTION: Read the information below aloud.

- “Use a step stool/ladder to prevent yourself from overreaching (reaching outside of your power zone). Your power zone is located between your shoulders and hips. Using your body’s power zone will help you prevent injuries by decreasing overall stress and strain.

  Note: Overreaching occurs when an individual reaches outside of their power zone to perform a task. You are overreaching if your hands go above your shoulders when grabbing an item or anytime you extend your body beyond where you can comfortably reach and perform repetitive activities without experiencing discomfort.
- Before using a step stool, inspect it for any signs of damage. Do not use it if it is damaged or shows other signs of not being in proper working condition.
- Escalate to a member of leadership or a member of your site's Safety team regarding the broken step stool to ensure no one else uses it.
- When climbing up or down a step stool, face step stool, take one step at a time, and do not rush.
- Always store stools in designated 5S location.
- When possible, use three points of contact (two feet on the ground, one hand on the stool) when ascending and descending the stool.
- AR Sites: Never release a POD or scan an item while standing on a step stool.”

Step Stools

Demonstrate this

ACTION: Demonstrate the activities below.

1. Ascending and Descending

- Demonstrate the proper method of ascending and descending a step stool (always facing the step stool)

2. Proper Storage

- Demonstrate the proper storage of a step stool in its 5S location

Step Stools

Observe this

ACTION: Observe each learner ascending, descending, and storing a step stool.

Key things to watch out for/reiterate are:

1. Learners are verifying that their step stool/ladder is in good working condition before using.
2. Learners are not using step stool/ladder while trying to reach for things that are out of their power zone. If so, this should be identified and corrected immediately.
3. Learners are facing forward when ascending and descending a step stool/ladder.
4. Learners are properly storing step stools in the appropriate 5S location after use.

Pallet Handling

Communicate this

ACTION: Read the information below aloud.

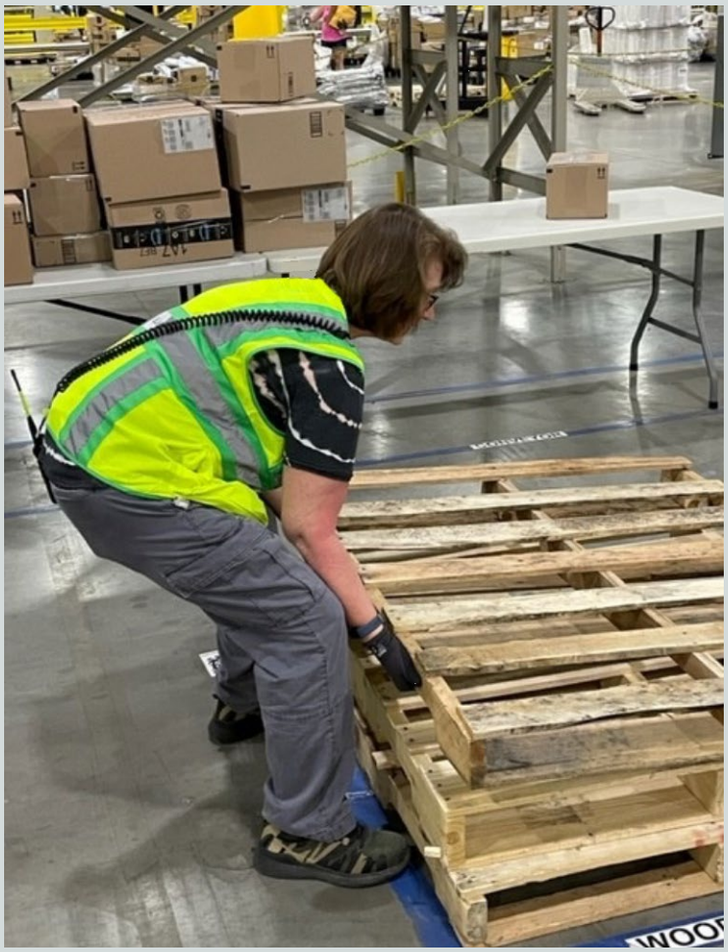
- “Always wear gloves when handling pallets.
- Check for and dispose of exposed nails and loose planks. Dispose of wood pieces and loose nails in wood bins.
- Lift pallets up by handles and not by the planks.
- Walk a pallet onto and off of the stack by sliding the pallet on its edge.
- When placing a pallet on the ground, bend at the knees (not at the waist) to slowly lower the pallet to the ground. Do not drop the pallet.
- Store pallets in designated 5S locations. Place a cone or empty tote on all single pallets for increased visibility.
- A team lift is required to stack/unstack pallets 5 or higher (16 for plastic pallets).
- Mechanical lift is required to stack/unstack pallets 11 or higher (16 for plastic pallets).
- Non-standard pallets (72” or larger) always require a team lift and must be stacked separately from other pallets.
- Never stand on pallets. If you must step onto a pallet, only place one foot on it. Never have both of your feet on a pallet.
- Pallets should always be laid flat or stacked (not standing on their side).
- Only handle one pallet at a time. Never walk with or lift more than one pallet at a time.”

Pallet Handling

Demonstrate this

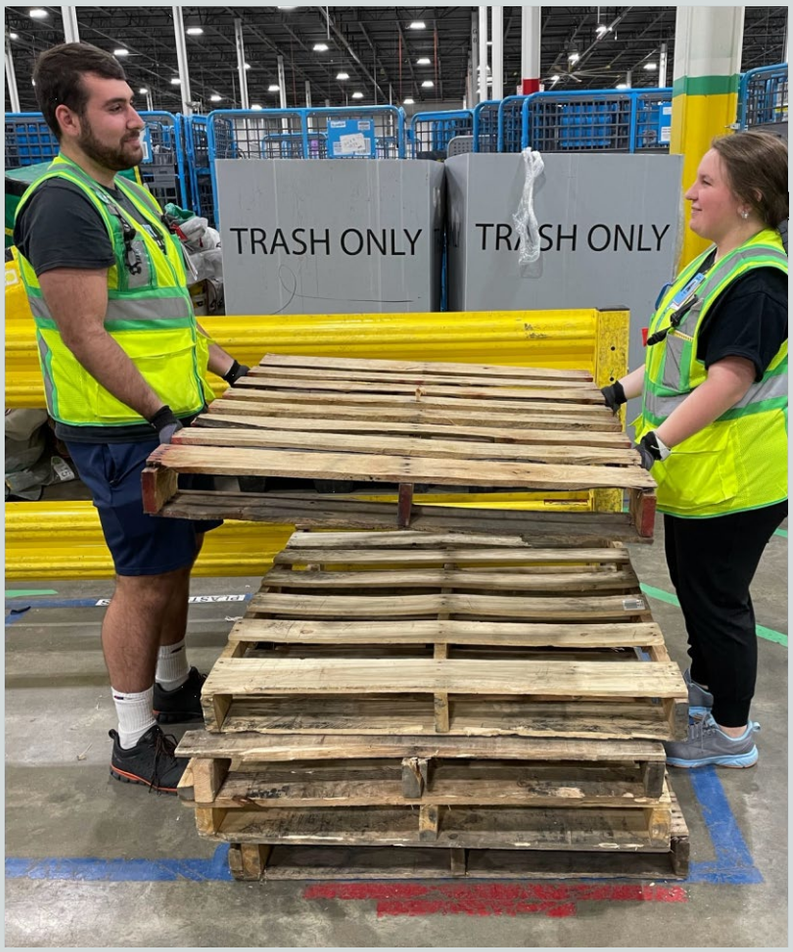
ACTION: Demonstrate the activities below.

1. Grabbing Pallets



- Demonstrate grabbing pallets by handles.

2. Team Lift



- Demonstrate team lift of pallets.

Pallet Handling

Demonstrate this

ACTION: Demonstrate the activities below.

3. Walking Pallets

- Demonstrate walking pallets onto and off the stack

4. Proper Foot Placement

- Demonstrate proper foot placement on a pallet

Pallet Handling

Observe this

ACTION: Observe learners transporting a pallet and demonstrating proper foot placement on a single (unstacked) pallet.

Key things to watch out for/reiterate are:

1. Learners should always wear gloves and should pick up pallets using the handles.
2. Learners should verify the condition of the pallet before using them.
3. Learners should not try to lift more than one pallet at a time.
4. Learners should bend at the knees and lower the pallet when placing it on the ground.
5. After usage, learners should store the pallet in designated 5S locations.
6. Lifting benchmarks should always be followed:
   - Team lift—stack/unstack pallets 5 or higher (16 for plastic pallets) and non-standard Pallets (72" or larger).
   - Mechanical lift—stack/unstack pallets 11 or higher (16 for plastic pallets).
7. Defective wooden pallets should be moved and stored in their designated 5S location when they are not in use."

Pallet Jack Safety

Communicate this

ACTION: Read the information below aloud.

- “Use both of your hands when pumping the pallet jack to raise pallet(s) off the ground.
- Always pull the pallet jack handle with your right arm with your right hand positioned over the lever. Do not pull it with both arms.
- When pulling a pallet jack, always walk to the side of the lever. Never walk directly in front of the pallet jack while pulling it.
- While the pallet jack is in motion, do not turn or twist to face the oncoming pallet.
- Always move in a controlled and steady manner.
- To stop the pallet jack, slow your momentum by extending the arm pulling the pallet jack. Do this with a slight bend in your elbow to apply resistance to the handle. In case of an emergency, drop the load by pulling up on the lever.
- Face forward and use both of your hands when pushing towards the load.
- When not in use, pallet jacks must be stored under a pallet with the handle turned sideways (**jackknife** the handle).”

Pallet Jack Safety

Demonstrate this

ACTION: Demonstrate the activities shown below.

1. Pump the lever to raise the pallet jack

- Demonstrate using both hands to pump the pallet jack lever up and down to raise the pallet off the ground

2. Pulling pallet jack

- Demonstrate pulling a pallet with one hand on the lever, in order to be ready for an emergency stop if needed

Demonstrate this

ACTION: Demonstrate the activities shown below.

3. Walking with a Pallet Jack

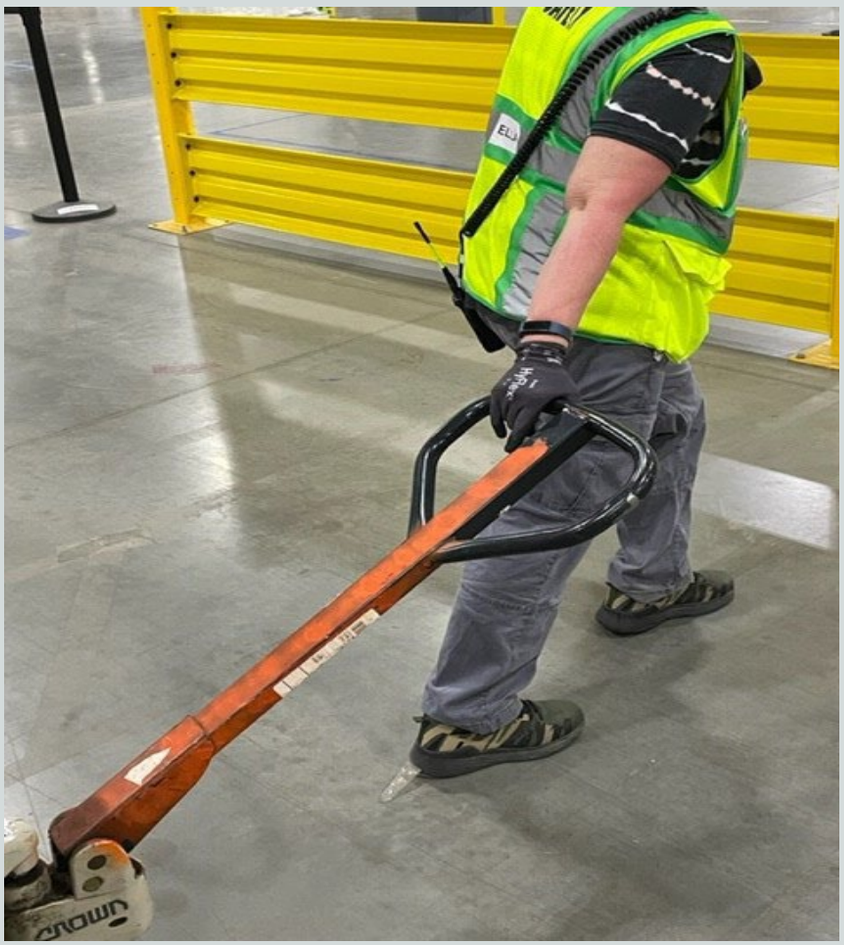
- Demonstrate walking to the side when pulling a pallet

- Never walk directly in front while pulling a pallet

Demonstrate this

ACTION: Demonstrate the activities shown below.

4. Stopping the pallet jack



- Demonstrate stopping the pallet jack by extending the (right) arm that's being used to pull the pallet jack

Pallet Jack Safety

Observe this

ACTION: Observe learners using a pallet jack (raising, pulling, walking with, and stopping the pallet jack). Observe learners using proper foot placement on a single (unstacked) pallet.

Key things to watch out for/reiterate are:

1. Learners should use both hands when pumping the pallet jack.
2. Learners should face away from the pallet jack and pull the handle with their right arm with their right hand hand positioned over the lever.
3. To stop the pallet jack, learners should slow their momentum by extending the arm pulling the pallet jack with a slight bend in their elbow to apply resistance to the handle.
4. After usage, learners should store the pallet jack under a pallet with the handle turned sideways (**jackknife** the handle).
5. Learners should always move the pallet jack with one hand on the lever to be ready for an emergency stop if needed.

Training Group Pulse Check

Training Group Pulse Check

Communicate this

ACTION: Read the information below aloud.

“Let’s review some of the important points we covered regarding the ATS Safety Rule, Always Work Safely.

I’m going to read each question and two answer options aloud. Once I have read both answer option A and B aloud, I will pause for each of you to respond with which one you believe is the correct answer. After all of you have answered the question, I will provide the correct answer. If majority of the group answers the question incorrectly, we will review that topic again.”

Training Group Pulse Check

Q1. What is the minimum time limit to hold a stretch?

a) 5 seconds

b) 10 seconds

Q2. Holding your breath while stretching gets better results?

a) True

b) False

Q3. You should **PUMP** the pallet jack using?

a) One arm

b) Both arms

Q4. How should you cut wrap using a knife?

a) Away from body

b) Towards your arms and body

Q5. You should **PULL** the pallet jack using?

a) Right arm

b) Both arms

Training Group Pulse Check

Q6. Which knife is used to cut cardboard?

a) Hook knife

b) Corrugate knife

Q7. Which direction should you face when descending a ladder or stool?

a) Face the ladder/stool when descending

b) Face away from the ladder/stool when descending

Q8. After usage, you should store the pallet at what location?

a) Appropriate 5S location

b) On its side at the closest spot to where you last used it

Q9. How will you move a pallet jack?

a) Face away and pull the pallet jack handle with your right arm

b) Face forward and pull the pallet jack handle with both arms

Personal Protective Equipment (PPE)

Personal Protective Equipment

Communicate this

ACTION: Read the information below aloud.

“At a high level, abiding by this ATS Safety rule means always using the PPE that is required for the task you are performing.

In this section, we will cover the PPE required for specific tasks at our site.”

Personal Protective Equipment

Communicate this

ACTION: Read the information below aloud.

"PPE is personal protective equipment that limits your exposure to risk factors that may cause injury. You will find various types of PPE used within each Amazon facility depending on the type of work done. **Only use Amazon-issued PPE.**

- Before using new types of PPE, be sure you receive training on its proper use.
- PPE can be found in the PPE vending machines. You can access vending machines with your Amazon issued ID number or ID card via scan.
- It is your responsibility to bring, store, and use your PPE as required daily.
- Inspect PPE prior to use. It is your responsibility to properly maintain and replace your PPE if it becomes worn or defective.
- PPE is not to be altered in any way, as altering PPE impacts its effectiveness.
- Always wear noise protection gears in areas designated with a **Hearing Protection Required** sign. Hearing protection is available at all safety board locations. Please ask if you need assistance in finding one.
- Glove requirements differ based on the task at hand.
- AIR requires impact-resistant gloves on the ramp, Caster Deck, and other process paths to prevent injury to the hands and fingers. They are mandatory for all AIR associates moving ULDs. Red/Yellow gloves are impact resistant gloves.

NOTE: Vests must be worn with the zippers or clasps secured to ensure 360° coverage. Use of hoods is not authorized.

Personal Protective Equipment

Demonstrate this

ACTION: Show the trainee(s) where to obtain the required PPE for the department.

1. Gloves

- Most frequently used PPE in facilities
- It prevents injuries when handling cardboard and wooden pallets

2. Impact - resistant gloves

- AIR requires impact-resistant gloves on the ramp, Caster Deck, and other process paths to prevent injury to the hands and fingers
- They are mandatory for all AIR associates moving ULDs

3. High visibility vests

- Some sites require vests to be worn in all areas of the work floor
- All sites require high-visibility vests to be worn in (or if crossing) a designated PIT area/PIT lane. For AIR, ANSI class 2 vests are required on the ramp

Personal Protective Equipment

Demonstrate this

ACTION: Show the trainee(s) where to obtain the required PPE for the department.

4. Hearing protection

- Ear plugs/muffs protect your hearing when working in noisy areas
- Signage indicates whether ear plugs are required
- Ear protection is required on the ramp

5. Composite toe shoes

- Safety shoes (with steel or composite toe) are required throughout the building due to the risk of foot injury
- In AIR facilities, only composite toe shoes are authorized

6. Face mask

- Face mask usage is subject to change depending on your organization and at times, your state
- Please confirm with your local site leadership for guidance

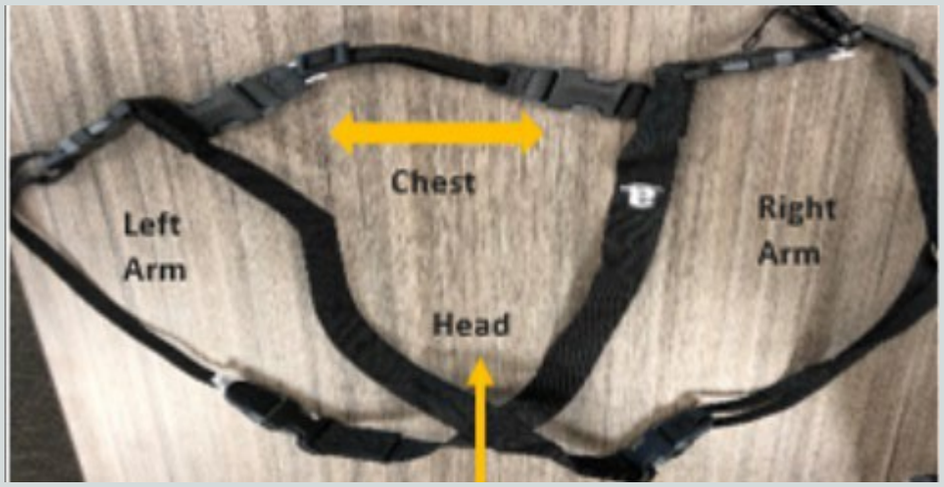
Personal Protective Equipment

Demonstrate this

ACTION: Show the trainee(s) where to obtain the required PPE for the department.

7. Scanner Harness

***The use of a scanner harness is optional for Amazon AIR associates.**



A Scanner Harness helps you to maintain control over your scanner if you need to use both hands for an activity, such as lifting a package.

- Lay out the Harness to identify the correct orientation. There are holes for your left and right arms, and a double clip goes across your chest.
- Place the harness over your head. The "A" should be facing out on your right side. The double clips should go across your chest.

Personal Protective Equipment

Demonstrate this

ACTION: Show the trainee(s) where to obtain the required PPE for the department.

8. Bump Cap***ONLY FOR AMAZON AIR

For AIR only:

Bump caps are recommended in the following process paths to reduce the risk of head strikes against low overhead obstructions-

- On the ramp when walking and working inside or underneath aircraft.
- During ULD load and unload, or any other activity that requires an employee to enter or exit a ULD.

Personal Protective Equipment

Observe this

ACTION: Observe learners using different PPE.

Key things to watch out for/reiterate are:

1. Learners are inspecting the PPE before use.
2. Learners are not altering the PPE given to them in any way.
3. Learners know to ask for a replacement if PPE is damaged or not appropriate for the task.
4. Learners understand hoods are not permitted and only authorized rain/snow hats or caps are to be used.

Hearing Protection

Communicate this

ACTION: Read the information below aloud.

“Earplugs are a form of PPE used to protect ears from loud noises. Always wear hearing protection devices in areas designated with a **Hearing Protection Required** sign. Headphone ear plugs are NOT appropriate hearing protection devices and are not allowed on the floor.

Follow these steps to properly insert ear plugs:

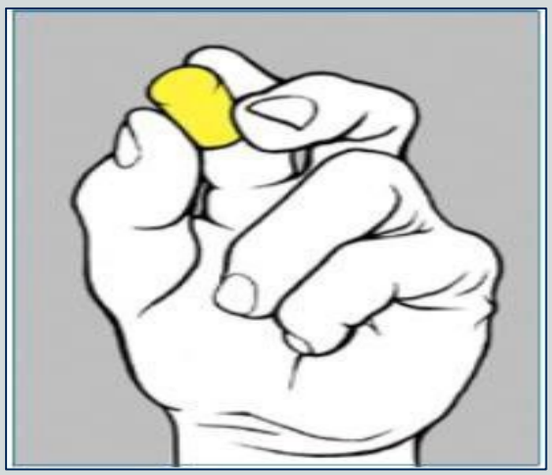
- **Step One:** With clean hands, roll and compress the earplug into a cylinder shape.
- **Step Two:** With opposite hand, reach behind your head and pull the top of the ear upward and insert the earplug.
- **Step Three:** Release the earplug to expand and block out noise. Make sure that the earplugs are inserted correctly. Earplugs should not be visible to others when looking straight ahead.”

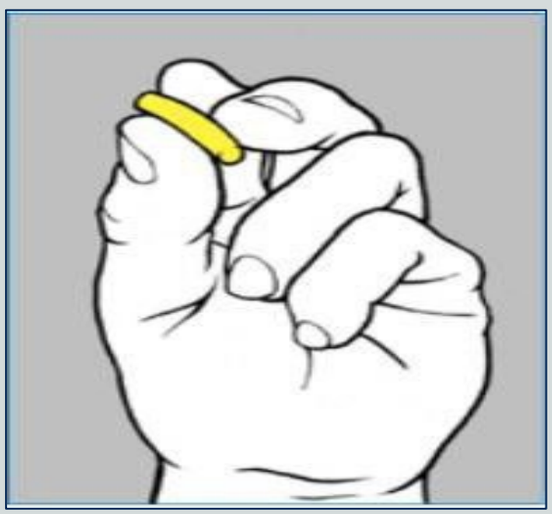
Hearing Protection

Demonstrate this

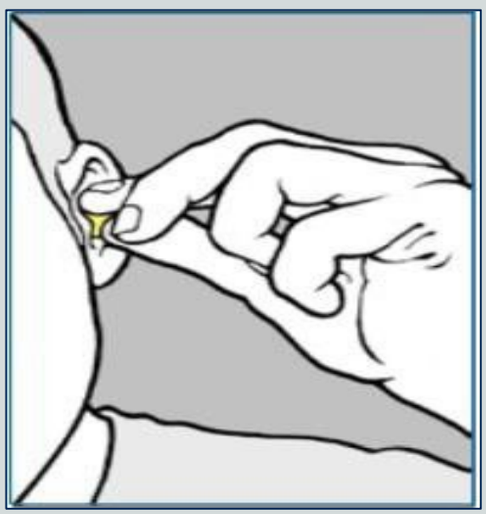
ACTION: Demonstrate how to properly insert ear plugs.

1. Roll and compress

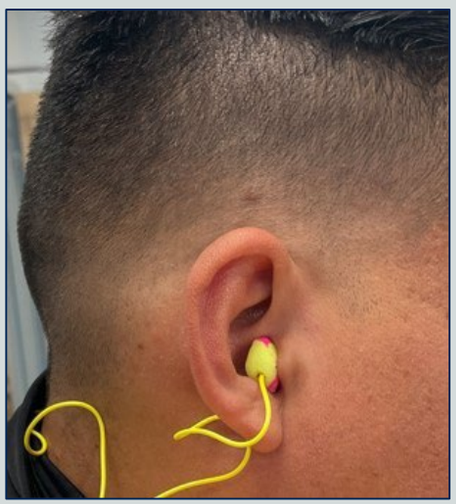




2. Pull and insert



3. Release and check



Hearing Protection

Observe this

ACTION: Observe learners using different hearing protection devices.

Key things to watch out for/reiterate are:

1. Learners are not using headphone ear plugs on site.
2. Learners are compressing the ear plugs with clean hands.
3. Learners are making sure that the earplugs are inserted correctly by making sure they are not visible from the front view.

Training Group Pulse Check

Training Group Pulse Check

Communicate this

ACTION: Read the information below aloud.

“Let’s review some of the important points we covered regarding the ATS Safety Rule on Personal Protective Equipment.

I’m going to read each question and two answer options aloud. Once I have read both answer option A and B aloud, I will pause for each of you to respond with which one you believe is the correct answer. After all of you have answered the question, I will provide the correct answer. If majority of the group answers the question incorrectly, we will review that topic again.”

Training Group Pulse Check

Q1. It is important to receive training on proper use, before using new types of PPE.

a) True

b) False

Q2. Ramp Associates must wear _____ while working in ramp functions.

a) Water proof gloves

b) Impact-resistant gloves

Q3. What is the third step in wearing an ear plug?

a) Pull and insert

b) Release and check

Q4. Safety shoes (with steel or composite toe) are **NOT** required throughout the building due to the risk of foot injury.

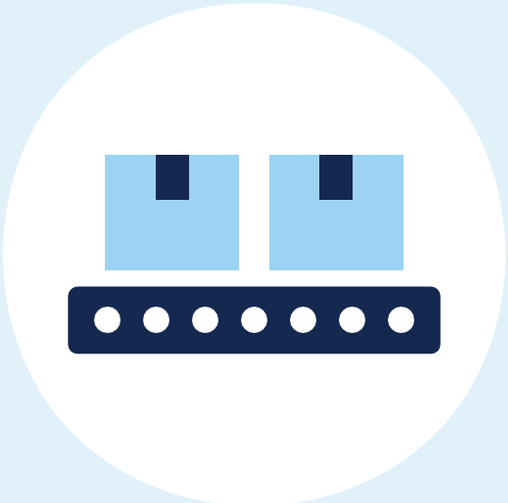
a) True

b) False

Q5. Apart from bringing, wearing, and storing your PPE, identify your other responsibilities?

a) Releasing

b) Maintaining



Conveyance

Conveyance

Communicate this

ACTION: Read the information below aloud.

- “Do not lean, ride, sit, or climb on a conveyor.
- Do not go under any conveyor with less than 6’8” of overhead clearance.
- All areas marked with red and white striped tape represent **No Stand** zones. No stand zones are where the automated conveyor meets the manual conveyor which creates a pinch hazard. Stay away from all No Stand zones.
- You must wear a break away lanyard and must have your hair pulled up above the base of the neckline. Never wear any loose clothing, loose jewelry, or accessories.
- Always wait for an opening to place boxes straight on the conveyor.
- In an emergency, use the E-stop to immediately stop the line.
- If any conveyance or machinery is malfunctioning, immediately contact a member of leadership or a member of your site's Safety team.
- Never attempt to clear a jammed conveyor unless you are trained and authorized to do so.
- Never place your hands into any portion of the conveyor.
- Always pick up packages that have fallen off the line to prevent trip hazards.
- Do not attempt to retrieve boxes that fall under the conveyance. Only trained personnel can retrieve packages that fall under the conveyor.
- Never block an area marked off in yellow and black tape as this obstructs air flow to machinery and creates a fire hazard.

Conveyance

Demonstrate this

ACTION: Demonstrate the activities shown below.

1. Traveling near conveyance

- Demonstrate locations for safe travel and show the yellow chains or cones in area

2. E-stop

- Point out guards in the area
- Show the trainees where the E-stop is located (E-stop button and/or red cable)
- DO NOT demonstrate pulling an E-stop

Conveyance

Observe this

ACTION: Observe learners around conveyance.

Key things to watch out for/reiterate are:

1. Learners are not standing in areas marked with red and white striped tape representing No Stand zones.
2. Learners are wearing break away lanyards and must have their hair pulled up above the base of the neckline with no loose clothing, loose jewelry, or accessories.
3. Learners are able to identify an E-stop.
4. Learners are keeping their hands free of all portions of the conveyor.
5. Learners are keeping the areas marked with yellow and black tapes free of obstructions.

Training Group Pulse Check

Training Group Pulse Check

Communicate this

ACTION: Read the information below aloud.

“Let’s review some of the important points we covered regarding the ATS Safety Rule on Conveyance.

I’m going to read each question and two answer options aloud. Once I have read both answer option A and B aloud, I will pause for each of you to respond with which one you believe is the correct answer. After all of you have answered the question, I will provide the correct answer. If majority of the group answers the question incorrectly, we will review that topic again.”

Training Group Pulse Check

Q1. Do not ride, sit, or _____on any conveyor.

a) Keep distance

b) Climb

Q2. Who can clear a jammed conveyor?

a) Everyone

b) Trained personnel

Q3. Red and white tape represents _____ zone.

a) No stand

b) Silence

Q4. Never place your hands into any portion of the conveyor.

a) True

b) False

Q5. In an emergency, use the _____ to immediately stop the line.

a) Z-stop

b) E-stop

Q5. Yellow and Black tape represents a no obstruction zone?

a) True

b) False

Area Readiness and Cleanliness

Area Readiness and Cleanliness

Communicate this

ACTION: Read the information below aloud.

“At a high level, this safety rule is about maintaining a safe workspace by keeping your work space clean and always returning equipment to its designated location. A safe work space is clean, clutter-free, free of slip/trip/fall hazards, with all items staged in their proper 5S locations. At Amazon, we refer to this concept as Area Organization (AO).”

Area Organization

Communicate this

ACTION: Read the information below aloud.

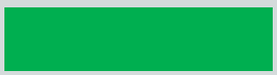
“Why Area Organization?

- ‘A place for everything and everything in its place.’ Everything must have a designated storage location and where it should always be stored (and promptly returned back to) when it is not in use.
- Area organization creates clear visual indicators as to where items throughout the warehouse are stored (colored floor tape, labels, standardized signage throughout the site).
- Everyone at this site is expected to uphold/maintain proper area organization in and around their workspace as this help us maintain a safe and efficient work environment for everyone.
- Ownership means keeping your workstation clean, putting trash in the proper place and making sure all equipment is placed in a properly marked location.”

Area Organization

Demonstrate this

ACTION: Read the information shown below aloud to explain the meaning of each floor marking and show a visual area.

Visual	Color(s)	Meaning
	Green	Pedestrian walkway, evacuation route
	Orange	PIT lane
	Green and Orange	PIT and pedestrian shared lane
	Green	Pedestrian walkway crossing PIT lane or AGV path
	Blue	Inventory and non-inventory storage, workstations
	Yellow	Trash receptacles, dock plates
	Red	Emergency equipment
	White	PIT parking
	Black and Yellow	Do not obstruct
	Black and Orange	AGV guide path
	Red and White	No standing or working area
	Black and White	Red tag area

Training Group Pulse Check

Training Group Pulse Check

Communicate this

ACTION: Read the information below aloud.

“Let’s review some of the important points we covered regarding the ATS Safety Rule on Area Readiness and Cleanliness.

I’m going to read each question and two answer options aloud. Once I have read both answer option A and B aloud, I will pause for each of you to respond with which one you believe is the correct answer. After all of you have answered the question, I will provide the correct answer. If majority of the group answers the question incorrectly, we will review that topic again.”

Training Group Pulse Check

Q1. A safe work space is clean, clutter-free, free of slip/trip/fall hazards, with all items staged in their proper ____ locations.

a) **6S**

b) **5S**

Q2. _____ means keeping your workstation clean, putting trash in the proper place and making sure the equipment is placed in the proper zone.

a) **Ownership**

b) Accuracy

Q3. What aids in identifying specific areas in your building?

a) **Standardized signage**

b) PPE

Q4. What does an orange-colored field marking indicate?

a) **PIT lane**

b) Emergency equipment

Q5. Area Organization creates clear visual cues.

a) **True**

b) False

Safe Body Positioning

Safe Body Positioning

Communicate this

ACTION: Read the information below aloud.

“Safe Body Positioning means you must always place your body in the safest position in relation to heights, overhead hazards, moving equipment, and material handling.

I will introduce you to a number of body positioning techniques that will reduce your risk of injury while you are performing certain tasks that your job may require.”

Gripping and Handling

Communicate this

ACTION: Read the information below aloud.

“Gripping and Handling Guidelines:

- “You must always use proper PPE.
- Test the weight and balance of the object, items might shift within the box when moved.
- Fingers and palm should make contact with the object when practicing **full hand contact**, no gaps should be seen between the hand and the object.
- Position one hand on the bottom corner to lift the object, and the other on the **opposite corner** to pull it towards your body.
- The hand and fingers should form the letter C, making full **C-grip** contact.
- DO NOT use built-in handles or straps to lift the package as those could break.
- Make sure to use both hands when conducting a six-sided check to avoid drops.”

Gripping and Handling

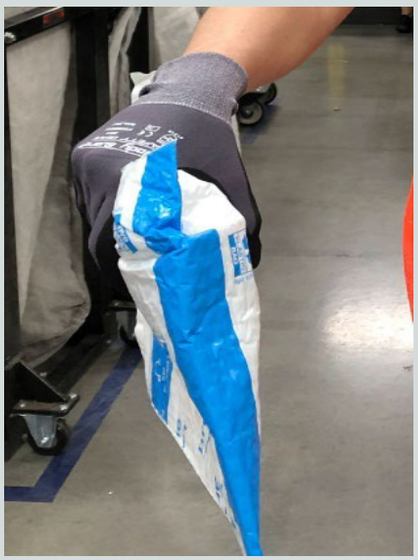
Demonstrate this

ACTION: Demonstrate all three types of grip and reiterate points from the previous slide.

1. Opposite corners grip

2. Full hand contact

3. C-grip



Gripping and Handling

Observe this

ACTION: Observe each learner performing the three types of grips.

Key things to watch out for/reiterate are:

1. Learners are wearing appropriate PPE.
2. Learners are not leaving any gaps between the hand and the object while performing full hand contact.
3. Learners are forming the letter C with their hand and fingers while making full C-grip contact.
4. Learners are positioning one hand on the bottom corner to lift the object, and the other on the opposite corner to pull it towards the body, while performing opposite corners grip.

Power Zone

Communicate this

ACTION: Read the information below aloud.

“Power Zone:

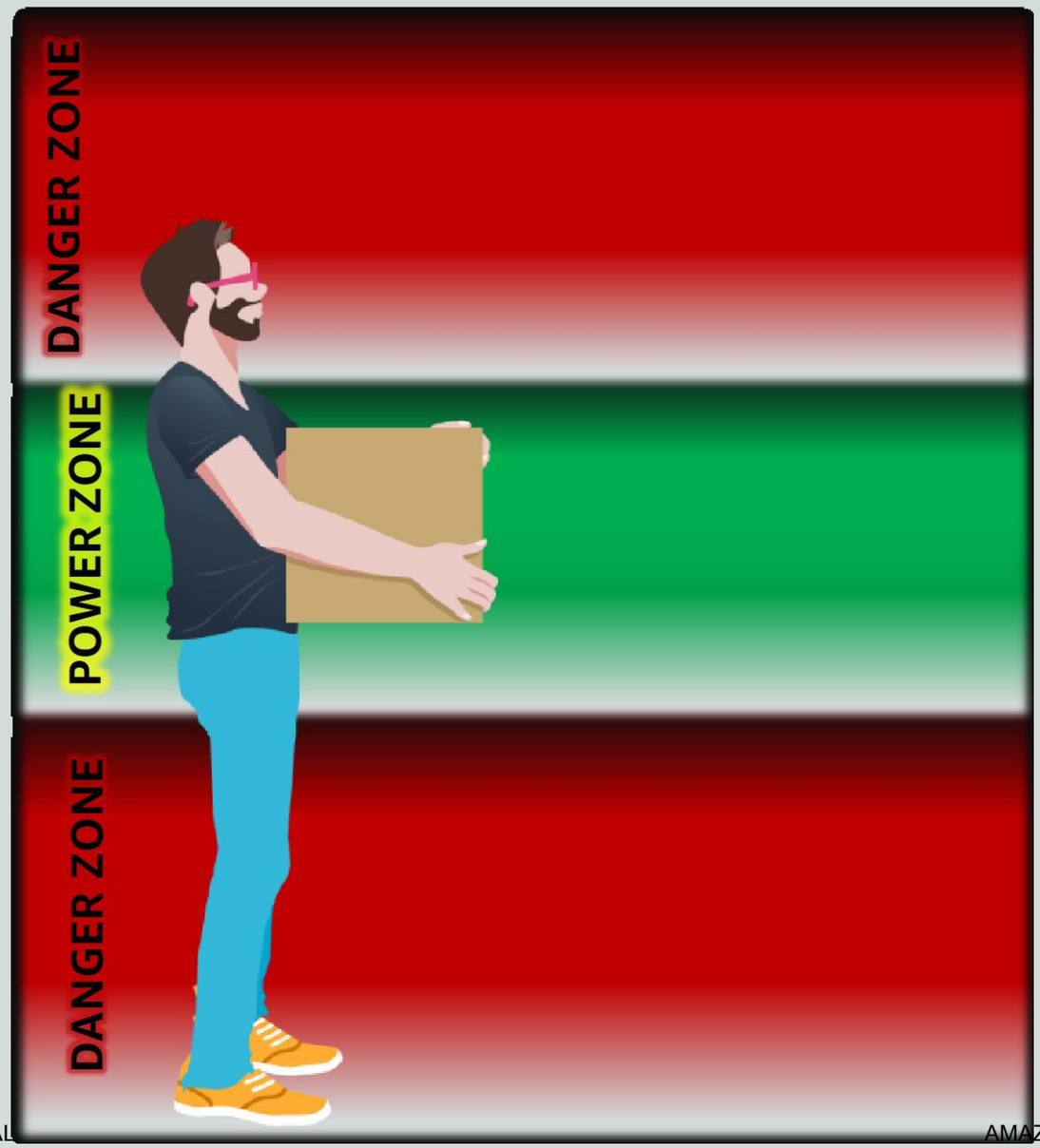
- Your power zone is located between your shoulders and hips.
- Using your body’s power zone will help you prevent injuries by decreasing overall stress and strain.
- Utilize the correct tools, such as a step stool, to create a strong power zone.
- Test the weight and balance of the object, items might shift within the box when moved.
- Prior to lifting an object, place your feet shoulder width apart.
- Position one hand on the bottom corner to lift the object and the other on the opposite corner to pull it towards your body.
- Always keep the object close to your body within the power zone.
- Always work within your own limits and utilize tip, slide, and push technique when necessary.”

Power Zone

Demonstrate this

ACTION: Demonstrate how to use your power zone while lifting and reiterate points from the previous slide.

Power Zone



Power Zone

Observe this

ACTION: Observe each learner lifting an item using their power zone.

Key things to watch out for/reiterate are:

1. Learners are testing the weight and balance of the objects before lifting.
2. Learners are placing their feet shoulder width apart.
3. Learners are positioning one hand on the bottom corner to lift the object and the other on the opposite corner to pull it towards the body.

Lifting

Communicate this

ACTION: Read the information below aloud.

“Planning to lift items that require two hands:

- Test the weight of the object. Also, check for balance as items might shift within the box when moved.
- Prior to lifting an object, place your feet shoulder width apart.
- Always keep the object close to your body within the power zone.
- Always hinge at hips and bend at the knees, **never** at your waist.
- Always hold the item securely with two hands on opposite corners.
- **Do not** use built-in handles or straps to lift the package as those could break.”

Lifting

Demonstrate this

ACTION: Demonstrate how to lift items using two hands and reiterate points from the previous slide.

Step 1	Step 2	Step 3
		
• Keep back flat • Hinge at the hips • Bend at the knees	• Use appropriate grip • Bring package to power zone • Lift using your knees, keeping your back flat	• Bring the package close to your body within your power zone • (Weight x Distance = Apparent weight)

Lifting

Observe this

ACTION: Observe each learner while lifting items.

Key things to watch out for/reiterate are:

1. Learners are testing the weight and balance of the item before lifting.
2. Learners are keeping the object close to their body within the power zone.
3. Learners are hinging at their hips and bending at the knees, not at their waist.
4. Learners are holding the item securely with two hands on opposite corners.

Tip, Slide, and Push method

Communicate this

ACTION: Read the information below aloud.

"The **Tip, Slide and Push Method** is used with large, awkwardly shaped items. This is an approved method to move team-lift items individually.

- **Tip**
  - Check your path and be sure it's clear of debris
  - Face the item straight on
  - Tip the object backwards
  - Brace it against your leg or body
- **Slide**
  - Create 3 points of contact with both hands on the object
  - Bend at the knees, not the waist
  - Slide the object to its destination
- **Push**
  - Push the item onto its final target (pallet or cart)"

Tip, Slide, and Push Method

Demonstrate this

ACTION: Demonstrate the activities below and reiterate points from the previous slide.

1. Tip

- Demonstrate tipping the product in a controlled manner so the weight of the product brings itself to a position to slide

2. Slide

- Demonstrate using proper lifting techniques to lift one end of the product and slide it into position

3. Push

- Demonstrate placing the raised portion of the product to its final destination and then use proper lifting techniques to place the rest of the package in place

Tip, Slide, and Push Method

Observe this

ACTION: Observe each learner while lifting, sliding, and pushing an item.

Key things to watch out for/reiterate are:

1. Learners are checking their path for debris before tipping.
2. Learners are facing the item straight on while tipping.
3. Learners are bracing the item against their leg or body.
4. Learners are creating three points of contact with both hands on the object while sliding.
5. Learners are pushing the item to the final target.

Team Lift

Communicate this

ACTION: Read the information below aloud.

“Team (two person) lift is required for the following:

- When lifting an item weighing between 50 lbs. - 99.9 lbs. (23 Kg - 44.9 Kg)
- When stacking pallets or down-stacking (retrieving) pallets from an existing stack, the 5th pallet or higher
- When lifting a CHEP pallet (blue pallet)
- When you feel uncomfortable or are unable to lift an item on your own (even if it's below 50 lbs.), please request help from another Associate or leader

Mechanical lift is required for the following:

- If an item is equal to or greater than 100 lbs. (45 kg)
- To move pallet stacks higher than 11 pallets

NOTE: Escalate to a member of leadership or a member of the site Safety team for assistance if you encounter these situations and need help.”

Team Lift

Demonstrate this

ACTION: Ask for a volunteer to assist you in demonstrating a team lift and reiterate points below during demonstration.

1. Team lift

- Remember to use proper body mechanics and test the weight of the item
- Always use team lift for objects weighing 50-99 pounds and are greater than 6 feet in length
- If the item is awkward or you do not feel comfortable with team lift, escalate immediately to a member of leadership for assistance

Team lift

Observe this

ACTION: Observe each learner while lifting items as a team.

Key things to watch out for/reiterate are:

1. Learners are testing the weight and balance of the item before lifting.
2. Learners are making sure to use team lift for items weighing between 50-99 pounds and items greater than 6 feet long.

Overreaching

Communicate this

ACTION: Read the information below aloud.

“Safely pushing/pulling items from conveyor:

- When pushing/pulling an object from the conveyor, ensure that both the hands are on the item.
- When grabbing the item, avoid jerking the object and retrieve it in a slow and steady manner.
- Be aware of potential debris on the ground that can cause slip/trip hazards.
- Be aware of your no stand zones to avoid standing in the wrong location.
- Square up to the object, facing it.
- Push out from your body.
- Do not push or pull boxes that require you to overextend your body.
- Keep your feet flat on the floor to prevent overreaching.”

Overreaching

Demonstrate this

ACTION: Demonstrate how to avoid overreaching and reiterate points from the previous slide.

1. Do’s

- Demonstrate feet planted firmly on ground.
- Keep item in your power zone.

2. Don'ts

- Do not overextend.

Overreaching

Observe this

ACTION: Observe each learner while lifting items.

Key things to watch out for/reiterate are:

1. Learners are not jerking the object and are retrieving it in a slow and steady manner.
2. Learners are checking for debris on the ground to avoid slip and trip hazards.
3. Learners are keeping their feet planted firmly on the ground.
4. Learners are keeping the item within their power zone.

Bending

Communicate this

ACTION: Read the information below aloud.

“Planning to lift continued:

- Test the weight and balance of the object. Items might shift within the box when moved.
- A **staggered stance** is best used when bending at a mid-level range or when an individual cannot squat.
- A **lunge** is best used when bending to a low-level range.
- Build a bridge to assist lowering/raising the body.
- Always bend at hips and knees, **never** at your waist.
- Always hold the item securely with two hands on the opposite corners.
- **Do not** use built-in handles or straps to lift the package as those could break.”

Bending

Demonstrate this

ACTION: Demonstrate proper bending techniques and reiterate points from the previous slide.

1. Build a bridge

- To assist lowering/raising the body, build a bridge

2. Staggered stance

- When bending at a mid-level range or when you cannot squat, use a staggard stance

3. Lunge

- When bending to a low-level range, use a lunge stance

Bending

Observe this

ACTION: Observe each learner while bending.

Key things to watch out for/reiterate are:

1. Learners are testing the weight and balance of the item before lifting.
2. Learners are using a staggered stance when bending at a mid-level range or when they cannot squat.
3. Learners are lunging when bending to a low-level range.
4. Learners are building a bridge to assist lowering/raising the body.
5. Learners are holding the item securely with two hands on opposite corners.
6. Learners are not using built-in handles or straps to lift the package.

Pivoting

Communicate this

ACTION: Read the information below aloud.

“Pivoting: Turning or pivoting instead of twisting can help prevent strains and common injuries of the lower back.

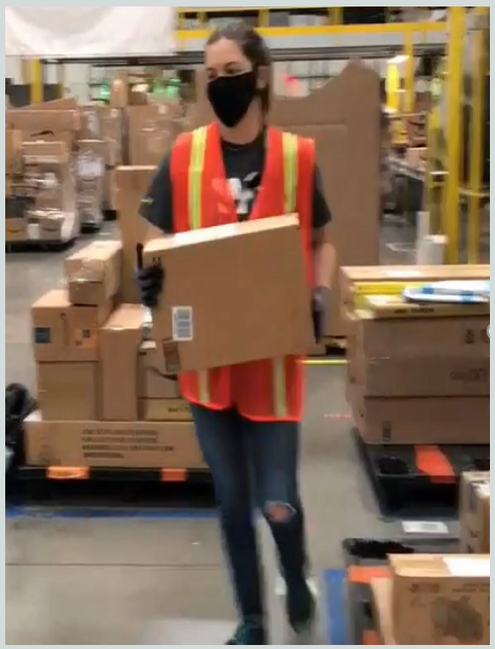
To safely turn:

- Keep the object close to your body and within the power zone.
- Keep a wide base of support with feet slightly staggered.
- Always move both feet in the direction your are moving towards.
- **Nose over toes!** NEVER twist at the waist. Use **nose over toes** when pivoting to avoid twisting at the waist (your nose and your toes should always be pointed in the same direction).“

Pivoting

Demonstrate this

ACTION: Demonstrate how to safety turn/pivot and while reiterating the points below.

Step 1	Step 2	Step 3
		

- Keep object in your power zone.
- Maintain wide base of support (feet slightly staggered).
- Do not twist at the waist- move both feet in the direction you are moving. **Nose over toes!**

Pivoting

Observe this

ACTION: Observe each learner while pivoting with a item.

Key things to watch out for/reiterate are:

1. Learners are keeping the object close to their body and within their power zone.
2. Learners are moving both feet in the direction they are moving towards.
3. Learners are using nose over toes when pivoting to avoid twisting at the waist.

Trip Hazard Awareness

Communicate this

ACTION: Read the information below aloud.

“Be mindful of the following trip hazards:

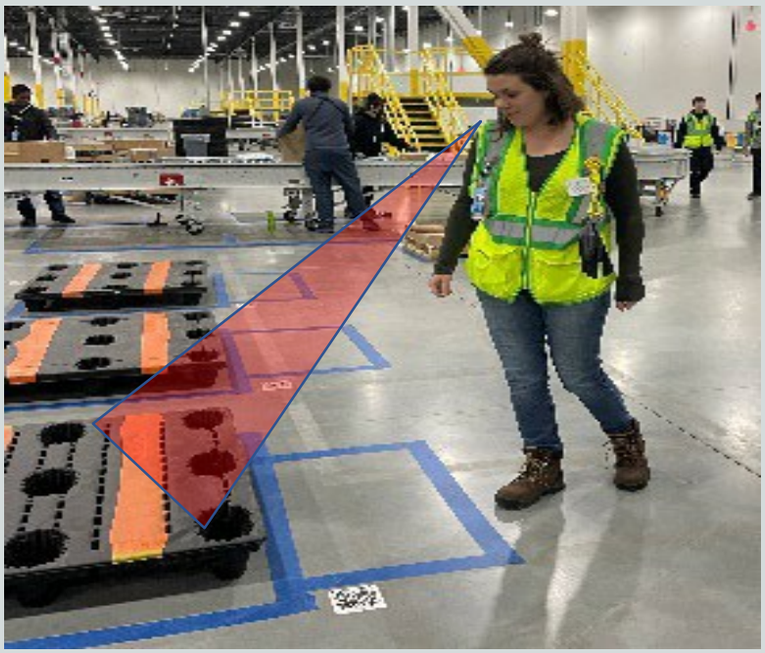
- **Pallets:**
  - Do not step over pallets when walking. Always review the pallet corners before walking around them.
- **Packages:**
  - You may see packages, trash, or labels fall to the ground. Please stop and pick those items up immediately to avoid potential injuries for yourself and your team.
- **Dock plates:**
  - When exiting trailers, be mindful of the dock plate lip that sits on the trailer floor. Always review the lip prior to stepping onto the dock plate.
- **Ergo mats:**
  - Always review the edge of an ergo mat prior to stepping onto it.
- **Pallet jacks:**
  - Do not step over the forks of a pallet jack. Always review the pallet jack fork edges before walking around them.
- **Boxes:**
  - Pick up any boxes seen on the ground and place them in the correct location. If you do not know the correct location, please give the package to a manager.
- **Parking lot:**
  - Whenever possible, avoid stepping over curbs and uneven surfaces. Be on the look out for ice during inclement weather.
- **Cords:**
  - Always ensure cords are tied up tightly on the ground and are properly covered with a cord cover to avoid tripping.”

Trip Hazard Awareness

Demonstrate this

ACTION: Demonstrate the activities below and reiterate the points from the previous slide.

1. Checking pallet corners



2. Looking at dock plate lip

Trip Hazard Awareness

Observe this

ACTION: Observe each learner while working in the location to avoid trip hazard.

Key things to watch out for/reiterate are:

1. Learners are not stepping over pallets when walking.
2. Learners are picking up boxes, packages, trash, or labels that are on the ground and placing it in correct location.
3. Learners are reviewing the dock plate lip prior to stepping onto the dock plate.
4. Learners are checking for pallet corners nearby.

Training Group Pulse Check

Training Group Pulse Check

Communicate this

ACTION: Read the information below aloud.

“Let’s review some of the important points we covered regarding the ATS Safety Rule on Safe Body Positioning.

I’m going to read each question and two answer options aloud. Once I have read both answer option A and B aloud, I will pause for each of you to respond with which one you believe is the correct answer. After all of you have answered the question, I will provide the correct answer. If majority of the group answers the question incorrectly, we will review that topic again.”

Training Group Pulse Check

Training Group Pulse Check

Q1. Use _____ method when pivoting to avoid twisting at the waist.

a) Head over toes

b) Nose over toes

Q2. It is permissible to step over pallets when walking.

a) True

b) False

Q3. While pivoting, keep the object close to your body and within the _____ zone.

a) Power

b) Speed

Q4. A _____ stance is best used when bending at a mid-level range.

a) Staggered

b) Lunge

Q5. The _____ is used with large, awkwardly shaped items.

a) Tip-Slide and Push Method

b) Lift method

Q6. Your Power Zone is located between your_____.

a) Shoulders and hips

b) Ankle and stomach

Dock and Trailer

Dock and Trailer Safety

Communicate this

ACTION: Read the information below aloud.

“This safety rule is focused on the Trailer Dock and Release (TDR) process. The TDR process ensures the safety of Amazon Associates during the process of loading and unloading trailers.

The TDR process is completed using a checklist that guides TDR certified Associates through a series of questions and check points in order to determine if a trailer is safe for Associates to enter for unloading/loading. Receiving this training does NOT mean that you are TDR-trained.”

Dock and Trailer Safety

Communicate this

ACTION: Read the information below aloud.

“Safe entry of trailers:

- Never open/close dock doors unless you are certified TDR Trained.
- Never enter a trailer that has not been properly TDR’ed in. Always verify the following TDR process has been completed before entering a trailer:
  - Verify that the dock plate is down.
  - Verify that the light next to dock door is green.
  - Verify that the TDR placard is flipped to green.
- Use the dock light inside the trailer at all times. A well lit workspace is a safer workspace.
- In case of an emergency evacuation, never block the egress route with pallets, packages, or any other debris.”

Dock and Trailer Safety

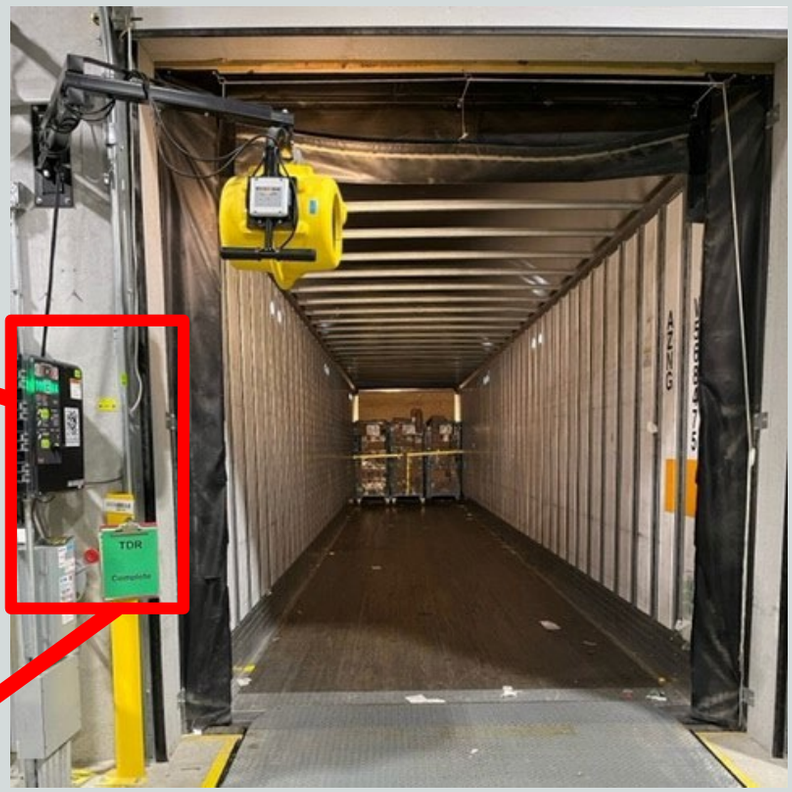
Demonstrate this

ACTION: Demonstrate how to verify TDR process is complete before safely entering a trailer.

1. Confirm the TDR process is complete

Verify the TDR process has been completed before entering by verifying the following: Dock plate is down, green light is on, TDR placard is flipped to green.

2. Turn on dock light, Inspect for egress route



Turn on the dock light inside trailer (If not already on). Ensure there is an unblocked egress route.

Dock and Trailer Safety

Observe this

ACTION: Observe each learner while working on a dock and trailer.

Key things to watch out for/reiterate are:

1. Learners understand they are not to complete the TDR process unless trained.
2. Learners can identify a down lock plate and understand to enter a trailer only when both a TDR placard and light are green.
3. Learners are using the dock light inside the trailer at all times.
4. Learners are not blocking the egress route with pallets, packages, or any other debris.

Training Group Pulse Check

Training Group Pulse Check

Communicate this

ACTION: Read the information below aloud.

“Let’s review some of the important points we covered regarding the ATS Safety Rule on Dock and Trailer.

I’m going to read each question and two answer options aloud. Once I have read both answer option A and B aloud, I will pause for each of you to respond with which one you believe is the correct answer. After all of you have answered the question, I will provide the correct answer. If majority of the group answers the question incorrectly, we will review that topic again.”

Training Group Pulse Check

Training group pulse check

Q1. **NEVER** enter a trailer that has not been properly _____ in.

a) TDR'ed

b) Cleaned

Q2. A well _____ workspace is a safer workspace.

a) Decorated

b) Lit

Q3. In case of an emergency evacuation, block the egress route with pallets, packages, or any other debris.

a) True

b) False

Q4. Who can open and close a dock door?

a) Certified TDR trained Associate

b) Everyone

Q5. What does TDR stands for?

a) Trailer Dock and Release

b) Truck Deck and Release

Trailer Yard Safety

Trailer Yard Safety

Communicate this

ACTION: Read the information below aloud.

“The next ATS Safety Rule is on trailer yard safety.

Only authorized personnel are allowed to enter the trailer yard. Additional training (separate from this training) is required in order to become authorized for trailer yard access. Untrained/unauthorized personnel are never allowed to enter the trailer yard.

If your position requires access to the trailer yard, you will undergo more extensive training on this ATS Safety rule so we will move on to the next rule.”

Powered Industrial Trucks (PIT)

PIT

Communicate this

ACTION: Read the information below aloud.

“Powered industrial trucks (PIT) are used at some, but not all, Amazon facilities.”

If PIT is not used at your site communicate this:

“We do not use PIT at our site so we will skip ahead to the next ATS Safety Rule.”

If PIT is used at your site communicate this:

“This site does utilize PIT. In this portion of our training, you will learn about what Amazon refers to as **PIT pedestrian interaction** and how to operate safely while working in the vicinity of PIT.”

PIT

Communicate this

ACTION: Read the information below aloud.

“PIT awareness:

- Be aware of all PIT (and PIT types) operating in your area.
- Always stay at least 8 feet away from an operating PIT.
- Always stay at least 20 feet away from a raised PIT (regardless of how high it is raised off of the ground).
- Always make eye contact with PIT operators before crossing a PIT lane.
- Immediately report any unsafe PIT behavior to a member of leadership or a member of the site Safety team.
- Report any possible leaks from a PIT.
- Do not walk between a PIT and a fixed or mobile object.
- Pay attention to the horns and be aware of your surroundings.
- Never enter a PIT area without wearing a high visibility vest.
- Only cross PIT lane at designated crossing locations, do not jump or climb barriers near PIT lanes.”

PIT

Demonstrate this

ACTION: Demonstrate the PIT guidelines below.

1. Maintain proper distance

- Maintain a distance of 20 feet from a raised PIT and 8 feet from a moving PIT.

2. Eye Contact

- Make eye contact with the PIT operators before crossing a PIT lane.

PIT

Observe this

ACTION: Observe each learner while working on a PIT.

Key things to watch out for/reiterate are:

1. Learners are at least 8 feet away from an operating PIT.
2. Learners are at least 20 feet away from a raised PIT.
3. Learners are making eye contact with PIT operators before crossing a PIT lane.
4. Learners are not walking between a PIT and a fixed or mobile object.
5. Learners are not entering a PIT area without wearing a high visibility vest.
6. Learners are only crossing PIT lane from the designated pedestrian crossing areas.

Training Group Pulse Check

Training Group Pulse Check

Communicate this

ACTION: Read the information below aloud.

“Let’s review some of the important points we covered regarding the ATS Safety Rule on Powered Industrial Trucks.

I’m going to read each question and two answer options aloud. Once I have read both answer option A and B aloud, I will pause for each of you to respond with which one you believe is the correct answer. After all of you have answered the question, I will provide the correct answer. If majority of the group answers the question incorrectly, we will review that topic again.”

Training Group Pulse Check

Training Group Pulse Check

Q1. Always stay at least _____ away from an operating PIT.

a) 8 feet

b) 20 feet

Q2. Never walk between a PIT and a fixed or mobile object.

a) True

b) False

Q3. Always stay at least _____ away from a raised PIT.

a) 8 feet

b) 20 feet

Q4. Never make eye contact with PIT operators before crossing a PIT lane.

a) True

b) False

Q5. Report any unsafe behavior you observe on PIT to _____.

a) Leadership or a member of the safety team

b) Closest Associate

Amazon Robotics (AR)

Amazon Robotics (AR)

Communicate this

ACTION: Read the information below aloud.

“AR refers to the mobile robotic machinery used at some (but not all) Amazon facilities to automate the flow of packages or inventory.“

If your site is not an AR site communicate this:

“Our site does not have Amazon Robotics, so we will skip ahead to the next ATS Safety Rule.”

If your site is an AR site communicate this:

“Our site is considered an **AR site,** because we utilize Amazon Robotics in certain designated areas of the facility. In this portion of our training, you will learn how to operate safely while working with and in the vicinity of AR machinery.”

AR Floor Safety

Communicate this

ACTION: Read the information below aloud.

“Amazon robotics floor safety:

- Never walk on the AR floor.
- If a product falls on the AR floor, leave it there and immediately notify a member of leadership. Only trained personnel identified by special safety vests, known as Short Range Broadcast RF System (SRBRS) vests, are allowed on active AR floor.
- Fencing and black/yellow safety tape surrounds the entire AR floor.
- At all times keep your body and all objects outside of the fencing and the black/yellow safety tape.
- Access gates are all around the AR floor.
- All perimeter gates will have the E-stop functionality.
- Only authorized personnel will have a key to access the AR gate.
- Never lean on a POD as it could shift.
- Never step or place your foot on the POD.
- Be aware that the AR drive units move without warning.
- Only trained facilities personnel may replace fiducials (floor stickers).
- Inform your Area Manager of any spilled liquid or spilled product on the AR floor.”

AR Floor Safety

Demonstrate this

ACTION: Demonstrate the activities below.

“Do not cross” line

- Demonstrate to the trainees the black/yellow safety tape indicating a **do not cross** line

E-stops

- Show the trainees the perimeter fencing/gates and E- stops

NOTE: This training does not authorize you to enter or interact with the AR floor.

AR Floor Safety

Observe this

ACTION: Observe each learner while working on the AR floor.

Key things to watch out for/reiterate are:

1. Learners never cross onto the AR floor.
2. Learners are keeping their body and all objects outside of the fencing and behind the black/yellow safety tape.
3. Learners are not leaning, stepping, or placing their foot on the POD.
4. Learners are able to identify an E-stop.

Training Group Pulse Check

Training Group Pulse Check

Communicate this

ACTION: Read the information below aloud.

“Let’s review some of the important points we covered regarding the ATS Safety Rule on Amazon Robotics.

I’m going to read each question and two answer options aloud. Once I have read both answer option A and B aloud, I will pause for each of you to respond with which one you believe is the correct answer. After all of you have answered the question, I will provide the correct answer. If majority of the group answers the question incorrectly, we will review that topic again.”

Training Group Pulse Check

Training Group Pulse Check

Q1. Only trained personnel identified by special safety vests are allowed on active AR floor.

a) True

b) False

Q2. All perimeter gates will have the _____ functionality.

a) C-stop

b) E-stop

Q3. Identify which of the below statements is **incorrect**.

a) Lean on a pod as it could shift

b) Never step or place your foot on the pod

Q4. Inform your _____ of any spilled liquid or spilled product on the AR floor.

a) Area Manager

b) Closest Associate

Q5. AR drive units always give warning before moving.

a) True

b) False

Safe Go Cart Handling

Safe Go Cart Handling

Communicate this

ACTION: Read the information below aloud.

“It's likely that you will handle carts on a daily basis.

If not handled properly, carts pose significant safety risks to the cart operator and to others working in the area. In this portion of our training, you will learn how to properly inspect, move, collapse, and park a cart in a way that it minimizes the risk of injury to yourself and those around you.”

Go Cart Pre-Inspection

Communicate this

ACTION: Read the information below aloud.

“You may see two different types of Go Carts (a ‘Traditional Go Cart’ and a ‘2022 Go Cart’), so it’s important to familiarize yourself with the difference between each and where pinch points may occur.”

Go Cart Pre-Inspection

Traditional Go Cart

Demonstrate this

ACTION: Demonstrate the pinch points and the differences between both types of Go Carts (traditional Go Carts and 2022 Go Carts).

Traditional Go Cart

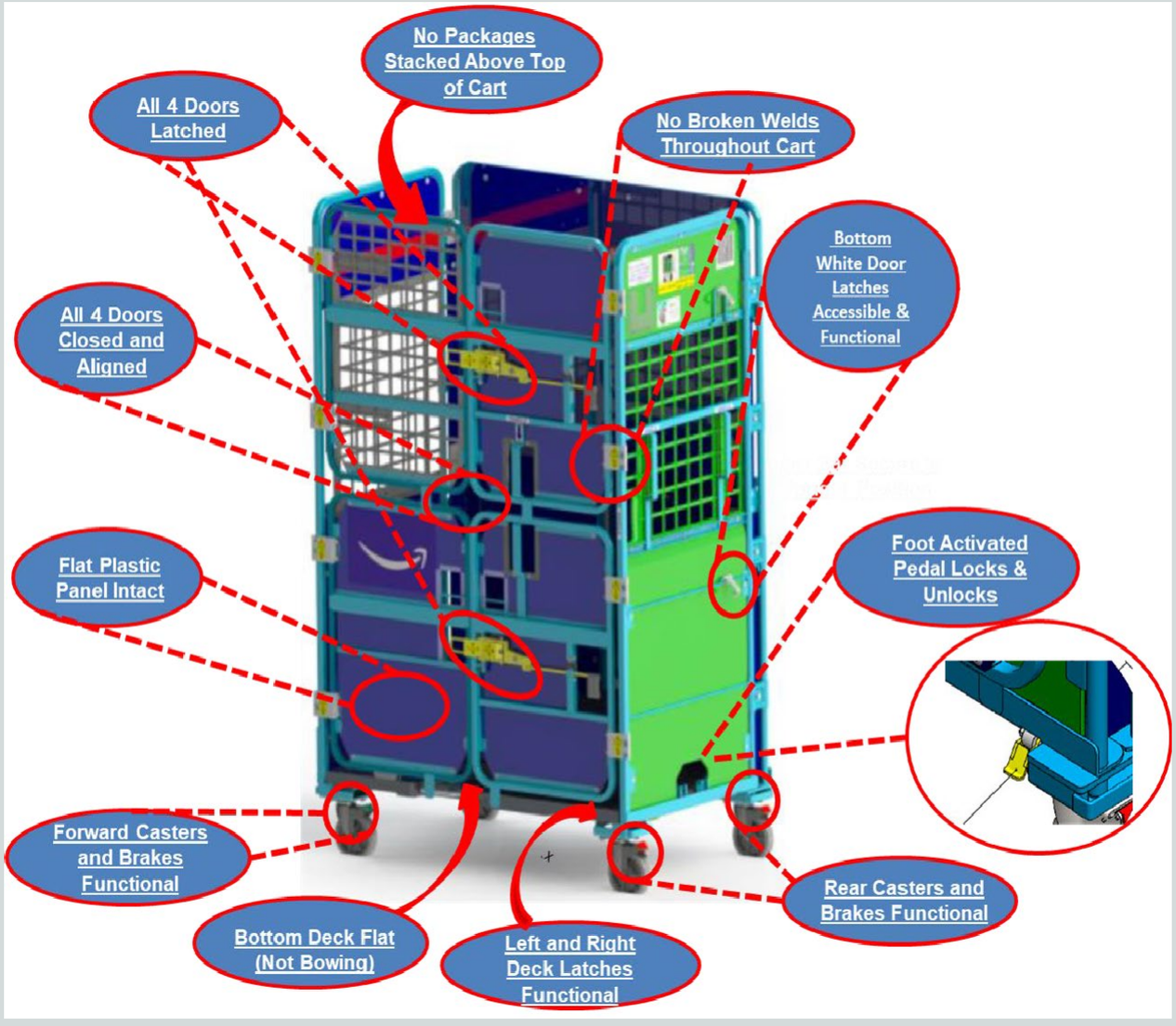
Go Cart Pre-Inspection

2022 Go Cart

Demonstrate this

ACTION: Demonstrate the pinch points and the differences between both types of Go Carts (‘Traditional Go Carts’ and ‘2022 Go Carts’).

2022 Go Cart



Go Cart Pre-Inspection

Traditional and 2022 Go Cart

Communicate this

ACTION: Read the information below aloud.

“Pre-inspection check:

- Check the cart from top to bottom.
- Make sure all four plastic sides and frames are not cracked or damaged.
- Inspect the two latches for corrosion and damage.
- Inspect that the plastic clips are not damaged.
- Inspect the doors and ensure they are functional and the hinges are not damaged.
- Inspect the Go Cart brakes and ensure the locks are functional and not broken or damaged.
- Inspect the bottom shelf, ensure it is functional without cracks and damage.
- Remove all the old pallet/shuttle labels from the Go Cart before use.”

Go Cart Pre-Inspection

Traditional and 2022 Go Cart

Demonstrate this

ACTION: Demonstrate the activity below and reiterate the points mentioned.

Pre-use check

- Always make sure that the cart is fully functional.
- Check the wheels, doors, locks, and brakes.
- Do not use damaged carts.

Red tag process

Place damaged carts in red tag area after notifying your leadership team.

Go Cart Pre-Inspection

Traditional and 2022 Go Cart

Observe this

ACTION: Observe each learner while conducting a Go Cart pre-inspection.

Key things to watch out for/reiterate are:

1. Learners are checking the cart from top to bottom.
2. Learners are inspecting doors and ensuring they are functional and hinges are not damaged.
3. Learners are inspecting the bottom shelf, ensuring it is functional without cracks or damage.
4. Learners are removing all old pallet/shuttle labels from the carts before use.

Go Cart Pre-Inspection

Traditional and 2022 Go Cart

Communicate this

ACTION: Read the information below aloud.

“Go Cart movement: Whenever moving a Go Cart, the following steps should be performed. Always start with a pre-inspection as we just covered.

Moving Go Carts that aren’t collapsed:

- Disengage brakes before moving. Use your foot to disengage the brake by stepping down on the step. The brakes are identified with a black or red step.
- Always make sure that front wheels are locked into fully fixed forward position. This will allow you to steer while pushing. The Direction locks are identified with green steps.

Removing from trailer or loading into trailer:

- Anticipate different cart speeds when pushing a cart past the dock plate and onto the trailer floor surface.”

Go Cart Pre-Inspection

Traditional and 2022 Go Cart

Demonstrate this

ACTION: Demonstrate how to differentiate between the front and back wheels and reiterate points mentioned below.

Wheels with (stopping) brakes

- Demonstrate the difference between wheels with (stopping) brakes
- Brakes are identified with a black or red step

Directional locking casters

- This end is equipped with directional locking casters
- Demonstrate front wheels and how to lock the pedal down to prevent wheel from moving

Hitch side

Hitch side always has brakes

Go Cart Movement

Traditional and 2022 Go Cart

Communicate this

ACTION: Read the information below aloud.

“When moving a Go Cart:

- Make sure that proper PPE is worn before touching Go Carts, including gloves and vest.
- Always use **both hands** to control the Go Cart. Standing on the side of the Go Cart, place your hand on the Go Cart handle with the shoulder in a neutral and comfortable position. Place your other hand on the side of the Go Cart.
- Only use designated grab bars or handles to move the Go Cart.
- Always maintain visibility between a cart and other individuals.
- **Never** place your hands inside the cart while it is moving, as packages often shift while the Go Cart is in motion and this creates a pinch hazard.
- **Never** run with a Go Cart.
- **Push,** don't pull a Go Cart.
- Always maintain 8 feet of distance between Go Carts.”

Go Cart Movement

Traditional and 2022 Go Cart

Demonstrate this

ACTION: Demonstrate the activity below and reiterate the points mentioned.

Handle with hand

- Demonstrate how to engage a handle with hand, so that the shoulder is in a neutral and comfortable position
- Demonstrate standing on the side of the cart for visibility and maneuverability
- Place other hand on side of the cage
- Always use both hands to control the Go Cart

Visibility

- Demonstrate how to always keep visibility between a Go Cart and other individuals

Go Cart Movement

Traditional and 2022 Go Cart

Observe this

ACTION: Observe each learner while moving a Traditional Go Cart.

Key things to watch out for/reiterate are:

1. Learners are wearing appropriate PPE.
2. Learners are disengaging brakes before moving.
3. Learners are moving the carts with front wheels locked.
4. Learners are standing on the side of the cart and using both hands to push the cart.
5. Learners are using the designated grab bars or handles to move the Go Cart.
6. Learners are maintaining at least a distance of 8 ft between the Go Cart and an individual.

Go Cart Movement

2022 Go Cart

Communicate this

ACTION: Read the information below aloud.

“When moving a 2022 Go Cart:

- Use your foot to disengage the brake by stepping down on the caster lock, while maintaining three points of contacts on the cart.
- Place left hand on the side handle with the shoulder in a neutral and comfortable position.
- Stand on the side of the cart for visibility.
- Place right hand on the designated front handle for additional control and maneuverability. Always use both hands to control the cart. Push, don’t pull a cart.
- Empty carts with doors fixed in the open position, can be moved using a ‘one-handed push’ from the designated handle on front of the cart.
- Brake casters will need to be facing front for maneuverability. Green lock casters in the back need to be locked down to reduce the cart from swaying.
- The 2022 Go Carts have a yellow foot pedal that must be dis-engaged using your foot in order to open the cart.
- Maintain 3 points of contact with two hands on the Go Cart and one foot planted firmly on the ground.

ACTION: Demonstrate the activity below.

Hand and body positioning while moving a 2022 Go Cart

Go Cart Movement

2022 Go Cart

Observe this

ACTION: Observe each learner while moving a 2022 Go Cart.

Key things to watch out for/reiterate are:

1. Learners are using their feet to disengage the brake by stepping down on the caster lock.
2. Learners are standing on the side of the cart for visibility.
3. Learners are placing the right hand on the side handle and the left hand on the designated front handle for pushing the cart.
4. Learners are not pulling the cart at any time.
5. Learners are disengaging the yellow foot pedal using their foot in order to open the cart.

Go Cart Movement

Traditional Go Cart

Communicate this

ACTION: Read the information below aloud.

“Moving and staging a Go Cart:

- Engage the brakes while the cart is parked in a staging 5S location.
- Before collapsing and nesting a Go Cart, you must be within 5 feet of a designated 5S storage location or trailer location.
- Keep the bottom latched to keep all 4 casters stable on the ground during moving and staging.
- Do not push carts in an L Shape for over 5 feet.
- NEVER push carts from the wide side of the cart, which will cause the cart to tip.
- Do not move collapsed carts over a dock plate. Move the cart into the trailer and collapse it inside prior to nesting.”

Go Cart Movement

Traditional Go Cart

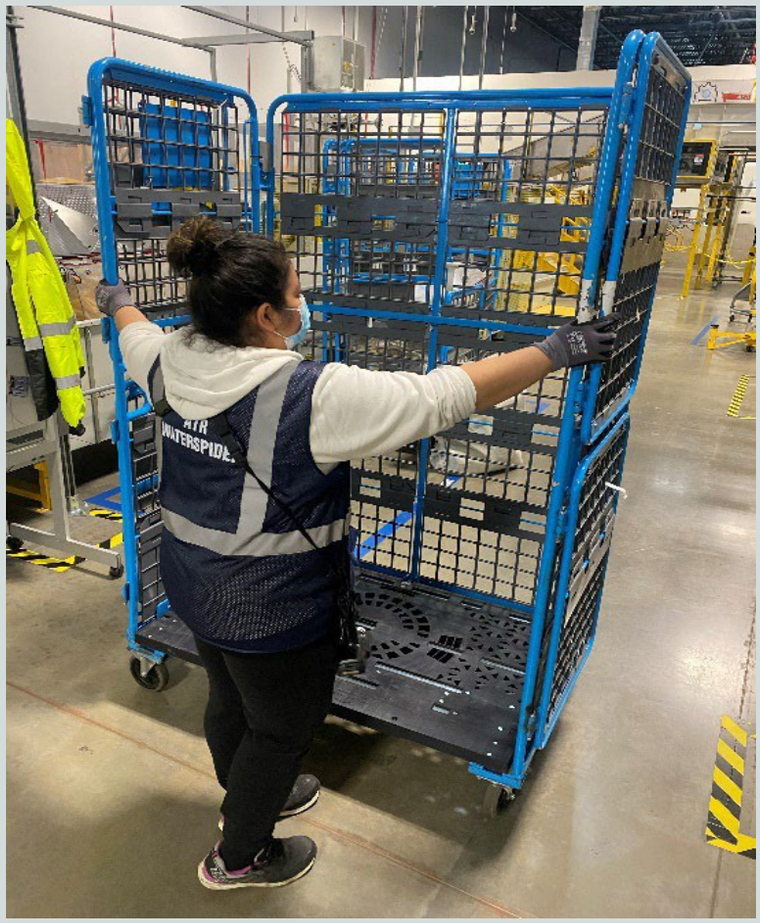
Demonstrate this

ACTION: Demonstrate the activity below and reiterate the points mentioned.

Bottom latched

- Demonstrate moving an empty Go Cart with bottom latched to keep all four casters on the ground during moving and staging.

Wide side



- Demonstrate the importance of not moving a cart from the wide side, which will cause the cart to tip.

Go Cart Movement

Traditional Go Cart

Observe this

ACTION: Observe each learner while moving and staging a Go Cart.

Key things to watch out for/reiterate are:

1. Learners are engaging brakes while parked in a staging 5S location.
2. Learners are keeping the bottom latched during moving and staging a Go Cart.
3. Before collapsing and nesting a Go Cart, learners are moving the cart within 5 feet of a designated 5S storage location or trailer location.
4. Learners are not moving the Go Carts in an L shape for over 5 ft of distance.
5. Learners are not moving collapsed carts over a dock plate.

Go Cart Handling
Traditional Go Cart

Communicate this

ACTION: Read the information below aloud.

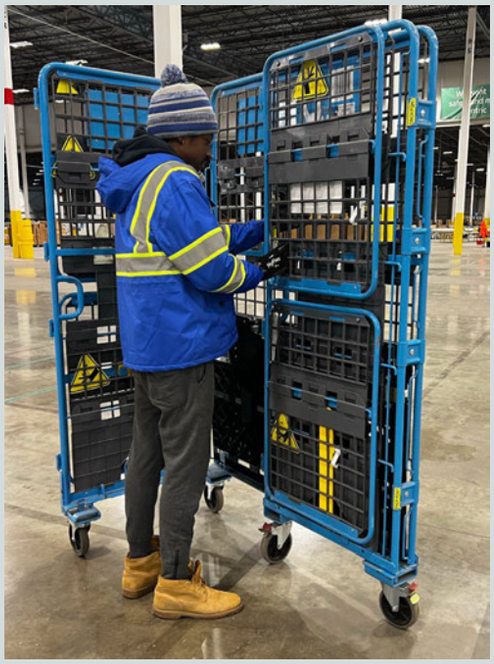
“Moving carts from 5S staging area/trailer:

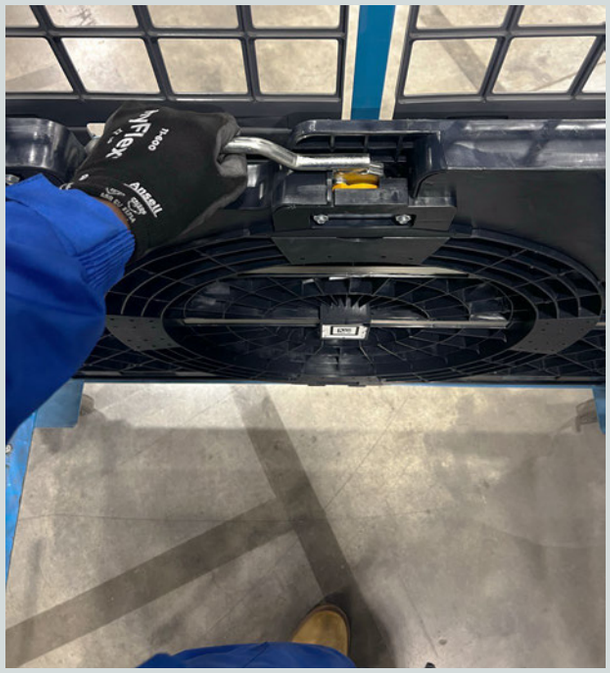
- Retrieve one cart in an L-position.
- Open the right collapsible side of the panel.
- Ensure that the cart is locked in a place by engaging the red or black locks.
- Pull up the lever and lower the bottom shelf.
- Ensure that the latch properly engages and releases.
- Unhook the plastic hook from the left bottom door.
- Swing the bottom door towards the center.
- Unhook the plastic hook from the right bottom door.
- Swing the right door to nest in the bottom left door.
- Put pressure on the bottom doors to allow for the latch to engage easily.
- Rotate the door latch across the door gap.
- Slide latch to engage the lock.
- Put pressure on the bottom doors to allow for the latch to engage easily.
- Rotate the door latch across the door gap.
- Slide latch to engage the lock.”

Go Cart Handling
Traditional Go Cart

Demonstrate this

ACTION: Demonstrate the activity below and reiterate the points mentioned.





- Demonstrate locking a cart in place by engaging red or black locks
- Demonstrate lowering bottom shelf
- Ensure that the latch engages

Go Cart Handling
Traditional Go Cart

Demonstrate this

ACTION: Demonstrate the activity below and reiterate the points mentioned.

- Demonstrate unhooking plastic hook from the left side.
- Swing the door towards center and then unhook plastic hook from the right door.
- Swing the right door to nest in the bottom left door.

Go Cart Handling
Traditional Go Cart

Demonstrate this

ACTION: Demonstrate the activity below and reiterate the points mentioned.

- Demonstrate putting pressure on the bottom doors to allow the latch to engage easily.
- Demonstrate rotating door latch across the door gap.
- Slide latch to engage the lock.

Go Cart Handling

2022 Go Cart

Demonstrate this

ACTION: Note the difference between a traditional Go Cart and a 2022 Go Cart. Demonstrate the activity below and reiterate the points mentioned.

To Open a 2022 Go Cart

Pic 1

Pic 2


Pic 3

Step 1: When removing the torsion bar from the bar retainer, place your right hand on the paddle handle and your left hand on the door handle, slowly guiding up and over retainer (Pic 1).

Step 2: Once paddle handle is free from retainer, move left hand to the latch. To release the latch open the paddle handle with your right hand (Pic 2) and release the latch with your left hand Pic 3)

Note: When opening and closing the cart doors, always maintain control of the paddle handle when not seated in the retainer to avoid a paddle handle free swing “struck by” incident.

Go Cart Handling

2022 Go Cart

Demonstrate this

ACTION: Note the difference between a traditional Go Cart and a 2022 Go Cart. Demonstrate the activity below and reiterate the points mentioned.

To Close a 2022 Go Cart

Pic 1

Step 1: Close bottom section first by closing left door, then right door. Secure the latch with your left hand making sure it is placed securely around cart door channel. Use the right hand to maintain control of the paddle at all times (Pic 1).

Pic 2

Step 2: Move left hand down to door handle, use right handle to secure paddle handle into the handle retainer. (pic 2)

Note: When opening and closing the cart doors, always maintain control of the torsion handle when not seated in the retainer to avoid a paddle handle free swing "struck by" incident.

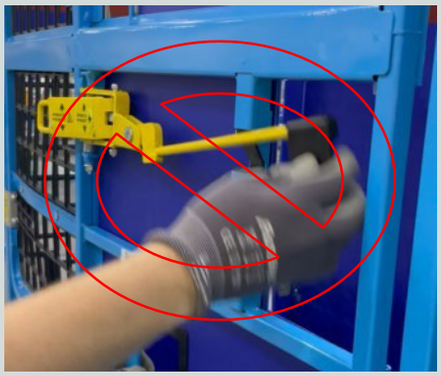
Go Cart Handling

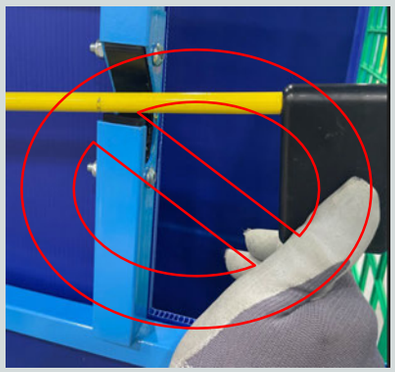
2022 Go Cart

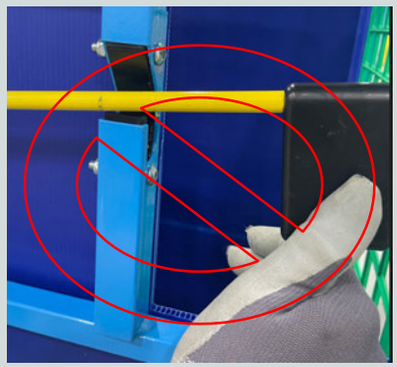
Demonstrate this

ACTION: Note the difference between a traditional Go Cart and a 2022 Go Cart. Demonstrate the activity below and reiterate the points mentioned.

2022 Go Cart Hand Positioning







Using your right hand to properly grasp the paddle handle will prevent sliding or slipping of the handle, and will help you to maintain control of handle at all times.

Go Cart Handling

Traditional and 2022 Go Cart

Observe this

ACTION: Observe each learner while handling a Go Cart.

Key things to watch out for/reiterate are:

1. Learners are ensuring that the cart is locked in a place by engaging the red or black locks.
2. Learners are ensuring that the latch properly engages and releases.
3. Learners are putting pressure on the bottom doors to allow for the latch to engage easily.

ACTION: Read the information below aloud.

“Moving carts from 5S staging area/trailer:

Top set of doors continued:

- Press down on the green wheel locks to lock casters in a forward position.
- Push with your one hand on the handle and your other hand along the broad face of a cart. Lean your shoulder into the cart.
- Place the cart in a staging area.
- Ensure that the brakes are set before leaving a cart unattended.”

Go Cart Handling

Traditional and 2022 Go Cart

Demonstrate this

ACTION: Demonstrate the activity below and reiterate the points mentioned.

- Demonstrate pressing down on the green wheel locks to lock casters in a forward position
- Push with one hand on handle and other hand along broad face of cart and finally leaning shoulder into cart

- Demonstrate placing cart in a 5S area and ensuring brakes are set before leaving the cart unattended
- Do not overload Go Carts, this makes moving unmanageable
- If a Go Cart is over loaded, get a second Go Cart and disperse items accordingly

Go Cart Handling

Traditional and 2022 Go Cart

Observe this

ACTION: Observe each learner while moving carts from 5S staging area/trailer.

Key things to watch out for/reiterate are:

1. Learners are pushing the green wheel locks to lock casters in a forward position.
2. Learners are pushing with their one hand on the handle and the other hand along the broad face of a cart.
3. Learners are leaning their shoulder into the cart.
4. Learners are ensuring that the brakes are set before leaving a cart unattended.

Training Group Pulse Check

Training Group Pulse Check

Communicate this

ACTION: Read the information below aloud.

“Let’s review some of the important points we covered regarding the ATS Safety Rule, Go Cart Handling.

I’m going to read each question and two answer options aloud. Once I have read both answer option A and B aloud, I will pause for each of you to respond with which one you believe is the correct answer. After all of you have answered the question, I will provide the correct answer. If majority of the group answers the question incorrectly, we will review that topic again.”

Training Group Pulse Check

Q1. Before collapsing and nesting a Go Cart, you must be within ___ft of a designated 5S storage location or trailer location.

a) 5 ft

b) 8 ft

Q2. Where are the damaged carts placed?

a) Green tag area

b) Red tag area

Q3. Always maintain _____ of distance between the Go Carts and individuals.

a) 8 feet

b) 20 feet

Q4. Use your _____ to disengage the Go Cart brakes.

a) Foot

b) Hands

Q5. Do not push carts in an L Shape over 5 feet.

a) True

b) False

Ramp Safety

Ramp Safety

Communicate this

ACTION: Read the information below aloud.

"The next ATS Safety Rule is on ‘Ramp Safety'.

You must be properly trained in order to be on the Ramp (a separate training from this one). Untrained Ramp Associates are not allowed on the ramp.

If you will be operating on the ramp you will undergo more extensive training on this ATS Safety Rule so we will skip ahead to the next rule."

Unit Load Device (ULD) Handling Safety

Decking Safety

Communicate this

ACTION: Read the information below aloud.

“Different types of Decking:

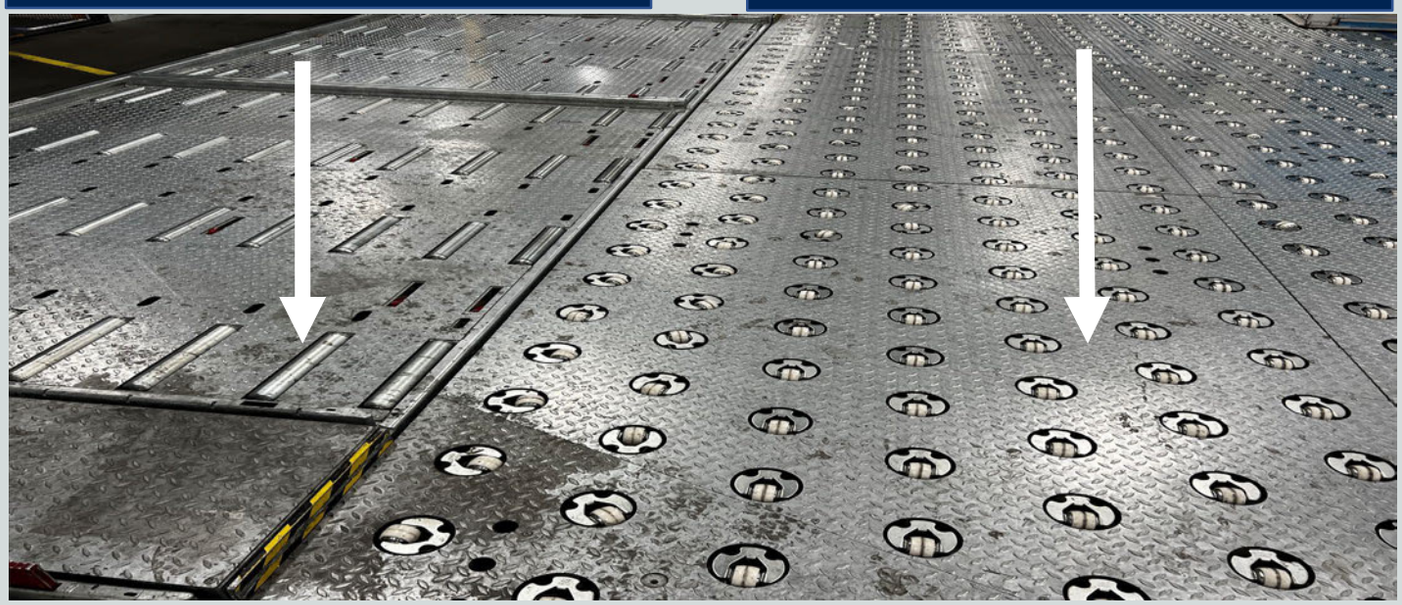
- We use two different types of Decking to move heavy objects through our building-Caster Decking and Roller Decking.
- Caster Decking is the most common type used for ULD movement, while Roller Decking is used at stations.
- When walking on the Caster Deck avoid walking on the wheels by placing your feet on the seams diagonally or walking in a straight line.
- In the event that you step on the caster, walking on the Caster Deck is safe if most of the surface area of your foot is still on flat ground with traction.
- You must enter the Caster Deck through the approved stairs. Never step directly from the ground onto a raised Caster Deck.
- Never run in any area of an Amazon facility.
- Keep your eyes on path – distractions are particularly dangerous when operating on a surface which is not even, or has moving parts.”

Decking Safety

Demonstrate this

ACTION: Demonstrate the different types of Decking and the differences in movement that each deck will cause.

Roller	Caster



- Roller Decking is most commonly used at stations

- Caster Decking is most commonly used for moving ULDs throughout the facility

Decking Safety

Demonstrate this

ACTION: Demonstrate how to properly walk on Caster Decking.

Seams	Diagonal	Straight line
		

When walking on Caster Decking, avoid walking on the wheels by placing your feet on the seams diagonally or walking in a straight line

Demonstrate this

ACTION: Demonstrate how to maintain balance in the event that you step on a Caster Deck roller.

Maintaining balance

Walking on the Caster Deck is safe if most of the surface area of your foot is still on flat ground with traction

Decking Safety

Demonstrate this

ACTION: Demonstrate the proper way to enter Caster Decking.

Approved entry points

Unapproved entry points

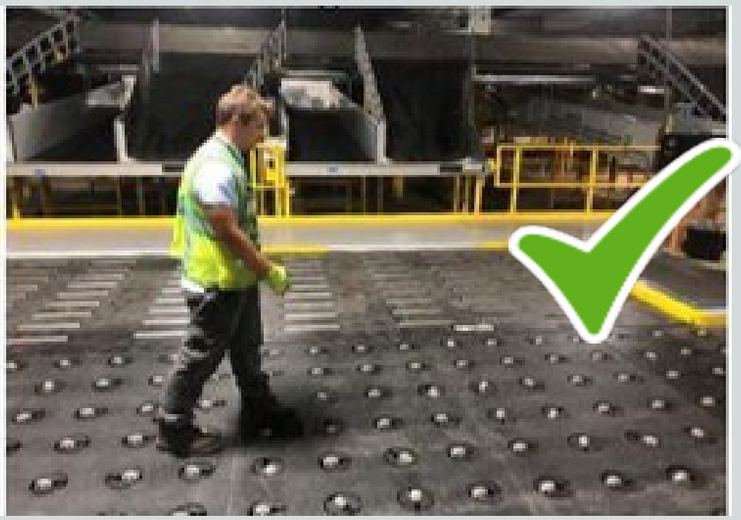
Always enter Decking through approved stairs – never step onto the Decking from the ground without anything to help you up

Decking Safety

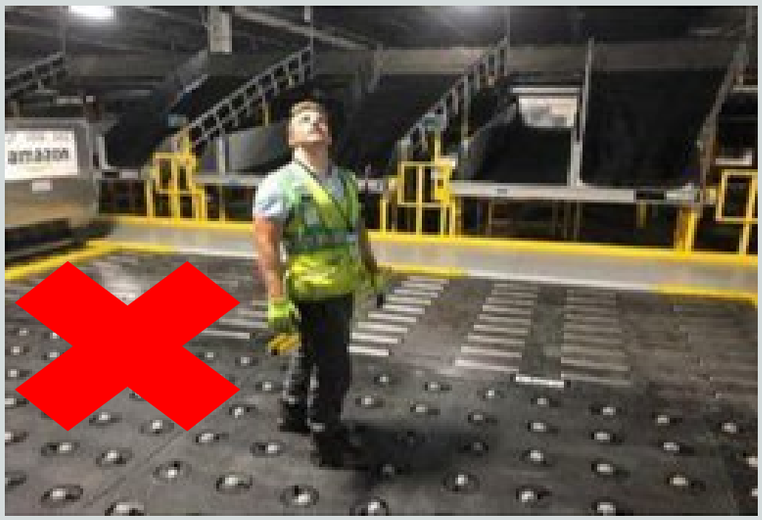
Demonstrate this

ACTION: Demonstrate keeping your eyes on the path while walking on Caster Decking.

Keeping eyes on the path



Lack of attention to the path



Keep your eyes on path – distractions are particularly dangerous when operating on a surface with potential to step on rollers

Decking Safety

Observe this

ACTION: Observe each learner while moving/working in a Decking area.

Key things to watch out for/reiterate are:

1. Learners are avoiding walking on the wheels by placing their feet on the seams diagonally or by walking in a straight line.
2. Learners are making sure that most of the surface area of their foot is still on flat ground with traction.
3. Learners are only entering the decking through approved stairs.
4. Learners are not running and are always keeping their eyes on path.

Fast Door Safety

Communicate this

ACTION: Read the information below aloud.

“Opening and closing Fast Doors:

- All Fast Doors are button activated. Fast Doors open and close more quickly than a standard garage door.
- Never stand near the opening of a Fast Door, in case the safety device fails and the door closes, it does close with speed and pressure.
- Never stage ULDs or leave items in the opening of the fast door to avoid crushing.
- Always expect ULD and/or people traffic on either side of the door and proceed through with caution.

Fast Door Safety

Demonstrate this

ACTION: Demonstrate the activity below, where to not stage ULDs, and reiterate points from the previous slide.

Open/Close button

- Demonstrate to trainee(s) where to find the open/close button

- Demonstrate to trainee(s) where to find the open/close button
- Keep the door closed when not in operation

Fast Door Safety

Observe this

ACTION: Observe each learner while opening and closing fast doors.

Key things to watch out for/reiterate are:

1. Learners are not standing near the opening of a Fast Door.
2. Learners are never staging ULDs or leaving items in the opening of the Fast Door.
3. Learners are always proceeding to the other side of the door with caution.
4. Learners are able to locate the open and close button.

Tug Highway Safety

Communicate this

ACTION: Read the information below aloud.

“Note: Disengaging of the border locks is only necessary when ULDs are loaded from the deck onto a dolly.

- The Caster Deck Associate must **never** step onto the tug highway.
- The Caster Deck Associate must follow the cargo tractor operator’s lead for loading and unloading of ULDs on and off the dollies.
- Cargo tractor operators are responsible to ensure that the ULDs are secured (locks up).
- When positioning the ULDs, never step on the large edge rollers.

Note:

- Associates must keep arms within the plane of the Caster Deck until cargo tractor operators are out of their vehicle.
- Associates will follow the **one-piece** flow while transferring the ULDs.”

ACTION: Read the information below aloud.

“Note: Disengaging of the border locks is only necessary when ULDs are loaded from the dollies to the deck.

- The Caster Deck Associate must **never** step onto the tug highway.
- The Caster Deck Associate must follow the cargo tractor operator’s lead for loading and unloading of ULDs on and off the dollies.
- Cargo tractor operators are responsible to ensure that the ULDs are secured (locks up).
- When positioning the ULDs, never step on the large edge rollers.

Note:

- Associates must keep arms within the plane of the Caster Deck until cargo tractor operators are out of their vehicle.
- Associates will follow the **one-piece** flow while transferring the ULDs.”

ACTION: Demonstrate how to engage the mobile lock and reiterate the points mentioned.

Engaging the mobile lock

Note:

- Before using any mobile lock, inspect to ensure it is not damaged (No cracks/sharp edges or bent/broken prongs)
- If damage is discovered do not use the lock and escalate to your supervisor so that the red tag process can be followed

ACTION: Demonstrate how to engage the Border Lock.

Engaging the border lock

Show the associate the proper way to engage the border lock. In this image, stepping down on red disengages the border lock and stepping down on green, reengages the border lock. If your border locks are different, please indicate to your Associate

Tug Highway Safety

Observe this

ACTION: Observe each learner while working on a tug highway.

Key things to watch out for/reiterate are:

1. Learners are not stepping onto the tug highway.
2. Learners are following the tractor operator's lead for loading and unloading of ULDs on and off the dollies.
3. Learners are not stepping on the large edge rollers when positioning the ULDs.
4. Learners are demonstrating stepping on border locks to disengage and then reengage the border lock.

Caster Deck Lock Configurations

Communicate this

ACTION: Read the information below aloud.

“Caster Deck lock configurations:

- Engage the locks when ULDs are in position on the Caster Deck.
- Use proper body mechanics to engage the locks.
- Use appropriate impact gloves.

Caster Deck Border Locks:

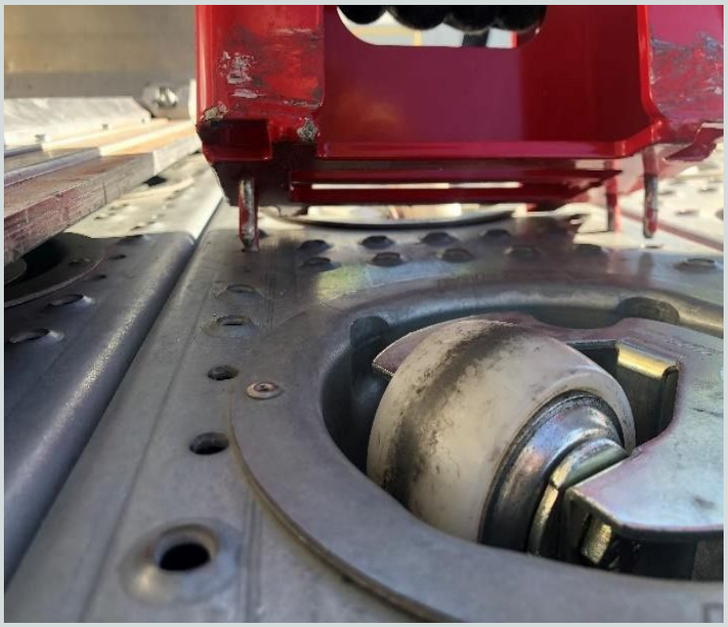
- Step down on the deck Border Locks to disengage for the ULD loading to the dolly. Dolly to deck movements automatically disengages the locks.
- Place the border locks in the locked position. Border Locks should always be engaged when not disengaged for the purpose of ULD movement.”

Caster Deck Lock Configurations

Demonstrate this

ACTION: Demonstrate the activity shown below and reiterate points from the previous slide.

	ULD in position	Empty
ULD Build Station	Up	Down
ULD staging	Up	Down
Mobile configuration	In place	5S storage area



NOTE: Caster Deck Border Locks need to be engaged when not in use

Caster Deck Lock Configurations

Observe this

ACTION: Observe each learner while configuring a Caster Deck lock.

Key things to watch out for/reiterate are:

1. Learners are engaging the locks when ULDs are in position on the Caster Deck.
2. Learners are using proper body mechanics to engage the locks.
3. Learners are using appropriate impact resistant gloves.
4. Learners are stepping down on the deck Border Locks to disengage the ULD to load the dolly.
5. Learners are engaging the Border Locks when not disengaged.

Magnetic ULD Locks- Locking

Communicate this

ACTION: Read the information below aloud.

“Magnetic ULD Locks must be activated on the edge of a ULD in the event Caster Deck locks aren't available.

To activate a Magnetic Lock:

- Place your foot on the flat **tongue** of the magnetic ULD lock.
- Push down on the **T** handle of the magnetic ULD lock.
- Twist the **T** handle of the magnetic ULD lock to the right, i.e. (clockwise) 180º.
- The lock will now be secure and will hold the ULD in place."

Magnetic ULD Locks- Locking

Demonstrate this

ACTION: Show learners what a Magnetic ULD Lock looks like.

Preventing movement

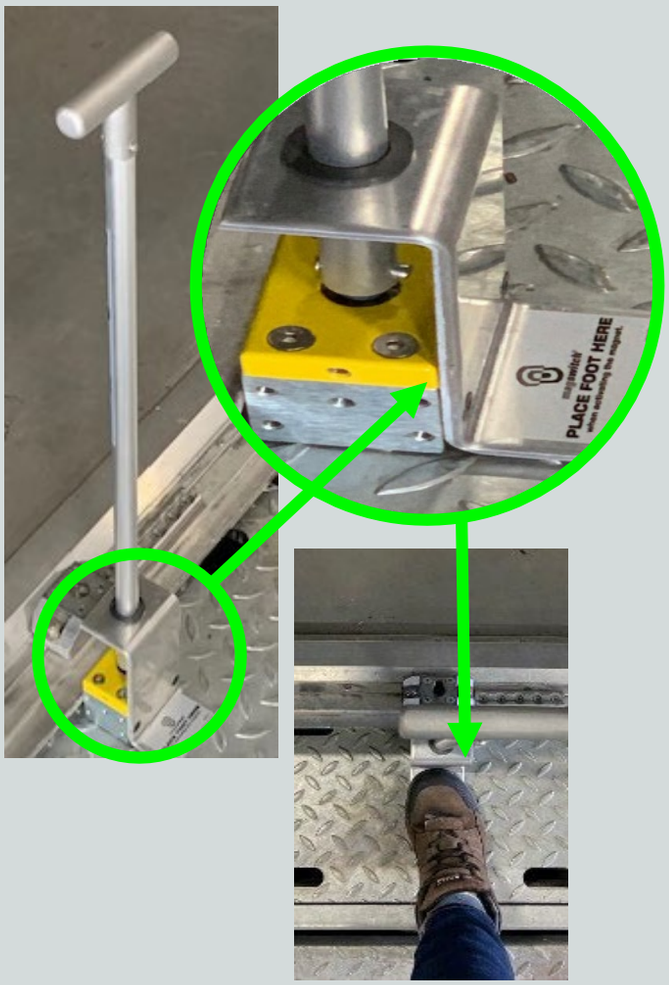
Demonstrate to the Associate how to place the lock next to the ULD edge to prevent movement

Magnetic ULD Locks- Locking

Demonstrate this

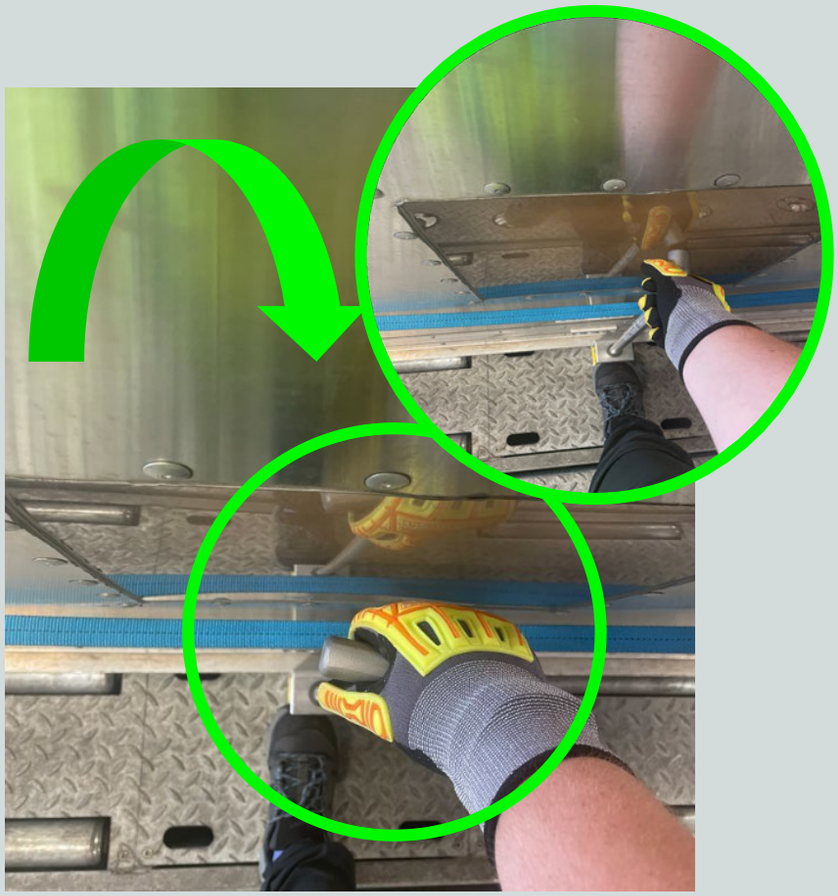
ACTION: Demonstrate activating (locking) a magnetic ULD lock.

1) Put foot on lock tongue



- Place your foot on the lock tongue

1) Turn the T shaped handle



- Turn the “T” shaped handle to the right (clockwise) to activate

Magnetic ULD Locks- Locking

Observe this

ACTION: Observe each learner while locking a magnetic ULD lock.

Key things to watch out for/reiterate are:

1. Learners are placing their foot on the flat tongue of the magnetic ULD lock.
2. Learners are pushing down on the T handle of the magnetic ULD lock.
3. Learners are twisting the T handle of the magnetic ULD lock to the right, i.e. (clockwise) 180^{o} to lock.

Magnetic ULD Locks- Unlocking

Communicate this

ACTION: Read the information below aloud.

“Deactivation of magnetic lock:

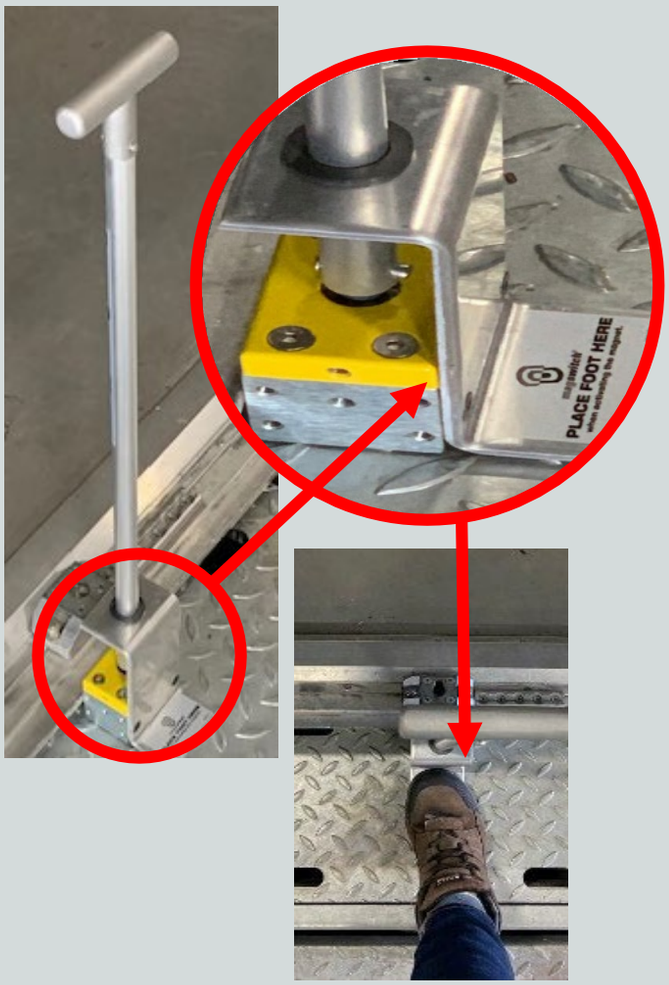
- Place your foot on flat **tongue** of the magnetic ULD lock.
- Push down on the **T** handle of the magnetic ULD lock.
- Twist the **T** handle of the magnetic ULD lock to the right, i.e. (counter clockwise) 180º.
- This will deactivate the lock and it can be removed and placed in its 5S area.”

Magnetic ULD Locks- Unlocking

Demonstrate this

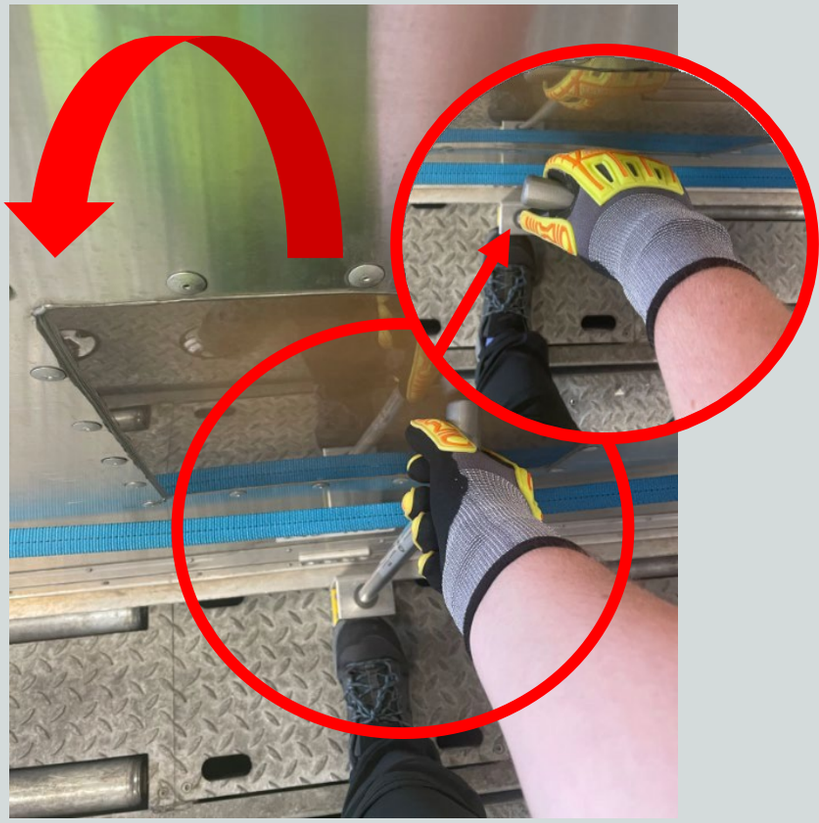
ACTION: Demonstrate deactivating (unlocking) a magnetic ULD lock.

1) Put foot on lock tongue



- Place your foot on the lock tongue

1) Turn the T shaped handle



- Turn the T handle to the left (counter clockwise) to deactivate

Magnetic ULD Locks- Unlocking

Observe this

ACTION: Observe each learner while unlocking a magnetic ULD lock.

Key things to watch out for/reiterate are:

1. Learners are placing their foot on the flat tongue of the magnetic ULD lock.
2. Learners are pushing down on the T handle of the magnetic ULD lock.
3. Learners are twisting the T handle of the magnetic ULD lock to the right, i.e. (counter clockwise) 180º.
4. Learners are placing the magnetic ULD locks in the proper 5S location.

Exceptions–ULD Magnetic Locks

Communicate this

ACTION: Read the information below aloud.

“Breaking the magnetic lock free by force is a method not recommended as the magnet is still engaged and requires extra force to remove from the Caster Deck.

Forced release:

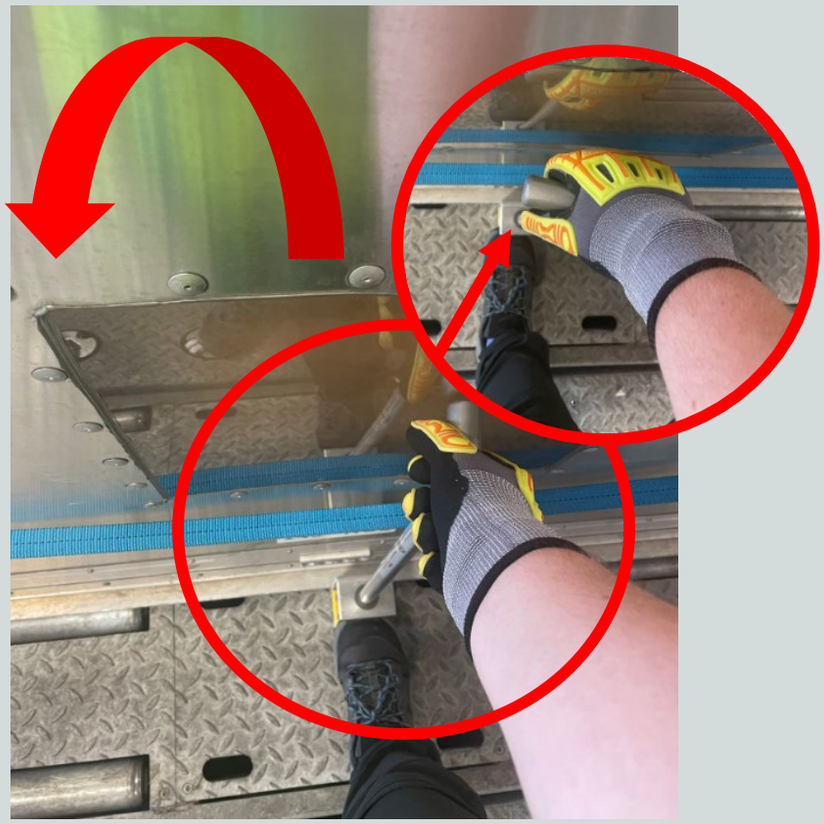
- Grasp the **T** Handle and rotate the entire lock away from the side with the tongue.
- The lock will break loose but it still requires force to pick up, as the magnet is still engaged.”

Exceptions–ULD Magnetic Locks

Demonstrate this

ACTION: Demonstrate the activity below and reiterate points from the previous slide.

1. Grasping the T Handle



- Demonstrate to the Associate how to force the release of the lock by grasping the **T** handle and rotating the handle away from the side with the tongue.
- Magnet will still be active so it will require force to pick up.
- Have the Associate demonstrate forcing the release of a magnetic lock and picking it up.

ULD Lock Spacers

Communicate this

ACTION: Read the information below aloud.

“Engaging ULD Lock Spacer:

- Identify arrows on the ULD Lock Spacer.
- Identify open ended part of the ULD Lock Spacer.
- Verify that the ULD Build Station Locks are engaged prior to inserting the ULD Lock Spacers.
- Ensure the arrows on the ULD Lock Spacers are facing towards the ULD.
- Place the ULD Lock Spacers on the Build Station Lock.
- Push the ULD Lock Spacer horizontally, ensuring the open end of the spacer is closest to the Build Station Lock.
- Utilize the 2:1 ratio and repeat steps on the secondary ULD build station lock.
- To disengage the ULD Lock Spacers, push the Lock Spacer horizontally in the opposite direction.
- Repeat the same step on the secondary ULD Lock Spacer.
- Return the ULD Lock Spacers to designated 5S Location.

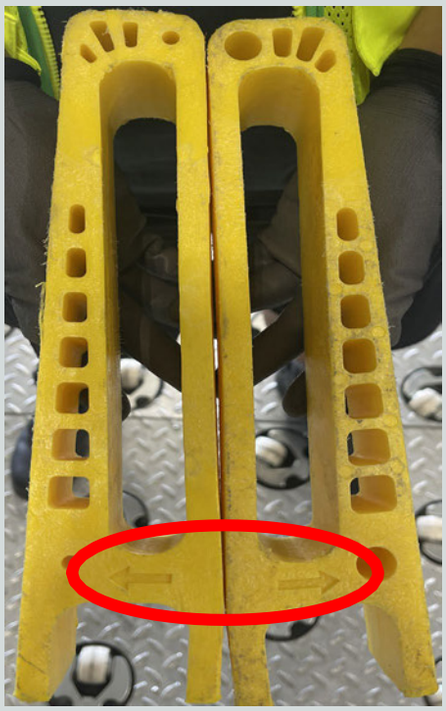
Note: If the ULD Lock Spacer appears to be broken, damaged, or does not prevent an ULD from shifting while loading or unloading, report the broken or damaged lock to a member of leadership.”

ULD Lock Spacers

Demonstrate this

ACTION: Demonstrate the activity below and reiterate points from the previous slide.

1. Identifying the arrows



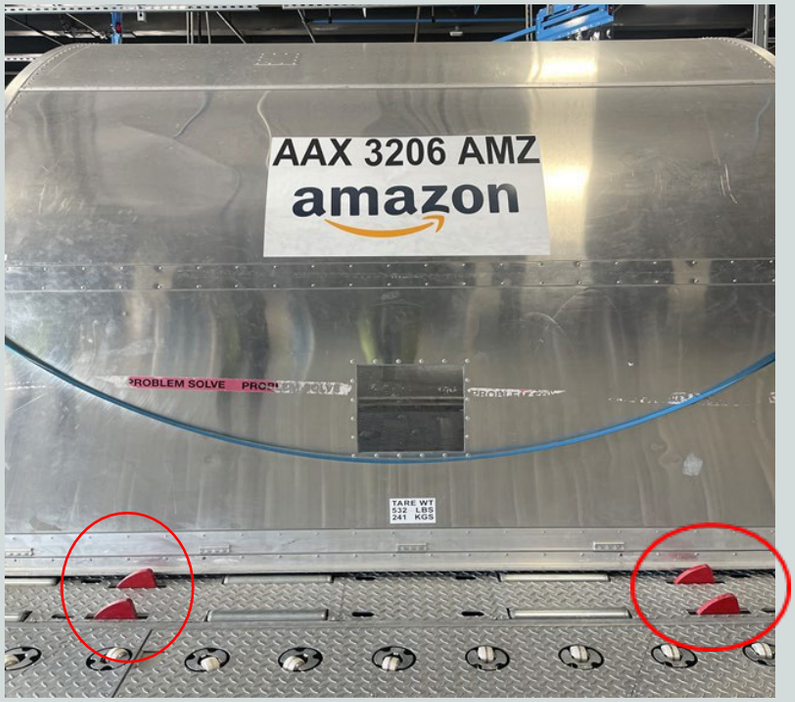
- Demonstrate to the Associate how to identify the arrows on the ULD Lock Spacers

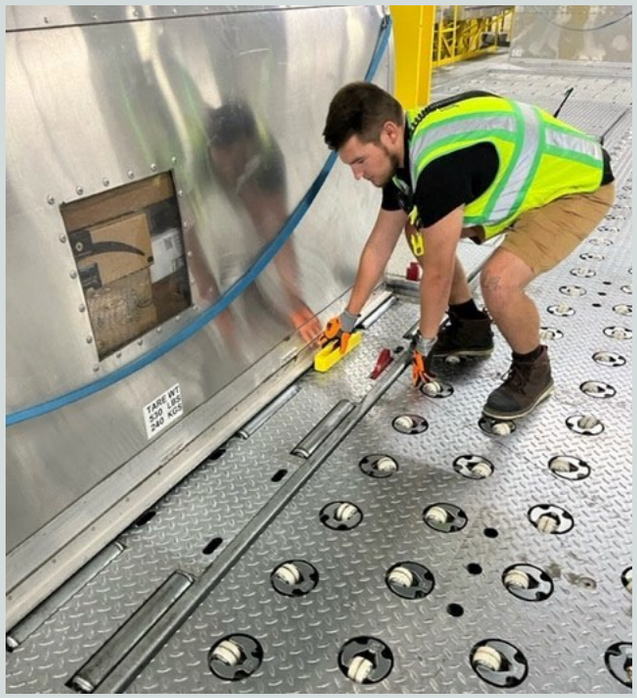
2. Identifying the open ended part

- Demonstrate to the Associate how to identify the open ended part of the ULD Lock Spacer

ACTION: Demonstrate the activity below.

3. Verifying locks are engaged





Demonstrate how to verify that the ULD Build Station Locks are engaged **prior** to inserting the ULD Lock Spacers

ACTION: Demonstrate the activity below.

4. Engaging the ULD Lock Spacers

Using your foot, demonstrate engaging the ULD lock spacers, pushing the ULD Lock Spacer horizontally, and ensuring that the open end of the spacer is closest to the Build Station Lock

ACTION: Demonstrate the activity below.

5. Disengaging the ULD Lock Spacers

- Using your foot, demonstrate disengaging ULD Lock Spacers by pushing the lock horizontally in opposite directions
- Repeat the same step on the secondary ULD Lock Spacer

ULD Lock Spacers

Observe this

ACTION: Observe each learner while unlocking a magnetic ULD lock.

Key things to watch out for/reiterate are:

1. Learners are identifying arrows on the ULD Lock Spacer.
2. Learners are identifying open ended part of the ULD Lock Spacer.
3. Learners are verifying that the ULD Build Station Locks are engaged prior to inserting the ULD Lock Spacers.
4. Learners are ensuring the arrows on the ULD Lock Spacers are facing towards the ULD.
5. Learners are placing the ULD Lock Spacers on the Build Station Lock.
6. Learners are pushing the ULD Lock Spacer horizontally using their foot, ensuring that the open end of the spacer is closest to the Build Station Lock.
7. Learners are utilizing the 2:1 ratio and repeating the steps on the secondary ULD build station lock.
8. Learners are returning the ULD Lock Spacers to designated 5S Location.

2-Step Little Giant Step Stool

Communicate this

ACTION: Read the information below aloud.

“Applying ULD Spacers: Ensure the ULD is placed with two ULD Spacer Locks, so no movement can occur within the ULD.

- Check that the ULD is locked into a place.
- Place one spacer on each of locks, pushing until its snug.
- Ensure no movement can occur within the ULD.

Opening the Step Stool:

- With both hands, grasp the top step and push it down and away from the handle.
- Pull the handle up to lock into place.

Closing Step Stool:

- Grasp handle locks and carefully lower handle into place. While grasping front of the top step, pull up and away from the bottom step to fold the ladder.”

2-Step Little Giant Step Stool

Demonstrate this

ACTION: Demonstrate how to use ULD spacers.

Application of ULD spacers

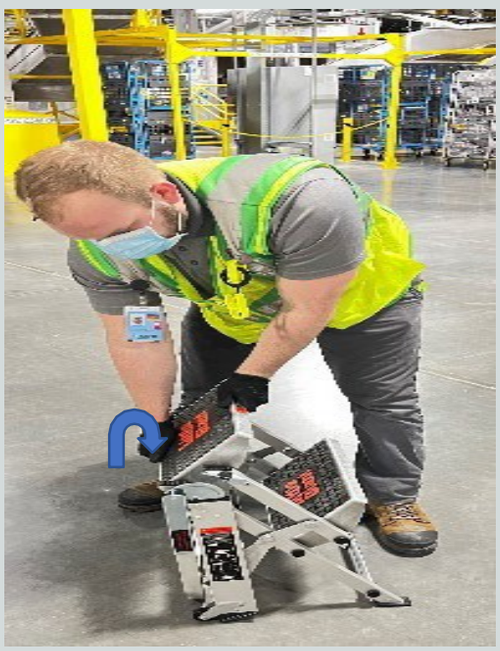
Note: If both spacers are not present, do not utilize a step stool

2-Step Little Giant Step Stool

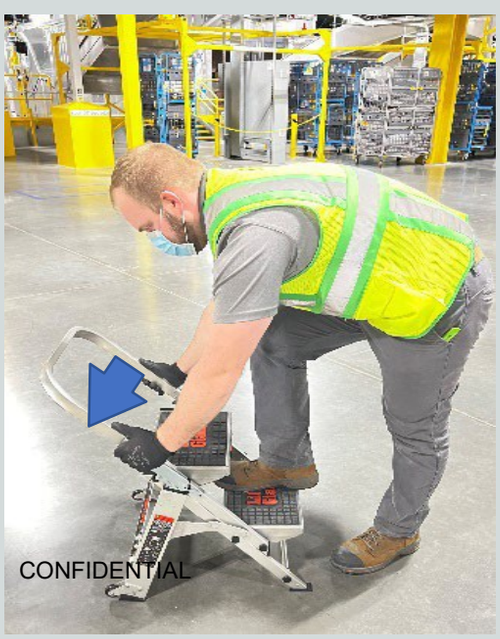
Demonstrate this

ACTION: Demonstrate the activity below and reiterate points from the previous slide.

Opening a step stool



Closing a step stool



2-Step Little Giant Step Stool

Observe this

ACTION: Observe each learner while using a 2-Step Little Giant Step Stool.

Key things to watch out for/reiterate are:

1. Learners are ensuring the ULD is placed with two spacers.
2. Learners are checking that the ULD is locked into a place.
3. Learners are placing one spacer on each of locks, pushing until its snug.
4. Learners are ensuring that no movement can occur within the ULD.
5. Learners are using both hands, grasping the top step and pushing it down and away from the handle. Pull handle up to lock into place.
6. Learners are grasping handle locks and carefully lower handle into place.
7. While grasping front of the top step, pull up and away from the bottom step to fold the ladder.

2-Step Little Giant Step Stool

Communicate this

ACTION: Read the information below aloud.

“Moving step stool inside the ULD:

- Retrieve a step stool from the 5s location.
- When placing step stool ensure it is always placed on an even surface.
- Always face the freight wall while moving the step stool inside a ULD.

Ascending and descending the step stool:

- Ensure footing is stable before moving or taking another step.
- When climbing up or down a step stool/ladder face forward, take one step at a time, and do not rush.
- Never overextend.

If the item is awkward or you do not feel comfortable with the movement, escalate immediately to your AM or PA for assistance.”

2-Step Little Giant Step Stool

Demonstrate this

ACTION: Demonstrate the activities below.

Proper body mechanics

- Demonstrate the use of proper body mechanics and how to test the weight of the package

5S location

- Demonstrate the 5S location for a step stool storage

2-Step Little Giant Step Stool

Observe this

ACTION: Observe each learner while using a 2-Step Little Giant Step Stool

Key things to watch out for/reiterate are:

1. Learners are retrieving a step stool from the 5s location.
2. Learners are ensuring that the step stool is always placed on an even surface.
3. Learners are always facing the freight wall while moving the step stool inside a ULD.
4. Learners are ensuring that the footing is stable before moving or taking another step.
5. Learners are taking one step at a time when climbing up or down a step stool/ladder.
6. Learners are not overextending when climbing up or down a step stool/ladder.
7. Learners are not leaning on or against ULDs or ULD interiors.

ACTION: Read the information below aloud.

“Unit Load Devices:

- They are used to load freight or mail onto aircraft.
- There are several types of ULDs including AAX, DQF, LAY, AKE, AAY, and PAJ/PAG.
- ULDs are designed to be moved across decking.
- When moving a ULD, Associates must use the straps and maintain control at all times.”

ULD Handling Safety

Demonstrate this

ACTION: Demonstrate the different types of ULDs and reiterate points from the previous slide.

1. DQF

2. AAX

3. LAY

4. AKE

5. AAY

6. PAJ/PAG

ULD Inspections

Communicate this

ACTION: Read the information below aloud.

“ULD inspections:

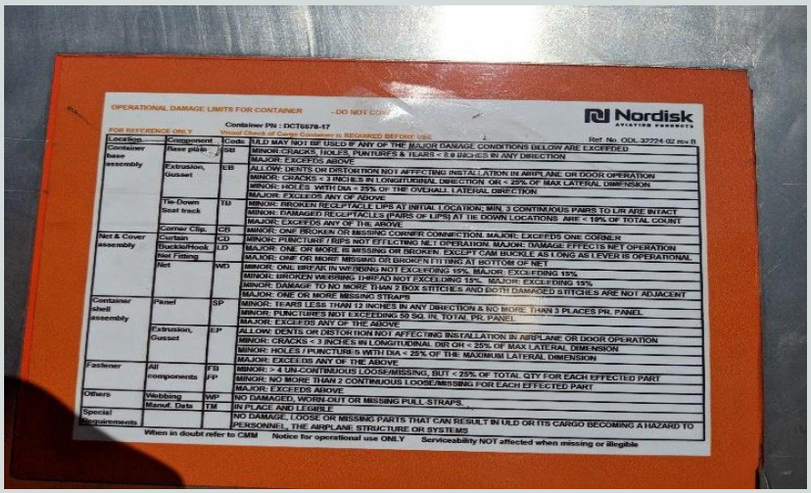
- Follow the carrier guidelines and ULD placards for serviceability standards.
- Escalate any damages to an Area Manager or a PA.
- Inspect the ULD wall and base for dents, punctures, gouges and flexing.
- Inspect the ULD curtains and webbing for punctures, rips, and cuts.
- Ensure the ULD is free of debris, including trash and cardboard.
- If a spill or liquid is encountered in a ULD, use a spill kit to clean it up or partner with problem solve to clean it up.

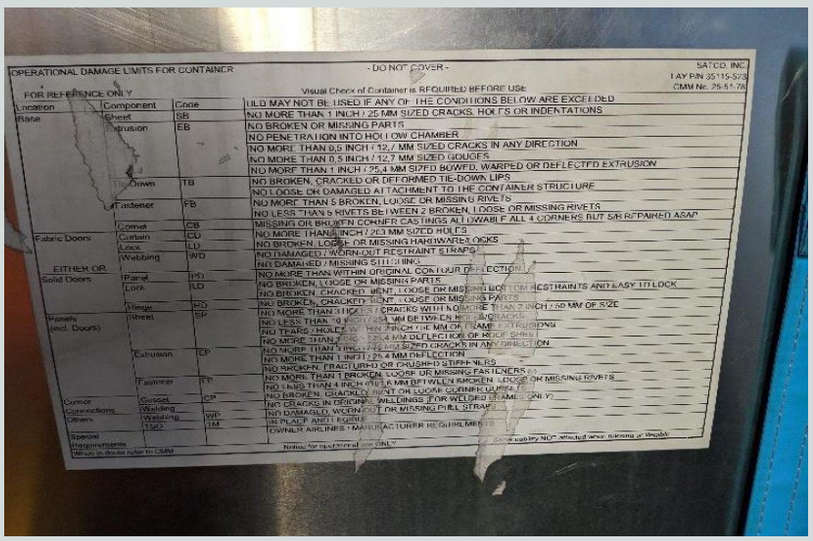
ULD Inspections

Demonstrate this

ACTION: Demonstrate where to find the ULD checklist and demonstrate how to complete it while reiterating points from the previous slide.

1. ULD inspection checklist





- Show Associate location of the ULD inspection checklist

2. Inspecting ULD

- Demonstrate how to inspect a ULD for any damages
- Perform a walk around using the checklist to inspect the ULD

ULD Inspections

Observe this

ACTION: Observe each learner while conducting ULD inspections.

Key things to watch out for/reiterate are:

1. Learners are following the carrier guidelines and ULD placards for serviceability standards.
2. Learners are inspecting the ULD wall and base for dents, punctures, gouges and flexing.
3. Learners are ensuring that the ULD is free of debris, including trash and cardboard.

ULD-Initiating Movement

Communicate this

ACTION: Read the information below aloud.

“Initiating ULD Movement:

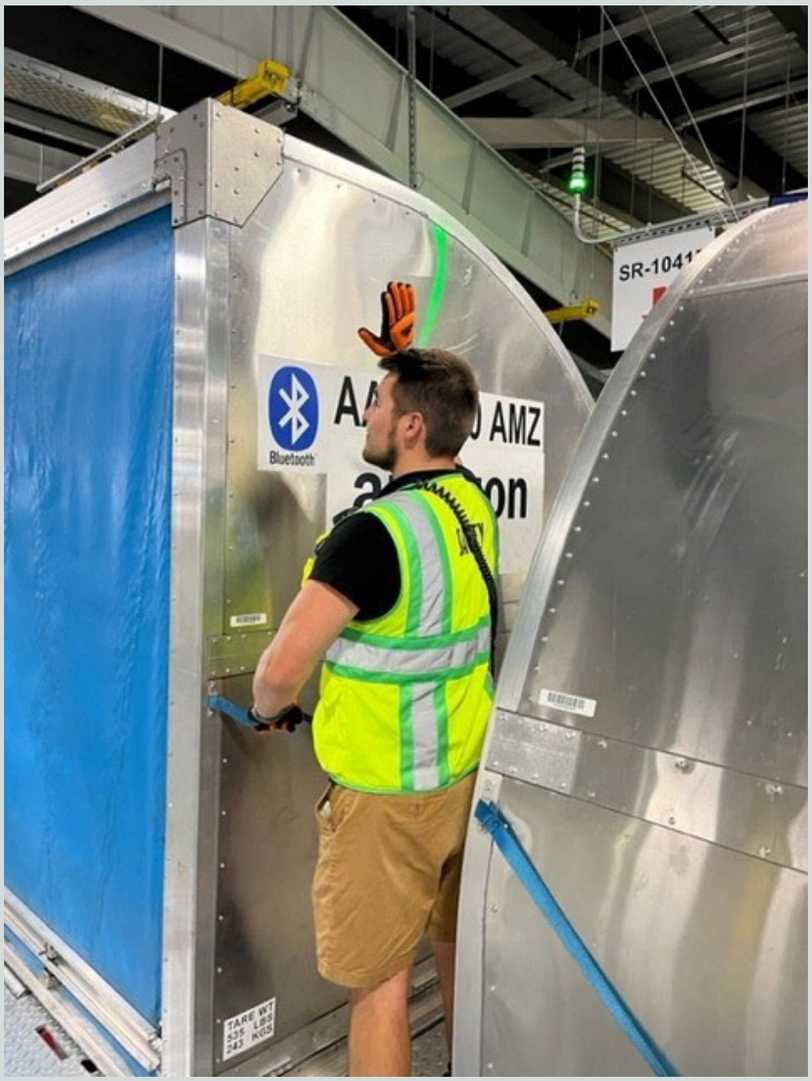
- Moving a ULD requires two people. Never attempt to move a ULD on your own.
- Always wear impact resistant gloves and safety shoes (composite toe footwear) when moving ULDs.
- Always use the proper pushing and pulling techniques, with arms slightly bent to absorb any potential impacts.
- Keep the movement within your power zone.
- Prior to initiating a movement, visually verify that the path is clear.
- Communicate movement of ULD:
  - Before movement, hit the side of the ULD one time to make an echoing sound and should shout “STAND CLEAR” to warn surrounding Associates.
  - Visual and Verbal communications should be used by the front Associate to indicate to stop the ULD movement.

ULD-Initiating Movement

Demonstrate this

ACTION: Demonstrate the steps to take before/while moving a ULD while reiterating the points below.

1. Initiate movement



- Keep arms within your power zone and slightly bent to absorb any potential impacts when pushing/pulling
- Visually verify a clear path
- Before initiating movement, hit the ULD one time and shout “STAND CLEAR”

ULD-Initiating Movement

Observe this

ACTION: Observe each learner while initiating a ULD movement.

Key things to watch out for/reiterate are:

1. Learners are always wearing impact resistant gloves and safety shoes (composite toe footwear) when moving ULDs.
2. Learners are using the proper pushing and pulling techniques.
3. Learners are keeping the movement within their power zone.
4. Learners are visually verifying that the path is clear before initiating a movement.
5. Before movement, learners are hitting the side of the ULD one time to warn surrounding Associates.
6. Learners hit the side of the ULD two times before stopping the ULD.

ULD-Movement Deck to Dolly

Communicate this

ACTION: Read the information below aloud.

- **“ULD movement Caster Deck to Dolly:**

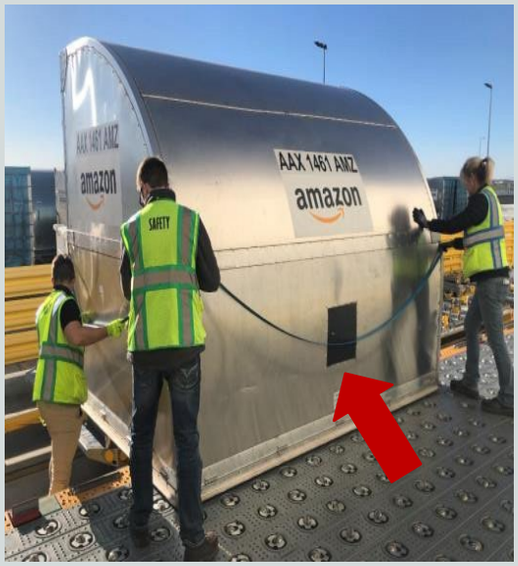
  - Before moving a ULD from the Caster Deck to a Dolly, hit the side of the ULD to let those around you know know that a movement is being initiated, and shout “STAND CLEAR”.
  - Then, push the deck lock down with your foot.
  - **DO NOT step off the Caster Deck to assist with dolly movement.** With someone on the opposite side of the ULD, initiate movement by pulling the strap on the side of the ULD towards the Caster Deck. Guide the ULD onto the dolly then move towards the rear to help push ULD smoothly onto the dolly.
  - DQF and AKE ULDs should always be transferred at a 45° angle. AAX and LAY will be transferred straight on.
  - Once the ULD is on the dolly, the tractor operator must engage the locks (not you!).
  - Then reset the border locks.”

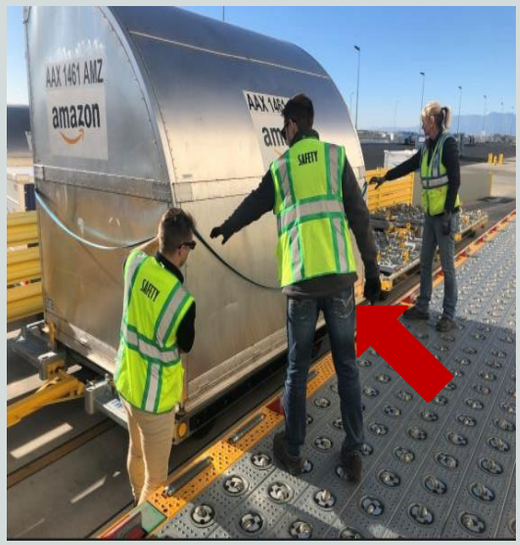
ULD-Movement Deck to Dolly

Demonstrate this

ACTION: With the assistance of someone else, demonstrate how to safely move a ULD off of the Caster Deck and onto a dolly. Reiterate the points mentioned below.

Step 1	Step 2	Step 3





- Caster Deck Associate 1 pushes the deck lock down. Before initiating movement, they must hit the side of the ULD and shout “STAND CLEAR”.
- DQF and AKE ULDs should always be transferred at a 45° angle. AAX and LAY will be transferred straight on.
- Standing on the opposite side of the ULD, Caster Deck Associate 2 guides the ULD onto dolly (until the tractor operator has control of it). They then help the other Caster Deck Associate finish pushing the ULD onto the dolly.
- The Tractor operator must then engage the dolly locks, locking the ULD into place on the dolly.
- Caster Deck Associate 1 or 2 must then reset the border locks

ULD-Movement Deck to Dolly

Observe this

ACTION: Observe each learner while moving the ULD from deck to dolly.

Key things to watch out for/reiterate are:

1. Before movement, learners are hitting the side of the ULD and are shouting “STAND CLEAR.”
2. Learners are not stepping off the Caster Deck to assist with dolly movement.
3. Learners are transferring the DQF and AKE ULDs at a 45° angle.
4. Learners are transferring AAX and LAY straight on.
5. Learners are not engaging the locks while the ULD is on the dolly. This should be done by the tractor operator.
6. Learners are resetting the border locks after the ULD is placed on the dolly.

ULD-Movement Dolly to Deck

Communicate this

ACTION: Read the information below aloud.

“ULD movement: Dolly to Caster Deck:

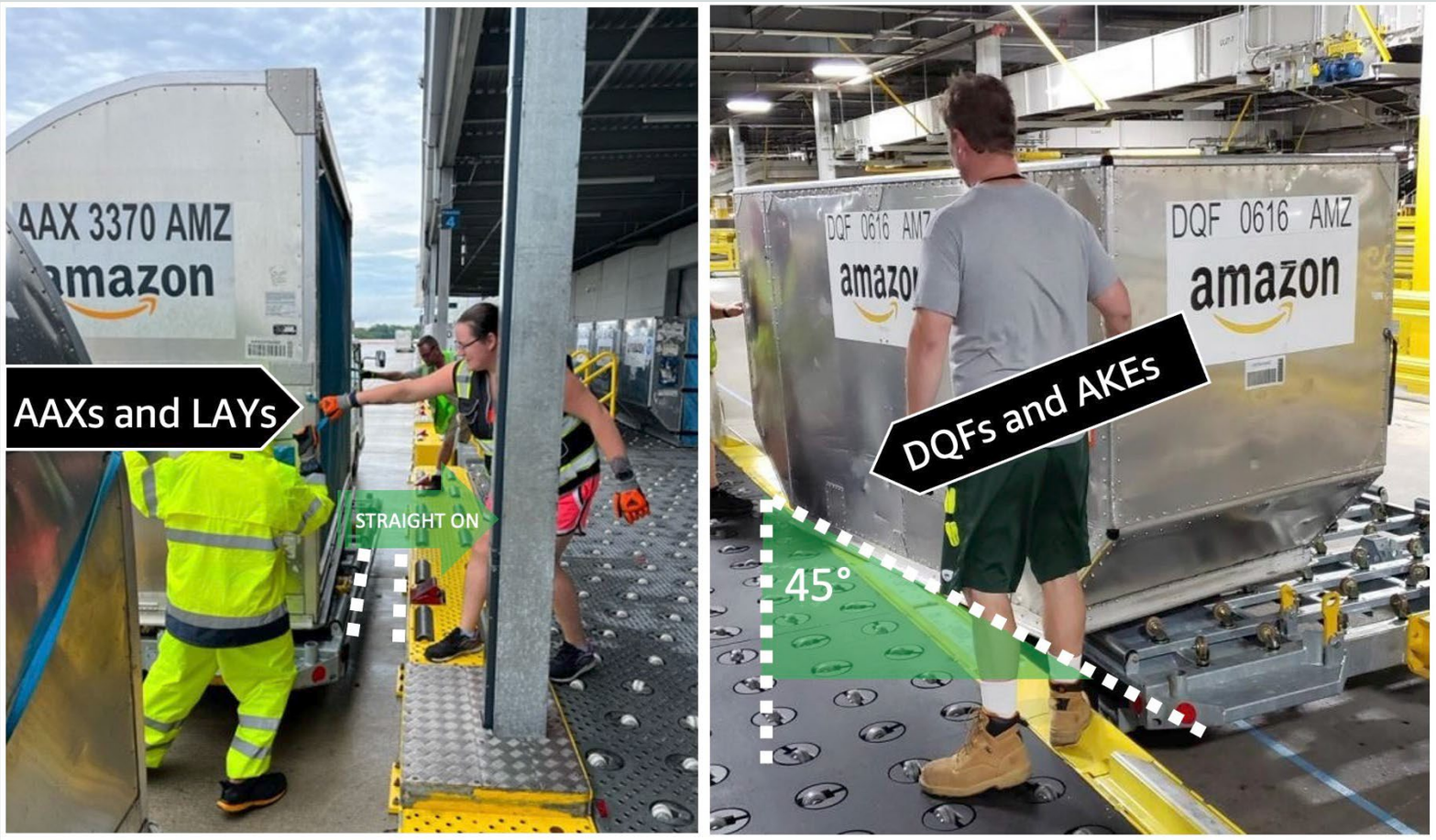
- The tractor operator (not you) will initiate the transfer of the ULD off of the dolly and onto the Caster Deck.
- Two people must be on the Caster Deck to receive the ULD.
- For DQF and AKE ULDs: Using the ULD strap, one person must catch and pull the ULD forward onto the Caster Deck, creating a 45 degree angle to the deck. Avoid being directly in front of the ULD container.
- For AAX and LAYs: Both people pull the ULD forward to transfer it straight onto the Caster Deck.
    - **Be cautious not to overextend while on the Caster Deck when reaching for the ULD strap, as this can lead to injury.**
- Never step down from the Caster Deck. Only assist from the Caster Deck.

ULD-Movement
Dolly to Deck

Demonstrate this

ACTION: With the assistance of someone else, demonstrate how to safely move a ULD off of a dolly and onto the Caster Deck. Reiterate the points mentioned below.

Moving ULD off Dolly onto Caster Deck



- For DQF and AKE ULDs: Using the ULD strap, one person must catch and pull the ULD forward onto the Caster Deck, creating a 45 degree angle to the deck
- For AAX and LAYs: Both people pull the ULD forward and transfer it straight onto the Caster Deck

ULD-Movement Dolly to Deck

Observe this

ACTION: Observe each learner while moving the ULD from dolly to deck.

Key things to watch out for/reiterate are:

1. Learners are waiting for the Cargo Tractor Operator to initiate ULD movement when transferring the ULD from the Dolly to the Caster Deck.
2. Learners are working in groups or pairs to ensure two people are on the Caster Deck to receive the ULD.
3. Learners are not directly in front of the ULD container.
4. Learners are not overextending off of the Caster Deck when reaching for the ULD strap.
5. Learners are only assisting from the Caster Deck and are not stepping down.

ULD-Movement Through Site

Communicate this

ACTION: Read the information below aloud.

“ULD Movement Through Site:

- All movement of ULDs shall always occur with two Associates.
- When moving ULDs, maintain a full ULD-length gap between others.
- During this coordinated movement Associates will:
  - Avoid walking backwards.
  - Whenever possible, walk between casters and rollers.
  - Whenever possible, Associates should be positioned on the same side of ULD to allow line-of-sight for visual commands and signals throughout the ULD movement.
  - Never stop a ULD using your body or foot as a break.
  - Never position your body in a pinch point between a moving ULD and an immovable object.
- The back associate pushes the ULD only to initiate movement. Once the ULD is in motion, the back associate then then guides the ULD in a straight line while the front associate pulls ULD along the deck.

NOTE: Never step or walk in front of the ULD. Never stop the ULD using your body as a brake by pushing it against the direction of travel. Instead, pull on straps with two hands to stop the ULD’s movement, keeping your body out of the direction of travel.”

ULD-Movement Through Site

Demonstrate this

ACTION: With the assistance of someone else, demonstrate how to safely move a ULD throughout the site.

Moving ULDs

- Back associate pushes ULD (only to begin movement). Once ULD is moving, the back associate *guides* (does not push) the ULD in a straight line while front associate *pulls* ULD along the deck
- Both associates keep their bodies out of the ULD's direct line of travel
- Maintain a full ULD-length gap between the ULD and others

ULD-Movement Through Site

Observe this

ACTION: Observe each learner while moving the ULD through the site.

Key things to watch out for/reiterate are:

1. Learners are starting the movement with two Associates.
2. Learners avoid walking backwards.
3. Learners are walking between casters and rollers, whenever possible.
4. Learners are positioned on the same side of ULD.
5. Learners are not stopping a ULD by using their body or foot as a break.
6. Learners are never positioning their body in a pinch point.
7. Learners in the back are pushing the ULD only to begin the movement, then guiding the ULD in a straight line once it is in motion.
8. Learners in the front are pulling the ULD along the deck.
9. Learners are maintain a full ULD-length gap between the ULD and others

ULD Stopping/Turning/ Changing Direction

Communicate this

ACTION: Read the information below aloud.

“Stopping/turning/changing direction of a ULD:

To stop the ULD:

- The front associate will let the employee in the rear know to stop pushing.
- Both front and rear Associates will pull the ULD straps with both hands to stop motion.
- As the ULD slows, the front Associate will then lightly pull on the straps until the ULD comes to a complete stop.

To turn ULD or change directions on the deck:

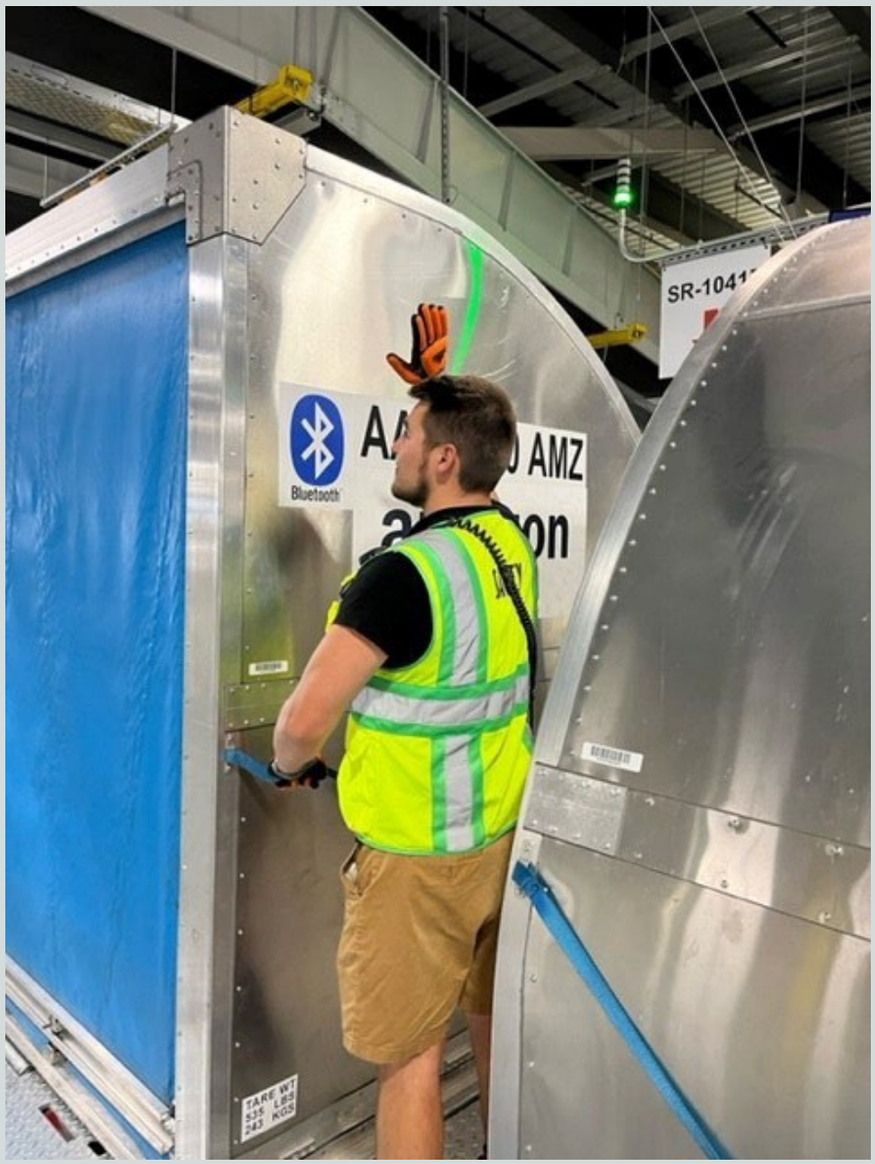
- The ULD must be at a complete stop.
- The front guide must notify the Associate at the rear about the change of direction verbally and visually, and determine who will pivot to change the direction.
- The front Associate may hit the ULD and/or both Associates can shout to ‘**Stand Clear’**.
- The front Associate will push to turn the ULD and the rear Associate will be the pivot to maintain control of the ULD, until the front guide has completed the turn.
- When the ULD is turned, rear Associate must indicate to stop the motion either verbally or by hitting the ULD.”

ULD Stopping/Turning/ Changing Direction

Demonstrate this

ACTION: Demonstrate the activity below and reiterate points from the previous slide.

Stopping and turning the ULD



ULD Stopping/Turning/ Changing Direction

Observe this

ACTION: Observe each learner while stopping, turning and changing the direction of a ULD.

Key things to watch out for/reiterate are:

To stop the ULD:

1. The front Learner is signaling the rear Learner to prepare for a stop by communicating verbally and visually.
2. As the ULD slows, both Learners are slightly pulling on the straps until the ULD comes to a complete stop.

To turn ULD or change directions on the deck:

1. Learners are making sure that the ULD is stopped completely.
2. Front Learners are notifying the Learner on the rear side about the change of direction verbally and visually, and determine who will pivot to change the direction.
3. As the ULD slows, the front Learner is hitting the ULD and/or both Learners are shouting to ‘Stand Clear.’
4. Front learners will push to turn ULD; rear Associate will be the pivot and maintain control of ULD until front guide has completed the turn.
5. Learners are indicating to stop the motion either verbally or by hitting the ULD.

ULD-Staging at a Work Station

Communicate this

ACTION: Read the information below aloud.

“Staging a ULD in a work station:

- When at the opening of the staging area, complete a safety stop to arrest momentum and allow a chance to reset the body positioning.
- Take advantage of the safety stop to ensure the Associates are at the front edge of the ULD and have stepped over or cleared any trip hazards at the staging area.
- Gently pull the ULD into position from the front edge, keeping the hard stop at the end in mind. This will mitigate the cargo shift in the ULD.
- One Associate will always lock the Caster Deck locks at the rear of the ULD, while they or another Associate maintains a positive control of the ULD.
- Associate uses this time to engage the ULD Spacers to prevent movement once inside the ULD.
- Refer to the ATI serviceability checklist for the ULD inspection before loading a ULD.
- Before opening the door of a ULD, verify that the ULD is locked in place and has no significant pressure or bulging on the fabric, indicating the load has shifted.”

ULD-Staging at a Work Station

Demonstrate this

ACTION: With the assistance of someone else, demonstrate how to stage a ULD at a workstation.

Step 1

Step 2

Step 3

Step 4

- Ensure safety stop is engaged. From the front edge, pull the ULD into position.
- One Associate locks Caster Deck locks at the rear of the ULD, while the second Associate maintains control of the ULD. Engage the ULD Spacers.
- Refer to the ATI serviceability checklist for the ULD inspection before loading a ULD.
- Before opening the door of a ULD, verify that the ULD is locked in place and has no significant pressure or bulging on the fabric, indicating the load has shifted.

ULD-Staging at a Work Station

Observe this

ACTION: Observe each learner while staging the ULD at the work station.

Key things to watch out for/reiterate are:

1. At the opening of the staging area Learners are completing a safety stop to arrest momentum.
2. Learners are taking advantage of the safety stop to ensure they are at the front edge of the ULD.
3. Learners are gently pulling the ULD into position from the front edge, keeping the hard stop at the end in mind.
4. One Learner is always locking the Caster Deck locks at the rear of the ULD while the other Learner is maintaining positive control of the ULD.
5. Learners are engaging the ULD Spacers to prevent movement once inside the ULD.
6. Learners are referring to the ATI serviceability checklist for the ULD inspection before loading a ULD.
7. Before opening the door of a ULD, Learners are verifying that the ULD is locked in place and has no significant pressure or bulging on the fabric.

ULD-Removing from a Work Station

Communicate this

ACTION: Read the information below aloud.

“Removing ULD from the work station:

Prior to moving a ULD from the staged and locked position, the Associates needs to follow the below steps:

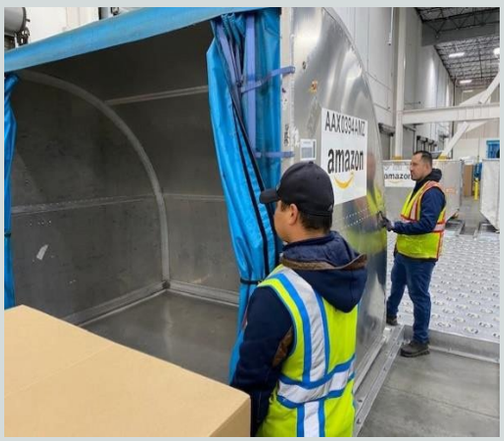
- Two Associates should begin the process by aligning with each other on a short side of the ULD, with one Associate confirming that the ULD is completely empty with no packages, debris, or cardboards.
- Front side Associate will give a thumbs up visual to the Associate at the back of the can, indicating that the ULD is empty or properly closed/secured.
- The Associate working at the back of the ULD will always unlock the Caster Deck lock at the right side of the ULD followed by the lock on the left side.
- The Associates will verify with each other that the locks are disengaged and ULD Spacers are removed before any movement.
- Associates should then both move to the same side of the ULD to pull it out of staging and then assume the position for moving the ULD across the site.

NOTE: If during movement, the ULD gets stuck, do not attempt to move or force the ULD. Escalate to a member of leadership or a member of your site Safety team.

ULD-Removing from a Work Station

Demonstrate this

ACTION: With the assistance of someone else, demonstrate how to remove a ULD from a work station. Reiterate points mentioned below.

One	Two	Three
		

Note: During this coordinated movement Associates will:

- Avoid walking backwards, limiting the time the Associate's back is in the direction of travel when the ULD arrives at its location
- Conduct the movement on the same side of the ULD so that the Associate in the back has full view of the Associate in the front

ULD-Removing from a Work Station

Observe this

ACTION: Observe each learner while removing the ULD from the work station.

Key things to watch out for/reiterate are:

1. Two Learners are beginning the process by aligning with each other on a short side of the ULD, with one Learner confirming that the ULD is completely empty with no packages, debris, or cardboards.
2. To indicate an empty can, the front side Learner is giving a ‘thumbs up’ visual to the Learner at the back of the can.
3. Learners working at the back of the ULD are unlocking the Caster Deck lock at the right side of the ULD followed by the lock on the left side.
4. Learners are verifying with each other that the locks are disengaged, and that the ULD is empty and ULD Spacers are removed before any movement.
5. Learners are then moving to the open side of the ULD to move the container along the Caster Deck.

ULD Movement Safety Reminders

Communicate this

ACTION: Read the information below aloud.

- “To avoid injury and to maintain optimal control of container, front Associate must be at the side of the ULD, not in front of it.
- No single Associate should pull both straps on the same side of the ULD at the same time; this can cause muscle strain and injury.
- Associates must be aware of their feet positioning to avoid pinching when the ULD begins to move.
- To avoid injury Associates should never wrap a ULD straps around their hands in a circular configuration; the strap must be grasped with a closed fist.
- Associates should never position their body in a pinch point between a moving ULD and an immovable object.
- If during a movement, the ULD gets stuck, Associate should not attempt to move or force the ULD, escalate it to leadership or to a member of your site Safety team.”

ULD Movement Safety Reminders

Demonstrate this

ACTION: Demonstrate improper handling of a ULD (reiterate that you're demonstrating what NOT to do)

Don'ts

- DON'T stand in front of the ULD
- DON'T pull both straps from the same side at the same time
- DON'T position your body in a pinch point
- DON'T wrap ULD straps around your hands in a circular configuration, grasp the strap with a closed fist

ULD Movement Safety Reminders

Observe this

ACTION: Observe each learner while moving a ULD.

Key things to watch out for/reiterate are:

1. Front Learners are standing at the side of the ULD, not in front of it.
2. Learners are not pulling both the straps on the same side of the ULD at the same time.
3. Learners are reviewing their feet position to avoid pinching when the ULD begins to move.
4. Learners are not wrapping ULD straps around their hands in a circular configuration to avoid injury.
5. Learners are not positioning their body in a pinch point between a moving ULD and an immovable object.
6. If a ULD gets stuck during the movement, Learners are not attempting to move or force the ULD.

ULD Securement

Communicate this

ACTION: Read the information below aloud.

“Loaded ULDs:

- Close the curtains completely.
- Secure the nets, by tightening the fasteners and the buckles.
- Engage the tie down locks.
- When working with nets tighten the lashings to reduce slack.
- Only trained Associates can perform ULD netting.
- Escalate any issues that are observed. In the event a ULD cannot be secured or if a restraint feature is defective/broken escalate to your manager and do not move the ULD to be loaded onto aircraft.
- ULDs (AAX/LAY only) with freight for aircraft bulk will be positioned with the curtain side resting on the exterior locks.

Caution: Never spin a ULD onto a dolly. If the ULD is not in the correct orientation and needs to be rotated, transfer it back to Caster Deck to move it into the correct orientation.

Empty ULDs:

- Secure nets loosely (to not have loose straps).
- Engage the tie down locks.
- Use impact gloves as per the standard PPE requirements.”

ULD Securement

Demonstrate this

ACTION: Demonstrate the activity below and reiterate points from the previous slide.

Demonstrate engaging all fasteners, buckles, and locks

ULD Securement

Observe this

ACTION: Observe each learner while securing a ULD.

Key things to watch out for/reiterate are:

1. Learners are closing the curtains completely.
2. Learners are securing the nets by tightening the fasteners and the buckles.
3. Learners are engaging the tie down locks.
4. Learners are not performing the ULD netting.
5. Learners are positioning the ULDs (AAX/LAY only) with freight for aircraft bulk to the curtain side resting on the exterior locks.
6. Learners are not leaving gaps between the ULD and the dolly edge.
7. Learners are not spinning the ULD on the dolly.
8. Learners are loosely securing the nets of an empty ULD.
9. Learners are engaging the tie down locks of an empty ULD.
10. Learners are using impact gloves as per the standard PPE requirements.

Training Group Pulse Check

Training Group Pulse Check

Communicate this

ACTION: Read the information below aloud.

“Let’s review some of the important points we covered regarding the ATS Safety Rule on ULD Handling Safety.

I’m going to read each question and two answer options aloud. Once I have read both answer option A and B aloud, I will pause for each of you to respond with which one you believe is the correct answer. After all of you have answered the question, I will provide the correct answer. If majority of the group answers the question incorrectly, we will review that topic again.”

Training Group Pulse Check

Training Group Pulse Check

Q1. When placing step stool ensure it is always placed on an _____ surface.

a) Even

b) Blue-taped

Q2. While opening a step stool use _____ to grasp top step and push down away from handle.

a) One hand

b) Two hands

Q3. The_____ is responsible for staging and securing all ULDs on the deck using mobile locks.

a) Caster Deck Associate

b) Floor manager

Q4. The three techniques of walking on the deck are Seams, Diagonal, and _____.

a) Straight Line

b) Cross

Q5. Associates will keep their arms within the plane of the Caster Deck until Cargo Tractor Operators are out.

a) True

b) False

Q6. If the ULD Lock Spacer appears to be broken report the broken or damaged lock to _____.

a) A member of leadership

b) Caster Deck Associate

Q7. _____ is most common type used for ULD movement.

a) Roller decking

b) Caster Decking

Q8. Breaking the magnetic lock free by force is a method not recommended as the magnet is still engaged and requires extra force to remove from the Caster Deck.

a) True

b) False

Q9. The two different kinds of decking we use are Caster Decking and _____ Decking..

a) Straight line

b) Roller

Q10. Cargo Tractor Operators are required to physically verify locks are engaged prior to operating a loaded vehicle.

a) True

b) False

Articulate 10

SR_Safety Is Your Mission

AMAZON LEADERSHIP LIFTOFF

Safety is Amazon's top priority!

By recognizing the importance of your role as a leader, and learning to identify potential hazardous conditions, you will have a positive impact on the safety of your team.

EXPLORATION MENU

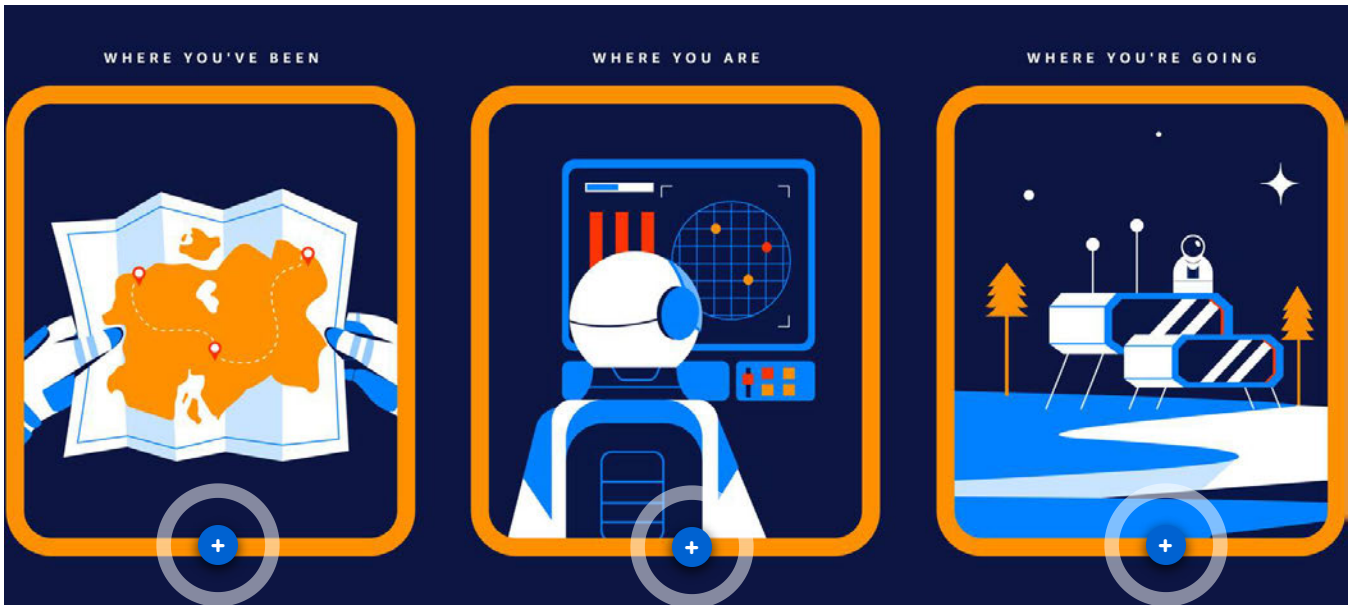
- Kick Off Your Exploration
- Amazon's Vision for Safety
- Ensuring Safety as a Leader

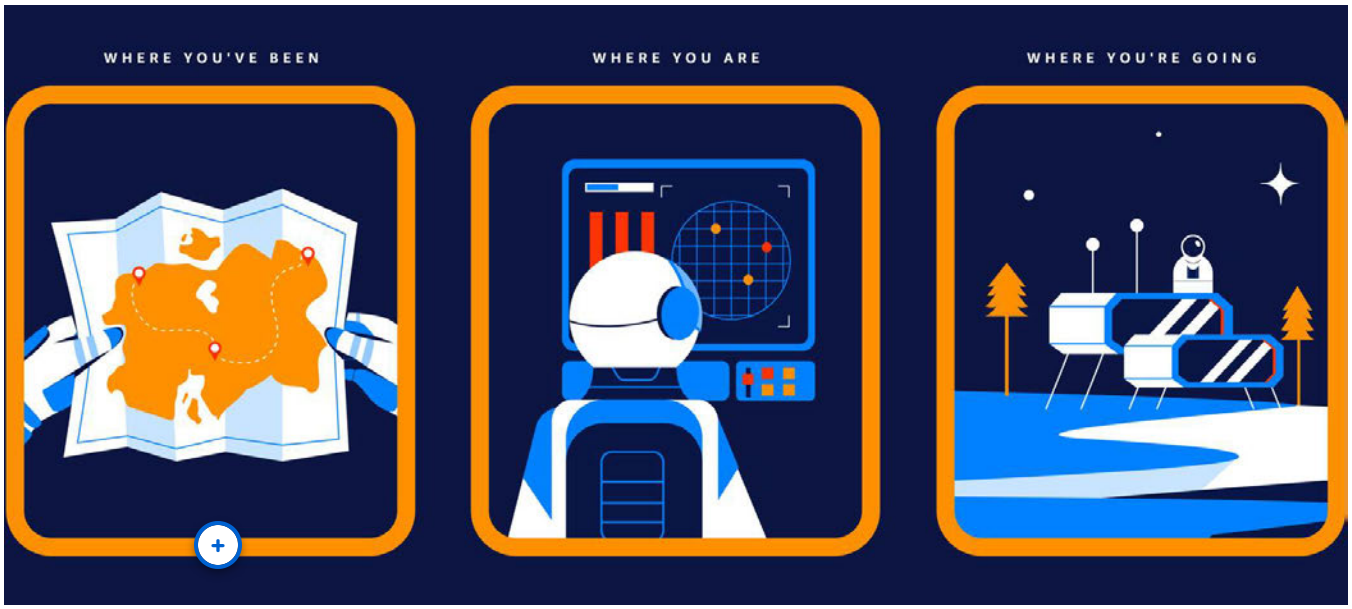
- **Supporting a Safe Work Environment**
- **Make It REAL**
- **Exploration Summary**

Lesson 1 of 6

Kick Off Your Exploration

SR10 Articulate 10

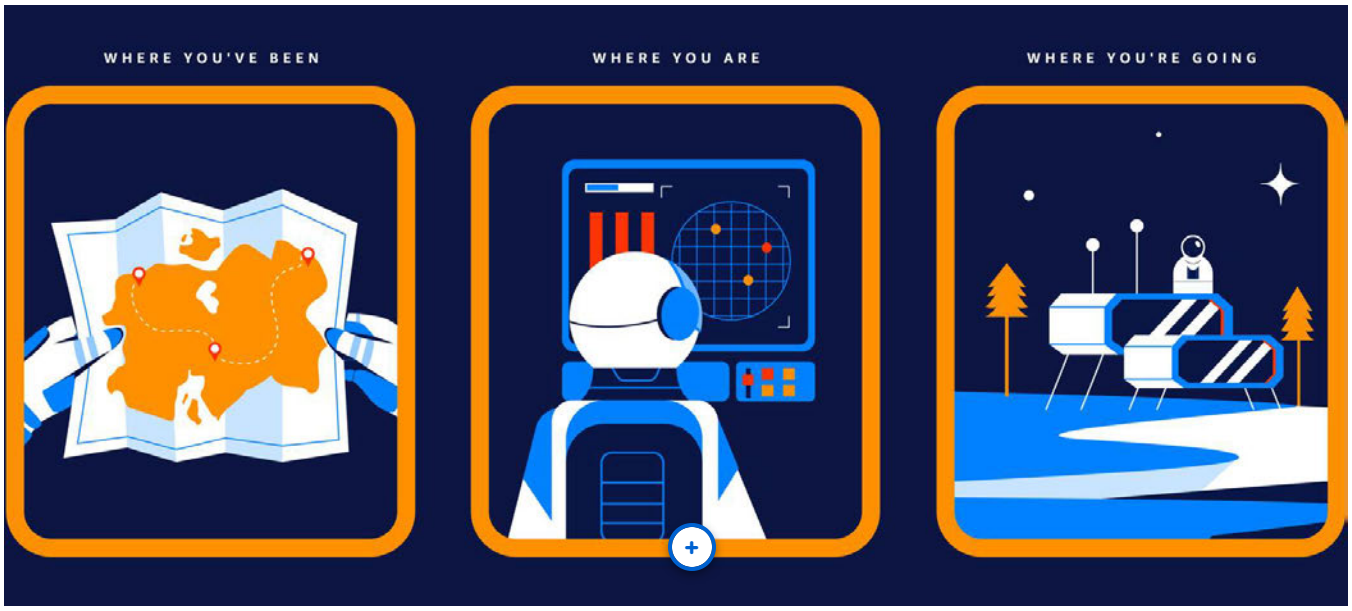

WHERE YOU'VE BEEN
WHERE YOU ARE
WHERE YOU'RE GOING



Where You've Been

In Amazon Day 1 (AD1), you were introduced to the key Workplace Health & Safety (WHS) systems (KNet, AUSTIN, Safety Leadership Index (SLI), and Global EHS Management System (GEMS)) and how to lead safely through Amazon's leadership principles.

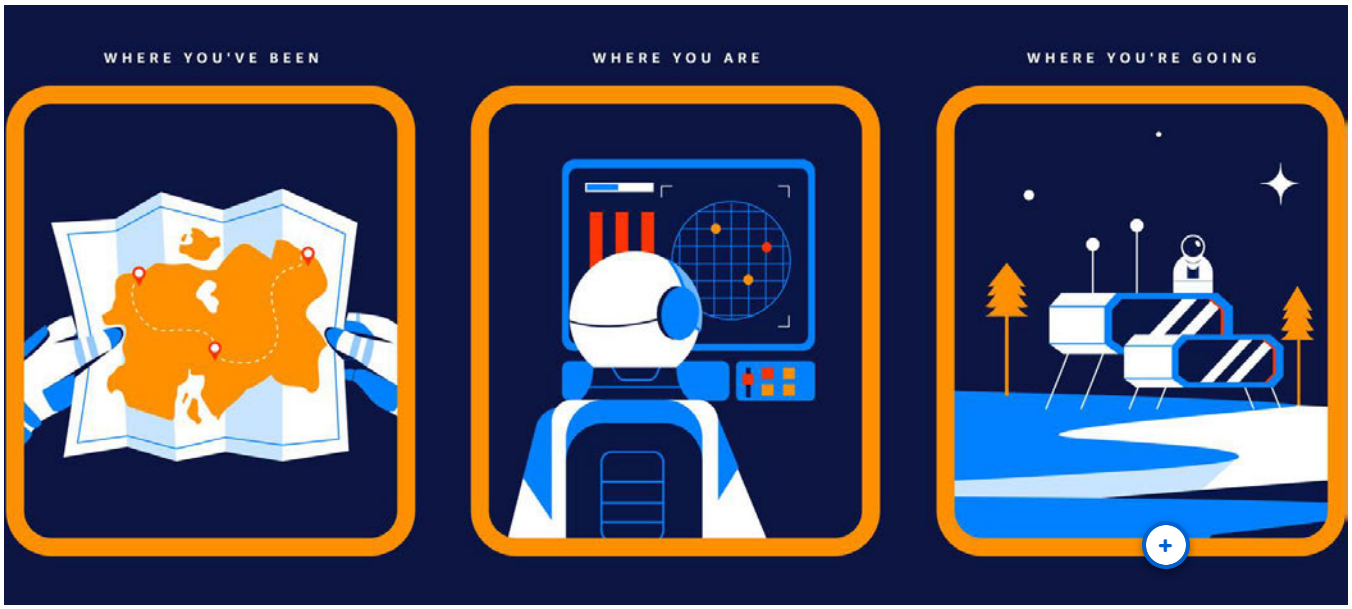
In Associate Experience Week (AEW), you experienced the life of an associate.



Where You Are

You're exploring Amazon's vision for safety.

Supporting a safe work environment encourages an efficient, productive, and happy team.



Where You're Going

Your destination is leading safely!

Amazon leaders take ownership of safety and integrate safety into all aspects of their day-to-day work.

Click the three hotspots above before moving on.

Lesson 2 of 6

Amazon's Vision for Safety

Articulate 10

Safety At Amazon...

Prioritizes the person over the process. Encourages associates to make safety decisions.

Encourages communication and leads to highly productive and efficient processes.

Yields trust and collaboration between Area Managers and associates. Report and address incidents and concerns immediately.

Click the three hotspots above before moving on.

Why Is Safety a Priority?

Click the three flipcards below to explore why safety is a priority.

2. Safe work environments are foundational to efficiency, productivity, and happy associates.

3. A safe workplace encourages high performance and proactive, supportive associates.

Click the flipcards above before moving on.

As a leader, what you do and say will shape the behaviors, beliefs, and values of your team.

Leaders own the safety of their team.

Safe teams are happy teams.

Check Point

What is the importance of making safety a priority?

- ○ A safe workplace ensures awareness and ownership of job performance.
- ○ Safe work environments are foundational to efficiency, productivity, and happy employees.
- ○ A safe workplace ensures high performance and increases turnover.

SUBMIT

Complete the content above before moving on.

Associates trust leaders. They come to you for decisions. Lead by example in your words and actions.

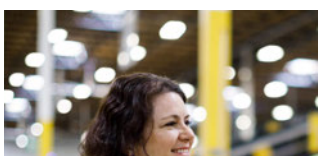
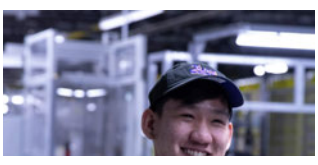
CONTINUE

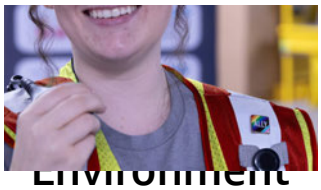
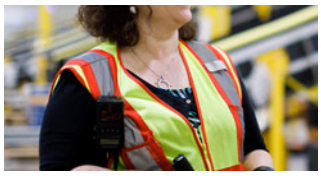
Lesson 3 of 6

Ensuring Safety as a Leader

SR10 Articulate 10

Some Of Your Responsibilities

You can ensure safety every day.

Create a rapport with your team. Exemplify safe behaviors. Build confidence in your leadership skills. Adhere to Leadership Principles.

5 Leadership Principles you'll follow to become a great leader.

OWNERSHIP

Hold yourself accountable and strive to create the safest work environment for your team.

- Be self-critical
- Ask for help when needed
- Lead by example
- Own the opportunity to coach associates
- Reach for long-term solutions

BIAS FOR ACTION

Be willing to jump in and be part of the solution.

- Accept challenges
- Work toward resolutions
- Improve processes
- Hold yourself accountable

EARN TRUST

Ensure that your associates feel supported and can rely on you.

- Follow up and follow through
- Be present and transparent
- Listen attentively
- Speak candidly

- Exude empathy

INSIST ON THE HIGHEST STANDARDS

Expect high standards from yourself and your team.

- Support your team
- Encourage high expectations
- Reassure proper corrective actions
- Use positive reinforcement

DIVE DEEP

Take deep dives into why a concern or issue occurred.

- **Review safety metrics**
- **Ask questions and connect**
- **Work with safety teams to gain insights**
- **Collaborate and stay informed**
- **Be consistent and attentive**

Check Point

The Amazon Leadership Principles should be your guide for all safety decisions. Which definition below most closely relates to Earn Trust?

- [ ] You support your team and encourage them to strive to meet these standards through reassurance and corrective actions.
- [ ] Show your team each day that safety is your top priority. You continually work to improve processes by holding yourself and your associates accountable.
- [ ] You can ensure your associates feel comfortable raising safety issues to you. You listen attentively, speak candidly, and lead with empathy.

SUBMIT

Complete the content above before moving on.

Ensuring safety begins with understanding the needs of your

associates and feeling confident to address safety issues as they arise.

CONTINUE

Lesson 4 of 6

Supporting a Safe Work Environment

Articulate 10

Show safety is your priority by understanding safety terminology, recognizing common hazards, and sustaining a safe work

environment for your team.

Learning Safety Terminology

Expand each of the seven items below to review safety terminology.

Hazard

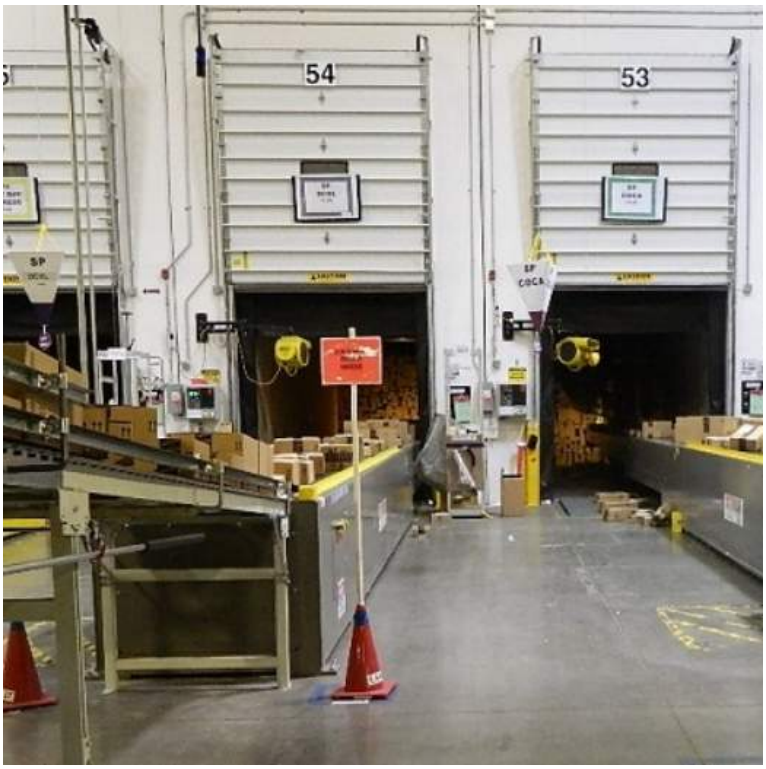
A source of potential harm or injury caused by an object, material, or activity.

Example: A fallen box in a walkway.

Risk

The probability of a hazard occurring combined with the severity of the injury or illness.

Example: Loading dock during a high-volume time period.



Near Misses

A potential hazard or incident where, with a slight shift in position or time, an injury or incident could have occurred.

Example: A worker slips but catches themselves before falling.

Corrective Actions

Actions taken to eliminate or mitigate hazards and to prevent the recurrence of incidents.

Example: A worker asks for assistance during a heavy lift.

Unsafe Acts

Taking shortcuts or practicing improper techniques, such as improper lifting or bending.

Example: A worker pulls a pallet off a stack over five pallets high by themself.

Unsafe Conditions

A condition in the workplace that is likely to cause personal injury or property damage.

Example: Items are stacked improperly and could fall.

5S

5S stands for Sort, Straighten, Shine, Standardize, and Sustain. It is Amazon's method for preventing unsafe conditions.

Example: Work areas are well organized and eliminate workflow disruptions.

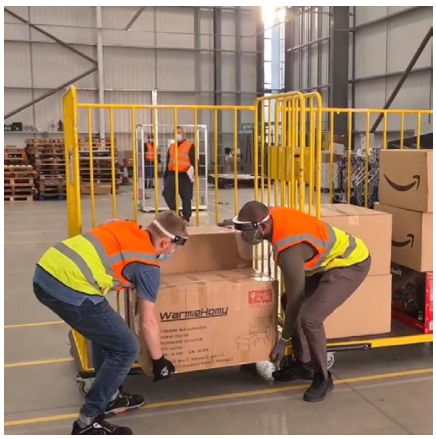
Expand and review important terminology above before moving on.

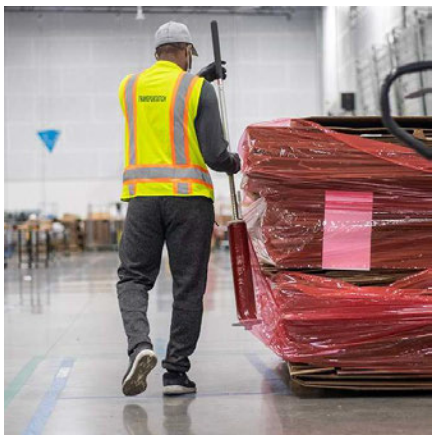
Defining Common Hazards

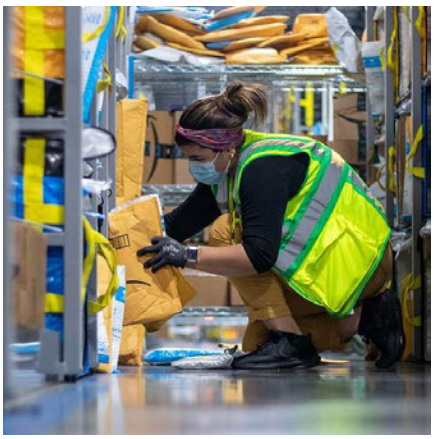
1. Musculo-Skeletal Disorder (MSD)

Appropriately designed tools and work procedures reduces the likelihood of musculo-skeletal injury.

Avoid awkward positions, repetitive movements, and excessive effort on joints.







2. Conveyance

These systems can be fast-moving, transporting packages and boxes several miles throughout the facility.

Proper attention and body positioning are important for avoiding injury or incidents.

3. Walking Surfaces

Follow the 5S process to avoid and eliminate slips, trips, and falls.

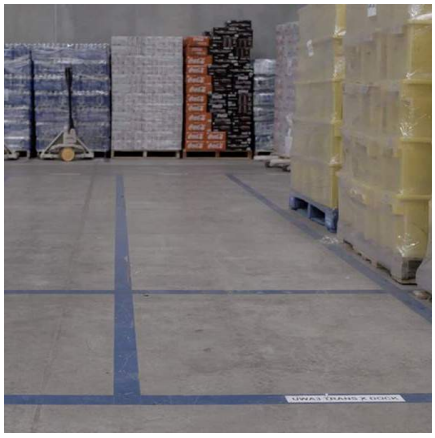
Sort: Remove unnecessary items from the work area

Straighten: Organize storage areas

Shine: Clean and inspect work areas regularly

Standardize: Put everything in the correct place

Sustain: Ensure regular housekeeping checks



4. Falling Objects

Items falling from one height to another can pose immediate risk and injury or lead to a fall hazard.

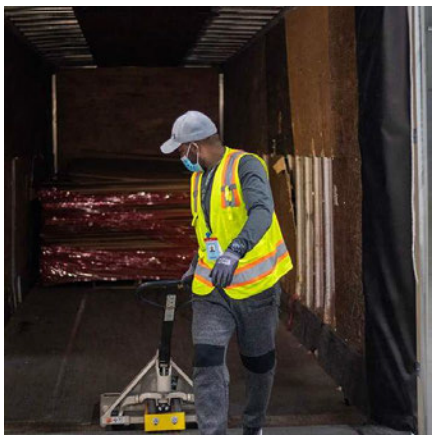
Objects could fall from storage bins, shelves, conveyor belts, or pallet racks.

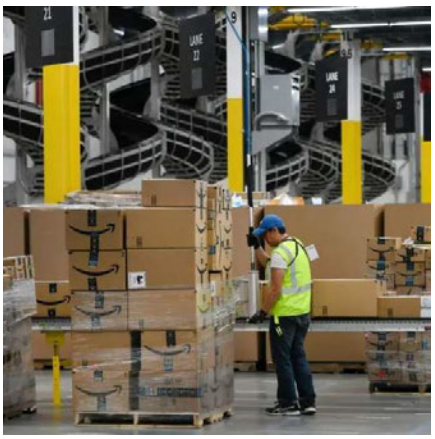
Remember to step out of the way and report the incident immediately.

5. Loading Docks

Loading docks are busy areas serving as the main arrival and departure area for Amazon packages and equipment.

Be cautious of moving vehicles, swinging doors, debris on the floor, crush hazards, stacked pallets with minimal visibility, and manual loading tools.





Sustaining a Safe Environment

REVIEW

Review and refer to risk assessments when answering questions about safe work procedures.


SINGLES
PACK

ENCOURAGE

Encourage associates to keep an eye out for unsafe conditions and behaviors.

See something, say something!

SUPPORT

Support and praise associates who join risk assessment/incident investigation teams and other safety programs.

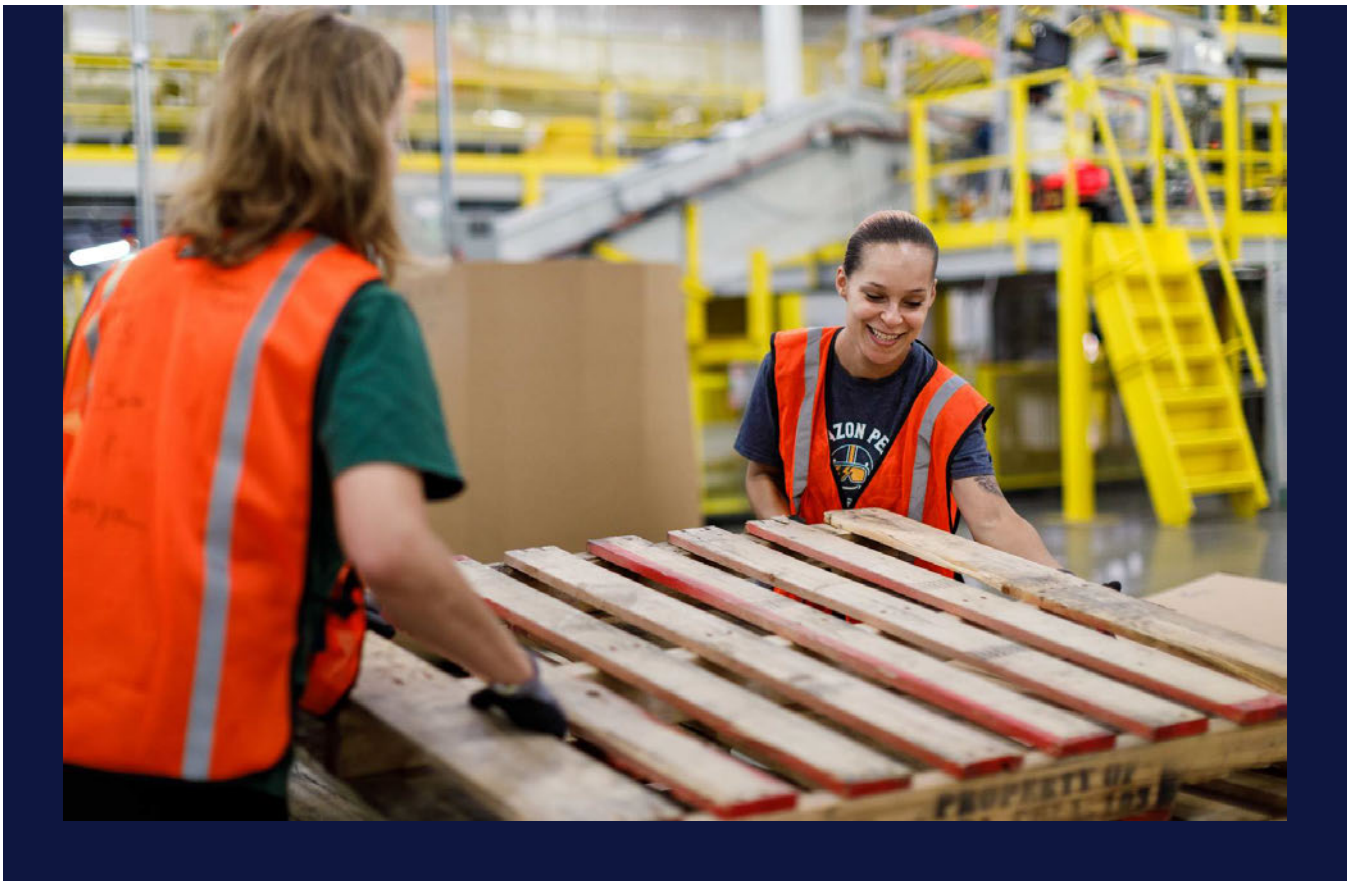

HyFlex

DISCUSS

Make safety the first discussion point on agendas at every daily associate team meeting.

ACTION

Promptly correct any unsafe behavior, anywhere it happens, when you notice it or are informed about it.



Check Point

You are responsible for sustaining a safe work environment for your team. You should mitigate hazards when possible and support your team. Which is the *best* way to sustain a safe work environment?

- ◯ Encourage associates to say something if

they see something.

- [ ] Coach unsafe acts when you observe them.
- [ ] Identify common hazards.

SUBMIT

Complete the content above before moving on.

As a leader, safety is your top priority.

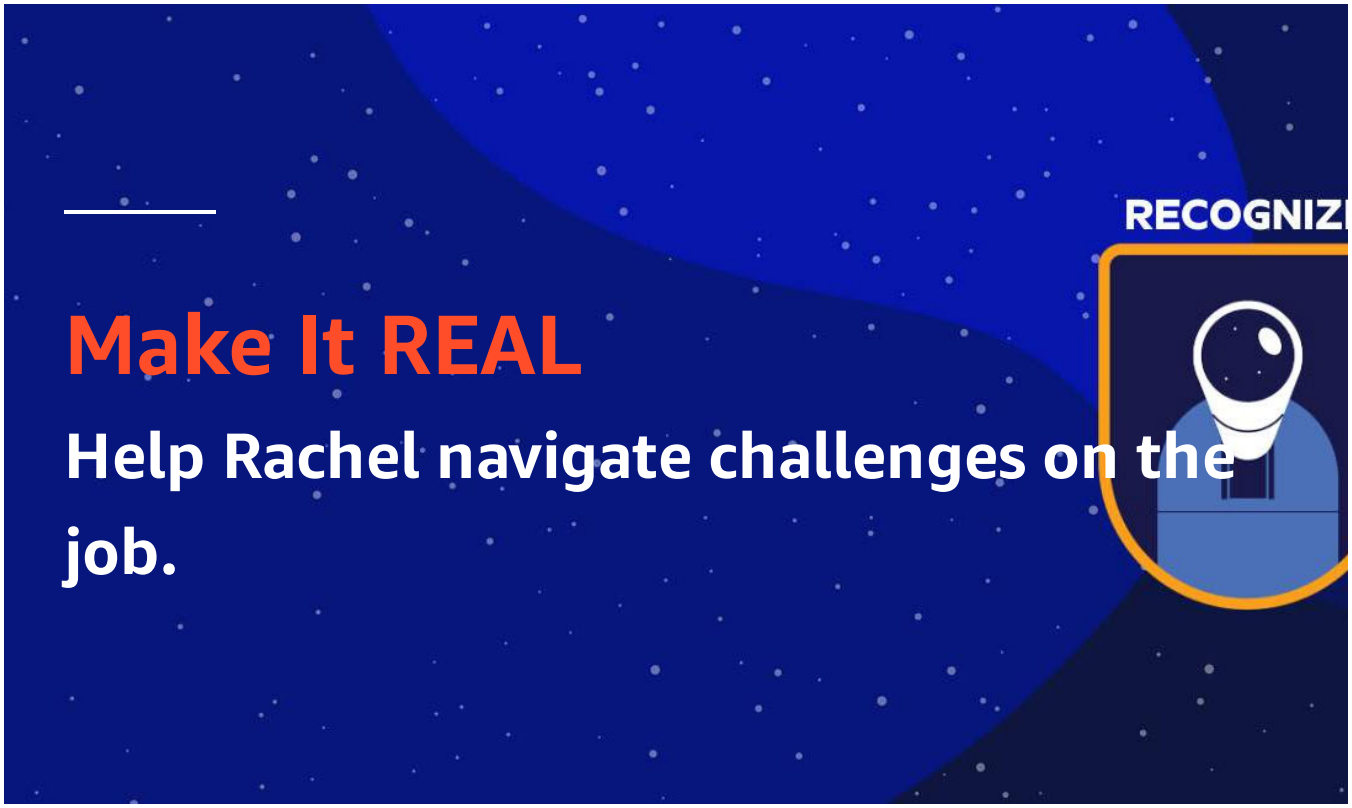
Take immediate action when associates report concerns and ensure a safe environment for your team each day.

CONTINUE

Lesson 5 of 6

Make It REAL

Articulate 10



Help Rachel RECOGNIZE

Rachel meets her new associates for the first time.

Step 1

She has a Bias for Action.

Rachel tells her team, "My life motto is whoever scores first and most often wins. I want our team to win. I am prioritizing operations metrics. If you can keep that in mind, we'll become the best and brightest at Amazon."

Step 2

What's Rachel missing?

Rachel wants to align with Amazon’s overall vision and achieve operational excellence with a healthy dose of customer obsession. But she may have missed a few steps while communicating priorities to her team.

Let's help.

After reflecting on her interactions, Rachel recalls the REAL approach to decision making.

Click and review the scenario above before moving on.

Rachel wants to balance her Bias for Action with supporting the safety of her team.

Rachel cares about the safety of her team. How can she communicate that?

- "I want our team to win, but never at the expense of safety."
- "Safety is the priority, but we must always excel in our performance goals."
- "If we all focus on our own safety, it will show in our operations metrics."

SUBMIT

Complete the content above before moving on.

Rachel wants operations excellence. What role does safety play in achieving that?

- Safety as the priority will allow associates to feel confident in their performance and achieve higher standards.
- Safety as the priority means work will always be completed in an efficient manner.
- Operations excellence depends solely on the safety of the team so all tasks can be completed on time.

SUBMIT

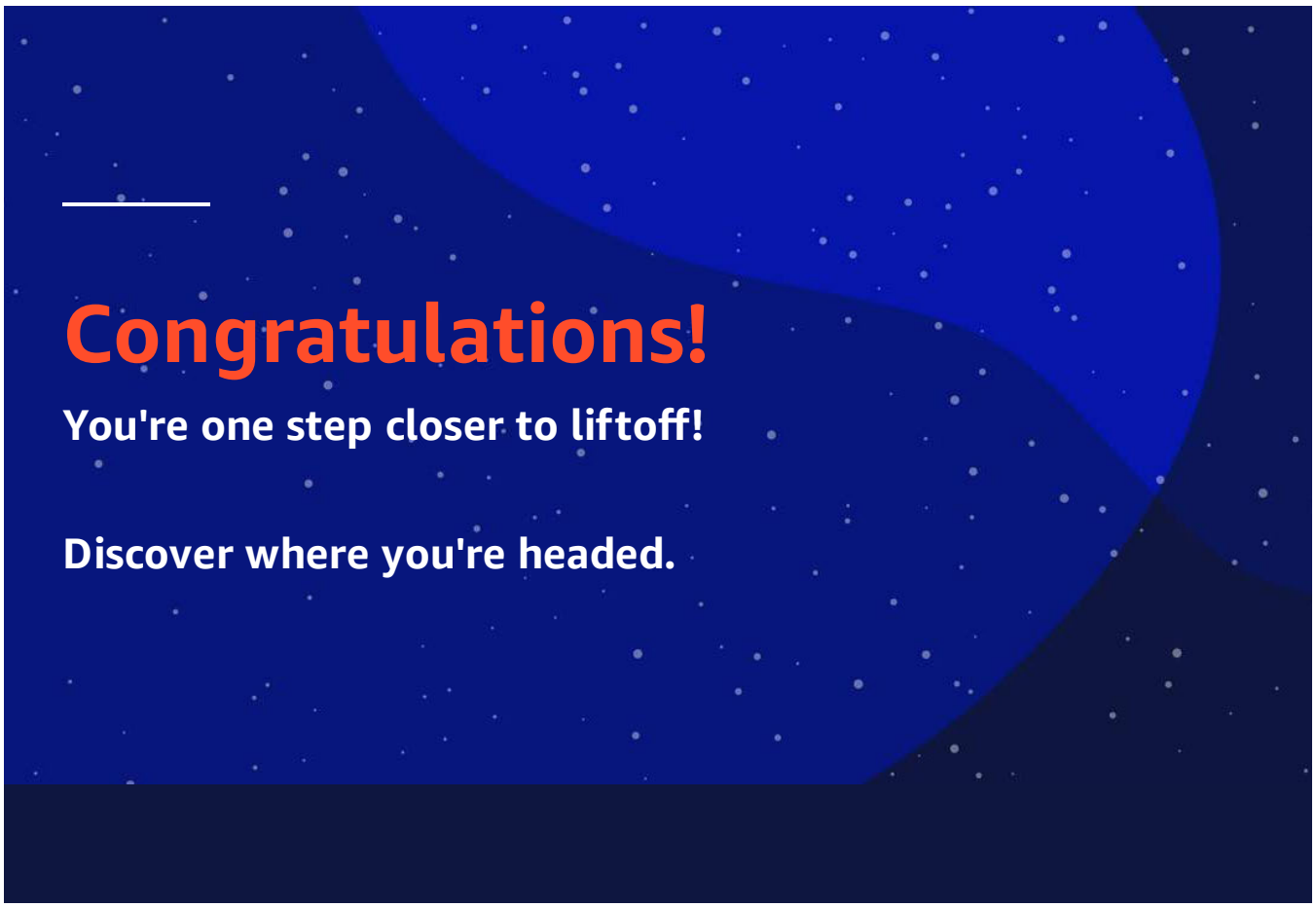
Complete the content above before moving on.

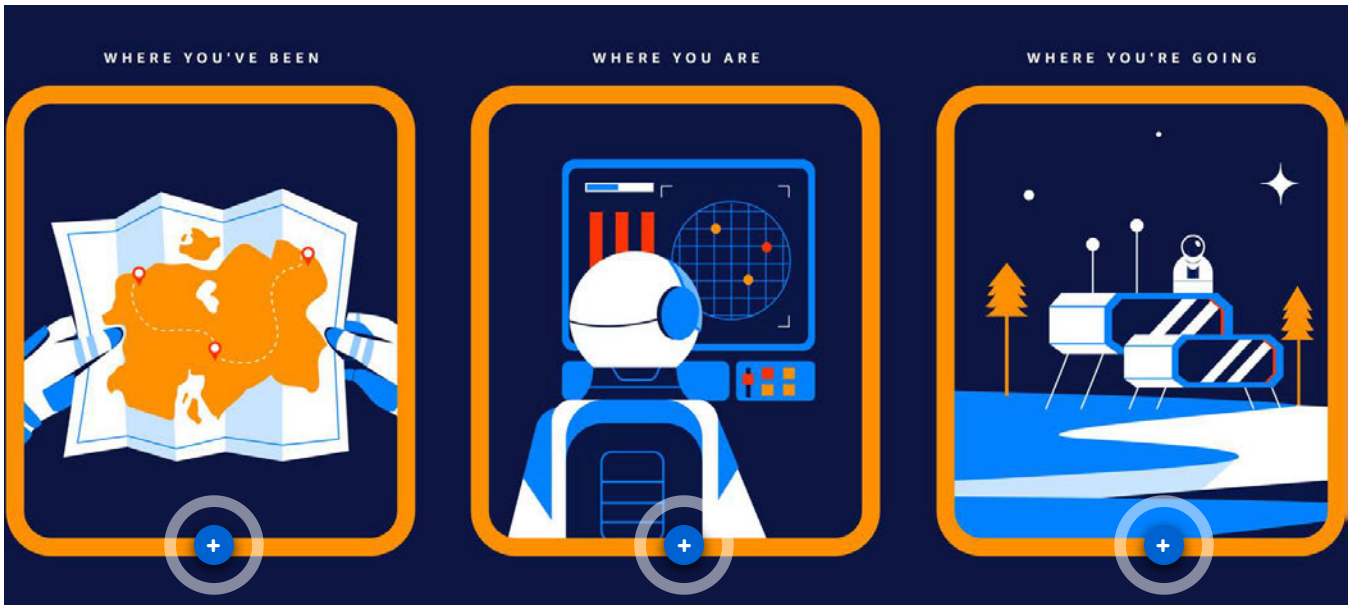
Recognize is the first step to ensure the safety of your team.

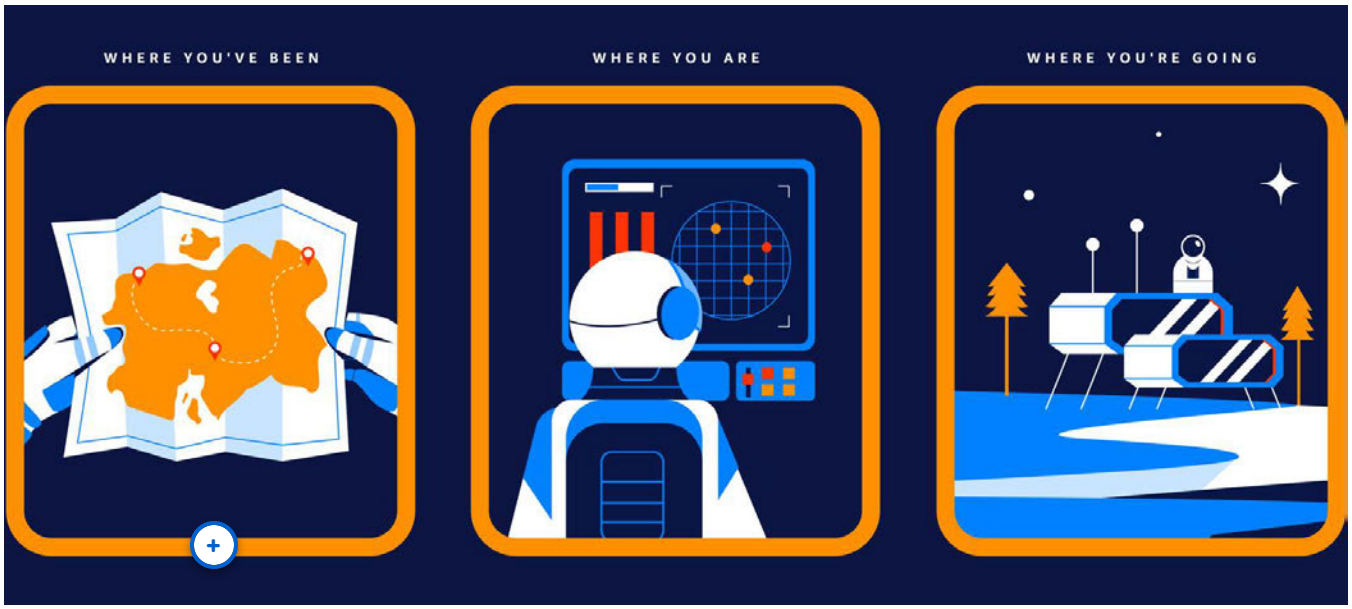
CONTINUE

Exploration Summary

Articulate 10



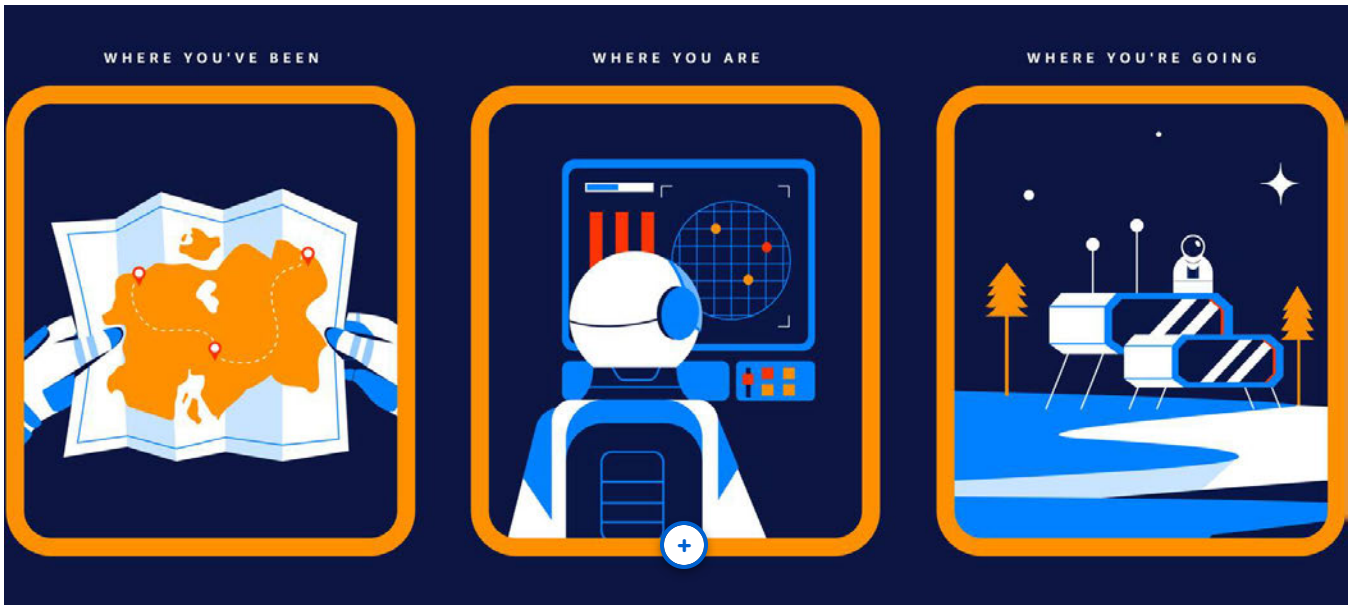

WHERE YOU'VE BEEN
WHERE YOU ARE
WHERE YOU'RE GOING



Where You've Been

In AD1 and AEW, you observed safety through the experience of associates.

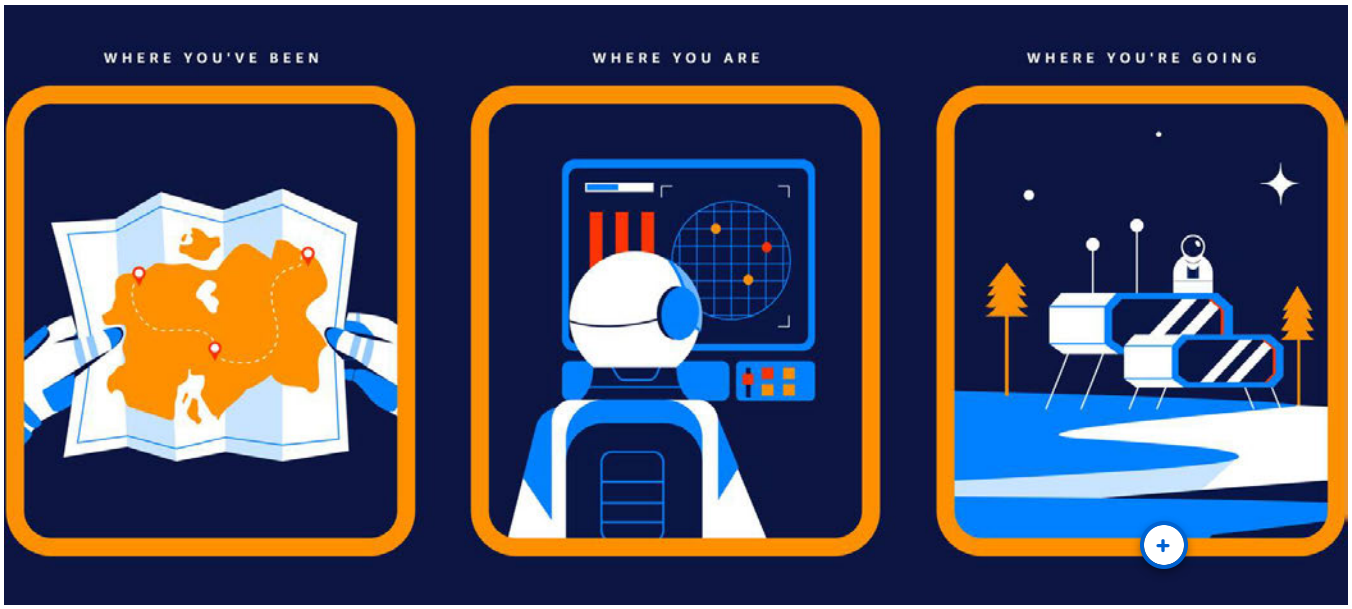
You have instilled a sense of empathy for the work they do every day.



Where You Are

You can identify common hazards and risks to safety in your workspace.

You understand the importance of resolving hazards and sustaining a safe work environment.



Where You're Going

Get ready for your next exploration!

You'll explore common near misses and practice spotting safety hazards through a Safety First simulation.

Click and review the three hotspots above before moving on.

You're ready for your next exploration!

Click Exploration Complete to record your exploration.

EXPLORATION COMPLETE

Row Labels	Count of Date
ABE2	41
ABE3	6
ABE4	30
ABE8	15
ACY1	34
ACY2	7
ACY5	1
ATL5	1
ATL7	1
ATL8	3
AVP1	10
AVP3	14
AVP4	2
AVP6	1
AVP8	2
AWS2	1
BDL1	1
BDL2	10
BDL3	43
BDL5	1
BEN3	1
BFI1	1
BFI3	10
BFI4	38
BFI5	5
BFI7	2
BNA1	1
BNA2	6
BNA3	3
BNA5	3
BOS7	47
BWI1	17
BWI2	107
BWI4	1
BWI5	1
CAE1	11
CFW7	1
CHA1	19
CHA2	21
CLE2	13
CLE3	6
CLE4	1
CLE5	2
CLT4	12
CMH1	8
CMH2	26

Row Labels	Count of Date
CMH3	15
CMH6	12
CVG1	7
CVG2	5
CVG3	5
CVG5	7
CVG6	1
CVG7	4
CVG9	3
DAL9	1
DAU2	2
DBA2	2
DBO2	1
DBO6	1
DCA1	113
DCA2	1
DCM1	1
DDC3	1
DEN2	2
DEN3	58
DEN5	2
DET1	8
DET2	11
DEW7	1
DFW7	163
DFW8	1
DFW9	1
DLA8	1
DMO1	1
DMO4	1
DTW1	28
ECH5	1
EWR4	18
EWR6	5
EWR7	1
EWR9	1
FAT1	47
FTW1	4
FTW2	6
FTW3	20
FTW4	1
FTW6	35
HOU2	39
HOU3	40
HTA7	1
IND1	27

Row Labels	Count of Date
IND2	9
IND4	10
IND5	14
IND8	8
IND9	1
IVSC	3
IVSD	2
JAX2	13
JAX3	13
JFK2	1
JFK8	10
KILN	9
LAS2	2
LAS6	5
LAS7	21
LAW7	1
LAX6	1
LAX9	14
LEX1	1
LEX2	7
LGB3	24
LGB5	1
LGB6	7
LGB7	12
LGB8	1
MCI7	1
MCO1	8
MDM	1
MDT1	8
MDT2	14
MDW2	1
MDW4	11
MDW5	8
MDW6	9
MDW7	4
MDW8	21
MDW9	1
MEM1	8
MEM2	2
MEX2	1
MGE1	1
MGE3	1
MGE5	2
MIA1	40
MIM2	1
MKC6	32

Row Labels	Count of Date
MKE1	39
MKE5	4
MSG1	1
MSP1	15
MTN5	3
NWI2	1
OAK3	48
OAK4	34
OAK5	3
OAK7	5
OKC1	8
ONT2	15
ONT6	2
ONT8	31
ONT9	4
ORD4	2
ORD6	1
PDX5	1
PDX7	3
PDX9	37
PHL1	3
PHL4	9
PHL5	15
PHL6	23
PHL7	62
PHL9	3
PHX3	2
PHX4/5	1
PHX5	6
PHX6	7
PIT5	12
PLE2	1
PNE5	5
RDU5	1
RIC1	88
RIC2	2
RIC3	2
RIC5	4
RNO4	9
SAT1	37
SAT2	178
SAV3	1
SDF1	1
SDF4	5
SDF8	8
SDF9	5

Row Labels	Count of Date
SJC1	1
SJC7	5
SJC9	5
SJL8	1
SLC1	15
SLC3	3
SMF1	57
SMF3	28
SMF5	6
SMS1	2
SNA4	13
SNA6	5
SNA7	3
STL5	4
STL6	7
STL8	40
TEB3	55
TEB6	35
TES1	1
TPA1	6
TPA2	1
TUS1	21
TUS2	21
UCA1	1
UMN1	7
UNKNOWN	1
UTX3	1
UTX7	1
UWA4	2
WFMBLV	1
WFMBMR	1
WFMBVH	1
WSM452	1
YVR2	1
YVR4	1
YYC1	5
YYZ3	2
(blank)	
Grand Total	**2766**

Row Labels	Count of Date
ABE2	19
ABE3	6
ABE4	15
ABE5	2
ABE8	4
ACW9	1
ACY1	27
ACY2	1
ACY5	1
ADV2	1
ALD1	1
Amazon Distribution Center	1
AND5	1
ATL1	1
ATL2	2
ATL7	3
ATL8	4
AVP1	3
AVP3	2
AVP8	10
BDL2	12
BDL3	21
BDL5	1
BDL6	1
BDO1	1
BFI1	1
BFI3	5
BFI4	8
BFI5	2
BFL1	2
BLE3	1
BNA2	4
BNA3	3
BNA5	1
BNA9	1
BOI2	2
BOS5	1
BOS7	7
BTD4	1
BWI1	13
BWI2	26
BWI4	1
BWI5	3
CAE1	6
CAE3	2
CEB3	1

Row Labels	Count of Date
CHA1	10
CHA2	20
CLE2	1
CLE3	9
CLE5	1
CLT2	2
CLT4	14
CMH1	2
CMH2	8
CMH3	2
CMH4	7
CMH6	10
COP4	1
CSG1	1
CVG1	3
CVG5	7
CVG7	1
CVG9	3
DAL3	7
DAT2	1
DBV1	1
DCA1	3
DCA6	4
DDC4	1
DDT3	1
DEN2	1
DEN3	2
DEN5	17
DEN6	1
DEN7	1
DET1	1
DET2	16
DFW5	6
DFW6	2
DFW7	16
DGB1	1
DIA4	2
DID2	3
DLA8	1
DMI6	1
DNJ1	1
DNO2	10
DPD4	2
DSF4	1
DSW5	1
DSX1	2

Row Labels	Count of Date
DTW1	8
DVB1	1
DYR4	1
EOI2	1
EPO12	1
EWR4	3
EWR6	3
EWR7	1
FAT1	12
FAT2	1
FLC1	1
FTW2	7
FTW3	17
FTW4	2
FTW6	6
FTW9	1
FWT1	1
GEG1	11
GRR1	3
GRY4	1
GSO1	2
GSP1	1
GYR1	1
HAL2	1
HMW1	1
HOU2	34
HOU3	8
HSC1	1
HSE1	1
HWA2	1
HWA3	1
IAH1	1
IND1	6
IND5	16
IND7	4
IND8	3
IND9	4
JAX2	14
JAX3	16
JBL1	2
JVL1	7
KAFW	1
KBW1	4
KBWY	1
KCVG	1
KCW1	1

Row Labels	Count of Date
KDWI	1
KILN	11
KLAL	1
KRB2	3
KRFD	2
KRSD	1
Laguna Whole Foods	1
LAS1	8
LAS2	1
LAS6	1
LAS7	61
LAS8	1
LAS9	1
LAW7	3
LAX3	1
LAX5	4
LAX9	15
LBG7	1
LEX2	3
LGA9	4
LGB3	10
LGB4	5
LGB5	1
LGB6	3
LGB7	19
LGB8	1
MAA1	1
MCO1	5
MDE1	1
MDT1	3
MDW4	8
MDW6	10
MDW8	13
MEM1	2
MEM2	10
MEM4	2
MEM6	4
MGE1	1
MGE3	1
MIA1	7
MKC6	16
MKE1	6
MKE2	1
MKE5	2
MOB5	1
MSP1	2

Row Labels	Count of Date
MSPI	1
MTM5	1
MTN9	1
OAK 3	1
OAK3	24
OAK4	74
OKC1	7
ONT2	16
ONT6	1
ONT8	4
ONT9	1
ORD2	1
PCA3	2
PCW1	1
PDX7	1
PDX9	25
PHL1	1
PHL4	2
PHL5	2
PHL6	7
PHL7	23
PHX3	1
PHX5	2
PHX6	10
PHX7	1
PIN1	2
PIT2	6
PIT5	7
PSP1	5
RAD1	1
RDG1	5
RDU1	1
RIC1	132
RIC2	4
RNO4	3
SAT1	20
SAT2	44
SAZ1	1
SBD2	3
SBD3	2
SDF4	5
SDF8	7
SDF9	2
SJC9	5
SLC1	7
SLC2	5

Row Labels	Count of Date
SLC3	2
SMF1	111
SMF2	1
SMF3	10
SMF5	3
SMS1	1
SNA1	1
SNA4	6
SPD3	1
STF9	1
STL4	1
STL8	16
STW2	1
TEB1	2
TEB3	35
TEB5	1
TEB6	8
TEN1	22
TEN1	1
TNO1	1
TPA2	4
TUL2	10
TUS1	21
TUS2	17
UCA1	2
UCA2	1
UCA6	3
UCO1	1
UFL6	2
UFO6	1
UGA4	1
UIL1	1
UMD1	1
UMN1	4
UOR1	3
USC1	2
UTN1	1
UTX3	4
UTX7	3
UTX8	2
UVA1	1
UWA6	5
UWH6	1
WFM546	1
WFMCCH	1
WFMKMQ	1

Row Labels	Count of Date
WFMPNC	1
WFMSFX	1
Whole Foods 167	1
Whole Foods C131	1
Whole Foods FSX177	1
WMF161	1
YVR4	1
YYC1	3
YYZ1	1
(blank)	
Grand Total	**1721**

Row Labels	Count of Date
ABE2	8
ABE4	9
ABE5	1
ABE8	3
ACY1	20
ACY2	2
AGS1	9
AKC1	1
ALB1	5
AMD1	1
ATL2	22
ATL7	1
ATM1	1
AUL1	1
AUS2	1
AVP1	2
AVP8	2
AWR7	1
AZA5	1
BCA2	1
BCA6	1
BDL2	35
BDL3	3
BF13	1
BFI3	4
BFI4	7
BFI5	6
BFI6	1
BFI8	2
BFL1	3
BFW5	2
BNA2	4
BNA3	3
BNA9	12
BOI2	1
BOS1	1
BSL1	1
BWI1	8
BWI2	44
BWI4	1
BWI5	3
CAE1	3
CAE3	2
CHA1	10
CHA2	10
CHA5	1

Row Labels	Count of Date
CLE3	1
CLT4	2
CMH1	1
CMH2	4
CMH3	1
CMH6	3
CNO5	1
COT4	1
CSG1	1
CVG1	2
CVG2	3
CVG9	2
DAC6	1
DAL2	6
DAL3	16
DAX8	1
DBK1	1
DCA1	1
DCA2	17
DCA6	15
DDF8	1
DEG1	1
DEN1	1
DEN2	5
DEN4	2
DEN5	5
DET1	1
DET2	17
DET3	4
DFW1	1
DFW5	9
DFW6	2
DFW8	1
DFW9	1
DNA9	2
DNO2	3
DPD4	2
DRO1	1
DSM5	3
DTE2	1
DTU9	1
DTW1	10
DTW3	1
DWS5	1
EUG5	2
EWR6	3

Row Labels	Count of Date
EWR7	3
FAT1	12
FAT2	11
FAT4	2
FCK3	1
FLC1	1
FOE1	1
FOV1	1
FTL4	1
FTW1	1
FTW3	6
FTW3/4	4
FTW3-4	1
FTW5	1
FTW6	16
FTW8	7
GE1	1
GEG1	14
GR1	1
GRR1	4
GRY4	1
GSO1	1
GSP1	4
GYR1	23
GYR2	1
GYR3	5
GYR4	5
HCA6	1
HCN1	1
HDM3	1
HEN1	1
HEQ1	1
HMD3	2
HMW1	2
HNE1	2
HOU2	24
HOU3	19
HOU7	1
HOU8	2
HSC1	4
HSE	1
HSE1	16
HSV1	1
HTN1	1
IAH1	1
ICQ2	1

Row Labels	Count of Date
IGL1	2
IGQ2	4
ILG1	3
IND1	3
IND4	1
IND5	22
IND6	1
IND8	1
IND9	8
IOG1	1
JAX2	18
JAX3	15
JPD1	1
JVL1	1
KAFW	4
KAFX	1
KBWI	2
KCBG	3
KCDG	1
KCGB	1
KCVG	14
KDW5	1
KFRD	1
KHUB	1
KILN	1
KIRV	1
KLAL	1
KRB2	4
KRB4	1
KRFD	7
KSBD	2
LAS1	61
LAS5	1
LAS6	22
LAS7	18
LAS8	10
LAX1	1
LAX5	4
LAX9	27
LBD7	1
LBG7	1
LEX1	2
LEX2	1
LFT1	5
LGA9	10
LGB240	1

Row Labels	Count of Date
LGB3	14
LGB4	9
LGB5	3
LGB7	30
LGB8	5
LGN9	2
LIT1	2
LIT2	3
LUK7	3
MCI7	10
MCL4	1
MCO2	1
MCO4	9
MCO5	1
MCO6	4
MCO9	1
MDT2	1
MDW4	3
MDW5	2
MDW7	8
MDW8	1
MEG1	1
MEM2	5
MEM3	1
MEM4	1
MEM5	1
MEM6	4
MGE1	1
MGE3	1
MGE5	3
MGI7	1
MIL	1
MJQ1	1
MKC2	1
MKC4	2
MKC6	14
MKC8	1
MKE2	2
MKE5	1
MOB5	1
MPN2	1
MQJ1	13
MQJ2	1
MQJ5	1
MSP1	3
MST1	3

Row Labels	Count of Date
MTN1	15
MTN2	4
MTN6	1
MTN9	20
NQY1	1
OAK3	27
OAK4	22
OAK5	17
OKC1	17
OKC2	5
OLM1	2
ONT2	34
ONT6	4
ONT8	29
ONT9	1
ORD2	2
ORD5	2
ORD9	1
OUK5	1
OWD5	1
PCW1	3
PDX5	2
PDX7	1
PDX9	1
PFI3	3
PGA1	1
PHA2	1
PHL1	2
PHL4	2
PHL5	4
PHL6	3
PHL7	36
PHL7	1
PHX3	4
PHX6	1
PHX7	1
PHX9	1
PIT1	1
PIT2	14
PIT5	7
PLV026	1
PNE5	2
PSP1	3
PST1	1
RAD1	1
RDG1	34

Row Labels	Count of Date
RDT1	2
RDU1	1
REG1	1
REW5	1
RFD1	1
RGD1	1
RIC1	65
RIC2	14
RNT9	2
RSW5	3
RTN9	2
SAN3	1
SAT1	20
SAT2	7
SAT4	8
SAV3	1
SAZ1	3
SBD1	1
SBD2	4
SBD3	1
SCD2	1
SCK1	9
SCK3	5
SCL5	1
SDC1	3
SDF4	7
SDF6	3
SDF8	1
SDF9	1
SGA2	2
SJC7	5
SKC1	1
SLC1	6
SLC4	3
SLC9	3
SMF1	46
SMF3	5
SMF6	1
SNA4	1
SNA6	3
SPD2	1
SPD3	1
SPF8	1
SPL8	2
STL3	4
STL4	15

Row Labels	Count of Date
STL5	2
STL8	14
STW6	2
SWA1	1
SWF1	1
SWS1	1
TAE1	1
TCY5	1
TCY9	1
TDM1	2
TEB2	1
TEB3	21
TEB4	4
TEB6	7
TEB9	2
TEBS	1
TEM1	1
TEN1	50
TEN2	1
TEN9	1
THL7	1
TPA1	2
TPA2	1
TPA3	1
TTA2	1
TUL2	4
TUL3	1
TUS1	23
TUS2	5
TWR7	1
UCA5	1
UFL2	1
UFL4	2
UFL5	2
UFO5	1
UGA4	1
UIL1	1
UIL2	1
UMZ2	1
UNC2	1
UNC3	1
UNT2	1
UOH4	1
UOH5	1
UPA1	7
USF1	2

Row Labels	Count of Date
USF4	5
USS1	1
UTX3	2
UTX4	6
UTX7	2
UVA2	1
UVA4	2
UWA6	2
VWI2	1
WFIV	1
WFM529	1
Whole Foods Ignacia Valley, CA	1
Whole Foods-Marbleton, NJ	1
WMO2	1
YVR7	1
YYC1	4
YYC5	1
YYZ1	2
YYZ7	2
(blank)	
Grand Total	**1927**

Row Labels	Count of Date
AB4	1
ABE1	1
ABE2	26
ABE3	8
ABE4	4
ABE5	7
ABE8	18
ABQ5	1
ABT1	1
ACK1	1
ACY1	7
ACY2	34
ACY6	1
ADP1	1
ADT1	1
AFW1	17
AFW5	2
AGS	1
AGS1	27
AGS2	11
AKC1	1
AKP1	1
ALB1	21
ALG1	1
AMA1	18
AMC4	1
AMV1	1
AOB1	1
ARB4	1
ATL2	13
AUN2	1
AUS2	7
AUS3	2
AVP1	16
AVP8	1
AVT1	1
AWR4	1
AZA5	2
BCA1	1
BDL2	21
BDL3	15
BDL6	3
BDU5	1
BFI3	8
BFI4	15
BFI5	2

Row Labels	Count of Date
BFI7	1
BFI9	21
BFL1	1
BFW5	1
BFW9	1
BHM1	2
BLDL6	1
BNA2	4
BNA3	2
BNA8	2
BNA9	2
BOS7	1
BTW3	1
BW2	1
BWA2	1
BWI1	7
BWI2	24
BWI4	1
BWI5	6
BWI7	1
CAE1	7
CAE3	1
CBG5	1
CHA1	5
CHA2	11
CLE2	1
CLE5	1
CLT2	7
CLT4	2
CLT5	1
CLT9	1
CMH1	3
CMH2	5
CMH3	2
CMH4	3
CMH6	3
CNO5	1
CSK4	1
CVG1	1
CVG2	1
CVG5	3
CVG9	7
DAL2	1
DAL3	7
DAX8	1
DCA1	1

Row Labels	Count of Date
DCA2	3
DCA6	14
DCA7	1
DDF1	2
DEN3	2
DEN5	6
DEN8	4
DET3	15
DFA2	1
DFW5	7
DFW6	14
DFW9	8
DSD8	1
DSM5	17
DSW6	1
DTW1	4
DTW3	2
DTW5	4
DUT3	1
EGS5	1
ELP1	1
EUG4	1
EUG5	10
EWI2	1
EWR4	4
EWR6	1
EWR7	19
EWR8	1
FAR1	1
FAT1	12
FAT2	29
FAT4	6
FOC1	1
FOE1	14
FTW 3/4	1
FTW3	3
FTW3/ FTW4	1
FTW3/4	19
FTW6	6
FTW7	1
FTW8	6
FTW9	3
FWA4	3
GEG1	30
GFW9	1
GRR!	1

Row Labels	Count of Date
GRR1	15
GSO!	1
GSO1	7
GSP1	6
GYR1	6
GYR2	2
GYR3	4
GYR4	4
HAU6	1
HEA2	2
HFD5	1
HFE1	2
HGR2	1
HIL3	1
HMB3	1
HMC3	1
HMD3	11
HMW1	4
HOU2	23
HOU3	23
HOU6	2
HOU8	16
HSC1	2
HSE1	46
HSF2	1
HSV1	2
HTN1	4
HWA2	2
IAH1	4
ICT2	4
IGL1	4
IGO2	1
IGQ1	16
IGQ2	11
ILE1	1
ILG1	23
ILG2	1
IMB4	1
IMD5	1
IND1	2
IND4	1
IND5	4
IND8	5
IND9	15
ING8	1
INT9	1

Row Labels	Count of Date
IOG1	3
IOG2	1
IRG1	1
IVQ1	1
IVQ2	1
JAX2	10
JAX3	13
JAX5	2
JFK8	5
KAFW	4
KASW	1
KBW1	4
KBWI	1
KBWY	2
KCBD	1
KCBG	4
KCBT	1
KCGB	2
KCVG	33
KDWI	1
KFW	1
KGB1	1
KGB4	1
KILM	1
KILN	1
KRB2	11
KRB3	6
KRB4	9
KRB6	1
KRB7	10
KRFD	5
KRFD	1
KRFD1	1
KRG7	1
KRID	1
KRIV	5
KSBD	5
KSVD	2
KTBG	1
KWBI	2
LAS1	5
LAS2	2
LAS6	55
LAS7	14
LAS8	5
LAS8/9	1

Row Labels	Count of Date
LAS9	2
LAX5	6
LAX6	1
LAX9	43
LAZ9	1
LEX1	2
LEX2	1
LFT1	1
LFT2	1
LGA9	4
LGB3	7
LGB4	7
LGB6	14
LGB7	22
LGB8	5
LIT1	8
LIT2	4
LST1	1
LTD6	1
LVG2	1
MAG4	1
MCE1	1
MCI1	1
MCI7	19
MCI9	1
MCO1	42
MCO2	1
MCO4	2
MCO6	9
MCO9	1
MDQ2	1
MDT1	4
MDT2	1
MDT5	1
MDW4	4
MDW6	5
MDW7	6
MDW9	1
MEM2	2
MEM3	3
MEM4	1
MEM5	3
MEM6	2
MEN5	1
MGE1	1
MGE3	6

Row Labels	Count of Date
MGJ1	1
MIA2	1
MIA5	6
MKC4	1
MKC6	7
MKE1	4
MKE2	4
MKE5	2
MKE6	2
MKG1	1
MOB5	1
MQJ1	18
MQJ5	1
MQY1	2
MSP1	4
MSP5	2
MST1	1
MTD1	1
MTJ1	1
MTN1	31
MTN2	2
MTN9	9
NCI7	1
NCO1	3
NDT1	1
NDW7	1
NGE3	1
NKC6	2
NQJ1	1
NTN1	1
OAK3	38
OAK4	24
OAK5	10
OAK6	1
OAK7	8
OAK8	1
OGB1	1
OKC1	1
OKC2	11
OLM1	3
OM1	1
ONT2	16
ONT5	4
ONT6	14
ONT8	22
ONT9	4

Row Labels	Count of Date
ORD1	1
ORD2	3
ORD4	2
ORD5	20
ORD6	1
ORD9	2
ORF1	1
ORF2	1
ORF3	4
ORG5	1
ORX1	1
ORX3	2
OUH4	1
OXR1	44
PAC1	1
PCA3	1
PDX7	15
PDX9	10
PGA1	8
PHL1	1
PHL4	6
PHL5	6
PHL6	3
PHL7	51
PHL9	1
PHX5	1
PHX6	1
PHX7	1
PIT2	9
PIT5	1
PLO6	1
PNE5	1
PSP1	12
PST1	2
QXX6	2
QXY8	3
QXY9	1
RAD1	1
RDG1	33
RDU5	1
RFD1	1
RFD3	5
RIC1	14
RIC2	27
RIC3	1
RNO4	1

Row Labels	Count of Date
RNT9	27
RSW5	9
RTN9	4
SAF2	1
SAN3	1
SAN5	1
SAT1	8
SAT2	7
SAT4	17
SAV1	1
SAZ1	4
SBD1	14
SBD3	6
SBD4	1
SBV2	1
SCA1	1
SCA4	1
SCA5	3
SCK1	25
SCK3	1
SCK4	23
SCK6	1
SCK9	1
SCL1	1
SDF	1
SDF4	8
SDF6	7
SDF8	1
SDF9	2
SDO1	1
SDX4	1
SIL1	3
SJC9	2
SKC1	1
SLC1	25
SLC2	2
SLC4	2
SLT2	1
SMF1	39
SMF3	10
SMF6	3
SNA4	3
SNA6	2
SOH2	1
SPW2	1
STB3	1

Row Labels	Count of Date
STF8	1
STK4	1
STL1	1
STL3	12
STL4	4
STL8	5
STW3	1
STW3/4	1
STW8	2
STX2	7
STX4	1
STX5	1
STX7	2
SUT1	2
SWA1	4
SWF1	8
SYR1	8
TCY5	3
TCY9	1
TEB3	4
TEB4	1
TEB6	6
TEB9	21
TEN1	24
TEN5	1
TIL2	1
TPA2	4
TSO1	1
TTN2	1
TUL2	10
TUL5	1
TUS1	11
TUS2	7
TUS9	1
U54	1
UAZ1	1
UCA1	1
UCA2	4
UCA4	2
UCA5	19
UCO1	5
UCO1 / DEN6	1
UFL4	2
UFL5	8
UFO4	1
UFO5	1

Row Labels	Count of Date
UGA2	2
UGA4	6
UIL1	2
UIL2	2
ULA6	1
UMB3	4
UMN1	6
UMV2	1
UMV3	1
UNB3	6
UNC1	1
UNC2	2
UNC3	8
UND2	1
UNJ2	1
UNV2	3
UNV3	5
UNY2	1
UOH5	3
UPA1	14
USC3	1
USD1	2
USF1	17
USF2	8
USF4	5
USK4	1
USL4	2
USS2	2
UTB1	1
UTN1	4
UTX1	1
UTX3	3
UTX4	5
UTX7	1
UTX9	2
UVA1	4
UVA4	9
UVA5	4
UVL1	1
UWI2	2
VFW9	1
VGT1	4
VJH8	1
VSW9	1
VTX2	1
WCH2	4

Row Labels	Count of Date
XPX2	1
YAM5	1
YHM5	6
YHM9	1
YUL5	4
YULG	1
YUO5	1
YVR7	1
YYC	1
YYC1	1
YYC5	8
YYZ4	1
YYZ5	1
1/1/2022	1
(blank)	1
Grand Total	**2793**

Amazon PHL Case Overview 2023

Total Number of Calls by Type

TYPE	January	February	March	April	May	June	July	August	September	October	November	December	Total
WORK-RELATED	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
PERSONAL	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!

Top 5 Chief Complaints

JANUARY

FEBRUARY

MARCH

APRIL

MAY

JUNE

JULY

AUGUST

SEPTEMBER

OCTOBER

NOVEMBER

DECEMBER

Total Number of Calls by Location													
LOCATION	January	February	March	April	May	June	July	August	September	October	November	December	Total
LAS6	2	2	2	8	4	3	0	0	0	0	0	0	21
PHL7	7	8	1	1	2	2	0	0	0	0	0	0	21
HSE1	3	2	2	1	2	2	0	0	0	0	0	0	12
LAX9	1	0	3	1	3	5	0	0	0	0	0	0	13
MCO1	11	10	16	12	14	10	0	0	0	0	0	0	73
SMF1	1	1	4	2	1	1	0	0	0	0	0	0	10
OAK3	4	1	6	5	6	6	0	0	0	0	0	0	28
ACY2	2	1	2	3	7	4	0	0	0	0	0	0	19
KCVG	1	3	0	1	4	2	0	0	0	0	0	0	11
RDG1	2	1	1	0	1	0	0	0	0	0	0	0	5
MTN1	3	1	4	7	0	2	0	0	0	0	0	0	17
GEG1	1	4	3	3	4	1	0	0	0	0	0	0	16
FAT2	6	1	2	1	2	1	0	0	0	0	0	0	13
RIC2	0	0	1	0	0	1	0	0	0	0	0	0	2
RNT9	1	1	1	0	1	3	0	0	0	0	0	0	7
ABE2	0	0	0	0	0	0	0	0	0	0	0	0	0
SCK1	1	1	2	0	0	1	0	0	0	0	0	0	5
SLC1	0	0	0	0	0	0	0	0	0	0	0	0	0
BWI2	1	1	1	0	1	2	0	0	0	0	0	0	6
ILG1	2	1	0	2	2	2	0	0	0	0	0	0	9
OAK4	2	1	1	1	1	0	0	0	0	0	0	0	6
TEN1	1	0	1	0	0	0	0	0	0	0	0	0	2
HOU2	0	2	0	0	2	1	0	0	0	0	0	0	5
HOU3	2	1	2	2	2	2	0	0	0	0	0	0	11
SCK4	1	3	5	2	4	1	0	0	0	0	0	0	16
LGB7	2	1	7	5	1	4	0	0	0	0	0	0	20
ONT8	0	0	2	1	2	1	0	0	0	0	0	0	6
ALB1	0	0	2	1	3	4	0	0	0	0	0	0	10
BDL2	2	2	0	4	1	2	0	0	0	0	0	0	11
BFI9	0	0	0	0	0	0	0	0	0	0	0	0	0
EWR7	0	0	0	1	0	2	0	0	0	0	0	0	3
FTW3/4	2	0	1	2	3	1	0	0	0	0	0	0	9
MCI7	0	0	0	0	0	1	0	0	0	0	0	0	1
UCA5	1	0	1	1	0	0	0	0	0	0	0	0	3
ABE8	1	0	0	2	0	1	0	0	0	0	0	0	4
MQJ1	0	1	1	1	0	0	0	0	0	0	0	0	3
AFW1	0	0	0	0	0	4	0	0	0	0	0	0	4
SAT4	2	1	0	0	0	2	0	0	0	0	0	0	5
USF1	0	2	1	0	0	0	0	0	0	0	0	0	3

AVP1	4	1	1	4	2	2	0	0	0	0	0	0	14
HOU8	1	0	1	1	2	3	0	0	0	0	0	0	8
ONT2	1	5	3	3	3	0	0	0	0	0	0	0	15
BDL3	0	0	0	0	1	0	0	0	0	0	0	0	1
BFI4	2	0	1	0	0	0	0	0	0	0	0	0	3
GRR1	0	3	2	0	1	0	0	0	0	0	0	0	6
IND9	0	1	1	2	1	3	0	0	0	0	0	0	8
PDX7	0	0	0	0	1	0	0	0	0	0	0	0	1
UPA1	1	0	1	2	0	0	0	0	0	0	0	0	4
DCA6	0	0	2	4	0	0	0	0	0	0	0	0	6
DFW6	0	0	0	1	1	0	0	0	0	0	0	0	2
FOE1	3	1	0	2	0	2	0	0	0	0	0	0	8
LAS7	0	0	0	1	2	1	0	0	0	0	0	0	4
LGB6	0	0	0	0	0	0	0	0	0	0	0	0	0
ONT6	2	2	3	2	2	3	0	0	0	0	0	0	14
RIC1	1	0	1	4	0	0	0	0	0	0	0	0	6
SBD1	0	1	2	1	1	2	0	0	0	0	0	0	7
ATL2	0	0	0	0	0	0	0	0	0	0	0	0	0
JAX3	0	0	0	0	0	0	0	0	0	0	0	0	0
FAT1	0	0	1	0	0	0	0	0	0	0	0	0	1
PSP1	0	0	0	0	0	0	0	0	0	0	0	0	0
STL3	0	0	0	0	0	0	0	0	0	0	0	0	0
CHA2	1	1	1	2	1	1	0	0	0	0	0	0	7
HMD3	0	0	0	0	0	1	0	0	0	0	0	0	1
KRB2	0	1	0	0	0	0	0	0	0	0	0	0	1
TUS1	0	2	1	2	1	1	0	0	0	0	0	0	7
EUG5	0	0	0	0	0	0	0	0	0	0	0	0	0
JAX2	0	0	0	0	0	0	0	0	0	0	0	0	0
OAK5	0	0	0	0	0	0	0	0	0	0	0	0	0
PDX9	0	0	0	2	0	1	0	0	0	0	0	0	3
SMF3	1	2	2	0	0	0	0	0	0	0	0	0	5
TUL2	0	0	0	0	0	0	0	0	0	0	0	0	0
MTN9	0	0	0	0	0	0	0	0	0	0	0	0	0
PIT2	1	2	2	0	3	2	0	0	0	0	0	0	10
RSW5	1	0	0	0	1	1	0	0	0	0	0	0	3
UVA4	0	0	0	0	0	1	0	0	0	0	0	0	1
ABE3	0	0	0	0	0	0	0	0	0	0	0	0	0
BFI3	0	0	0	0	0	0	0	0	0	0	0	0	0
DFW9	4	1	0	1	0	0	0	0	0	0	0	0	6
LGB4	0	0	0	3	1	2	0	0	0	0	0	0	6
LIT1	1	1	3	1	0	1	0	0	0	0	0	0	7
OAK7	1	2	0	0	4	0	0	0	0	0	0	0	7
SAT1	0	1	0	1	0	1	0	0	0	0	0	0	3

SDF4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SWF1	0	0	0	0	0	1	0	0	0	0	0	0	**1**
UFL5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UNC3	0	0	0	0	0	1	0	0	0	0	0	0	**1**
ABE5	2	0	0	0	0	1	0	0	0	0	0	0	**3**
BWI1	0	0	0	1	1	0	0	0	0	0	0	0	**2**
CAE1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
CLT2	0	0	0	0	1	0	0	0	0	0	0	0	**1**
CVG9	0	3	1	3	0	4	0	0	0	0	0	0	**11**
DAL3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DFW5	0	0	1	1	3	0	0	0	0	0	0	0	**5**
GSO1	0	0	0	0	1	1	0	0	0	0	0	0	**2**
LGB3	1	1	1	0	2	1	0	0	0	0	0	0	**6**
MKC6	1	1	0	0	0	0	0	0	0	0	0	0	**2**
SAT2	0	0	0	0	1	1	0	0	0	0	0	0	**2**
SDF6	0	0	0	0	2	0	0	0	0	0	0	0	**2**
STX2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
TUS2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BWI5	1	0	1	1	0	0	0	0	0	0	0	0	**3**
DEN5	1	1	3	1	1	0	0	0	0	0	0	0	**7**
FTW6	0	0	0	0	1	1	0	0	0	0	0	0	**2**
FTW8	0	0	0	0	0	0	0	0	0	0	0	0	**0**
GSP1	0	0	0	1	0	0	0	0	0	0	0	0	**1**
GYR1	0	0	0	0	1	0	0	0	0	0	0	0	**1**
LAX5	0	0	1	0	0	0	0	0	0	0	0	0	**1**
MDW7	0	0	0	1	0	0	0	0	0	0	0	0	**1**
MGE3	2	2	1	1	2	2	0	0	0	0	0	0	**10**
MIA5	0	1	0	0	0	0	0	0	0	0	0	0	**1**
PHL4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
PHL5	0	1	1	1	0	0	0	0	0	0	0	0	**3**
SBD3	0	0	1	0	0	1	0	0	0	0	0	0	**2**
TEB6	0	0	0	2	0	0	0	0	0	0	0	0	**2**
UGA4	0	0	0	0	1	1	0	0	0	0	0	0	**2**
UMN1	1	0	0	1	2	0	0	0	0	0	0	0	**4**
CHA1	1	0	2	2	0	2	0	0	0	0	0	0	**7**
CMH2	1	0	0	0	0	0	0	0	0	0	0	0	**1**
IND8	1	0	0	3	1	0	0	0	0	0	0	0	**5**
JFK8	1	1	0	3	3	2	0	0	0	0	0	0	**10**
KRFD	2	1	1	0	1	1	0	0	0	0	0	0	**6**
LAS1	1	0	0	0	2	1	0	0	0	0	0	0	**4**
LAS8	0	0	0	0	0	0	0	0	0	0	0	0	**0**
LGB8	0	0	0	0	1	1	0	0	0	0	0	0	**2**
MDW6	0	0	2	0	0	0	0	0	0	0	0	0	**2**

STL8	0	0	0	0	2	0	0	0	0	0	0	0	**2**
UCO1	1	0	1	1	0	0	0	0	0	0	0	0	**3**
USF4	0	0	0	0	0	1	0	0	0	0	0	0	**1**
UTX4	0	0	0	0	1	0	0	0	0	0	0	0	**1**
ABE4	0	0	1	0	0	1	0	0	0	0	0	0	**2**
BNA2	0	0	0	1	0	0	0	0	0	0	0	0	**1**
DTW1	0	0	0	1	0	0	0	0	0	0	0	0	**1**
DTW5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
EWR4	0	0	1	0	0	0	0	0	0	0	0	0	**1**
HMW1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
IND5	1	0	0	0	0	0	0	0	0	0	0	0	**1**
KAFW	0	0	0	0	0	1	0	0	0	0	0	0	**1**
KBW1	1	0	1	0	0	1	0	0	0	0	0	0	**3**
KCBG	0	0	0	0	0	0	0	0	0	0	0	0	**0**
LGA9	0	2	0	0	2	0	0	0	0	0	0	0	**4**
MDT1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDW4	0	0	0	1	1	3	0	0	0	0	0	0	**5**
MKE1	0	0	0	0	1	2	0	0	0	0	0	0	**3**
MSP1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
ONT5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
ONT9	0	0	0	0	0	0	0	0	0	0	0	0	**0**
RTN9	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SAZ1	0	0	0	1	0	0	0	0	0	0	0	0	**1**
STL4	0	0	0	0	0	1	0	0	0	0	0	0	**1**
TEB3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
TPA2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UCA2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UVA1	0	0	0	0	2	0	0	0	0	0	0	0	**2**
WCH2	1	0	1	0	0	1	0	0	0	0	0	0	**3**
CMH1	2	5	9	4	4	1	0	0	0	0	0	0	**25**
CMH4	0	2	0	1	0	2	0	0	0	0	0	0	**5**
CMH6	0	0	0	0	1	0	0	0	0	0	0	0	**1**
CVG5	0	1	0	0	0	1	0	0	0	0	0	0	**2**
DCA2	0	0	0	4	1	1	0	0	0	0	0	0	**6**
FTW3	0	0	1	0	0	0	0	0	0	0	0	0	**1**
FTW9	0	0	1	0	0	0	0	0	0	0	0	0	**1**
IOG1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MEM5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
PHL6	1	2	0	0	0	2	0	0	0	0	0	0	**5**
SIL1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SMF6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UNV2	1	0	0	1	0	0	0	0	0	0	0	0	**2**
UOH5	0	0	1	0	0	0	0	0	0	0	0	0	**1**

UTX3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
AZA5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BFI5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BNA3	0	0	0	0	1	0	0	0	0	0	0	0	**1**
BNA9	0	0	0	1	0	0	0	0	0	0	0	0	**1**
CLT4	0	1	0	1	0	0	0	0	0	0	0	0	**2**
CMH3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DEN3	0	1	0	0	0	2	0	0	0	0	0	0	**3**
HSC1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
HWA2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
IND1	0	1	1	0	1	1	0	0	0	0	0	0	**4**
JAX5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
LAS2	0	0	0	0	1	2	0	0	0	0	0	0	**3**
LEX1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MCO4	1	0	0	1	0	0	0	0	0	0	0	0	**2**
MEM2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MEM6	1	1	0	0	1	0	0	0	0	0	0	0	**3**
MKE5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MKE6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MSP5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
ORD4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SDF9	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SJC9	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SLC2	0	0	0	0	0	1	0	0	0	0	0	0	**1**
SNA6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
STW8	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UIL1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UNC2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
USL4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
USS2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UTX9	0	0	0	0	0	0	0	0	0	0	0	0	**0**
ABE1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
AKC1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
ARB4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
AVP8	0	0	0	0	0	1	0	0	0	0	0	0	**1**
BCA1	0	0	0	1	0	0	0	0	0	0	0	0	**1**
BFI7	0	0	0	0	2	1	0	0	0	0	0	0	**3**
BFL1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BOS7	0	1	0	0	0	0	0	0	0	0	0	0	**1**
BWI4	0	0	1	0	0	0	0	0	0	0	0	0	**1**
BWI7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
CAE3	0	0	0	0	1	0	0	0	0	0	0	0	**1**
CLE2	0	0	0	0	0	0	0	0	0	0	0	0	**0**

CLE5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
CLT5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
CNO5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
CVG1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
CVG2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DAL2	3	1	1	1	2	0	0	0	0	0	0	0	**8**
DCA1	0	0	0	0	2	1	0	0	0	0	0	0	**3**
EWR6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
EWR8	0	0	0	0	0	0	0	0	0	0	0	0	**0**
FOC1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
FTW7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
HMB3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
IND4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
KDWI	0	0	0	0	0	0	0	0	0	0	0	0	**0**
KILN	0	0	2	1	0	0	0	0	0	0	0	0	**3**
LAX6	0	0	0	1	0	0	0	0	0	0	0	0	**1**
LEX2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
LST1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MCO6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MCO9	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDT2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDW9	0	0	0	0	1	0	0	0	0	0	0	0	**1**
MEM4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MGE1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MKC4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MOB5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
NCI7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
OAK6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
OGB1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
OKC1	0	0	0	0	0	1	0	0	0	0	0	0	**1**
ORD6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
PCA3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
PHL1	1	0	0	0	0	0	0	0	0	0	0	0	**1**
PHL9	0	0	0	0	0	0	0	0	0	0	0	0	**0**
PHX5	0	0	0	0	0	1	0	0	0	0	0	0	**1**
PHX6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
PHX7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
PIT5	0	0	0	1	0	0	0	0	0	0	0	0	**1**
PNE5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
RAD1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
RDU5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
RIC3	0	0	0	0	0	2	0	0	0	0	0	0	**2**
RNO4	0	0	0	0	0	0	0	0	0	0	0	0	**0**

SDF8	0	0	0	0	0	0	0	0	0	0	0	0	**0**
STF8	0	0	0	0	0	0	0	0	0	0	0	0	**0**
STW3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UCA1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UMV2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UTX7	0	1	0	1	0	0	0	0	0	0	0	0	**2**
YYC1	0	0	0	0	1	1	0	0	0	0	0	0	**2**
ACW9	0	0	0	0	0	0	0	0	0	0	0	0	**0**
ACY1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
ACY5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
ADV2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
AFE1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
ATL5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
ATL6	1	0	0	0	0	0	0	0	0	0	0	0	**1**
ATL7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
ATL8	0	0	0	0	0	0	0	0	0	0	0	0	**0**
ATM1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
AVP2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
AVP3	0	0	0	2	4	1	0	0	0	0	0	0	**7**
AVP4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
AVP6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
AWF1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
AWS2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BDL1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BDL5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BEN3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BFI1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BFI6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BLE3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BNA1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BNA5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BOI2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BOR1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BOS1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BOS5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BTD4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BUF5	0	0	0	0	1	0	0	0	0	0	0	0	**1**
BWI6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
CAU1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
CDF8	0	0	0	0	0	0	0	0	0	0	0	0	**0**
CEB3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
CHS1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
CLE3	0	0	0	0	0	0	0	0	0	0	0	0	**0**

COP4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
COT4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
CSG1	0	0	0	0	1	0	0	0	0	0	0	0	**1**
CVA1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
CVG3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
CVG6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
CVG7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DAC1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DAL6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DAL9	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DAT1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DAT2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DAU2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DBA2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DBC2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DBL1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DBL2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DBO1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DBO2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DBO3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DBO6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DDC4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DDT3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DEC1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DEG1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DEN2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DEN6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DEN7	0	0	0	0	0	1	0	0	0	0	0	0	**1**
DET1	0	0	1	0	0	0	0	0	0	0	0	0	**1**
DET2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DEW1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DEW2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DEW7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DFW1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DFW7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DFW8	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DIA4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DID2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DLA8	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DLV1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DMI6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DMO1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DMO4	0	0	0	0	0	0	0	0	0	0	0	0	**0**

DMX1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DNJ1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DNO2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DNY4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DOR1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DPD4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DSF3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DSF4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DSF5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DSX1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DTH1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DTL1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
ECH5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
EDT8	0	0	0	0	0	0	0	0	0	0	0	0	**0**
EWR5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
EWR9	0	0	0	0	0	0	0	0	0	0	0	0	**0**
FLC1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
FMF1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
FNA6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
FTW1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
FTW2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
FTW4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
HOU1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
HTA7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
HWA3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
IND2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
IND6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
IND7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
IVSC	0	0	0	0	0	0	0	0	0	0	0	0	**0**
IVSD	0	0	0	0	0	0	0	0	0	0	0	0	**0**
JBL1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
JFK2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
JFK7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
JPD1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
JVL1	0	2	0	1	2	0	0	0	0	0	0	0	**5**
KCW1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Laguna Whole Foods	0	0	0	0	0	0	0	0	0	0	0	0	**0**
LAS5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
LAW7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
LAX1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
LAX3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
LGA7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
LGA8	0	0	0	0	0	0	0	0	0	0	0	0	**0**

LGB5	0	0	1	0	0	0	0	0	0	0	0	0	**1**
MAA1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MCI5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDE1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDM	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDW1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDW2	0	0	0	0	0	1	0	0	0	0	0	0	**1**
MDW5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDW8	0	0	0	0	0	1	0	0	0	0	0	0	**1**
MEG1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MEK1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MEM1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MEX1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MEX2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MGE2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MGE5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MGE6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MGE7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MGI7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MIA1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MIA6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MKC3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MKC5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MSG1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MTM5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MTN5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MWI4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
OGA9	0	0	0	0	0	0	0	0	0	0	0	0	**0**
ONC2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
ONT3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
ONT4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
ONT7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
PCW1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
PDX5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
PHL2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
PHL3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
PHL8	0	0	0	0	0	0	0	0	0	0	0	0	**0**
PHX3	2	0	0	0	0	1	0	0	0	0	0	0	**3**
PHX4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
PHX8	0	0	0	0	0	0	0	0	0	0	0	0	**0**
PIN1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
PLE2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Prime Now (N. Seattle)	0	0	0	0	0	0	0	0	0	0	0	0	**0**

Q2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
RDU1	0	0	0	0	1	0	0	0	0	0	0	0	**1**
RIC5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
RIC7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
RNO1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
RNO2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
RNO3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SAV3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SBD2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SDF1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SDF2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SDF7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SEA1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SEA6/8/Fresh	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SJC7	4	0	0	0	0	0	0	0	0	0	0	0	**4**
SLC3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SMF5	0	0	0	0	0	2	0	0	0	0	0	0	**2**
SMS1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SMS3	0	0	1	0	0	1	0	0	0	0	0	0	**2**
SMS5	0	0	0	0	0	1	0	0	0	0	0	0	**1**
SNA1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SNA4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SNA7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SOC3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
SPD3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
STL5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
STL6	0	0	0	1	3	2	0	0	0	0	0	0	**6**
STL7	0	0	0	0	0	0	0	0	0	0	0	0	**0**
STW1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
STW2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
STW4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
TEB1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
TEB5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
TES1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
TNO1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
TPA1	0	0	0	0	0	1	0	0	0	0	0	0	**1**
TUL1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UCA6	0	0	0	0	0	2	0	0	0	0	0	0	**2**
UCA9	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UFL6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UFO1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UFO6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UMA3	0	0	0	0	0	0	0	0	0	0	0	0	**0**

UMD1	0	0	1	0	0	0	0	0	0	0	0	0	**1**
Unknown Location	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UNT2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UOH2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UOR1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
USC1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UTX8	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UVA2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UWA4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UWA6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
UWH6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
WFIV	0	0	0	0	0	0	0	0	0	0	0	0	**0**
WFM1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
WFM529	0	0	0	0	0	0	0	0	0	0	0	0	**0**
WFM546	0	0	0	0	0	0	0	0	0	0	0	0	**0**
WFMBLV	0	0	0	0	0	0	0	0	0	0	0	0	**0**
WFMBMR	0	0	0	0	0	0	0	0	0	0	0	0	**0**
WFMBVH	0	0	0	0	0	0	0	0	0	0	0	0	**0**
WFMKMQ	0	0	0	0	0	0	0	0	0	0	0	0	**0**
WFMPNC	0	0	0	0	0	0	0	0	0	0	0	0	**0**
WFMSFX	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Whole Foods 167	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Whole Foods C131	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Whole Foods CCH10211	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Whole Foods FSX177	0	0	0	0	0	0	0	0	0	0	0	0	**0**
WIR6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
WMF161	0	0	0	0	0	0	0	0	0	0	0	0	**0**
WSM221	0	0	0	0	0	0	0	0	0	0	0	0	**0**
WSM452	0	0	0	0	0	0	0	0	0	0	0	0	**0**
YVR2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
YVR3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
YVR4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
YYZ1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
YYZ2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
YYZ3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
YYZ7	0	0	0	0	0	0	0	0	0	0	0	0	**0**

[redacted] | Associate
Paul, Weiss, Rifkind, Wharton & Garrison LLP
1285 Avenue of the Americas | New York NY 10019-6064

[redacted]@paulweiss.com | www.paulweiss.com
Pronouns She/Her

From: [redacted] @amazon com>
Sent: Monday, November 6, 2023 10 02 PM
To: [redacted] @paulweiss com>
Subject: FW: AMZL Automation Announcement – DMF3!

fyi

From: [redacted] @amazon com>
Sent: Thursday, August 24, 2023 4:38 AM
To: [redacted] @amazon com
Subject: AMZL Automation Announcement – DMF3!

NA AMZL UPDATE

MechLite Automation – **[DMF3]**

MechLite Automation Announcement

On 8/10/23, DS DMF3 commissioned 1 Auto Divert to Aisle (ADTA) fingers as part of the MechLite Automation program Container Sort PPH is 119 24, a 28% increase during commissioning week!

A big THANK YOU goes out to all the individuals and cross-functional teams that dedicated their time, effort, and resources to making this retrofit a success

Please join me in thanking the Operations team for their partnership and all those involved for supporting this initiative (listed below)!

ORT (Operation Readiness Test) Score

The purpose of ORT+ is to provide a standard quality evaluation for each REI to be completed prior to SUEX de-mobilization ORT+ provides each REI with a measurable quality score and also provides a mechanism to capture, track, and close out punch-list items related to REI quality

Score: 100%

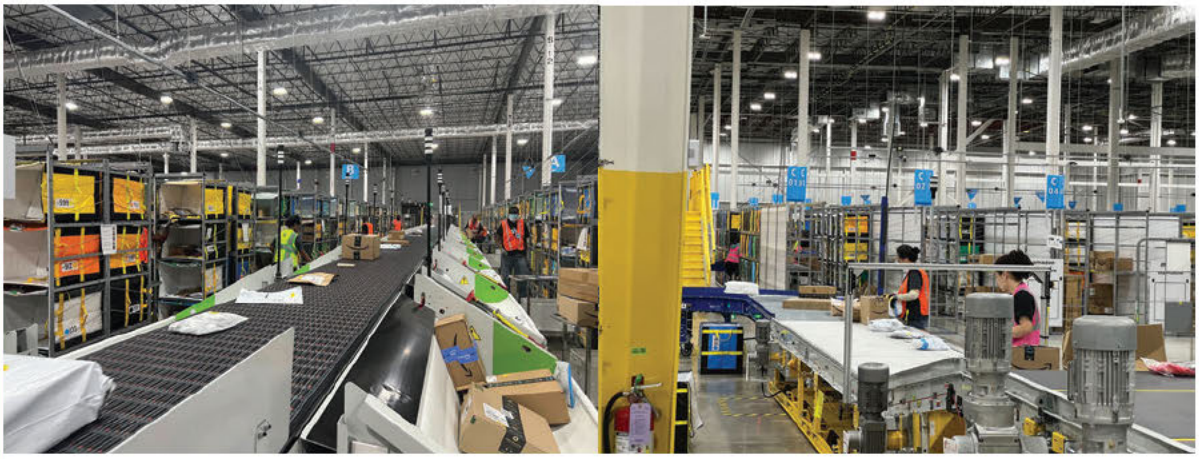
What is launched?

The MechLite Automation program aims to increase station performance by 20% through ASL's and ADTA's while also increasing site safety by reducing repetitive motions from using the Avery scanner and manual handling in the current Pick-to-Buffer process The ADTA technology automatically diverts packages to hampers, which are stowed by an associate The ASL technology automatically scans the SLAM label and applies a SAL label to each package

DMF3 is expected to be fully commissioned by 8/31/23 The site is a 2W3F site that will have an additional 1 ADTAs and 3 ASLs once all commissioning is complete, in addition to the 1 Pick-to-Buffer fingers and 3 manual induct lanes

More information on the MLA program can be found here as well as equipment videos:
https://w amazon com/bin/view/NA_AMZL_AUTOMATION_PROGRAM/RetrofitOnboardingResources

What does DMF3's new automation look like…



What was DMF3's performance?

From 8/10-8/22

Inbound Sort TPH	54 31
Container Sort TPH	119 24

ADTA Finger #1 Quality %	95 9% success rate
ADTA Finger #1 PPH	2,348 avg PPH

Associate Anecdote

Its great! I love not having packages all over the floor!

A Special Thank You to Everyone Involved!

TEAM	NAME
Project Engineer	[redacted]
Manager, MHE Engineering - Program	[redacted]
Startup Manager	[redacted]
Sr Startup Manager	[redacted]
Sr Regional Start Up Manager	[redacted]
Launch Planning Manager	[redacted]
REI Program Manager	[redacted]
Senior PM Strategy Planning	[redacted]
IT Deployment Program Manager	[redacted]
IT Support Engineer II	[redacted]
Design Engineer	[redacted]
Sr Automation Integration Engineer	[redacted]
Sr Manager, Amazon Logistics	[redacted]
Station Manager	[redacted]
Operations Manager	[redacted]

TEAM	NAME
PXT Team	[redacted]
Sr NPI Deployment Program Manager	[redacted]
RME Technicians	[redacted]
Sr Safety Engineer	[redacted]
WHS Program Manager	[redacted]
Regional WHS Manager	[redacted]
MLA Project Team	[redacted]
Capacity Engineering	[redacted]
S&OP	[redacted]
Controls Engineer	[redacted]
ASL SME	[redacted]
Sr Start-Up Supply Chain Manager	[redacted]
Sr Manager, Automation Program	[redacted]
Sr Controls System Engineer	[redacted]
Field Ops Engineer	[redacted]

Thank you to all that made this possible!

AMZL START-UP WE BRING IT HOME

Startup Execution Team

BEFORE THE BOARD OF INDUSTRIAL INSURANCE APPEALS

STATE OF WASHINGTON

IN RE: AMAZON.COM SERVICES, LLC	)	DOCKET NOS. 21W0156
	)	22W0000
	)	22W0056
CITATION & NOTICE NOS. 317961850	)	22W0121
317964648	)	
317965157	)	
317965723	)	

Stephen Pfeifer, Industrial Appeals Judge

Hearing taken at 2815 Second Ave,
Suite 550, Seattle Washington

Scheduled: 9:00 a.m. Actual: 9:00 a.m. End: 4:52 p.m.

Monday, September 25, 2023

REPORTED BY: Crystal D. Schaff, CCR 2025

A P P E A R A N C E S

Stephen Pfeifer, Industrial Appeals Judge

For the Employer, Amazon.com Services, LLC DBA Amazon.com

JEFFREY B. YOUMANS, ATTORNEY AT LAW
JOSEPH P. HOAG, ATTORNEY AT LAW
DANIELLE KIM, ATTORNEY AT LAW
Davis Wright Tremaine LLP

For the Department of Labor & Industries:

ELLIOTT S. FURST
SARAH E. KORTOKRAX
Assistant Attorney Generals

Also present: Sara Hollister, Nick Miller, Joe Herbster Boizelle, Andrea Carino

I N D E X

* * *

EXHIBIT	DESCRIPTION	AD	ID	REJ	RSV/WD
178	Repetition Limit Project (Project Elderwand). Workplace Health & Safety. [14 pg.] (Confidential Designation)	192	192		
189	AMZL External Lift Assist Device Ergonomic Assessment WWHealthandSafety 1653. C. Coudray. May 3, 2022. Ver. 1.2 [9 pg.] (Confidential)	179	179		
706	Project Shot Rock-Sortable Pack Singles Workstation Design (Confidential Trade Secrets). [22 pg]	100	100		
707	RSP Universal Station Ladder Rail Position version 1.1. (Confidential Trade Secrets) [47 pg]	117	117		
709	Comparison of Destuff-IT Articulating Conveyor to Flex Conveyor for Case Handling v1.4 field evaluation by Vincent Racco and Amy Brown. (Confidential Trade Secrets). [15 pg]	124	124		

JUDGE PFEIFER: This is a continued hearing before the Board of Industrial Insurance Appeals relating to the four citations the Department issued against Amazon. There are four docket numbers. The lead is 21W0156. Today is the second week of the Amazon's case-in-chief. Today is Monday, September 25, 2023. I am Industrial Appeals Judge Stephen Pfeifer.

The Department is present through the Office of the Attorney General.

And Amazon is present through its attorneys from Davis Wright Tremaine.

In your confirmation letter, Mr. Youmans, indicate that Mr. -- how do you pronounce your name? Is it Racco?

MR. RACCO: Racco.

JUDGE PFEIFER: That Mr. Racco's testimony is be taken today. Are you going to be asking the direct examination questions, Mr. Youmans?

MR. YOUMANS: I am Your Honor.

JUDGE PFEIFER: As far as Mr. Racco's testimony, Mr. Furst, are you going to be asking cross-examination?

MR. FURST: Yes.

JUDGE PFEIFER: Okay. Thank you. All right. You may call your witness, Mr. Youmans.

MR. YOUMANS: Your Honor, Amazon calls

Vincent Racco.

VINCENT RACCO, witness herein, being first duly sworn on oath, was examined and testified as follows:

JUDGE PFEIFER: Mr. Youmans, please proceed.

MR. YOUMANS: Thank you.

D I R E C T E X A M I N A T I O N

BY MR. YOUMANS:

Q Good morning, Mr. Racco.

A Good morning.

Q Do you work for Amazon?

A Yes, sir.

Q And what is your job title?

A My job title is senior manager.

Q And does that position have to do with ergonomics?

A Yes, sir.

Q Are you a professional ergonomists?

A Yes, sir.

Q And just briefly, Mr. Racco, what is ergonomists?

A Ergonomists is broadly defined as the science of matching the physical capabilities of workers to the physical demands of the work.

Q Just briefly, what is the goal of ergonomics?

A The goal of ergonomics is to ensure that workers can perform their work with optimal performance.

Q And does injury prevention or injury reduction, does that play any role in ergonomics?

A Injury prevention is part of ergonomics, yes.

Q How long you been ergonomist?

A I have been an ergonomist for approximately 23 years.

Q Okay. Before we get to your work at Amazon, let's discuss your education and your professional background. Do you have any college degrees?

A Yes.

Q What degrees do you have?

A I have an undergraduate degree in science, kinesiology from the University of Waterloo in Waterloo, Ontario.

Q An undergraduate would be a bachelor?

A Yes, sir, a Bachelor of Science.

Q When did you earn that degree?

A In 2000.

Q You said it was in kinesiology; is that correct?

A Yes, sir.

Q What is kinesiology?

A Kinesiology is the study of human movement.

Q Does that relate in any way to ergonomics?

A Yes.

Q How so?

A Kinesiology includes the study of biomechanics, anatomy, physiology all of which contribute to ergonomics.

Q And what sort of coursework did you complete to earn that degree?

A I completed undergraduate courses in anatomy, physiology, biomechanics biology, chemistry, math, physics.

Q Do you have any professional certifications?

A Yes, sir.

Q What certifications do you have?

A I have a CPE.

Q What does that stand for?

A Certified professional ergonomist.

Q What does that mean, what does that mean when you are a CPE?

A So a CPE is a designation awarded by the Board for Certification in Professional Ergonomics.

Q The board, is that some sort of professional organization?

A Yes.

Q Where is the board based; do you know?

A I believe it's based in Bellingham, Washington.

Q About when did you earn that certification?

A Approximately 2007.

Q Do you have any ergonomics-related work experience prior to coming to Amazon?

A Yes, sir.
Q Okay. You mentioned that you earned your bachelor's degree in 2000; is that correct?
A Yes.
Q Why don't we start there and sort of work our way to the present, or at least until when you became employed with Amazon.
A Starting in 2000 until 2004, I was a consultant for Siemens. I was a consultant on their Ford Motor Company project where I used ergonomics and Digital Human Modeling principles to assess service procedures in future model vehicles.
Q And can you spell Siemens?
A S-i-e-m-e-n-s.
Q And what kind of company was that?
A Siemens is a software provider and a consulting company.
Q And you said you were a consultant. Were you a consultant at Siemens or were you an employee?
A I was an employee at Siemens.
Q So you were acting, if I understand you correctly, as a consultant for Ford on behalf of Siemens?
A Yes.
Q You mentioned using Digital Human Modeling with respect to, I think, you said service procedures?
A Yes.

Q Just explain what you mean by that. What sort of modeling were you doing, what sort of ergonomic assessment?

A So when the future model vehicles were being developed, the team that I worked on would evaluate the service procedures and the context and the design. So this could include items that a customer would bring their vehicle into like a shop or a garage to complete, you know, potentially replacing an alternator or something along those lines, as well as tasks that the vehicle owners might do themselves, like changing their oil or replacing a head lamp.

Q What would you be assessing from an ergonomic's perspective for those sorts of tasks?

A We would primarily assess things like hand access to be able to complete the task, the ability to use tools to complete the task to ensure that the design of the vehicle was compatible with completing those tasks.

Q And you mentioned using Digital Human Modeling. What is that?

A Broadly speaking, Digital Human Modeling refers to a set of software applications where a virtual human is placed in a computer-aided design environment to be able to assess the design and the tasks that the human is performing.

Q What was the next job you had that related to ergonomics?
A Following my employment at Siemens, I worked at a tier-one automotive supplier called Johnson Control.
Q What does tier-one mean?
A Tier-one means that that company supplies their parts directly to the automotive and manufacturer.
Q And what was your position when you worked at Johnson Controls?
A Was employed as an ergonomics engineer.
Q And just briefly, what were your duties as an ergonomic engineer?
A My responsibility included ergonomics in our seat manufacturing facilities. This included both the design of future products and continuous improvement of the ergonomics in the facility.
Q And so if I understand you, part of your responsibility had to do with ergonomic design of the actual automotive seats?
A The design of the assembly process that builds automotive seats.
Q All right. I see. This is, what, a manufacturing environment?
A Yes, sir.
Q And you mentioned another component of what you did was continuous improvement in terms of the process. What did

you mean by that?

A So while the facility was actually building existing products, we would seek out opportunities to improve the process to reduce musculoskeletal risk and improve human performance.

Q Okay. In terms of whatever tasks the employees were performing in a manufacturing setting?

A Yes, sir.

Q And what sort of tools would you use for that sort of continuous improvement within the facility?

A We used a broad range of tools, including things like Digital Human Modeling and the tools it supports, as well as paper and pencil checklists. Johnson Controls had an internal checklist they used also.

Q When was it that you worked at Johnson Controls?

A I worked at Johnson Controls from approximately 2004 to 2005.

Q What was the next job you had that related in some way to ergonomics?

A Following Johnson Controls, I worked at Lear Corporation.

Q Can you spell that?

A L-e-a-r.

Q What kind of company was that?

A Lear is also a tier-one automotive supplier.

Q What was your job at Lear?

A My last job at Lear was as an ergonomic manager.
Q What were your responsibilities when you were at Lear?
A Very similar to the ones I had at Johnson Controls. We sought to design the manufacturing process for the new models to be compatible with ergonomic principles, as well as continued improvement with the existing products on the site.
Q Are you looking at ways to improve ergonomic safety for the network in a manufacturing environment?
A Yes, sir.
Q What sort of tools would you use for that when you were at Lear Corporation?
A Similar to the ones at Johnson Controls, including Digital Human Modeling and the analysis tools that it supports.
Q What years were you working at Lear Corporation?
A I was at Lear from approximately 2005 to 2018.
Q 2018?
A Yeah.
Q What was your next job that related to ergonomics?
A Following my time at Lear, I moved to Faurecia as a director of Environmental Health and Safety Ergonomics.
Q Can you spell that?
A F-a-u-r-e-c-i-a.
Q What kind of company was Faurecia?

A Faurecia is also a tier-one automotive supplier.
Q And you gave your job title. What were your responsibilities as director of Health Safety Environmental and Ergonomics?
A My responsibilities were to ensuring that our safety programs were executed at 12 manufacturing facilities in North America, specifically the US and Mexico.
Q And would those safety programs, would that include programs relating to ergonomic safety?
A Yes.
Q And how would you go about ensure that the ergonomic-related programs were being executed at these manufacturing facilities?
A I had a series of direct reports that were stationed at the facilities that were responsible for the execution of the programs and of the improvement projects.
Q And when you were with Faurecia, would you be doing any of this continuous improvements that you described for the prior employers, that is sort of looking at ways to reduce ergonomic risk for the workers in these facilities?
A Yes, that was also part of my responsibility.
Q What tools, just briefly, did you use for that when you were with Faurecia?
A Faurecia also used the Digital Human Modeling, as well as

an internal checklist system that was part of their overall safety management program.

Q And these checklists that you've described for these various employers, can you just sort of summarize? I mean, I know what a checklist is. But what sort of things are you looking for and checking off?

A Sure. They are primarily screening tools that can be applied to determine the presence or the absence of a specific risk factor.

Q And you say "screening tools." So when you would do a checklist for these employers and you would check something off and indicated that they there was potentially a risk factor, what would typically be the next step broadly speaking?

A Broadly speaking, the next step would be to engage in a deeper dive. So the checklist didn't make a determination on the risk factor but broadly just identifying whether or not it was potentially present.

Q And so you said "deeper dive." What would that typically consist of?

A Typically, that would include one of our subject matter experts using something like a Digital Human Modeling to make assertion as to the level of the risk that's present.

Q And what years were you with Faurecia?

A From approximately 2017 to the start of 2019.
Q Okay. I think you testified earlier that you came to Faurecia early in 2018?
A Sorry, yes.
Q But you were there, I think you said, until early 2019?
A Yes.
Q And what was your next ergonomic-related job after Faurecia?
A After Faurecia, I moved to Amazon.
Q And that would have been in early 2019?
A Yes, in February 2019.
Q You mentioned earlier that your current title is senior manager. What was your first position that you had with Amazon when you began working there in 2019?
A My first position was as a senior ergonomist.
Q How long were you in that position?
A I was in the position of senior ergonomist from approximately 2019 to the fall of 2021.
Q And were you part of a department or team within Amazon?
A Yes.
Q What team was that?
A I was part of a safety engineering team.
Q And what were your duties as senior ergonomist when you were part of the safety engineering team?
A I had three primary work streams as a senior ergonomist.

The first work stream was to review and make a decision on approvals that were submitted by other teams. So the way the process would work is that if somebody at Amazon is looking to make some type of change in the facility to a process, it kicks off an approval work stream with multiple stakeholders that may be impacted by that change. As one of the -- with ergonomics being one of the stakeholders. So my responsibility was to make a decision on those projects.

Q And so what sort of changes were you being asked to weigh in on as part of this Amazon approval process?

A It could be, broadly speaking, any type of change that gets made at a site. So it could be the introduction of a new piece of equipment, it could be a change to an existing piece of equipment, or a change to a process.

Q And so why were you on the approval list? What was your role or what, I guess, were you reviewing when you were asked to approve these changes?

A My responsibility was to review the change with ergonomics in mind to ensure that the change did not have a negative impact on ergonomics.

Q And so if you did review a proposed change and it had, in your view, a negative impact on ergonomics, what would you do?

A I could seek to clarify the change from the individual

submitting it to make sure I understood. And upon that, I could propose an amendment to the change, or reject it.

Q So fair to say, your role is basically to ensure that any proposed change is not going to introduce additional ergonomic risk?

A Yes, sir.

Q You mentioned a couple of other work streams. What was the next work stream in terms of your job responsibilities?

A The next work stream was as support to other stakeholders that may be initiating projects on their own. So if a stakeholder were initiating change and had an idea it might impact ergonomics, they would seek out myself in this time frame as a subject matter expert to weigh in on the change and to confirm its impact to ergonomics.

Q And so you say "stakeholders." Would that be some other department within Amazon, or what would be an example of a stakeholder that would sort of bring you in as a subject matter expert?

A An example of another stakeholder might be someone from operations, or engineering, or a different workplace health and safety group.

Q And I think you mentioned a third work stream. What was that?

A Yes. The third work stream was to initiate and lead

continuous improvement projects focused on reducing musculoskeletal disorders.

Q And would that involve doing ergonomic risk assessments?

A Yes.

Q Would that involve sometimes supporting or proposing engineering solutions or improvements?

A Yes.

Q And I think you said you were in the senior ergonomist position until the fall of 2021; is that correct?

A Yes, sir.

Q What was your next job at Amazon?

A My next job is senior manager.

Q And that brings us to your current position?

A Yes, sir.

Q And as a senior manager, are you part of a department or team within Amazon?

A Yes.

Q What is that team called?

A So the team that I directly supervise is our World Wide Ergonomic and Safety Experience Engineering Team.

Q And going back to let's say 2020 to 2021, which is the time period in this case for the most part focusing on, did that team have another name?

A Yes.

Q What was the name?

A We were referred to at that time as the Human Factors and Ergonomics Team.

Q And what are your duties and responsibilities as a senior manager in ergonomics for we will say the human factors and ergonomics team?

A So my roles and responsibilities in -- as a senior manager are to provide guidance to a team of direct reports that are subject matter experts in ergonomics. And their roles and responsibilities follow the same three work streams that we just discussed.

Q And how many direct reports do you have?

A At this moment, my organization includes approximately 15 ergonomic subject matter experts.

Q And if we went back to, let's say, fall of 2021 when you became a senior manager, do you recall about how many direct reports you had back then?

A Approximately 18 at that time.

Q And do you know why you have gone from 18 in your group to 15 currently?

A Yes. We have redeployed three of those subject matter experts to different roles insides of our broader organization to help support the rollout and the pilot of our continuous improvement projects.

Q Okay. So fair to say that they're still with Amazon, they are just on different teams?

A Yes.
Q And you say that the direct reports that you supervise, I guess, you supervised back in 2021, are subject matter experts. Does that mean they are all ergonomists or do they have other subject matter expertise?
A Yes, they are all ergonomists.
Q And I was going to ask you what the human factors and ergonomics team does, but I think you have said basically it's the same three work streams you have described earlier?
A Yes.
Q And would that include performing ergonomic risk assessment and trying to identify solutions?
A Yes.
Q And was that broadly speaking true back in 2020 and 2021 as well?
A Yes, sir.
Q What geographical scope does your team cover?
A We cover North America.
Q Okay. Would be US?
A US and Canada.
Q Mexico?
A Primarily, no. We sometimes support Mexico but it's not a main work stream for us.
Q We have heard testimony in this case about business units

within Amazon. What is a business unit?

A Broadly speaking, a business unit within Amazon covers the functionality of the buildings and the performance of those buildings. So, you know, you think about our work, we have three main work steams, we have the fulfillment centers that fulfill your orders, we have a transportation work stream that moves the orders from one location to another, and we have a delivery work stream that gets the orders to your front door. So broadly speaking, our business units fall into these three categories.

Q And you support all of those business units?

A Yes, sir.

Q And was that true back in 2020/2021, as well?

A Yes, sir.

Q Just to sort of place the specific facilities that have been cited in this case in context, so one of those is BFI3, I think you know, in DuPont. What business unit would that be part of?

A BFI3 would be part of our North America.

Q That would be a fulfillment center?

A Yes.

Q I assume the same thing with BFI4 in Kent?

A Yes.

Q And another facility that's been cited in this case is

DSE7 in Sumner. What business unit, if you know, would that fall under?

A That would have fallen under delivery business unit, also referred to as AMZL.

Q What does a typical work week look like for you?

A So a typical work week includes ensuring that we are up-to-date and meeting our service level agreements on the approvals that are in our work stream. Because there are multiple stakeholders on these approvals, that's a high priority for us to ensure that we are providing the appropriate feedback and support to the approvals work stream. In parallel to balancing out the approvals, we spend time interacting with our stakeholders who might have submitted support requests. And the approvals and the support requests go hand in hand from a workload or balancing standpoint. There's often times back and forth between our team and the partners we are working with in those cases. And then final, we spend time developing and supporting our continuous improvement projects that we own. This includes work at a desk, includes doing analyses and, you know, design work, as well as site visits and field visits making observations and collecting data in the field and interacting with our associates.

Q And about how much of your work time do you spend

traveling to different Amazon facilities?

A Broadly speaking, a good estimate would be between 30 and 40 percent of our time in the field at facilities.

Q Was that true broadly speaking back in 2020 and to 2021?

A Broadly speaking. I mean, COVID restrictions and such not withstanding during that time period but, yes, we would be in the field taking measurement and making observations.

Q How did COVID impact your travel if it did?

A So primarily instead of, you know, getting on a plane or traveling further distances to different fulfillment centers that might meet specific criteria, our team, which is geographically distributed across the country, would just spend time and visit sites that were within driving distance.

Q In terms of your team of ergonomists, about how much of their time are they spending out in the field visiting facilities?

A On average about the same, between 30 and 40 percent; however, that may change depending on the specific timeline of a project or where that project is in the development.

Q And just broadly speaking, the 30 to 40 percent, was that true back in 2020 and 2021 for your direct reports?

A Yes.

Q And why -- why are you and your direct reports visiting these sites? I think you mentioned sort of doing field assessments would be one of those reasons; is that correct?

A Yes. So our primarily reason for visiting the sites is to directly engage with the sites and understanding our impact with our change and projects. This includes making direct observations with associates and understanding the variability in the work they do. And being able to translate that work into -- those observations into the analyses that we complete.

And then also, interacting with the associates. Getting their feedback on the work that we are doing, the pilots that we are executing.

And then also executing pilots. So once we make a change or propose a change, our team is directly in the field supporting and understanding the impact of that change.

Q And by "pilot," do you mean essentially testing some proposed change out in the field?

A Yes, sir.

Q And you mentioned going out there to make observations in of associates, interviewing associates, getting that feedback. What about collecting data? Is that one of the reasons that you and your direct reports would go out

to sites?

A Yes.

Q And what sort of data, just broadly speaking, are you collecting when you go out there?

A That could be dimensional data on workstations, on the types of packages that are coming through the -- through the work stream or the process flow, in addition to direct measurements using force gauge and other direct measurement tools.

Q And, Mr. Racco, have you ever visited any of the facilities involved in this case, again, that would be BFI3, BFI4, and DSE7?

A Yes.

Q Which ones?

A I have visited BFI4 and BFI3.

Q How many times have you visited BFI3?

A I have visited BFI3 once.

Q Do you recall about when that was?

A It was during the -- during the L&I visit.

Q Was that when L&I was out there in December -- excuse me, November of 2020?

A Yes.

Q And what was the reason you were out there in November of 2020 when L&I was there?

A The reason that I was there, as well as one of my direct

reports and other members of my team, was to be present during the visit and support so that we can answer any questions or be supportive of the site while the visit was happening.

Q Okay. Did you accompany any of the L&I contingent when they were on site on that occasion?

A Yes.

Q Who did you accompany?

A I apologize, I don't recall the specific ergonomist's name but I was with one of the ergonomists.

Q For L&I?

A Yes, sir.

Q And what was the reason that you were accompanying the L&I ergonomist?

A The reason was just to ensure that we understood the different measurements that were being taken, if any. You know, to have the same photos and videos that were going on. And just generally, to try to be able to answer any questions or provide any support in the industrial environment.

Q And you mentioned videos and photos. What did you mean by that?

A During the visit, the L&I ergonomists were taking videos and photos of the work processes. So we were seeking to try and take the same or similar photos and videos to

understand the observations.

Q So any other facilities that you have been to besides BFI3 that have been cited in this case?

A Yes, I have been to BFI4.

Q And how many times have you been to BFI4?

A I have been to BFI4 approximately three or four times.

Q Just approximately, when did those visits take place?

A Those visits took place in late 2019, early 2020.

Q And did any of those relate to L&I's inspection at BFI4?

A No.

Q Were you on site on any of the occasions that L&I was on site at BFI4?

A No.

Q What was the purpose, just briefly, of the three or four times that you visited BFI4 in 2019 to 2020?

A The purpose of those visits was to support a pilot project that I was leading.

Q And what did that pilot relate to?

A That pilot related to the position of the ladder rail in our universal stow stations.

Q Okay. And we'll talk about that particular pilot in more detail a little bit later in your testimony. Is your team, Mr. Racco, involved in the design of Amazon facilities?

A We are not.

Q And so if you are not involved in the design, what sort of engineering controls, for example, would you be looking at or potentially recommending?

A So we recommend changes or redesigns to workstations in existing facilities, as well as other technical or software changes that might improve the associate's experience, reduce musculoskeletal risk, or optimize associate misperformance.

Q Okay. So the focus of your team, is it on existing facilities rather than new facilities that are being launched?

A Yes.

Q Are there other ergonomic teams at Amazon that focus on facility design?

A Yes.

Q What team or teams is that?

A There's a team that focuses on future building design that's referred to as World Wide Design and Engineering. And there's a team that's focused on future robotics and automation projects in Amazon robotics.

Q You said in Amazon robotics?

A Yes.

Q The first team you mentioned, the World Wide Design team, how long has that team existed at Amazon?

A Since approximately 2017.

Q And how many ergonomists are on that team if you know?
A I believe that there are six ergonomists on that team.
Q The other team with Amazon robotics, how many ergonomists are on that team if you know?
A There are four ergonomists on that team.
Q Any other ergonomic teams at Amazon besides the ones you described?
A So we have counter -- when I say human factors and ergonomic teams have counterparts in Europe, an engineering team in Europe that's responsible for the same work streams in Europe. We additionally have a group of ergonomists that is paralleled or a peer to my team that is responsible for our programs and procedures.
Q And the team you mentioned in Europe, if I understood you, that's basically they are doing the same thing your team does but just a different geographical scope?
A Yes.
Q The other team, the programs team, what is the name of that team?
A The Ergonomics Program team.
Q And you may have just said this, but what is that programs team responsibile for? Can you give some examples?
A They are responsible for the development of our overarching ergonomics program for the sites.

Q Would that include Amazon's written ergonomics procedure?
A Yes.
Q And so if you know, any kind of examples of what that team would assist the sites with when it comes to implementing the written procedure?
A Sure. That team would assist the sites in implementation of the procedure through training and feedback and guidance on each of the different components that are called out in the procedure.
Q And when you reference training, would that relate to ergonomic training for associates?
A It would refer to training on the procedure itself.
Q Training the site-level folks?
A Yes.
Q If you know, do they have any responsibilities for assisting sites with site-level risk assessment, in other words, local ones not done by your team?
A Yes.
Q What role do they play with respect to that?
A They play a role with respect to the training and upscaling the sites to be able to do those assessments.
Q About how many ergonomists are on the Programs Team?
A There's approximately four ergonomists on the Programs Team.
MR. YOUMANS: Let's take a look at

Exhibit 45, please.

JUDGE PFEIFER: Here again, Mr. Youmans, we are display it in the room. I am relying on you to let me know if it should not be displayed on the webinar. It would appear Exhibit 45 has been designated as confidential, so we will not be displaying it.

MR. YOUMANS: That's right. Thank you, Your Honor.

Q BY MR. YOUMANS: Mr. Racco, we're looking at Exhibit 45. It says "WHS Ergonomics Procedure NA." Can you tell us what this document is?

A This document is the workplace on health and safety ergonomics procedure for North America.

Q Is this the written procedure you were just referring to in terms of the Program Team's responsibilities?

A Yes, sir.

Q Who does this program or this procedure apply to if you know?

A My understanding is that this document, this procedure applies to the sites.

Q Does this procedure apply at all to your team?

A No, sir.

Q Does it describe what ergonomic assessment tools, for example, your team uses?

A No, sir.
Q And does your team have any responsibility for implementing this procedure at the site level?
A No.
Q You mentioned that your team performed some ergonomic risk assessments and looks at potential ergonomic solutions. Is there just a general process that you follow when you are going about doing that?
A Yes. Generally speaking, we have a process that we follow.
Q Has that general process, before we get into it, has that changed since 2020 and 2021?
A No, it's primarily the same.
Q Okay. And at a fairly high level, can you take us through the steps of your process in terms of performing an ergonomic risk assessment?
A Yes. So to start off, our team of ergonomic subject matter experts will identify a process path that we would target for improvement. We primarily do this by looking at lagging indicator, primarily the musculoskeletal disorder incident reports that are tracked through our internal systems.

Upon deciding what process or processes the team is looking at, we'll start to define the functional parameters of that process, including understanding the

standard work for the process and any types of operations metrics that go along with it.

We will then proceed to head into the field to make direct observations and make direct measurements that were referenced a little bit earlier.

Upon completing those direct measurements and direct observations, we'll complete a musculoskeletal risk assessment to define the specific parts of the job that we can target for improvement. And then those musculoskeletal risk assessments and the part of the job that we targeted for improvement become our roadmap for the potential changes that we would make.

Q Okay. You mentioned standard work as one of the things that you would look at when you're looking at whatever process path you identified. What did you mean by standard work?

A These would be the standard operating procedures that associates would execute when they're performing the industrial task.

Q And you mentioned going out in the field for observations. Would that include taking measurements and collecting data as well?

A Yes.

Q And at some point during this process, do you and your colleagues have to make a decision in terms of what

ergonomic assessment tools you are going to use?

A Yes.

Q At what point in the process are you choosing which tools you are going to use?

A This is primarily in the point where we are designing the parameters and making the physical observations of the work.

Q Okay. So sort of in conjunction with your field visit, you're deciding, based on the observations and the data you are collecting, which tools would be most appropriate?

A Yes.

Q Okay. I think you said once you use the tools and you collect the data, you perform an ergonomic risk assessment; is that correct?

A Yes.

Q And then what happens next based on the risk assessment?

A So based on the risk assessment, we would define where our opportunities for improvement are and design solutions that address those issues for improvement.

Once we either define and make the design, we would continue on through the process by seeking approval to prototype or to pilot the improvement with the various groups of stakeholders that might be impacted by the project.

And then from the seeking approval, we would then transition into the field testing and pilot of the interventions that we are proposing.

Q Okay. When you get to the conclusion of the pilot, what is the next step in terms of your general process?

A So our next step would then be to seek a network rollout. So if the project is successful or the pilot is successful and it impacts musculoskeletal disorder risks the way we expect it to, we would then seek to expand that project to the entire network of buildings that are impacted.

Q And what does that mean, "the entire network of buildings"?

A So when we were speaking, you know, earlier about the different types of fulfillment centers, we would seek to understand what potential buildings that intervention is applicable to, and then roll the change out to those buildings.

Q Okay. For example, if you're doing the assessment for AR non-sortable sites and you piloted it and it looks successful, would the goal then be to roll out that change throughout the AR non-sortable network?

A Yes.

Q And when you get to that point where you have done the pilot and you conclude that it's successful, do you and

your direct reports, do you actually make a recommendation to Amazon?

A Yes.

Q Okay. And who do you make that recommendation to and who has to approve it in terms of the rollout?

A So the recommendation gets made starting with my team's direct leadership inside of Workplace Health and Safety. From there, we identify the additional stakeholders in the different engineering groups or building types that might be impacted by the change and seek their approval. Similar and through the same approval process that I was referencing earlier that the ergonomics team is part of.

Q Okay. So your recommendation is going to go through that same approval tool or process that you described earlier?

A Yes.

Q Fair to say that the stakeholders who will approve or need to approve a particular project, is that going to change based on the nature of the proposal?

A It may.

Q Okay. And I just want to go back sort of to the first part of your process where you were talking about, I think, how your team decides where you're going to go and perform this risk evaluation. I think you mentioned looking at lagging indicators; is that correct?

A Yes.

Q And I think you said that that would include looking at, among other things, injury data; is that correct?

A Yes.

Q And you mentioned, I think, some sort of reports that you look at in terms of identifying where to sort of target the improvement; is that right?

A Yes.

Q What sorts of reports were those?

A So our internal injury tracking systems are able to generate reports and metrics with respect to the locations or the process paths where different incidents reported. So we drill into that data to help define what it is that we are looking at.

Q So are you looking at, for example, the number of injuries that Amazon is tracking in a particular process past, or are you looking at other types of data?

A Yes, we primarily look at the number of injuries.

Q And why do you look at that data, the injury data when you are trying to figure out sort of where to deploy your team?

A We look at that data to help us ensure we are addressing the process paths that have the highest number of injuries and will give us the greatest impact to our associates.

Q Would you ever recommend implementing some new control or

piece of equipment based on this injury data alone?

A No.

Q Why not?

A Because the injury data alone is a lagging indicator. And so our group measures our success based on the impact on the musculoskeletal disorder risk.

Q And when you say "lagging indicator," what did you mean by that?

A So a lagging indicator is typically a report of something that happens after the event has occurred. And in the case of musculoskeletal disorders, there are like many potential factors that contribute to whether or not an individual may report an MSD. So our success criteria and our metrics are focused on things that we can control, which are the design of the work and the changes that we make and their impact on the musculoskeletal risk factors.

Q Okay. And so can you tell us a little bit more specifically about how your team measures success then? So you're looking at, among other things, the injury data to figure out where to go and do an assessment. But assuming the assessment goes through your process and you have a pilot and you are recommending implementing it, how are you measuring whether a particular solution that you propose is a success?

A So we start off, as I mentioned, doing a series of musculoskeletal disorder risk assessments. So we make that decision as we are making our field observations. And as we proceed through, we will look at different risk indicators, like peak low back impression, peak low back sheer, cumulative low back compression when we are looking at the low back as a primary body part.

We will also go on to look at things like the moments of force acting on the shoulder, metabolic energy expenditure, and a series of other musculoskeletal metrics and factor.

Once we establish the baseline by looking at the process as it currently exists, we will develop those interventions and perform those same analyses virtually on the interventions we have designed, and then we will look at the comparison between the two. So how much our intervention has impacted that list of metrics that I just mentioned.

Q Okay. Just to make sure we all track that. So for example, if you are looking at potential low back risk, I think you said one of the things your team might measure would be peak low back sheer?

A Yes.

Q So let's say that the initiate measures you get is 800 Newtons for that. So you would be looking for some

sort of reduction in that measurement that would be brought about as a result of the change you are proposing?

A Yes, sir.

Q And is there sort of a rule of thumb that you follow in terms of how much of a reduction in your the ergonomic risk you are trying to achieve?

A The target that we give to our subject matter experts is to seek at least a 20 percent improvement in those risk measurements.

Q Just to be clear, is that a 20 percent reduction in MSDs for the process path, or is that something else?

A No. That's a 20 percent reduction in any one of those individual metrics. So in the case of peak low back sheer, that would be a 20 percent of reduction in low back sheer.

Q We've heard testimony about various threshold limit values under various ergonomic assessment tools. Is that something that your team looks at when you are trying to figure out where to target your efforts and what sort of solutions to propose?

A We do not focus specifically on threshold limit values, no.

Q Okay. Why not?

A So our view is that we are seeking continuous improvement

regardless of the performance to those threshold limit values. So we are seeking improvement wherever we can get it. This may include jobs or tasks where the task is already below a threshold limit value but it incidents might be reporting that way.

Q Okay. So do and your team sometimes recommend an improvement in a situation where the process path that you are evaluating is already below whatever the relevant threshold limit value is?

A Yes.

Q And how often do you make those sorts of recommendations?

A Sorry, how often?

Q Right. Is it common, is it rare, when they are already below?

A It's common, yes, we commonly do that.

Q Mr. Racco, you mentioned the pilot phase in terms of your process. Do you always do a pilot as part of your process, right, in other words, after you've done your risk assessment and you have identified some sort of potential improvement?

A Yes, we always pilot.

Q Why do you always do that?

A We always pilot to ensure that we get a good feel and understanding for how the intervention actually exists in real life and how it works with our associates. Amazon

is a highly variable changing environment and we know that our designs may not capture everything that an associate might experience in the course of their workday even despite our best efforts of comprehensive field observations. Therefore, we pilot and exercise our interventions in the field to make sure we understand the impact of those interventions on the associate.

Q How do you does that? Do you typically gather feedback from associates on a proposed change?

A Yes. We identify at least one, usually multiple sites where we'll -- where my team will retrofit the existing work stations or make the changes that we are proposing. And then during the pilot phase, my reports will be in the field interacting with associates making observations and gathering their feedback on the changes.

Q And in your experience doing these pilots at Amazon, do pilot, when you actually test a change, do they ever introduce sort of unforeseen consequences?

A Yes, they can.

Q What would be an example of that?

A So there are two specific examples that come to mind. The first is a workstation redesign where we proposed taking the workstation surface from a flat tabletop, kind of like the one in front of me, to pivoting that tabletop on a 45-degree angle. Through our design and

engineering, it seemed like it was a good idea. And we created a prototype workstation and brought that into the field and got feedback from our associates. Upon installation and testing, we realized that the angled workstation impeded the transition of that package onto the conveyor that it went to. It was getting hung up and causing negative experience for our associates. So we would never have caught that unless we piloted that and saw that feedback from the associates.

Q And so what did you do in that case once you got this negative feedback from the associates?

A So we proceeded to redesign the workstation and made some additional changes that achieved our risk production without having the angled-work surface.

Q And you mentioned you can think of a couple of examples. Is there another example you can share with us about sort of unforeseen consequences coming as a result of the pilot?

A Yes. Another example is with respect to our XL business, our extra large fulfillment centers. We developed a change to the work process that reduced the number of times those extra large items are handled in the fulfillment process. This included adding a computer monitor and a printer to the order pickers. So the order pickers are like forklifts that is driving around and the

associates handle items from racks onto their order pickers.

So, again, we identified a way we can reduce touches downstream by applying a label to the item immediately upon it being picked. As we proceeded through the pilot and the mockup phase, we identified that the size of the printer and the computer screen and the power source potentially introduced safety hazards including visibility to the associate while they are driving to the order picker.

In this case, we worked with our partners to define what these additional safety requirements are that we were concerned about, and then we re-engineered the printer, the power source, and the monitor to meet those requirements.

Q Okay. And does that sometimes happen then on other occasions in your experience, in other words, you design a pilot that's supposed to reduce the risk but you find that when you pilot it, it's introducing some unforeseen safety risk?

A Yes.

Q Is that one of the reasons that you pilot these things out in the field?

A Yes.

Q In terms of these pilots that you and your team conduct,

is there a typical process for continuing a pilot, in other words, does it sort of go from stage one to stage two?

A Yes. We usually start off with a mockup or one or two stations to get initial feedback. That will then expand potentially to a full site at minimum, or multiple sites depending on the impact and the scope of the change. And then upon successful, usually, a six-week pilot, we would move to seeking approval for a network rollout.

Q And would that seeking-approval process, would that be similar to what you described earlier for a network rollout?

A Yes.

Q And in your experience, about how long does a pilot typically take, that is a pilot at Amazon?

A Sure. It could go anywhere from several months up to and over a year depending on the complexity and the scope of change.

Q And are you responsible for the sort of monitoring the cost of the pilots that your team runs?

A So our team is involved in monitoring all of the metrics and the impacts of the pilot.

Q And would that include at least having access to how much your pilots are costing?

A Yes.

Q And how much does the typical pilot cost in your experience?

A A typical workstation redesign project could cost anywhere from several hundred thousands to over a million.

Q And I think you have already said not all pilots are successful; is that correct?

A Yes.

Q Can you give us a ballpark of the pilots that you and your team have been involved in at Amazon roughly what percentage result in some success and what percentage is just a failure that doesn't work out?

A So the majority will eventually result in a success after, you know, re-engineering and redesign and taking in requirements and feedback from additional stakeholders. We usually find a way to get some type of risk reduction.

Q Have there been any examples where you have gone down the wrong road and decided, "Hey, is not going to work. Let's scrap this and try something else?"

A Not that I can think of really off the top of my head.

Q Okay. So it's more to the point where you have to sort of redesign and rethink things and redeploy?

A Yes, definitely involves iteration and rework.

MR. YOUMANS: Your Honor, we have been

going for about an hour. Could we take a 15-minute break at this point?

JUDGE PFEIFER: Yes, show us off the record.

(Off the record.)

JUDGE PFEIFER: Back on the record. Mr. Youmans?

MR. YOUMANS: Thank you, Your Honor.

Q BY MR. YOUMANS: Mr. Racco, I want to switch to talking about the various ergonomic assessment tools that you and your team use, and you talked about some of them already. What are the primary tools or some of the primary tools that you and your team use to assessment ergonomic risk at Amazon?

A For musculoskeletal risk at the low back, we primarily focus on peak low back compression and peak low back sheer, as well as cumulative low back compression and cumulative low back loads.

When we look at musculoskeletal risk at the shoulder, we focus on the moments of force that are acting above the shoulder, we additionally consider items like the other Ohio Bureau of Workers' Compensation Push/Pull Tables, the Liberty Mutual Tables when we are considering manual material handling that involves pushing, pulling, and carrying. And that's an initial

overview of at least some of tools the we use.

Q You mention, I think, a lot of sort of things or measurements you take when you are assessing low back risk starting with peak low back compression, I think you mentioned peak low back sheer, cumulative low back compression, and I think cumulative low back moment; is that correct?

A Yes.

Q So how are you measuring those things or what sort of tool or device do you use to capture that?

A So we quantify each of those metrics through the use of our diagonal human model.

Q Okay. So you are using diagonal human modeling typically to quantify those?

A Yes.

Q And what about for the shoulder? You mentioned looking at shoulder movement I think; is that correct?

A Yes.

Q And so how are you typically quantifying shoulder movement?

A That's also quantified and calculated through the use of our Digital Human Modeling.

Q I think you mentioned with respect to push/pull risk, you sometimes use the push/pull guideline from the Ohio Bureau of Workers' Compensation; is that correct?

A Yes.
Q And did I hear you that also use the push/pull guidelines from Liberty Mutual?
A Yes.
Q Any other tools that you might use to sort of quantify the push/pull risk for a particular process path?
A We might also use the digital human model and push/pull tasks to assess the amount of forces.
Q Okay. So the human Digital Human Modeling function that you use also has a function where you can look at push/pull?
A Yes.
Q Do you and your team ever look at metabolic energy expenditure?
A Yes, we do.
Q Just briefly what is that?
A Metabolic energy expenditure is the sum of the energy cost for each of the tasks in an overall process. There are equations that define each of, you know, specific set of movements or material handling tasks. Those can be summed up to give an overall expenditure of energy cost.
Q And so what are you using that measurement to assess? Is that a way of assessing low back risk, or upper extremity, or something completely different?
A Generally, metabolic energy expenditure is used to give

it a quantification of the whole body impact of a process or a task.

Q Okay. Would that be whole body fatigue?

A That's one way it's commonly describe, yes.

Q And does your team ever use heart rate monitoring to assess risk?

A Yes, we use heart rate monitoring in our pilots.

Q Okay. And so what would be -- strike that. How would you go about doing that in a pilot and what would be some reasons for wanting to do that in a pilot?

A So the way we would do it is to distribute heart rate monitoring to a group of associates, establish their baseline in the condition before the change, and then distribute heart rate monitors to the same associates in the condition after the change, and then compare the heart rates between the two condition.

Q Why are you comparing them?

A To understand the impact of a change on their heart rates.

Q And this would be a physiologically response basically to the change?

A Yes.

Q And so what are you looking for though? I mean, if a heart rate goes down, if it goes up, if it stays the same, what do you do with those scenarios?

A We are typically looking for the heart rate to stay the same or decrease, and that would be a positive outcome. If a heart rate went up, it would drive us to look at why that happened and re-evaluate the change.

Q And does that relate to becoming more fatigued basically as a result of the change?

A Potentially.

Q So you have already given us, I think, an overview or a broad definition of Digital Human Modeling. Is there a particular software program that you and your team use for that?

A Amazon uses the Siemens' suite of Digital Human Modeling software referred to as Process Simulate Human.

Q And did that particular program used to go by Siemens Jack?

A Yes.

Q And has that been the program or the versions of the program that you have used throughout your time at Amazon?

A Yes.

Q And if I am remembering, Siemens you actually worked there back in the early 2000s?

A Yes.

Q And you have already testified about all the different things you can measure using Siemens or Digital Human

Modeling in general. What are the benefits of using Digital Human Modeling in your opinion compared to other types of ergonomic assessment tools?

A The benefits are primarily the precision that the digital human model provides us, as well as the suite of analyses you can perform using the model. So it supports all of the metrics and the measurements that I referred to in our conversation today.

It also allows us to rapidly compare before and after, or different what-if scenarios that we like to evaluate, as well as getting a visual representation of what that change might look like to different stakeholders, or even associates, or leadership. So it's --

Q Go ahead.

A Primarily, it falls into those scenarios.

And then additional, it allows us to evaluate not only the different what-if scenarios, but different types and sizes and shapes of humans doing the task ultimately.

Q And so in terms of the modeling, you are modeling not only the virtual human but the actual workplace?

A Yes.

Q And are you able to use that software then to virtually model the current state of the workplace and then the workplace as a result of the change you are proposing?

A Yes.
Q And when you say you can model different types of humans or workers, what did you mean by that?
A So we have the ability to change the size and shape of the virtually humans. This allows us to scale the virtual humans based on their stature or height and their body weight.
Q Why is that significant or why is that helpful?
A That's important and helpful because it allows us to consider the full range of the population and establish different boundaries and take into account the impact of our changes on the entire range of humans everywhere from small females to our largest and heaviest males.
Q And to be more specific in terms of the comparison, does Digital Human Modeling in your opinion, have any advantages when you are assessing low back risk compared to the Revised NIOSH Lifting Equation?
A Yes, digital human model has advantages.
Q What would those advantages be?
A Specifically, it allows us to be very precise in the biomechanical outputs that we are looking at, and to evaluate the changes at a level that the Revised NIOSH Lifting Equation doesn't allow us to do.
Q And in terms of how you go about collecting the data that you use for the Digital Human Modeling, I think you have

already testified that one of the ways your team will do that is you go out in the field and you observe things and you sort of physically measure dimensions, correct?

A Yes.

Q Are there any other ways that you and your team go about collecting data for use in the Digital Human Modeling?

A Yes. So we have the physical measurement we are going out and taking. We also partnering with our various engineering groups and suppliers to receive 3D models of the equipment and, you know, carts, or tables, or workstations that we might be evaluating. So we actually have dimensionally representative, you know, models that we're evaluating and simulating the humans moving around. So that refers to how we set up the environment.

We have a couple of different ways of inputting the -- how the humans move or how they are postured, which might include the observations that we have already measured and then using a mouse button clicks to posture the humans, as well as different motion capture technology as an input into the digital human model.

Q Okay. That first option you mentioned, mouse button clicks, what did you mean by that?

A So in this case, this is where we would -- an ergonomic subject matter expert would be out in the field observing a range of humans and then physically manipulating the

virtual human model into the postures that they have observed.

Q And that's done right on the software?

A Yes, sir.

Q And I think you mentioned motion capture is another option?

A Yes.

Q And so what sorts of motion capture devices does your team use?

A So our team primarily uses Xsens inertia motion units and then accesses them to input the digital model into the calculations we perform.

Q That's another way of collecting the sort of associate movement inputs?

A Yes.

Q And what are the benefits, if any, of using Xsens motion capture devices?

A That allows us to more precisely, you know, measure the specific humans and movements that are being performed. It also allows us to potentially capture the kinetics and kinematics of the movement.

Q What about with respect to variability? Are there any advantages in your view in terms of Xsens?

A Yes. I think primarily being able to capture multiple cycles, you know, over a specific period of time, it

allows us to capture some of that variability.

Q And is that Xsens sometimes what is call a direct measurement tool?

A Yes, we refer to Xsens as a direct measurement tool.

Q What does that mean, that category broadly?

A As we use the term "direct measurement tool" at Amazon, it means we are physically instrumenting an individual to capture, to directly capture their movements, you know, as opposed to relying on observation and then recreating the movement using the software.

Q Okay. Let's get into a little bit more detail in terms of how you go about measuring or trying to quantify low back risk using your Digital Human Modeling. And you mentioned that in the number of different measures that you take, the first is peak low back compression; is that correct?

A Yes.

Q And can you give us just a brief working definition of what that is looking at?

A So peak low back compression looks at the compressive forces acting on the 4th and 5th lumbar vertebra.

Q Is that basically the lower part of your spine?

A The lower part of your back, yes.

Q Which way are those compressive forces acting when you are looking at the compression?

A So generally speaking, like up and down or along the axis of the spine.

Q Okay. So sort of two discs that are vertically aligned sort of how much they are compressing together?

A Yeah, how much they are getting squeezed together.

Q And I think the second thing you talked about measuring was peak low back shear; is that correct?

A Yes.

Q And is that s-h-e-a-r?

A Yes.

Q And what is peak low back shear?

A So peak low back shear is a measure of the vertebrae moving forward and aft on each other.

Q Okay. So it's basically capturing a different type of movement of the spine?

A Yes.

Q The third thing I think you mentioned was measuring cumulative low back compression; is that correct?

A Yes.

Q And what is that?

A So cumulative low back compression is a measure of the sum of the individual compressive forces that are acting over the course of a work shift.

Q Okay. And is it the same type of compression that you described earlier for peak low back compression, in other

words, a vertical compression of the L4 and L5?

A Yes.

Q And is the difference -- I am guessing but correct me if I am wrong, is the difference between the peak values and the cumulative values that you just described is that cumulative is actually measuring that compression over a period of time?

A Yes. So it measures the -- it adds up each of the compressive forces over the course of the day. It's a way to consider and to take into account exposure to repetition and duration.

Q And I think you mentioned one other related measurement. Was it cumulative low back moment?

A Yes.

Q And what is that?

A So moment is a measure of rotational force of the spine. And so the cumulative low back moment, similar to the cumulative low back compression, is the sum of those moments over the course of the day. And the primary advantage is to quantify the impact of repetition and duration.

Q Okay. But it's looking at the rotational force of the spine as opposed to just the vertical compression that you described earlier?

A Yes.

Q And so, Mr. Racco, when you and your team are doing an assessment where you're focused primarily on trying to quantify the risk to an associate's low back, are you going to measure all four of those things that you just described, or are you going to focus on, you know, one or two or three of them?

A So we typically, when evaluating the forces and the risk acting on the low back, we will typically go in considering all of them.

Q Okay.

A And at least start to calculate all of them. As the evaluation progresses or certain, you know, items get identified, we may focus on one over another. We start in by being open to all of them.

Q Okay. And so what would be a situation where you would focus on cumulative low back compression?

A A situation where we would focus on cumulative low back compression would be one where we are trying to understand the impact of repetition, or variable item weights, or different shelf heights, or inputs, right, that may happen over the course of the shift.

Q Okay. So if you are trying to focus on the impact of repetition, does cumulative low back compression, does that have any advantage in your mind with -- as opposed to measuring some peak values that you described?

A Yes.
Q And what is that, why is -- why is that an advantage of using cumulative?
A The advantage of looking at the cumulative low back compression is it gives us a history over the course of the entire shift which allows us to focus in on which of the risk factors we want -- which of the inputs we can potentially change.
Q Okay. So the peak is not necessarily telling you the impact over a period of a time over the course of the shift?
A That's right.
Q You mentioned variability. Does cumulative low back compression, does that have any advantages in your opinion when you are trying to take into account the variability of, I think you gave item weights as an example, as compared to some of these peak values you described?
A Yes.
Q What would be the advantage if you are trying to capture the impact of variability?
A So by capturing the peak of variability and especially using the cumulative low back compression tool, we can factor in the frequency with each item weight or each condition for example might happen. So this might give

us the opportunity to focus a specific intervention around a particular item that maybe had a big contribution to the cumulative load but only occurs a small percentage of time or a small frequency factor over the course of the day, or potentially something that happens repeatedly multiple times over the course of the day. So in summary, by looking at the cumulative metrics, we can identify which areas we want to focus our interventions around.

Q When you use these cumulative measurements, what duration or time period are you typically looking at?

A The course of the entire shift.

Q And focusing specifically on cumulative low back compression, which we have just been talking about, does that in your opinion have any advantages when it comes to assessing low back risk compared to the Revised NIOSH Lifting Equation?

A Yes.

Q What would those advantages be?

A Specifically, it allow us to be more precise with the areas where we would define or design our intervention.

Q How so? What sort of additional precision are you getting out of that?

A It allow us to specifically focus on the frequency and the duration of the items.

Q You mentioned that your team sometimes uses heart rate monitors; is that correct?
A Yes.
Q Okay. And so do you believe that's sometimes at least an appropriate tool for ergonomist to use?
A Yes.
Q And I think you have already described situations where you and your team use them. You're familiar with Amazon's expert outside experts in this case, Dennis Mitchell, correct?
A Yes.
Q And did your team assist Mr. Mitchell with collecting some heart rate data in this case?
A Yes.
Q And just broadly speaking, how you did your team assist Mr. -- strike that. How did your team assist Mr. Mitchell with collecting heart rate data?
A My team assisted Mr. Mitchell by executing the protocol that he designed in the BFI4 fulfillment center.
Q And that protocol, was that something that you participated in designing as well?
A We broadly agreed to the protocol.
Q "We" being you and Mr. Mitchell?
A Yes.
Q In terms of assisting him in sort of executing that

protocol, how specifically did you and your team do that?

A We had two team members that were on site at BFI4 and they distributed the heart rate monitors to the associates, answered any questions, collected them at the end of the day, made sure they were cleaned and sanitized between uses.

Q By "team members," are those ergonomist on your team?

A Yes.

Q Did they also perform similar function over at BIF3?

A Yes.

Q I think you testified that you weren't on site during the L&I inspection of BFI4 in Kent; is that correct?

A Yes, sir.

Q Do you recall being on a call with L&I though relating to that inspection in December of 2021?

A Yes.

Q Was anyone else from Amazon on that call with L&I?

A Yes.

Q Who was on that call?

A We had support from Amazon legal on that call.

Q So some Amazon lawyers?

A Yes.

Q And who was on that call for L&I?

A So I recall Mr. Goggins was on the call and there was also an L&I inspector whose name I don't recall.

Q You recall Rick Goggins being on the call?
A Yes, sir.
Q What was discussed during that call with L&I?
A The call was to discuss the use of heart rate monitors and wearable devices during the inspection at BFI4.
Q Okay. Did you -- during the course of that call, did you raise any questions or concerns with respect to the use of heart rate monitors?
A Yes.
Q What were those?
A So during the call, we were seeking to understand the methodology that was to be used during the data collection.
Q Okay. So were you asking L&I on the call what their methodology was going to be for using the heart rate monitors?
A Yes.
Q Any other questions or concerns that you raised during the call about the use of the heart rate monitors?
A The additional question and concern at the time specifically, since we were in kind of in the thick of the COVID pandemic, was to ensure that we understood how the heart rate monitors were going to be applied, you know, sanitized and cleaned, etc., between uses so we could communicate that to our associates and ensure they

had a positive experience and were -- didn't have any concerns during the pandemic.

Q And so these COVID-related questions or concerns, are those questions that you asked L&I during the call or were those raised by someone else?

A Those were raised by me.

Q Okay. In terms of the legal representatives who were on the call, do you recall whether they raised any questions or concerns specifically relating to the heart rate monitors?

A As I recall, there were questions around informed consent forms and the privacy of the data that was to be collected.

Q And those were questions or concerns that were raised by the lawyers?

A Yes, as I recall, yes.

Q Did you or anyone else from Amazon on that call refuse to let L&I use heart rate monitors during that inspection?

A No.

Q Or tell L&I that you thought heart rate monitors were irrelevant?

A No.

Q Did you or anyone from Amazon on that call suggest to L&I that heart rate monitors were not an appropriate tool for an ergonomists to use?

A No.
Q You mentioned earlier -- and we are back to tools now, you mentioned earlier that you and your team, I think, use a variety of tools when you're trying to assess push/pull risks; is that correct?
A Yes.
Q The three I have written down are Digital Human Modeling, Ohio Breau of Workers' Comp, and Liberty Mutual; is that correct?
A Yes.
Q And are there differences in your mind between those tools?
A Yes.
Q And just broadly speaking, how would you differentiate them?
A So broadly speaking, the Liberty Mutual Field Model and the Liberty Mutual tools take into account both the initial force and the sustained force of material handling push and pull tasks. So this includes the ability to factor in the distance that's being traveled during the push or pull task, as well as the frequency of the task.
Q Okay. So then sticking with Liberty Mutual, let's compare to the Ohio Bureau of Workers' Comp. Does the Ohio tool take into account both the initial force and

the sustained force?

A The Ohio State tool is only looking at one force. It doesn't consider -- it doesn't break it down into initial and sustained.

Q Okay. So you have to essentially choose one then, you either want to measure the impact of the initial force or the sustained?

A Yes.

Q What about distance? That is, I understand from you, a variable that Liberty Mutual takes into account?

A Yes.

Q Is that the distance say the pallet jack is actually being pulled by worker?

A Yes, whatever the height is that's being pushed or pull.

Q Does the Ohio tool take distance into account?

A To the best of my knowledge, no.

Q And I think the last thing you mentioned about Liberty Mutual was the frequency of the pull. I assume that's just how many pulls over some set period of time?

A Yes.

Q Is that a variable that the Ohio tool takes into account?

A To the best of my knowledge, no.

Q But I think you testified that your team has used all three of those tools at least on some occasions; is that correct?

A Yes.
Q Can you give us a broad idea of why you might choose Digital Human Modeling in one case, or the Ohio tool in another case, or the Liberty Mutual in another case?
A Yeah. So the Digital Human Modeling tool allows us to take into account a greater degree of flexibility of different postures that the associates might be engaged in when they're performing the push or pull tasks. So that might be an advantage under certain circumstances.

The Ohio State tool is primarily based on biomechanical data specifically at the low back. So if the specific area of concern is focused around biomechanics of the low back, we might choose to use the Ohio State tool, whereas the Liberty Mutual tables are primarily focused on psychophysics and, again, takes into account the distancing frequency traveled. So if that is potentially a concern, we might choose to use our judgment to leverage the Liberty Mutual table versus the other two.

Q I think you said the Liberty Mutual table is primarily based on psychophysics; is that correct?
A Yes.
Q And is that in distinction to biomechanical?
A Yes.
Q Just briefly, what is psychophysics as opposed to a

biomechanical basis for that tool?

A Yes. So broadly speaking, the Liberty Mutual tool was developed using psychophysical data, which means that the way the data was collected focused on like associate feedback and their perception of the forces that they were exerting. And broadly speaking, the Ohio Bureau of Workers' Comp tool was based on direct measurement in a lab setting of the biomechanics of the spine.

Q And just focusing on the Ohio tool from the Bureau of Workers' Compensation, if you know, what are the variables that you can input into that, what variables is it considering when it does its assessment?

A So the variables include height of the handle that the associate is interfacing with, whether the task is a push or a pull, and whether the task is one-handed or two-handed and, additionally, whether the task is a straight line or if the force is being exerted as a turn.

Q Okay. And would the last variable you input, I assume, but whatever force you measured for the pull or the push?

A Yes.

Q So when you are using the Ohio Bureau of Workers' Comp guidelines and you are looking at this one-handed versus two-handed, is that essentially just an option you can click when you are using the tool?

A Yes.

Q Okay. Have you, Mr. Racco, ever observed Water Spiders pulling loaded pallet jacks at Amazon fulfillment centers?

A Yes.

Q About how many times have you observed that?

A Many, many times.

Q Dozens or --

A Yes.

Q And have you ever observed Water Spiders pulling loaded pallet jacks at BFI4?

A Yes.

Q And would that have been during the visits you described when you actually have been onsite at BFI4?

A Yes.

Q About how many times have you observed Water Spiders pulling loaded pallet jacks at BFI4?

A Many times. So I mean, in the same order of magnitude, dozens.

Q So based on your observations, do associates typically use one or two hands when they are pulling a loaded pallet jack?

A So it depends on the point in the pull. Typically and generally speaking, what you will observe in the field is an associate initially having two hands on the pallet jack and starting the pallet jack moving by pulling with

two hands. And then once the inertia of the load is overcome and the pallet jack is in motion, they might continue to pull it with two hands or transition to only have one hand on the pallet jack to continue the movement.

Q Okay. So if you were evaluating the initial pull for the Water Spiders using the Ohio tool, would you check the two-handed or the one-handed?

A Based on observations, I would you initially start by checking the two-handed.

Q And then what about if you are trying to assess the pull forces after they get the pallet jack moving, would that be a two-handed or a one-handed if you were using the tool?

A I would switch to one-handed.

Q And when you are using the Ohio Bureau of Workers' Comp. Push/Pull Guidelines, what difference does it make, if any, whether you treat it as a one-handed or two-handed pull?

A So the differences is in the force that acts on the spine. So you always -- when using tools like this, we always try to or should strive to be representative of the tasks that are being performed to be able to have the closest output to what the associate is actually doing.

Q My understanding, and correct me if I am wrong, but when

you use the Ohio Bureau Workers' Comp, it's essentially calculating a maximum safe weight limit or force limit; is that correct?

A It's comparing the force that you input to a population capability.

Q Okay. And I guess what I am getting at, if you know, you know, are you going to have a higher permissible limit if you select two-handed pull than you would if you selected one-handed pull?

A I would expect that you would have a higher population capability if you selected a two-handed pull.

Q I want to talk about some other tools that have come up in this case that we haven't discussed with you at least in any detail yet. Has your team ever used the Revised NIOSH Lifting Equation?

A My team has occasionally used the Revised NIOSH Lifting Equation, yes.

Q How often has your team used that particular tool?

A We use that tool infrequently.

Q And what types of situations have you used the lifting equation for?

A My team may use the lifting equation if we need to perform a quick or a rapid initial analysis on symmetric two-handed lifting.

Q And you mentioned two-handed lifting. Why is that

significant in terms of whether you would deploy that particular tool?

A Two-handed lifting is one of the requirements for the use of the tool.

Q Is that a requirement that's in the NIOSH Lifting Equation Manual?

A I believe so, yes.

Q When you and your team has used the Revised NIOSH Lifting Equation, have you followed the Application Manual?

A Yes.

Q Does the Revised NIOSH Lifting Equation have any limitations in your opinion?

A Yes.

Q What would those be?

A So specifically as it relates to the highly variable nature of the work that we do at Amazon, the primary limitations are around the inclusion of the one-handed versus two-handed lifting. So because the tool focuses on two-handed lifts, it's generally not applicable to many of the tasks that we evaluated at Amazon.

Q And based on your experience and the observations you have had, you know, at a variety of sites since you have been at Amazon, do some of the process paths in the fulfillment center involve a significant amount of one-handed lifting?

A Yes, one-handed lifts is a part of many tasks.
Q Do many of the process paths involve that?
A Yes.
Q I think you also mentioned something about the symmetrical nature of the lifts, was that a phrase that you used?
A Yes.
Q What did you mean by that with respect to when you would use this particular tool?
A So the lift has to meet a certain set of criteria to be evaluated by the NIOSH Lifting Equation, which is, you know, which drives whether or not an SM will choose to use it following the Applications Manual.
Q Okay. Was there a specific requirement with respect to symmetry though? I was just trying to follow that.
A Yeah, so when I was referencing symmetry, I was meaning the two-handed nature of the lift versus a one-handed lift.
Q Okay. Have you or your team ever recommended that Amazon implement some new control or some new piece of equipment based on an assessment that you or your team did using the Revised NIOSH Lifting Equation?
A Not that I recall, no.
Q Why not?
A Generally because we would use the more precise outputs

of one of our assessments using Digital Human Modeling.

Q Okay. Would that be when you see some potential risk under the lifting equation, would do some sort of deeper dive with other tools?

A Yes.

Q L&I in this case also used the ACGIH Hand Activity TLV and the Upper Limb Localized Fatigue TLV for some of the assessments it did in this case. Are you familiar with those tools?

A Yes.

Q Do those tools have any limitations in your opinion?

A Yes.

Q What are they?

A So in the case of the lifting TLV, it's primarily application is monotask jobs, so jobs with low variability that are repeatedly performed. So given the variability of the nature of our lifting tasks at Amazon, it isn't general a good fit for the type of assessments we would perform.

Q Has your team ever used either of those ACGIH tools?

A Not frequently, no.

Q Can you recall any specific times that you or your team used them at Amazon?

A We may have occasionally used the lifting TLV as, again, a rapid screening tool or quick check if we had a

monotask job.

Q I am sorry, that was my fault. I was talking specifically about the upper extremity tools for ACGIH, so the hand activity TLV and the ULLF. Is there also some other tools that ACGIH puts out relating to lifting specifically?

A Yes.

Q Okay. Just so the record is clear, have you or your team to the best of your recollection, ever used the hand activity TLV or the ULLF?

A No, we have not.

Q You mentioned, I think, earlier some methods that your team uses to evaluate shoulder risk, correct?

A Yes.

Q And I think you mentioned that primarily you use Human Digital Monitoring; is that right?

A Yes.

Q Would that be the Siemens software that you already discussed?

A Yes.

Q How does Siemens go about helping you assess shoulder risk?

A So what -- the method that we use is to model the posture that the associate is in, and then calculate the moments of force that are acting about the shoulder, and then, as

we previously discussed, compare and contrast the current state to the intervention that we are proposing with the intention of minimizing the forces that are acting on the shoulder.

Q So the Siemens software allows you to calculate what you call the moments of force on the shoulder; is that correct?

A Yes.

Q And can you just give us a work definition, what does the moment of force mean?

A A moment is an analogous to a torque. So it's the tendency for a body, right, to rotate around a fixed point.

Q Okay. And why are you looking at the moments of force when you are trying to assess an ergonomic risk to the shoulder?

A So it's a biomechanical indicator and it's related to the strength of that joint. So the amount of force that can be exerted by the joint.

Q There's also been some testimony about how at least in part of this case, L&I used a shoulder tool that was offered by Boni Hani, B-o-n-i, H-a-n-i. Are you familiar with the shoulder tool?

A Yes.

Q Have you or your team members ever used that as an

assessment tool or some version of that tool?

A We have occasionally.

Q And when has your team used that?

A We used it in the 2021 time frame as a screening tool to evaluate some changes, some proposed changes that were being made.

Q So in 2021?

A Yes.

Q Was that on one occasion or more than one occasion that you used the tool?

A I can think of potentially two occasions where we used the tool.

Q And would those have been both in 2021?

A Yes.

Q You mentioned using it as a screening tool. What did you mean by that?

A So we were evaluating the use of the tool to understand if it had a broader application that could be used in Amazon. So the specific case that we were looking at was a design change that was potentially being made to the bandon around our pods in our AR sortable sites. So we took that opportunity to use the tool to identify if the change would have a negative impact on ergonomics.

Q Okay. So sort of before and after assessment?

A Yes.

Q And have you used the tool to calculate sort of the absolute ergonomic risk to a shoulder?

A We have not since then, no.

Q You say "since then," did you use that to calculate the absolute risk -- strike that. So it seems to me you can sometimes use these tools to try to figure out is this associate, for example, exceeding the tool's TLV; is that correct?

A Yes.

Q But there's other occasions where you can use it more as a comparison where you are not really focused on the TLV but you are evaluating the current state, a proposed state, or before and after; is that correct?

A Yes.

MR. FURST: Objection; leading.

JUDGE PFEIFER: Yeah, sustained. Can you re-ask, please?

MR. YOUMANS: Sure.

Q BY MR. YOUMANS: What would be -- strike that. You mentioned, I think, that you used the Boni Hani tool on these occasions that you recall for some sort of comparative analysis; is that correct?

A Yes.

Q And what was that comparative analysis that you used it for?

A We used it to compare the current state versus the proposed change that was being made.

Q And have you ever used that tool for anything other than that sort of comparative analysis?

A No.

Q And have you ever recommended that Amazon implement some new control or new piece of equipment based on your use of that particular shoulder tool?

A No.

Q Why not?

A So we found that the tool was rather limited in its application. The number of inputs that can be used to calculate the output of the tool is limited to ten inputs, which doesn't accurately capture the variability of the tasks in our fulfillment centers. The method within the documentation of the tool describes a binning method, which for all intense and purposes is an oversimplification of the variability. We found that the limitation of the tool didn't translate into metrics that we could use to drive decisions.

Q Have you used that tool at all since 2021?

A No, sir.

Q And why not?

A For the reasons that I mentioned above.

MR. YOUMANS: Can we take a look at

Exhibit 706, please? This would be a confidential trade secret. It's fine to display in the room certainly, but not shared outside.

JUDGE PFEIFER: Exhibit 706 will not be shared on the webinar.

Q BY MR. YOUMANS: Mr. Racco, I want to turn now to talk to you about some specific ergonomic controls and improvements that you and your team have been involved in during your time at Amazon. We're looking at Exhibit 706. And the top right of it says, "December 2020" and then just below that it says, "Project Shot Rock sortable pack singles workstation design;" do you see that?

A Yes, sir.

Q Do you know what this document is?

A Yes, sir.

Q Did you write this document?

A My direct report wrote this document.

Q Did you view and revise it to any degree after your direct report drafted it?

A Yes. I was responsible for reviewing and providing feedback on this document.

Q And just broadly speaking, what was project Shot Rock?

A So project Shot Rock is a redesign of the pack singles workstations in our sortable building types. This

includes Amazon robotic sortables and traditional sortable soft lines.

Q So that would include AR sortables such as BFI4?

A Yes.

Q And what specifically were you looking at in terms of redesigning the workstation for Pack Singles?

A In resigning the workstations for Pack Singles, we sought to reduce the musculoskeletal risk factors of the low back and the shoulder.

Q And did this project involve your team doing some sort of ergonomic risk assessment?

A Yes.

Q And what tool or tools did you use to evaluate the risk?

A We primarily used peak low back forces, so the compression and shear that we have been discussing, as well as the shoulder moments.

Q And did you calculate those using the Digital Human Modeling software or in some other way?

A Yes, using the Digital Human Modeling software.

Q Based on that assessment, did you and your team propose pioloting any sort of changes?

A Yes.

Q And what sort of changes or modifications did you propose for the pack single workstation?

A The changes that we proposed included converting the

fixed height table to an adjustable height table. We proposed lowering the elevation of the tote infeed conveyor, modifying the tote ramp, as well as providing a take-away slide for the completed packages once the items are packed.

Q And were all of those basically proposals that you believed would reduce the low back risk?

A Yes.

Q We heard testimony about the adjustable height table but how is that, in your opinion, going to reduce the low back risk for associates?

A By introducing adjustability, it allows the associate to customize the height of the table to their specific anthropometric characteristic traits, so to their body sizes. So this might allow a taller associate to elevate the table to a higher working height so they don't have to bend over quite as much, and it might allow a shorter associate to lower the elevation of the table so that they are not reaching or assuming awkward shoulder postures while they are interacting with the workstation or packing the boxes.

Q You mentioned lowering the elevation of the tote infeed conveyor; is that correct?

A Yes.

Q What does that mean? What is the point of doing that

from an ergonomic's perspective?

A Sure. So items to be packed arrive at the workstation on a conveyor in what we refer to as a tote. It's the yellow plastic container that has the items that will be packed and go off to the customers' homes. The elevation of the conveyor was such that associates -- some associates had to perform over-the-shoulder reaches to access the tote and put in a position where they could then receive the items to be packed.

Our intervention was to lower the elevation of that conveyor to reduce and prevent over-the-shoulder reaches.

Q And in terms of the time frame for this project, so this document is dated December 2020, when did you and your team first become involved in the particular project?

A My team initiated this project in approximately Q3 2020.

Q And why was it that you and your team initiated this project?

A The project was initiated because we identified Pack Singles for a priority based on our lagging indicators, our incident reporting, as well as the outputs of the risk assessments in the Digital Human Modeling that we completed.

Q And then this document is coming out in December of 2020. Where were you at in the overall process, I guess, of this project in December of 2020? Was this pre-pilot,

post-pilot, or some other point?

A When this document was completed, we had already performed our site visits and our baseline risk assessments in Digital Human Modeling, and we were in the process of seeking approval to proceed to a pilot.

Q And I think you mentioned that you used the Digital Human Modeling to measure low back compression, low back shear, and the shoulder moment; is that correct?

A Yes, we calculated those items in the Digital Human Modeling.

Q Okay. Why not cumulative low back compression?

A As we proceeded through the assessment, we realized that the biggest impact we would have would be on the shear forces, excuse me, on the peak compression and shear forces. And that by making these changes, the cumulative forces would follow. So we didn't necessarily index on including those metrics in this report.

Q Okay.

MR. YOUMANS: Can we turn to page 9 of the report, please? This is going to be the next page, Judge. I thought this started as page zero for some reason.

Q BY MR. YOUMANS: So this is the page that is numbered page 9 on the bottom right-hand corner. It says, "Appendix B" at the top "Baseline ergonomic evaluations";

do you see that Mr. Racco?

A Yes, sir.

Q And in terms of the pictures that are shown here, what are those?

A So these are stream captures from our Digital Human Model.

MR. YOUMANS: Could we scroll down a little bit? A little bit more to capture that table. Thank you.

Q BY MR. YOUMANS: So we are looking at now a table that's just below those screen captures. It says, "Integrated shoulder moment;" do you see that?

A Yes, sir.

Q And then it looks like there's an "F05-05" and some of other sort of similar notations in the left-hand column; do you see that?

A Yes.

Q What does that indicate?

A So those -- the rows indicate the specific human models that were considered in this evaluation. So the naming convention is F05-05 is a female that's 5th percentile by stature and 5th percentile by weight. And then the next line is F50-50, so this is a female that's 50th percentile by stature, 50th percentile by weight. In the then it proceeds on from there.

Q Okay. So we look at the 95th percentile female after that?

A Yes.

Q And then the same basically for the male I assume, that's what M is?

A Yes.

Q And so are these basically showing which models you chose to use for purposes of assessing this risk?

A Yes.

Q And why -- why would you choose that range? In other words, the 5th percentile, the 95th percentile, and then it looks like the 50th percentile right in the middle?

A So we chose to consider all of the mannequins that are presented in this paper, in this analysis, to ensure that we had comprehensive understanding of how each of the proposals would impact the entire population.

And this is important given that since we are recommending adjustability and lowering, you know, heights of the conveyor, which means the interaction and the way the associate is working, it's important that we consider the entire range of populations so that we are not creating any inadvertent risk, or the decisions we are making cover the entire, you know, range of the size of the associates in our fulfillment centers.

Q So we've heard a lot of testimony about reducing risk to

protect the 25th percentile female. So, for example, it's my understanding that the Revised NIOSH Lifting Equation was designed with the intent of at least protecting the 25th percentile; is that your understanding?

A Yes.

Q And is that the population that you and your team at Amazon are seeking to protect when you are performing your risk assessments?

A So our view is that that paradigm is somewhat one dimensional and limited as we are considering these improvement efforts. What I mean by that is we are seeking to design interventions and reduce risk as much as possible across our population base, which means not just considering like a strength metrics or one specific type of like anthropometric model, but making sure we understand the changes across the entire ranges of the associates that we are covering, and then making sure that those changes are beneficial to the population.

Q So the 25th percentile female that the Revised NIOSH Lifting Equation used, is that the 25th percentile in height, or weight, or what is that?

A So generally speaking, it's seeking to protect the 25th percentile strength.

Q And so is that metric that the Revised NIOSH Lifting

Equation uses, does that take into account differences in height and weight?

A Not as applied in the lifting equation.

Q And so that's something then, I assume based on your discussions, you are trying to take into account in your analysis?

A Yes.

Q And why is it important than your opinion to take height and weight into account when you are trying to figure out which population we are protecting?

A Sure. So our associate population comes in all different shapes and sizes. And the way the associates interact with the workstation and their movement patterns are impacted by their anthropometry. And so because of that, we model each of the different anthropometrics to ensure that our changes are representatives and having a positive impact on the entire population.

Q So but, I mean, if something is safe for a 25th percentile female, doesn't that necessarily mean that it's safe for the 95th percentile female or a 9th percentile male?

A It may not, it may not.

Q Okay. Can you give us a situation where it wouldn't be?

A Sure. So some specific examples might include the postures, right? If you do not consider the entire

breadth of height and weight of the associates, the shorter female might be in a different posture than the taller male when using the same conveyor elevation or shelf height for example. By ensuring that we consider each of those postures and each of those body shapes and sizes, we are ensures that we are overall protecting the population.

Q Okay. And let me ask you this in terms of when you're calculating peak compression, for example, or cumulative compression, does the associate's weight have any impact on those measures?

A Yes, the size and shape of the associate. So their stature and weight would have an impact.

Q And how does that relationship work?

A So the way that Digital Human Model calculates these outputs is a function of both the load, like the external load that they are lifting, so the weight of the item or the force that's being exerted and their body weight; therefore, the model takes all of that into account. So the heavier person, again, depending on the posture that they are in, may have a higher peak low back compression or a back low back shear than say a smaller person that's performing the same task.

Q And so, Mr. Racco, if I asked you broadly, what associate population are you and your team seeking to protect if

it's not just this 25th percentile female strength threshold, what would you say?

A So we continue to seek to protect 90 percent of the overall population.

Q That's the goal in terms of the specific human models you chose for this assessment?

A Yes.

Q And in your opinion, are the inventions that you are recognizing in this particular project, that is project Shot Rock, do they succeed in protecting at least 90 percent of the Amazon population?

A Yes, I believe they do.

MR. YOUMANS: Let's take a look at page 2 of the exhibit. This would actually be the third page of the PDF. It's the page that says page 2 in the bottom right-hand corner. If we could look towards the top of that page, please?

Q BY MR. YOUMANS: I want to ask you a couple of specific questions about this particular assessment that you did. So looking at that first top paragraph, it's discussing there in the last sentence, "When the weight of the item in the tote is greater than 30 pounds, the moment at the shoulder exceeds the capabilities of the female population leaving a residual risk for the totes picked that have 30 pounds of items." Can you interpret that

for us?

A Yes. So the intention of this sentence was to provide an upper boundary the moments acting at the shoulder. So what we are trying to say or what the author is trying to say is that if for some reason, even with the change, the weight of the tote exceeded 30 pounds, there would be part of the female population that exceeds the strength capabilities.

Q Okay. And did that conclusion that you just interpreted for us, did that in your mind indicate that we were still leaving an unacceptable or unsafe risk everything?

A It does not in this case. The reason for that is our totes have a weight limit that does not allow them to exceed 30 pounds in this case.

Q Okay. So was that statement then more hypothetical?

A Yes.

Q And just another statement there that I wanted to ask you about. And so now we are looking at the first full paragraph.

MR. YOUMANS: And that's fine right there.

Q BY MR. YOUMANS: And the heading on line 95 is "Select an item from tote;" do you see that?

A Yes.

Q And the last sentence of that paragraph says, "When the

weight of an item is 3 pounds, shoulder moments are not limiting for the population. When the weight of an item is greater than 14 pounds, then the moment at the shoulder exceeds the capabilities of the female population leaving a residual risk of -- for the 0.2 percent of items picked that are over 14 pounds;" do you see that?

A Yes.

Q And actually that's two sentences. Can you interpret those sentences for us and what your team is concluding there?

A Yes. So what this is trying to say is, again, to establish some upper bounds for the situation we are in, which is trying to say that for items that are greater than 3 pounds that shoulder moments -- excuse me, yeah. For items that up to 3 pounds or shoulder moments are not limiting in any -- for any strength capabilities.

Q Does that mean that all of the populations you tested could safely to do that?

A Yes.

Q Okay. And then next sentence that talks about the residual risk, what is that discussing?

A Yeah, so what this is trying to say is that for items that are greater than 14 pounds, that the strength capability is exceeded. And then the second part of that

sentence goes on to quantify that it is only .2 percent of the items that are being handled that are over 14 pounds.

Q Okay. So would that residual risk that's described there, would that in your opinion be an unacceptable risk or an unsafe risk for associates?

A What this is trying to say is that the -- that the improvements -- that we still have opportunities for improvements for that .2 percent; however, we made a huge improvement for the rest of the task. So that we are continuing to push forward with the change knowing that we have this small percentage that we still have to continue to work on.

Q Okay. And this, again, is a document that you and your team drafted in December of 2020. So were these changes that you've described or these proposed changes, were they actually piloted?

A Yes.

Q About when did the pilot occur?

A So the pilot continues through 2021.

Q Okay. And was the pilot in your view successful?

A Yes.

Q And so did your team at that point make some sort of recommendation based on the pilot?

A Yes. Based on the feedback from the pilot, we proceeded

to seek approval for a network rollout of these changes.

Q Was that approval granted?

A Yes.

Q And about when was the approval for the network rollout granted?

A The approval for the network rollout was granted towards the end of 2021 as I recall.

Q And then -- strike that. Have these changes that you recommended in this project, have they actually been implemented at the Amazon fulfillment centers?

A Yes.

Q And are you aware of any hitches or problems or issues that came up during the implementation phase?

A During the -- during the network implementation phase?

Q Strike that. I think I meant to go earlier. During this full process that you're describing, from the pilot, to the approval, to the actual implementation, are you aware of any sort of hitches or issues or problems that came up?

A Yes. So we did have -- this pilot was running during the peak of the COVID pandemic. So as we were completing the installations during the pilot phase, we had to make some accommodations and some change to the design to accommodate different barriers and social distancing requirements in our centers. So that introduced some

changes along the way. Additionally, we had some supply chain challenges and limitations throughout the pandemic, which elongated the delivery time.

Q Okay. And were you able to work through these issues you mentioned relating to social distancing and how you were going to design these interventions?

A Yes.

Q And if you know -- I mean, can you give us sort of a ballpark, how much time does it typically take from finalizing a proposed design and actually getting the prototype that you can test?

A It can take different amounts of time based on the complexity of the prototype. During this projection, it was around 10 to 16 weeks.

Q Okay. And how did that compare with the same time period pre- and post-COVID?

A So it was elongated. Prior to COVID, we were typically having prototypes and pilot designs delivered in the 8 to 10 weeks.

Q And once it was approved, I think you said in 2021, so about how many facilities did this impact? How many facilities ended up having these changes made to their pack single stations?

A Between our Amazon robotics sortable facilities and traditional sortable soft lines, this impacts

approximately 100 fulfillment centers.

Q So about how many pick stations are we talking about that were modified?

A This would impact approximately 10,000 pack stations.

Q I am sorry, pack stations. And can you give us a ballpark of what the pilot you conducted cost?

A The pilot all-in was approximately $2 million.

Q And how about the total cost of this project in terms of implementation across the network as you described?

A This would be approximately $40 million project.

Q Any idea of what portion of that would have an attributable to modifying the pack single stations at BFI4 in Kent?

A That would be in the ballpark of $400,000.

MR. YOUMANS: Can we turn to page 5 of Exhibit 706? So this would be the sixth page of the PDF but it says page 5 the bottom right-hand corner. If we could look at the bottom half of that page, please? Thank you.

Q BY MR. YOUMANS: So, Mr. Racco, we are looking at basically a table on page 5 of this assessment that you and your team wrote. It says, "Individual Brownfield Risk Reduction" at the top; do you see that?

A Yes.

Q What is this table summarizing?

A So this table is attempting to summarize the change in the musculoskeletal risk. So in this case, the forces acting on the low back and the shoulder between the baseline risk assessment and the intervention.

Q Okay. And so this is the percentage change that your team came up with for each of these interventions based on the assessment and the Digital Human Modeling that you described?

A Yes.

Q And so it looks like they there are four or five different changes that are mentioned here. So were all of these implemented?

A So the lower height conveyor was implemented, the height-adjustable table was implemented, the modified tote slide was not implemented. And the reason for that was because it cascaded causing some other types of jam-ups and some safety issues with jams with totes getting jammed up on the conveyor.

Q Is that something that you found out during the pilot phase?

A Yes.

Q Okay. What about the lower tote slide?

A So the modified tote slide and the lowered slide are continent upon each other. Because we couldn't implement the model type on one, we couldn't implement the lower

change.

Q What about the take-away slide?

A The take-away slide is able to be implemented on a portion of the pack singles tables based on the size of the items that are being packed. When the box sizes increased, it caused some conveyor jam-ups on the take away, which leads to other safety issues with breaking the jams or freeing the jams. We only implemented the take-away slide on a portion.

Q The portion where it worked?

A Where it worked, yes.

Q And was that also something that you found out about during the course of the pilot?

A Yes.

MR. YOUMANS: Your Honor, we move to admit Exhibit 706.

MR. FURST: No objection.

JUDGE PFEIFER: Exhibit 706 is admitted. It's also designated as implicating a confidential trade secret based on my review of it.

(Exhibit No. 706 Marked & Admitted.)

MR. YOUMANS: Your Honor, this would be a natural time to stop. It's a little early for lunch. I don't know if you want us to take 15 and come back or what would work best for everyone.

JUDGE PFEIFER: Let's discuss that off the record. Show us off the record.

(Off the record)

JUDGE PFEIFER: Back on the record. Mr. Youmans, you may continue.

MR. YOUMANS: Thank you. Let's take a look at Exhibit 707, please.

JUDGE PFEIFER: 707 has been designated as implicating a confidential trade secret; therefore, we are not going to display it on the webinar.

Q BY MR. YOUMANS: Mr. Racco, we are looking at Exhibit 707. At the top it says, "Robotic storage pack form universal station ladder rail position," correct?

A Yes, sir.

Q And then it has your name and it's dated October 16th of 2019, correct?

A Yes, sir.

Q Can you tell us what this document is?

A This document is a write-up document of an independent analysis that was completed to support moving the ladder rail position at our universal stations.

Q And who wrote this document if you know?

A I wrote this document.

Q And at high level, what is this project about? What is the assessment that you and your team performed and what

recommendation did you end up with?

A So the project was surrounding improvements that could be made at our universal stow stations. The universal station has a rail that a ladder can move and the ladder slides across the station to allow the associates to step up and to reach the upper parts of the pod. During our review of the station design as part Kaizen improvement event, we identified that by moving the ladder rail closer to the pod face, we could reduce horizontal reaches.

Q Okay. This particular project, if I understand you, applies to stow stations?

A Yes.

Q And what type or types of facilities were you looking at?

A This is specific to ARS, Amazon robotics stations.

Q You mentioned a Kaizen. About when did that occur?

A The Kaizen occurred in September of 2019.

Q And what was that something you attended?

A Yes.

Q And who else attended or what other teams if you can remember?

A The Kaizen included representation from engineering operations, workplace health and safety, and our ACEs continuous improvement team.

Q Was that an in-person meeting?

A Yes.
Q There's a reference in that first paragraph to FAT-1, F-A-T-1. What is that?
A FAT-1 is an ARS fulfillment center in Fresno, California.
Q And the purpose of that Kaizen, was it specific to stow or was it broader?
A Yes, the Kaizen event was seeking to improve the MSD conditions at the stow workstations.
Q And just briefly, what do you recall happening and being discussed at that Kaizen that you attended?
A So the Kaizen was a -- you know, generally speaking, a typical continuous improvement event where the cross-functional team learned about the continuous improvement for methodologies, identify the Gemba, or the workstation, the place of work that we would be seeking to improve, identify the value stream map for the process happening at the workstation, and then proceeded to go out to the work floor, make observations, and brainstorm potential solution.
Q When you said Gemba, is that G-e-m-b-a?
A Yes, sir, G-e-m-b-a.
Q Did you then go there to the actual stow station at that facility?
A Yes.
Q What did you do when you were out on the floor?

A So our -- well, when we were out on the floor, we sought to brainstorm and discuss different improvement opportunities. This led to a discussion of moving the ladder rail, which eventually led to us mocking up and physically changing around one of the workstations at the site to physically move the ladder.

Q When did that mockup happen?

A During the event in September of 2019.

Q And so the outcome of all of this was, what, the particular solution that's being proposed in this exhibit?

A Yes, so based on the Kaizen and the results of that initial meeting and the deep dive, we proceeded to complete the ergonomics analysis that's presented in this case.

Q And there's a reference -- we don't have to turn to the page -- but on page 2 of this exhibit it talks about the ARF, A-R-F. Can you explain what that is talking about?

A Yes, so the ARF is also called the amnesty reduction future. So this was -- I guess, it could commonly be described as a brush or bristles that extended out of the ladder roll closer to our pod. And the purpose of this feature was if for some reason an item fell out of the pod, the idea was that it was supposed to catch the item before it fell on the robotics floor.

Q And so how, if at all, did the brushes that you just described play into this particular project?

A So the brush took up the space that we wanted to move the ladder rail into. We had to remove the brush in order to move the ladder rail.

Q That was the proposed change?

A Yes.

Q And I think you said the idea was to reduce the horizontal reach; is that right?

A Yes.

Q And what would be the benefit, if any, from an ergonomic perspective from doing that?

A By moving the ladder rail, we allowed the associate to position their feet closer to the pod, which reduced the horizontal scaffold reach. Reducing the horizontal reach reduced the distance between the associate's body and the work that they were doing, which is the first principal of ergonomics is to try to minimize horizontal reaches. This leads to reduced forces acting on the body, specifically the low back and the shoulder.

Q And looking at page 1 --

MR. YOUMANS: Actually, if we could go back to page 1, please, of the exhibit?

Q BY MR. YOUMANS: The fifth paragraph down there's a reference there to BFI4; do you see that?

A Yes.
Q What was BFI4's involvement in this project, if any?
A So upon testing the solution in the one station at FAT-1 and then completing this analysis, we proceeded to use BFI4 as one of our pilot sites for the broader evaluation of the change.
Q Okay. And you mentioned, I think, that the purpose of this paper we are looking at was to get approval for the pilot; is that correct?
A Yes. To communicate and seek approval for the broader pilot.
Q Okay. So was BFI4 was that part of the broader pilot or was that the initial?
A That was the initial.
Q Got it. Was the approval given for a broader pilot of this particular change?
A Yes.
Q What with was the outcome of the pilot?
A The pilot was successful.
Q In what way?
A That our observations of the associate's foot placement led them to being closer to the pod, which reduced those musculoskeletal risk factors that we were discussing earlier, so the forces acting on the back and the shoulder.

Q And after the broader pilot was deemed successful by you, what happened next?

A Upon the pilot proving to be successful, we submitted and received approval for the change to go network wide.

Q And would that be for all the AR sortables?

A Yes.

Q And do you remember about when it was approved to go network wide?

A It was approved to go network wide either late 2019 or early 2020.

Q And do you remember when this was actually implemented throughout the AR sortable network?

A Yes, it was implemented throughout 2020.

Q Throughout?

A 2020.

Q And if you know, what was the approximate cost of that project in terms of implementing this change throughout the AR sortable?

A If I recall, this was in the order of between $4 and $5 million.

Q Okay. I want to talk a little bit about the assessment you did supporting this particular change. What tool or tools did you use to assess, I guess, the ergonomic risk, pre-change and post-change in this particular case?

A In this particular case, we focused on peak low back

metrics, specifically peak low back compression, and peak low back shear supported using our Digital Human Modeling.

Q Why did you focus in this case on the peak low back compression and peak low back shear?

A We focused on these because we could do simple discrete analyses of each bin elevation. So the pods have multiple bins, multiple shelves inside of them. We were quickly able to do a comprehensive analysis of each bin evaluation and multiple item plates across each of those bins. To do that before-and-after comparison to identify moving -- if moving the ladder rail was going to have the intended affect.

Q Okay. And still looking at page 1 of the exhibit?

MR. YOUMANS: Could we scroll down just a little bit, please?

Q BY MR. YOUMANS: So we're looking now at page 1 of the exhibit, Mr. Racco, and there's a couple of tables there towards the bottom of the page. I see in the first row of those it says models and it starts with F0505; do you see that?

A Yes.

Q What is that representing?

A So the -- in the "model" column, each of those references the anthropometry of the Digital Human Modeling that we

used. So the F05-05 represents the 5th percentile female by stature and weight. The F95-95 is the 95th percentile female by stature and body weight. And then likewise, the M95-95 is the 95th percentile male by stature and body weight.

Q So were those the particular models you used in this project for purposes of evaluating the risk?

A Yes.

Q It looks like those are similar to at least what you used in project Shot Rock. What was the rationale in this case for modeling this based on the 5th percentile female and the 95th percentile female model?

A So to rationale in limiting the -- in focusing on these three models was that our first principles indicated that this move, this change, was inherently going to be positive. So we focused on these three being the boundaries of the population so that we could execute this change and get -- seek approval more rapidly. We knew that the additional models that we evaluated in Shot Rock, but not here, would not have changed the outcome.

Q So looking at the, what, 50th percentile female?

A Yes. That wouldn't have added any specific values on this based on the outcomes we already saw.

Q And just briefly explaining the rest of this table. So to the right of the model column, you have A, B, C, etc.

It says, "Average low back compression percent change." Can you just briefly describe what that's reflecting?

A Yes. So each of the alpha numeric numbers, so the A, B, C, those represent the bin elevations or the shelf heights inside the pod. Each of them has a letter associated with it. A is the lowest. And then as the letters increase, the elevation of heights increases.

And what we did in this case was, of course, we have a wide range of items that our fulfillment centers store, right, and then sell to customers. Those items are different weights. We completed an analysis of the peak low back compression and shear in 1-pound increments. So from 1 pound all the way up to 21 pounds in individual analyses. And the percent change is the average change in the pre- and post-condition for all of those item weights.

Q Okay.

MR. YOUMANS: If we could turn to page 12 of the exhibit, please? Towards the top would be great. Thank you.

Q BY MR. YOUMANS: Mr. Racco, we are looking at appendix E. It says, "Simulation output." Is this describing basically in more detail the analysis you just described?

A Yes.

Q What bin are we looking at and which model here?

A This would be the A-level bin, the lowest bin elevation. The model would be 5th percentile female by stature and weight, so the smallest end of our population.

In this case, for the A-level bins, associates may adopt a posture where they kneel. So the column that says posture calls out the kneeling posture in this case. The column that says load is the item weights.

Q And that's the range you just described, 1 to 21 pounds?

A Yes.

Q And then the current state compression and the proposed state compression, what does that represent?

A So the current state compression represented the position -- the compression when the ladder rail was in its existing position. And then the proposed state represented the compression after the ladder rail was moved.

Q And then the last two columns to the right, is that a similar comparison but now we are looking at shear?

A Yes.

MR. YOUMANS: If you could scroll down to the bottom table, please? Thank you.

Q BY MR. YOUMANS: Are all of these measurements on this column, are these all products of the Digital Human Modeling that you did?

A Yes.

Q I know you testified earlier that when your team is looking at reducing ergonomic risk, you are typically not focused on the TLVs; is that correct?

A That's correct.

Q But for this, in this case, for current state compression there you are talking about, what, peak low back compression?

A Yes, sir.

Q And are you aware is there a TLV out there or some action limit that ergonomists sometimes look at when they are using that particular measurement?

A 3,400 Newtons is a common action limit for peak low back compression.

Q Where is that coming from?

A That's a common reference from NIOSH, from the National Institute for Occupational Safety and Health.

Q You called it an action limit. How does that -- strike that. You called it an action limit. What did you mean by that?

A An action limit is a limit beyond which it's recommended. Further investigations and interventions should potentially be investigated.

Q How does that compare to another term we have heard in this case that is the threshold limit value?

A They are often used interchangeably, action limits and

TLVs.

Q Okay. And then looking at the right-most columns, two columns on the right that are talking about peak, similar question, I know you typically don't look at threshold values but are you aware of any action limits or TLVs that ergonomists sometimes use with respect to peak low back shear?

A Yes, commonly referred to action limit for peak low back shear is 700 Newtons.

Q And you can correct me if I am wrong, but it looks to me like all of these are below these action limits you just described even in the current state; is that correct?

A Yes, sir.

Q Okay. And so what's the purpose of this intervention then?

A The purpose of this intervention is to continuously improve. By moving the ladder rail closer, we are reducing those peak forces any time any of these actions is performed.

MR. YOUMANS: Let's take a look at page 38, please?

Q BY MR. YOUMANS: So, Mr. Racco, looking at page 38 of the exhibit, looks like we have got a similar scenario but for the 95th percentile male; is that correct?

A Yes.

Q And couple of things about this. This is the only one I could find where the current state compression, some of them at least, are exceeding the NIOSH action limit that you mentioned; is that correct?

A Yes.

Q And same thing about the peak values there, I believe most of those would exceed the Merits 700-Newton limits that you mentioned?

A Yes.

Q So doesn't this analysis show that this intervention has failed to reduce this particular process path to an acceptable risk level?

MR. FURST: Objection; leading.

JUDGE PFEIFER: Overruled. You can answer.

A So what the analysis in this case shows is that for the tallest and heaviest models that we evaluated that we do have conditions that exceed the action limits.

Q BY MR. YOUMANS: Okay. And in your mind, is that acceptable in terms of the risk or unacceptable?

A So what it tells us that, you know, this is why we look at the entire broad spectrum of anthropometries and consider the range of boundary mannequins. So we know that we get benefit for the broad majority of our population, and that we are still going to have --

potentially in this specific posture for this specific mannequin, we still might have some tasks that exceed the action limit but it doesn't make the change unacceptable or it doesn't mean that we shouldn't keep pursuing this change.

Q And in terms of the percentage or the rough percentage of the Amazon associate population that this change protects, in your view, what would that be?

A So if we consider that in this case, it's only the tallest and heaviest males that are exceeding the action limit, we're roughly looking at somewhere in the order of maybe about 2 percent of associates that are still not covered by this change.

MR. YOUMANS: Let's take a look at one more page. If we could go back to page 9 of the exhibit, please?

Q BY MR. YOUMANS: So looking at page 9 at the top it says, "Appendix D. Simulated conditions" and then top half of the page there's a couple of pictures, pictograms there. What are we looking at there?

A This is the output of our Digital Human Model. You can see a few of the criteria or the points that we discussed earlier this morning. In this case, we have the actual 3D models of our work environment that were supplied by engineering to our team. On the left-hand side of the

screen, you see the station that we were looking at with the current design. It's a little bit difficult to see in the way the contrast is showing up on the screen here. But you can see the amnesty reduction feature that's kind of bolted onto the ladder rail with the associate, in this case, the small female, kneeling on one knee and flexed bending her trunk in order to reach into the pod.

On the right-hand side, as I am facing the screen, you can see the ladder rail like with respect to some of the geometry and the stream capture has been moved towards the pod. You can see that the small female is closer to the pod, which results in her trunk, her back not being bent so far over, and her arms not reaching so far forward.

MR. YOUMANS: And if we could scroll down to the bottom half of the page?

Q BY MR. YOUMANS: This looks like, again, a before-and-after picture; is that correct?

A Yes.

Q And would this also be generated by the Digital Human Modeling?

A Yes.

Q What is this reflecting?

A This represents a different task. So reaching to one of the upper bin elevations. This shows the small female,

in this case, using the ladder. Specifically one of the field observations we made is that when reaching to this particular bin elevation, the associate only ascends to the top of the second step. Again, you see the same movement of the ladder rail with respect to the pod for reference, which, again, you see the model not bent over so far in the spine and not reaching so far forward with their arms.

MR. YOUMANS: Your Honor, move to admit Exhibit 707.

MR. FURST: No objection.

JUDGE PFEIFER: Exhibit 707 is admitted and it's also designated as implicating a confidential trade secret and should be kept confidential.

(Exhibit No. 707 Marked & Admitted.)

Q BY MR. YOUMANS: Let's take a look at one more project that you and your team were involved in.

MR. YOUMANS: Could we take a look at Exhibit 709, please?

Q BY MR. YOUMANS: Mr. Racco, we are looking at Exhibit 709 displayed on the screen. It's entitled "Comparison of Destuff-It articulating conveyors and flex conveyors for case handling." And then a couple of lines under it, it has your name and Amy Brown; do you see that?

A Yes.
Q Who is Ms. Brown?
A Amy Brown is one of my direct reports.
Q This is dated August 24th of 2020, correct?
A Yes, sir.
Q And did you write this document?
A Yes, sir, Amy and I coauthored this document.
Q And just briefly, can you explain what this particular project or risk assessments is about?
A Yes, sir. So this would fall into one of the support and approval work streams that we discussed earlier today. Our business was seeking to implement a Destuff-it articulating conveyor into our operations for the purposes, in this case, of case handling.

We -- Amy and myself and our team partnered with the stakeholders to conduct and complete this analysis to provide the necessary support that this was a po -- that this intervention had a positive impact for ergonomics.
Q You said case handling. Is that the same as what we've heard called manual Fluid Unload or is that different?
A Yes. So we refer to case handling, in this case, as it was a cardboard box. There's just a nomenclature that we use internally.
Q And when did you first get involved in, I guess, supporting this project?

A So Amy and I were involved in this project throughout 2020 through the various pilots and approval phases.

Q And so you're doing this particular assessment. And similar question, so what assessment tool or tools did you use to evaluate ergonomic risk in this case?

A In this case, we leveraged again our Digital Human Modeling and we specifically completed a case-by-case evaluation of the contribution of each elevations in the trailers to the cumulative low back load.

The reason that we did that was the way the tools work, the analysis tools that we were considering, we deem this the best way to be able to show a difference between the no-Destuff-it condition and the Destuff-it condition.

Q You said, I think, in this case you looked at cumulative low back loads?

A Yes, sir.

Q Why did you choose to focus on that particular metric in this assessment as opposed to some of the other peak measurements you described in some of the other projects?

A In this case, based our field observation of the equipment they used and the way the associates interact with the equipment, the benefit and the intervention -- the benefit that the intervention is providing is with respect to the duration of each lift. So because the

conveyor articulates, associates don't have to exert a force when handling the case for quite as long, which has a positive impact on the cumulative low back loading.

Q And just looking towards the bottom of page 1, there's a table down there. It says, "Cumulative L4/L5 compression" that's Newtons I assume?

A Yes.

Q And then below for associate A, for example, we have got basically measurements of that value?

A Yes.

Q And are any of the measurements you took relating to cumulative low back loading for this assessment, are any of them in excess of any action limit or TLV that you are aware of?

A No.

Q And this table, is it basically a before-and-after comparisons based on your modeling?

A Yes.

Q You mentioned, I think, pilots plural; is that correct?

A Yes.

Q How many pilots are you aware of that were performed by Amazon relating to the Destuff-it?

A There have been pilots to the best of my knowledge, in each of the individual business units that were seeking to implement Destuff-it.

Q What business units were those?

A This would include North America -- let me clarify. There are both business units and the building types. Because the applications are somewhat different between building types, they were to be specific pilots at each building type.

Q So was there a pilot, for example, within the AR sortables?

A Yes.

Q And within the AR nonsortables?

A I believe so, yes.

Q Which, I guess, population did you model for purposes of this assessment?

A For the purpose this assessment, we completed modeling for the 95th percentile female by stature and weight.

Q Any others or just the 95th percentile female?

A We did not complete any others in this case.

Q Why did you just do the 95th percentile female?

A In this case, since it was a comparison analysis between the two and based on the results that we saw, we did not -- we did not see any indicators that the comparisons would be different for any of the other populations or any of the arthrometry that we would evaluate.

MR. YOUMANS: Can we take a look at page 14, please?

Q BY MR. YOUMANS: So looking at page 14 we have got a photograph. And just describe what we are looking at, please.

A Sure. This is a photograph of the equipment that we have been discussing, the Destuff-it articulating conveyor. This is just a photo of the piece of equipment in space, it's attached to the conveyor or in use. It's just parked as this one was not in use at that time.

Q Okay. And the portion of it marked A, is that the platform that's adjustable that the associates stand on?

A Yes. So an associate, while the equipment is in use, would be standing on the platform called out by position A in this photo.

Q And about when -- well, strike that. Was the Destuff-it at some point approved to be rolled out on a network-wide basis?

A The Destuff-it has been approved.

Q Do you recall about when that approval was granted?

A I do not off the top of my head.

Q And if you know, along this journey of you doing this assessment and the pilots and getting approval and implementation, were there any kinks in that process or any issues that you or Amazon encountered in sort of making this change happen?

A Sure. There were different items that were learned about

the equipment throughout the pilots and even into, you know, some of the network rollouts. These included the identification of different pinch-joint hazards from a safety perspective, you know, as the equipment came into more use and had more associates interacting with it. There were also some additional material flow and material handling process items that needed to be sorted out through the pilots and the launch. Specifically, in the context of hybrid trailers. So when a case and a tote might be mixed in the same trailer. So those are a couple of examples of ongoing items that needed to be worked out during the pilot and rollout.

Q Okay. When you encountered during the pilot the issue of potential pinch points, how was that issue addressed if you know?

A So in that case, the stakeholders that had responsibility for the safety engineering sign off partnered with the equipment and manufacturer Destuff-it to address the issue by adding additional sensors and making design changes.

Q Do you know, did the manufacturer in fact make modifications to the design of the project?

A My understanding is that they have, yes.

Q And if you know, about how much does a Destuff-it cost?

A My understanding is they are approximately $200,000 a

piece.

Q And if you know, about how much did is this project cost total for Amazon to implement across the network as you have described?

A I don't have an exact number but my estimate is it's in tens of millions of dollars.

MR. YOUMANS: Your Honor, move to admit Exhibit 709.

MR. FURST: No objection.

JUDGE PFEIFER: Just for my clarification, I might have misheard, this would be the Unloaded Trailer process path at both BFI3 or BFI4 or am I misunderstanding it?

MR. YOUMANS: That's correct.

JUDGE PFEIFER: Thank you. Exhibit 708 is admitted and it -- 709 is admitted and I am also designating it as implicating a confidential trade secret.

(Exhibit No. 709 Marked & Admitted.)

Q BY MR. YOUMANS: Mr. Racco, you mentioned earlier that you were actually on site during one of the inspections at BFI3 in DuPont; is that correct?

A Yes.

Q And you talked about accompanying one of L&I's ergonomist that day; is that correct?

A Yes.
Q About how long were you with the L&I ergonomist during the course of that day?
A For several hours. We were together throughout their entire time on the floor.
Q I think you testified earlier that one of the reasons you were there that day was to sort of serve as a resource; is that accurate?
A Yes.
Q And during the course of that day when you were accompanying the L&I ergonomist, did they ask you any questions about controls that Amazon put in place or pilots that you were working on or what you and your group at Amazon did?
A Not that I recall, no.
Q And in terms of the various risk assessments you've described, about how many risk assessments do you think you and your team have performed since you came to Amazon in 2019?
A That number would be in the hundreds.
Q And just focusing on your team, about how many pilots have you run looking at potential ergonomic improvement since you came to Amazon in 2019?
A In the dozens of pilots.
Q And if we expanded that, if you know, to the number of

pilots approximately that your team and the other Amazon ergonomic teams that you have described, can you give us an estimate how many pilots you and the other ergonomic teams have performed since you came to Amazon in 2019?

A That would be in twenties.

Q So I want to turn to a different topic and talk to you about some of the potential abatements that L&I's ergonomists have suggested that Amazon implement in this particular case. One of the things that L&I has recommended for some of the process paths we are talking about, primarily on the docks, are vacuum lifts or intelligent lift assist devices. Has that been an intervention that your team has looked into since you have been at Amazon?

A Yes.

Q And when did you start looking into this issue of vacuum lifts and sort of describe sort of what you have done in that area?

A Yeah. So there are -- there's two process paths that we've evaluated overhead lifting devices, you know, vacuum lifts. The main ongoing pilot that my team is working on are vacuum lifts in our traditional nonsort Outbound Sortation process path. This is the process path where after a box is packed, it proceeds through our process to a sortation point which sorts it before it

goes into our trailers to go into the transportation work stream.

So we have evaluated overhead lifting devices specifically in the process path for taking the packages from the sort conveyors into the destination conveyors -- into the destination containers.

Q And did you say this is for Outbound Sort?

A Yes.

Q And was this an actual pilot that you performed?

A Yes.

Q And when did this pilot begin?

A So this pilot has been ongoing. To the best of my recollection it started in -- it was installed in 2021.

Q And is that at a particular site?

A Yes, this is at two sites, at our from traditional nonsort site in Imperial Pennsylvania, PEN-2, and at one of our traditional nonsort sites in Denver, Den2.

Q And what's the status of that particular pilot?

A So the pilot is ongoing. There are feasibility and design challenges with executing vacuum lifts in overhead lifts. We continue to try and make changes to the equipment to make it feasible for the process.

Q And can you give us more specifics about the feasibility and design challenges that you've encountered while piloting this particular intervention?

A Yes. So there's a number that are specifically related to how the vacuum lift interfaces with the item being handled. So first off, when we have the wide range of item weights that we encounter in our Outbound Process, tuning the vacuum lift to be bale to accommodate that range of items that could be, you know, highly variable, so that it's strong enough so that heavy items don't fall off, but not so strong that it's, you know, damaging or creating a negative like interface with lighter packages so that tuning is important.

Additionally, understanding the orientation of the package as it's delivered to the destination container is critical. So the associate needs to know how it's going to fit in the destination container to be able to couple the vacuum lift to the box on the right side so it can get delivered in the right orientation. So based on the number of sortation points in the Outbound Sort, that's a challenge.

Q When you -- I am sorry, when you say "orientation," so if I have a box, are you talking about whether the little Amazon smile is on the side that's facing me, or the side face away, or the top?

A Yes, all of the above. If it's facing you, if it's rotated 90 degrees so it's more like a C, or if it's facing up to the ceiling.

Q Okay. And the issue is, what, that it may have to be oriented in some way?

A Yes. So if the lift is not coupled to the right side of the box to -- at the point where it's lifted to be delivered to the destination in the right way, then it needs to be, you know, placed, reoriented, grasped multiple times to get it into the container the right way.

Q Okay. You've mentioned variable weights in orientation of the packages. Any other feasibility or design challenges you have encountered while piloting the vacuum lift?

A Yes. The overhead lift devices typically work best when the associate doesn't need to change direction or, you know, go in different ways to get the item delivered to the container, which presents layout changes if the positions of like the overhead device and how it relates to the other monuments in the layout.

Q You are talking about the layout, are you talking about the physical layout of whatever that part of the facility looks like?

A Yes.

Q Any other challenges that you have encountered while piloting the vacuum lifts?

A Those are the main ones.

Q Have you been able to solve for those challenges yet?
A We have not, no.
Q And I think you said the pilot is ongoing. What does that mean?
A Yes. So the pilot is ongoing. So we're continuing to evaluate different ways to solve these, you know, headwinds that we are seeing, or to amend the layout of the equipment to be more accommodating to them.
Q And the pilot that you described, which I think your team has been involved in at these two sites you mentioned, are you aware of any other pilots or testing of vacuum lifts that other departments or other folks at Amazon have done?
A Not directly, no.
Q Another proposed abatement that L&I's ergonomists have recommended in this case have to do with adjustable height carts and, actually more specifically, carts that have shelves that sort of can be adjusted in height. Are you familiar with that type of intervention?
A Yes.
Q Is that something that your team has looked at or other teams at Amazon has looked at to see if it's feasible and workable?
A Yes.
Q And tell us about that, what team or teams have looked at

this issue in terms of adjustable height carts?

A Yes. Our team in North America has been partnered with out counterparts in Europe on height-adjustable self-adjusting cart that they initially started piloting in the 2020/2021 time frame.

Q "They" being?

A They being the team in Europe, our -- my counterparts in Europe.

Q Is this the European ergonomics team that you mentioned in your testimony earlier?

A Yes.

Q So they started looking at this I think you said in 2021. If you know, what came of that?

A So they have continued through their process, right, to design and engineer the cart. They shared those designs with us here in North America. We have completed a pilot in our traditional sortable soft lines building type and are continuing to expand that pilot and to seek other opportunities to use the cart.

MR. FURST: Objection; hearsay. There was previous testimony that they are not connected with what's being done in Europe. There's a separate team and he doesn't have knowledge about it.

JUDGE PFEIFER: Could you inquire as to basis of the knowledge of the witness, Mr. Youmans?

MR. YOUMANS: Yeah.

Q BY MR. YOUMANS: How do you know what you just told us about your counterparts in Europe did with respect to the carts?

A Because we meet regularly with our team in Europe and share knowledge back and north.

JUDGE PFEIFER: The objection is overruled.

Q BY MR. YOUMANS: I think you said that based on what you learned or what your European counterparts shared with you, you began piloting the carts for at least one business unit; is that correct?

A Yes, that's correct.

Q When was that pilot or when did that begin?

A I am sorry?

Q When did you start piloting it?

A That would have been in 2022.

Q Does that project have a name?

A It's referred to as Project Levy Tote.

Q And have you pilot -- what sites have you piloted these adjustable-shelf carts at?

A The primary site was SDF8, which is a traditional sortable soft line site in Louisville, Kentucky.

Q And have you partnered with any sort of manufacturer for this particular pilot you are performing here in North

America?

A National Cart Company is the supplier of the cart.

Q You said you have been working with. What have you been working with them on?

A They have been supporting us with design and engineering of the cart and helping us identify the different spring tensions and the different opportunities to design a cart of our processes.

Q Have they basically come up with a prototype for you to pilot?

A Yes.

Q And has that been a single design or have you gone through multiple iterations at this point?

A Yes, we have gone through multiple variations.

Q You mentioned spring tension. Let me ask you more broadly, as you are conducting this pilot, have -- strike that. In conducting this pilot, have you encountered any sort of feasibility or technical issues that you need to overcome or solve?

A Yes. So the primary item that required design iteration was on the spring line to make sure that the elevation of to cart -- of the platform on the cart adjusted as -- adjusted appropriately as the weights were added or removed from that platform.

Q Okay. Why is that a challenge?

A That's a challenge because we have to make sure that as the weights are added or removed, the platforms stays at an elevation that's in the associate's power zone for them to lift.

Q Does the variability of packages at the Amazon facility does that play into that challenge at all?

A Yes.

Q How so?

A The more variable the packages, the more difficult it is to find the right spring tension to keep the platform in the power zone.

Q Any other challenges you have encountered in the pilot that your team has been involved in?

A The main items were ensuring that we had the proper cart dimensions to fit within our aisles and in the context of the other process.

Q Okay. These aren't -- and I think you previously testified, these aren't sort of off-the-rack carts. These are custom carts that you're working with a vendor to design?

A Yes, sir.

Q And where are you at in terms of the pilot for I think you said TSSL?

A So we are seeking approval for the network rollout in TSSL.

Q And about how many sites would that be?
A I am not sure off the top of my head, I am sorry.
Q And assuming that that's approved, I know that hasn't happened yet, but what would be the approximate cost of implementing that just for that type of facility?
A I believe an appropriate estimate would be somewhere around $14 to $15 million.
Q And are there any plans to take a look at this intervention in some of the facility types in this case, that would be AR sortable, AR nonsortable?
A Yes.
Q What are those plans?
A We don't have those developed yet, but we plan to pilot the Levy tote carts in AR sortable.
Q But you haven't done that yet?
A Not yet.
Q There was another recommendation by L&I's ergonomists in terms of abatement. That Amazon eliminate Fluid Load entirely or eliminate Fluid Unload entirely. Based on your expertise and your experience as an ergonomist for Amazon, do you see any potential challenges with that proposed solution?
A I think from my standpoint, the thing that would need to be understood is where that lift gets moved, right? So if we eliminate the Fluid Load, someone is still handling

that product to get it into the trailer. What does that mean and where does that lift now take place?

Q Okay. And so just to follow that though, so the lift of the package would occur, where, somewhere -- different spot in the process?

A It might have to, yes.

Q What about the Fluid Unload, is there a similar issue there or no?

A Potentially, yes.

Q And any other issues or challenges you see from a safety perspective or ergonomic's perspective in eliminating Fluid Load and Unload?

A So depends on the context of the elimination and how it was executed, if we were, you know, palletizing or using some other type of containerization, those pallets would have to be moved in and out of the trailer, which would mean increase PIT use, power industrial truck use, so forklifts or some other piece of equipment which would need to be considered in the design of the intervention and how our docks would have to change to make sure we could do that safely.

Q Okay. There's another recommendation from L&I's ergonomists to basically get what they call automated robotics system to load or unload the packages one at a time either into or off of the trailers. Have you

actually ever seen anything like that?

A I am not familiar with that technology.

Q Do you know whether that would be feasible for Amazon?

A I do not.

Q Similar recommendation from L&I's ergonomists, they talked about an auto unloader system that essentially would be a wall inside the trailer that would push packages out of the trailer instead of Fluid Unload. Have you actually ever seen anything like that implemented?

A I am not familiar with that, no.

Q Do you have any kind of opinion on whether that would be feasible at Amazon's facilities?

A I do not.

Q Another recommendation that L&I's ergonomists suggested was a system to sideline defective carts and pallet jacks, basically, if a wheel is not working or they are deficient in some other way. Does Amazon have any sort of system in place along these lines?

A Yes. We have what we refer to as our red tag process.

Q Explain how that works.

A So if there's some type of defect to a cart or a piece of equipment or, you know, anything that the associate -- a tool that the associate is using, they can side line that, a red tag gets applied to it that identifies that

that item is in need of repair.

Q Are there specific areas designated as red tag areas in the Amazon facilities?

A Yes.

Q Are associates trained on that?

A To the best of my knowledge, yes.

Q How long has that system been in place?

A To the best of my knowledge, that's always been in place as long as a have been at Amazon.

Q I wanted to ask -- this isn't actually a specific recommendation from L&I, but another thing I believe your piloting has to do with manual start-assist pallet jacks; is that correct?

A Yes.

Q And just tell us about that, what is that and why are you piloting that?

A So a start-assist pallet jack is a non-powered pallet jack that has a linkage between the pump handle and the wheel. And the associate can engage this linkage and use the pumping of the pallet jack handle to overcome the inertia of the load when they start the pallet jack move.

Q That does what from an ergonomic perspective?

A That reduces the initial force of moving the load.

Q Okay. That's not an electric pallet jack just to be clear?

A No, sir.
Q When did you or your team start pioloting these manual start-assist pallet jacks?
A We started looking at the start-assist pallet jacks toward the end of 2020 and into 2021.
Q And what's the status of that pilot?
A It's -- they are still being piloted.
Q Have you been able to do any kind of assessment as to whether that would actually reduce ergonomic risk to the associate?
A If the feature is engaged, it does reduce the initial force to start the load.
Q And you said the pilot is still ongoing. Have you encountered any sort of difficulties or challenges in terms of trying to implement that particular control?
A The main headwind is with error proofing the use of the intervention. So the associate or the user of the tool still has the ability to not engage the linkage and engage the pump future. Our main headwind is to try to ensure that the feature is actually used.
Q Okay. So you think it helps but the challenge then is to get associates to do it?
A Yes.
Q And have you been able to work through a solution for that particular issue yet?

A We have not at this point.
Q Some of the other recommendations that L&I's ergonomists have made in terms of improvements or abatements for pick and stow, they recommended sort of having a weight restriction on items that can be placed on high pods and items that can be placed in the lower pods.
So first question, in terms of -- strike that. Is there a weight restriction on items that can be placed in the higher pods in pick and stow?
A Yes.
Q And what's the nature of that restriction?
A So the -- the big filters prevent health items from being stowed in the upper part of the pods.
Q Is that something that's sort of programmed into the system?
A Yes.
Q And how long have weight filters been in place for the top shelves or upper shelves for pick and stow?
A They have been in place for the upper shelves as long as I have been here.
Q And what about the bottom shelves? Has your team looked into whether it's feasible and workable to basically create similar weight filters for the bottom shelves?
A Yes.
Q Are there any issues you've encountered or things you

need to consider before you go ahead and do that?

A So main impact or the main feedback that we have evaluated is that as you place these restrictions on the different bin elevations, then items have to move. Like an item that would have been otherwise stowed in the bottom level in the A-level bin, has to find a home somewhere else in the pod, which then takes up space there and something else then moves to the A level. What we are trying to identify is if we are moving those bigger or heavier items away from the bottom to someplace else, are we then trading off with increased repetition to the lower elevations.

Q Okay. Why would moving the heavier items up in the pod potentially result in what did you say increase repetitions down at the lower levels?

A Yes.

Q Why would that happen?

A Because now we've taken that heavier items that's taking up more volume, more space in the higher elevation and replacing it with fewer small -- more smaller items in the lower elevation.

Q Okay. And so why would more reaches or potentially more reaches to the lower level of the pod, why would that be significant, if it is significant, from an ergonomics perspective?

A That's the tradeoff we have to make sure that we explore. The lowest bin elevations generate the highest peak forces. So we want to ensure before we make a change like that that we've evaluated all the potential details to make sure we haven't created some other negative condition.

Q Any other issues or challenges you've encountered as you look at the idea of a weight filter on the lower shelf of the pod?

A The only other item is that the pods themselves have a stability cone and a center of gravity. The pods are designed so that center of gravity stays low to prevent any undue hazards or any risks from the pods potentially tipping over. If potentially heavier items were to move higher in the pods, they would potentially raise the center of gravity and increase the risk of pods tipping over.

Q In terms of some of the recommendations L&I's made, turning to Pack Singles, one of those was provided adjustment-height workstations, and I think you have already testified about a particular project you have been involved in that's doing that; is that correct?

A Yes.

Q Another suggestion that L&I had for Pack Singles was automating the yellow bin stow and delivery. Are you

able to comment on that? Is that something that you looked into or think might potentially reduce ergonomic risk?

A I am not sure about that one specifically. The totes are already delivered automatically on conveyors. I would need to understand that recommendation a little bit better to make a comment on it.

Q Another recommendation that L&I made for Pack Singles was to automate the taping of the boxes there. Can you speak to that? Do you have an opinion on that in terms of whether that would be a necessary ergonomic improvement for Pack Singles?

A So in the case of automatic taping, we do automatic taping in our process paths in other building types. The tapers themselves generally have some reliability issues, which means that there's usually an associate commonly staffed at the auto taper anyway ensuring that it's -- that the flaps are folded, that it's lined up properly, and so on. So from a standpoint of actually reducing the risk, you know, based on the additional associate interventions to make sure that the automated feature works, I am not sure that there's a benefit.

And then additionally, you know, automating the taper is actually just one small part of the Pack Single task, which still includes constructing the box, folding

the flaps, etc. I am not 100 percent sure what the net benefit of that would be.

Q And we've heard some testimony about the job cycle. Is that what you are referring to now in terms of the overall task?

A Yes.

Q Turning to AFE Rebin, there's been some similar recommendations from L&I with respect to that process path having to do with moving the heavier items from the top and bottom shelves and trying to get them more towards the middle so they are at a better height for the associates to handle them. Has Amazon done anything along those lines?

A My understanding is that there are weight filters for the top and bottom bins in the AFE wall already. But --

Q Go ahead.

A Additionally though, the placement of the orders in the AFE wall is primarily driven by the size of the order, not necessarily the individual weights of the items in the order. So that would potentially require a redesign of the entire wall, not just the bin filters.

Q Okay. But in terms of the filters that you mentioned that are already in place, do you know how long the existing filters have been in place for that process path?

A I believe they have been in place ever since I have been here, since 2019.

Q Mr. Racco, I wanted to go back to one thing you said earlier in your testimony. You talked about how, I believe, you have never made a recommendation to implement some new control or piece of equipment based on injury data alone; do you recall testifying about that?

A Yes.

Q And can you just explain to us why you haven't done that?

A Yes. The reason that we don't rely on injury data alone is that the injury data itself can be very -- very complex and messy, and we might not have direct understanding of like the causality on a case-by-case basis. Even through a pilot, right, the timing of a report, you know, might not be directly related to the affects or the causes from that pilot. So because of that, we know that we have -- we have an empirical measure of risk using the different tools and assessment methods that we employ to help design the interventions.

Because of that, our success criteria and our decisions on whether to proceed with interventions are based not on injury data, but on the quantitative metrics that we can measure and calculate.

MR. YOUMANS: Thank you. I do not have any further questions for you.

JUDGE PFEIFER: All right. Show us off the record.

(Off the record.)

JUDGE PFEIFER: Back on the record. Mr. Furst, cross-examination?

MR. FURST: Thank you, Your Honor.

C R O S S - E X A M I N A T I O N

Q BY MR. FURST: Mr. Racco, you are not a doctor, correct?

A I am not a doctor, no.

Q And you don't teach ergonomics at a university or a college, correct?

A I do not teach ergonomics at a university or college.

Q And you've never written any peer-reviewed or published ergonomic studies, correct?

A No.

Q When you started with Amazon back in 2019, you were both the first and the only ergonomist in Amazon's Workplace Safety section, correct?

A Yes.

Q And your task was you were covering all of North America, correct?

A Yes.

Q And do I understand it right that all ergonomic -- all proposed ergonomic changes at any other warehouses had to be approved by you even if they were fairly minor?

A All changes that went through the Amazon approval process were -- came through my work stream, yes.

Q And there was no sort of cutoff of ones that were too -- I am sorry, too minor to go through you, right?

A No, not to the best of my knowledge.

Q And then you in 2021, you lead the World Wide Human Factors in Ergonomics Team; is that right?

A Yes.

Q But your team just covers North America, right?

A Yes.

Q And at that point, your team expanded to be being just you to 21 ergonomists?

A In which time period?

Q By 2021.

A We had 18 ergonomists by 2021.

Q Okay. And your team focuses mainly on engineering as opposed to administrative controls, correct?

A Yes, sir.

Q And you're focusing on pilot studies at the national level to determine what will work in various process paths, right?

A We are focusing on pilot studies that can be scaled to the different networks that included all the buildings in that network, yes.

Q And if those pilots are deemed to be successful and don't

have any major flaws or problems, then you're going to implement them network wide, right?

A Yes.

Q And in prioritizing what projects you are going to work on, you used a number of injuries in a year in a given process path; is that right?

A That is one of the metrics that we look at to narrow our focus, yes.

Q And you're looking at the number of injuries, not the injury rate, correct?

A Yes. We primarily focus on the count of injuries, yes.

Q And when you say that you're looking at injuries, are you basing that on what's a recordable injury on a 300 log or something else?

A We are basing the count on the number of records that are kept. So one of those records is recordable injuries and one of them is all types of incidents that might be reported, first aid or reportable.

Q Okay. So it would be broader than the OSHA 300 logs?

A Yes.

Q And you're unaware of any evidence that when the Kent and DuPont or BFI3 and BFI4 fulfillment centers were designed that they took into account ergonomic principals, you're unaware of anything along those lines, right?

A Those fulfillment centers were designed and launched

before my time at Amazon so I don't have firsthand knowledge of their design or engineering.

Q And they were both designed before 2017, correct?

A I believe so, yes.

Q And you testified at your -- you -- strike that. And the team that -- the engineering ergonomic's team that would look at those issues, wasn't formed until 2017, correct?

A The World Wide Design Engineering Ergonomics Team was formed in 2017.

Q And that's the team that when a new warehouse is being proposed that team looks at ergonomic factors in its initial design of this new center, right?

MR. YOUMANS: Objection; foundation if we are talking about the time period before Mr. Racco was actually at Amazon.

JUDGE PFEIFER: Well, I take it this came up in his deposition?

MR. FURST: Yes.

JUDGE PFEIFER: Overruled.

A So do you mind asking the question again?

Q BY MR. FURST: Sure. I am focusing on 2017. But isn't it true that the engineering team that looks at ergonomic factors for any proposed new Amazon facility that that team was formed in 2017, right?

A The team that includes ergonomic subject matter experts,

the subject matter experts arrived at Amazon in 2017, yes.

Q Those are the engineering subject matter experts?

A Yes.

Q And you're unaware, aren't you, of any group or any individual ergonomists who were looking at these issues before 2017, right?

MR. YOUMANS: Objection; foundation, lack of personal knowledge.

JUDGE PFEIFER: If --

MR. FURST: I am asking him what he's aware of.

JUDGE PFEIFER: Right. I am overruling the objection to the extent he can answer that it. If not, he can say he doesn't know. You may answer.

A I don't have firsthand knowledge of that, no.

Q BY MR. FURST: And when performance standards are set for either individual employees or work groups, there's no consideration as to whether the rate of units per hour being set is safe from an ergonomic standpoint, correct?

MR. YOUMANS: Objection; vague, foundation.

JUDGE PFEIFER: Overruled. You may answer if you know or ask for clarification if you need to.

A Do you mind clarifying the question?
Q BY MR. FURST: Sure. What I am asking is when performance standards are being set for either individual employees or for work groups, isn't it true that there's no consideration given as to whether the performance standard or the rate of units per hour that's being set is safe from an ergonomic standpoint, correct?
MR. YOUMANS: Same objections.
JUDGE PFEIFER: Same ruling. You may answer.
A I don't have firsthand knowledge of that, no.
Q BY MR. FURST: And at the time of your deposition in March, you had never read Amazon's written ergonomics program, correct?
A I have not read it from front to back, no.
Q And their written program that was dated 2020 and was shown to you earlier this morning as Exhibit 45, that is Amazon's only written ergonomic's program, right?
MR. YOUMANS: Objection; vague, vague as to time frame.
JUDGE PFEIFER: Overruled. You may answer.
A Are you asking if that's the only program for the site implementation?
Q BY MR. FURST: I am asking -- I will rephrase it. Isn't

it true that the WHS Ergonomic Program Procedure NA, which has been marked as Exhibit 45, isn't it true that that's the only written ergonomic's program Amazon has?

A To the best of my knowledge, yes.

Q And your group doesn't use that program, correct?

A My engineering subject matter experts do not use that program.

Q But your group doesn't have a separate written program that you're using, correct?

A We do not have a formal separate written program, no.

Q And you don't have an informal separate written program, right?

A We have standards and tenants and processes that our team follows when we are engaging in the three work streams that I outlined earlier in my testimony.

Q But there's not some sort of parallel written ergonomics program that works along side Exhibit 45, correct?

A For the engineering subject matter experts?

Q For implementation of ergonomics at Amazon.

A Not to the best of my knowledge, no.

Q What is cycle time?

A In what context?

Q The context of ergonomics.

A Cycle time is commonly referred to as the time to complete work tasks.

Q And your team measures cycle time to evaluate the risk of repetition in ergonomic analysis, correct?

A Cycle time is an input that goes into our overall musculoskeletal risk assessments.

Q And your team sometimes uses the Revised NIOSH Lifting Equation for two-handed lifts, correct?

A My team has occasionally used the Revised NIOSH Lifting Equation, yes.

Q And you said that the ACGIH TLV Hand Activity Tool is not used by your team, correct?

A My team does not use the activity level TLV, no.

Q But they do sometimes use the Ohio Workers' Comp Push/Pull tool, right?

A Yes.

Q And they also use the Liberty Mutual tool for push/pull, correct?

A Yes.

Q And your team does not regularly evaluate muscle fatigue, correct?

A Can you help me understand the question? In what context are you...

Q When you are doing an ergonomic analysis, when your team is doing one, you are not evaluating muscle fatigue, correct?

A So fatigue is a really broad statement. Is there a

specific tool that you are referencing?

Q I am using it more as a concept.

MR. FURST: Could I have a paper copy of Mr. Racco's deposition?

JUDGE PFEIFER: Show us off the record.

(Off the record.)

JUDGE PFEIFER: Back on the record.

Q BY MR. FURST: Is this a copy our you deposition, Mr. Racco?

A Yes, sir.

Q I took your deposition back in March?

A Yes.

Q And on page 58.

A Yes, sir.

Q Okay. Do you see halfway down the page or so around line 17, I say -- turning to page 22. I ask about the Rodgers Muscle Fatigue Analysis?

A Yes.

Q And I say, "Is that a methodology that your unit uses?" And you said "No," correct?

A Yes, we do not use the Rodgers Muscle Fatigue Analysis.

Q And then skipping down to line 25 on the page I said, "Do you have a methodology that your team uses for analyzing muscle fatigue?"

A Yes.
Q Why don't you read your answer there?
A At the top of the next page?
Q Yeah, 59.
A So the answer starting at line 2 says, "My team will use either metabolic energy expenditure or we might measure muscle activity directly using electromyography."
Q And then I said or then I asked, "Is that a regular part or --" I am sorry. I asked, "Is that something that is part of your evaluations evaluating muscle fatigue?" And you answered, "It is not a regular part of our evaluations, no." Is that an accurate way of reading what you said?
A Yes.
Q And you have not reviewed the citations that L&I issued at BFI3, correct?
A I have not, no.
Q And you have not reviewed any of L&I's reports except for what we talked about at a settlement meeting a year or so ago, right?
A Yes, sir.
Q And you were present for part of the BFI3 inspection, right?
A Yes, I was present for the BFI3 inspection.
Q And at that inspection in DuPont BIF3, your team was

videotaping the workers -- the same workers that L&I was videotaping, correct?

A Yes, sir.

Q And you weren't present at all during the BFI4 inspection, right?

A I was not present, no.

Q Were members of your team present?

A Yes, members of my team were present.

Q And did those members of your team that were present, they were videotaping the same workers that L&I was videotaping, correct?

MR. YOUMANS: Objection; foundation.

MR. FURST: I can ask.

JUDGE PFEIFER: Yeah, please. Thank you.

Q BY MR. FURST: Did you give instructions to your team as to what they should do while they were there during the L&I inspection?

A Did I give instructions?

Q Yes.

A My team was instructed to support the site in the inspection and to work with the other Amazon stakeholders on site to support the inspection.

Q Are you aware as to whether your team did videotaping?

A My understanding is that my team did videotaping, yes.

Q Do you have an understanding whether they were videotaping the workers versus videotaping the L&I inspectors?

A My understanding is that they were videotaping the workers.

Q And have you looked at those videotapes?

A Not at all of them, no.

Q And at that inspection at BFI4, you attended a either a Zoom or a Teams meeting with Mr. Goggins and an L&I inspector to talk about heart rate monitoring before the inspection, correct?

A I believe it was a phone conference. I don't believe there was a video conference but, yes.

Q Yes. And were you part of previous discussions before that phone conference with L&I regarding heart rate monitoring?

A I don't recall any conversations previous to that on heart rate monitoring.

Q Were you part of conversations with anyone outside of legal counsel before that phone conference about heart rate monitoring by L&I?

A I don't recall.

Q And it's your testimony that the only concerns that you or Amazon counsel's raised about heart rate monitoring were, one, consent forms to be signed by the workers and

then, two, that the heart rate monitoring devices be fully cleaned; is that right?

A Our concerns were about the consent forms, the privacy of the associate's data the -- how the heart rate monitors were going to be used in the context of the COVID pandemic at the time. As well as trying to understand the methodologies that were going to be used to collect the heart rate data so that we could ensure that the associates understood, that we were completing appropriate sampling, and that we could generally help the heart rate monitoring be done successfully.

Q Did you raise any concerns as to the methodologies because you didn't talk about that this morning?

MR. YOUMANS: Objection; misstates his testimony.

JUDGE PFEIFER: Can you re-ask that question, please? The part you through in at the end I think maybe threw me off.

Q BY MR. FURST: Did you raise at that phone meeting any concerns about the methodologies being used by L&I?

MR. YOUMANS: Objection; asked and answered.

JUDGE PFEIFER: You may answer. Overruled.

A As I recall, we never received the methodologies that

were going to be used by L&I, so we didn't have an opportunity to raise any concerns.

Q BY MR. FURST: Okay. Maybe I am misunderstanding about what you said a minute ago. I thought you said "we had concerns" or something like that?

A Yes. So the understanding was that the inspectors wanted to use heart rate monitors. So when we asked the question about how the heart rate monitors were going to be used, what methodologies were going to be used, and then subsequently the concerns during the COVID pandemic, those questions were not clearly answered.

Q So what were -- what were the concerns about methodology that you raised?

A The concerns were that the methodologies be provided to us so we could appropriately understand how the data was going to be collected or how it was going to be used.

Q Did anyone from -- did either Mr. Goggins or the inspector say they wouldn't provide you with the methodologies?

A Not that I recall.

Q And those are the only concerns that you raised?

A Yes.

Q Moving to a different topic. You mentioned vacuum lifts and some pilots that are going on in Pennsylvania and Denver, correct?

A Yes.
Q Are you also aware of a pilot project for vacuum lifts in Tampa, Florida?
A I do not recall, no.
Q What is project Elderwand?
A Sure. So project Elderwand was an attempt to understand the impact of repetition on musculoskeletal risk in our ARS Pick process.
Q And was that a project that your team was involved in?
A My team provided some analysis as part of project Elderwand.

MR. FURST: Could we have Exhibit 160?

JUDGE PFEIFER: Mr. Youmans?

MR. YOUMANS: Your Honor, this does contain confidential trade secrets.

JUDGE PFEIFER: All right. I would ask that we not display Exhibit 160 on the webinar but we can show it to the witness here. Which page would you like to direct Mr. Racco to, Mr. Furst?

MR. FURST: I am going to start at the top.

Q BY MR. FURST: Mr. Racco, have you seen Exhibit 160 before?
A Yes, I have seen this exhibit before.
Q What is it?

A This is a report that was completed by one of my colleagues in World Wide Design and Engineering on a redesign of a traditional non-sort pack singles workstation.

Q And was -- when you say "one of my colleagues," was this done by your team?

A No, this was not done by my team.

Q So what team is this?

A This is the World Wide Design and Engineering Team.

Q So would they do work in Europe?

A This is a team that is primarily responsible for evaluating ergonomics in future design building.

Q So in future design buildings?

A Yes.

MR. FURST: And could we go to page 2?

Q BY MR. FURST: In this study, they use the RNLE, didn't they?

A Yes. About halfway through the first paragraph on the second page it says that the Revised NIOSH Lifting Equation was used to calculate lifting index --

Q And --

A -- for this study.

Q And then if you go down the next paragraph there, the one that says the American Conference, they are using the ACGIH TLV for hand activity, aren't they?

A That's what the document says, yes.
Q And if we go further down to the recommendations, they recommend a vacuum lift, don't they?
MR. FURST: I think we have to go further down. Let's try there.
Q BY MR. FURST: Under 50.1, they recommend a scissor lift/vacuum lift, correct?
A Yes, that's what the document says.
MR. FURST: Move for admission of Exhibit 160.
MR. YOUMANS: Well, objection based on foundation. But a bigger objection, I guess, Your Honor based on relevance. This is TNS, that's traditional nonsort. I think it's been established in the testimony by now that that is not the facility type that's at issue for any of these three citations.
MR. FURST: Do you want a response?
JUDGE PFEIFER: What is the purpose of showing that this exhibit would establish from the Department's perspective?
MR. FURST: Several reasons, Your Honor. First, they use the RNLE and the ACGIH TLV as ergonomic tools which I think has been an obvious issue in this matter. Second, they recommend using vacuum lifts, which is obviously one of the ergonomic tools that

we have been talking about as far as abatement. Three, we just heard -- regardless of what process this was meant for or was being studied, we just heard testimony before the break that they will use -- that they will study something in non-ARS work sites first often and then if they can, they then use that in work sites, such as those at issue here. We just heard testimony about that.

MR. YOUMANS: After piloting it and testing it.

JUDGE PFEIFER: Let me say that I am inclined to admit it on the limited basis that Mr. Furst has articulated, but I will give you a chance to make a record.

MR. YOUMANS: Okay. Well, again, Your Honor, relevance. It's a different type of facility, it's a different group that's evaluating this, and it's actually a total different process path. You can see that at page 6 when it's talking about the lift mechanism or vacuum lift as a recommendation, it's talking about the OPK, that's the order picker cage, that's a power industrial truck. That's not even close to any of the process paths that any of -- any of the sites have been cited for in this case.

JUDGE PFEIFER: Just help me

understand the Pack Singles process in the TNS, what type of relationship would that be to the process paths that are cited in these -- in BFI3 or BFI4? Are they totally separate and distinct or --

MR. YOUMANS: So my understanding and belief that there are significant changes. You know, it could be called the same process path but it depends on the type of facility.

JUDGE PFEIFER: Okay. That's what I thought.

MR. YOUMANS: I believe Mr. Racco's testified to that. It's not that you couldn't then pilot a change at another type of facility, but you can't just say it works in TNS, now we are going to roll it out to AR sortables or AR non-sortables.

JUDGE PFEIFER: I would agree with all of that, Mr. Youmans. I am going to admit Exhibit 160 for the limited purpose that Mr. Furst has articulated. I also find that it implicates a confidential trade secret and it's going to be designated as confidential. Exhibit 160 is admitted.

(Exhibit No. 160 Marked & Admitted.)

MR. FURST: Could we have Exhibit 161?

JUDGE PFEIFER: Off the record.

(Off the record.)

JUDGE PFEIFER: Back on the record.

MR. YOUMANS: Your Honor, this would also implicate a trade secret.

JUDGE PFEIFER: Thank you. All right. So we are going to be displaying it here in the room. Exhibit 161. Mr. Furst?

Q BY MR. FURST: Exhibit 161, Mr. Racco. This is a study by an outside consultant from 2016, correct?

A Yes, that's what the document indicates.

Q And it's by BSE, which is a third-party consultant?

A Yes, sir.

Q And it's -- and its title or its for nonsortable outbound ship dock, correct?

A Yes, sir.

MR. FURST: And if we could go to the third page? I am looking for the recommendations. There stop.

Q BY MR. FURST: So for the long-term engineering recommendations back in 2016, they were recommending implementing a vacuum lift system, correct?

A Yes, sir, that's what the document say.

Q That's based on Kodak's program from 2004 is what's indicated there?

A It says Kodak 2004 in brackets, yes.

Q And that would be -- and are you familiar with Kodak's

ergonomic's program?

A I am familiar with the commonly referenced Kodak textbook. I am not sure if that's what this is referencing or not.

Q Right. I don't know if it's referencing a textbook or an ergonomic's program. It would be something used by Kodak?

A That's what it seems to indicate, yes, sir.

MR. FURST: Move for admission of 161, Your Honor.

MR. YOUMANS: Objection hearsay, foundation, relevance. It's a 2016 document, three years before Mr. Racco even showed up at Amazon.

MR. FURST: Your Honor, this is the issue we have with -- you know, this was part of the 700 documents that we were given. And, you know -- we've had this issue in the past, as you know, that we don't have -- you know, we don't have someone who was with Amazon in 2016 and that's not our fault.

JUDGE PFEIFER: Well, I think we have been through this before.

MR. FURST: Right.

JUDGE PFEIFER: You should have called a business record's custodian for this stuff. Why don't you ask Mr. Racco if he's seen this before and if he

knows what it is? Maybe you can get it in that way.

Q BY MR. FURST: Have you seen this exhibit before?

A I don't recall. I don't believe I have seen this specific document before, no.

Q Were you aware of the BSI ergonomic studies?

A Generally aware of them, yes.

Q And in what context were you made aware of them?

A That they were completed at some point several years before I arrived at Amazon.

Q Mr. Racco, did you have any role in assembling the ergonomic studies that were turned over to both the US and State of Washington?

A The -- I am sorry, can you?

Q Sure. The State of Washington received roughly 700 ergonomic studies from Amazon early July.

A Okay.

Q I am asking -- and the US had received them months earlier. I am asking whether you were involved in that process of working with Amazon's counsel and in gathering those studies to produce?

MR. YOUMANS: Well, objection, vague. I honestly don't think Mr. Racco is in a position to know about specific requests that were made by either Washington or the feds.

JUDGE PFEIFER: We are going to find

out. Overruled. You may answer.

A I was asked to produce documents during a specific time frame, which I shared with Amazon legal, yes.

Q BY MR. FURST: And what time frame were you asked to find documents for?

A I don't recall off the top of my head specifically.

Q Well, was it for documents only after you started or, I mean --

A For me, it was only for documents after I started.

Q And do you know who at Amazon would have worked to find documents that existed before you started?

A I do not.

MR. FURST: Your Honor, when we named our witnesses, we didn't even have these documents.

JUDGE PFEIFER: Right, I understand. I have been clear that I think you are entitled to have a record's custodian. You should have anticipated that for sure. The question is whether or not I am going to make one available to you to get these documents in.

MR. YOUMANS: Your Honor, just to further complicate things, I am not confident we have a record's custodian for -- for these documents. It's an outside party and it's 2016.

JUDGE PFEIFER: Is BSI an outside party?

MR. YOUMANS: They are.

MR. FURST: But these have been provided as a business record as I understand it. It's my understanding there's no question as to their authenticity and their feasibility as a business record.

MR. YOUMANS: Well, my objection was hearsay.

JUDGE PFEIFER: Right. It's clearly hearsay. The thing is the business record exception can overcome that but not with this witness and not with Exhibit 161.

MR. FURST: Isn't this a statement by a party opponent?

MR. YOUMANS: It's not even a statement by someone at Amazon.

JUDGE PFEIFER: I think we went through this before and this was when one of the witnesses in the back row wanted to chastise me about how erroneous my ruling was.

I have to reject Exhibit 161 at this time. We can revisit this at a later date if we do -- Mr. Youmans is telling me there is no business record's custodian, which may cause me to rethink whether any witness would be available. It's clearly hearsay at this point. Go ahead and make your record. I know Ms. Kortokrax has strong

feelings about this.

MR. FURST: You can actually say it too probably as well as me.

JUDGE PFEIFER: Yes, you are allowed.

MS. KORTOKRAX: The Department -- it's a statement of a party opponent under 801(d)(2)(3) because it's a statement by a person authorized a party to make a statement concerning the subject does not have to be working for Amazon. They were hired specifically to make this statement, and so that's what the Department would argue, Your Honor.

JUDGE PFEIFER: Well, I have to assume all of that. None of those facts are in evidence here. So I understand your point and you're correct, but this witness can't even verify that Amazon hired BSI and what the parameters were when they hired them and that this is the report that was produced, although you aren't arguing its authenticity.

MR. YOUMANS: We are not.

JUDGE PFEIFER: Still, it's hearsay. I have to reject it on the basis of hearsay. Exhibit 161 is rejected. It will remain in the record until the end of the hearing and we decide whether we are going to revisit this exhibit. I am also designating it as implicating a confidential trade secret.

(Exhibit No. 161 Marked & Rejected.)

MR. FURST: If I could just add to the record I am making here, Your Honor? I understand your ruling. We had a number of situations throughout this matter where Amazon, because of high turnover, has no knowledge as to what happened before X date, and that's hardly the fault of L&I here that they literally don't have people with knowledge of various things that happened that are very relevant to this matter.

JUDGE PFEIFER: I would like to hear your response to that. Is that true? I mean, I am not casting any aspersions. I am just saying, you just suggested there may not even be a record's custodian at Amazon for this 2016 study. Is that -- do you know that for sure?

MR. YOUMANS: I -- we have not found one in terms of laying the foundation for a business record, Your Honor. Again, we're not contesting authenticity. It's the document that we gave them in discovery.

MR. FURST: But what I am understanding is there may not be anyone who works there is now who worked with BSI.

JUDGE PFEIFER: Yeah.

MR. FURST: That's -- that may well be

entirely true, and I am not saying it's intentional in Amazon's part but it -- it's certainly shouldn't stop L&I from being able to get in relevant evidence to prove its case just because people don't work there any more.

JUDGE PFEIFER: Right. That is troubling to me. So let's just get through the witness. I have rejected the exhibit subject to reconsideration. Next.

MR. FURST: The next 162, which is another one from BSI. Do we want to stipulate along the same lines?

JUDGE PFEIFER: Let me open up 162. Why don't you ask the witness the preliminary questions to see? We might be able to get it in through testimony even though the exhibit may not be admissible itself.

Q BY MR. FURST: Mr. Racco, have you ever seen Exhibit 162 before?

A No, sir.

Q It's for outbound ship dock. Are you aware or were you aware of this exhibit before now?

A Of this specific exhibit?

Q Yeah.

A No, sir.

Q Right. And I know you testified that you were generally aware that BSI did studies?

A Yes, sir.
Q And this is not -- and is this one of the studies that you have looked at from BSI?
A No, sir.
JUDGE PFEIFER: Why don't you direct his attention to what you want him to -- we can at least get this in through his testimony. Which page of the exhibit would you like to go?
MR. FURST: 3, page 3.
Q BY MR. FURST: And on page 3 there is the long-term engineering control that's recommended, a height-adjustable conveyor to reduce shoulder reaching and lifting?
A That is one of the items that's listed, yes, sir.
Q And do they also recommend -- well, they also recommend as vacuum lift, and I am thinking further up we might have gone past it, they recommended powered-pallet jacks. I know I had seen that.
MR. FURST: It would probably be further down from where we are now. If I can find that again? I think it's on page 3 somewhere. I will just drop it on the powered-pallet jacks.
JUDGE PFEIFER: You are withdrawing that question?
MR. FURST: Yeah, I am leaving it with

the vacuum lift and height-adjustable conveyor.

JUDGE PFEIFER: Are you moving to admit Exhibit 162.

MR. FURST: Yes, Your Honor.

JUDGE PFEIFER: Mr. Youmans, you have the same objections?

MR. YOUMANS: Same objections.

JUDGE PFEIFER: All right. I am rejecting Exhibit 162 as hearsay. I am designating it as a document that implicates confidential trade secrets. Exhibit 162 is rejected.

(Exhibit No. 162 Marked & Rejected.)

MR. FURST: I am now moving off of the BSI studies, Your Honor.

Q BY MR. FURST: Are you familiar with project Soteria?

A I am generally aware of project Soteria.

Q What is your understanding as to what it was?

A My understanding is that the project was considering the policy changes that were applied during the COVID pandemic and trying to understand their impact on musculoskeletal disorders.

MR. FURST: If we could have Exhibit 164? I will be starting from the top.

JUDGE PFEIFER: Exhibit 164 is a previously moved for admission on July 25th and it was

rejected. It's also been designated as confidential. So you may inquire.

MR. FURST: Thank you, Your Honor.

Q BY MR. FURST: And this is a study from August of 2020?

A That's what the document says.

Q Right. And was your team part of project Soteria or is that a different team?

A No, my team was not part of project Soteria.

Q And were you involved in -- I should say was your team involved in it anyway?

A No, sir.

Q How did you become aware of it?

A I have just heard it mentioned in different context. I can't pinpoint exactly when I was made aware of it or how I know of it.

MR. FURST: Could we go off the record for a minute, Your Honor?

JUDGE PFEIFER: Show us off the record.

(Off the record.)

JUDGE PFEIFER: Back on the record. In an off-the-record discussion, we confirmed that Exhibits 164 and Exhibits 165 will -- are beyond Mr. Racco's involvement, but they would be familiar to Austin Nichols, who is going to be testifying on

October 3rd, and I anticipate that these exhibits will be admitted when Mr. Nichols testifies.

Mr. Furst, do you want to move onto a different topic?

MR. FURST: Actually, could we have Exhibit 166?

Q BY MR. FURST: Mr. Racco, have you seen Exhibit 166 before?

A No, sir.

Q I am trying to determine whether this is related to project Soteria or is entirely different. I mean, there's nothing that indicates it is, but it seems -- there seem to be some overlap and I wasn't sure.

JUDGE PFEIFER: Let's go off the record.

(Off the record.)

JUDGE PFEIFER: Back on the record. We were just discussing the exhibits, and Mr. Nichols is also familiar with Exhibit 166.

MR. FURST: 169, please.

JUDGE PFEIFER: Off the record.

(Off the record.)

JUDGE PFEIFER: Back on the record. Exhibit 189.

MR. FURST: Yes, Your Honor.

JUDGE PFEIFER: We will not display Exhibit 189 but it is on the board here in the room.

Q BY MR. FURST: And have you seen this document before, Mr. Racco?

A Yes, sir, I am familiar with the this document.

Q What is it?

A This document is a report by one of my skip levels that is a study of an overhead lift device in our AMZL delivery business.

Q What did you call the author, a skip level?

A Yes, sir.

Q What does that mean?

A She reports to one of my direct reports.

Q Okay. Got it. And this was done on May 3rd of 2022?

A Yes, sir, the document is dated May 3, 2022.

Q And the recommendation is to eliminate the bottom bin, correct?

MR. YOUMANS: Your Honor, we have an objection based on relevance. Based on the date, this is actually an assessment that was done after the citation was issued to Sumner.

MR. FURST: It's the same process path at Sumner. Whether it was done before or after relates to things like the allegations of the willful or something, which we don't have at Sumner, but it's not --

it's not relevant to its admissibility.

MR. YOUMANS: It's an assessment of ergonomic risk that was performed by Amazon after the citation was issued to Sumner. And as counsel said, there's no allegation of a willful with respect to Sumner.

MR. FURST: No. What I am saying is if it had been done before, then it would be relevant.

MR. YOUMANS: I would agree.

MR. FURST: But any assessment that they do where they talk about something being a risk or they talk about what may or may not be a feasible method of abatement is relevant in this matter.

JUDGE PFEIFER: I have not reviewed this exhibit. Are you telling me that there are recommendations that are consistent with L&I's recommended means of abatement?

MR. FURST: Yes, where they recommended eliminating the bottom bin.

JUDGE PFEIFER: Alright. And is that consistent with what L&I indicated in their citation of the recommended abatement?

MR. YOUMANS: Your Honor, based on Mr. Goggins' testimony, again, we are talking about DSE7 Sumner, the only recommendation for DSE7 was smaller

bags.

JUDGE PFEIFER: I am going to admit Exhibit 189 not to show evidence of any risk or proof of alleged hazard, but I am going to show it as it relates to the Department's burden of proving feasible means to eliminate or materially reduce the hazard.

MR. FURST: That's the only reason we are offering it, Your Honor.

JUDGE PFEIFER: All right. I am going to also designate it as implementing confidential trade secrets. Exhibit 189 is so designated and is admitted.

(Exhibit No. 189 Marked & Admitted.)

MR. FURST: Could we have Exhibit 178?

MR. YOUMANS: This would also, Your Honor, implicate a trade secret.

JUDGE PFEIFER: I have already made a finding that Exhibit 178 implicates a trade secret. Does Mr. Racco have the exhibit in front of him.

MR. FURST: Yeah, I was waiting for us to pull it up.

JUDGE PFEIFER: Alright. It's being displayed here and it won't be shared.

Q BY MR. FURST: This is project Elderwand; is that right?

A Yes, sir.

Q And --

A That's what the document says.
Q I think I briefly asked you about this. Could you explain what project Elderwand was?
A Project Elderwand was an attempt to understand the impact of repetition in the Amazon robotics sortable Pick process path.
Q And are you familiar with Exhibit 178?
A I am familiar with this document, although I am not the author.
Q And is the author someone on your team?
A No.
Q Which team would this be?
A I actually don't know who authored this document.
Q Okay. About 8 or 9 lines down in the first paragraph in the executive summary, they talk about developing a software solution that could be used to effectively eliminate repetition; is that right?
A Yes, sir, that's what it says.
Q And then moving to the next paragraph, the paragraph on repetition limit pre-pilot study, the second sentence that is really long, but about halfway through that long sentence it says, "A thorough study on the negative impact on operations assisting customer experience needs to be studied before we rollout this intervention"; is that right?

A That's what the document says, yes.
Q Do you know if that study was ever conducted?
A I do not, no.
Q Moving onto the second page at the top, the first sentence that starts on that page. So it's the sentence, "Repetition can best be thought of as contributing to the cumulative of damage of tissues resulting from repeated loads up to the point where the applied load exceeds the tissue tolerance." That's what that sentence says, correct?
A Yes, sir, that's what the document says.
Q And do you know if these issues were ever studied?
A I am not clear on the question.
Q Well, the sentence that I just read talks about the impact of repetition on tissues, right?
A Yes, that's a general statement about the impact of repetition on tissues, right.
Q Right. And if I am understanding this in general, like sort of globally, this document is recommending that these issues be studied; is that right?
A Yes, this is a document that is discussing repetition, yes.
Q And the possible impact on repetition on associates?
A Yes.
Q And so my question to you was do you know whether this

medical issue that is -- that I just read was ever studied?

A I do not, no.

Q And then in the next section they talk about the mind and body moments; is that right?

A Yes, sir.

Q What are mind and body moments?

A Mind and body moments are a communication and administrative control, if you will, that in process paths that have a screen, an MMI screen, a human interface screen will pop up messages to the associates about wellness, or well-being, or stretch, or certain other content that gets displayed to the associates.

Q And reading what it says here, are these basically 30-second microbreaks, using Amazon's phrasing here, these mind body moments? I am --

A Yes, on line 57 it indicates them as 30-second microbreaks, yes.

Q And in the next sentence after that it says, "In its current state MBMs have not demonstrated any reduction to MSD recordable incident rates, IRI"; is that right?

MR. YOUMANS: Your Honor, if he's just going to have the read this, can I have a continuing objection to hearsay?

JUDGE PFEIFER: Yes, you may have a

continuing objection to hearsay.

MR. YOUMANS: Thank you.

Q BY MR. FURST: And this is a long -- a long section on the mind/body moments. But if I can direct you down to line 80 on page 2? It talks about a -- line 79, I am sorry, to line 80, 81, it talks about a message that would encourage associates to slow their pace in order to reduce their risk of injury; is that what it says?

A Yes, sir, that's what the document says.

Q And do you know if that type of recommendation was ever implemented?

A I do not know that, no.

MR. FURST: If we could turn to page 12?

Q BY MR. FURST: Are you on that page, Mr. Racco?

A Yes, sir.

Q And on line 316, there's a question asked, "How is this project different than project TAZ." Do you know what project TAZ is?

A Yes, sir.

Q What is it?

A Project TAZ is a project focused on job rotation for associates between Pick and Pack process paths in Amazon robotic sortable facilities.

Q So it focuses on job rotation?

A Yes, sir.
Q And the purpose of the study is to determine whether job rotation eliminate physical fatigue; is that right?
MR. YOUMANS: Objection. Are you asking him whether it says that or what the witness knows?
MR. FURST: I am asking what the witness knows.
Q BY MR. FURST: And was project TAZ focused on whether job rotation eliminated physical fatigue and biomechanical stress?
A To the best of my understanding, project TAZ is focused on understanding the impact of job rotation on musculoskeletal disorders.
Q Were there various -- well, project TAZ is something that's new to me. Were there ergonomic -- strike that. Did you consider the -- strike that. Were there studies that were written about -- as part of project TAZ?
A I don't know the answer to that.
Q Was project TAZ part of your group?
A No, sir.
Q Which group was it?
A I am not sure who owns project TAZ.
Q And looking at line 322, it says, "Job rotational alone does not change the risk factors present in the

workplace. It only distributes the risk factors differently across a large group of people"; is that right?

MR. YOUMANS: Object to form. Is that right, is that what it says, or --

Q **BY MR. FURST: Is that what it says?**

JUDGE PFEIFER: Thank you.

A That's what the document says, yes, sir.

Q **BY MR. YOUMANS: And then along those lines on line 325, does the document say, "Limiting repetition changes the risk profile of the job by reducing the absolute number of motions that an individual is performing?"**

MR. YOUMANS: Well, Your Honor, just to raise the hearsay objection again, I mean, I do think it's improper just to have the witness read hearsay into the records which is mostly what he's done. I don't object to him directing him to parts of this document and asking what he knows or doesn't know about it. It seems to me there's a lot of former and not much of the latter.

JUDGE PFEIFER: Well, the witness said he's familiar with this document. It's been offered twice and rejected both times.

MR. FURST: I am trying to get -- so I have been going through trying to show its relevant after everything we have heard about pace of work and

repetition.

And this goes back to our earlier discussions as to finding the right witness for these documents.

JUDGE PFEIFER: Well, there's no context because the exhibit is undated.

MR. FURST: And this is the exact problem that we have a number of exhibits that are unauthored and undated, none of which is L&I's fault.

JUDGE PFEIFER: Is this how the -- is this the form in which the exhibit was provided to you -- to the Department?

MR. FURST: Yes. And we haven't -- I mean, we didn't alter anything.

JUDGE PFEIFER: Let's ask the witness if he knows anything about when this was produced and in what context, otherwise it's not very helpful to me.

Q BY MR. FURST: Do you know any more about Exhibit 178, whether there's other versions of it, whether there's versions that are dated and authored?

A I do not, no, sir.

Q Do you know why certain ergonomic recommendations or studies by Amazon would be undated or unauthored?

A I do not, no.

Q And do you know if there's other similar reports that are part of project Edlerwand?

A I do not.

JUDGE PFEIFER: That's about as good as you are going to get. I appreciate you asking those questions.

MR. FURST: I move for admission of Exhibit 178, Your Honor.

MR. YOUMANS: Objection; hearsay, foundation.

JUDGE PFEIFER: Have you seen this document prior to your testimony today?

A I believe it came up in one of the other depositions that I was part of.

MR. YOUMANS: Your Honor, I am sorry, just one other thing in terms of dating this document, if you look at the bottom of page 1, working backwards to conduct or to conduct the pre-pilot starting in August 2022. I think based on that, this is a recent document. It's post all the citations.

MR. FURST: If I am reading that sentence right, they are talking about that they want to start a pre-pilot in August 2022. I can't tell how soon before that they wrote this.

JUDGE PFEIFER: Is it likely, Mr. Youmans, given your knowledge of Amazon, that this was -- this exhibit was prepared after the final citation

issued in this matter in March 2022?

MR. YOUMANS: I think so, Your Honor. But in light of Counsel's comment about what I just quoted, I am not sure. I am looking for something in here that would give us a clue. I do know this a recent project and I believe Mr. Racco --

MR. FURST: If I can, Your Honor? Even if it's true that they started this a week after the citation was issued or whenever, it's still relevant to the issues that we have been arguing about here as to the impact of repetition.

My co-counsel has pointed out to me that in the first paragraph around lines 6 or 7, they talk about something that happened in August 2021, which is before the Kent citation was issue, started, or would have been. It's -- it wouldn't have been before it, you know, we are right in that time frame.

JUDGE PFEIFER: Is this one of the documents you received in July, Mr. Furst?

MR. FURST: Yes.

MR. YOUMANS: And, Your Honor, looking at page 10, it looks like they are basing this on an analysis of 2021 data. So I think that puts us at least into 2022. Again, this is recent. I still don't understand the relevance. I mean, it's basically

proposing that we study an issue in terms of repetition. I mean, there's no conclusion in this, or outcome, or recommended abatements. It's not going to go to feasibility.

MR. FURST: I would disagree with that, Your Honor. There's some statements made in here as to the author's opinion as to some things that aren't working at Amazon and as to the issues involving the impact of repetition.

JUDGE PFEIFER: Mr. Racco, who -- what team was in charge of project Elderwand?

A To the best of my knowledge, it was the Global Health Technologies Team.

JUDGE PFEIFER: Do we have any witness from the Global Health Technologies Team that's scheduled to testify?

MR. YOUMANS: We don't, Your Honor.

JUDGE PFEIFER: All right. State your objection to the exhibit if you would, Mr. Youmans, please.

MR. YOUMANS: Again, relevance, foundation, and hearsay, Your Honor. And I am sorry, we are getting -- so we will have to confirm this, it looks like the meta data shows that the document was created in July of 2022, which, if true, means this is, again, this

is all post citation. The citation, the last citation I think at BFI4 was March of 2022. At best, this is a post-citation assessment that says Amazon is looking into this issue. We don't deny that. It's not going to do anything in terms of the Department's burden of proof.

MR. FURST: Your Honor, it's certainly relevant to this -- to the author's opinions as to the impact on muscles and things like that of repetition, which it doesn't matter what date someone came up with that conclusion. Human muscles aren't any different in 2021 than in 2023.

JUDGE PFEIFER: But this document can't be used to prove any of the elements that of the Department's citation given when it was created unless you are telling me something that there are abatement methods that are recommended in here, are there?

MR. FURST: But it talks about the opinions -- it supports the opinions of the Department's experts of the importance of dealing with the issue of repetition, and it backs up Dr. Harris 'testimony as to muscle fatigue.

JUDGE PFEIFER: It does, but -- when does the meta data show that this was created?

MR. YOUMANS: July of 2022, Your Honor.

JUDGE PFEIFER: Yeah.

MR. YOUMANS: I guess on the repetition issue, we have never taken the position that that's irrelevance. And Mr. Racco, I think today, has testified today about some of his analyses looking at the issue.

MR. FURST: We have as one of our elements of the citation that the pace of work, which relates to repetition, is one of the items that was cited at Kent as the -- as a -- as hazard. They have moved to dismiss on it. I don't know how he could say they never said it's not relevant or not a hazard.

JUDGE PFEIFER: All right. Have you made your record, Mr. Youmans?

MR. YOUMANS: Your Honor, I apologize. Just to complicate things, we are not confident of that July 2022 date. I can't say for sure that's when it was created. It's possible it was created before then. It's clearly a recent document but we are not sure if July 2022 is the right date.

MR. FURST: And our position, Your Honor, is that the exact date doesn't matter for the purposes that we want to use it.

JUDGE PFEIFER: I am going to admit Exhibit 178 and I am not sure what, if any, usefulness I

will find in it. Exhibit 178 is admitted.

(Exhibit No. 178 Admitted)

JUDGE PFEIFER: Off the record.

(Off the record.)

JUDGE PFEIFER: Back on the record.

Mr. Furst?

MR. FURST: Thank you, Your Honor. If we could pull up Exhibit 163?

JUDGE PFEIFER: Mr. Youmans, confidentiality.

MR. YOUMANS: I am sorry, yes, Your Honor, we would assert this is a confidential trade secret.

JUDGE PFEIFER: All right. We will not be displaying it.

Q BY MR. FURST: Mr. Racco, this is another one of the BSI studies, correct?

A Yes, sir.

Q Are you familiar with this study?

A No, sir.

Q Have you ever seen it before?

A No, sir.

MR. FURST: If we could scroll down a few pages to the conclusions? Little further I think. I am looking for a picture. Yes, there we go.

Q BY MR. FURST: They are talking about a pallet-wrapping device on page 3, is that right, Mr. Racco, that it mentions a pallet-wrapping device?

A Yes, sir.

Q And a pallet-wrapping device, isn't that one of the methods of abatement that L&I recommended?

MR. YOUMANS: Objection; relevance and, actually, that's not true. This was not a recommended abatement.

JUDGE PFEIFER: I didn't think it was.

MR. FURST: I thought we discussed it.

MR. YOUMANS: There was testimony from the experts as I -- that this was just a best practice. They didn't find an ergonomic risk relating to the actual wrapping of the pallets.

JUDGE PFEIFER: All right.

MR. FURST: I will withdraw that one. But I wanted to add something on this BSI document, Your Honor.

JUDGE PFEIFER: The exhibit hasn't been offered yet, but Mr. Furst has something to tell me about that I think.

MR. FURST: I also wanted to add to our explanation on these BSI documents in general, not just this one, that we're not offering these for the

truth of the matter asserted. We are offering these as a hearsay exception to explain course of conduct or lack thereof because it shows that Amazon had knowledge back in 2016. And our assertion is that they didn't act on these recommendations after they got them. So that's -- that's different than admitting them only for the truth of the matter asserted. It's hearsay exception for just explaining lack -- for just explaining the party's course of conduct or its non-course of conduct because it goes to the knowledge issue.

JUDGE PFEIFER: But wouldn't the underlying truth have to be -- it does go to the truth of the matter asserted for it to have in any bearing on course of conduct, right? That's the way I see it.

MR. FURST: No. What I am saying, Your Honor, is that they received a large number of recommendations to do X, Y, and Z, and didn't do that. That is either course of conduct or --

JUDGE PFEIFER: I see.

MR. FURST: Or lack of course of conduct.

JUDGE PFEIFER: I see. Thank you for that clarification.

Do you want to be heard on that, Mr. Youmans?

MR. YOUMANS: So I am trying to track

the last argument, Your Honor. But to me, it seems like it's only relevant if the underlying statement is true, right? I mean, they are offering it basically to say, "Hey, there's risk in this particular process path." If that is not true, it's irrelevant. And so I think they need to establish it is true for it to be relevant, and that's hearsay.

In addition, I mean, the current one we are talking about, additional relevance objections, this is '07 in a pantry site. Now we are at a totally different type of facility, it's not the same process path, and at least so far, the only recommendation that the Department has cited has been in abatement that they have actually not recommended in this case.

JUDGE PFEIFER: So do you object to any questions about Exhibit 163 as far as having Mr. Racco read portions of it into the record? Is that your objection in part?

MR. YOUMANS: Yes, I don't think the exhibit should be admitted. And I would object, if it's just reading hearsay statements into the record, I don't think that's appropriate, it's hearsay. If we wants to direct him, again, to parts of it and ask what he knows, I think that's proper.

JUDGE PFEIFER: Alright.

Q BY MR. FURST: And in this sentence No. 2 that's displayed here, they recommend a vacuum lift, correct?

JUDGE PFEIFER: That's question to you, Mr. Racco.

A Yes, sir.

JUDGE PFEIFER: Scroll down, please.

A That's what the document says.

Q BY MR. FURST: That's been discussed as a method of abatement here in this matter, correct?

MR. YOUMANS: And, Your Honor, I understand I have got a continuing objection based on hearsay; is that correct?

JUDGE PFEIFER: You do, yes.

MR. YOUMANS: Thank you.

A Yes, we discussed vacuum lifts.

MR. FURST: And move for admission of 163 for the reasons that I have recently explained and explained before the break.

MR. YOUMANS: Same objections, Your Honor.

JUDGE PFEIFER: Yeah, I am rejecting it just as I rejected the other two BSI studies. It's inadmissible hearsay. Exhibit 163 implicates a confidential trade secrete. It is so designated and Exhibit 163 is rejected.

(Exhibit No. 163 Marked & Rejected.)

MR. FURST: And I am done with this exhibit, Your Honor.

Q BY MR. FURST: Different topic, Mr. Racco. You were asked some questions about the costs of various projects. And you explained some of the costs, both globally and I think at least once or twice to what the costs were at BFI3 and BFI4, correct?

A Yes, sir.

Q And when you're looking at costs, does Amazon also look at the possible cost savings that are involved in a successful ergonomic intervention?

A Cost savings with respect to?

Q To lower worker's compensation costs and all the other costs that go with not having a worker injured?

A The overall business cost is part of the approval process; however, the costs of the project does not factor into whether or not it gets approved or not.

Q So the cost of a proposed ergonomic intervention is not relevant for -- to Amazon as to whether it gets approved?

A The cost savings are not relevant.

Q Oh, okay. Why is that?

A Why are cost savings not?

Q Yes.

A Because we view the health and safety of our associates

and the implementation and the continuous improvement of musculoskeletal risk factors as not being relevant from a business case standpoint. The interventions are designed and developed to improve the conditions for our workforce.

Q Well, let me see if I am understanding this, I am not saying I disagree with it. Are you saying that it's so important to improve safety that it doesn't matter what it costs, or are you saying something different?

MR. YOUMANS: I will object based on foundation, Your Honor, personal knowledge. I am not sure if this is a question about were all the stakeholders and approval take into account or just Mr. Racco.

JUDGE PFEIFER: Overruled. Do you understand the question?

A I don't, sir.

JUDGE PFEIFER: That's fine. If you could you state that.

MR. FURST: Okay.

Q BY MR. FURST: I asked you why cost savings are not part of Amazon's consideration, and you gave an answer I didn't really understand. I am asking you to explain what you said before as to why cost savings are not taken into account.

A So for an ergonomics or safety project, the project does not necessarily need to deliver a return on investment for the project to be approved if it's a safety or ergonomics improvement project.

Q I understand that. I am -- so my question then is do you know why that is the case?

A Do I know -- I am sorry, I still don't understand the question.

Q Do you know why you're considering the cost?

A Because we're focusing on the improvement of the work conditions for our associates.

Q Have -- let me ask this in a different way. Has -- are you aware of either your team or anyone at, I will call it a local-level, ever propose an ergonomic intervention that was then rejected because of cost?

A I don't have any firsthand knowledge of that, no.

Q And -- but you're unaware of that every happening, right?

A I am not aware of any, no.

Q And would you agree though even though Amazon isn't considering it, would you agree, Mr. Racco, that Amazon would be saving money if an ergonomic intervention is successful in lowering the number of injuries?

MR. YOUMANS: Well, objection; vague.

JUDGE PFEIFER: Overruled. You may answer.

A Again, I am not sure I understand the question, sir.
Q BY MR. FURST: I am just -- I am asking whether you would agree with the hypothesis or statement that a successful ergonomic intervention may lower Amazon's worker's compensation costs and other costs that are related to injuries?
MR. YOUMANS: Objection; vague speculation.
JUDGE PFEIFER: Overruled.
A Successful ergonomic interventions potentially have multiple positive impacts on the business.
MR. FURST: I don't have any further questions, Your Honor.
JUDGE PFEIFER: All right. Thank you. Show us off the record.
(Off the record.)
JUDGE PFEIFER: Back on the record.
MR. YOUMANS: Could we take a look at Exhibit 163, Judge Hendrickson?

R E D I R E C T E X A M I N A T I O N

BY MR. YOUMANS:
Q So, Mr. Racco, we're looking again at Exhibit 163. It hasn't been admitted but there was some testimony that you gave relating to these BSI assessments, correct?
A Yes, sir.

Q And I think you testified, you can correct me if I am wrong, that you were generally aware that these had been done but you hadn't reviewed them in any sort of detail; is that accurate?

A That's correct.

Q When you were hired by Amazon in 2019, why didn't you go back to these BSI studies and study them in detail?

A So a couple of reasons, primarily they were already three years old by the time that I had started and we didn't have any indication that there hadn't been changes to the sites that would make these relevant to look at.

And then additionally, my understanding was that these were primarily completed -- these risk assessments were primarily completed using says semi-quantitative methods, specifically REBA and RULA assessments, which wouldn't provide us a great deal of insight into the specific risks or the potential corrective actions.

MR. YOUMANS: Could we take a look at the last page of this exhibit, please?

Q BY MR. YOUMANS: And so this would be --

MR. YOUMANS: If we could scroll up a little bit?

Q BY MR. YOUMANS: This would be a REBA employee assessment worksheet that was the basis for this particular BSI study; is that correct?

A Yes, sir.
Q And the REBAs and the RULAs are those assessment tools that you and your team uses to assess ergonomic risk?
A They are not.
Q Why not?
A Because we have more comprehensive methods, the ones that I described earlier today supported by our Digital Human Modeling and the accompanying analysis tool.
Q And just in terms of some of the recommendations that Counsel mentioned that are in these BSI assessments, I think one of them was vacuum lifts, one was some sort of adjustable-height table, are -- we had testimony, but are those things that you and your team have looked into during your time at Amazon?
A Yes, sir.
MR. YOUMANS: Let's take a look at Exhibit 178, please.
Q BY MR. YOUMANS: So looking at 178, Exhibit 178, you've testified, Mr. Racco, that you didn't author this document, but in terms of your involvement in project Elderwand, you testified, I believe, that you and your team were at least involved in doing some sort of analysis relating to this project; is that true?
A Yes, sir.
Q What sort of analysis did you do in relation to this

project?

A The analysis that we did was to attempt to work backwards from our current product weight and bin elevation distribution in our Amazon robotic sortable Pick process path to work backwards to an upper limit on repetition.

Q Okay. An upper limit on what, the number of units picked?

A Yes.

Q During a particular time period?

A Yes, during a normal shift.

Q Okay. Why are you looking into an upper limit, what are you trying to accomplish?

A So we were trying to again understand the impact of repetition on MSD risk.

Q And is the idea to see if there's some sort of upper limit per shift that might have an impact in a positive way in MSD risk?

A Yes.

Q And after you did that analysis, looking at, I guess, this issue of would an upper limit have an impact on risk, did you have any other involvement relating to Elderwand?

A So following our assessment, there was an evaluation on whether the mind and body moments could enforce this upper limit, and the conclusion was, no, that it could

not.

Q And the mind and body moments you mentioned those earlier, but those are essentially the microbreaks that occur during the shift?

A Yes, sir.

Q And were you involved in doing that assessment or experiment in terms of trying to use these microbreaks to sort of enforce an upper limit?

A Yes, we were part of the team that evaluated whether or not they couldn't enforce the upper limit.

Q I think you said this was not effective. Why not?

A The -- for the technical reasons that the sampling period could still -- could not enforce the upper limit. The way the mind and body moment sampled the associate work, it was not able to enforce the upper limits.

Q Didn't have an impact on it?

A No.

MR. YOUMANS: Let's take a look at page 13 of the exhibit, please?

Q BY MR. YOUMANS: We are still looking at project Elderwand. And right at the top there it has Q3, "What is the long-term solution for the project? At this point, a long-term solution has not been identified;" do you see that?

A Yes, sir.

Q And "The purpose of this pilot is to determine the correlation between shift-level repetition limits in and MSD RIR." What is MSD RIR if you know?

A Musculoskeletal disorder recordable incident rate.

Q It says, "Once this data is gathered, eloquent solutions can then be proposed and designed if the data suggested this is the correct direction. This pilot is operating under a bias for action to gather the necessary data to determine if this is in fact an area of opportunity for MSI IRI reduction or not." And so to the best of your knowledge, has either your team or anyone else at Amazon actually concluded at this point that setting some sort of upper limit per shift on the number of units picked would have some positive impact on MSD risk?

A We have not, no.

Q And in terms of looking at this issue of repetition, is there anything new and your team are doing in terms of trying to look at the relationship, if any, between repetition and MSD risk?

A Sure. So all of our deep dive into musculoskeletal risk assessments, they all consider repetition as one of the primary risk factors in determining our baseline risk, and then the interventions that we describe or that we develop. From that standpoint, all of the interventions that we build include repetition in some way.

Q You were asked some questions about the number of ergonomists at Amazon at sort of different points where -- or during your employment at Amazon. When you came to Amazon in 2019, I think you said you were the only ergonomist in WHS or Workplace Health and Safety; is that correct?

A Yes, sir.

Q Were there other ergonomists on staff at Amazon when you came on board in 2019?

A Yes, sir.

Q What departments did they work in?

A The other ergonomists worked in the World Wide Design and Engineering Department.

Q And then in terms of the number of ergonomists within your team during your time there, I understand that when you came on board in 2019 it was just you on the team, correct?

A Yes, sir.

Q And then when we get to 2020, how many ergonomists are on your team?

A In 2020, I had six reports.

Q And then I think you have already testified about how many you had in 2020 -- 2021 and 2022; is that correct?

A Yes, sir, that was 18.

Q 18 for which year?

A For 2021 and 2022.
Q You were shown some of the testimony from your deposition about muscle fatigue and whether you used or didn't use, I think it was EMG and heart rate monitoring; do you recall that?
A Yes, sir.
Q Just so the record is clear, do you and your team sometimes use EMG?
A Yes.
Q And have you already testified about what circumstances you use it in?
A Yes.
Q And just so the record is clear, do you and your team sometimes use heart rate monitoring as one of your tools?
A Yes.
Q You have already testified, I think, about the circumstances in which your team uses that, correct?
A Yes.
MR. YOUMANS: If I could have one minute to confer?
JUDGE PFEIFER: Yes. Show us off the record.
(Off the record.)
JUDGE PFEIFER: Back on the record.
Q BY MR. YOUMANS: Mr. Racco, I had just one other, maybe a

couple of questions. But it relates to the approval process that you described. To your knowledge, are there any sort of simple ergonomic changes that the sites are allowed to make that would not have to go through the approval process you described?

A In terms of just like just do-it actions or --

Q Yeah, I don't know. Any kind of action that the site could potentially take to improve or try to improve ergonomics, is there anything that you are aware of that the sites could do or would do that would not necessarily have to go through your approval process that you described?

A The -- I mean, sites do have the authority to make changes that don't have to like a full, you know, stakeholder group if the change is relatively minor and only affects their own specific site.

Q Can you think of any examples of what would fall in that relatively minor category?

A Like something that might be a site specific, you know, might be changing like the orientation of a shelf or a rack, you know, based on something unique to that building, like a column, or something along those lines.

MR. YOUMANS: I don't have any other questions. Thank you.

JUDGE PFEIFER: Mr. Furst?

MR. FURST: Just a couple of questions.

R E C R O S S - E X A M I N A T I O N

BY MR. FURST:

Q So you were asked about the BSI studies. Had you talked to someone when you started in 2019 about these studies is that what I understood?

A No.

Q So how did you become aware of them? That's what I am trying to figure out.

A I was just generally aware that there had been studies completed in the past by sites or by other third parties.

Q And were you able to find out whether Amazon acted or started any studies based on the recommendations of BSI?

A I was not, no.

Q And for project Elderwand, if I understood your testimony right, your team was involved in determining whether mind/body moments would be able to enforce some type of upper limit for the number of units picked; is that right?

A Yes.

Q And your conclusion of your team was that mind/body moments would not work to accomplish that, correct?

A The conclusion of the team that was looking at it was that the mind and body moments were not effective in

creating the upper limit, no.
Q And did your team determine what the upper limit should be on the number of units picked?
A The -- that was part of the working backwards analysis that we did from the weight distribution and the bin elevation distribution.
Q So what upper limits did you determine were appropriate?
A The -- I believe it's in the document, the -- I don't recall the specific number --
Q So it's in Exhibit 178?
A If that's the exhibit.
Q That's the exhibit we were talking about.
A Yes, sir.
Q So what's -- so what's referenced in there were the conclusions of your team?
MR. YOUMANS: Objection; vague, referencing "in there."
Q BY MR. FURST: The references in there to what the upper limits should be, were the conclusion of your team; is that what you are saying?
A Yes.
Q And do I -- and have those upper limits that are discussed there, has that ever been enforced in any way?
A Not to the best of my knowledge, no.
MR. FURST: I don't have any further

questions.

MR. YOUMANS: Just one or two, Your Honor.

R E D I R E C T E X A M I N A T I O N

BY MR. YOUMANS:

Q So with reference to this upper limit that your team suggested in the document, again, did your team or has your team at any point actually confirmed that setting that limit or any other upper limit on the number of items picked would in fact reduce musculoskeletal risk?

A No.

Q To your knowledge, has anyone else at Amazon, any other team, confirmed that this limit or any other upper limit would in fact reduce musculoskeletal risk?

A No.

MR. YOUMANS: No further questions.

JUDGE PFEIFER: Mr. Furst?

R E C R O S S - E X A M I N A T I O N

BY MR. FURST:

Q Have you confirmed that it won't reduce MSDs?

A No.

MR. FURST: No further questions.

JUDGE PFEIFER: Thank you, Mr. Racco, for your time and testimony. You are excused as a witness. Show us off the record.

(Proceedings adjourned at 4:52 p.m.)

TRADITIONAL NON-SORT PACK TABLE REDESIGN (PROJECT BONSPIEL) – NETWORK DEPLOYMENT

ALL TNS PACK SINGLES WORKSTATIONS

03/31/2022

CAPEX: $0.00M **OPEX**: $0.00M **NPV**: $0.00M **Payback Period**: 0.00 years

EXECUTIVE SUMMARY

The Human Factors and Ergonomics (HFE) Engineering team is requesting network approval for new Traditional Non-Sort (TNS) Pack Tables specifically designed to reduce musculoskeletal disorder (MSD) risk. The redesigned pack tables reduce MSD risk to the shoulder by up to 47% and MSD risk to the low back by up to 53%. PHL5 has reported zero MSD incidents associated with the redesigned pack tables compared to 13 MSD incidents on the existing pack tables over the pilot period. PHL5 reports between a 2% and 7% productivity gain on the redesigned pack tables compared to the existing pack tables over the pilot period.

Current State

The Pack Singles process accounts for 17.2% (1,036 incidents) of the USNS recorded MSD, since 2018 (Appendix A). The back, shoulder, and wrist are the three most commonly reported injury locations (Appendix A). Multiple sites have independently highlighted areas of concern and have been actively seeking assistance to reduce the frequency of MSD incidents at pack tables. The TNS Pack Singles process path was therefore identified as a priority for a comprehensive quantitative biomechanical analysis and ergonomic focused intervention plan in North America (NA) by HFE Engineering. The current pack tables are: (1) 34in deep, (2) positioned perpendicular to the take away conveyance, requiring a twist to load product, (3) equipped with under table box suites, and (4) two box suites positioned 34in forward of the associate. These design features contribute to MSD risk by: (1) forcing the associate to rotate greater than 90 degrees with loads, (2) bending below the work surface to acquire boxes, and (3) reaching forward 34in to acquire boxes. In addition to MSD risk factors no standardized layout has been established with positioning of dunnage machines, printers, screens, and large box racks across facilities.

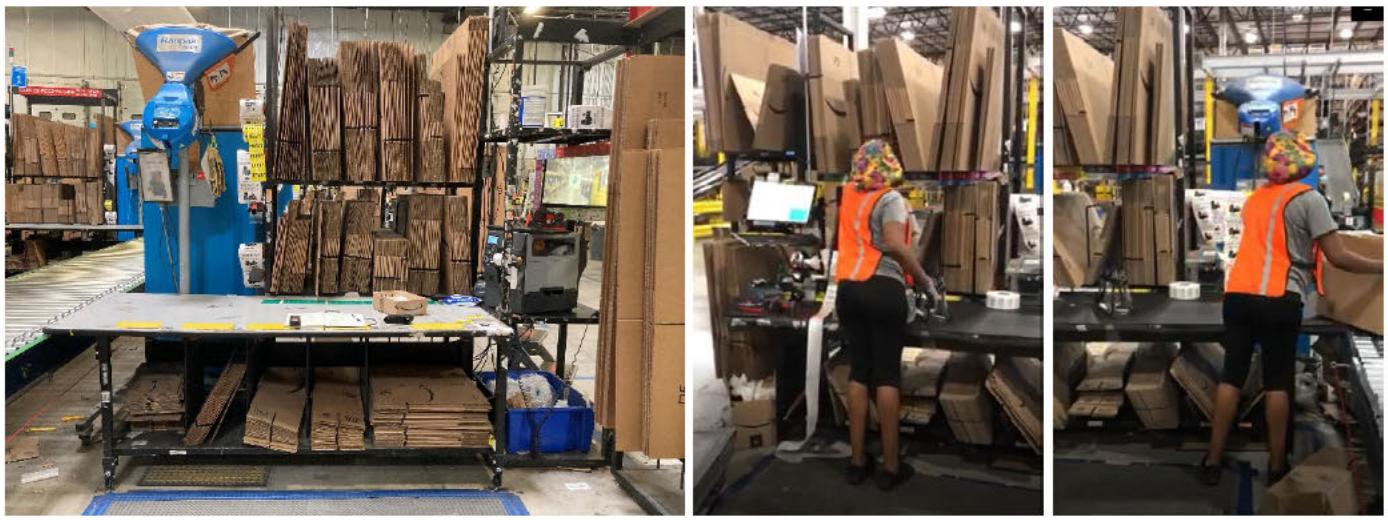


Figure 1: Current pack stations PHL5, and BNA2.

Desired State

The redesigned pack table: (1) reduces table depth to 26in, (2) Positions the station parallel to the takeaway conveyor, enabling a forward push to load product on the take away, (3) eliminates under table box storage, and (4) consolidates large box storage adjacent to the table enabling the associate to select a box without an extended reach up or forward. The changes present a reduction in MSD risk by up to 47% for the shoulder and up to 53% for the lower back. This reduction is achieved through the combined changes to the table and box suites. Reducing the table depth from 34in to 26in reduces the compressive forces on the low back from 1,811N to 1,1197N and the moments of force on the shoulder from 38.3Nm to 19.9Nm when reaching for boxes. Positioning the station parallel

to the line so associates can push forward reduces the compressive forces on the low back from 1,723N to 1,1013N and the moments of force on the shoulder from 31.6Nm to 19.5Nm.

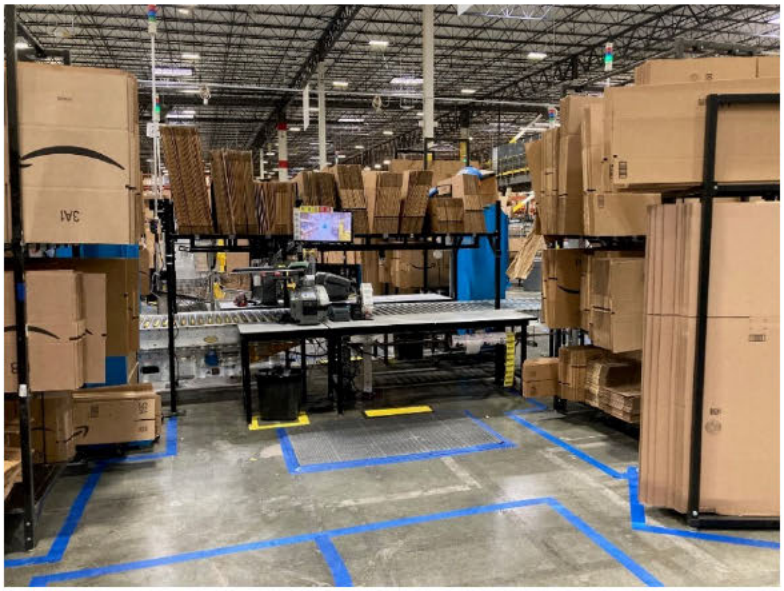


Figure 2: Beta Pilot Pack station, PHL5.

Broadcast video of GEN 5.0 Pack Table at PHL5: TNS Pack Station Redesign - BETA Pilot

Objective

- To obtain network approval for the HFE Engineering retrofit design of the TNS Pack Single workstation for all TNS locations by all key stakeholder by April 15, 2022.
- To obtain CAR funding approval for the retrofit design of the TNS pack singles workstations for all TNS locations by April 22, 2022 to start the replacement of all existing pack tables in the TNS Network with the new pack station design by Q4, 2022.
- Reduce MSD Recordable Incidents at TNS Pack by 25% in 2022.

PROJECT SCOPE

1. Scope

- To outfit the TNS Network with the new pack station design by Q1 2023.
- TNS Pack Singles: Site Data Collection

Business Unit	# of Sites	# of Units	Est. Cost per Unit	Total Budget
TNS (Pre-2021 Launch)	55	3,485 (1,743)	4,202.05 (2)	7,324,174.00 USD
TNS (Post-2021 Launch)	18	1,100	4,202.05 (2)	4,538,214.00 USD
Grand Total	73	4,585	4,202.05 (2)	11,862,388.00 USD

- Update Launch Modules for 2023+ launches for future TNS Sites.
- Third party install is not included in the above cost. Each station requires 1 hour to assemble, and 8 hours per line.

2. Dependencies

- Key stakeholder approvals for the Dehnco TNS Pack Singles workstation design for the TNS network.
- Partnership with the Pi2 and Ops Integration teams for network deployment.
- Partnership with Local Operation and Process Engineering Teams to install new stations networkwide
- Identification of trusted local third-party vendors to install the new stations networkwide.

3. Safety

The redesigned pack table reduces MSD risk to the low back and shoulder musculoskeletal disorder risk by 27 to 57% (Table 1).

Individual Existing Site Implementation Risk Reduction			
	Eliminate Under Table Box Storage	Table Rotation	Table Width Reduction
Shoulder Risk	-	47% Reduction	14% Reduction
Low Back Risk	53% Reduction	27% Reduction	32% Reduction

Table 1: Risk reduction for the redesigned pack table compared to the current pack table.

Alpha Pilot (8 stations): 07/11/2021 to 02/25/2022
PHL5 recorded 13 MSD incidents across all pack stations during the Alpha Pilot associated with workstation design. There were zero MSD incidents reported on the eight redesigned pack stations compared to 13 MSD incidents reported on the 40 existing pack stations. All eight redesigned pack stations were fully staffed for the entire Alpha pilot.

Beta Pilot (48 stations): 02/28/2022 to 03/25/2022
PHL5 has recorded zero MSD incidents across 48 redesigned pack stations associated with workstation design since the start of the Beta Pilot.

HFE Engineering Ergonomics Specialist and PHL5 Workplace Health and Safety (WHS) Manager review incidents reports weekly throughout the trial to verify and validate root cause of any pack MSD incidents.

4. Sourcing Strategy and Cost Model

- The current workstation Vendor [redacted] has quoted an 8-week lead time to start production.
- The Category procurement partner for this project is [redacted]
- Vendor quoted that upon receipt of purchase order, the lead times would be 6-8 weeks until first access with approximately 2 sites delivered per week, with full network roll out by Q1, 2023.

5. Benefits

Pilot Results:

PHL5, has reported zero MSD incidents since installation of the new pack stations in both Alpha and Beta pilot phases. In addition, the site reported a 7% increase in units per hour (UPH) for the Alpha Pilot. Beta testing 02/26 to 03/18 has returned an average increase in UPH by 1.1% for pack singles and 5.1% for pack multis.

Ergonomic Benefits:

- Box suite orientation and design changes: 53% reduction in low back MSD risk factors
- Pack Singles station design changes: 47% reduction in shoulder MSD risk factors AND 27% reduction in low back MSD risk factors.

Voice of Associate (VOA) Themes:

- Associates like the increased space to perform the pack function.
- Associates like the pushing action of the new design station orientation to the conveyor, compared to the twisting action of current state.
- Associates state they twist less and feel a difference in their low back with the new design station orientation to the conveyor, compared to the twisting action of current state.
- The reach is more manageable for associates for the general population.

VOA Results:

- 93% state that the new design reduces the twisting and bending strain of the pack singles process.
- 92% positive response to the station design and the reduction of twisting in the job function.
- 85% positive response to the increased space and layout of the new station design.
- 75% positive response to the new orientation of the table to the conveyor, in relation to the pushing of the box to the conveyor.
- 75% positive response to the changes in box locations, in relation to bending at the waist.

- 64% state they find it easier to access the upper box suite.

VOA Verbatims:

- "The setup of the workstation allows you to have more room to work instead of hitting your back into the box stations behind you. This set up is perfect"
- "I like to push the package more than the way I had to on the old station"
- "I like that the workspace feels larger"

Station Replacement

We recommended replacing all pack stations in the TNS network with the new pack station design to reduce the current MSD risk in alignment with the 2025 MSD reduction goal. PHL5 and IND2 were selected as pilot sites due to both the sites need to update and replace end of life and failing work stations. By selecting them as pilot sites we eliminated the cost of double replacement. We recommend prioritizing a rollout strategy that starts with the oldest sites and the sites with the highest MSD recordable incident rate (RIR).

6. Deployment Timeline

Deadline	Date (m/d/yy)	Comment(s)
Complete Network Pilot	03/31/2022	
Collect site specific needs, total number of stations required.	Complete	
Complete Network Lessons learned document	03/31/2022	
Complete Network Deployment Checklist	03/31/2022	
Submit for Network Approval	03/31/2022	
Obtain Network Approval	04/15/2022	
Obtain Network CAR Funding	04/22/2022	
Transition Project to Pi2 Team and Category Procurement for Network Deployment	04/22/2022	
Deployment Start	Q3, 2022	6 weeks post PO issuance
Deployment End	Q1, 2023	25 – 30 weeks

Table 2: Risk reduction for the redesigned pack table compared to the current pack table.

7. Disposal/Transfer of Existing Assets

Each site has the ability to manage the disposal or transfer of existing assets:

- Site may identify a vendor to break down and recycle current state pack singles stations.
- Site may enter into idle assets for network distribution if stations classified as in proper condition.
- Site may reallocate current stations to overflow lines or pack singles lines designated for peak season.

8. Internal Amazon Labor – Execution Plan

Vendor Labor? ☒Yes ☐No

Internal Labor? ☒Yes ☐No

Site RME will be asked to provide the deployment POC with a known and respected vendor to support the build, installation, and removal of all parts associated with this project.

Total Labor Hours: Third Party Vendor Estimation: 30 Hours for 45 station Assembly (1.5 stations per hour), 10 hours per line to install (8 stations) one hour per station.

IT Labor includes 1 hour per station with 8 stations with an estimated 8 labor hours

Is downtime required for work? ☒Yes ☒No Based-on site demand, downtime may be required. For pilot sites, the number of lines and number of stations used per day and per shift did not require down time.

9. Risks and Blockers

- Network deployment approval and financing.
- Financial Risk: Pilot site RME bandwidth to identify vendors and cost for vendor install exceeding original request.
- Prime Day and Peak may be a limiting factor for sites that receive station deliveries during this timeframe.

10. Possible Alternatives

NA Field Ergonomics Team has ruled out modifying current state stations in Q3 2020 after a Gemba Go See Event at BNA2. Key stakeholders were present key feature changes and an adjustable height table was introduced. Following the Gemba Go See Event, key stakeholders reviewed proposed solutions to include a conveyor facing station design similar to ARNS and ARS/TSSL Pack Multis. The HFE Engineering team conducted a human modeling analysis and four design considerations were presented to the core team. This project worked through five iterations of the design to maximize VOA and Voice of the Business (VOB).

Do Nothing: The network could make no change to the pack table design. Continuing with the existing design would not change the MSD risk profile and there would be no reason to expect that the frequency of MSDs at the pack station would change. Doing nothing does not contribute to the goal of 40% reduction in injuries by 2025.

Turn Existing Tables Parallel to the Takeaway Conveyor: We considered maintaining the existing pack tables and turning them parallel to the takeaway conveyor. The table position resolved issues with twisting while moving packages but the table depth continued to drive reaches when selecting boxes.

Height Adjustable Pack Table: An adjustable height pack table was considered as an early design alternative. Simulations and VOA determined that the adjustable height table was not a feasible option. Developing an interface between the adjustable height table and the package takeaway conveyor that did not required the associate to lift the package, and thereby introduce a new MSD risk factors was a barrier to implementation. Additionally, the range of item dimensions in TNS would not have resulted in associates working at a higher percentage in their power zone even with a height adjustable table.

Angled Work Surface: An angled work surface was considered as an early design alternative. While simulations supported the angled work surface, VOA was strongly against the angled work surface. The force to slide packages from the angled work surface to the takeaway conveyor were an area of concern for associates.

Hybrid Angled/Flat Work Surface: A hybrid angled-flat work surface was considered as an early design alternative. The hybrid solution was deemed not feasible because it limited both the flat and angled work surface areas.

11. Project Team and Stakeholders

Role	Name	Alias
WHS Leader and Sponsor	[redacted]	[redacted]
Operations Leader Sponsor	[redacted]	[redacted]
HFE Director of Ergonomics	[redacted]	[redacted]
HFE Engineering Leader	[redacted]	[redacted]
HFE Engineering Sr. Ergonomist	[redacted]	[redacted]
HFE Engineering Project Support	[redacted]	[redacted]
WHS Pi2 Support	[redacted]	[redacted]
PHL5 Site Leader	[redacted]	[redacted]
PHL5 Operations POC	[redacted]	[redacted]
PHL5 Site WHS Manager	[redacted]	[redacted]
PHL5 Site RME Manager	[redacted]	[redacted]

APPENDIX A: TNS PACK SINGLES INJURY TRENDS

Figure 3: TNS Network, Pack Singles Injury Trend 2018, 2019 and 2020.

APPENDIX B: CURRENT STATE VISUALIZATIONS

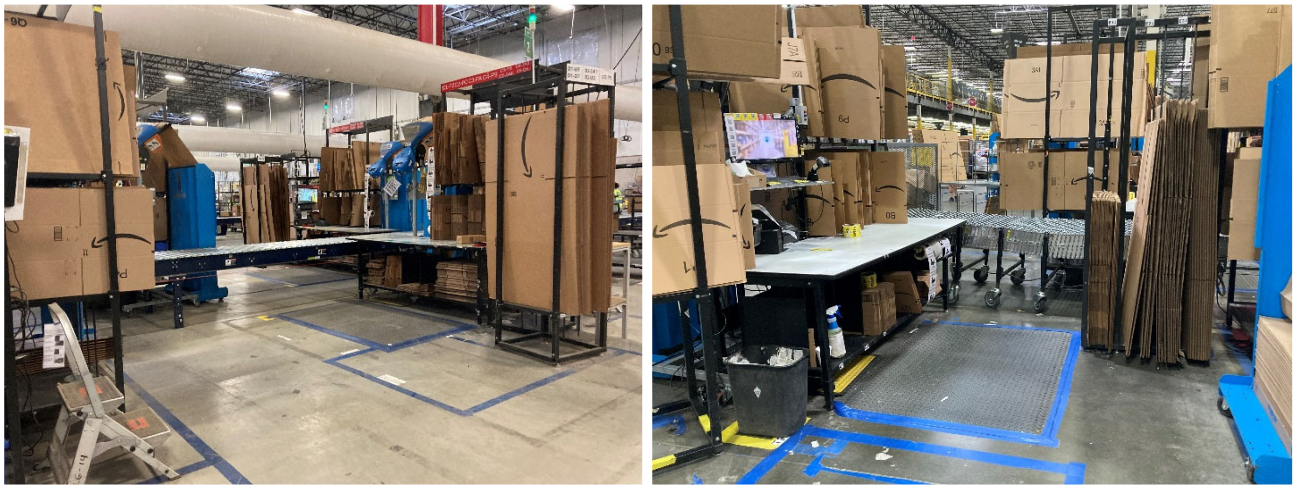


Figure 3. Examples of pack stations deployed at PHL5 (L) and BNA2 (R), no standard for layout present.

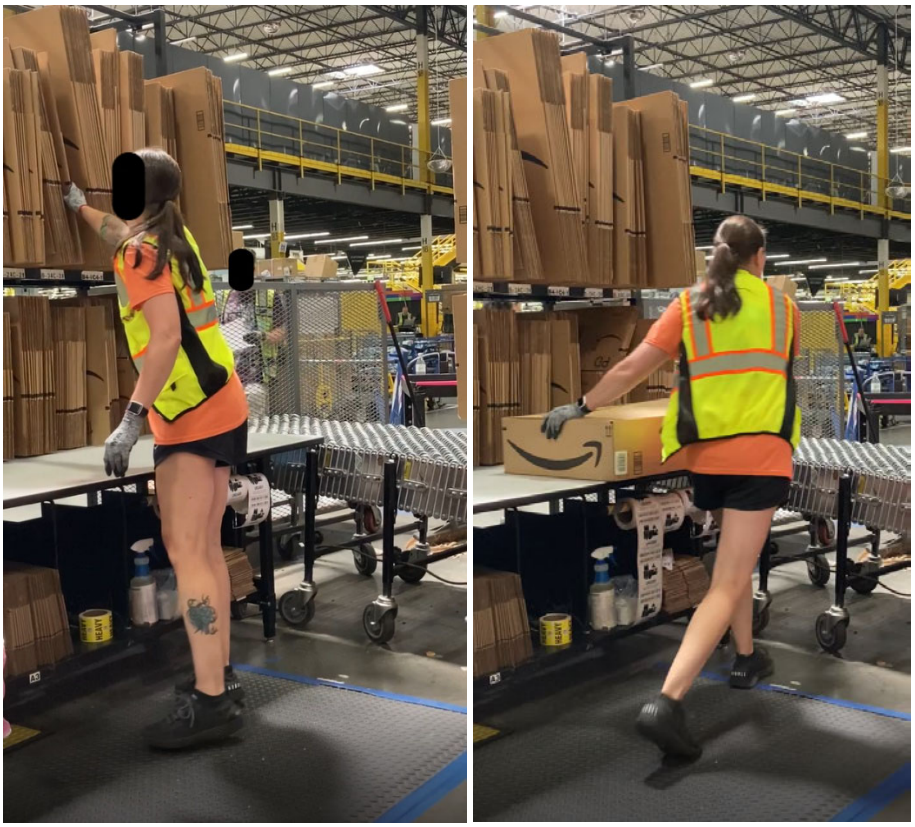


Figure 4: Associate reaching for boxes across the old station (L) and twisting to load product to take away conveyance.

Figure 5: DHM twisting to load product from pack station to conveyance.

Figure 6: DHM reaching for boxes across 34in table (L) DHM bending and twisting to select box below pack station (R)

APPENDIX C: FUTURE STATE VISUALIZATIONS

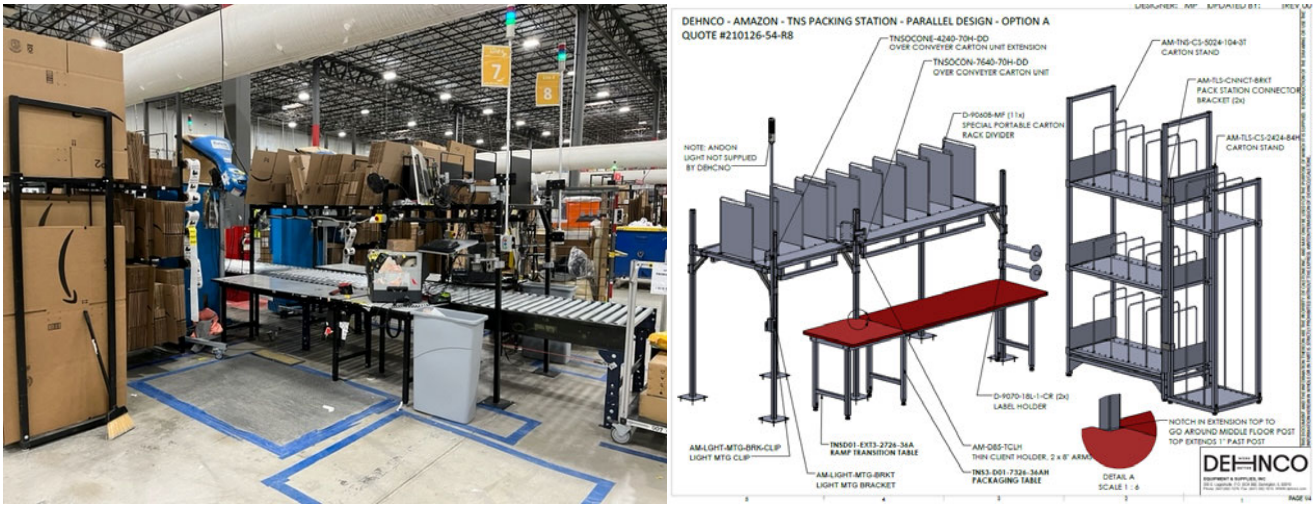


Figure 7: BETA Pilot Pack station PHL5

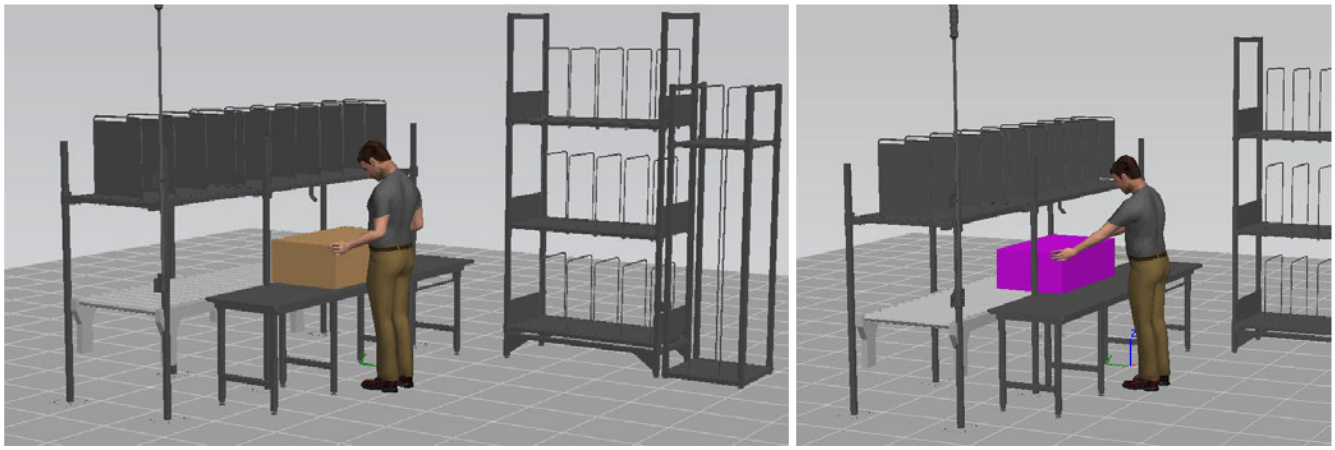


Figure 8: DHM simulation of a Packer pushing product from the pack station to the conveyance.

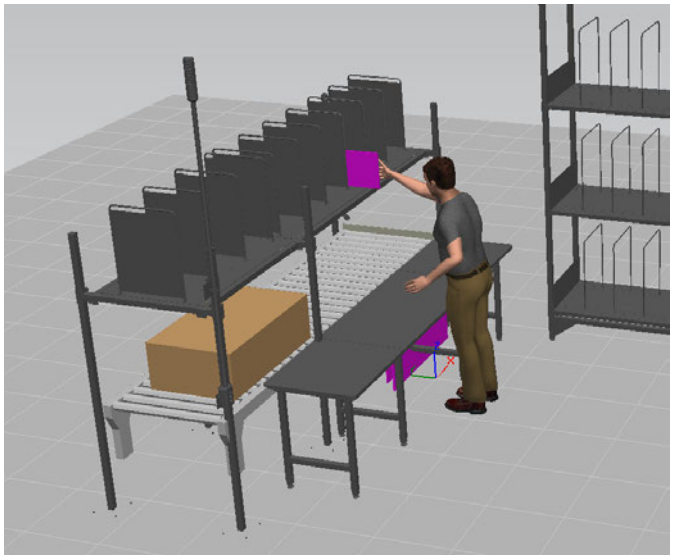


Figure 9: DHM of an associate pushing product from the pack station to the conveyance.

APPENDIX D: PICTURES OF NEW STATION SET UP

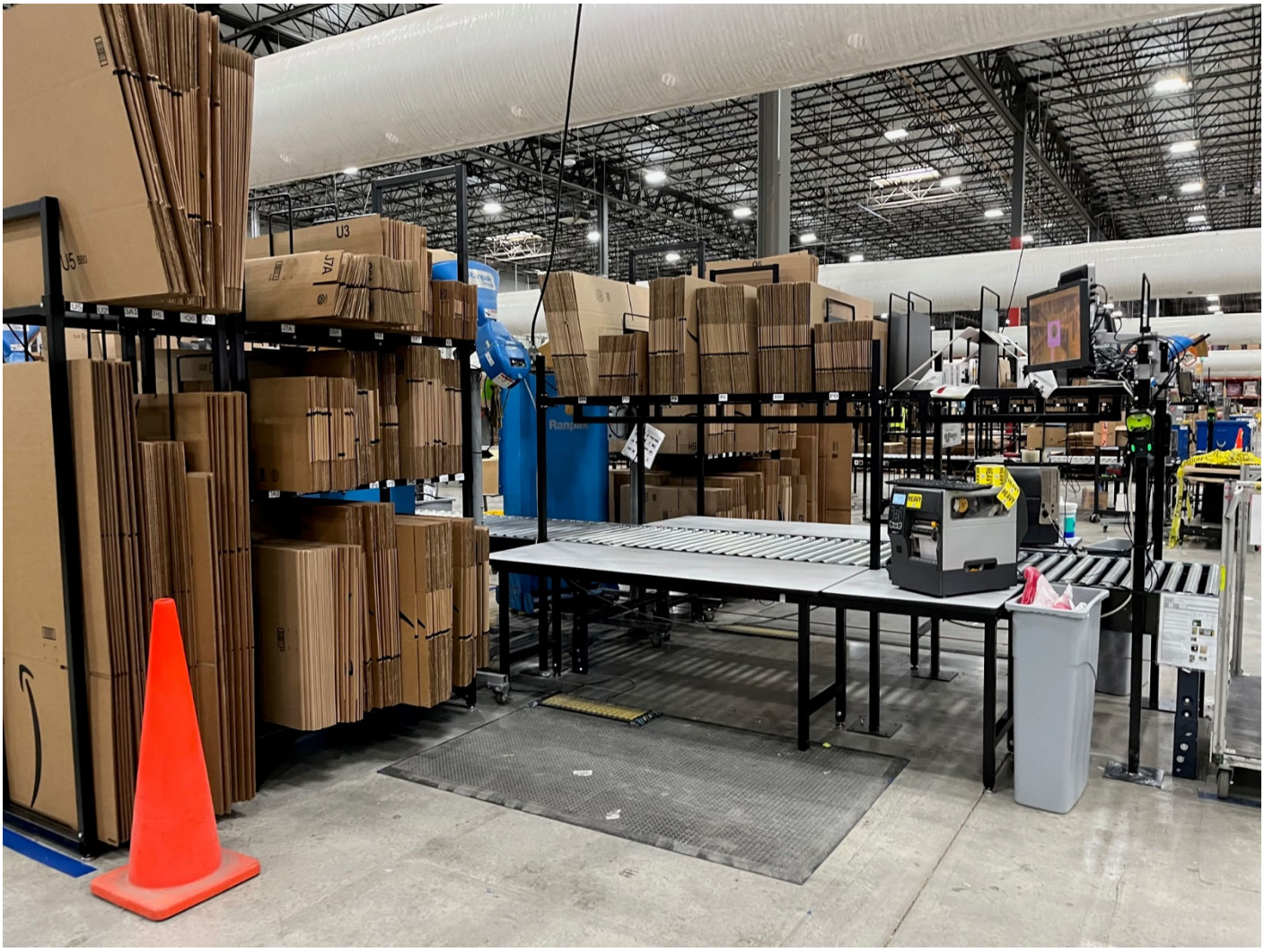


Figure 10: PHL5 Beta pilot station.

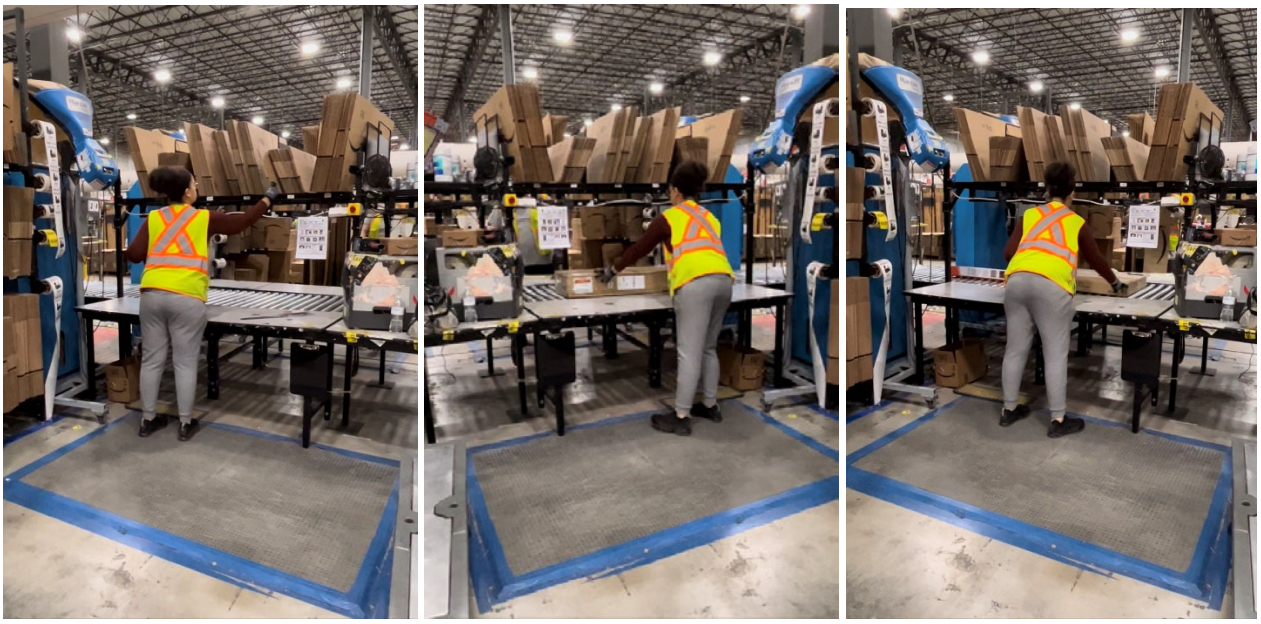


Figure 9: Associate packing on new pack station, demonstrating reduced reach and forward push.

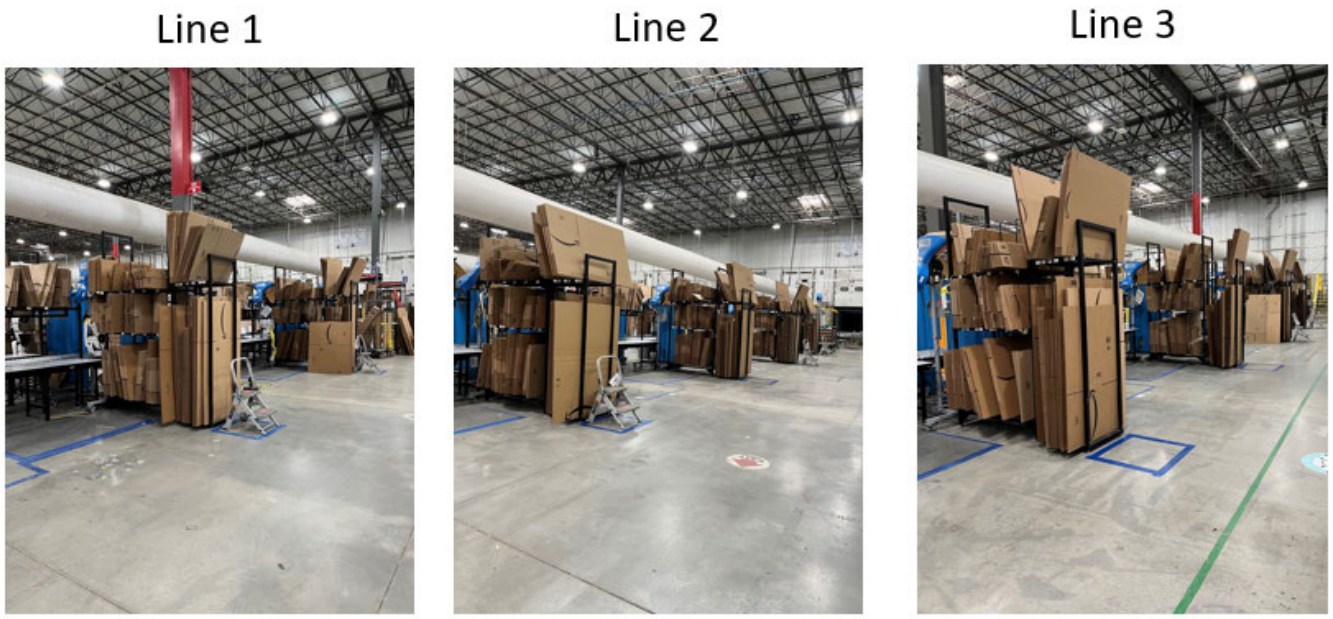


Figure 10: PHL5 pack lines following installation and BETA kick off.

APPENDIX E: DESIGN DRAWINGS OF FINAL DESIGN

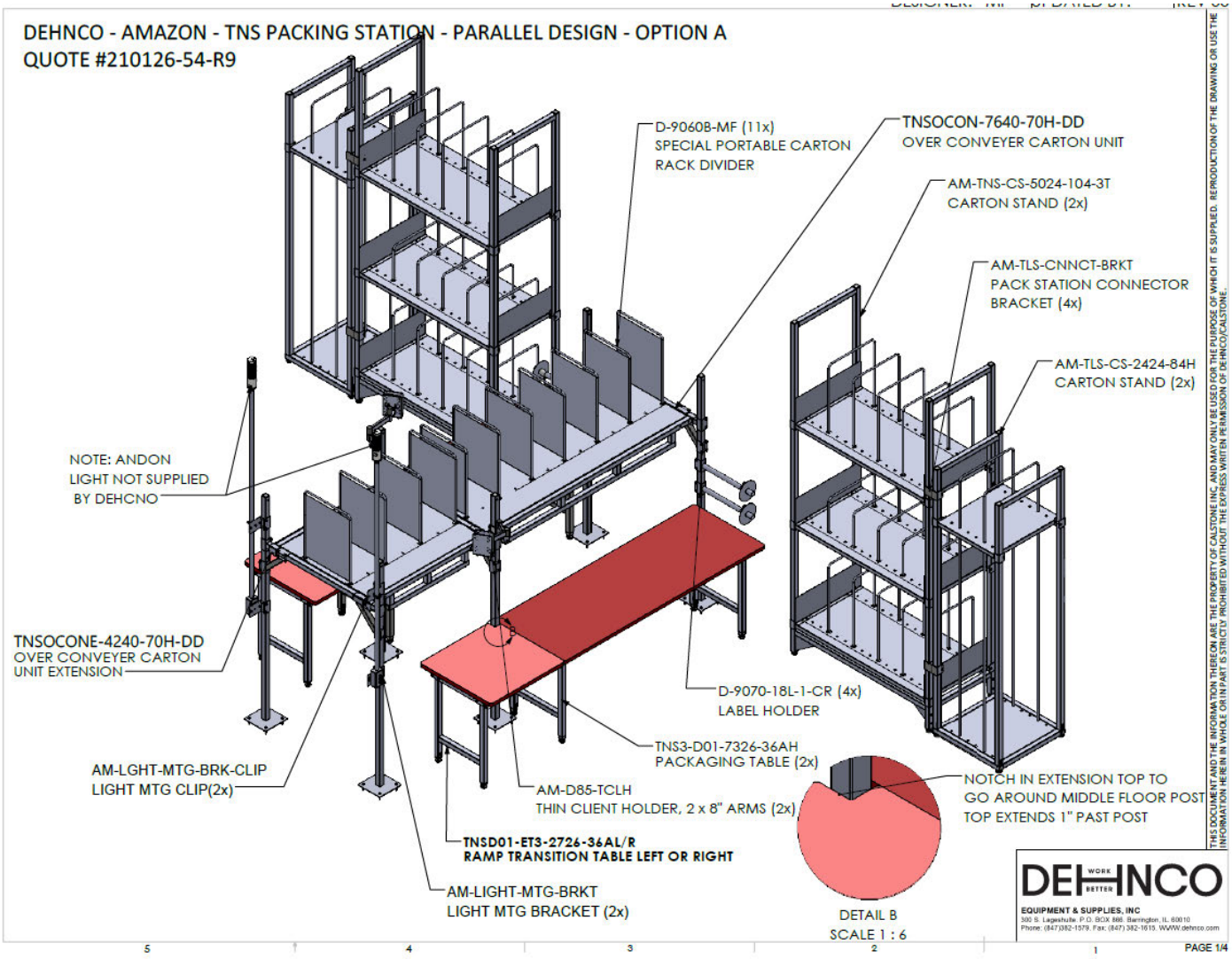


Figure 11 Final BETA pilot design of pack stations.

APPENDIX F: INITIAL COST BREAKDOWN FROM VENDOR

345 Boren Ave. N		TNS Packing Station - Parrallel - Back-to-Back		
Seattle, WA 98109		Workstation Detail		
		October 28, 2021		
[redacted]		RC9		
			Price	Extended
Qty	Type	Description	Each	Net
1	TNSPS-200	TNS Packing Station Parallel - Back-to-Back		
2	TNS3-D01-7326-36AH	Sp. Modular Table 73 x 26 x 29-36"H	369.68	739.36
1	TNSD01-ET3-2726-36AL	Sp. Extension Table 27 x 26 x 29-36"H, c/w notch in top - back LEFT to go around middle floor post and 1 set of legs- as per sketch.	260.10	260.10
1	TNSD01-ET3-2726-36AR	Sp. Extension Table 27 x 26 x 29-36"H, c/w notch in top - back RIGHT to go around middle floor post and 1 set of legs- as per sketch.	260.10	260.10
1	TNSOCON-7640-70H-DD	Sp. Over Conveyor Carton Unit, 76 x 40 x 70-3/8"H. C/w 2 x D-9200, OCON-CROSS-40AC, OCON-DIVB-77AC w/ holes for 7 metal filler dividers (D-9060B-MF) and SOPAN7718- as per sketch.	650.62	650.62
1	TNSOCONE-4240-70H-DD	Sp. Over Conveyor Carton Unit, 42 x 40 x 70-3/8"H. C/w 1 x D-9200, OCON-CROSS-40AC, OCON-DIVB-43AC w/ holes for 4 metal filler dividers (D-9060B-MF) and SOPAN4318- as per sketch.	346.80	346.80
11	D-9060B-MF	Sp. Wire Dividers for lower shelf, with thread to be cut-down to match up with return on lower shelf C/W metal filler piece x	24.51	269.61
4	D-9070-18L-1CR	Sp. Cantilever Storage Arm 18" long, with 1 disc	24.08	96.32
2	AM-D85-TCLH	Sp. Single Flat Screen Mount & Thin Client CPU Holder only (size: 5 x 2-1/4"D x 6-1/2"H) - with Swivel bracket, comes complete 2 - 8-1/2"	120.42	240.84
2	AM-TLS-CS-5024-104-3T	Sp. 3 Tier Carton Stand, 50-1/4 x 24 x 104-1/4"H. C/w 3 adjustable shelves, with 15 D-9060B dividers spaced on 3" centers, c/w 6 x 8" splashers on left & right side of shelves. Base to have 2 gussets welded underneath to prevent lateral sway – as per sketch	527.43	1,054.86
2	AM-TLS-CS-2424-84H	Sp. 1-Tier carton stand 24 x 24 x 84"H, comes with 1 adjustable shelf, solid base with 2 rods & divider holes spaced on 3" centers - as per sketch	98.74	197.48
4	AM-TLS-CNNCT-BRKT	Sp. Pack Station Connector Bracket (Set of 2) to connect TLS Carton Stands - as per sketch	7.04	28.16
2	AM-LGHT-MTG-BRKT	Andon Light Mounting Bracket3-1/2" x 4-1/8" to mount to 1-1/2" Upright.	13.25	26.50
2	AM-LGHT-MGT-BRK-CLP	Sp. Andon Light Stabalizing Bracket 3-1/2" x 4-1/8" c/w Heavy Duty Conduit Hanger to attach to Light. Bracket to mount to 1-1/2" Upright - As per Sketch	15.65	31.30
		Total		4,202.05

Workstation Summary:

Qty	Type	Description	Price Each	Extended Net
1	TNSPS-200	TNS Packing Station Parallel - Back-to-Back	4,202.05	4,202.05

Figure 12 Future state item cost

Global Ergonomics
Handbook 1.0

For Amazon

Workplace Health & Safety
Human Factors & Ergonomics

amazon

Introduction

This document has been created to support Amazon's continued drive to reduce Musculoskeletal Disorder (MSD) injury risk through the application of ergonomics guidelines and criteria to design operations processes. As part of a Prevention Through Design (PtD) framework, this handbook is a non-mandatory guide for use throughout the design and operation cycle in sites to improve the setup and layout of work areas.

Introduction

This handbook has been created to provide high-level guidance on some of the common MSD risks factors impacting elements of process, equipment and site design. As such, it is designed to be used for minor modifications at active sites, and for high level guidance in the concept design phases of projects. Further support from a member of the ergonomics team for your region can be sought beyond the concept design phase if you respond 'yes' to any of the questions below:

- Does the project introduce new equipment?
- Does the project introduce a new task?
- Does the project modify an existing task, by;
    a. Affecting Associate posture (change in reach, grasp, lift, lower, push or pull location),
    b. Increasing weight (to be lifted, lowered, carried) or force (to push/pull),
    c. Altering the amount of working space allocated for the Associate or
    d. Creating additional walking/steps/climbing required by the associate?

Accessibility & Disability

People with disabilities are equal, valued, and included. They see themselves in the stories we tell, and the leaders, builders, and Associates we hire. People come to Amazon to solve problems with a strong foundation of customer obsession and a bias for action combined with diverse workplace talent, science, and technology; we propel the industry forward inspiring and challenging others because disability employment deserves our collective attention. More information at this link.

How to use this handbook

This guide is intended to be used by WHS, Project Managers, Engineers, Kaizen teams, Change Managers, Procurement, Advanced Technologies (AT) and Worldwide Design & Engineering (WWDE).

- It is recommended to complete the Level 1: Ergonomics Awareness before using this handbook. This training will provide understanding of musculoskeletal disorders (MSD), risk recognition, and how to apply ergonomics principles to reduce risk.
- For large-scale retrofit projects in existing sites, you should always involve the WESE Ergonomics Engineering team (SIM) or WWDE (Wiki) for technical input.
- The WWDE Ergonomics team is responsible for new designs within the Product Development Process (PDP) and Advanced Technologies (AT) process
- Make sure that a safety risk assessment is completed to identify any additional risks.
- For ergonomics assessment tools and training, refer to the WHS Global Ergonomics Wiki, Level 1: Ergonomics Awareness and Level 2: Ergonomics Risk Assessment Overview.

Further Support

Support can be sought via the below links:

- For existing site inquires: Ergonomics SIM
- For new building inquires: WWDE Wiki
- For Amazon Robotics (AR) inquires: AR Wiki

In scope

This document has been developed using National/ International ergonomics design standards (references).

The handbook provides ergonomics guidance to improve workplace set-up and layout to make workstations more inclusive for Associates. The intention is to provide suggested workstation dimensions to accommodate the majority of the working population.

» In Scope: CF, AMZL, ATS, GSF, AMXL, Retail

» Out of Scope: AWS

» Important: This handbook provides best practice recommendations to follow. It is not intended to supersede or replace any local/regional regulatory requirements. Additionally, this handbook does not supersede a detailed risk assessment completed by a trained ergonomics professional

Not in scope

Not in scope for this document:

» Environmental topics such as lighting, noise, temperature; refer to the WHS Policies and Procedures page

» Office workstations/corporate ergonomics. Visit this site for more information on corporate ergonomics

» Manual handling techniques, only the guidance on weights of items, location for storage and the importance of mechanical aids to reduce physical strain

'Traffic light' guidance

This handbook will provide guidance on such topics as equipment design and workstation layout. In order to provide some flexibility, the guidance will be presented using **green, yellow**, and **red** categories.

Green: aim to design within the 'green' limits wherever possible.

Yellow: the 'yellow' categories are not ideal, but may be considered acceptable risk (acceptable risk is that which the probability of an incident or exposure occurring and the severity of harm or damage that may result are as low as reasonably practicable).

Red: red categories present an increased risk of developing MSDs and need to be evaluated for potential change.

Any change must be carefully considered and based on risk assessment.

Understand

Please note that values within this handbook are ergonomic guidelines.

There may be additional considerations, such as emergency procedures, building structure, etc. that may be different due to Authorities Having Jurisdiction (AHJ).

In the event of a discrepancy, the most stringent requirements shall apply in the respective local jurisdiction.

Improve

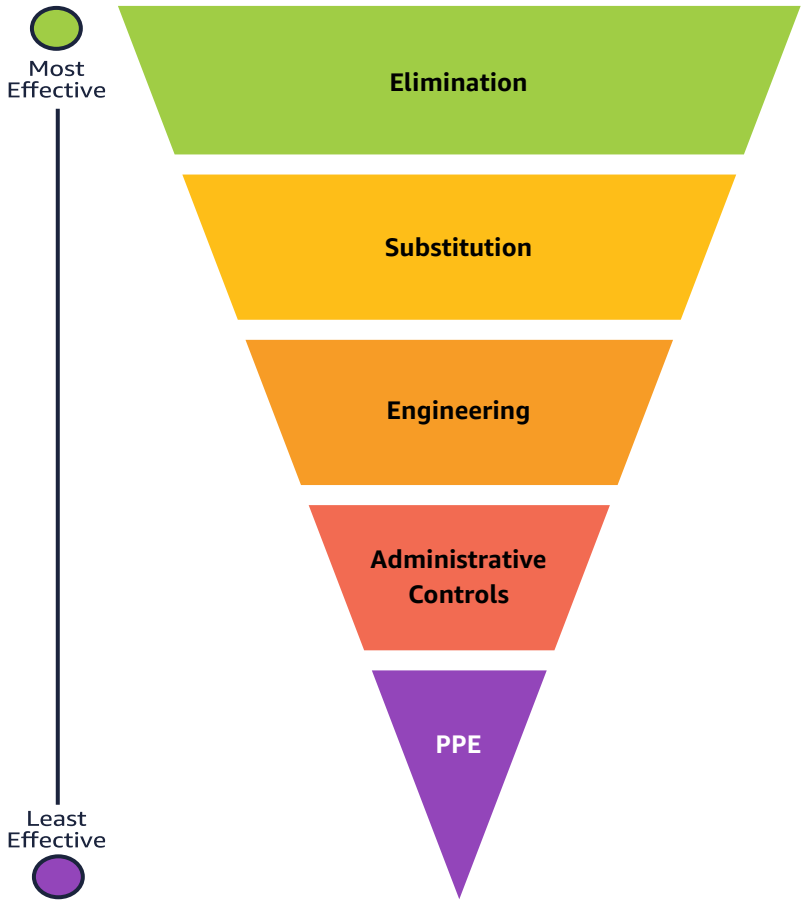
Use this handbook as part of the design and operations processes. Implement appropriate controls where current workstations do not meet design guidelines.

The hierarchy of controls outlines a systematic approach to reduce risk by sequentially ordering controls from most effective (elimination) to least effective (PPE). The effectiveness of introduced controls can be classified through the systematic approach of the hierarchy of controls (see image below).

When making changes, remember that eliminating one hazard can sometimes create different hazards, so it's important to stress that when we apply these principles we have the right people involved to ensure that any unintended consequences are addressed.

The hierarchy of controls helps to identify which actions will most effectively reduce the MSD risks factors. It has five levels of actions to reduce or remove hazards.

Hierarchy of controls



Hierarchy of controls

1. Elimination: physically remove the hazed

Involves physically removing the risk factor from the workstation (e.g.: Installing a robot to perform a task).

2. Substitution: replace the hazard

Replacing the hazard with a safer alternative such as replacing a manual pallet jack with an electric pallet jack.

3. Engineering: isolate people from the hazard

Involves implementing adequate design, tools or equipment to protect people from the hazard such as introducing scissor lift pallets to reduce bending to low levels.

4. Administrative Controls

Change the way people work through procedures or training and can include:

a. Job rotation plans and work schedules focused on promoting the use of different muscle groups, and appropriate rest and recovery periods.

b. Safety audits or similar behavioral audits to enforce safe behaviors.

c. Work practice controls include training Associates on specific behaviors, to perform work in a specific manner, and perform the task consistently each time. Work practice controls include:

   i. Training to increase Associate awareness about body mechanics and stretching exercises, including wearables with haptic feedback;

   ii. In-process safety school: body mechanics, safe handling, and situational awareness training; and

   iii. Manual handling considerations.

5. Personal Protective Equipment (PPE): protect the worker with PPE

Equipment worn by an Associate to protect them from MSD risk exposure, such as knee pads or padding to reduce contact stress. PPE should only be used as a substitute for engineering or administrative controls if it is used in circumstances in which those controls are not practicable.

Understanding Ergonomics

What is ergonomics?

“Fitting the task to the human”

“Ergonomics is the science of work: of the people who do it and the ways it is done; the tools and equipment they use, the places they work in, and the psychosocial aspects of the working situation.”

— Stephen Pheasant

The benefits of applying ergonomics principles to a job, the equipment, and the layout of the working area include: inclusiveness, longterm cost-saving, ease of working, efficiency, improved quality, reduction in MSD, injury prevention, and decreased performance errors.

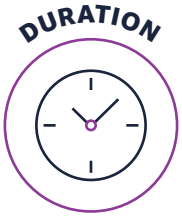
Why apply ergonomics?

The reason we are applying ergonomics principles is to improve the workplace for Associates and to reduce MSD risk. An MSD is an injury to the soft tissues that support the body: our muscles, tendons, ligaments, joints and nerves.

Where an Associate is working in an awkward posture, they may experience pain/discomfort and be at risk of injury. Joints at end of range of movement put strain on muscles, ligaments, etc. A good design enables the Associate to work in an optimal posture, with their joints in mid-range.

Force typically refers to manual handling tasks, such as pushing, pulling, lifting, lowering, holding or carrying. The greater the effort applied, the greater the risk of injury.

Repetition in conjunction with other risk factors, can contribute to MSD risk.



A task performed all shift without enough variety or rest may over-use certain muscles. Variety of movement and interest help to reduce the risk of injury and boredom.

Throughout this handbook, we will use the symbols shown above to highlight which of the key MSD risk factors is being addressed.

Anthropometry

Anthropometry is the study of body measurements. Anthropometric data helps to identify and accommodate targeted percentages of a population. Try to avoid designing for the 'average' population, as this excludes a large portion of the population.

Anthropometry can be thought of as the measurement of people, and provides sets of data points for both male and female measurements. Almost all body measurements and strength data fall within a normal distribution (sometimes referred to as the "bell curve").

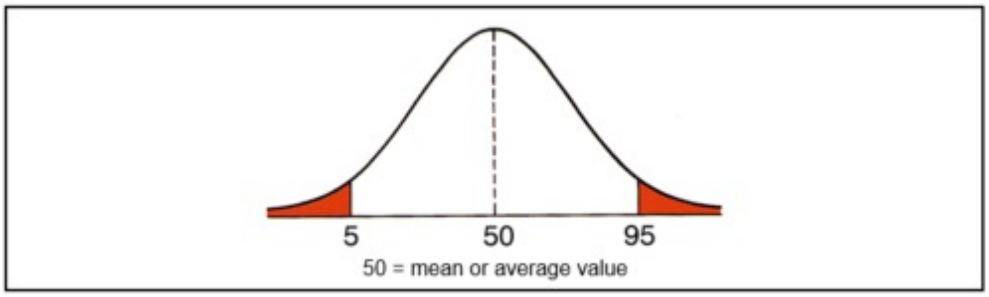


Figure 1: Bell Curve

Anthropometric data points provide valuable information which can be used to define clearance and access requirements, postures, and reach distances. This handbook provides anthropometric data points, which are referred to as percentiles. Percentiles represent the percentage of a given population above or below the data point. For example, for reaches, use the 5th percentile female population to accomodate the majority of the working population.

Ergonomics Principles

Everyone is different, so it is important to design for as much of the population as possible. In these images below, we can see the extremes in stature between 5th and 95th percentile across men and women. In an effort to design for a large percentage population, we often want to design for the extremes.

Figure 2: Bell curve stature men and women (*Source: "Ergonomics Design for People at Work" Brolin E.*)

To accommodate as many people as possible in the workplace, we should follow these principles of layout (what goes where) and design limitations (which extremes to consider in which conditions).

Layout principles

Consider reviewing the layout of a workstation after an incident has been reported, after receiving feedback from an Associate, or during the pilot of a new workstation at your site. Prior to making workstation changes, consider work-flow and what is required to complete the task. Then, apply these principles:

Importance
Make the most important items obvious and easy to see/reach

For example, scanner, keyboard, printer, e-stop

Frequency
Put the most frequently-used items within easy reach

For example, knife, scanner, tape dispenser

Function
Group together equipment that has a similar or linked function

For example, label printer and spare labels

Sequence
Make sure the equipment is placed so that it follows the flow of the task

For example, tape to seal and dunnage, used one after the other

Design limitations

The four most important factors to consider when evaluating designs of workstations or equipment are:

Posture
Allow an individual to set-up and modify their workstation to work in a neutral posture for them.

Force
Is it manageable for all Associates to lift/lower/push/pull?

Reach
Make sure the shorter/smaller Associate can reach and use the controls and equipment.

Clearance/Access
Is there enough space for the taller/larger Associates?

Is there space to gain access, walk around and work, or bend if necessary to do task?

Note: *EN614-1 requires at least the 5th to 95th percentiles to be used (in safety critical cases use 99th percentile, such as doorways, emergency stop buttons).*

Posture

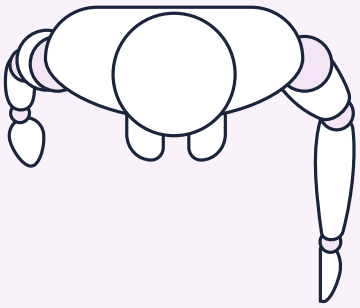
What is it?
The position of the body and individual parts.

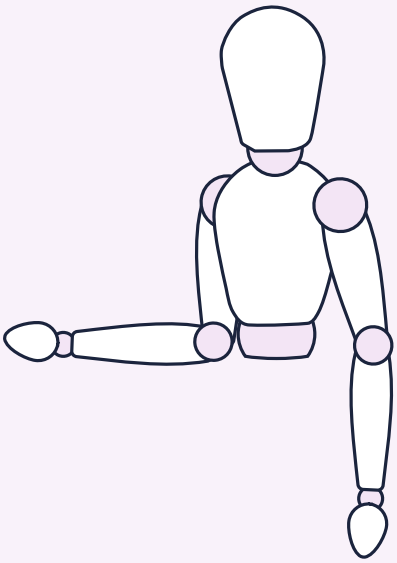
How is it measured?
The angle of each joint, within its given range. See next pages for these ranges.

What does good look like?
What you are aiming to achieve is as close to the neutral posture as possible, with variety to allow the muscles to recover.

Neutral posture is defined as the position of the body which places the least stress on the musculoskeletal system while still allowing for maximum control and strength. Maintaining neutral posture is one of the fundamental principles of sound ergonomic design. When sitting or standing, a neutral posture will be comfortable and balanced for the Associate.

Optimal means a posture that can be sustained with minimal muscular effort for the task. An example for the elbow (at 90 degrees of flexion) is shown below:

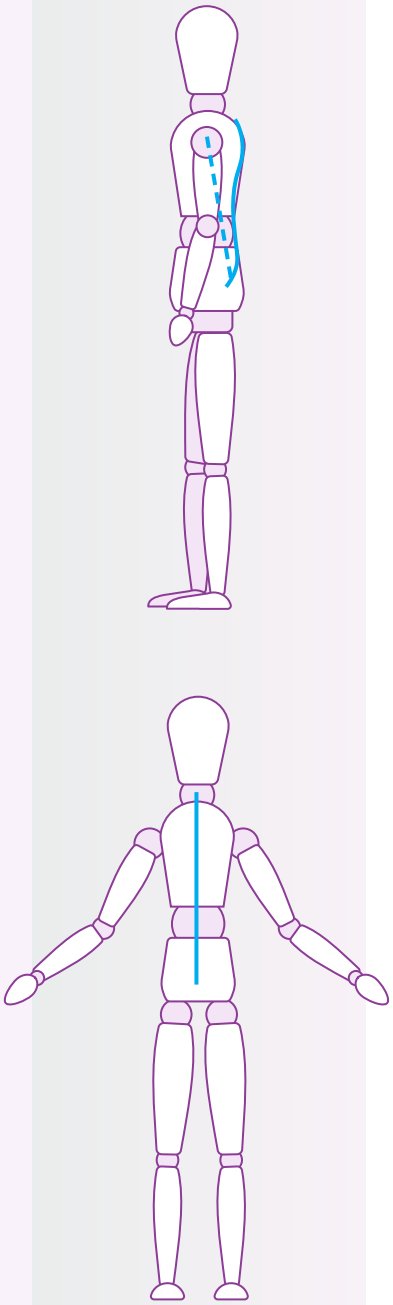




Back

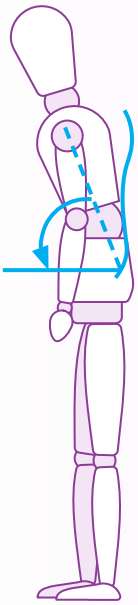
Design to keep the back upright and with minimal bending and/or twisting movements. A combination of bending and twisting creates even further pressure on the soft tissues.

Neutral Postures

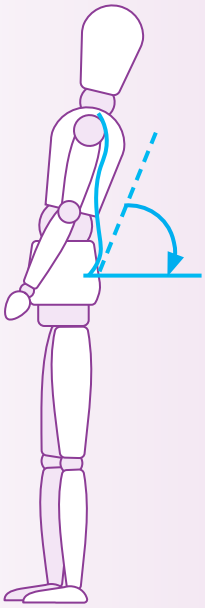


Awkward Postures

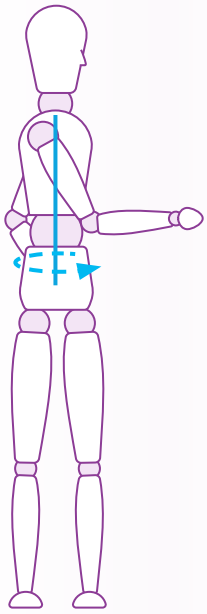
Back flexion



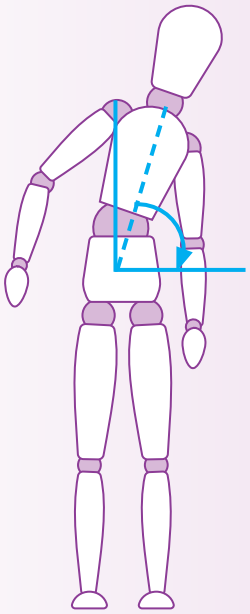
Back extension



Twisting about waist



Lateral bending



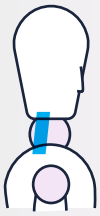
Legs

If the job is performed from a standing position, make sure there is leg and foot clearance so they can stand close enough to the workstation. See Workstations for more information on workstation set up. Design in tasks which encourage the Associate to take a few steps to break the monotony of standing still.

Head/neck

Design to avoid looking up (bending the head backwards into neck extension) and limit the time spent looking down (bending the head forwards into neck flexion). For things that are viewed constantly, aim to keep them in front of the person to avoid awkward or prolonged turning of the head.

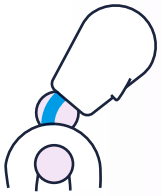
Neutral Posture



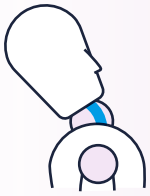
Neck

Awkward Postures

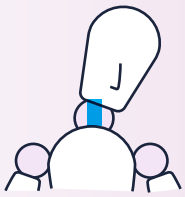
Flexion



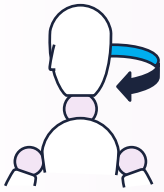
Extension



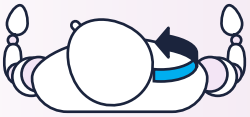
Lateral bending



Rotation



Rotation

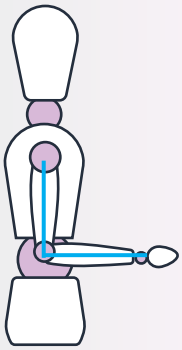


Arms/shoulders

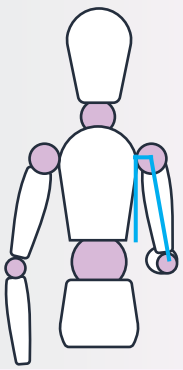
Design to keep the elbows close to the side of the body and arms working in their mid-range position (neither fully bent or straight). See horizontal and vertical reach sections for details.

Neutral Postures

Elbow

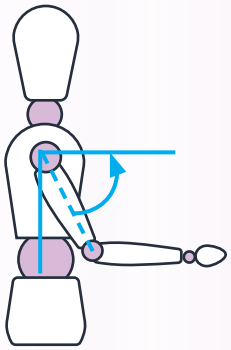


Shoulder

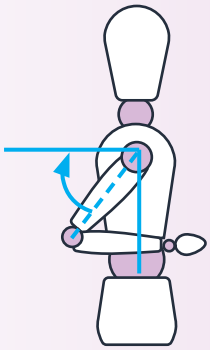


Awkward Postures

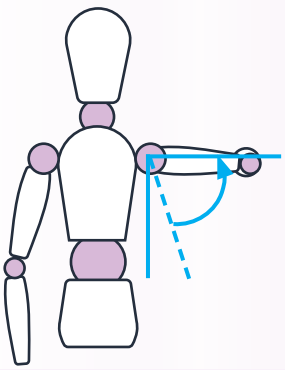
Shoulder flexion



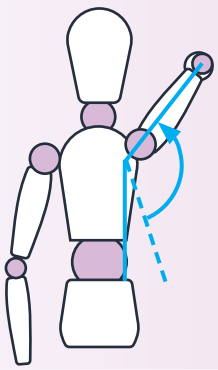
Shoulder extension



Shoulder abduction



Shoulder abduction and extension



Hands/wrists

Design to keep the wrist in a neutral position. Avoid working at the end of range movements (wrist fully bent or extended) and reduce repetition. Consider the height and position of bins, scanner, keyboard, touch screen, or other equipment or material.

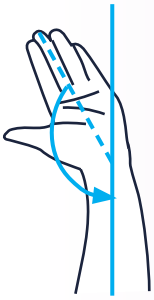
Neutral Postures

Minimal radial/ ulnar deviation

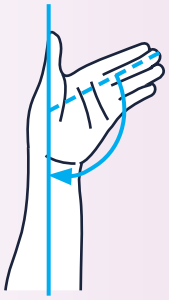
Minimal flexion/ extension

Awkward Postures

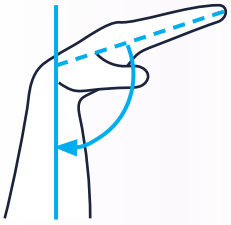
Radial Deviation



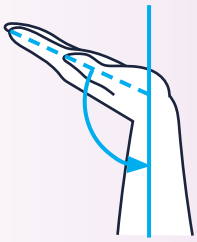
Ulnar Deviation



Flexion

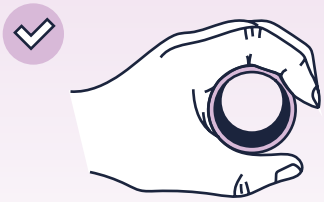


Extension



Hand Grip types

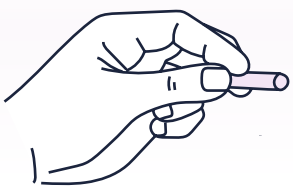
There are many ways to grasp an object, the most efficient being use of handles, or ensuring the whole hand can contact the object. It depends on what is being held and manipulated, but the aim is to avoid designs which require pinch grips. A simple pinch grip is when an object is held between the tip of the thumb and tip of the index finger and does not touch the palmar surface of the hand.



Cylindrical

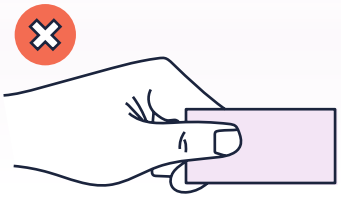
Spherical

Hook or Snap



Palmar

Tip



Lateral

Reach

Horizontal reach

What is it?
Horizontal reach is the scope of how far a person can reach around them to touch or grasp something.

What does good look like?
To help you decide how far away to place equipment and tools for the task at a workstation, consider first the layout principles described earlier: importance, frequency, function, and sequence.

There are three zones of reach for you to consider, according to the task. This will accommodate 75% percent of the female population.

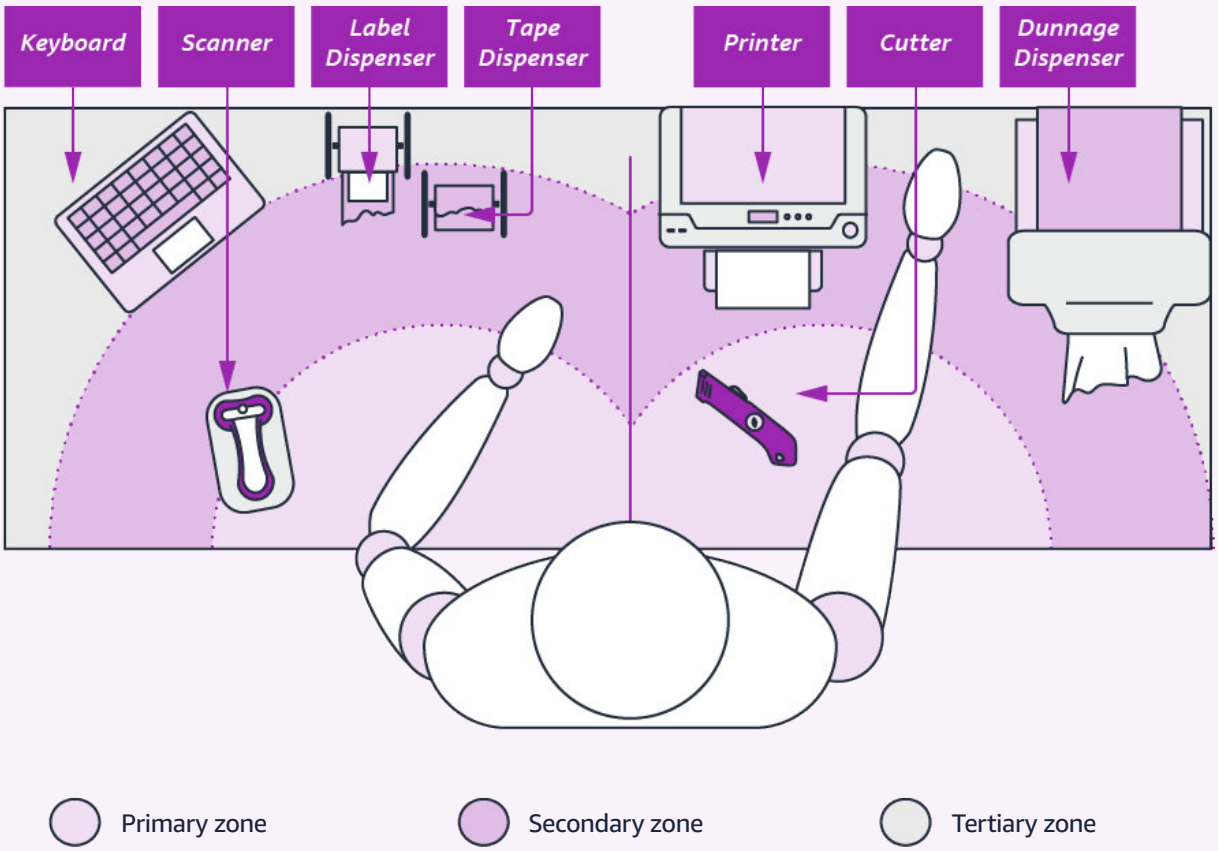
Aim to reduce the reach as much as possible without cluttering the workspace.

How is it measured?

For the primary zone, measure from the elbow joint to the mid-point of the hand.

For the secondary and tertiary zones, measure from the shoulder joint to the mid-point of the hand.

Zone	Factors	Measurement
Primary	Important/frequently used	12-19.5 in (350-500 mm) (measured from elbow)
Secondary	Used intermittently	19.5-25.5 in (500-650 mm) (measured from shoulder)
Tertiary	Least important/infrequently used	15.5-30 in (650-760 mm) (measured from shoulder)



Vertical reach

What is it?

The scope of how far above them a person can reach to touch or grasp something.

How is it measured?

- The shoulder allows an arc of movement, where reach distance is greatest at shoulder height and less above or below shoulder height.
- For shelving above a workstation, a person's reach and visibility will be limited by the height/depth of the workstation, so consider the arc of movement. Consider that vertical reach may be obstructed by the workstation or equipment.
- A person may have better reach from a side-on position, standing sideways to the shelf.
- Vertical reach is measured from the floor to the mid-point of the hand.

What does good look like?

Max recommended vertical reach is **65 in (1650 mm).**

If the task is repetitive or performed for a long duration of time, aim to reduce the reach as much as possible. These height and depth measurements do not specify weight limits, only the physical reach limits for the 5th percentile female. Utilizing the 5th percentile female data is recommended to determine maximum reach distances.

Max recommended reach to the front of a bin and farther into a deeper shelf is shown in the illustration.

Shelf heights beyond the figures below would need to be assessed by the ergonomics team before implementing.

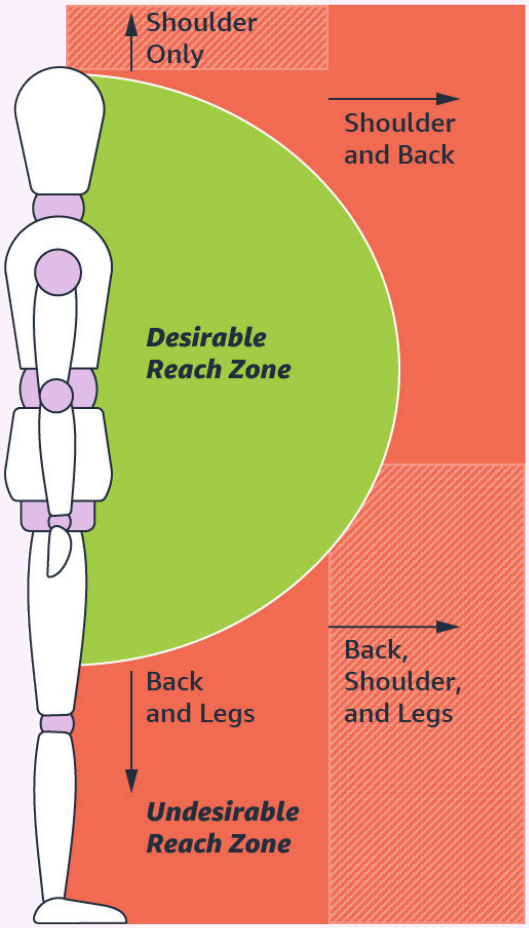
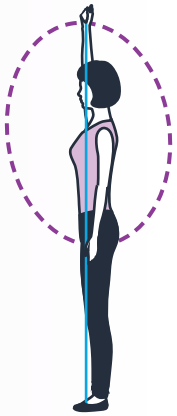
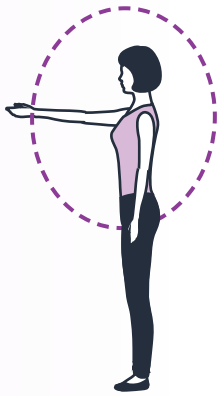


Figure 3: Body parts impacted by undesirable reach zones

Maximum reach criteria

Reach criteria	*Max reach*	*Image*
Max vertical reach-height (floor to shelf) to reach to grasp an item at the front of a bin	**65 in (1650 mm)** 5th percentile female reach zone height using base of palm (Associate can use hand and fingers to grasp item).	
Max horizontal reach into a bin, at shoulder height only (this is reduced for levels above and below the shoulder)	**13.5 in (480 mm)** 5th percentile female reach zone horizontal distance using shoulder joint to center of palm (Associate can use whole hand to move item)	

Source: NHANES 2014

Force

What is it?
This is a measure of how much effort is required for lifting, lowering, pushing or pulling.

How is it measured?
Use scales and force gauge to measure weights and forces. Ensure the scales or gauges are calibrated as per the manufacturers' instructions.

Factors that influence force limits

The acceptable force to push or pull is calculated based on the height of the person's hand where they interact with the object being moved, the frequency and distance of the load being moved, and the actual force required. Force required is both the initial force to get the object moving, and then the subsequent force to keep it moving. Factors that influence the force include the floor surface, floor slope, and the size, material and condition of the wheels.

Weight scales can be used to directly measure the weight of an object being lifted, lowered, or carried.

Snook Tables (Ergonomics Wiki) can be used to provide the limits for manual handling tasks such as lifting, lowering, carrying, pushing and pulling.

What does good look like?

» Design for 75% of the strength capability of the female population and ensure the forces are assessed and are within acceptable limits, using standardized tools (see Snook tables).

» Provide mechanical assistance where possible to reduce injury, make the work accessible for everyone.

Clearance/Access

What is it?
The surrounding space needed to accommodate an individual to pass through (e.g. doorway) or under (e.g. overhead structure, ceiling).

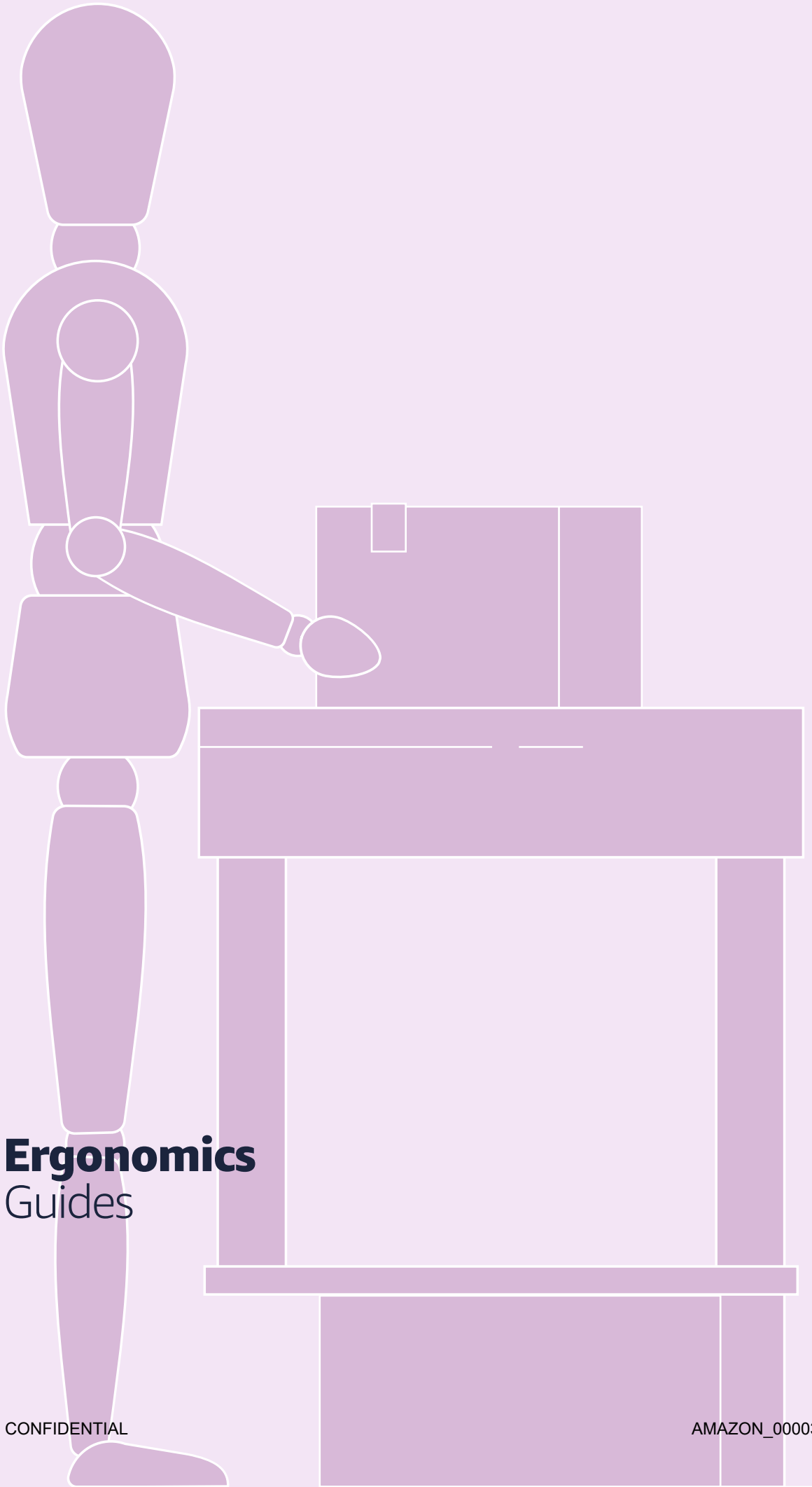
What does good look like?
Clearance: 83 in (2100 mm) recommended. Consider the 99th percentile male stature height data and be sure to provide sufficient space at doorways and under conveyors so they can pass underneath without stooping or risking hitting their head.

Increase the clearance height if PPE, such as bump caps, are required in this area. Where feasible, there may be nothing lower than **83 in (2100 mm)** where there is a walkway.

Access: 31.5 in (800 mm) is the minimum access for a workstation. **23.6 in (600 mm)** is the minimum for engineering access (see guides for Working space and Walkways).

How is it measured?
Head clearance: generally measured from the standing surface, vertically, to the lowest point/ underside of the structure.

Width space: the minimum width available for a person to pass through.



Ergonomics
Guides

Guides

page #

Ergonomics guide: **Workstations**

Dive deep

Identify the variety of tasks performed at this workstation. Consider tasks done by Water Spider, Engineering, etc.

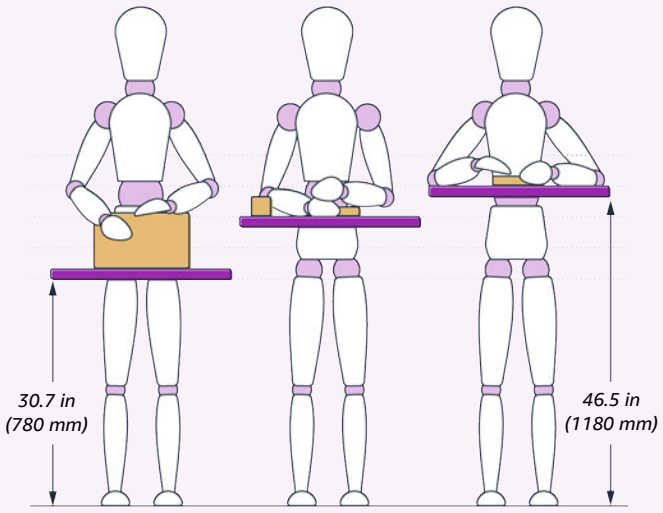
What good looks like

POSTURE

- Make sure the Associate can work in a neutral posture.
- Encourage a variety of movements.
- If the working surface is too high, shorter individuals will work with their arms/shoulders elevated; if it is too low, taller people will be more likely to slouch.
- Ideally a workstation would be height-adjustable (if there are shelves or items stored underneath, ensure the lowest height of the table will not crush these items). The ideal height range for the workstation is **30.7-46.5 in (780-1180 mm)**, but depends on the type of work being performed.
- For the Problem Solve Carts/Computer on Wheels (COW), or other carts utilizing a computer, explore height-adjustable options. The cart may be adjusted, where feasible so that the top of the keyboard is at elbow height to the person.
- This is only suitable for occasional work; it does not replace a computer workstation if the equipment is used for a substantial percentage of the shift.

How high should a workstation be?

- Working height refers to the location of the hands while performing a task. Hand working height should be around elbow height, which is between **950-1200 mm (37-47 in)**.
- Consider the height of totes/boxes/cartons and items being handled. Hand height will be impacted by the need to reach over box flaps and larger totes.
- Adjust the working height to align with the force requirements of the work being done. Tasks which require more force are more easily performed at a lower work surface height.
- Start with a workstation height of **850mm (33.5in)** and then raise/lower according to the height of more frequently used box sizes. Remember to allow for the manipulation of boxes (to make them up) and placing items in them.



What good looks like

Guidelines for work-surface height

Note: measured from standing surface to the top of the work surface.

Table 2.0: height guidelines for workstations per package size.

Height:	Pack – Small; Gift Wrap; Prep	Pack – Medium	Pack – Large Receive	Pack – X-large	Height:
37.4 in (950 mm)		x	x	x	37.4 in (950 mm)
34.4 in (875 mm)			x	x	34.4 in (875 mm)
33.4 in (850 mm)	x			x	33.4 in (850 mm)
31.5 in (800 mm)	x	x		x	31.5 in (800 mm)
29.5 in (750 mm)	x	x			29.5 in (750 mm)

Key: Recommended Height Range x Not Recommended Height Range

Ergonomics guide:
Workstation layout

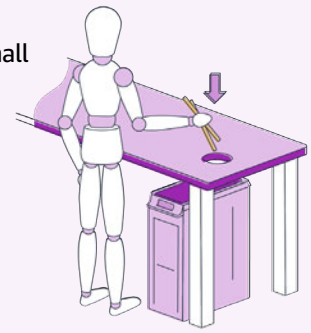
Dive deep

Make sure you consider the equipment that is used/needed at the workstation as well as its frequency of use.

What good looks like

REACH

- Place equipment and materials within reach, according to the guidance in horizontal and vertical reach.
- Use carts, shelves, or additional storage locations to store less frequently used items and keep more frequently used items within reach.
- Ensure waste bins are easy to see and reach – consider an access hole in the worktop for small items.
- Apply principles of importance, frequency, sequence and function based on the zones of reach. This includes placing frequently used items in the primary work zone, the next frequently used items in the secondary work zone, and rarely used items in the tertiary work zone.

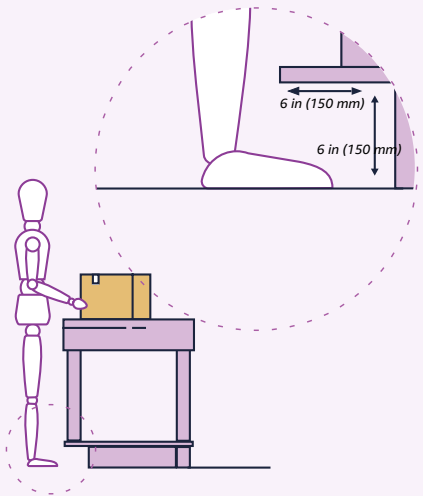


FORCE

Reduce the effort required to lift boxes and totes by designing a layout that promotes sliding (pushing/pulling) to and from an adjacent cart, conveyor, or pallet.

CLEARANCE/ACCESS

Space below workstation
Avoid obstructing or placing objects in the foot/knee space that could affect posture. Ensure adequate space is provided for the feet under the workstation: **6x6 in (150x150 mm)** (height and depth) to allow for natural foot movement during work.



Ergonomics guide:
Screens/monitors, keyboards, scanners and hand tools

Dive deep

Understand what equipment is used, for what purpose and for what frequency and duration.

Screens/monitors

What good looks like

POSTURE

» Position the display to enable the Associate to look directly across or slightly down (max 15° neck flexion) to view.

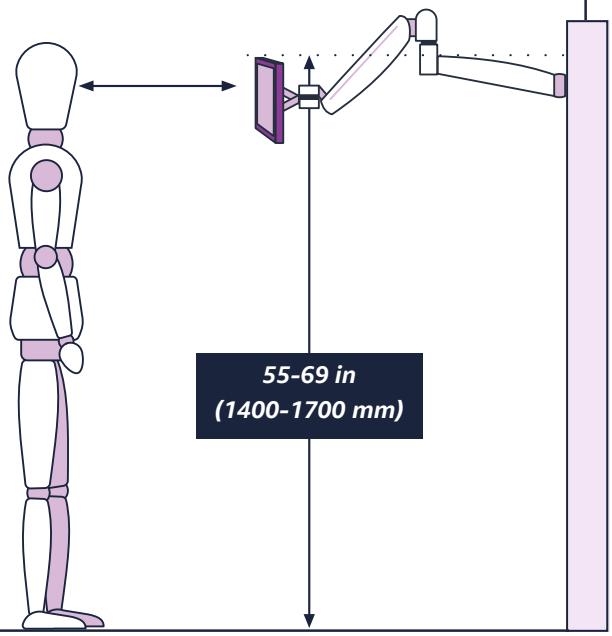
» The screen may, where feasible, be positioned to enable the Associate to look directly in front of them for frequently viewed information, not to one side.

» Use a height-adjustable monitor arm to allow the individual to adjust a screen to their eye height. The monitor arm may, where feasible, allow height, distance, and angle adjustments.

» The top of the screen for a standing workstation should be **55-69 in (1400-1700 mm)** above the floor. If it is a touch screen, then the range may be **47-63 in (1200-1600 mm)** above the floor. For guidance on the reach to a touch screen, please refer to section on horizontal reach. The top of the screen for a seated workstation may be **26-34 in (677-871 mm)** above the floor.

» Screen size – Consider the information to be viewed on the screen and the distance the screen is positioned from their eyes (see table below).

	Eye to screen distance	Minimum letter height
Mm	<500	3
inches	<20	0.1
Mm	<900	5
inches	<35	0.2

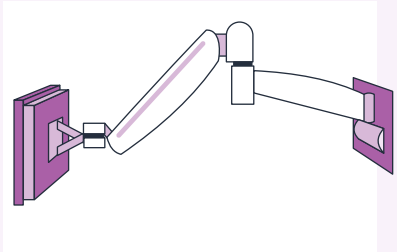


Ergonomics guide:
Screens/monitors, keyboards, scanners and hand tools

Keyboards

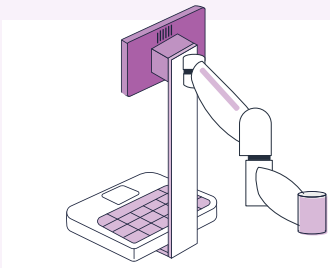
POSTURE

- If the keyboard is used frequently, ensure the Associate can type with forearms parallel to the floor and with wrists in a neutral position.
- Position the keyboard as close to elbow height as possible. For standing workstations: **37-47 in (940-1200 mm)** from standing surface. For seated workstations: **20-25 in (532-657 mm)** from the floor. This might require adjustment of the working surface, keyboard tray, or chair.
- If a touchpad/touchscreen is used and gloves are needed, make sure that the gloves are compatible. Snug glove fit improves function.
- If a screen has a keyboard tray attached, ensure it is for occasional use (log in/out). For frequent typing, a fixed keyboard shelf/tray for added stability.



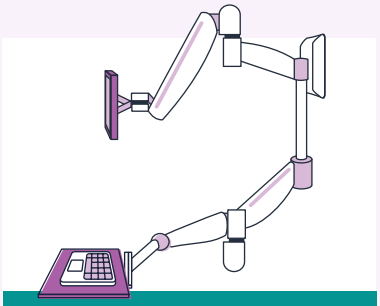
Adjustable monitor arm – distance, height and angle of screen

Ideal for viewing screen only



Monitor arm with keyboard tray – screen and keyboard are close together

Ideal for minimal data entry



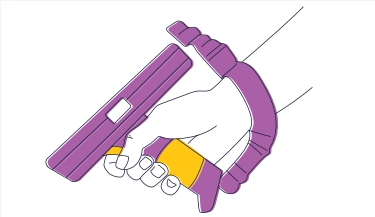
Monitor arm with keyboard tray – greater distance between keyboard and screen

Ideal for significant typing

Scanners

POSTURE

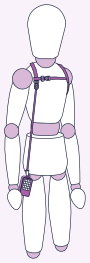
- Gripping a scanner for a long period of time, fatigues the muscles of the hand and forearm and increases the risk of injury.
- Where feasible, provide a fixed (inline, upright) location for scanners when not using. Consider using a scanner harness to free the hands and avoid awkward handling postures.
- Finger or wrist scanners are an option to reduce manual handling of the scanner.
- Tool balancers are an option to take the weight of the scanner.

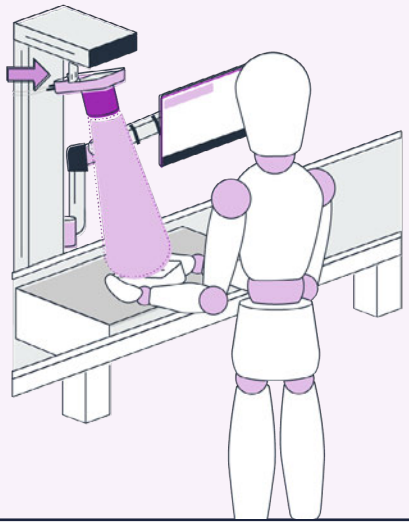


POSTURE

» Use a magnet or mount to secure a scanner to the workstation to allow for hands-free scanning.

» Provide a holster or shoulder strap for scanners or Kindles when the Associate needs to handle totes or push carts (where a scanner holder is not appropriate).





Hand Tools

Examples of ergonomics guidance for hand tools recommends:

» Appropriately-sized/shaped to allow the individual to maintain a neutral wrist posture in the space available.

» Appropriately fit to the individual's hand and grip orientation (i.e., whether left- or right-handed).

» Designed to reduce the force required for use.

» Designed to minimize contact pressure on the hand.

» Appropriate for the specific task being done (see below).

» The handle material may be textured or slightly compressible to increase grip. Avoid handles with preformed finger spaces.

High-force tasks

» High-force tasks, such as hammering, may, where feasible be designed to promote the use of a power grip (i.e., neutral wrist position, all fingers wrapped around the handle). If used with only one hand, limit tool weight to no more than **3 lb (1.4 kg)**.

» For high-force tasks that require a single-handle tool, such as a hammer, the handle diameter is recommended to be between **1.2-2 in (32-50 mm).**

» Double-handle tools (such as pliers) may, where feasible, have a grip span of at least **2 in (50 mm)** when closed and no more than **3.5 in (90 mm)** when fully open.

Precision tasks

» Design precision tasks to promote the comfortable use of the pinch grip (i.e., neutral wrist with the tool gripped between thumb and fingers). If used with one hand only, the tool may, where feasible, weigh no more than **1.1 lb (0.5 kg)**.

» For precision, low-force tasks that require a single-handle tool (e.g., precision screwdriver), the handle diameter may, where feasible, measure between **0.2-0.5 in (6-13 mm).**

» For precision, low-force tasks that require a double-handle tool (e.g., tweezers), the grip span may, where feasible, be at least **1 in (25 mm)** fully closed and no more than **3.1 in (80 mm)** fully open.

Ergonomics guide:
Screens/monitors, keyboards, scanners and handtools

Hand Tools

Power tools

Power tools selected may, where feasible be designed to reduce the operator's exposure to vibration. These include:

» A counter-balance mechanism (to control the intensity of the vibration).

» Torque reaction bars.

» Vibration absorbing materials or housings (e.g., vibration dampening handle or tool wrap).

Ergonomics guide: **Conveyors**

Dive deep

Understand how many conveyor levels are needed, what they will carry (size and weight ranges of items) and if workstations will be next to them (e.g., Receive, Pack).

What good looks like

REACH

Height

The same guidance provided for workstation heights applies to conveyors: conveyor height depends what is being placed on it or removed from it. Consider the height of the case, tote, package, and how it will be handled.

If there is only one conveyor, refer to workstation height guidance.

Where there are 2 or 3 conveyors, these are the recommended heights:

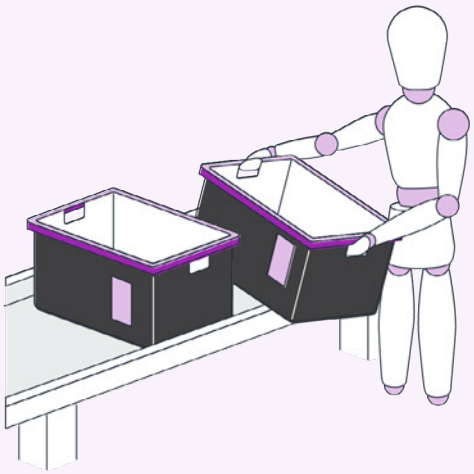
	Ideal	Acceptable	Maximum
Upper conveyor (including guard rail)		66.5-69 in (1680-1750 mm)	71 in (1800 mm)
Middle conveyor	30 in (760 mm)	27.5-34 in (700-860 mm)	
Lower conveyor	17.5 in (450 mm)		

Width

The width may, where feasible, be 1**9.5-23.5 in (500-600 mm)** wide (depending on the process). Conveyors wider than **23.5 in (600 mm)** may, where feasible have an Associate placed on each side of the conveyor – see section on horizontal reach.

FORCE

Where there is only one level, the conveyor may, where feasible, be level with or a maximum of **19.5 in (500 mm)** higher/lower than the workstation to slide cases/totes across to avoid lifting. Wherever possible, consider adding slides or ramps and ensure a smooth work surface to decrease the coefficient of friction when sliding items.



Ergonomics guide: **Conveyors**

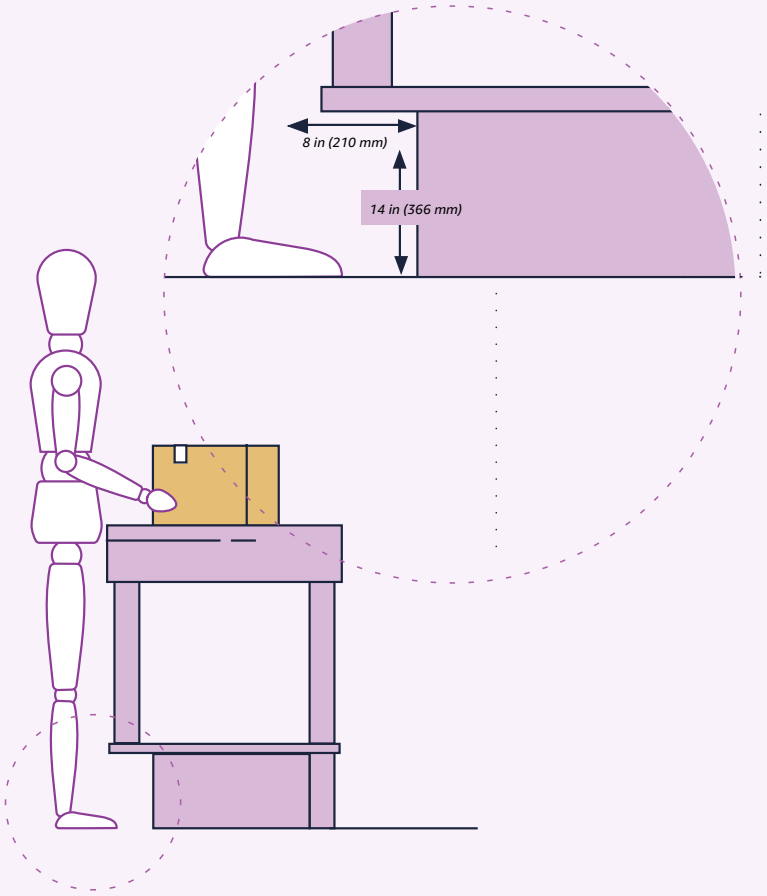
What good looks like

CLEARANCE/ACCESS (FOR CONVEYORS)

Conveyor foot space
When working at a conveyor, the recommended foot clearance height is **14 in (366 mm)** and the depth is **8 in (210 mm)**[2]. Note: this is greater than the foot clearance required at a workstation.

Access
Use diverging conveyors off a main line to create tasks which are less repetitive. Install diverters on conveyors to direct resources and materials towards the Associate to eliminate excessive leaning or reaching.

Place conveyor supports out of the working space to avoid restricting the Associates' ability to take items from or place items on the conveyor. Keep clear access to the conveyor. Consider the maintenance and repair tasks required (such as an RME Technician removing blockages or repairing equipment) and ensure there is sufficient access for their work to be done safely.



[2] ISO 14738 (2002)Anthropometric requirements for the design of workstations at machinery

Ergonomics guide:
Access to workstations

Dive deep

Before deciding on the space needed, make sure you are aware of who needs to gain access, what they need to do and what equipment they may be using or carrying. Remember to consider everyday use and/or occasional routine/unplanned maintenance/repair work.

What good looks like

Access to a workstation	**> 31 in (800 mm) width**	
Access for engineers/non-routine work		**> 23.6 in (600 mm) width**

POSTURE

- Consider the 99th percentile male for the width of a walkway and clearance under overhead conveyors.
- Please note that Authorities Having Jurisdiction (AHJ) may have local regulations for width and height clearances. Always utilize the most stringent requirements.

CLEARANCE/ACCESS

- Consider the activity in an area and the equipment to be used, such as ladders and machinery/tools for engineers, technicians. Make sure there is clear access to machinery, equipment, and workstations for these purposes.
- Make sure controls, switches, and monitoring equipment have enough clearance for a 95th percentile male hand.

Ergonomics guide: **Working space**

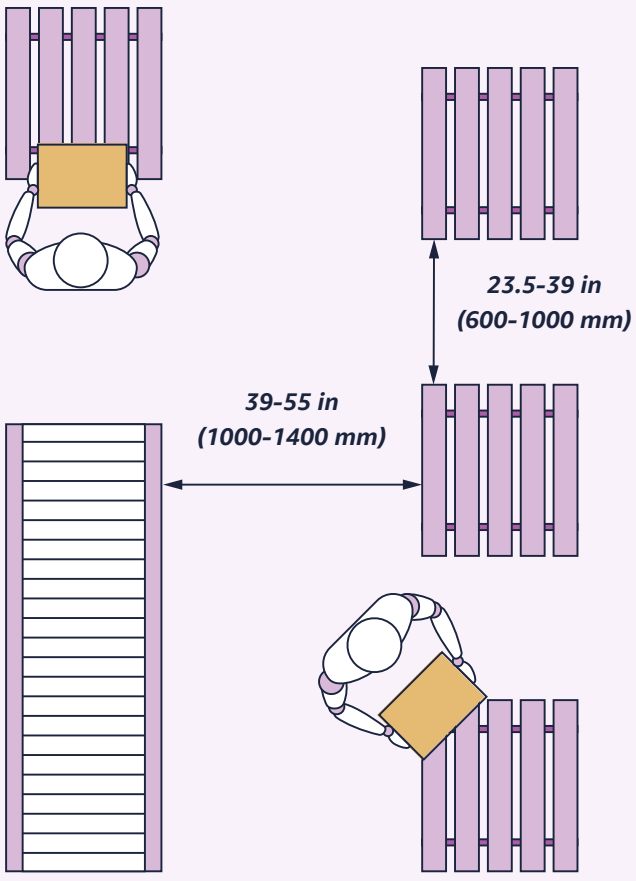
Dive deep

Understand the process associated with the working area, the equipment used, the number of people working there, and who needs to share the space to replenish or take-away work. Consider if a person needs to reach lower than workstation height (to access shelving underneath), if people need to pass one another, and if any equipment needs to be used in the space, such as carts or pallets/pallet jacks.

What good looks like

ACCESS

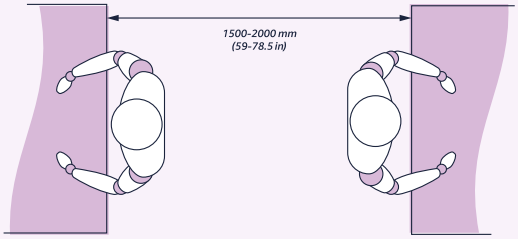
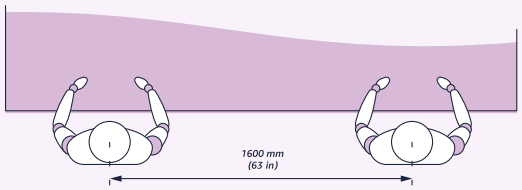
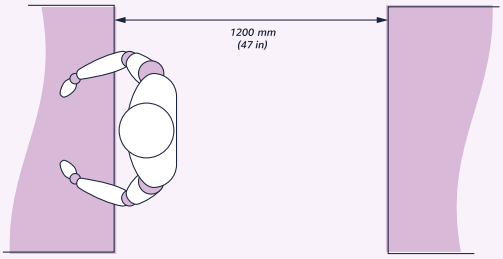
- The in-feed pallet must be minimum **39 in (1000 mm)** and max **55 in (1400 mm)** from the end of the conveyor. This distance provides enough space for the Associate to take one step after collecting a package before taking it to the conveyor, and standing square-on to put it down. If there is less, the Associate will likely twist.
- Ensure minimum **23.5 in (600 mm)** gap between pallets to allow for walking between them.
- Ensure minimum **39 in (1000 mm)** to allow for pallet wrapping. If space allows, robotic mobile pallet wrapping machines are preferable.
- Where larger cartons are handled (such as Non-Con), spacing of **39 in (1000 mm)** is recommended.
- If the space is too great, time and energy are wasted while manually handling products.



Ergonomics guide: **Working space**

What good looks like

See table/illustrations below for measurements of a working space, dependent upon the number of people and the nature of the work.

Working set-up	*Space requirement*	*Illustrated example*
Back-to-back*	59-78.5 in (1500-2000 mm)	
Side-by-side	63 in (1600 mm)	
Work area for one person*	47 in (1200 mm)	

Where a workstation is next to PIT activity	If <96 in (2440 mm)	Install a barrier
	If >96 in (2440 mm)	Distance is considered safe

*= dimensions must be taken from the front edge of the workstation

Space between carts: if only for walking, allow minimum of **23.5 in (600 mm)** for clearance. If carrying a carton or tote, ensure this can be carried without needing to twist the torso.

Ergonomics guide: **Walkways**

Dive deep

Gain a full understanding of who will use this walkway/aisle at all times of the day and throughout the year. Consider what equipment they may be pushing or pulling and whether they will walk in single file or whether you need space for multiple people to pass one another.

What good looks like

CLEARANCE/ACCESS

The width of a walkway/aisle will depend of the width of the largest load carried by the cart/cage/pallet truck (if larger than the equipment itself).

Guidance for straight walkways[3]:

- 1-way walkway with pallet size width 31.5 x 47.2 in (800 x 1200 mm)= **51 in (1300 mm)**
- 2-way walkway with pallet size 31.5 x 47.2 in (800 x 1200 mm)= **114 in (2900 mm)**
- 1-way walkway with pallet size 39.4 x 47.2 in (1000 x 1200 mm)= **55 in (1400 mm)**
- 2-way walkway with pallet size 39.4 x 47.2 in (1000 x 1200 mm)= **122 in (3100 mm)**

Guidance to maneuver Powered Industrial Trucks (PIT)[4]:

Ride on PIT:

- To maneuver a short-fork PIT= **138 in (3500 mm)** width
- To maneuver a long-fork PIT= **177 in (4500 mm)** width

Electrical Pallet Jacks (EPJ):

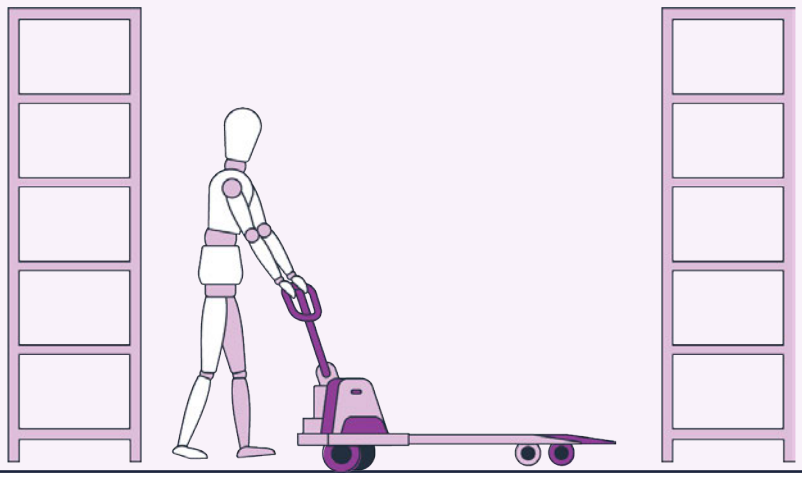
- To maneuver EPJ= **39.3 in (1000 mm) + A_{st}** [5] width

Guidance for manual pump truck:

- To maneuver a manual pump truck: **78.7 in (2000 mm)**

Complete a local risk assessment by the site (WHS, space manager, operations teams) for final walkway/aisle widths.

Check with authority having jurisdiction and local legislation as there may be a combination of a work area and/or a fire escape requirement. In this case, comply with the widest requirement.



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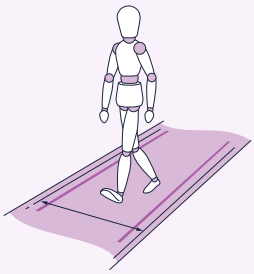
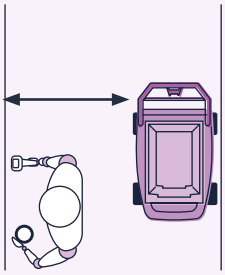
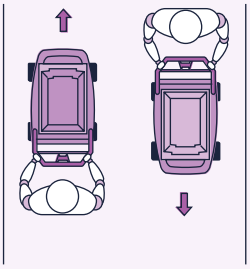
4 PIT Safety Requirements - Procurement Guidance

5 Working aisle width (A_{st}) corresponds to the minimum clearance between the racks or loads to be stored

Ergonomics guide: **Walkways**

What good looks like

Working set-up	Ideal	Acceptable	Unacceptable
 **Standard pedestrian walkway**	>51 in (1300 mm)	30-51 in (760-1300 mm)	<30 in (760 mm)
 **One-way flow of walk-way/aisle with carts**	Width of cart/load + 30 in (760 mm)		
 **Two-way flow of walk-way/aisle with carts**	Width of 2 carts + 8 in (200 mm)		

Ergonomics guide: **Carts and cages**

Dive deep

Take the time to identify all the factors and conditions that are important in relation to the cart/cage.

What good looks like

POSTURE

Who will use this equipment? Design the height and shape of the handles to be sure it will suit all Associates.

REACH

How will they stow and retrieve items on the cart/cage?

FORCE

What will be transported? What will the maximum weight be? What distance will be travelled? Will the cart be used inside or outside, and what type of surface it will be used on? Will it be moved on a slope? Is it going to be handled only by Associates or also by PIT? Can it be moved with two hands?

CLEARANCE/ACCESS

Can Associates access everything easily? Is visibility through/around the cart possible? Is the cart/cage to be pushed or pulled? How wide are the aisles and walkways in which the cart/cage will be pushed?

The guidance is divided into sub-headings organized by different features of the equipment.

Wheels and castors

- Anti-static required.
- Diameter of **6-8 in (150-200 mm)** (the larger the wheel, the lower the resistance). Diameter of **5 in (125 mm)** is acceptable for smaller carts (or those with minimal weight loads).
- Sealed bearings for smooth and durable movement.
- Choose an appropriate castor material based on the surface across which the cart will roll.
- Reduce noise as much as is practicable, but take care – a softer castor makes less noise but makes it harder to push. It can also collect small objects from the floor, such as grit or nails.
- A rubber wheel is fine for smooth floors and reduces noise, but can increase effort to move cart and can be damaged by debris.
- Polyurethane wheels tend to roll easily and be quiet, but are expensive.
- Fixed wheels help with steering in a straight line. Position fixed wheels at the opposite end of the cart to the handle. A central wheel (or two) will also help to control a cart in a straight line.
- A pivot wheel allows for multi-directional movement in tight confines with reduced rolling resistance.

Ergonomics guide: **Carts and cages**

Brakes

- Brakes are required on all carts and cages to ensure they remain in place when being loaded, unloaded, or transported in trailers.
- Brakes may, where feasible, be easily visible and accessible for the foot, but not risk striking ankles. A brake may be better positioned to the side of the wheel, not in the center. On larger carts, a single braking mechanism is preferable to individual ones on each wheel.

Force

- Guideline limits – see Snook Tables in the Global Ergonomics Wiki and Ergonomics Level 2: SNOOK . In some instances, further force evaluations may be required. For assistance, please submit a ticket to the WESE Ergonomics team.
- Be sure to consider distance moved, frequency, weight of load and height of handles.
- Where men and women use the carts/cages, design carts to accommodate a minimum of 75% of the female population.
- Make sure you consider the actual floor surface where the cart will be moved. Look out for changes in floor surface, like the lip of a trailer, the dock plate, a floor drain, or floor covering/ material.

Push or pull

- Push carts where possible as this allows you to use body weight and remain aligned.
  However, if the cart or its contents obstruct the view (of the shorter person), this may be unsafe.

Visibility

- Design cart to give the best visibility (when full/empty) for the user.
- A max height of **55 in (1400 mm)** is recommended (5th percentile female eye height).
- The longer the cart, the less visibility in front for the person pushing it.
- If visibility is restricted, it may be necessary to push from the front of the cart first using a vertical handle

Ergonomics guide:
Carts and cages

Access to load/unload

» Avoid designs which result in Associates needing to twist/stretch/over-reach. Put items **>33 lb (>15 kg)** between knuckle and elbow height. At higher/lower levels a maximum of **11 lb (5 kg)** per item is recommended.

Capacity

» Take care that the cart design is such that it cannot be overloaded beyond its max capacity (this will either be indicated on the cart, or can be found in the technical information from the supplier).

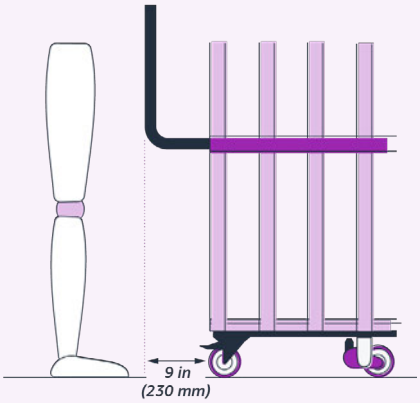
Nesting

» Carts generally need to fit together when empty to take up less space.

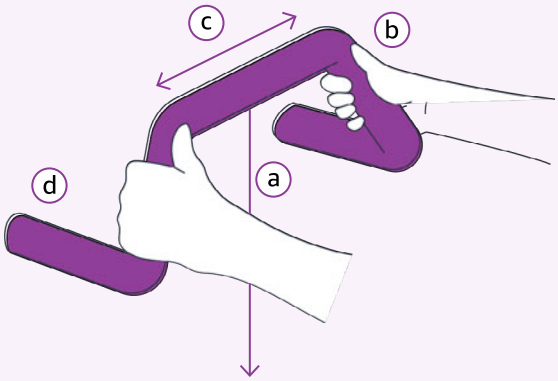
Ergonomics guide: **Carts and cages**

Handles

- For carts that are pushed, allow a space of **9 in (230 mm)** for foot clearance when walking. This allows the person to walk and push the cart without the risk of hitting their feet.[6]
- An adjustable T-Handle could be used to protect the handlers feet from being struck by the pallet during pulling transfers. At least **8 in (200 mm)** of horizontal extension is needed.



Horizontal handles



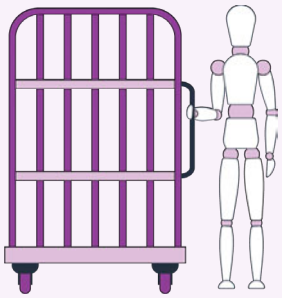
(a) Position horizontal handles **35-43 in (900-1100 mm)** above the floor so Associates can keep elbows tucked in and maintain a neutral wrist posture. A choice of grip positions is required.

(b) The recommended minimum grip diameter is **1 in (30 mm)** and there may, where feasible, be a gap for the fingers of **1.5-2.5 in (45-60 mm)** between the cart/cage and the handle.

(c) The distance between handles on each side of a cart or truck may, where feasible be **18 in (460 mm)** wide. Wider separations put higher loads on the weaker shoulder muscles.

(d) Make sure the backs of the hands are protected from getting knocked if working in a confined area. An angled handle helps with this.

Vertical handles



- Position vertical handles 35-43 in (900-1250 mm) above the floor.
- Handling a cart with elbow close to body in upright posture results in better visibility.
- Vertical handles encourage a good wrist posture and elbows tucked in.

6

Ergonomics guide: **Carts and cages**

Cart shelves

Dive deep

Review what will be placed on the racking – pallets of cases, loose cases, bags, individual ASINs, and how it is removed.

What good looks like

POSTURE

Top shelf max height recommended is **36 in (900 mm)** to allow for a tote to be used on the shelf (top of tote is at **47 in (1200 mm)**, which is shoulder height for 5th percentile female).

Bottom shelf recommended min height is **12 in (300 mm)**, allowing for a tote to be filled at **23 in (600 mm)** and for the tote to be removed when full.[7]

FORCE

Make sure that the strength of the shelf is sufficient for the cart's intended use - see Storage section for weight guidance.

CLEARANCE/ACCESS

Where totes are used, the shelf design must allow for placing/removing empty/full totes and potentially filling them whilst on the cart.

Consider whether the low shelf may be used to store empty totes, and only the top shelf used for filling and storing full totes.

Access to load/unload

- Put items **<33 lb (15 kg)** between knuckle and elbow height, **32-48 in (800-1200 mm)**. At higher/lower, levels a maximum of **11 lb (5 kg)** per item is recommended.
- Consider whether the low shelf may be used to store empty totes, and only the top shelf used for filling and storing full totes.

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Ergonomics guide: **Storage**

Shelves

Dive deep

Review what will be placed on the racking – pallets of cases, loose cases, bags, individual ASINs, and how it is removed.

What good looks like

POSTURE

Design shelves so that all Associates can see the material on the shelf. This will make it easier to pick items and decreases the risk of items falling on the Associate.

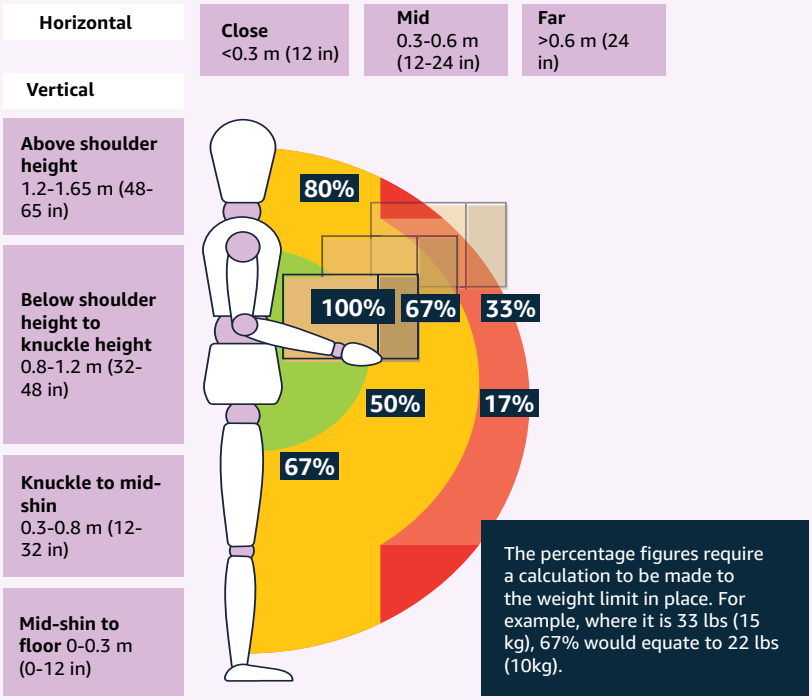
REACH

Design shelves so that a person can reach to place or remove an item. Ideally, the Associate would not need to use a stepladder, but if they do, remember they need to maintain three points of contact. It may be helpful to have some form of shelf available to place the item (or their scanner) on as they go up or down the ladder.

FORCE

Consider the weight of the item and where it is stored. See the diagram below for details on weight and location. This guidance is also applicable to RME stores; ensure that tools and electrical equipment are stored following their weight and frequency of use/ease of access.

Recommendations for individual ASIN weight limits to shelving height below.



Source: [8]

[8] EU Operational Safety Rules (Rule 37)

Scuttles

Dive deep

Consider what will be placed in the scuttle and how easy it is for people to stow and pick from it. Scuttles suit small, light packages that can be dropped inside (ideally from a chute), not needing careful placement.

What good looks like

POSTURE

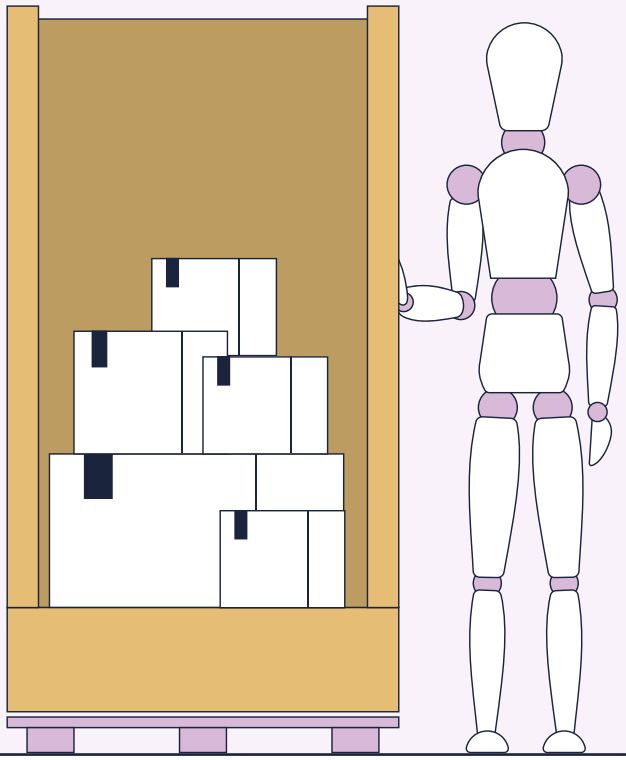
The front of the scuttle can block access to lower levels. It requires the person to reach inside with their legs straight, using their back muscles. It is recommended to have perforated openings at knee height **(17.5-19.5 in [450-500 mm])** to allow the person to bend their legs and reduce back strain.

REACH

Avoid using scuttles if there are large or fragile items inside that need careful placement.

FORCE

It is not possible to team lift from a scuttle so the weight limit of packages in scuttles may, where feasible be that of one person.



Ergonomics guide: **Storage**

Bin boxes

Dive deep

Bin boxes are used to contain items too small for bin locations. The risk of injury increases when the Associate cannot see or reach the bin from floor level and steps are required, so take care with the placement of these boxes.

What good looks like

REACH

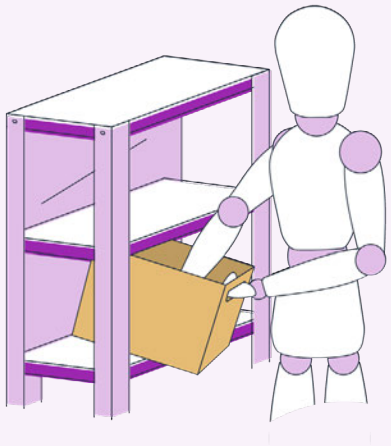
Keep boxes within vertical reach from floor level to avoid the need to use a ladder.

FORCE

Recommended max weight is **11 lb (5 kg)** individually (ideally the bin weight is capped).

CLEARANCE/ACCESS

Use a 'stopper' or backstop (same idea as drawers in a kitchen, for example) at the back of boxes (except 'A' or lowest level) to reduce the risk of dropping the bin. Box must be of a sturdy construction, with no sharp edges. A window in the front of the box helps the Associate to view the contents.



Shelving below 12 in (300 mm)	» Box must be removable so it can be taken out for easier access (no stopper).
Shelving 12-48 in (300-1200 mm)	» Boxes must have a stopper at the back. » Items in the box can be any size or weight within existing guidelines.
Shelving above 48 in (1200 mm)	» Bin boxes above **48 in (1200 mm)** must have a stopper at the back (to prevent them from falling). » Individual items must be easy to hold in one hand (to promote safe ladder use). » No ASIN can weigh more than **11 lb (5 kg)** individually. Ideally, no ASIN would weigh more than **6.5 lb (3 kg)**.

Ergonomics guide: **Storage**

Stepladders

Dive deep

Remove the need for ladders where possible. Identify who will use the ladder (e.g., Associate, engineer) and for what purpose. Consider whether the user needs to carry tools/packages/scanners.

Some countries have specific regulations with regard to ladders, such as requirement for guard rails. Be sure to check local regulations.

What good looks like

REACH

See section on Vertical Reach for details.

It may help to have a fixed shelf on a permanent ladder (as seen in some AR buildings). Alternatively, a ladder cart built specifically for accessing higher levels may be used to pick, stow, or perform ICQA tasks.

FORCE

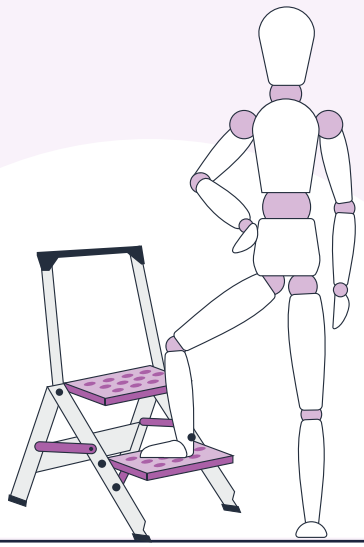
- Avoid storing large or heavy items (items not easily held in one hand) on levels where an Associate may need to use a ladder.
- One hand must be free for balance or to hold onto the ladder; the other hand is needed to hold product (and requires the Associate to put the scanner down). Ideally, only store items on higher levels that can be gripped in one hand.
- Associate needs to maintain three points of contact when using the stepladder or ladder.
- For maintenance (RME) and process tasks, ensure the ladder is easy to transport using wheels or weighted castors (two or four), or light enough to be carried **(max 22 lbs [10 kg]).**

CLEARANCE/ACCESS

Take care that locations where ladders provide sufficient clearance such that a 100th percentile male will not hit their head on the ceiling or surrounding structures, such as sprinkler systems, beams, light fittings, etc.

Environmental

Where ladders are used in chillers and freezers, ensure metal handles are covered to protect from exposure to cold metal. Ensure tread is non-slip.



Ergonomics guide:
Mechanical solutions

Dive deep

Use engineering solutions to reduce the force required for tasks that require physical effort beyond the recommended limits for lifting, lowering, pushing, pulling, holding and carrying.

Please note that AHJ may have local regulations for weight limit. Please check your country/region weight limit. Always utilize the most stringent requirements.

Maximum Acceptable Lift Limits

- One-person lift: **≤33 lb (15 kg)**
- Two-person lift: **≤66 lb (30 kg)**
- Mechanical lift: **>66 lb (30 kg)**

What good looks like

POSTURE/REACH

Consider tasks where a person may be in an awkward posture AND applying force. For example, reaching to floor level or above head height to handle large, heavy cases.

FORCE

Consider the weight of the item and if it exceeds the weight limit for one person at the required frequency. If so, look for a mechanical solution to help. Do not rely on team handling, as it is not always practical or reinforced. Think about the packaging as well; an example is pet food/products. These are challenging to handle as they are often in bags and can be more difficult to grip and handle.

Ergonomics guide:
Mechanical solutions

Scissor lift or pallet lifters

What good looks like >

POSTURE/REACH

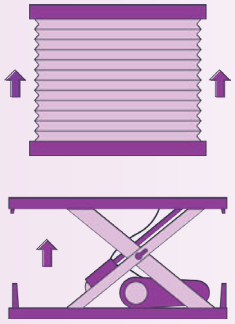
This equipment helps to reduce the need to bend down to reach packages on lower levels of pallets.

CLEARANCE/ACCESS

- You must think about how the pallet will be lifted – will the scissor lift be mobile and used to collect the pallet and then stay in place until the pallet is empty? For example, this can be seen in a Receive function. Will the pallet be placed (full) onto a pallet lifter (static in a 5S location) and left there? An example of this would be a rotating, height-adjustable lift table to allow layers of cases to be removed without a need to stretch or bend.
- Consider how the pallet will be placed on the equipment and if this changes the need for additional safety measures (safety barrier, safety shoes, ensuring separation between people and PIT).
- Ensure the type of pallet lifter is appropriate for the pallets used. For example, the scissor lift truck shown on the next page cannot be used by pallets with cross-braces on the bottom.

Ergonomics guide:
Mechanical solutions

Pros and Cons



Pallet lifter

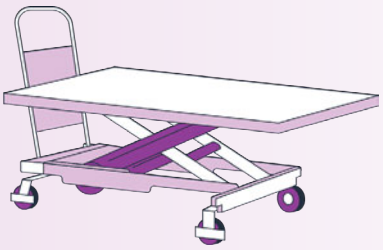
Pros
- Height adjustable
- Useful for all types of loads

Cons
- Pallet must be placed on it using PIT
- Open mechanism can be entrapment risk – use protective cover

Scissor lift truck

Pros
- Mobile
- Height adjustable

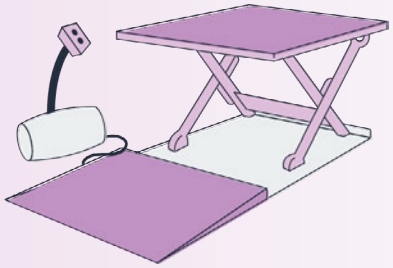
Cons
- May not suit all types of pallets
- Open mechanism can be entrapment risk – use protective cover



Mobile pallet lifter

Pros
- Height adjustable
- Mobile
- Suitable for totes, cases

Cons
- Not suitable for pallets
- Open mechanism can be entrapment risk – use protective cover



Pallet lift table with ramp

Pros
- Height adjustable
- Suitable for totes, cases, pallets

Cons
- Pallet must be placed on it using pallet truck
- Open mechanism can be entrapment risk – use protective cover

Shrink wrap equipment

Dive deep

Where shrink wrapping is carried out regularly in a process, consider installing a shrink wrapping machine. If less frequent, provide shrink wrap roll holders (either on a wheeled device or handheld) to improve working posture and reduce strain.

What good looks like

POSTURE/REACH

The person has to reach awkwardly to wrap low and high levels of a pallet. For small numbers of pallets, introduce a roll holder or a wheeled tool to improve their posture.

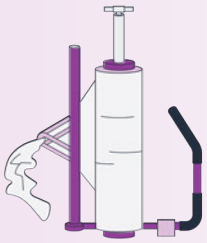
FORCE

A roll of shrink wrap can be heavy and needs to be held for a sustained period of time. Using a wheeled tool removes the need to support the weight of the roll.

CLEARANCE/ACCESS

Make sure there is space around the pallet to perform this task without compromising their posture or being close to walkways.

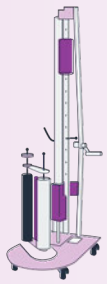
Pros and Cons



Simple, hand-held tool

Pros
- Lightweight
- Easy to use
- Inexpensive

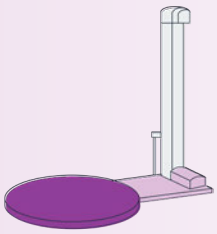
Cons
- Requires multiple layers to wrap a full pallet
- Person has to reach high and low
- Person has to walk around and carry equipment



Wheeled shrink-wrap tool

Pros
- No requirement to carry, only push the tool
- Can take larger rolls so requires fewer layers
- Roll can be raised/ lowered to reach all parts of the pallet
- Moderately priced

Cons
- Person still has to place roll on tool
- Still has to walk around pallet



Automated pallet shrink wrap machine

Pros
- Fully automated

Cons
- Requires dedicated space
- Pallet is placed on the machine when full, not partially (some processes require partial wrap during pallet building)

Vacuum lifters

Dive deep

Vacuum lifters are mechanical devices that are either fixed in place (suspended on rails, fixed to a pillar, or floor-fixed) or mobile device that have a tube which provides a strong suction force to assist in lifting and lowering packages. They reduce the effort needed to lift an item, but do not eliminate risk. Care must be taken to choose the right equipment, location, and support from ergonomics team and operations to ensure the success of a vacuum lifter.

What good looks like

Vacuum heads
Select the head that is most suited to the packaging, size, shape and weight of the item. Where this varies, select a multi-functional one that is suitable for most.

Which form of installation?

- You will need to consider the building design, any structural limitations with the floor reinforcement, and the weight limit capacity of overhead structures.
- Consider the nature of the task and whether it is a simple transfer from one fixed location to another. If the person may need to walk a few steps, then consider whether this is in a straight line, a curve, or more complex. Identify if the layout can be adapted to the vacuum lift capabilities, or whether it must be vice versa
- If in a simple, straight line (like line loading a conveyor from a fixed pallet location) then a simple floor or pillar fixed device will suffice. If there are multiple locations, then it makes more sense to have an overhead system with tracks, so the user can walk easily from Point A to Point B.
- Ensure that the vacuum lifter range of motion is equal to or greater than the distance which a package is retrieved and placed.
- Look for equipment that will allow as much versatility as possible and make the job easy and quick for users.
- Ensure the controls of the vacuum lifter are within the vertical and horizontal reaching guidelines.

More information can be found in the vacuum lifter Wiki .

Ergonomics guide: **Seating**

Dive deep

Typically, tasks are performed from a standing position. However, there are times when the Associate may need to be seated. Work together with Associates, managers, HR and operations to adapt the workstation to the needs of the Associate.

What good looks like

Advantages of sitting:

- It can be beneficial for an Associate to be seated on a standard chair or on a stool with a forward sloping seat (sit-stand stool) to rest the leg or back muscles.
- A chair is generally required for regular computer (Display Screen Equipment - DSE[9]) users (i.e., people using a computer for the majority of their work at a fixed location such as HR, but not generally for process tasks where large motor movements are required.
- If a stool is used, it may, where feasible, have a forward sloping seat and be height-adjustable to help the person sit more upright. The Associate's feet must be flat on the floor or on a foot ring. This way, they can continue their work in a good working posture, but allow recovery of certain muscles by alternating between sitting and standing. If the tasks require prolonged sitting for long durations, a height-adjustable chair with an appropriate back rest is preferred over a stool.
- Seated workstations in an industrial environment are appropriate for fine motor, precision, or high visual acuity tasks.

Disadvantages of sitting:

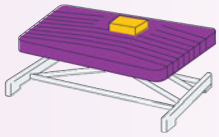
- The sitting posture in a chair (where hips and knees are in line) is unsuitable for many of the movements required for working at an Amazon work area. Sitting reduces reach capabilities. In a standing position, a person can lean on one foot or step to one side to better access a package. This is not possible from a static, seated position.
- A static sitting posture will force the spine to move repetitively into flexion (forward) when reaching forward performing lifting and other manual handling tasks.
- The static sitting position also requires the shoulders and arms to take the strain, as the back and leg muscles are not able to support. The capacity to handle heavier weights is significantly reduced. The maximum recommended weight while seated is **6.5-11 lb (3-5 kg)**[10]**.**
- If the feet are unsupported, this creates pressure on the thighs, restricting blood flow.

9 DSE users are defined in the Amazon DSE Procedure (see Inside Amazon – Inside EUFC Safety – EU Safety Policies and Procedures)

10 UK HSE Guidance

Ergonomics guide: **Seating**

What good looks like

Use criteria	*Equipment to be provided*	*Comments*
Designated Rest Area		Pregnant workers and those with a reported medical condition who have completed a Risk Assessment or been advised by a medical practitioner may use a nearby Rest Area for a rest period, as agreed with their manager. It may, where feasible, have back support and not be on castors. The agreement may, where feasible, cover how long an appropriate rest period may, where feasible, last and for how long the use of the Rest Area is required.
Defined DSE (or computer) users		Regular computer (Display Screen Equipment – DSE[9]) users should be provided with an office chair (compliant with local DSE Regulations). They may, where feasible, take posture breaks every hour from sustained periods of sitting to maintain good circulation and promote comfort.
DSE Users in FC to sit at 'eye height'	 	In some cases, it may be appropriate for the person to be seated and remain at eye height to a standing person. For example, HR functions who may spend extended times talking with Associates and benefit from remaining seated to use their PC. A high gas stem chair raises the working height of the user, minimizing use of standard chairs. It may, where feasible, have a backrest and armrests (to help person to get on/off). A footrest must be provided for DSE users on these stools to keep the legs at 90°. It may, where feasible, have a max height of **12 in (300 mm)**. If they sit with their feet on the foot ring, they risk compromising blood flow in their legs.

[11] DSE users are defined in the Amazon DSE Procedure (see Inside Amazon – Inside EUFC Safety – EU Safety Policies and Procedures and Appendix 1 for definitions).

Ergonomics guide:
Anti-fatigue mats

Dive deep

Provide an anti-fatigue mat where an Associate stands for >15 minutes (at a time).

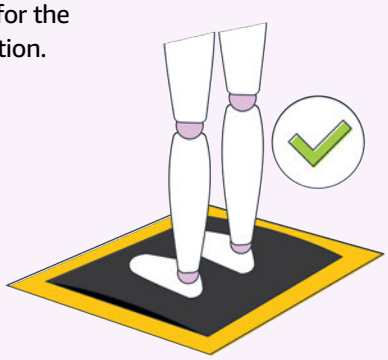
What good looks like

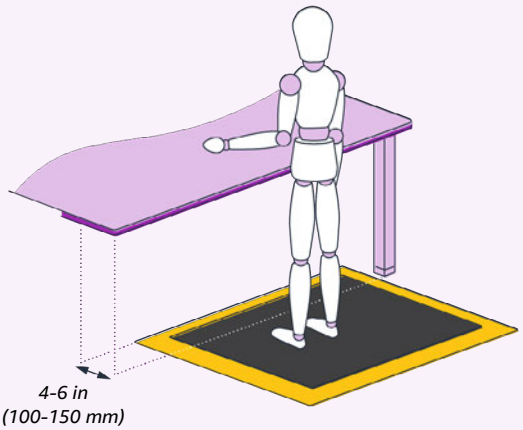
- It may, where feasible, be fixed to the floor and cover the entire working area (make sure it goes **4-6 in [100-150 mm])** under the front edge of the workstation and consider conveyors, too).
- Outer edges must have yellow borders (preferably printed) for visibility and edge detection.
- Make sure the edges are bevelled to reduce trip hazards.
- There should be sufficient shock absorption for the task/time spent standing.

More information on proper anti-fatigue mat placement can be found here.

IDEAL PLACEMENT

Ideal placement of the mat providing comfort for the feet at the workstation.





INCORRECT PLACEMENT

Mat too far away from workstation causing Associate to stand on the edge. This can make the Associate off-balance.

- Do not use chairs on mats
- If a chair is provided, a mat is not required.

Further information

DigiTools for ergonomics assessments and solutions

Global Ergonomics Wiki

REFERENCES

Books

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Pheasant, S., Ergonomics, Work and Health 1991

Oborne, David J., Ergonomics at Work: Human Factors in Design and Development 1996

Sanders Mark S., Human Factors in Engineering and Design 1993

Health and Safety Executive, Upper Limb Disorders in the Workplace 2002

Department of Trade and Industry, Adult Data: The Handbook of Adult Anthropometric and Strength Measurements – Data for Design Safety

Directives

Directive 89/391 EEC – The Framework Directive

Directive 89/654 – Workplace Requirements

Directive 2009/104/EC – Use of Work Equipment

Directive 90/269 – Manual Handling of Loads

Directive 90/270 EEC – Display Screen Equipment

Directive 2002/44/EC – Vibrations (Guide to Good Practice)

Directive 2006/42/EC – New Machinery Directive

Directive 2003/10/EC – Noise

Directive MIL STD 1472H

Directive ANSI/HFES 100

STANDARDS

Standard reference	Title
EN 1335-1, 2, 3	Office Furniture – office work chair Part 1: Dimensions Part 2: Safety Requirements Part 3: Test methods
EN ISO 6385	Ergonomics principles in the design of work systems
EN 13861	Safety of machinery: guidance for the application of ergonomics standards in the design of machinery
EN ISO 14122-3	Safety of machinery. Permanent means of access to machinery - Stairways, stepladders and guard rails
EN 131-6	Ladders - Telescopic ladders
EN 131-7	Ladders - Mobile ladders with platform
BS 2037	Specification for portable aluminium ladders, steps, trestles and lightweight stagings

ISO 11228-1, 2, 3	Ergonomics - Manual handling Part 1: Lifting and carrying Part 2: Pushing and pulling Part 3: Handling of low loads at high frequency
EN 1005-1,2, 3, 4	Safety of machinery – human physical performance Part 1: Terms and Definitions; Part 2: Manual handling of machinery and component parts of machinery Part 3: Recommended force limits for machinery operation Part 4: Evaluation of working postures and movements in relation to machinery
EN 547-1	Safety of machinery – human body measurements Part 1: Principles for determining the dimensions required for openings for whole body access into machinery Part 2: Principles for determining the dimensions required for access openings Part 3: Anthropometric data
EN 614-1, 2	Safety of machinery – ergonomic design principles Part 1: Terminology and general principles Part 2: Interactions between the design of machinery and work tasks
EN 842	Safety of machinery – visual danger signs – general requirements, design and testing
EN 894: 1,2,3	Safety of machinery – ergonomics requirements for the design of displays and control actuators Part 1: General principles for human interactions with displays and control actuators Part 2: Displays Part 3: Control actuators
EN 981	Safety of machinery – system of auditory and visual danger and information signals.
EN ISO 13732 – 1, 3	Ergonomics of the thermal environment – methods for the assessment of the human response to contact with surfaces Part 1: Hot surfaces Part 3: Cold surfaces
EN ISO 14738	Safety of machinery – anthropometric requirements for the design of workstations at machinery.
EN ISO 15536	Ergonomics – computer manikins and body templates Part 1: general requirements
EN ISO 7250 - 1	Basic human body measurements for technological design
EN ISO 7731	Ergonomics- danger signals for public and work areas
NSI Z590.3	Prevention Through Design Standard

SIM Reference	SIM Link
1920	Ergonomics study for minimum clearance between pallets at ARS OB shipping palletizing area
132	3PE Cart Ergo Assessment Requirements Request (amazon.com)
278	3PE Nestable Cart Ergo Assessment
717	EU GSF - Pedestrian-Controlled PIT working aisle width (amazon.com)

GLOBAL ERGONOMICS | PROJECT BLUE SKY SORTABLE AFE PACK STATION DESIGN

Beta Pilot Sites: DET3, IND1 SFL1, SFL4

Date: June, 2023

CAPEX: $0.00M **OPEX**: $0.00M **NPV**: $0.00M **Payback Period**: 0.00 years

EXECUTIVE SUMMARY

The Global Ergonomics Engineering team is requesting Amazon Robotics Sortable (ARS), Traditional Sortable Softline (TSSL) and Sub Same Day (SSD) network approval for pilot deployment of a new Amazon Fulfillment Engine (AFE) and SSD Pack station prototype at DET3, IND1 and SFL1/ SFL4. The new Pack workstation is designed to reduce musculoskeletal disorder (MSD) risk of the low back and shoulder. Quantitative biomechanical analysis indicates that the new AFE/SSD Pack station design reduces shoulder MSD risk factors by up to 53.0% and low back MSD risk factors by up to 63.0% relative to existing Pack stations. The scope of this project includes future expanded deployment of the new AFE Pack workstations pending positive feedback during initial piloting.

CURRENT STATE

From 2018 to 2021 the AFE Pack process is one of the top five MSD Recordable Incident (RI) contributors in ARS and TSSL fulfillment centers (FC) within North American Customer Fulfillment (NACF). AFE Pack contributed 311 MSD RI in 2020, and 314 MSD RI through Q3 2021 in ARS and TSSL FCs. The back and shoulder accounted for 47.7% of MSD RI across ARS and TSSL FCs. Additional MSD RI data are presented in Appendix A. Quantitative biomechanical assessment of current state AFE Pack workstations (Figure 1) was completed in Q4 2021. Three primary contributors to musculoskeletal risk of the low back and shoulder were identified: (1) current Pack table elevation, (2) current Pack table depth, and (3) repetitive reaching to scan items with a Honeywell scanner. Sub Same Day (SSD) Pack is nearly identical to ARS and TSSL AFE Pack in workstation layout and associate work methods and therefore shares an MSD risk profile with ARS and TSSL AFE Pack stations. More information can be found in Appendix B.

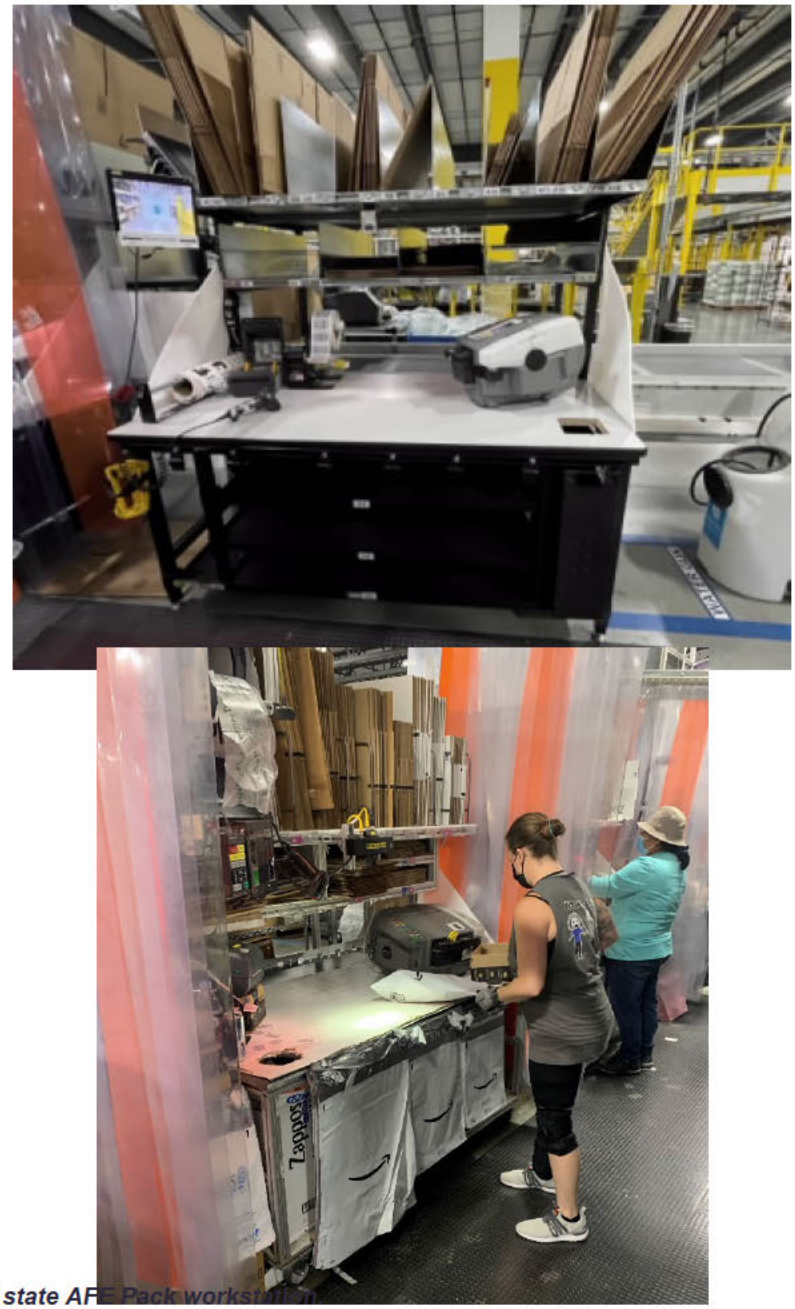


Figure 1: ***Photo of current state AFE Pack workstation***

DESIRED STATE

The proposed interventions (Figure 2) for AFE/SSD Pack workstations are: (1) An adjustable height Pack table with range from 30in to 39in, (2) reduction of the table depth as measured from the upper box suite to the edge of the table to 23in and (3) replacement of the Honeywell scanners with Cognex scanners that have greater scanning range. Quantitative biomechanical analysis indicates that the three aforementioned interventions result in estimated reduction of musculoskeletal risk factors of up to 53.0% at the shoulder and 63.0% at the back. Vendor Design Documents can be found in Appendix C.

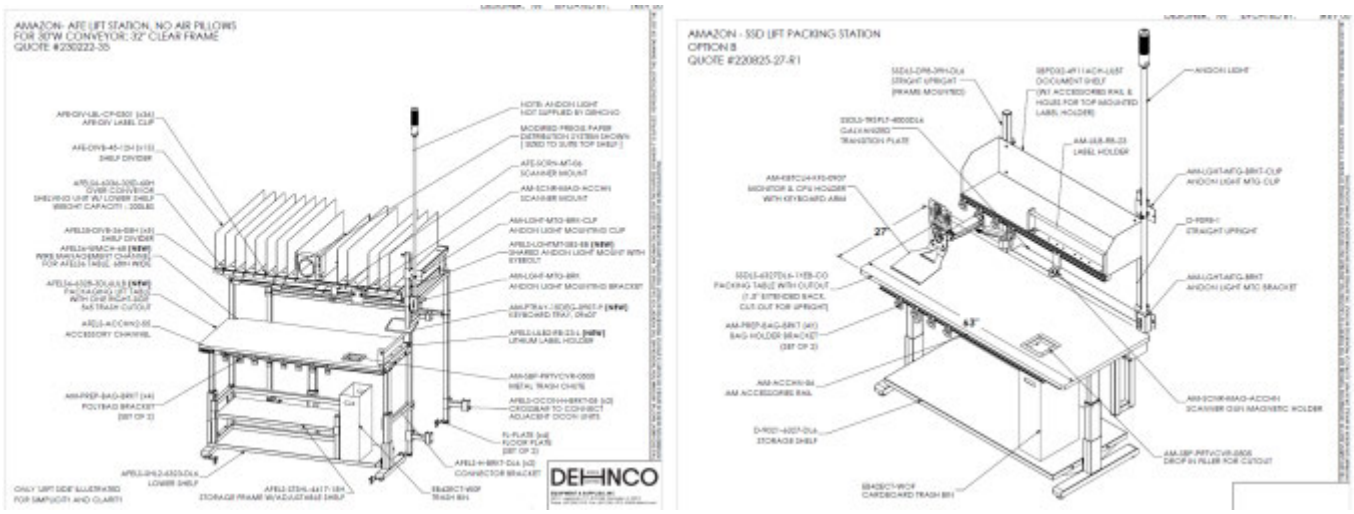


Figure 2*: Engineering drawing of the new AFE Pack (Sortable and SSD) workstation beta prototype.*

OBJECTIVE

- MSD Risk Reduction by a minimum of 20% within the sortable AFE Pack process path at SDF8 and DEN3 as well as the SSD Pack process path at SWA1 + IND1, DET2, and SFL1/4.
- Network approval for pilot program of AFE Pack and SSD Pack workstations at DET3, IND1 and SWA1 by May 30, 2023.
- Obtain capital appropriation request (CAR) approval for the retrofit of AFE Pack SSD Pack workstations at DET3, IND1 by May 30, 2023 with the goal of initiating replacement of existing workstations by August, 2023.

PROJECT DETAILS

1. SCOPE

- Initial scope: deploy pack workstation prototypes at DEN3, SDF8 and SWA1 (Table 1) by July, 2022. Voice of Associate (VOA) data will be collected regarding the efficacy of the prototype vs. current state workstations. Project scope will be expanded pending positive VOA data and successful adoption of initial Pack workstation prototypes.
- Expanded scope: Retrofit all Pack workstations across DEN3, SDF8 and SWA1 (Table 2) with the proposed ergonomic Pack workstation design pending positive VOA feedback from initial pilot.
- Expanded scope: Retrofit all Pack workstations across DET3, IND1, SFL1 and SFL4 (Table 3) with the proposed ergonomic Pack workstation design pending positive VOA feedback from initial pilot.

- TSSL Pilot Site Approval (SDF8) https://approvals.amazon.com/Approval/Details/8419855
- AR Sortable Site Approval (DEN3) https://approvals.amazon.com/Approval/Details/8557557
- SSD Sortable Site Approval (SWA1) https://approvals.amazon.com/Approval/Details/8557126
- TSSL pilot site Approval (IND1) https://approvals.amazon.com/Approval/Details/17114804?ref_=pe_3525350_264309050
- AR Sortable Site Approval (DET3) https://approvals.amazon.com/Approval/Details/17659142
- SSD Site Approval (SFL1) https://approvals.amazon.com/Approval/Details/18584349
- SSD Site Approval (SFL4) https://approvals.amazon.com/Approval/Details/18585543

2. BLOCKERS

- Prime Day timing would be a factor if sites receive workstation deliveries near that time.
- Supply chain limitations have prompted the use of a second vendor to minimize delays.
- Site design varies across the generation of the building and business unit. Risk assessments will be completed to ensure emergency egress standards are kept.

3. DEPENDENCIES

- Key stakeholder approvals for the proposed AFE/SSD Pack workstation design for ARS, TSSL and SSD networks.
- Partnership with the Program Insights and Innovation and Operations Integration teams for expanded deployment across all Pack stations in DEN3, SDF8 and SWA1 and beta sites DET3, IND1, SFL1, and SFL4.
- Partnership with local Operations (Ops) and Process Engineering (PE) teams to install new workstations. Local Ops and PE support will be required to guide third-party vendors during workstation installation.
- Identification of appropriate local third-party vendors to install the new workstations at DEN3, SDF8 and SWA1 and beta sites DET3, IND1, SFL1, and SFL4.

4. RELATED or PREVIOUSLY APPROVED PROJECTS

The adjustable height table design concept has previously been implemented in ARS Pack Singles workstations as part of Project Shot Rock. VOA data was collected during Project Shot Rock piloting at SDF8 and MDW7 in 2021. Initial results indicate that 85.0% of associates perceived the adjustable height table to "make it easier to pack" than the previous fixed-height table. The success of adjustable height tables in Pack Singles workstations supports the use of a similar engineering intervention for AFE Pack and SSD Pack workstations.

5. SAFETY

The proposed AFE/SSD Pack station design features reduce musculoskeletal risk to the low back and shoulder by up to 63.0% and 53.0% respectively (Table 3). Please refer to Appendix B for details regarding musculoskeletal risk assessment methodology.

Individual Implementation Risk Reduction						
	Cognex Scanner	Adjustable Height Table			Reduced Table Depth	
		Push Package to Conveyor	Pack Poly Bag	Pack Box	Upper Box Suite Reach	Push Packages to Conveyor
Shoulder Risk	6.0% Reduction	16.6% Reduction	53.0% Reduction	9.1% Reduction	6.8% Reduction	2.6% Reduction
Low Back Risk	-	30.3% Reduction	63.0% Reduction	50.3% Reduction	5.3% Reduction	25.0% Reduction

Table 3: ***Musculoskeletal risk factor reductions associated with each of the individual prototype design features relative to current state AFE Pack workstations.***

In addition to the Global Ergonomics Ergonomic Analysis, the Global Ergonomics team will complete a prototype risk assessment prior to Associate use, in partnership with each sites WHS team.

To date, there have been zero MSD RIs through the Alpha Pilot at both DEN3 and SDF8. The workstations have been utilized since March, 2023.

6. SOURCING STRATEGY

The Global Ergonomics team is currently working with two vendors: Dehnco and BOSTONtech. Formaspace is no longer being considered. Category procurement has been notified and reviewed the proposed pilot plan, as well as added to the site approval chains. Vendor Quote can be found in Appendix D.

CAR funding will not be required for this project, this project has been added to 2023 OP2 Funding approved through WHS Global Ergonomics pilot funding

Business Unit	# of Sites	# of Units	Est. Cost per Unit ($USD)	Total Budget
ARS	1	2	0 (Vendor Prototype)	0 (Vendor Prototype)
TSSL	1	36	2,527.74	90,998.64
SSD	1	2	0 (Vendor Prototype)	0 (Vendor Prototype)

Grand Total	3	40	-	90,998.64

Table 1: Initial project scope budget requirements.

Business Unit	# of Sites	# of Units	Est. Cost per Unit ($USD)	Total Budget
ARS	1	36	3,599.00	129,564.00
TSSL	1	36	3,599.00	129,564.00
SSD	1	24	3,599.00	86,376.00
Grand Total	3	108	3,599.00	345,504.00

Table 2*: Expanded project scope budget requirements, Alpha Pilot.*

Business Unit	# of Sites	# of Units	Est. Cost per Unit ($USD)	Total Budget
ARS	1	36	3,599.00	129,564.00
TSSL	1	36	3,599.00	129,564.00
SSD	2	48	3,599.00	86,376.00
Grand Total	4	120	3,599.00	345,504.00

Table 3*: Expanded project scope budget requirements, Beta Pilot.*

7. FINANCIAL ASSUMPTIONS & OVERALL BENEFITS

List of benefits in measurable and metric-based statements. This should correlate to the analysis presented in the CAR form. All assumptions used in your calculations should be explained here. Please separate out Financial vs. Non-Financial benefits of Initiative.

A: Financial

- Through the Alpha pilot at DEN3 and SDF8, operational data was collected with site stakeholders. The Alpha pilot concluded that Operational impact was equal to OP planning at DEN3 and showed 9% increase at SDF8. The Global Ergonomics team will continue to track through Beta testing.
- We assume that the sortable pack singles process is transferrable to the AFE pack process and will be successful in reducing the overall MSD risk related to the current state process.
    - Previous Network Approval for Sortable Pack Singles
- Cost for entire pilot program will be covered under the WHS project management fund, requested Q4, 2021.

B: Non-Financial

- MSD Risk Reduction
- Reduction in MSD Recordable Incident Rates
- Reduction in MSD First Aid Incident Rates
- Reduction in MSD Lost Time Incident Rates
- Replacement of legacy site – End of Life (EOL) initiatives, list year over year improvement in functionality, sustainability or an explanation for why there is no incremental benefit.
- Production increases due to increased ergonomic capabilities to be tested during pilot phase.

8. DEPLOYMENT TIMELINE

Deadline	Comment(s)
Pilot PO Issuance	6/6/2023
Vendor Lead-Time	6-8 weeks
Installation	8/1/2023
Training/Testing	August, 2023
Network Expansion “Go/No Go Decision”	October, 2023

9. DISPOSAL/TRANSFER OF EXISTING ASSETS

Each site has the ability to manage the disposal or transfer of existing assets. The Global Ergonomics projects team will support this effort. Any vendor cost for the disposal or recycle of current stations will be included in the WHS Project Management fund, during the pilot program. Any budget request submitted after pilot completion will be the responsibility of the pilot site.

- Site may identify a vendor to break down and recycle current state pack singles stations.
- Site may enter into idle assets for network distribution if stations classified as in proper condition.
- Site may reallocate current stations to overflow lines or pack singles lines designated for peak season.

10. INTERNAL AMAZON LABOR

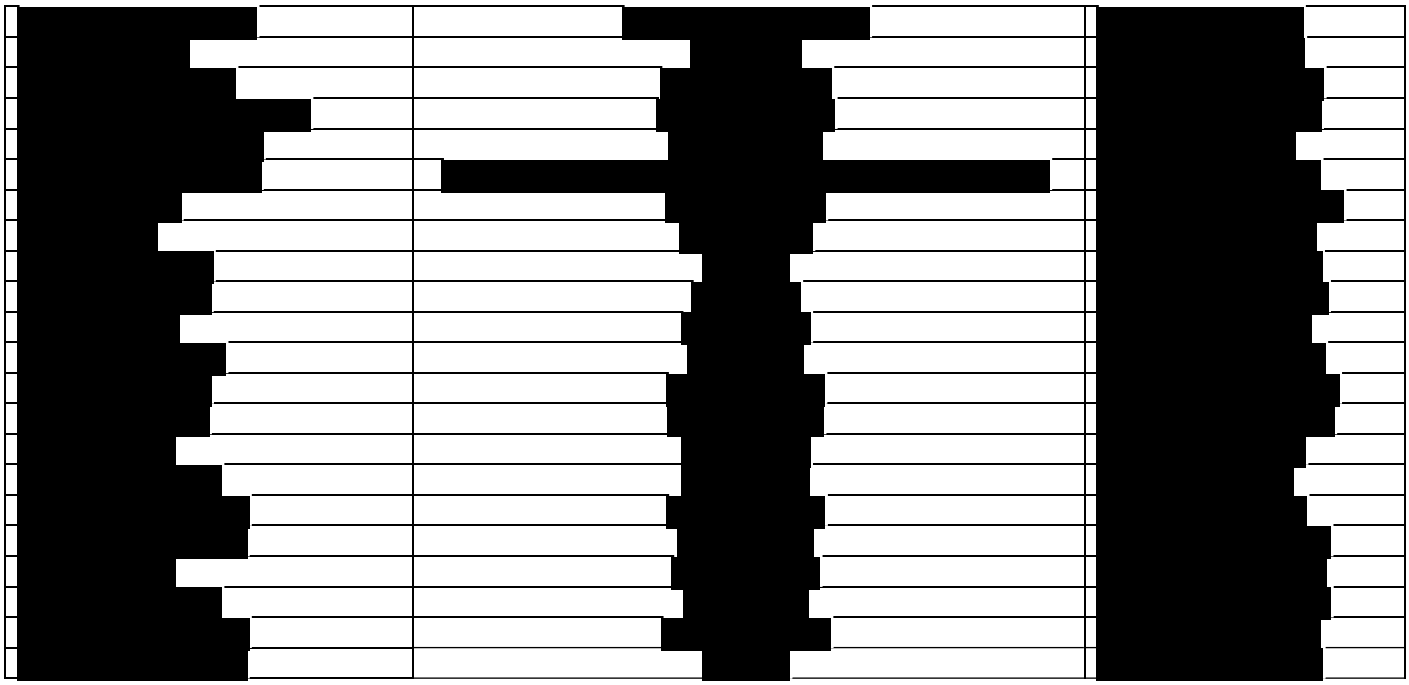
1. Vendor Labor? ☒Yes ☐No
2. Internal Labor? ☒Yes ☐No
3. A third-party vendor will be contracted to support the decommission and installation of the AFE Pack Stations. Global Ergonomics projects team will be partnering with RME to support the management of onsite 3P vendors. The site IT team will be asked to remove the computers and monitors from current stations, and assembled on the new stations.
4. Total Labor Hours: RME indirect labor hours, as required with questions/concerns. IT, 1 hour per station.
5. Site RME trained on workstation trouble shooting with QR code and trouble guide
6. If Vendor Labor is being considered, which team is responsible for overseeing the vendor while in the Amazon building? Global Ergonomics, Site RME, and Site WHS.
7. Is downtime required for work? ☒Yes ☐No
8. If downtime is required, please provide the total hours: The Global Ergonomics team will partner with site operations to complete the install during the "down time" between shift and during low labor hour time frames. Any additional down time will be processed a minimum of 2 weeks prior to install with the support of site operations referencing the Operational Planning Trouble Ticket.

11. POSSIBLE ALTERNATIVES

- There are currently no active Engineering Simple Ergonomic Solutions or Engineering alternatives being considered for this process path.
- During the Global Ergonomics AFE Pack Multis Kaizen, our key stakeholders indicated no conflicting projects related to this request.
- *Height Adjustable Pack Table:* An adjustable height pack table was considered as an early design alternative. Simulations and VOA determined that the adjustable height table was not a feasible option. Developing an interface between the adjustable height table and the package takeaway conveyor that did not required the associate to lift the package, and thereby introduce a new MSD risk factors was a barrier to implementation. Additionally, the range of item dimensions in TNS would not have resulted in associates working at a higher percentage in their power zone even with a height adjustable table.
- *Do Nothing:* The network could make no change to the pack table design. Continuing with the existing design would not change the MSD risk profile and there would be no reason to expect that the frequency of MSDs at the pack station would change. Doing nothing does not contribute to the goal of 40% reduction in injuries by 2025.
- There was a project in 2020 that proposed individual shelfs to each workstation. The shelf would raise the table height by 4 inches. This project was ultimately rejected as the shelfs were moved each shift depending on staffing. There was no storage in the AFE walls for the additional material, creating a tripping hazard. This project only looked at minimizing risk for taller associates. There was no solution for other associates.

12. PROJECT TEAM & STAKEHOLDERS

Role	Name	Alias
[redacted]	[redacted]	[redacted]



APPENDIX A: MSD INCIDENT DATA

Figure 3: Graphs containing MSD data by department (top), body part (middle) and type (bottom).

APPENDIX B: QUANTITATIVE BIOMECHANICAL ANALYSIS METHODOLOGY

This project utilized advanced ergonomic analysis tools and digital human modelling (DHM) software to objectively assess the physical demands of the packing tasks on the human body. The analysis process for the project included: (1) defining the key tasks that make up the AFE Pack process flow, (2) collecting field measurements of critical workstation dimensional data, (3) simulating the packing process path tasks in DHM, and (4) quantifying musculoskeletal risk factors.

Current State Workstation Measurements: Global Ergonomics requested field measurements for key AFE chuting pack workstation dimensions from 74 ARS, 17 TSSL, and 27 SSD sites. All sites have similar AFE pack workstations. Local safety specialists from 16 ARS and TSSL sites and 20 SSD sites responded with the requested workstation dimensions. The average of each dimension across the available sites was calculated to represent the baseline workstation.

Global Ergonomics collected weight and effort data as inputs to the musculoskeletal risk assessment. A sample item weight distribution was collected and the HFE Ergonomics team measured the forces required to push packages weighing 1-15lb to the conveyor.

Simulating AFE Pack Process Tasks: After field measurements were collected, Global Ergonomics used Siemen's Jack version 9.0 (Jack) to create DHM simulations of the AFE Pack process with the current average workstation measurements. Each of the four main tasks for the pack process were evaluated in a static environment using the postures adopted by associates to complete each task. (Figure 4) Critical postures were created based on field observations and video assessments. The analysis considered multiple unique digital human models:

The National Health and Nutrition Examination Survey 2011-2014 anthropometric database was used to generate the digital human models. The anthropometric models selected and the selection rationale is as follows:

5th Percentile Stature / 5th Percentile Weight Female (F-05-05): The 5th Percentile Stature / 5th Percentile Weight Female (F-05-05) model was selected to evaluate the impact on the smallest portion of the working population. The F-05-05 model can be identified in all figures in this paper as the female model with the green color shirt.

50th Percentile Stature / 50th Percentile Weight Female (F-50-50): The 50th Percentile Stature / 50th Percentile Weight Female (F-50-50) was selected to evaluate the impact on the average portion of the working population. The F-50-50 model can be identified in all figures in this paper as the female model with the gray color shirt.

95th Percentile Stature / 95th Percentile Weight Female (F-95-95): The 95th Percentile Stature / 95th Percentile Weight Female (F-95-95) model was selected to evaluate the impact on the largest portion of the female working population. The F-95-95 model can be identified in all figures in this paper as the female model with the dark blue color shirt.

5th Percentile Stature / 5th Percentile Weight Male (M-05-05): The 5th Percentile Stature / 5th Percentile Weight Male (M-05-05) model was selected to evaluate the impact on the smallest portion of the working population. The M-05-05 model can be identified in all figures in this paper as the male model with the green color shirt.

50th Percentile Stature / 50th Percentile Weight Male (M-50-50): The 50th Percentile Stature / 50th Percentile Weight Male (M-50-50) model was selected to evaluate the impact on the average sized male. The M-50-50 model can be identified in all figures in this paper as the male model with the gray color shirt.

95th Percentile Stature / 95th Percentile Weight Male (M-95-95): The 95th Percentile Stature / 95th Percentile Weight Male (M-95-95) model was selected to evaluate the impact on the largest portion of the working population. The M-95-95 model can be identified in all figures in this paper as the male model with the dark blue color shirt.

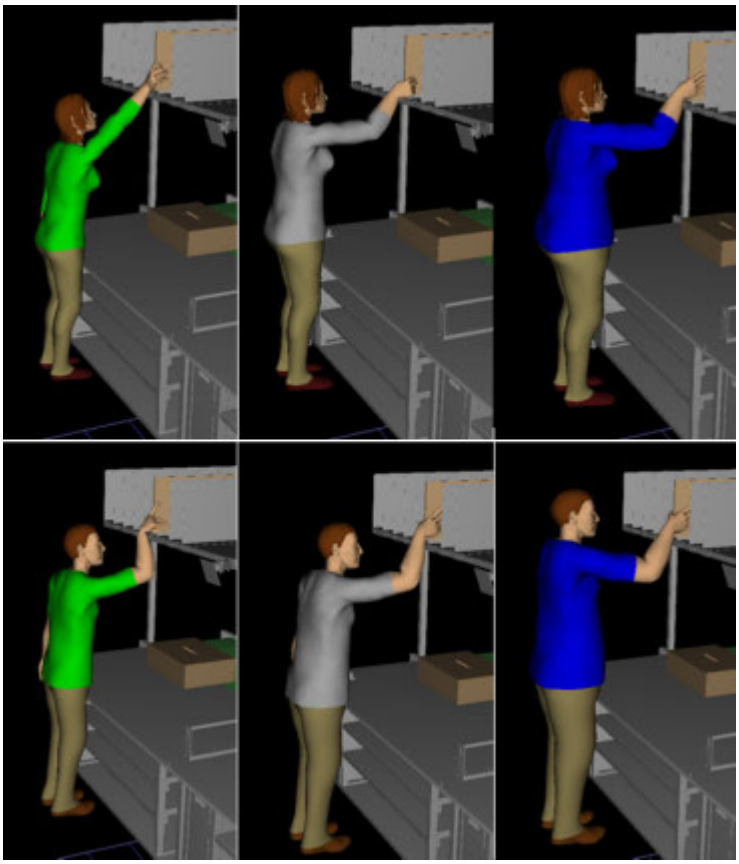


Figure 4: Exemplar images of Jack DHM simulations of female (top) and male (bottom) avatars reaching to the upper box suite of the baseline AFE Pack workstation.

Simulating Optimized Workstation: The goal in developing an optimized work station was to eliminate or reduce the forces and moments acting on the back and shoulder on a task by task basis as much as possible. A Kaizen event targeting musculoskeletal risk reduction interventions for AFE Pack was performed at SDF8 (Jeffersonville, IN) during week 44, 2021. Each individual proposal looked at mitigating the MSD risk associated with one specific task of the pack process. The optimized workstation combined multiple ideas generated during the Kaizen, with proven concepts from Project Shot Rock as a guide, to mitigate the MSD risk of the overall process flow. For direct comparison with the current workstation analysis, Jack was used to create a digital representation of the optimized workstation. Each of the four main sub-tasks for the pack process were evaluated in a static environment. The analysis considered each of the aforementioned digital human models.

Quantifying Musculoskeletal Risks Factors: A series of analysis tools were used to quantify the musculoskeletal risk factors described in this report. The analysis tools used in this report and their associated acceptability criteria are described below:

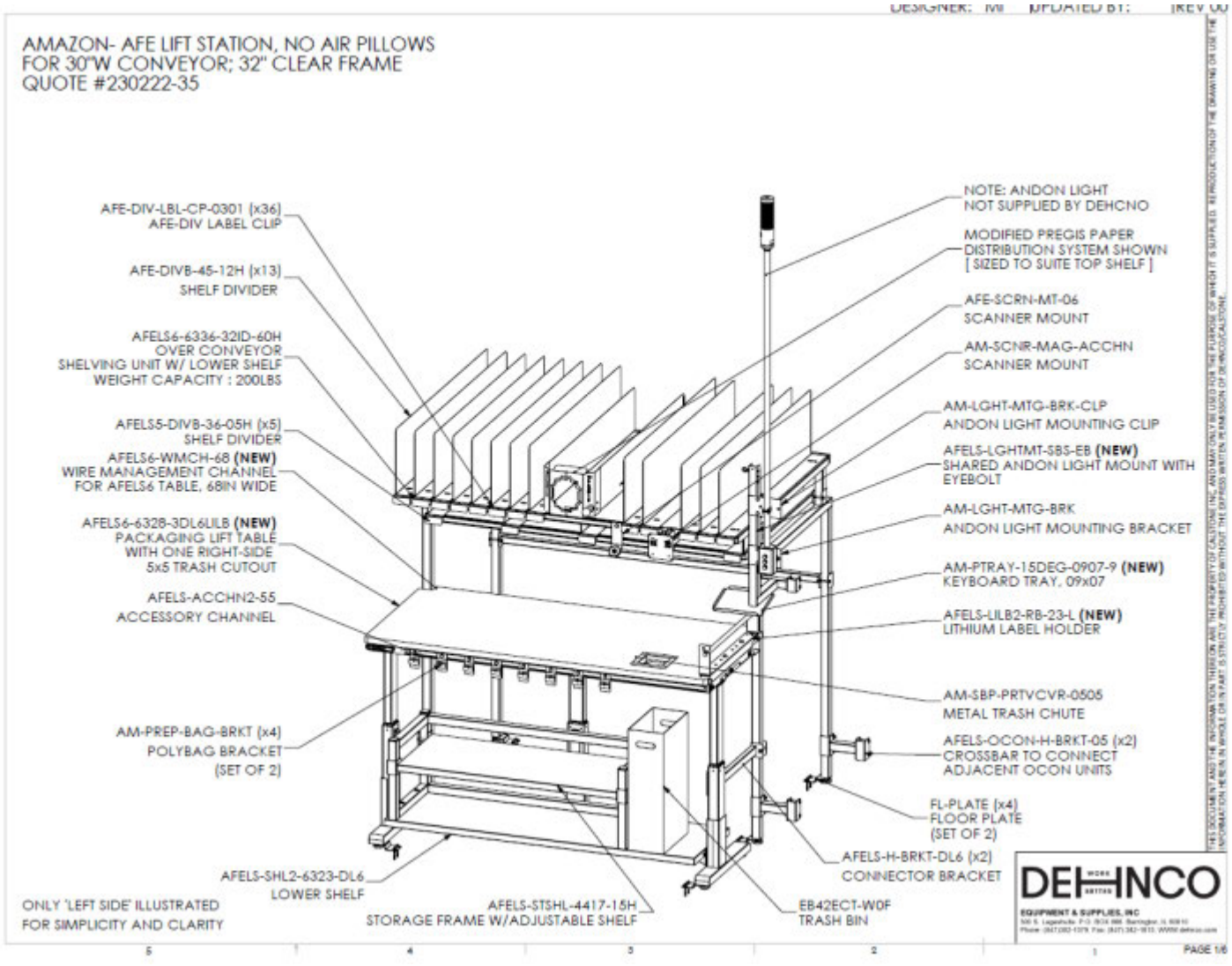
Jack Force Solver: The Force Solver (FS) provides an estimate of the maximum acceptable force (MAF) based on joint moments at the wrist, elbow, shoulder, and low back. An analyst may use the MAF to determine single-task suitability by comparing the MAF output to the task force. If the MAF is greater than the task force, the task is acceptable. If the MAF is less than the task force, the task is not acceptable. Additionally, FS outputs can act as inputs to the Recommended Cumulative Recovery Allowance (RCRA) tool for the purpose of determining multi-task suitability.

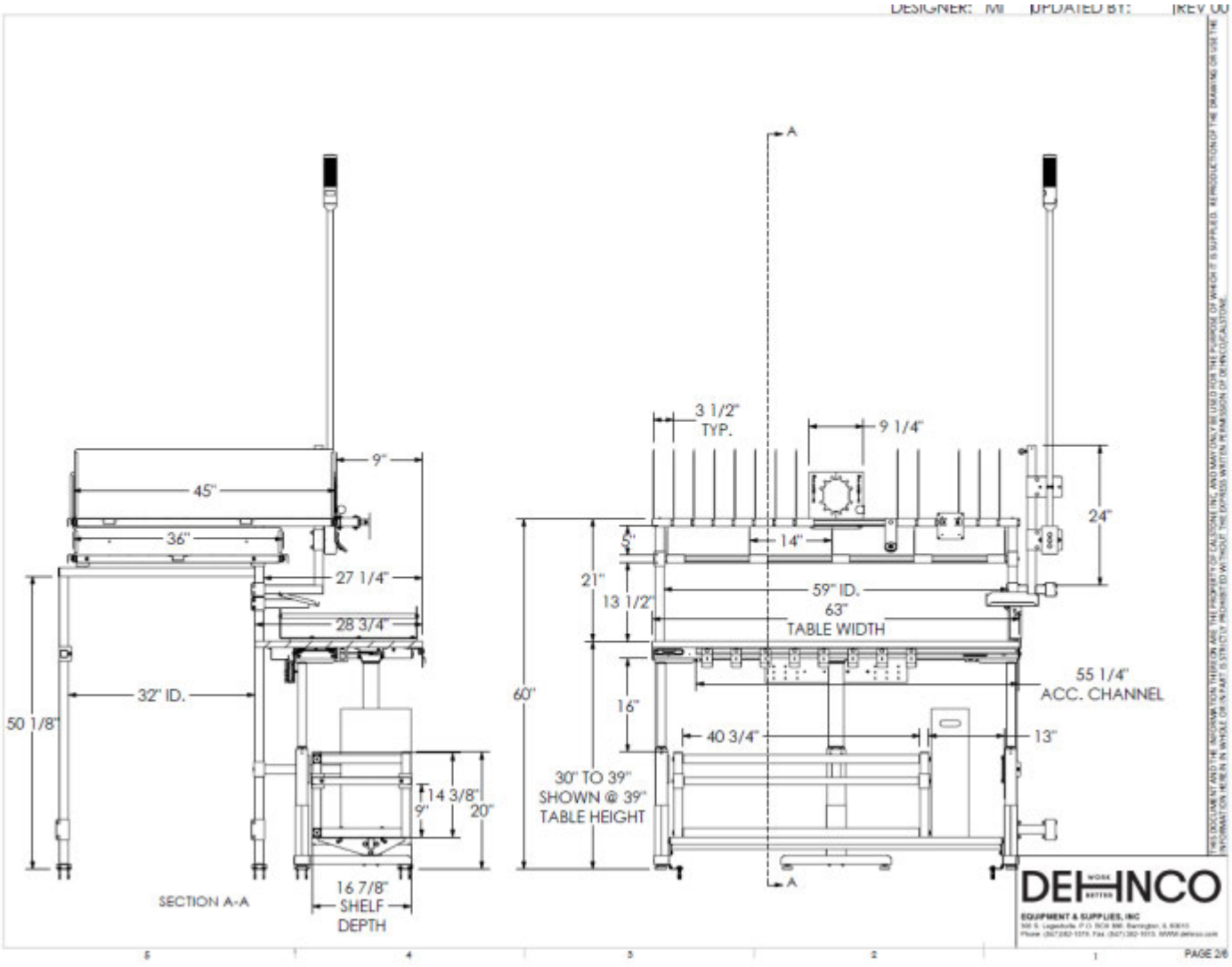
Jack Low Back Analysis: The Jack Low Back Analysis (LBA) provides an estimate of the compression and shear forces acting on the lower back. An analyst may use the LBA to determine single-task suitability by comparing the LBA output to limits of 3400N compression and 700N shear. If the compression is greater than 3400N, the task is not acceptable. If the compression is less than 3400N, the task is acceptable. If the shear is greater than 500N, the task is not acceptable. If the shear is less than 700N, the task is acceptable.

Jack Static Strength Prediction: The Jack Static Strength Predication (SSP) tool provides an estimate of the percentage of the worker population that has the strength to perform a task based on joint moments at the wrist, elbow, shoulder, and low back. An analyst may use the SSP tool determine single-task suitability by comparing the strength requirement to the strength capability of 75% of a female population. If the strength capability is greater than that of 75% of the female population, the job is acceptable. If the strength capability is less than 75% of the female population, the job is not acceptable. Additionally, SSP outputs can act as inputs to the Recommended Cumulative Recovery Allowance (RCRA) tool for the purpose of determining multi-task suitability.

The Shoulder Tool: The Shoulder Tool provides a model for evaluating injury risk to the shoulder based on a Fatigue Failure model applied to human tissue. An analyst may use the Shoulder Tool to determine multi-task suitability by comparing the cumulative damage (CD) and the probability of shoulder outcome (%) outputs. A probability of shoulder outcome of <25% is considered low risk, 25-50% medium risk and >50% high risk.

APPENDIX C: VENDOR DESIGN DOCUMENT (6 PAGES)

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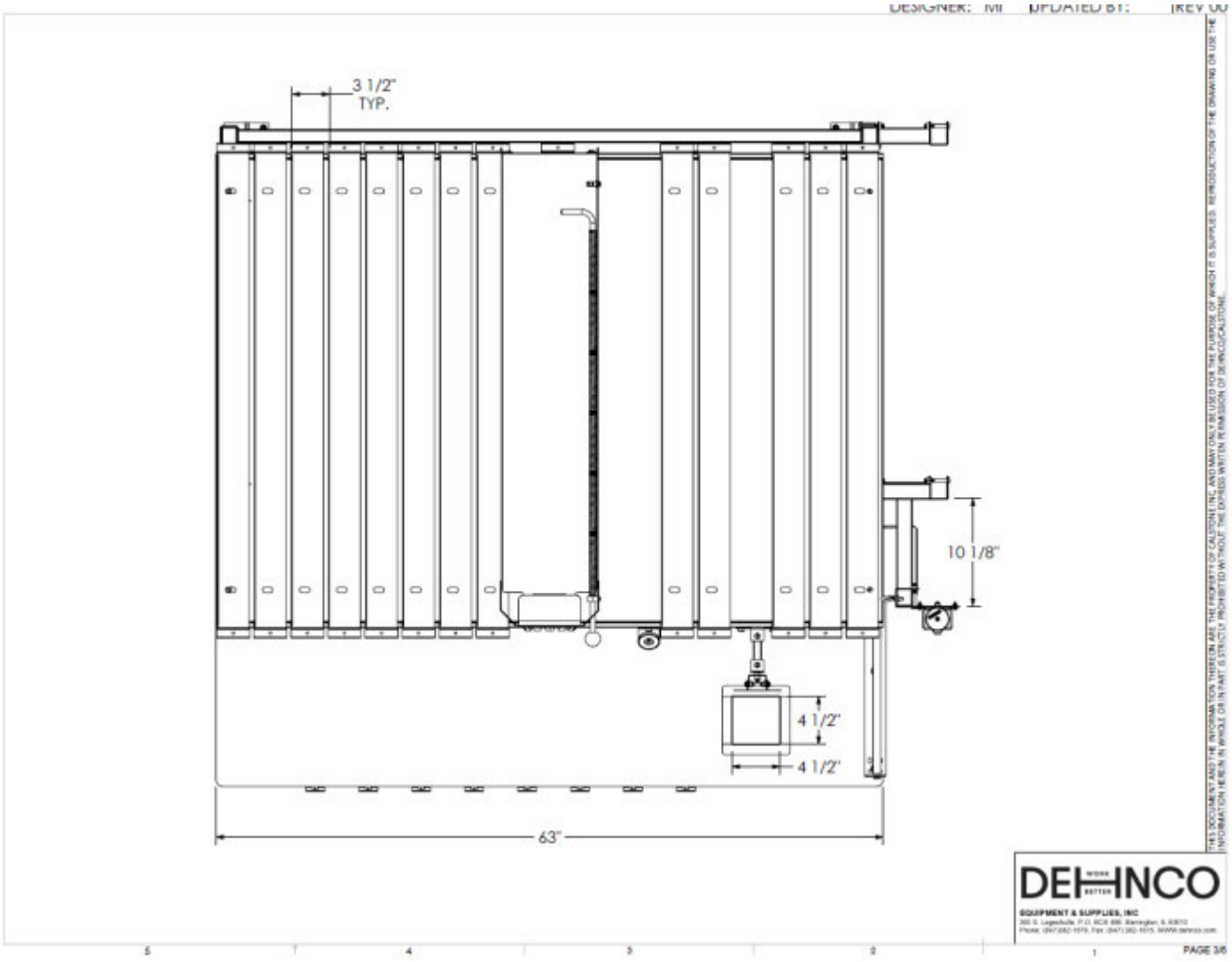

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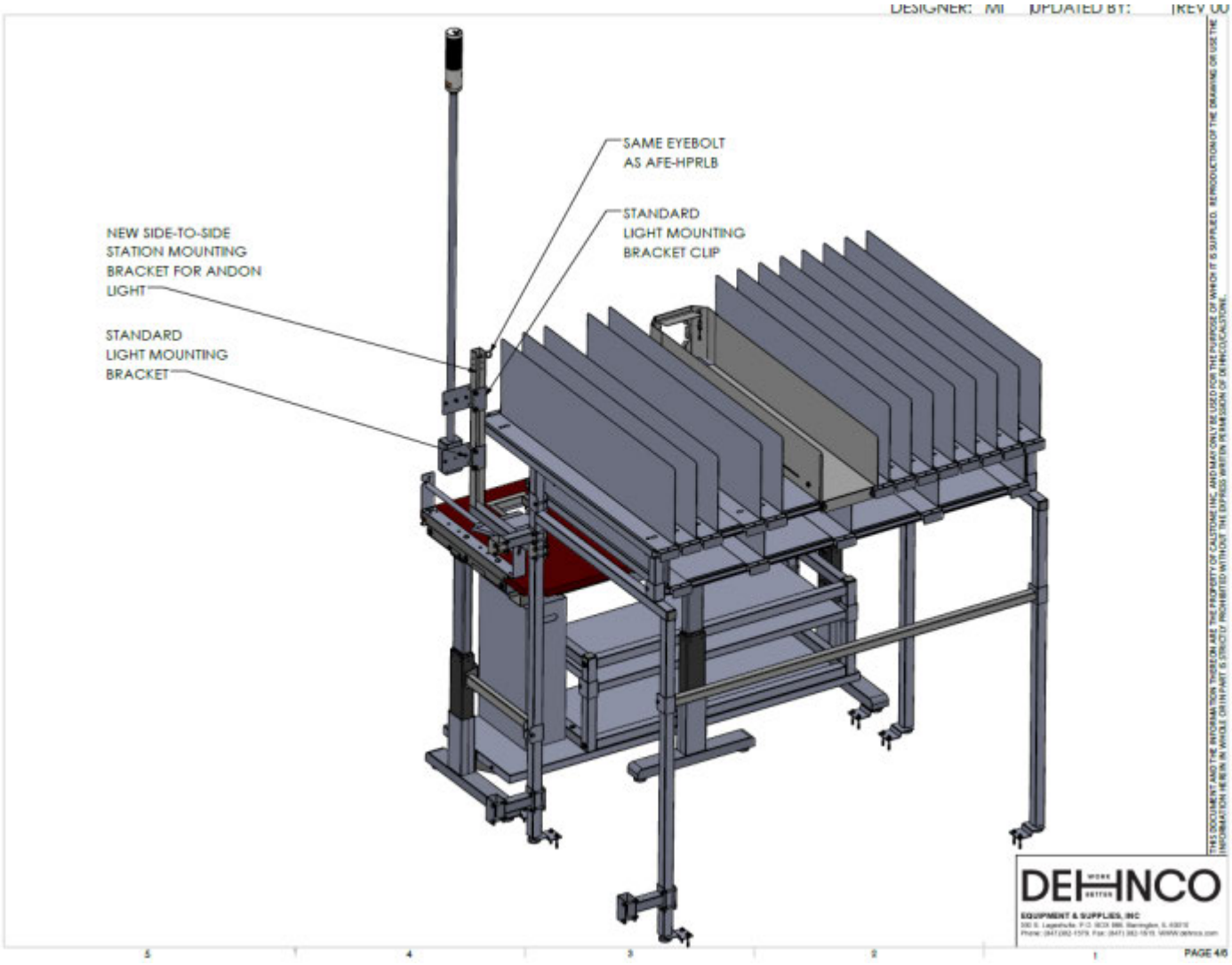
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EQUIPMENT & SUPPLIES, INC
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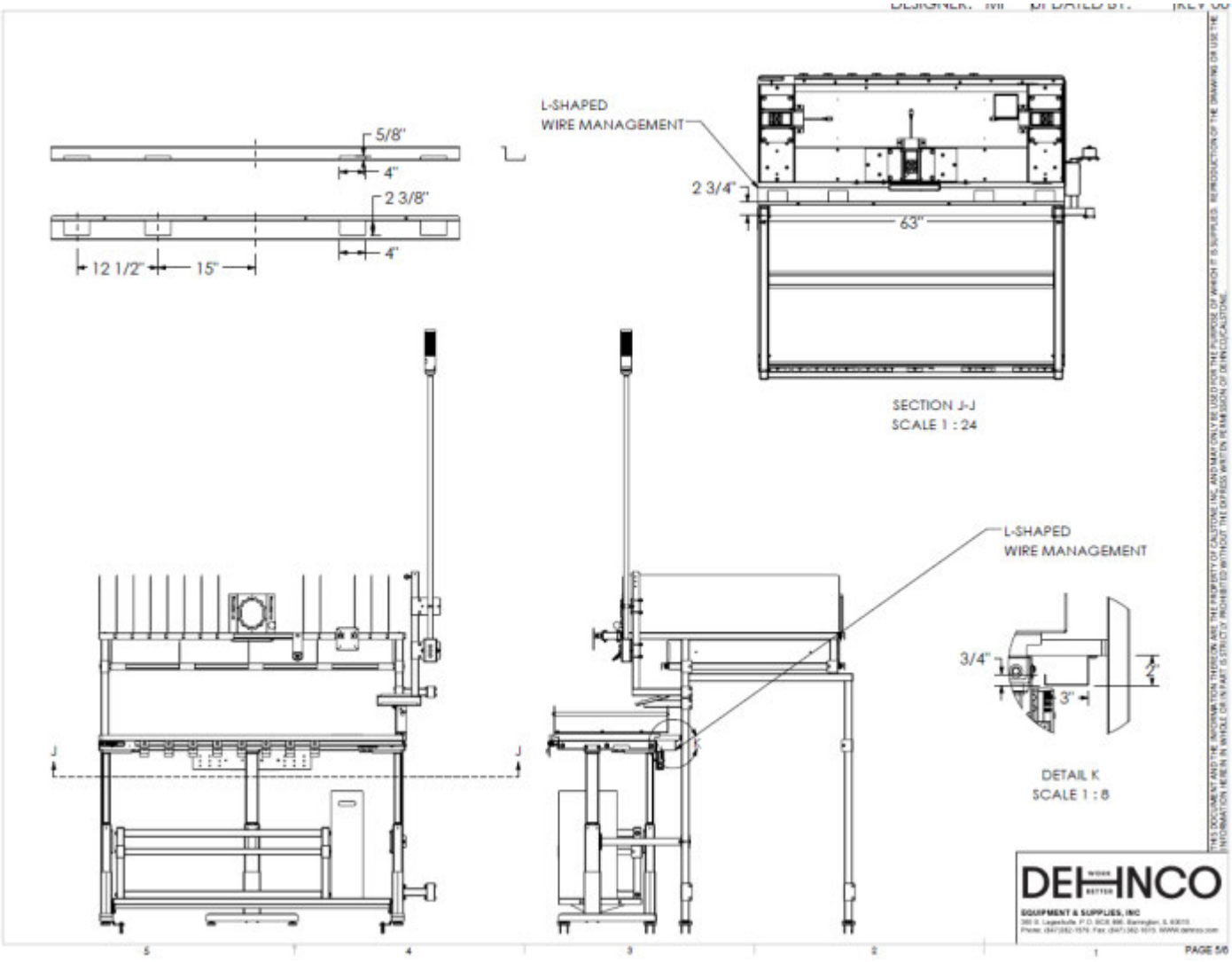
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SCALE 1 : 24
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SCALE 1 : 8
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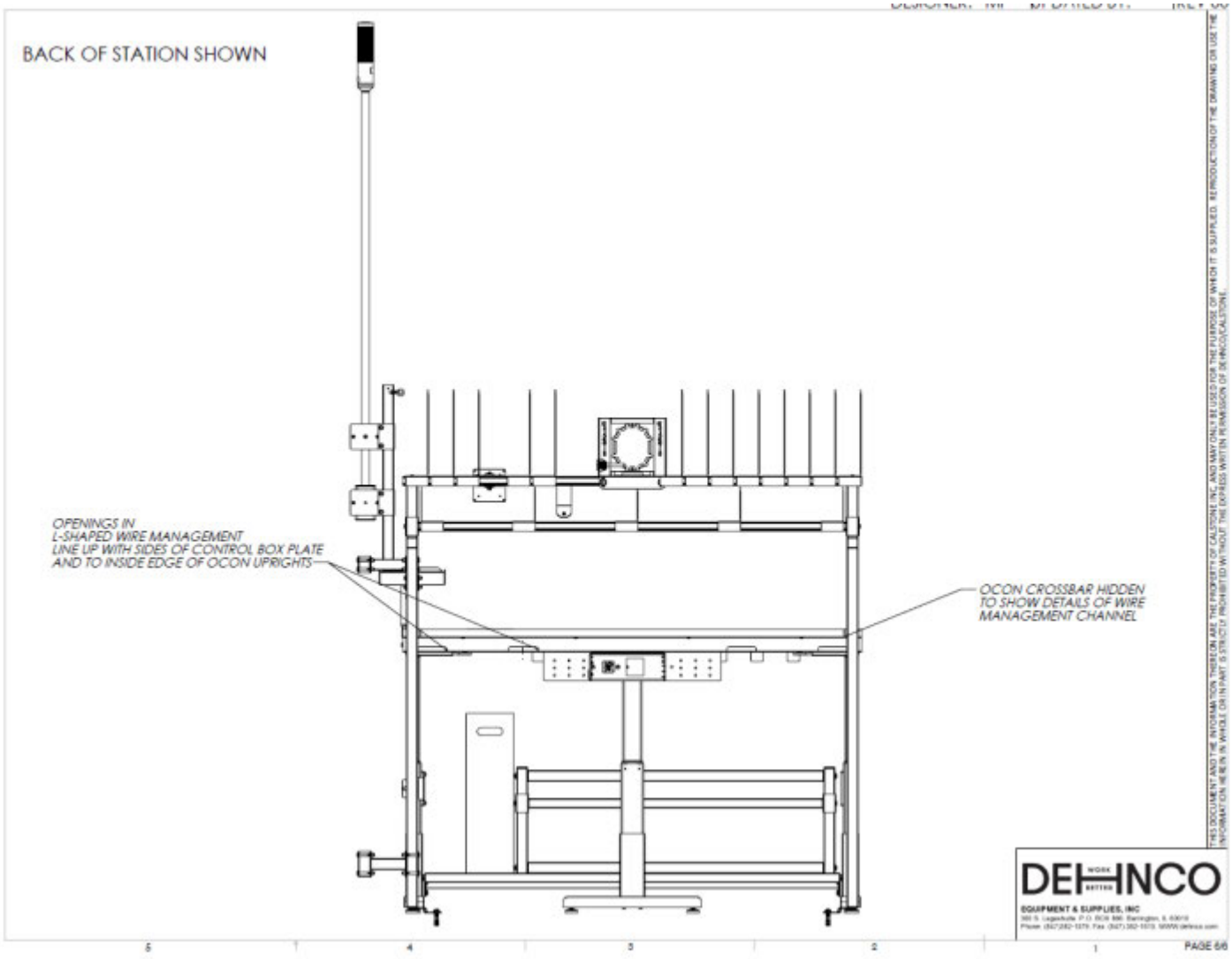
EQUIPMENT & SUPPLIES, INC
PAGE 5/6


BACK OF STATION SHOWN
OPENINGS IN
L-SHAPED WIRE MANAGEMENT
LINE UP WITH SIDES OF CONTROL BOX PLATE
AND TO INSIDE EDGE OF OCON UPRIGHTS
OCON CROSSBAR HIDDEN
TO SHOW DETAILS OF WIRE
MANAGEMENT CHANNEL
DEHNCO
EQUIPMENT & SUPPLIES, INC
PAGE 6/6

APPENDIX C: VENDOR QUOTE (4 PAGES)

Amazon.com		Amazon.Com		
345 Boren Ave. N		**AFE Workstation Detail**		
Seattle, WA 98109		**April 8, 2022**		
		RC2		
AFE Lift Station:			**Price**	**Extended**
Qty	**Type**	**Description**	**Each**	**Net**
1		**AFE Lift Station**		
1	AFELS-TB2-6323-36AH	Special Lift Table 63 x 23"D x 30-40"H (Linak DL6), w/ 3 legs, c/w control box & motor cable. Weight Cap. 810 lbs. Table top to have cutouts at back 2-1/2" in from left & right & 3" from back, & 5" Square trash hole at front LEFT &	1,254.74	1,254.74
1	AFE-TOP-FILLER-05	5" Square Laminate Top filler piece for trash hole	24.08	24.08
1	AFELS-ACCHN-48	Sp. Accessories Rail mounted to underside of table top in front of table frame - c/w wood screws	28.90	28.90
3	AM-PREP-BAG-BRKT	Sp. Bag holder brackets for rail system (set of 2)	12.05	36.15
1	IXD-TP-FLNG-0707-14H	Sp Trash Bin Insert (7x7 OD) x 14"H, for trash cutout 5x5 on laminate table top.	36.13	36.13
1	AFELS-SHELF-6323-DL6	Adjustable metal Lower shelf for DL6 Table, 63 x 23	156.55	156.55
2	AFELS-UDS-4223	Adjustable metal Lower shelf for 42 x 23	69.85	139.70
1	AFELS-SHL-EXT-FRM-23	Sp. Extension frame for adj. lower shelves x 23"D (set of 2)	125.24	125.24
2	AFELS-H-BRKT-DL6	Sp. H-Bracket to secure DL6 table to uprights	20.48	40.96
1	AFELS-63AC-36_45-63H	Sp. Over-conveyor shelving unit comes complete with 4 - Sp. D-9200-GLIDE Floor Posts (no floor plate on posts, Comes with Glides) x 63"H with welded cross bar at 45-3/8"H, Top Shelf 63 x 45 actual size (OD),bottom shelf to be adjustable 63 x 36"D - both shelves to have front & back rails for accessories to easily mount for adjustability	926.00	926.00
5	FL-PLATE	Sp. "Z" Style Floor Mounting Plates (set of 2)	18.06	90.30
8	L-1150MHOD	11.1" Black Cable Ties with moutning head (Accurate)	0.30	2.40
1	AFELS-LILB-RB-23	Special Lithium Label Holder 23-1/2"L x 5-1/2"H, comes complete with Roll Bar to hold Labels. Mounting Hardware sold seperately.	50.57	50.57
13	AFE-DIVB-45-12H	Sp. Divider 45"D x 12"H to mount to front & back rail on shelf (non-handed) Dividers to have folded edges - GAL	24.08	313.04
5	AFELS-DIVB-36-6H	Sp. Divider 36"D x 6"H to mount to front & back rail on shelf (non-handed) - Dividers to have folded edges - GAL	24.08	120.40
1	AFE-SCRN-MT-06	Sp. Swivel Flat Screen mount with 6"L arm - mounts to rail on upper shelf - mounting plate to have rounded corners	30.11	30.11
1	EB42ECT-W0F	Cardboard Waste Bin-Oyster (White) 11-5/8 x 6 x 21-1/2"H Double Wall (Coyle)	4.57	4.57
1	AFE-SCNRM-0307-04H	Sp. Scanner Mount, 3 x 7"L, 105 degree angle- As per	6.02	6.02
1	AFELS-HOPLS-1432-63H	AFE Hopper Leg Support, 14 x 32 x 63"H. Comes with four support brackets, and hopper connecting brackets	213.14	213.14
		Total		**3,599.00**
		Workstation Summary:		
Qty	**Type**	**Description**	**Price Each**	**Extended Net**
1	**AFE-LIFT-100**	**AFE Lift Station**	**3,599.00**	**3,599.00**
			Total:	**3,599.00**
Price does not include freight or installation				
FOB: Plant Scarborough, Ontario, Canada				
Lead time: TBD				
Terms: Net 45 days				

Executive Summary

The North America (NA) Amazon Logistics (AMZL) Line Loader process path was identified as a priority for a comprehensive analysis and focused intervention plan for 2022 based on musculoskeletal disorder (MSD) incident count. The Line Loader process path has the highest MSD Recordable Injury (RI) count of all Inbound processes, accounting for 255 (6.2%) of the total 4,089 MSD RI in NA AMZL between Q1 and Q3 2021 (Appendix A).

The current Line Loader process in NA AMZL was developed without support from Human Factors and Ergonomics (HFE) Engineering and is completely manual. As NA AMZL introduces projects such as Auto Scan and Label (ASL) which reduces MSD risk by automating Induct, and Auto Divert To Aisle (ADTA) which reduces MSD risk by automating Pick to Buffer (P2B), a solution for the Line Loader is an essential next step to mitigate MSD risk in Inbound.

Tippers are currently used in the North America Sort Center (NASC) network to empty Shuttles and as of 2021, they have been retrofitted to tip GoCarts as well. With the implementation of Tippers in NA AMZL, the Line Load AA will transition to the Aligner process which is currently in use on ASL capable Induct lines. Aligner AAs are tasked with orienting packages with the SLAM label facing upward and singulate packages prior to being inducted. Tippers will mechanize the transferring of packages from containers onto the Induct conveyor, but an Aligner is required to orient and singulate packages.

The intent of this paper is to: (1) provide a comprehensive evaluation of the physical demands and musculoskeletal risk factors associated with the Line Loader process, (2) provide a comprehensive evaluation of the physical demands and musculoskeletal risk factors associated with the Aligner process, and (3) quantify the MSD risk reduction with implementation of a GoCart/Shuttle Tipper. The team has started discussions with two Tipper vendors that supply the NASC network to determine the space required to install the equipment on manual and ASL capable lines, as well as determine the Tipper model that will perform optimally in NA AMZL. Safety engineering was involved in the implementation of Tippers in NASC and deemed the equipment safe to use by AAs which will assist in brining this project to pilot without the need for redesign to meet key safety requirements. Piloting Tippers in multiple delivery stations will assist the Automation team in their initiative to fully automate delivery stations from Inbound to Stow by tracking key metrics and providing lessons learned for future implementation.

The NA AMZL Inbound baseline musculoskeletal risk assessment highlighted three main areas of concern to the low back and shoulder for the Line Loader and Aligner processes: (1) obtaining packages from levels above shoulder and below knee elevations in GoCarts/Shuttles, (2) obtaining heavy packages from GoCarts/Shuttles and (3) lifting/orienting packages on the Inbound conveyor.

Problem Statement

From Q1 2021 through Q3 2021, the Line Loader process path contributed 255 (6.2%) of the 4,089 MSD Recordable Incidents (RIs) in NA AMZL. The most frequently reported body parts were identified as the low back, (37.6% of Line Load MSDs), and shoulder (19.6% of Line Load MSDs). NA AMZL Line Loader injury data can be found in Appendix A.

Quantitative Analysis - Process

Current State – Line Loader

This project utilized advanced ergonomic analysis tools and digital human modeling (DHM) software to objectively assess the physical demands of the Line Loader tasks on the human body. The analysis process for the project included: (1) defining the key tasks that make up the process flow, (2) collecting field measurements of critical workstation dimensions, (3) simulating the process path tasks in DHM, and (4) quantifying musculoskeletal risk factors. A breakdown of the analysis can be found in Appendix B.

Quantifying Musculoskeletal Risks Factors: A series of analysis tools were used to quantify the musculoskeletal risk factors described in this report. The analysis tools used in this report and their associated acceptability criteria are described in Appendix C.

Standard Process Flow: The standard process flow for Line Loader was taken from the Standards, Training, Assessments, Resource Toolkit (START) Content Management System (CMS): Line Loader SOP. The vertical height of the package in the GoCart/Shuttle and the weight of package being obtained from the GoCart/Shuttle were identified as the two main contributors to MSD risk. Additional tasks in the Line Loader process are out of scope for this analysis because field observations and engineering judgement concluded that they to do not contribute significantly to MSD risk.

Simulating the Line Load Process:, HFE Engineering used DHM software to create a digital representation of the Line Loader workstation based on field measurements gathered from NA AMZL sites in 2021. Each of the three main process tasks contributing to MSD risk were evaluated in a static environment using postures adopted by AAs to complete each task. Critical postures were created based on field observations and video assessments. The analysis considered multiple unique digital human models. For a breakdown of manikins used in this simulation, see Appendix D.

Functional Parameters: The Line Load process path requires AAs to obtain packages from GoCarts and Shuttles and place the packages onto the unload conveyor. Packages within the GoCarts/Shuttles are obtained from variable vertical heights ranging from 9in (bottom of GoCart) to 60in (top of GoCart) and can weigh up to 50lb. An itemized breakdown of package weights and other critical workstation dimensions can be found in Appendix E.

Desired State - Aligner

HFE Engineering is proposing the implementation of a GoCart/Shuttle Tipper in order to mechanize the Line Loader Process. The Tipper replaces the manual loading of packages with mechanized bulk infeed of packages from a container and will be able to integrate with both manual and ASL Induct lines. Although the Line Loader process is removed, an Aligner AA is required to be stationed at the sort table where packages are presented after being tipped out of a container. Comparison of Induct conveyor staffing layout can be found in Appendix E, Figure 17. The over all Tipper process and Aligner process are described below.

Tipper Process

Loading Bay

The Water Spider AA obtains an unopened GoCart or Shuttle from the Inbound staging area and transports it to the Tipper by either using the wheels on the GoCart or utilizing a pallet jack to transport a Shuttle. Floor railings inside the Tipper guide the wheels present on a GoCart in order to center the container prior to Tipping, Appendix E, Figure 18. Side bumpers within the Tipper assist in guiding and centering Shuttles as they enter the Tippers, Appendix E, Figure 18.

Tipper Operation

Once the GoCart or Shuttle has been loaded into the Tipper, the Water Spider AA presses a button on the exterior control panel to start the mechanized tipping cycle. Sensors inside the Tipper determine the type of container present and engage mechanisms that prevent the container from moving while being tipped. The lifting mechanism in the Tipper lifts and progressively tilts the container to slowly offload packages. The tipping cycle can be programmed to tilt at specific speeds and to specific angles with varying intervals in order to mitigate the flow of packages as well as any potential damage packages may experience in the process.

Chute and Sorting Table

Once containers are in the tipped orientation, packages are gravity fed down a chute and onto a static sorting table set to a height of 34in. An Aligner AA stationed at the sorting table is tasked with orienting packages with the Scan Label Apply Manifest (SLAM) facing upward and singulating packages before they are inducted.

Aligner Process

The Aligner process was initially developed for Induct lines with ASL technology present. Aligner AAs are stationed in close proximity downstream from the Line Load AA who is manually unloading packages onto the conveyor. The Aligner's responsibilities are to orient packages with the SLAM label facing up and singulate the packages to one side of the conveyor prior to being Inducted. After the Tipper is installed on Manual Induct lines, the Aligner process will replace the Line Loader process. Aligner process and tasks will remain the same as current, except the packages they obtain will be presented by a Tipper as opposed to another AA.

Standard Process Flow: The standard process flow for Aligner was taken from the START CMS: Aligner SOP. The lifting, flipping and singulating of packages were identified as the main contributors to MSD risk. Additional tasks in the Aligner process are out of scope for this analysis because field observations and engineering judgement concluded that they to do not contribute significantly to MSD risk.

Simulating the Aligner Process: Based on field measurements gathered from NA AMZL sites in 2021, HFE Engineering used DHM software to create a digital representation of the Aligner workstation. Each of the main process tasks contributing to MSD risk were evaluated in a static environment using postures adopted by AAs to complete each task. Critical postures were created based on field observations and video assessments. The analysis considered multiple unique digital human models. For a breakdown of manikins used in this simulation, see Appendix D.

Functional Parameters: The Aligner process path requires AAs to obtain packages from the sorting table and place them on the Induct conveyor in a single file with the SLAM label facing upward. The sorting table where packages are presented to the Aligner is at a height of 34in and packages can weigh up to 50lb. An itemized breakdown of package weights and other critical workstation dimensions can be found in Appendix E.

Quantitative Analysis - Results

Current State Analysis – Line Loader

There are two main contributing factors to AA ergonomic risk in the Line Load process path: (1) vertical height of packages within the container, and (2) weight of packages being lifted.

Vertical height of package within container: GoCarts and Shuttles are filled to obtain maximum capacity prior to being transferred to AMZL delivery stations where Line Load AAs are required to unload packages which can range in vertical height from 9in to 60in within the containers, images in Appendix B, Figures 2-4. The F-05-05, F-50-50, F-95-95, 5th percentile stature/5th percentile weight male (M-05-05), 50th percentile stature/50th percentile weight male (M-50-50), and 95th percentile stature/95th percentile weight male (M-95-95) manikins were simulated obtaining a 25lb package measuring 10inx12inx12in from a 9in, 21in, 34in, 46in and 59in elevation within a GoCart/Shuttle in order to quantify the effects on lower back compression, lower back shear and shoulder moments which are indicators of MSD risk. The package size used in this study was selected in order to assess key working heights within containers by segmenting them into 10in sections.

Posture analysis identified that picking packages from the base of the container (9in) resulted in the highest lower back compression and lower back shear forces for all manikins but resulted in the lowest shoulder moment outputs due to the posture required to reach down low. The average low back compression for the population was 3,365N and ranged from 2,351N to 4,662N. The average low back shear force was 964N and ranged from 665N to 1,330N. The average right shoulder moment was 8.8Nm, ranging from 7.4Nm to 10.3Nm, and 18.0Nm for the left shoulder, ranging from 15.0Nm to 21.0Nm.

Obtaining packages from the top level of the container (59in) resulted in the highest shoulder moment outputs for all manikins, but resulted in the lowest back compression and shear values due to the over shoulder reach required to obtain them. The average low back compression for the population was 1,717N and ranged from 1,457N to 2,026N. The average low back shear force was 221N and ranged from 198N to 277N. The average right

shoulder moment was 20.9Nm, ranging from 18.9Nm to 24.0Nm, and 36.8Nm for the left shoulder, ranging from 34.0Nm to 42.0Nm.

The DHM data outputs show an inverse relationship between lower back forces and shoulder moments in relation to the height of the obtained package. Lower back forces are highest for all manikins when reaching to the bottom of containers, and shoulder moments are highest when reaching to the top.

Weight of package obtained from container: NA AMZL accepts packages weighing up to 50lb which Line Loaders manually lift out of GoCarts/Shuttles and place onto unload conveyors. Refer to Appendix E for package weight distributions. The F-05-05, F-50-50, F-95-95, M-05-05, M-50-50, and M-95-95 manikins were simulated obtaining packages varying in weight from 5lb to 50lb from a 9in, 21in, 34in, 46in and 59in elevation within a GoCart/Shuttle. When obtaining a 5lb package from the 34in vertical height within the container, the average low back compression for the population is 930N, ranging from 680N to 1,330N and the average shoulder moment is 9.7Nm, ranging from 5.1Nm to 16.6Nm. When obtaining a 50lb package from the same elevation, the population experiences 2,554N of lower back compression, ranging from 2,204N to 2,917N, and an average shoulder moment of 47.2Nm, ranging from 31Nm to 64Nm. The DHM outputs indicate that as package weight increased, there is an increase in lower back compression and shoulder moment due to increased biomechanical stress on the lower back and shoulders.; refer to Appendix B, Figures 10-14, Tables 8-12.

Cumulative Low Back Risk for Line Loader: A Low Back Cumulative Load (LBCL) analysis was completed to quantify the cumulative risk of the Line Loader process over the average seven (7) hour belt run time during Induct. When lifting packages weighing 25lb from above shoulder and below knee height at a rate of 1,800PPH, the average cumulative compression for the population is calculated to be 21.58MNs, ranging from 17.60MNs to 26.20MNs. The average cumulative moment is 0.71MNms, ranging from 0.56MNms to 0.91MNms. As a result of the high peak back compression and shear forces and frequency of the process, the M-95-95, M-50-50, F-95-95 and F-50-50 manikins' cumulative compression and/or cumulative moments exceeded the acceptable threshold limits of 22.50MNs for cumulative compression and 0.6 for cumulative moment making this task high risk for Line Load AAs. Refer to Appendix B, Table 13 for LBCL analysis breakdown.

Desired State Analysis - Aligner

Lifting and Orienting Packages: After the Tipper has emptied a container, Aligner AAs obtain packages from a sorting table that is set at a height of 34in from the floor. Images of the current EU design being piloted can be found in Appendix B, Figures 15-16. The F-05-05, F-50-50, F-95-95, M-05-05, M-50-50, and M-95-95 manikins were simulated transferring a 25lb package measuring 10inx12inx12in from the sorting table to the Induct conveyor in order to quantify the effects on lower back compression, lower back shear and shoulder moments which are indicators of MSD risk. The same package size used in the Line Loader analysis is used to assess the Aligner process to directly compare MSD risk between processes.

The average low back compression force for the population was 1,649N and ranged from 1297N to 2,051N. The average low back shear force was 198N and ranged from 168N to 250N. The average right shoulder moment was 18.4Nm, ranging from 15.7Nm to 21.3Nm, and 33.8Nm for the left shoulder, ranging from 30.8Nm to 37.5Nm.

Considering the low back is most at risk when obtaining packages from the bottom of a container and the shoulders are most at risk when obtaining packages from the top of a container, there is significant risk reduction when replacing the Line Loader process with the Aligner process. There is a 50% decrease in lower back compression force and 79% decrease in lower back shear force when comparing the Aligner process to the Line Loader task of obtaining packages from the bottom of a container. Simulation outputs also indicate an 11.3% reduction in right shoulder moment and 8.2% reduction in left shoulder moment when comparing the Aligner process to the Line Loader task of obtaining packages from the top of a container. Refer to Appendix B, Tables 14-15.

Cumulative Low Back Risk for Aligner: An LBCL analysis was completed to quantify the cumulative risk of the Aligner process over the average seven (7) hour belt run time during Induct. When lifting packages weighing 25lb from a 34in high sort table at a rate of 1,800PPH, the average cumulative compression for the population is calculated to be 17.4MNs, ranging from 14.7MNs to 20.5MNs. The average cumulative moment is calculated to be 0.43MNms, ranging from 0.36MNms to 0.53MNms. Although the frequency does not change with the new process, the peak back compression and shear forces are decreased for the Aligner producing LBCL outputs below the threshold limit of 22.5MNs for cumulative compression and 0.6MNms for cumulative moment resulting in this process being ergonomically acceptable.

When comparing current state of using the Line Load AA to the future state scenario of utilizing a Tipper and Aligner AA, there is a 19.2% decrease in cumulative compression and 39.7% decrease in cumulative moment due to replacing the high-risk Line Loader process with the Aligner process. Refer to Appendix B, Table 16 for LBCL comparison between Line Loader and Aligner.

Summary

The baseline ergonomic evaluation highlighted the tasks of (1) obtaining packages from levels above shoulder and below knee elevations in GoCarts/Shuttles and (2) obtaining heavy packages from GoCarts/Shuttles to contribute to increased MSD risk for Line Load AAs. By replacing the Line Load AA with a mechanized Tipper to dump packages and an Aligner AA to orient the packages from a sort table, there will be a 50.0% decrease in lower back compression force and 79.0% decrease in lower back shear force as well as an 11.3% reduction in right shoulder moment and 8.2% reduction in left shoulder moment for peak loads during the process. Taking the cumulative effect on the AA into account over their seven (7) hour belt run time for Induct, there is a 19.2% decrease in cumulative compression and 39.7% decrease in cumulative moment.

Appendix A: MSD Injury Data

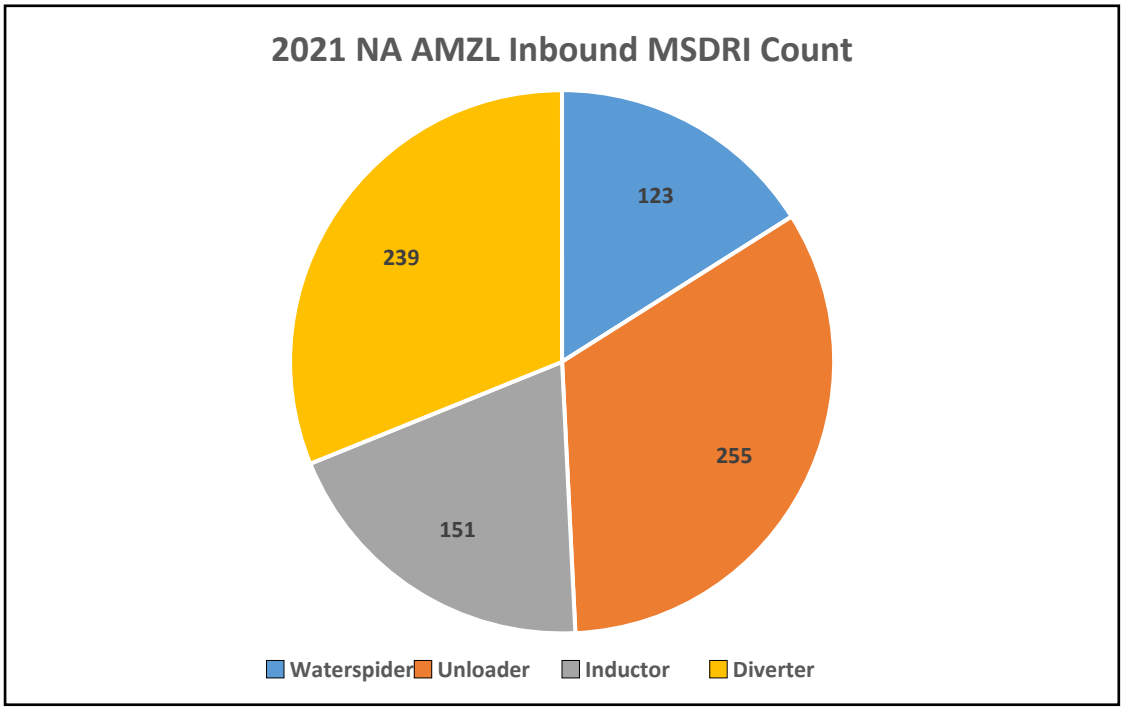


Figure 1: NA AMZL Inbound area MSDRI count by process path for Q1-Q3 2021

MSDRI by Inbound Process Path 2021		
Process Path	MSRI Count	% of total MSDRI
Water Spider	123	3%
Line Loader	255	6.20%
Inductor	151	3.70%

Table 1: MSDRI count by Inbound process path with Line Loader contributing 255 MSDRI (6.2%)

Unloader		
Body Part	Injury Count	% of total Process Path Injuries
Back	**96**	**37.65%**
Shoulder	**50**	**19.61%**
Trunk; upper	1	0.39%
Hand	12	4.71%
Knee	14	5.49%
Arm	11	4.31%
Finger	4	1.57%
Ankle	6	2.35%
Foot	5	1.96%
Leg	4	1.57%
Neck	5	1.96%
Elbow	7	2.75%
Chest	1	0.39%
Wrist	29	11.37%
Groin	2	0.78%
Abdomen/lower trunk/buttocks	5	1.96%
Hips/pelvis	3	1.18%
Total	**255**	

Table 2: MSDRI count by injured body part within the Line Loader process

Appendix B: Ergonomic Analysis

Line Loader Process Path

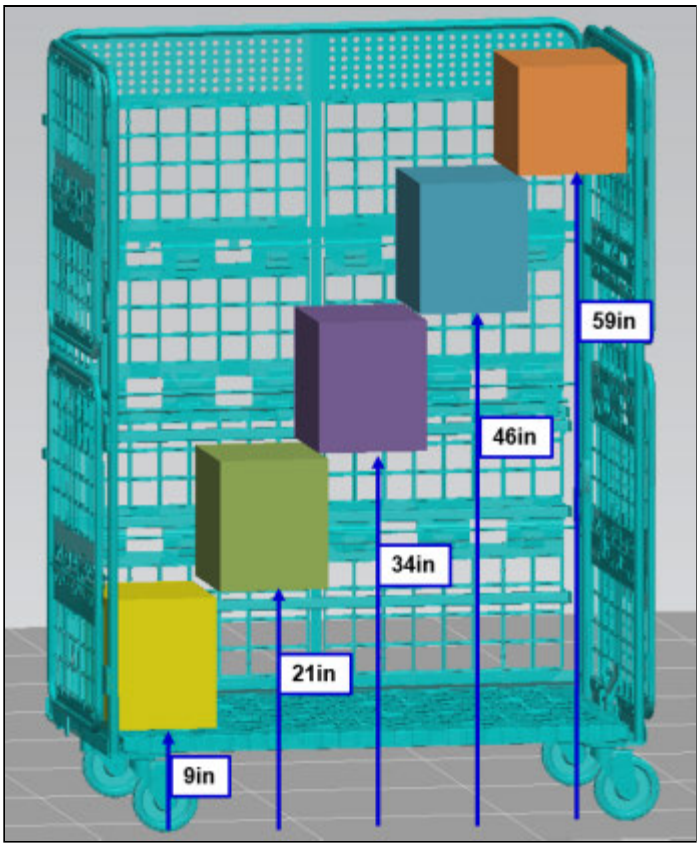


Figure 2: Varying vertical height of packages within a GoCart

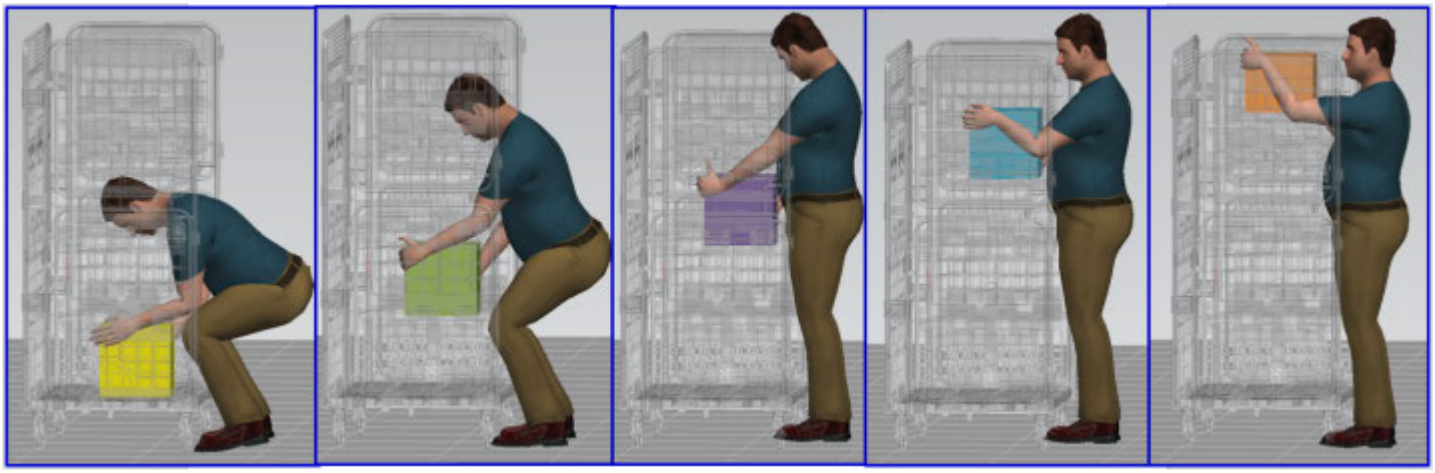


Figure 3: M-95-95 manikin obtaining packages from a 9in, 21in, 34in, 46in and 59in vertical height within a GoCart

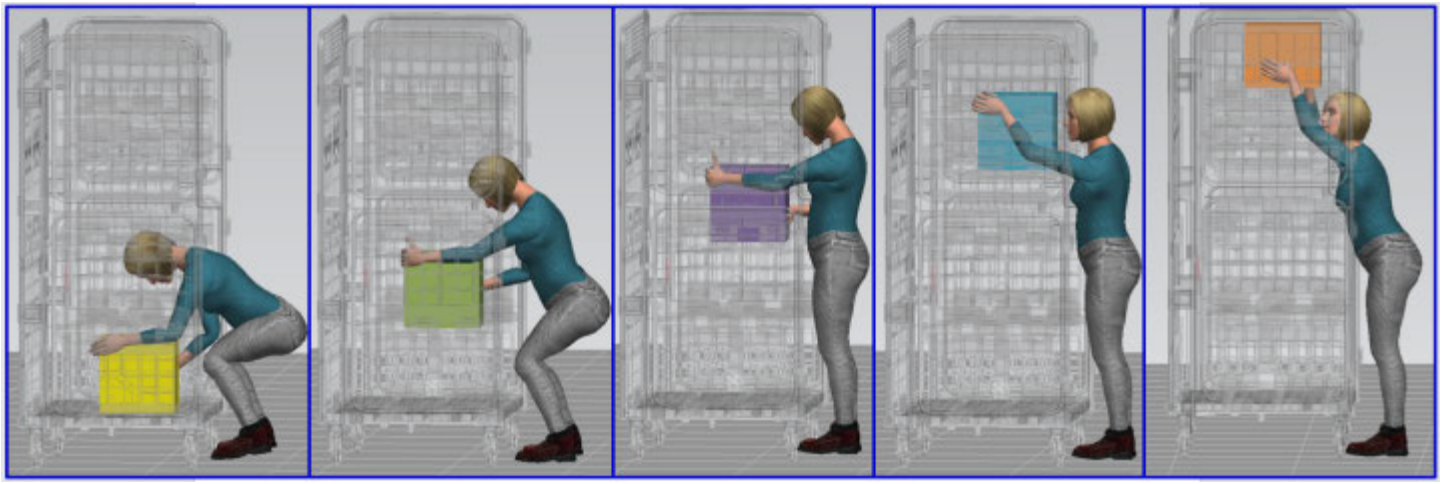


Figure 4: F-05-05 manikin obtaining packages from a 9in, 21in, 34in, 46in and 59in vertical height within a GoCart

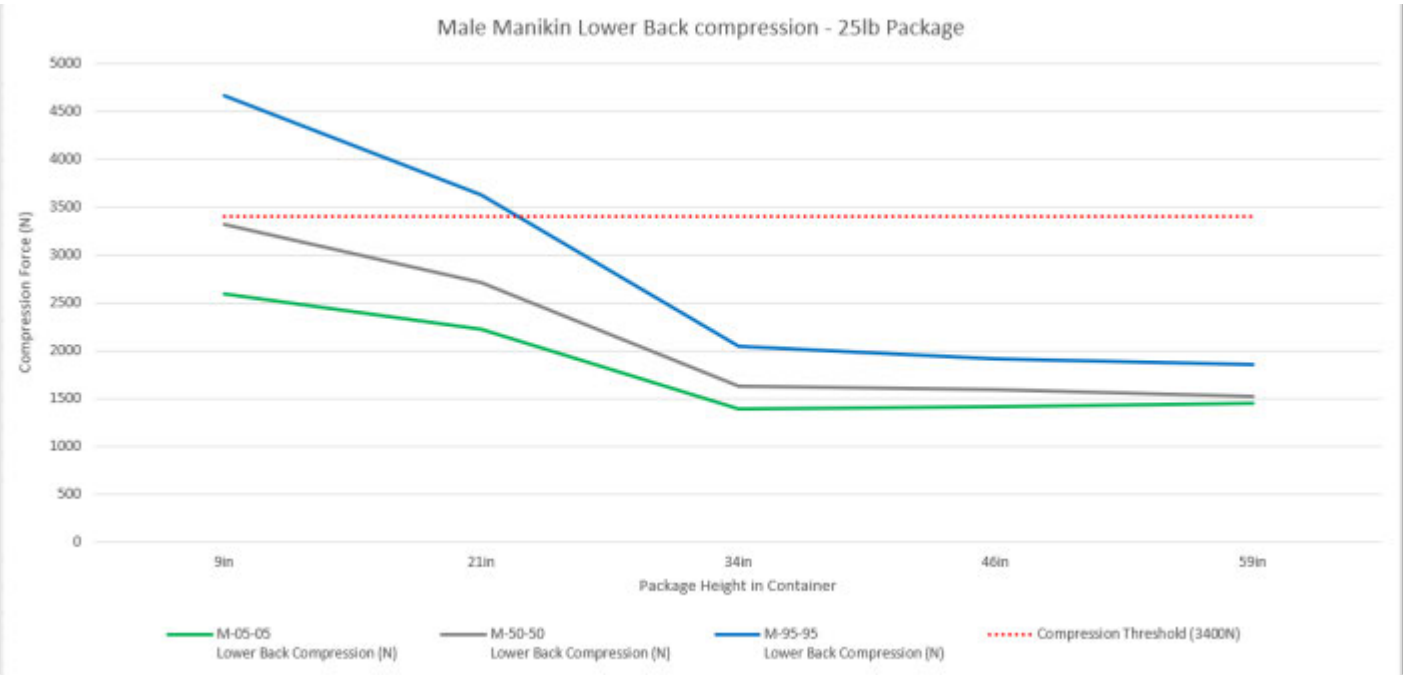


Figure 5: M-05-05, M-50-50 and M-95-95 Low back compression force (N) when obtaining a 25lb package from varying heights within a GoCart/Shuttle

Package Height in Container	M-05-05 Lower Back Compression (N)	M-50-50 Lower Back Compression (N)	M-95-95 Lower Back Compression (N)
9in	2588.4	3313.8	4662.2
21in	2227.5	2711.5	3629.3
34in	1398.6	1634.3	2051
46in	1419.2	1592.2	1917
59in	1457.6	1519.4	1859

Table 3: M-05-05, M-50-50 and M-95-95 Low back compression force (N) when obtaining a 25lb package from varying heights within a GoCart/Shuttle. Red text indicates values exceeding safe threshold limits.

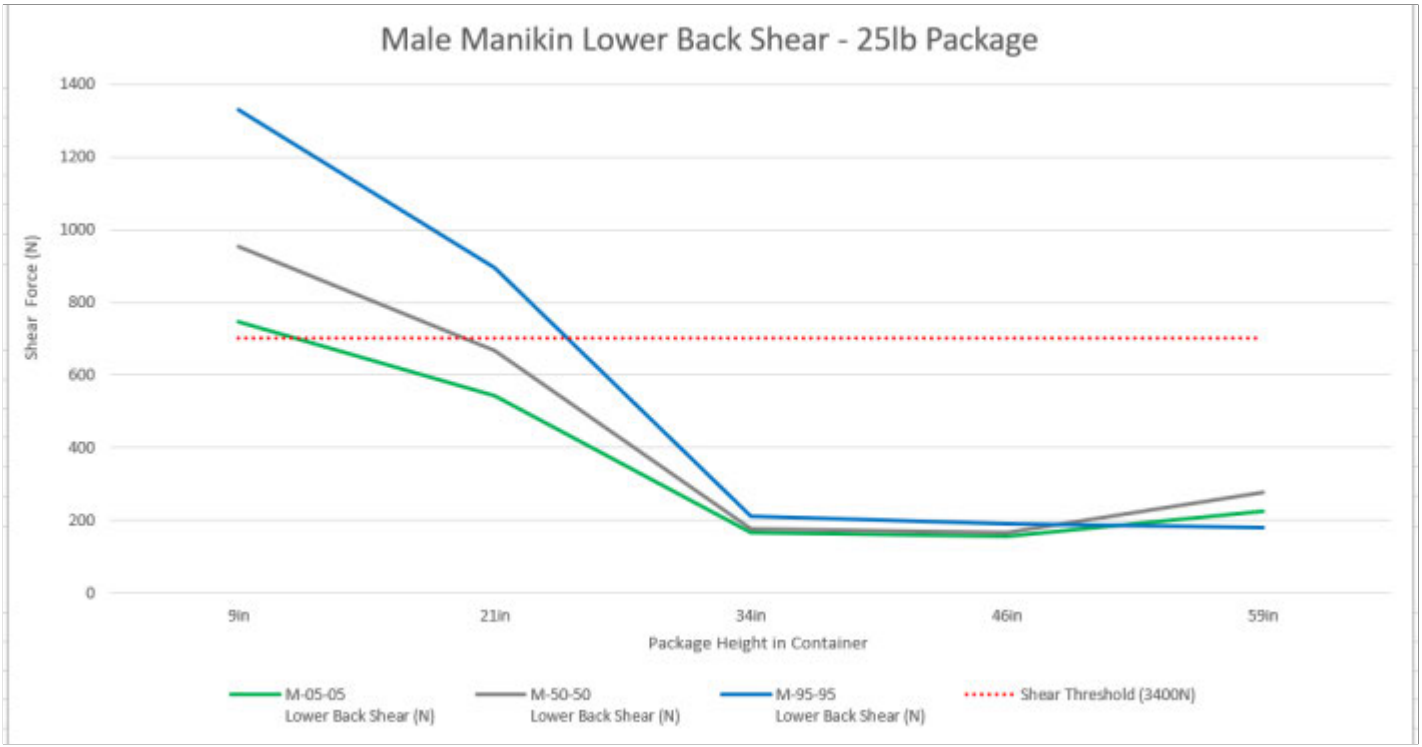


Figure 6: M-05-05, M-50-50 and M-95-95 Low back shear force (N) when obtaining a 25lb package from varying heights within a GoCart/Shuttle

Package Height in Container	M-05-05 Lower Back Shear (N)	M-50-50 Lower Back Shear (N)	M-95-95 Lower Back Shear (N)
9in	748	954	1330
21in	542	668	896
34in	168	177	212
46in	157	167	191
59in	225	277	180.6

Table 4: M-05-05, M-50-50 and M-95-95 Low back shear force (N) when obtaining a 25lb package from varying heights within a GoCart/Shuttle. Red text indicates values exceeding safe threshold limits.

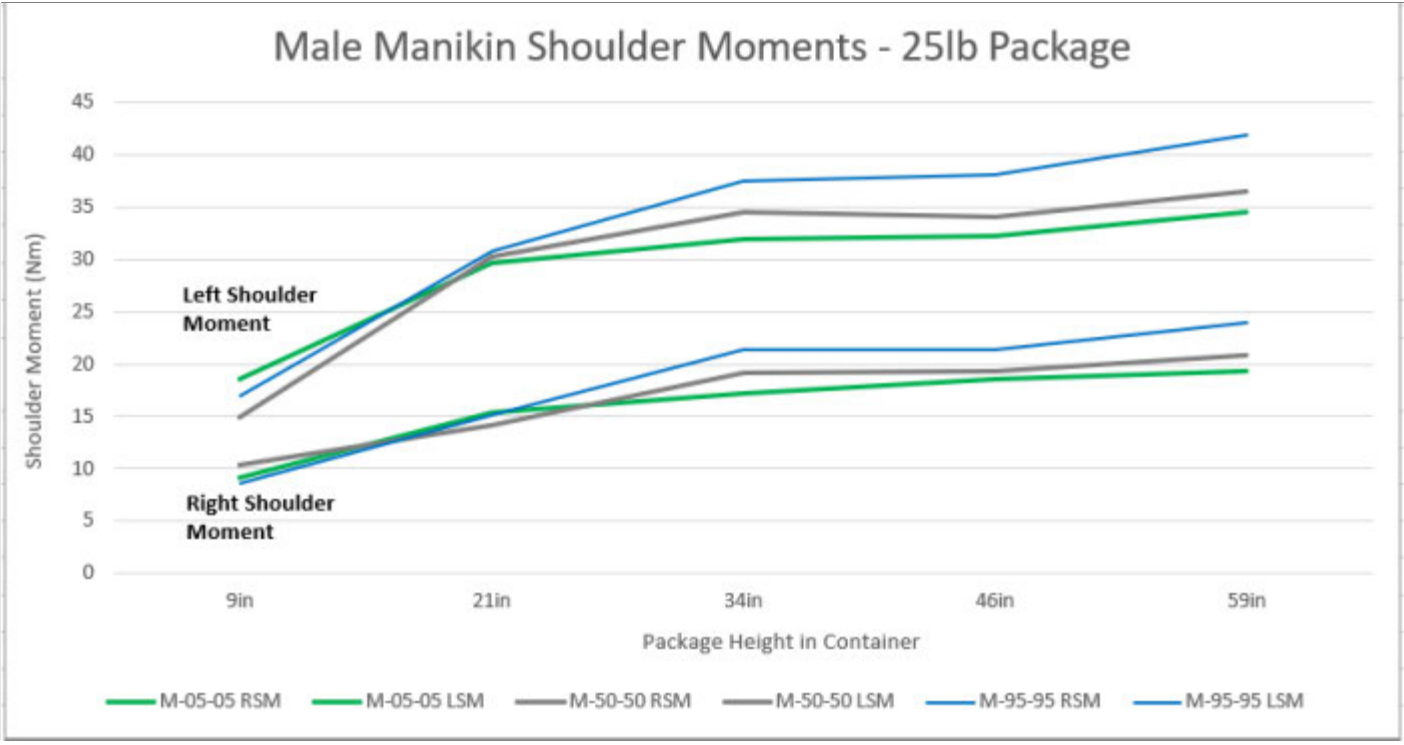


Figure 7: M-05-05, M-50-50 and M-95-95 Integrated Right Shoulder Moment (RSM) and Left Shoulder Moment (LSM) for obtaining a 25lb package from varying heights within a GoCart/Shuttle

AA Hand Height	M-05-05 RSM	M-05-05 LSM	M-50-50 RSM	M-50-50 LSM	M-95-95 RSM	M-95-95 LSM
9in	9.2	18.6	10.3	14.9	8.6	16.9
21in	15.3	29.7	14.1	30.2	15.1	30.8
34in	17.2	32	19.2	34.6	21.3	37.5
46in	18.6	32.2	19.3	34.1	21.4	38.1
59in	19.3	34.5	20.8	36.5	24	41.9

Table 5: M-05-05, M-50-50 and M-95-95 Integrated Right Shoulder Moment (RSM) and Left Shoulder Moment (LSM) for obtaining a 25lb package from varying heights within a GoCart/Shuttle

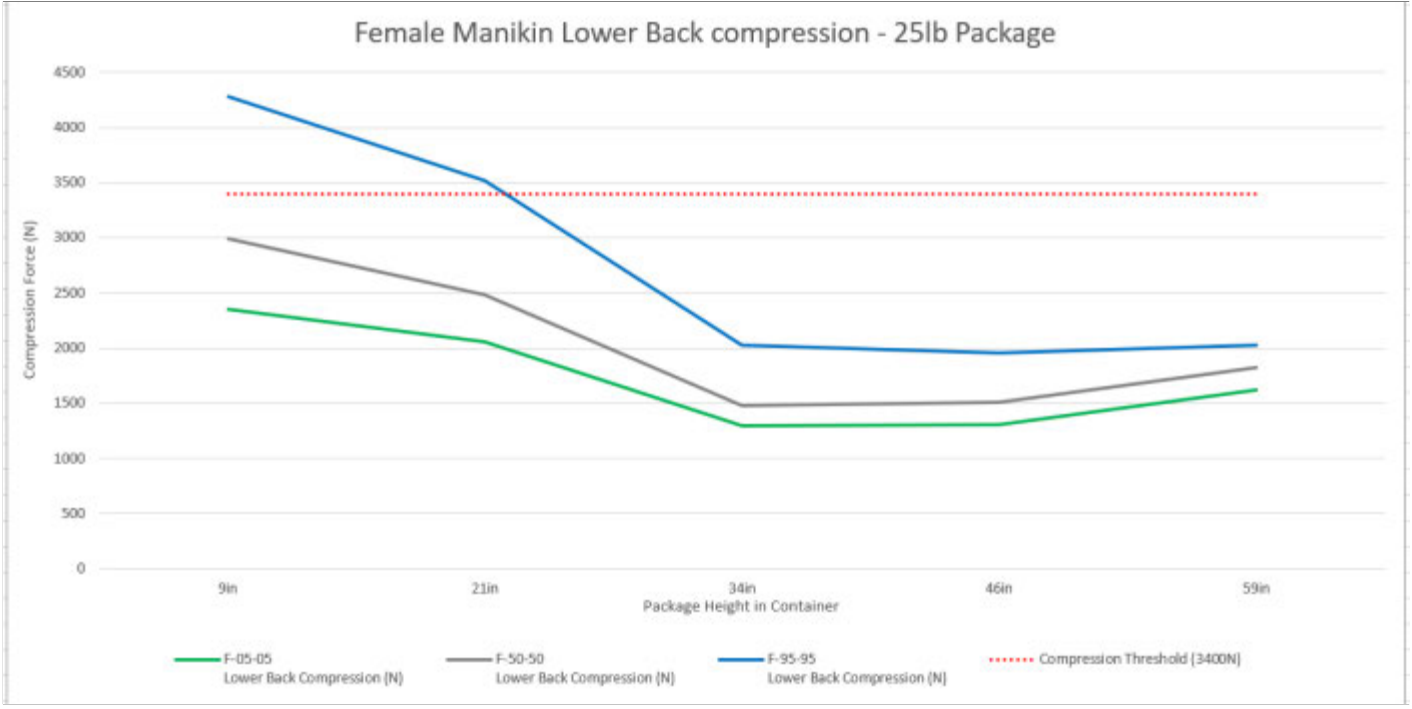


Figure 8: F-05-05, F-50-50 and F-95-95 Low back compression force (N) when obtaining a 25lb package from varying heights within a GoCart/Shuttle

Package Height in Container	F-05-05 Lower Back Compression (N)	F-50-50 Lower Back Compression (N)	F-95-95 Lower Back Compression (N)
9in	2351.3	2991.1	4284.8
21in	2060.3	2484.1	3515.5
34in	1297.2	1482.8	2028.5
46in	1306.2	1513.3	1956.8
59in	1617	1821.9	2026.6

Table 6: F-05-05, F-50-50 and F-95-95 Low back compression force (N) when obtaining a 25lb package from varying heights within a GoCart/Shuttle. Red text indicates values exceeding safe threshold limits.

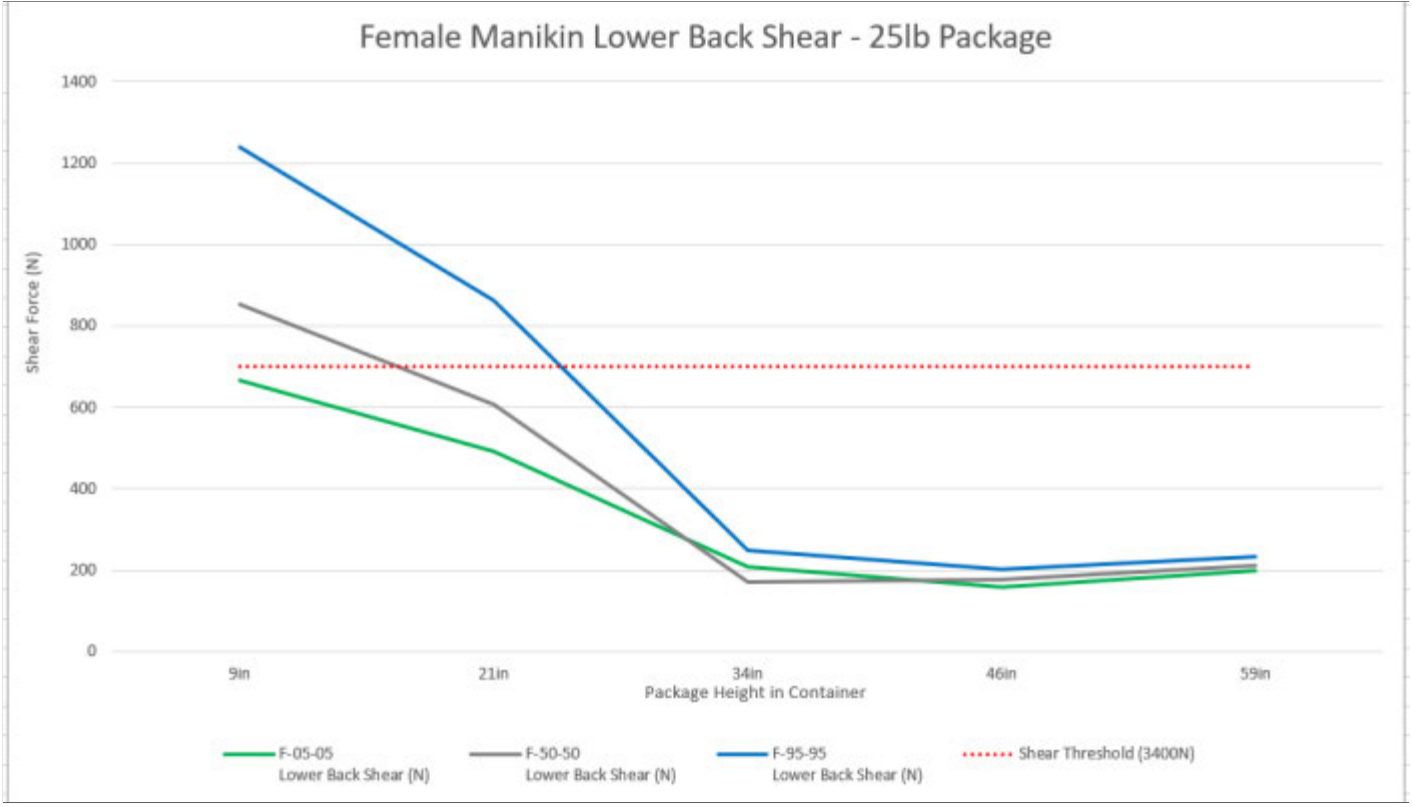


Figure 9: F-05-05, F-50-50 and F-95-95 Low back shear force (N) when obtaining a 25lb package from varying heights within a GoCart/Shuttle

Package Height in Container	F-05-05 Lower Back Shear (N)	F-50-50 Lower Back Shear (N)	F-95-95 Lower Back Shear (N)
9in	665	853	1238
21in	493	606	863
34in	209	172	250
46in	158	178	204
59in	198	213	232

Table 7: F-05-05, F-50-50 and F-95-95 Low back shear force (N) when obtaining a 25lb package from varying heights within a GoCart/Shuttle. Red text indicates values exceeding safe threshold limits.

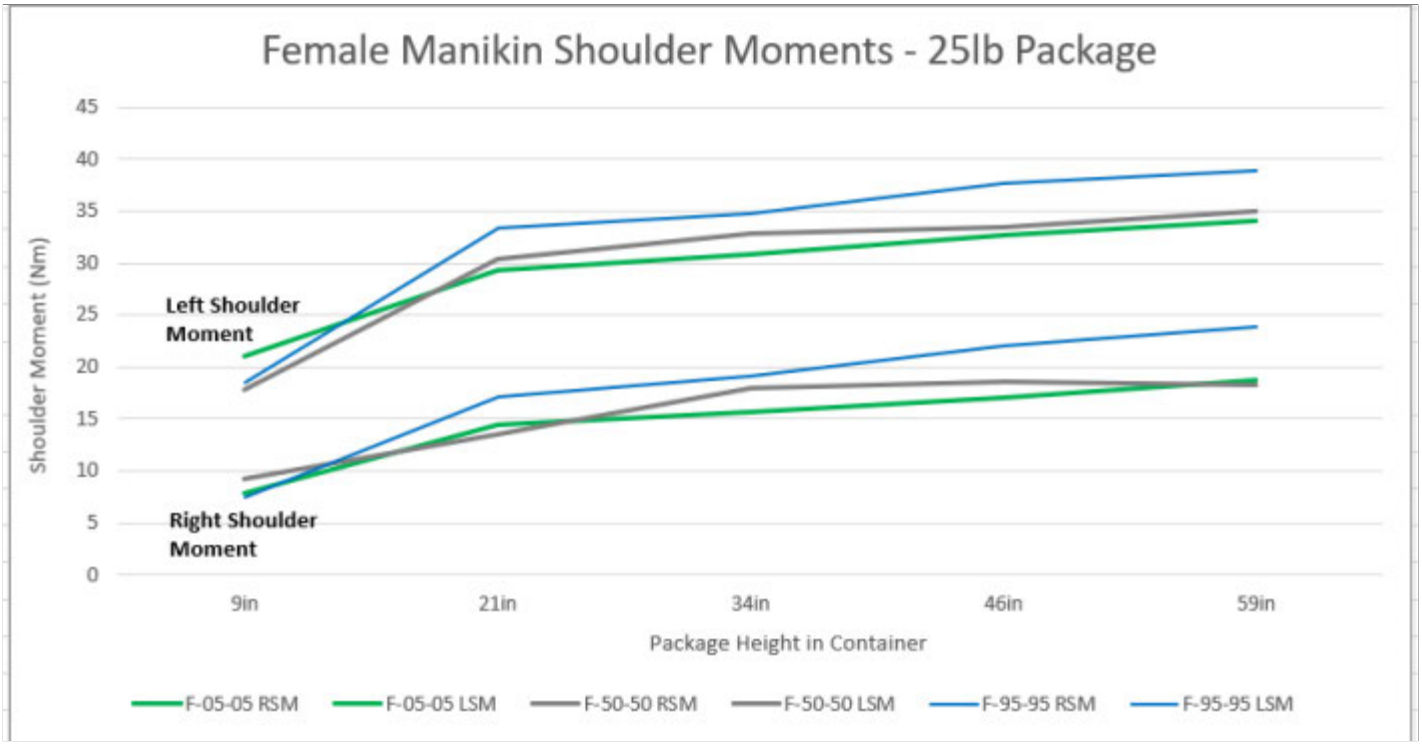


Figure 10: F-05-05, F-50-50 and F-95-95 Integrated Right Shoulder Moment (RSM) and Left Shoulder Moment (LSM) for obtaining a 25lb package from varying heights within a GoCart/Shuttle

AA Hand Height	F-05-05 RSM	F-05-05 LSM	F-50-50 RSM	F-50-50 LSM	F-95-95 RSM	F-95-95 LSM
9in	7.9	21	9.2	17.8	7.4	18.5
21in	14.4	29.3	13.5	30.4	17.1	33.3
34in	15.7	30.8	18	32.9	19.1	34.7
46in	17	32.7	18.6	33.4	22	37.6
59in	18.8	34	18.3	35	23.9	38.9

Table 8: F-05-05, F-50-50 and F-95-95 Integrated Right Shoulder Moment (RSM) and Left Shoulder Moment (LSM) for obtaining a 25lb package from varying heights within a GoCart/Shuttle

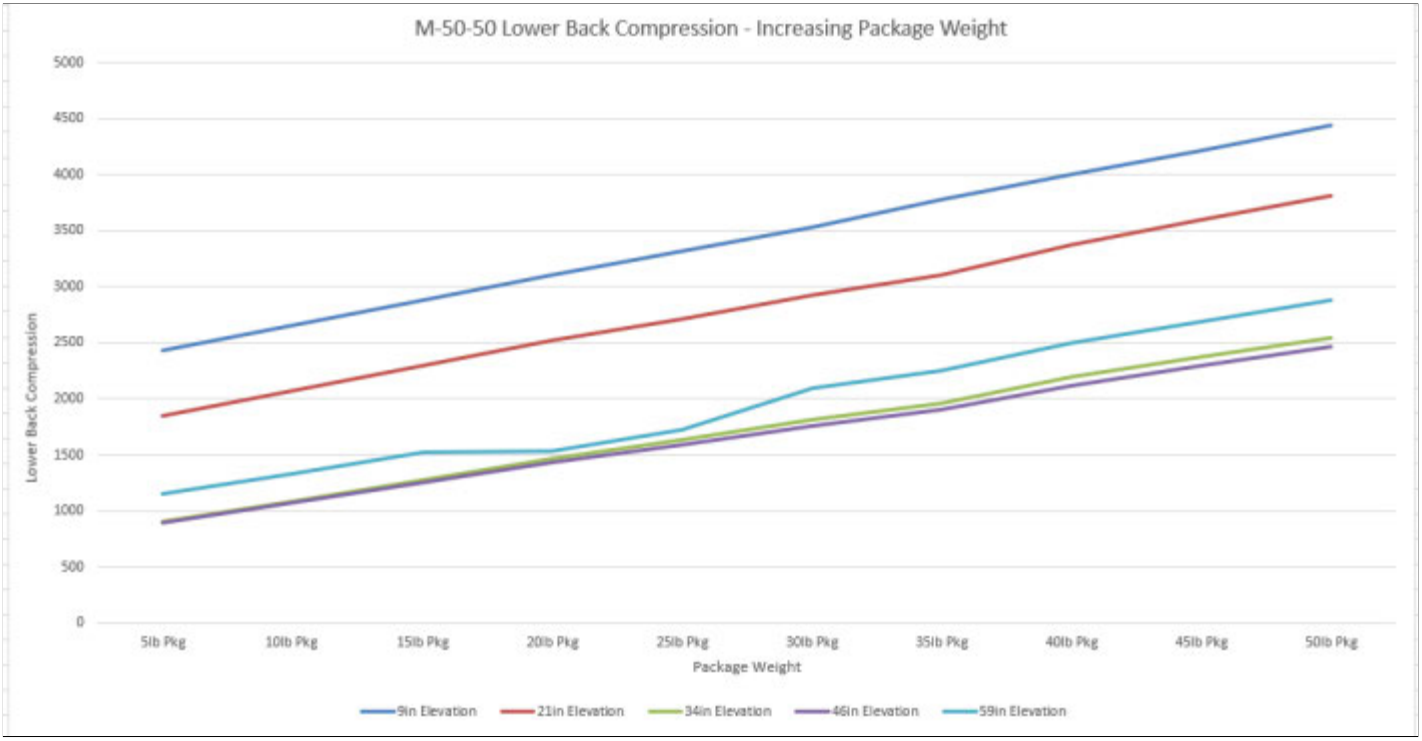


Figure 11: M-50-50 Lower back compression (N) results for obtaining packages from different elevations as package weight increases

Package level	5lb Pkg	10lb Pkg	15lb Pkg	20lb Pkg	25lb Pkg	30lb Pkg	35lb Pkg	40lb Pkg	45lb Pkg	50lb Pkg
9in Elevation	2430	2650.7	2882	3103.1	3313.8	3536	3773.3	3999.2	4221.3	4443.8
21in Elevation	1851.2	2067.1	2291.5	2516.5	2711.5	2927.9	3104.4	3377.6	3593.4	3807.6
34in Elevation	902.6	1089.8	1279.4	1469.7	1634.3	1816.2	1963.4	2191.8	2370.7	2549.1
46in Elevation	894.4	1073.7	1255.7	1436	1592.2	1763.7	1903.9	2122.1	2293.8	2464.8
59in Elevation	1151	1331.3	1519.4	1529.5	1727	2091.7	2248	2494.2	2688.6	2883.3

Table 9: M-50-50 Lower back compression (N) results for obtaining packages from different elevations as package weight increases. Red text indicates values exceeding safe threshold limits.

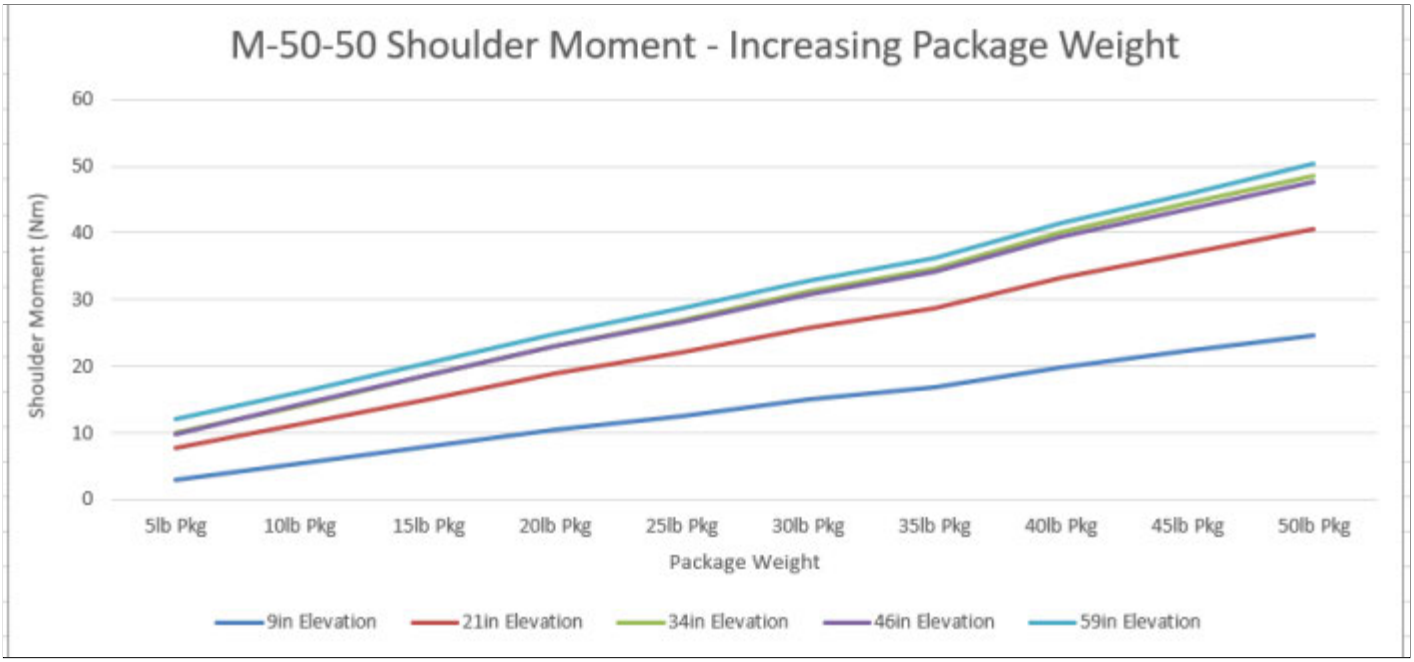


Figure 12: M-50-50 Average shoulder moment results for obtaining packages from different elevations as package weight increases

Package level	5lb Pkg	10lb Pkg	15lb Pkg	20lb Pkg	25lb Pkg	30lb Pkg	35lb Pkg	40lb Pkg	45lb Pkg	50lb Pkg
9in Elevation	3.1	5.5	8	10.45	12.6	14.95	16.9	19.95	22.3	24.65
21in Elevation	7.75	11.3	15.05	18.85	22.15	25.7	28.75	33.3	36.9	40.5
34in Elevation	9.95	14.2	18.6	23.05	26.9	31.2	34.7	40.15	44.35	48.55
46in Elevation	9.75	14.35	18.6	22.95	26.7	30.8	34.15	39.45	43.55	47.7
59in Elevation	12	16.15	20.5	24.9	28.65	32.85	36.25	41.5	45.7	50.35

Table 10: M-50-50 Average shoulder moment results for obtaining packages from different elevations as package weight increases

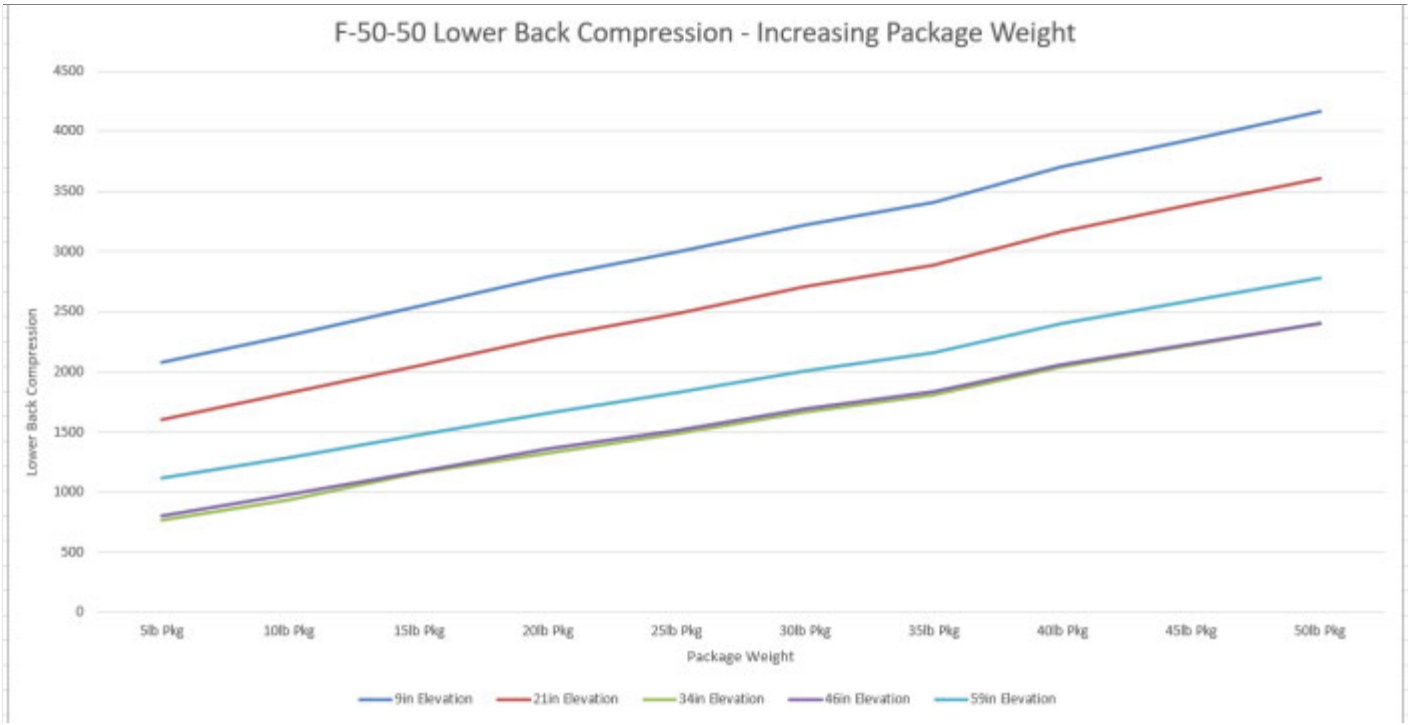


Figure 13: F-50-50 Lower back compression (N) results for obtaining packages from different elevations as package weight increases

Package level	5lb Pkg	10lb Pkg	15lb Pkg	20lb Pkg	25lb Pkg	30lb Pkg	35lb Pkg	40lb Pkg	45lb Pkg	50lb Pkg
9in Elevation	2076.7	2305.7	2544.4	2783.9	2991.1	3220.5	3408.2	3700	3930.7	4160.5
21in Elevation	1604.4	1824.2	2052.7	2283.8	2484.1	2704.5	2883.9	3164.3	3385.7	3605.4
34in Elevation	764.5	931.3	1160.9	1318.3	1482.8	1663.1	1810	2039.8	2221	2401.3
46in Elevation	802.4	983.9	1170.6	1354.3	1513.3	1689	1832.9	2055.2	2229.9	2405.2
59in Elevation	1114.9	1287.2	1470.4	1657.3	1821.9	2005.2	2157.3	2396.6	2587.9	2778.3

Table 11: F-50-50 Lower back compression (N) results for obtaining packages from different elevations as package weight increases. Red text indicates values exceeding safe threshold limits.

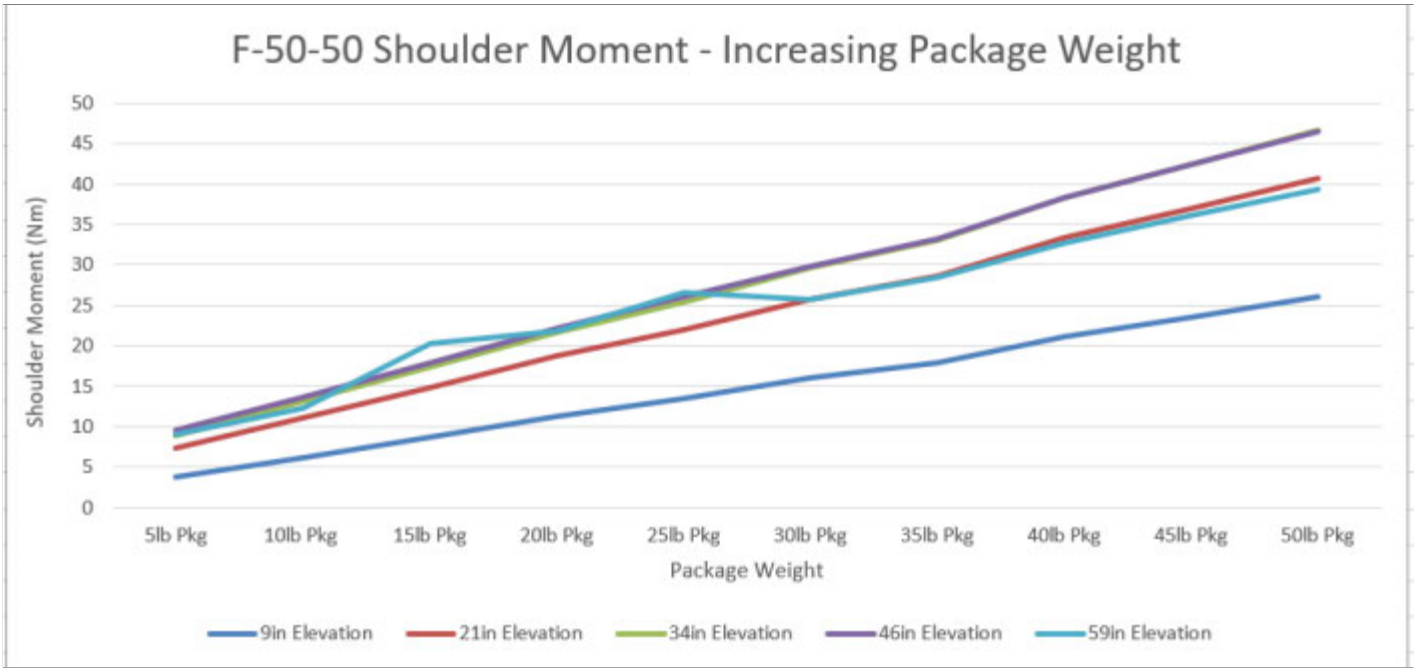


Figure 14: F-50-50 Average shoulder moment results for obtaining packages from different elevations as package weight increases

Package level	5lb Pkg	10lb Pkg	15lb Pkg	20lb Pkg	25lb Pkg	30lb Pkg	35lb Pkg	40lb Pkg	45lb Pkg	50lb Pkg
9in Elevation	3.7	6.15	8.65	11.3	13.5	16	17.95	21.15	23.55	26.05
21in Elevation	7.4	11.05	14.85	18.75	21.95	25.7	28.7	33.35	37	40.65
34in Elevation	8.95	13.05	17.35	21.7	25.45	29.6	33.05	38.25	42.4	46.6
46in Elevation	9.6	13.55	17.9	22.1	26	29.8	33.15	38.3	42.4	46.45
59in Elevation	9.05	12.35	20.2	21.85	26.65	25.7	28.45	32.7	36.05	39.35

Table 12: F-50-50 Average shoulder moment results for obtaining packages from different elevations as package weight increases

Line Loader LBCL:

LBCL Analysis Line Loader		
Manikin	Cumulative Compression (MNs)	Cumulative Moment (MNMs)
F-05-05	17.6	0.56
F-50-50	20.1	0.66
F-95-95	25.7	0.87
M-05-05	18.4	0.57
M-50-50	21.5	0.7
M-95-95	26.2	0.91

Table 13: Lower Back Cumulative Load analysis outputs for Line Loader AA. Red text indicates values exceeding safe threshold limits

Line Loader Process Path

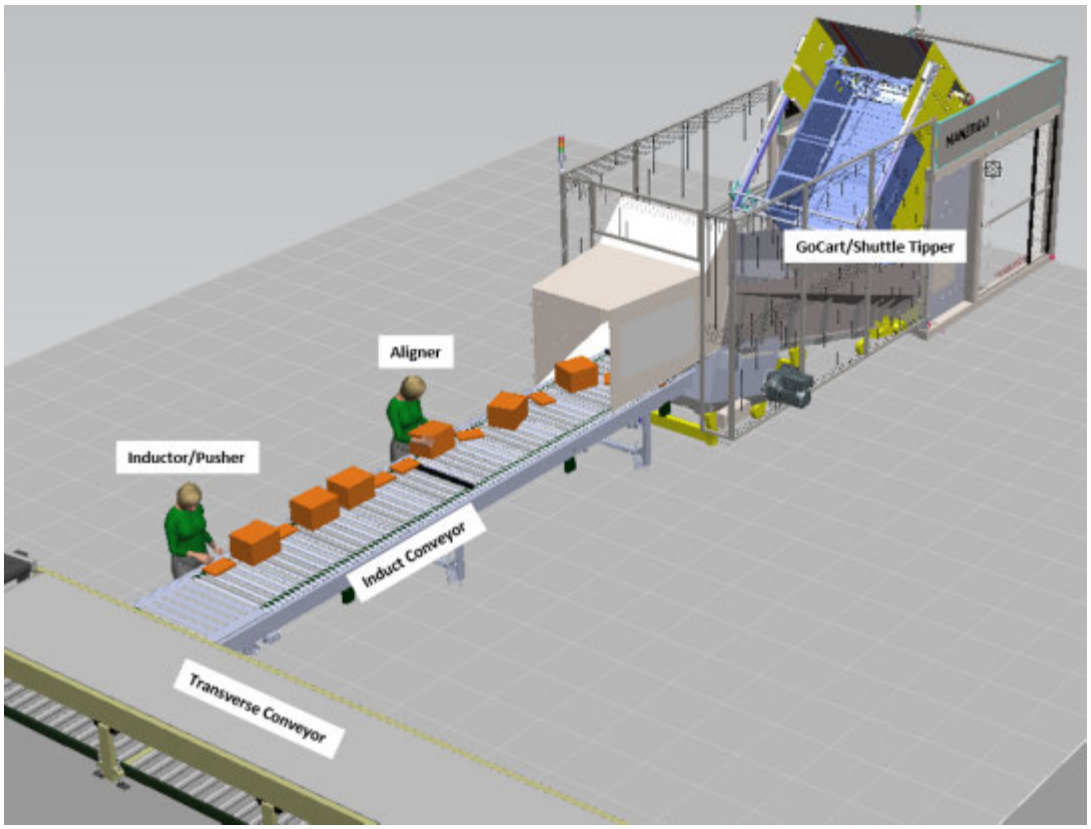


Figure 15: Inbound area layout with EU Tipper currently in pilot, Aligner AA and Inductor/Pusher AA.

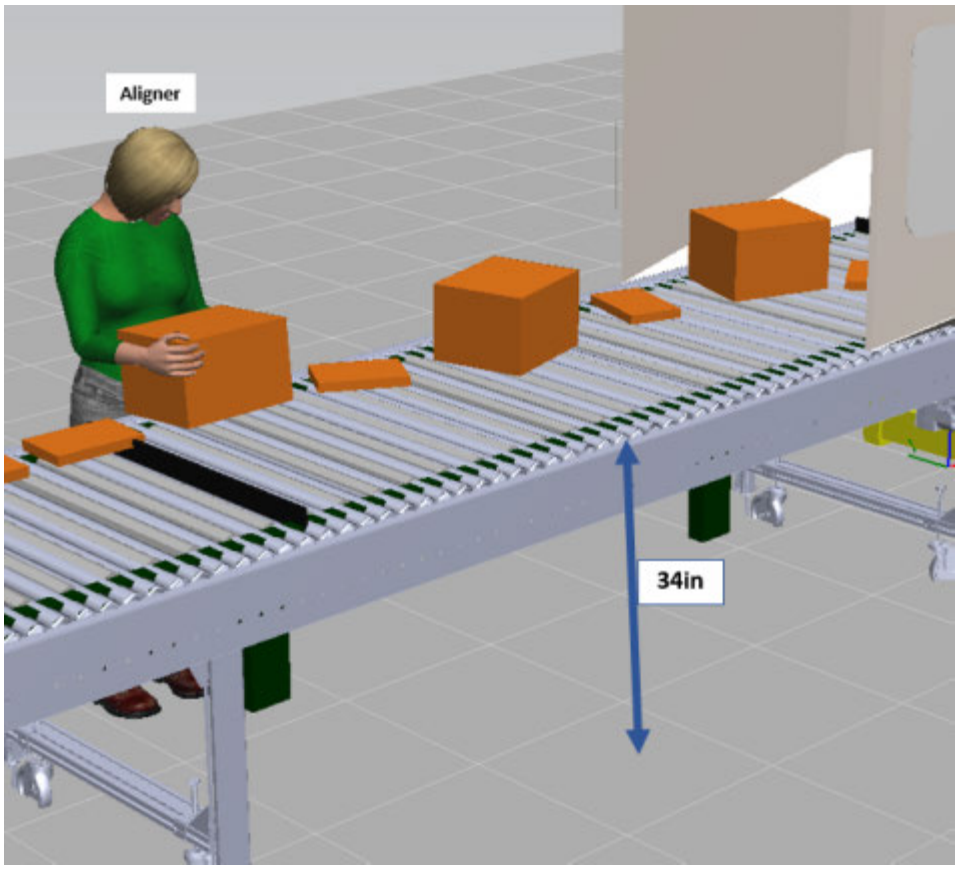


Figure 16: Aligner AA orienting packages on the 34in high Induct line

Peak Lower Back Forces						
25lb (11.3Kg) Package						
Anthro Model	L4/L5 Compression (N)			L4/L5 Shear (N)		
	Lift From Container Base	Lift From Sorting Table	%Change	Lift From Container Base	Lift From Sorting Table	%Change
M-95-95	4662.2	2051	-56.01%	1330	212	-84.06%
M-50-50	3313.8	1634.3	-50.68%	954	177	-81.45%
M-05-05	2588.4	1398.6	-45.97%	748	168	-77.54%
F-95-95	4284.8	2028.5	-52.66%	1238	250	-79.81%
F-50-50	2991.1	1482.8	-50.43%	853	172	-79.84%
F-05-05	2351.3	1297.2	-44.83%	665	209	-68.57%
AVG			-50.10%			-78.54%

Table 14: Lower back compression outputs compared between Line Load AA and Aligner AA. *Red text indicates values exceeding safe threshold limits*

Peak Shoulder Moments						
25lb (11.3Kg) Package						
Anthro Model	Right Shoulder Moment (Nm)			Left Shoulder Moment (Nm)		
	Lift From Top of Container	Lift From Sorting Table	%Change	Lift From Top of Container	Lift From Sorting Table	%Change
M-95-95	24	21.3	-11.25%	41.9	37.5	-10.50%
M-50-50	20.8	19.2	-7.69%	36.5	34.6	-5.21%
M-05-05	19.3	17.2	-10.88%	34.5	32	-7.25%
F-95-95	23.9	19.1	-20.08%	38.9	34.7	-10.80%
F-50-50	18.3	18	-1.64%	35	32.9	-6.00%
F-05-05	18.8	15.7	-16.49%	34	30.8	-9.41%
AVG			-11.34%			-8.19%

Table 15: Shoulder moment outputs compared between Line Load AA and Aligner AA

Cumulative Comrpession and Moment						
25lb (11.3Kg) Package						
Anthro Model	Cumulative Compression (MNs)			Cumulative Moement (MNMs)		
	Lift From GoCart/Gaylord	Lift From Sorting Table	%Change	Lift From GoCart/Gaylord	Lift From Sorting Table	%Change
M-95-95	26.2	20.4	-22.14%	0.91	0.49	-46.15%
M-50-50	21.5	17.2	-20.00%	0.7	0.41	-41.43%
M-05-05	18.4	15.4	-16.30%	0.57	0.37	-35.09%
F-95-95	25.7	20.5	-20.23%	0.87	0.53	-39.08%
F-50-50	20.1	16.1	-19.90%	0.66	0.39	-40.91%
F-05-05	17.6	14.7	-16.48%	0.56	0.36	-35.71%
AVG			-19.18%			-39.73%

Table 16: Cumulative compression and cumulative moment outputs compared between Line Load AA and Aligner AA

Appendix C –Analysis Tools

A series of analysis tools were used to quantify the musculoskeletal risk factors described in this report. The analysis tools used to develop this report include:

Arm Force Field: The Arm Force Field (AFF) provides an estimate of maximum hand forces, percent capable values, and maximum acceptable exertions (MAE). An analyst may use the AFF to determine single-task suitability by comparing the MAE output to the task force. If the MAE is greater than the task force, the task is acceptable. If the MAE is less than the task force, the task is not acceptable. Additionally, AFF outputs can act as inputs to the Recommended Cumulative Recovery Allowance (RCRA) tool for the purpose of determining multi-task suitability.

Jack Low Back Analysis: The Jack Low Back Analysis (LBA) provides an estimate of the compression and shear forces acting on the lower back. An analyst may use the LBA to determine single-task suitability by comparing the LBA output to limits of 3400N compression and 700N shear. If the compression is greater than 3400N, the task is not acceptable. If the compression is less than 3400N, the task is acceptable. If the shear is greater than 500N, the task is not acceptable. If the shear is less than 700N, the task is acceptable.

Low Back Cumulative Loading: The Low Back Cumulative Loading (LBCL) tool provides an estimate of the cumulative effect of compression forces and muscle moments acting on the low back. An analyst may use the LBCL to determine multi-task suitability by comparing the LBCL output to limits of 22.5NMs compression and 0.6MNms moment. If the cumulative compression is greater than 22.5MNs, the task is not acceptable. If the

cumulative compression is less than 22.5MNs, the task is acceptable. If the cumulative moment is greater than 0.6MNms, the task is not acceptable. If the cumulative moment is less than 0.6MNms, the task is acceptable.

Appendix D – Digital Human Modeling Parameters

The NHANES 2011-2014 anthropometric database was used to generate the digital human models. The anthropometric models selected and the selection rationale is as follows:

5th Percentile Stature / 5th Percentile Weight Female (F-05-05): The 5th Percentile Stature / 5th Percentile Weight Female (F-05-05) model was selected to evaluate the impact on the smallest portion of the working population. The F-05-05 model can be identified in all figures in this paper as the female model with the green color shirt.

50th Percentile Stature / 50th Percentile Weight Female (F-50-50): The 50th Percentile Stature / 50th Percentile Weight Female (F-50-50) was selected to evaluate the impact on the average portion of the working population. The F-50-50 model can be identified in all figures in this paper as the female model with the gray color shirt.

95th Percentile Stature / 95th Percentile Weight Female (F-95-95): The 95th Percentile Stature / 95th Percentile Weight Female (F-95-95) model was selected to evaluate the impact on the largest portion of the female working population. The F-95-95 model can be identified in all figures in this paper as the female model with the dark blue color shirt.

5th Percentile Stature / 5th Percentile Weight Male (M-05-05): The 5th Percentile Stature / 5th Percentile Weight Male (M-05-05) model was selected to evaluate the impact on the smallest portion of the working population. The M-05-05 model can be identified in all figures in this paper as the male model with the green color shirt.

50th Percentile Stature / 50th Percentile Weight Male (M-50-50): The 50th Percentile Stature / 50th Percentile Weight Male (M-50-50) model was selected to evaluate the impact on the average sized male. The M-50-50 model can be identified in all figures in this paper as the male model with the gray color shirt.

95th Percentile Stature / 95th Percentile Weight Male (M-95-95): The 95th Percentile Stature / 95th Percentile Weight Male (M-95-95) model was selected to evaluate the impact on the largest portion of the working population. The M-95-95 model can be identified in all figures in this paper as the male model with the dark blue color shirt.

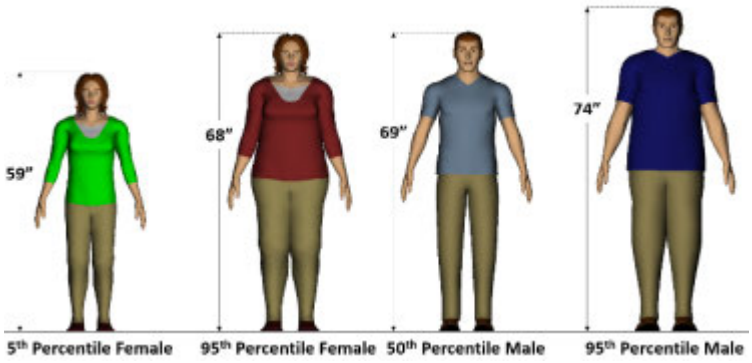


Figure 9 -Range of anthropometric models from the Jack DHM application

DHM enables sizing digital human models to match human population dimensions in within a country/geography (called anthropometric data sets which takes into account human body size and shape dimensions within the country). Advantages of DHM include the ability to create representative virtual environments (including equipment, process and tasks); assess with a variety of human dimensions/ anthropometric sets; variety of

industry accepted ergonomic analysis tools to assess current potential injury risk, energy expenditure, fatigue limits and other human parameters; ability to test for what-if scenarios by swapping human models of different sizes and changing aspects within the virtual environment (e.g. moving objects in the environment, changing the weight of an object or frequency of task) to re-test if the changes result in reduced risk between difference scenarios.

Low back compression and shear: The three directions in which forces are applied to the human low back are compression and shear. Compression is defined as the force acting perpendicular to a surface; in the spine it acts to squeeze the vertebra together. Shear is defined as a force that acts parallel to a surface; in the spine, it acts to sliding of one vertebra with respect to another.

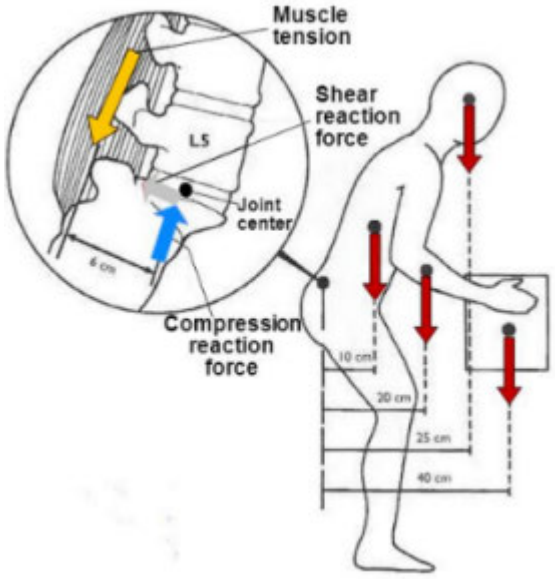


Figure 10-Schematic describing low back compression and shear forces

Joint moments/rotation: In biomechanics, a joint moment is the twisting force that causes a joint to rotate. The joint moment is defined load multiplied by the perpendicular distance between its line of action and the axis of rotation. Joint moments may also commonly be referred to as torque.

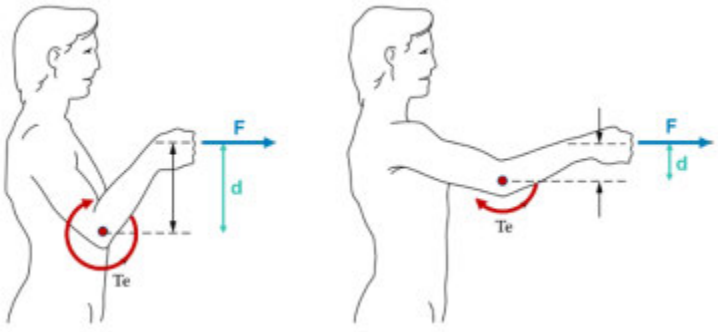


Figure 11-Schematic describing joint moments

Ergonomic Tolerance: Ergonomic tolerance values are a representation of population level risk. The tolerances or risk levels are outlined by National Institute for Occupational Health and Safety (NIOSH) through two different risk levels, the Action Limit (AL) and the Maximum Permissible Limit (MPL). The AL represents a level of force that provides a safe threshold where the majority of the population can perform below without a risk of lower back injury, the AL is 3,400N L4/L5 compression and 700N shear. The MPL is the maximum limit that when exceeded, poses high injury risk to the majority of the population, this value was established at 6,400N compression and 1,000N shear.

Appendix E: Workstation and Rate Information

Pkg Weight Distribution		
Weight (lb)	% of total packages NA AMZL	Cumulative
0-5	85.38%	85.38%
5-10	8.22%	93.60%
10-15	2.89%	96.50%
15-20	1.42%	97.92%
20-25	0.67%	98.59%
25-30	0.57%	99.16%
30-35	0.38%	99.54%
35-40	0.20%	99.74%
40-45	0.21%	99.95%
45-50	0.05%	100.00%

Table 17: NA AMZL Package weight distribution percentage

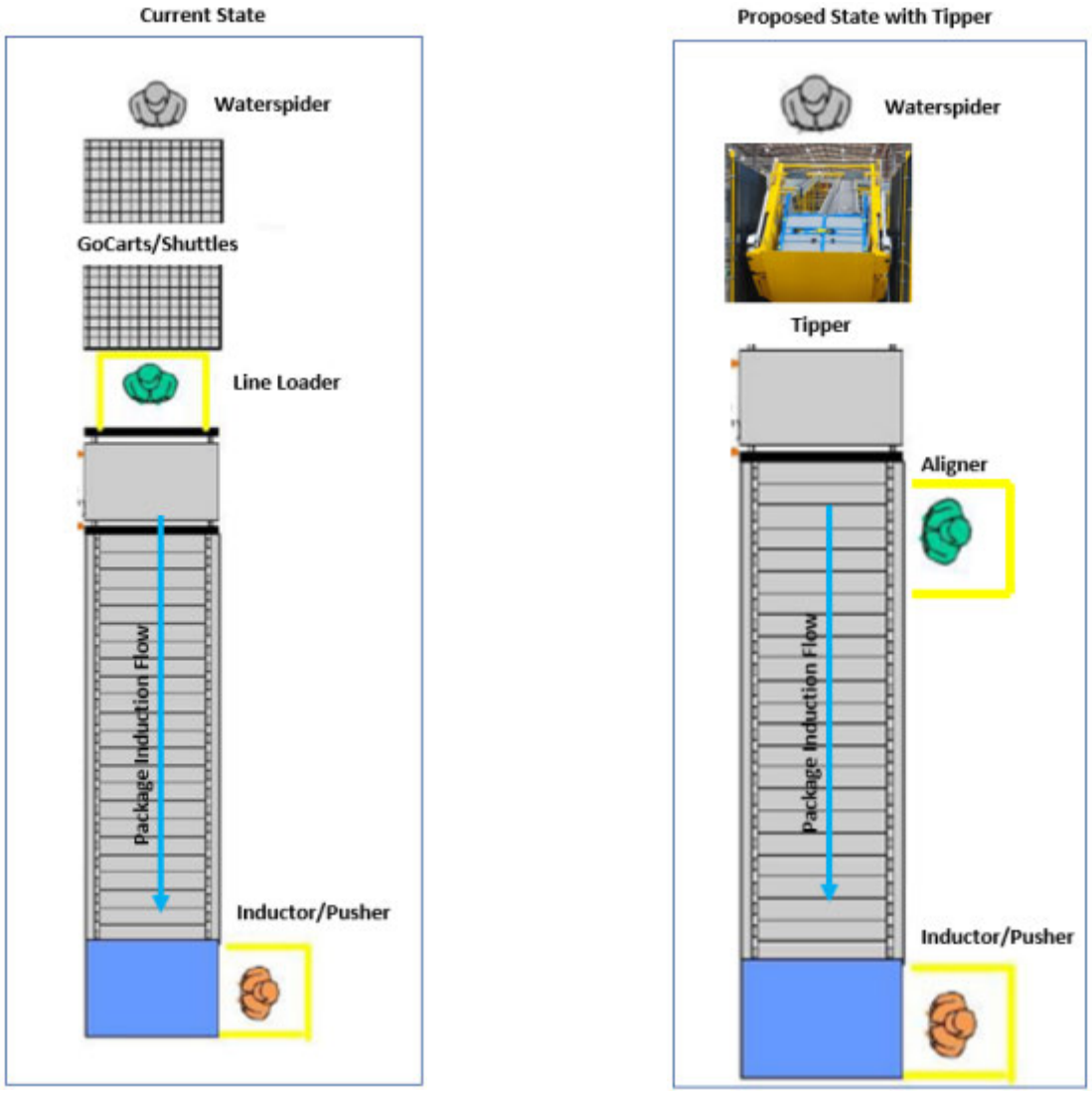


Figure 17: Staffing layout comparison between current state and proposed state with Tipper implemented to mechanize Line Loader process

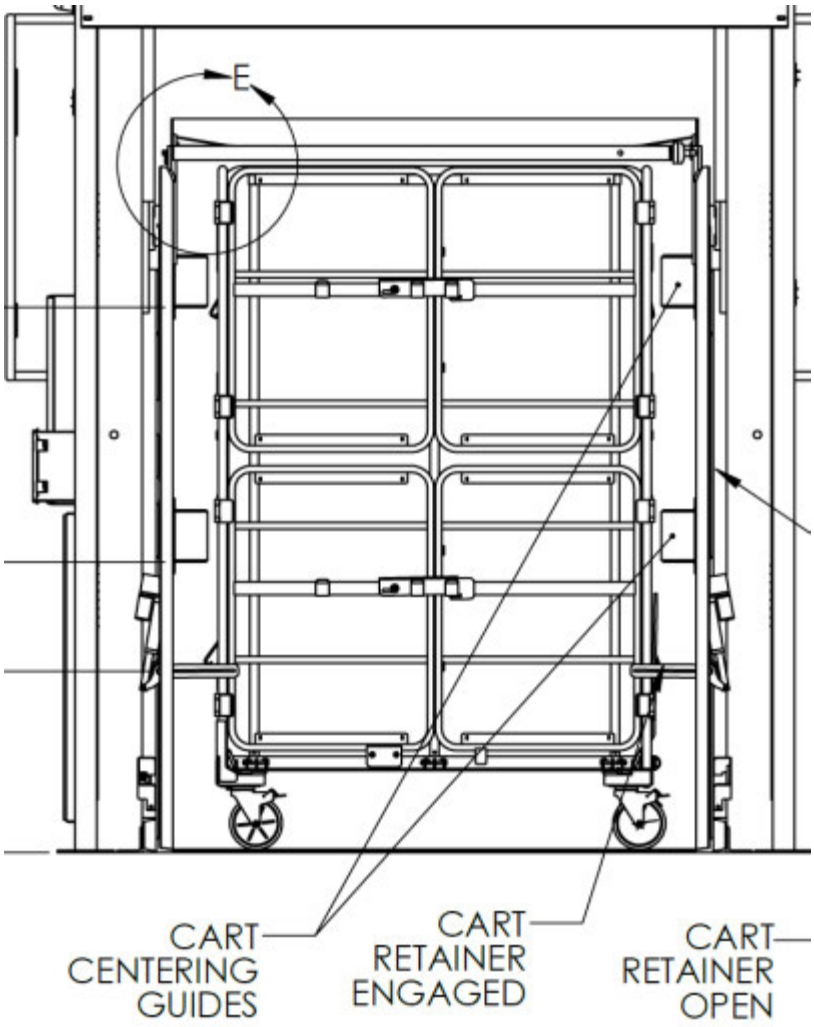


Figure 18: Cart Centering Guides and Cart Retainer functionality built into Tipper design

Document Produced in Native Format

Employee	Warehous	Type	Level	Delivered Date	Incident Details
[REDACTE	BFI9	BEHAVIORAL_IDLE_TIME	FIRST_WRITTEN_WARNING		On 12/22/2023, you had a total of 48 minutes of unknown idle time for your 2nd break at 2:19pm - 3:07pm. On 12/23/2023, a manager held a seek to understand conversation with you to follow up on the reason(s) for this time. You identified barriers including *You stated that you were not able to log back into your station after break as someone else was signed in, Manager went over how to reset station when this happens and SOW break times and scan to scan.*. Based on your explanation, the manager exempted 25 minutes of your idle time; 15 minutes for break time and 10 minutes for station readiness issues, and you had 23 minutes remaining of idle time. The manager validated that during this time, you were not actively engaged in a work process for reasons within your control. This behavior violates Amazonâ€™s Standards of Conduct, and therefore you are receiving this *First Written Warning*. This is a *2nd occurrence of behavioral feedback as first documented behavioral coaching was delivered on 11/12/2023* will be active for *30* days
[REDACTE	BFI9	BEHAVIORAL_IDLE_TIME	DOCUMENTED_COACHING		AA had 24 minute first break. No barriers reported, said they probably just lost track of time. I reminded of 15 minute scan to scan, and made some recommendations around scans, parking, and setting alarms for break.
[REDACTE	BFI9	BEHAVIORAL_IDLE_TIME	DOCUMENTED_COACHING	["2024-01-02T11:40:06-08:00","2024-01-02T11:40:06-08:00"]	On 12/20/23, you had a total of 40 minutes of unknown idle time. On 12/20/23 a manager held a seek to understand conversation with you to follow up on the reason(s) for this time. Between 11:07 to 11:47(40minutes), you stated you were looking for an integrated pick cart. Based on your explanation, the manager exempted 10 minutes of your time leaving you with 30 minutes remaining of idle time. After all exemptions, you had a total of 30 minutes of unknown idle time remaining. The manager validated that during this time, you were not actively engaged in a work process for reasons within your control. This behavior violates Amazon's Standards of Conduct, and therefore you are receiving this documented coaching.
[REDACTE	BFI9	BEHAVIORAL_IDLE_TIME	TERMINATION	["2023-12-26T10:26:44-08:00","2023-12-26T10:26:44-08:00"]	On (12/13/2023), you had a total of (4.01 hrs / 241 mins) of unknown idle time. On (12/13/2023), a manager held a seek to understand conversation with you to follow up on the reason(s) for this time. You identified barriers including (The decant line was dry, for a while. I know I was there.). You also stated (----). Based on your explanation, the manager exempted 30 minutes of your idle time (due to break times), and you had (211) minutes remaining of idle time. The manager validated that during this time, you were not actively engaged in a work process for reasons within your control. This behavior violates Amazonâ€™s Standards of Conduct, and therefore you are receiving this *termination*.
[REDACTE	BFI9	BEHAVIORAL_IDLE_TIME	DOCUMENTED_COACHING		On 12/20/2023, you had a total of 97.68 minutes of unknown idle time. On 12/20/2023, a manager held a seek to understand conversation with you to follow up on the reason(s) for this time. You identified no process related barriers and you mentioned that you were on break and restroom break. Based on your explanation, the manager exempted 30 minutes of your idle times (for your break time and restroom break), that leaves 67.68 minutes remaining of idle time. The manager validated that during this time, you were not actively engaged in a work process for reasons within your control. This behavior violates Amazonâ€™s Standards of Conduct, and therefore you are receiving this first written warning feedback.
[REDACTE	BFI9	BEHAVIORAL_IDLE_TIME	DOCUMENTED_COACHING		AA had a 27 minute first break. Was in multi building wide all night. Surprised by length of break, but doesn't recall any specific barriers to keeping closer to standard break time. We chatted for a bit where I laid out 15 scan to scan and explained that the 15 minutes is supposed to include the time to walk to and from the break area, and eventually he admitted he was probably talking and lost track of time.
[REDACTE	BFI9	BEHAVIORAL_IDLE_TIME	DOCUMENTED_COACHING		On 12/22/2023, you had a total of 45 minutes of unknown idle time. On 12/21/2023, a manager held a seek to understand conversation with you to follow up on the reason(s) for this time. You identified barriers including *Multi-step prep with large quantity boxes that took a long time to process all at once.*. Based on your explanation, the manager coached to the SOW for multi-step prep exempted 15 minutes of your idle time for break time, and you had 30 minutes remaining of idle time. The manager validated that during this time, you were not actively engaged in a work process for reasons within your control. This behavior violates Amazonâ€™s Standards of Conduct, and therefore you are receiving this *Documented Coaching*. This *1st documented coaching* will be active for *30* days
[REDACTE	BFI9	BEHAVIORAL_IDLE_TIME	DOCUMENTED_COACHING	["2023-12-28T17:17:38-08:00","2023-12-28T17:17:38-08:00"]	On 12/20/2023, you had a total of 21 minutes resulting in an elongated break. On 12/20/2023, a manager held a seek to understand conversation with you to follow up on the reason(s) for this time. You identified barriers including you were packing a large sized box resulting in an elongated break. Based on your explanation, the manager exempted 1.5 minutes of your idle time, and you had 5 minutes remaining of idle time. The manager validated that during this time, you were not actively engaged in a work process for reasons within your control. This behavior violates Amazonâ€™s Standards of Conduct, and therefore you are receiving this documented coaching.
[REDACTE	BFI9	BEHAVIORAL_IDLE_TIME	FIRST_WRITTEN_WARNING		On 12/22/2023, you had a total of 48 minutes of unknown idle time from 07:30 to 12:10. On 12/22/2023, a manager held a seek to understand conversation with you to follow up on the reason(s) for this time. You identified no process related barriers and you mentioned that you needed to use restroom multiple times. Based on your explanation, the manager exempted 14 minutes of your idle times (your travel time from station to bathroom and coming back), that leaves 34 minutes remaining of idle time. The manager validated that during this time, the restroom was open and you were not actively engaged in a work process for reasons within your control. This behavior violates Amazonâ€™s Standards of Conduct, and therefore you are receiving this first written warning feedback.
[REDACTE	BFI9	BEHAVIORAL_IDLE_TIME	DOCUMENTED_COACHING		On 12/21/2023, you had a total of 20 minutes of unknown idle time. On 12/21/2023, a manager held a seek to understand conversation with you to follow up on the reason(s) for this time. You identified barriers including *Processing multi-step prep on station and did not know to receive items in smaller groups if receiving a larger box.*. Based on your explanation, the manager exempted 15 minutes of your idle time, and you had 5 minutes remaining of idle time. The manager validated that during this time, you were not actively engaged in a work process for reasons within your control and also coached for prep SOW for multi-step prep items. This behavior violates Amazonâ€™s Standards of Conduct, and therefore you are receiving this *Documented Coaching*. This *Feedback level* will be active for *30* days

Problem Statement

Following Project Soteria's causal analysis, several recommendations were made based on the injury rate reduction attributed to Unlimited UPT/flexible VTO, and the pausing of SPPR/SQPR. The suggestion to test several levels of UPT and turn SPPR on/off was not approved by leadership in favor of more granular recommendations that allow business leaders to reduce injuries across the network without negatively impacting rate/productivity and the ability to deliver on time to customers. This paper defines the team's approach and direction to provide fine-tuned recommendations, these recommendations are achieved by replacing the use of binary (before vs after) intervention variables with continuous/numerical metrics.

Summary- Project Soteria Overview

Project Soteria reinforces and expands the understanding that reporting of injuries at fulfillment centers is influenced by more than undesired outcomes from hazardous conditions and at-risk behaviors in the workplace. Culture, management, and external factors contribute to the occurrence of and subsequent reporting of injuries. The first Project Soteria paper showed results of modeling 42 identified variables in these categories. Based on the analyses conducted this project aims to provide policy recommendations to reduce injuries.

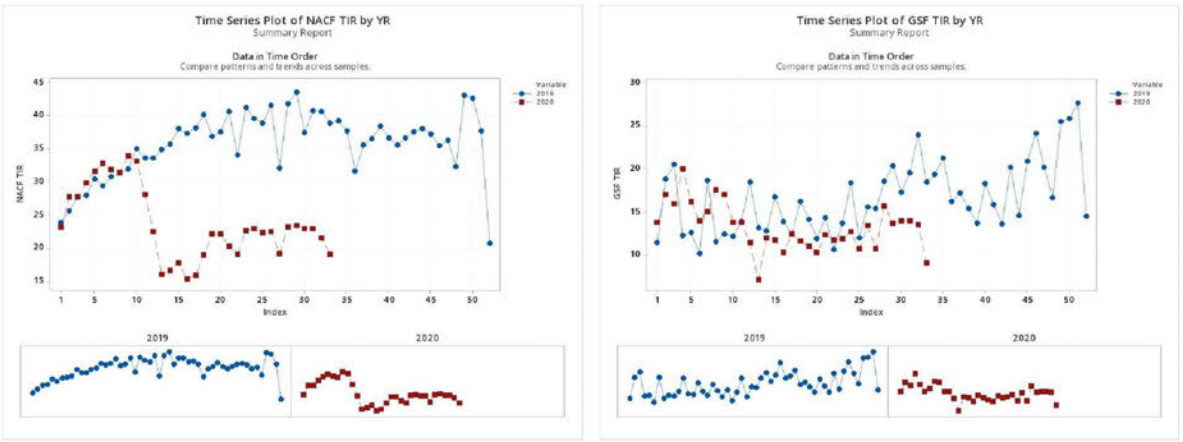
During the weeks following the emergence of the COVID-19 in the US, Amazon issued both modified and new requirements affecting facilities and associates' work experiences. Some of these changes effected every worker unilaterally and others affected smaller groups of associates or processes. Injury rates across NACF decreased in early March and remain lower than the pre-COVID-19 levels. Beginning in May some of the changes that were made in March and April were modified closer to their pre-COVID-19 requirements, examples include those related to hourly wages and UPT (unpaid time-off).

Over the past three months (May-July), there are varying degrees of response to injury reporting in different business groups. In the next analysis stage, Project Soteria identifies which modified work or management practices can be recommended for continuation in specific business groups to sustain lower injury rates.

Methodology

Since our top recommendations in a preceding paper included UPT/VTO flexibility and the pausing of SPPR, it makes sense to look at the injury rate differences between GSF and NACF. In particular, GSF has no attendance or rate performance policies that can lead to an associate's termination. The team hypothesizes that the variances in total injury rates are derived from the inexistence of attendance and performance policies in GSF. The graphs in Figure 1 support the shift in TIR observed in NACF from 2019 to 2020; a smaller TIR shift is present for GSF.

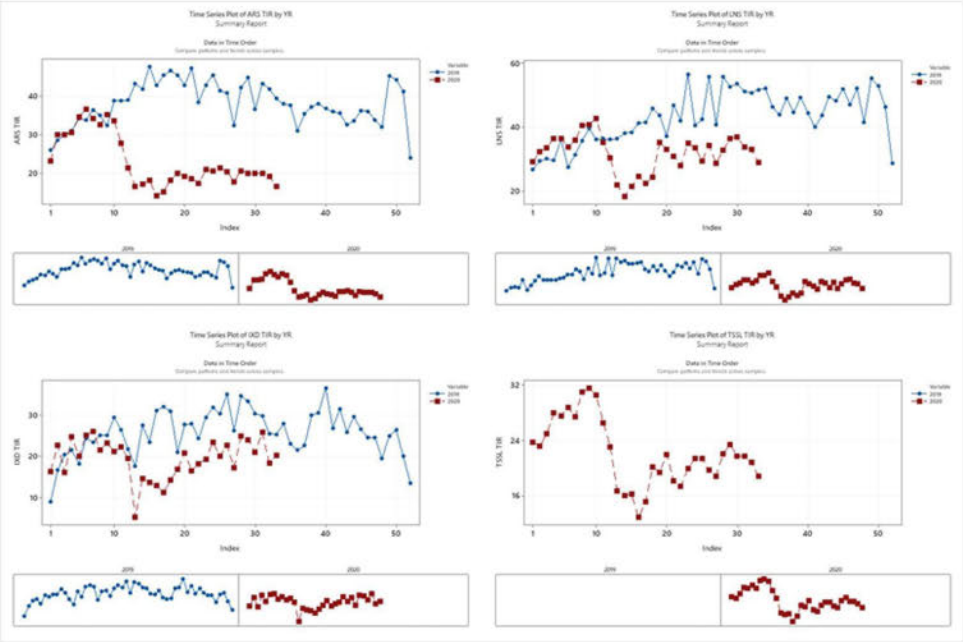
Figure 1 –Total Injury Rate (TIR) trends in 2019 and 2020, NACF vs GSF



GSF and NACF both showed a TIR reduction, however the WoW shift from 2019 to 2020 has been about 40% for NACF and 20% for GSF, starting WK11. While GSF sites are not impacted by AMCARE, UPT, or SPPR/SQPR, it is hypothesized that other variables are driving down injury rates (e.g. headcount increase, lower attendance rates).

Taking a deeper look into NACF site types reveals the largest drop in TIR comes from ARS sites (see Figure 2). While Traditional Non-Sort, and IXD sites have all seen a reduction in injury rates, the largest drop and the biggest overall contribution comes from the AR Sortable network.

Figure 2 – Total Injury Rate by Site Type (NACF)



***Note**: TSSL is a new BU formed in 2020 combining Softlines and Traditional Sort sites.*

Based on how NACF ARS sites have shown the largest reduction in reported injury rates, the rest of this paper focuses on NACF – ARS sites, and it is structured in three parts:

1. Deep Dive the two main policies from our initial recommendations: UPT/VTO policies, Paused SPPR.
2. Use a nonlinear programming formulation to help determine the tradeoffs between rates/productivity and injury rates.
3. Future work and experiments to generate a better understanding of the tradeoffs between rates/productivity and injury rates.

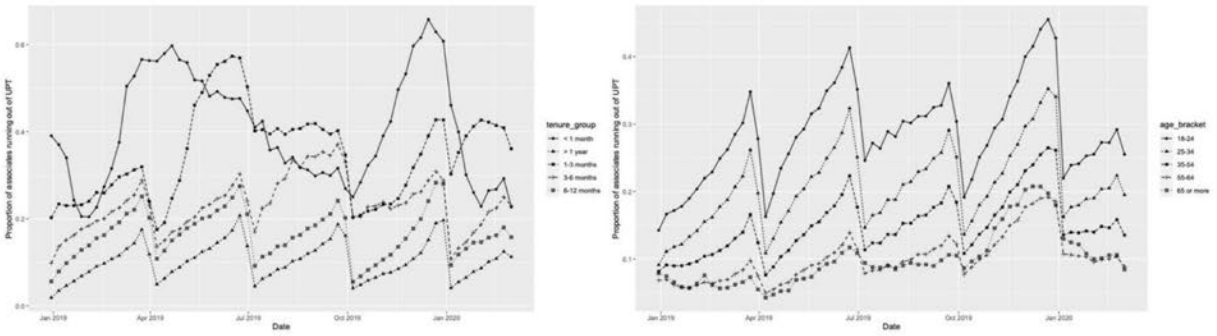
Recommendations

UPT Policy

The first deep dive (details in Appendix A) looks into what factors are associated with employees running out of UPT (zero or negative balance). The strongest signals linked to non-positive UPT balances are, in descending order: tenure, vacation balance, and age. Figure 3 (Left) shows the relationship between the cumulative proportion of associates and tenure, with new associates (<1 month, 1-3 months) running out of UPT the fastest, and the rest of the groups seldom exceeding 30% of associates running out of UPT before the end of quarter. A similar pattern is observed in Figure 3 (Right) showing the five age groups follow the same general pattern of using UPT, with younger associates using UPT more quickly than older AA's. This brings up a recommendation to break the current group

dynamic granting UPT in different times based on an accrued model or the associate's work anniversary (**R1**). This implies that if accrued over time, full time AA's would earn 3.1 hours per week accumulating 40 hours in a quarter.

Figure 3 — Left: Weekly UPT cumulative percentage of associates running out of UPT by tenure group; Right: Weekly UPT cumulative percentage of associates running out of UPT by age.

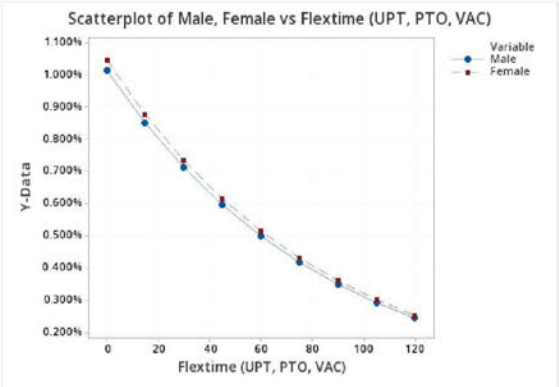


An accrued UPT policy opens up the possibility that an associate initiates a quarter with an empty UPT balance and has an unforeseen emergency that requires the immediate use of UPT. This type of issue can be handled on a case-by-case basis by an exception process or by granting 3.1 hours by default at the beginning of the quarter to all associates. Data on current UPT usage for the first two weeks of every quarter indicate P70 is 3 hours correspondingly.

The discussion above on how to grant UPT leads to another question our current data cannot answer: why do associates take UPT? While this can be speculated based on the usage patterns, it is important to understand the different reasons associates take UPT. For this reason, Project Soteria team has recommended the creation of a survey mechanism (see Appendix B) to capture additional information and shape recommendations around schedule flexibility.

Expanding on the causal analysis presented in the last paper, additional data on injuries and UPT balance since 2019 has been included. Based on a logistic regression model (presented in Appendix A), Figure 4 presents for a full time, median age, and median tenure the impact of flextime (which is represented by the sum of UPT, PTO and Vacation). For simplicity, it is assumed that the three balances are the same with the worst possible case, when an AA has 0 balance across all flexible time alternatives. The model estimates the injury risk for associates without any flextime is about 1 and 1.05% (females and males), dropping to 0.85% and 0.88% correspondingly when associates have 5 hours of UPT, VAC, PTO (15 hours total).

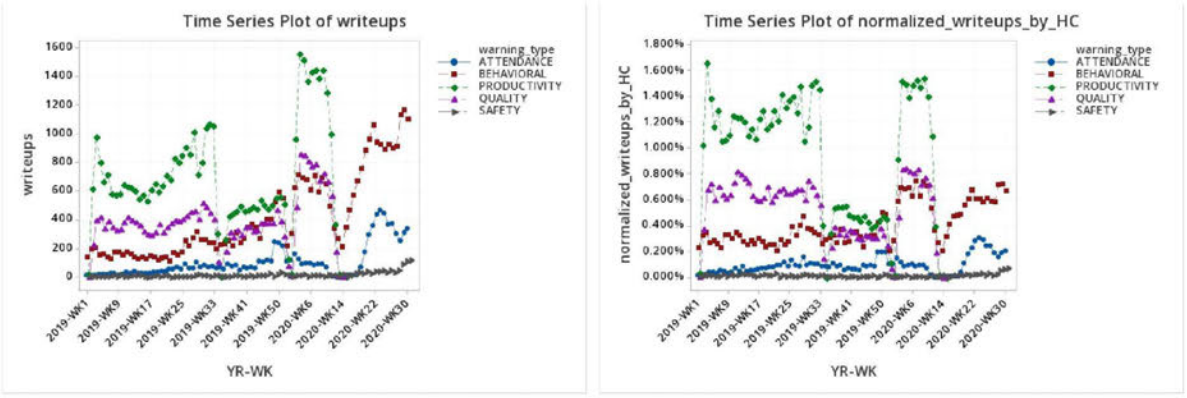
Figure 4 — Predicted Injury Probability for median age (32), median tenure (12 months), last week of quarter, full time AA's



SPPR Policy

The data from ADAPT shows, that from 2019 to date, 57% of all writeups/warnings in NACF are generated in ARS sites, while these sites represent 50% of the total labor. Productivity (SPPR) writeups and Quality (SQPR) writeups are more predominant in ARS and TSSL+, which could explain why NS sites have seen a smaller injury rate reduction (33%) from the pausing of SPPR/SQPR. A deeper look at ARS sites only (see Figure 5 – Left), shows that overall writeups remained low until end of April 2020 (WK18). And since SPPR/SQPR warnings were turned off, they have been followed by an increase in the percentage of Behavioral, Attendance, and Safety writeups.

Figure 5 — Left: ARS writeups WoW broken by feedback type (issues). Right: WoW Writeups normalized by Headcount.



The upward trend for Behavioral and Attendance writeups corresponds to May, June, and July of this year. The conjecture is that in the absence of SPPR/SQPR, AMs have focused on behavioral, attendance, and safety issues to coach and evaluate AA's. Figure 5 (Right) looks at the same data but normalizes it using headcount, the increase/shift in attendance and behavioral writeups coincides with a TIR/RIR increase in WK19 observed in NACF. If this trend continues, the team hypothesizes the benefits of pausing SPPR will be eliminated if stress levels about job security go back to pre-COVID levels.

A closer look at the ARS data for ADAPT writeups and injury rates shows that associates without writeups have a 0.51% chance of incurring in an injury. The first written performance warning increases this risk to 1.02% (2x), and second and final writings both increase the chances of injury to 1.2% (2.4x). This provides evidence to what the causal analysis concluded--the pausing of SPPR had a reduction effect on injury rates, but most importantly, its effect could soon fade away as writeups for other causes rise up to the levels of quality and productivity pre-COVID. The recommendation for SPPR is to reduce the percentile threshold to 3% (**R2**) reducing AA eligibility by 40%; the current threshold flags bottom performing AA's processing units at 50% the rate-goal while a 3% percentile would flag bottom performers at 45% the rate-goal.

Also, similar to the statement above when a quality writeup is delivered injury rates go up to 1.1% (2.2x), showing both performance and quality writeups have a negative impact on injury likelihood. Last, Figure 5 (Right) shows the impact of three change points in ADAPT. The first shift in WK34 2019 (September), where a change to ADAPT's support coaching eligibility reduced the productivity writeups percent by 50%, leading to an increase in writeups at the start of 2020, followed by COVID and the pausing of performance and quality writeups. The current trend shows behavioral and attendance writeup (%) surpassing levels observed in the weeks leading to COVID.

Reducing Injury without disrupting productivity

Addressing the concerns over possible disruption of productivity, the operating ranges are proposed for the factors/policies that maximize rates/productivity while keeping injury likelihood below certain threshold levels (see

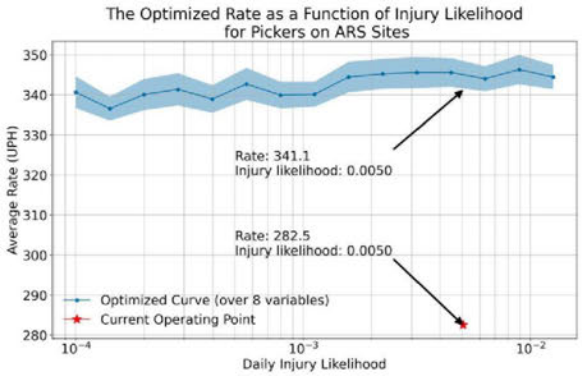
Appendix C for technical details). Finding the optimal point for different values of injury likelihood thresholds creates the optimized operating curve. The optimization is performed using two nonlinear causal models, one for the process path specific rate and one for the injury likelihood.

ARS Pick Process Path optimization

Figure 6 shows the optimized operating curve for pickers in ARS sites, where the daily productivity per site (rate * hours worked * headcount) is maximized.

Eight decision variables (UPT Balance, Hours, Writeups, AVOC Score, Rate, VTO, Bin fullness[1], and Headcount) are adjusted to obtain the optimized operating curve. Figure 6 shows the optimized rate as a function of injury likelihood. Each point on the optimized curve is a result of adjusting eight variables subject to the injury likelihood threshold in the X axis. This approach allows us to find the maximum Pick rate at a given injury rate, while optimizing for the remaining decision variables (**R3**); this optimization framework can be generalized to other process paths.

Figure 6 – Maximum achievable rate for any given injury risk; in general, as rates increase so is the daily injury likelihood.



According to our causal model, for the average UPT balance (7.4 hr/quarter), hours worked (9.9 hr/day), writeups (0.52% of associates), AVOC scores (90%), rate (283 uph), VTO (0.79 hr/week), headcount (79% max HC), and Bin fullness (82%) we expect to see an injury risk of 0.5%. The same injury risk can be sustained by increasing the rate to 341 uph and optimizing the other variables as shown below:

Decision variable	Current operating conditions	Optimized solution
UPT balance	7.37 hr/quarter	52.65 hr/quarter
Hours worked	9.93 hr/day	10.00 hr/day
Writeups	0.52%	4.26%
AVOC scores	89.91%	92.45%
Rate	283 uph	341 uph
VTO	0.79 hr/week	2.84 hr/week
Headcount	79.12%	100%
Bin fullness	81.9%	80.0%

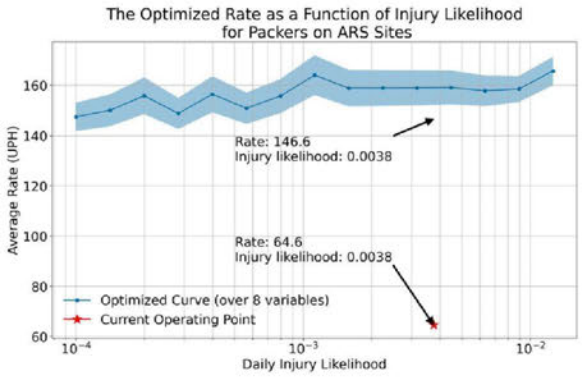
[1] Bin fullness is not directly controllable, but can be influenced across the network by inbound activity.

The table above suggests Pick can be run at 20% higher rates than today, the compromise is lowering bin fullness from 82 to 80%, increasing headcount to max capacity, and increasing UPT balance from 7.4 to 52.7 hours per quarter. Based on the UPT usage patterns summarized in Figure 3, adding 10 hours of UPT (50 hr/quarter) may not necessarily increase UPT balance by 10 hours, thus the team strongly suggests defining a change to the UPT attribution model that makes attendance as high as possible and predictable.

ARS Pack Process Path optimization

A subset of seven decision variables mentioned above are adjusted to obtain the optimized operating curve (bin fullness is dropped since it does not impact Pack). Figure 7 shows the optimized rate as a function of injury likelihood. Each point on the optimized curve is a result of adjustment of the seven variables subject to the injury likelihood threshold in the X axis.

Figure 7 – Expected maximum rate for any given injury risk: Pack process path.



According to this analysis, injury likelihood can be sustained by increasing the Pack rate 2.3x. The mean optimized results are shown below:

uptbalance: 46.5 hr/quarter
hours: 9.83 hr/shift
writeups: 4.5%
avoc_score: 98%
rate: 146.6 uph
vto: 2.3 hr/associate
headcount: 99.8%

The optimal solution makes a blank recommendation for rate, but this is not feasible for all Pack process paths: Multis (S/M/L), Singles (S/M/L), SmartPac. Our current data does not have the visibility over the exact process (PPR_line_item_id) in which an associate is working, and categorizes all packers as performing the same job. This callout can be resolved by creating causal models, and gathering more granular data at this finer level so our recommendations per process path are feasible.

Summary of Recommendations and Next Steps

R1. Break up UPT-usage group dynamics by moving away from current UPT attribution model in favor of accrued UPT. Current UPT usage shows 70% of associates use no more than 3 hours per week (thus an accrued 3.1 hours per week, 40 hours per quarter is feasible). This recommendation was presented to Dave Clark (WK35) and has been approved for implementation in 2021.

R2. If reinstating SPPR, the team suggests to evaluate and monitor injury and rate impact of setting ADAPT's bottom performer threshold to 3%. Data shows both writeups are linked to increased injury risks; the team hypothesizes that this increased risk is a result of stress and fear of being terminated, rather than ADAPT's

effect on an associate's rate/speed. Our team is currently exploring the link to injuries for programs like FC Games that incentivize and motivate associates rather than apprehending them due to underperformance.

R3. Find a compromised solution (rates/productivity vs injury rates) for each process path using a mathematical approach known as nonlinear programming.

The following action items are identified to further shape the recommendations above, and improve the quality of the compromised solution framework for each process path:

1. Using questions like those included in our survey (Appendix B), create a data collection mechanism to generate indicators on associate's schedule flexibility choices and psychosocial state. Project Soteria is will deliver this mechanism and analyze data gathered with ETA: 9/30/20. The team is exploring using WWBT's development team and leverage an upcoming product, Wisdom Of Operations (WOO), that can serve as the mechanism to create an ongoing health/psychosocial indicator from interactions with associates.
2. Gather site level data from Connections to measure psychosocial factors. The Connections Data Service team can create a data pipeline of aggregate Connections scores by site to correlate to injury data (ETA: 10/31/20).
3. Extend date ranges for WHS, ADAPT, BMI, and Bin Fullness from WK1 2019 to date (ETA: 9/30/20). This requires two BIE resources for one month to complete this.
4. Use R3 to come up with rate recommendations across different ARS process paths. This task is dependent of Action Item #3 (ETA: 10/15/20).

Appendix A: Supporting Statistical Analysis

Q. Is there evidence to support that accidents are more likely to occur in the last two hours of a shift? Would it be reasonable to reduce our daily work to 8 hours?

No, the data below shows that out of 65,336 recorded injuries with a timestamp, 10,770 occurred in the last 2.5 hours of a shift. Assuming injuries are constant across every hour of the day (even breaks, time between shifts), one would expect to see a 0.208 proportion associated with the last 2.5 hours of the day and night shift. The data below fails to show that injuries are more likely to occur at the end of shift (estimated proportion is 0.165), when associates are getting tired. A caveat to highlight is that over 25% of the injuries do not have a timestamp.

Statistics

Variable	N	N*	Mean	SE Mean	StDev	Sum	Minimum	Q1
Last_Two_And_A_Half	65336	23514	0.16484	0.00145	0.37104	10770.00000	0.00000	0.00000

Variable	Median	Q3	Maximum
Last_Two_And_A_Half	0.00000	0.00000	1.00000

Q. What are the most influential factors impacting UPT usage?

The first model below identifies the factors showing the strongest link to the probability of associates running out of UPT. Based on the Z values, the predictors with largest signal-to-noise ratios are pto_balance, tenure, and vac_balance.

Output from the logistic regression equation modeling the likelihood of associates running out of UPT:

```
Call:
glm(formula = RanOut ~ calc_age + tenure + factor(WeekInQtr) +
    pto_balance + vac_balance + fulltime_parttime + sex, family = binomial(),
    data = df)


Deviance Residuals:
    Min       1Q   Median       3Q      Max
-8.4904  -0.6439  -0.2914  -0.0234   8.4904

Coefficients:
                       Estimate Std. Error z value Pr(>|z|)
(Intercept)          1.417e+00  4.520e-03  313.37   <2e-16 ***
calc_age            -1.387e-02  8.455e-05 -164.09   <2e-16 ***
tenure              -3.163e-02  6.133e-05 -515.76   <2e-16 ***
factor(WeekInQtr)1  -4.380e-01  4.317e-03 -101.47   <2e-16 ***
factor(WeekInQtr)2  -1.090e+00  4.788e-03 -227.64   <2e-16 ***
factor(WeekInQtr)3  -9.794e-01  4.655e-03 -210.37   <2e-16 ***
factor(WeekInQtr)4  -8.523e-01  4.571e-03 -186.47   <2e-16 ***
factor(WeekInQtr)5  -7.732e-01  4.489e-03 -172.24   <2e-16 ***
factor(WeekInQtr)6  -6.717e-01  4.439e-03 -151.32   <2e-16 ***
factor(WeekInQtr)7  -5.973e-01  4.375e-03 -136.51   <2e-16 ***
factor(WeekInQtr)8  -4.038e-01  4.350e-03  -92.82   <2e-16 ***
factor(WeekInQtr)9  -3.342e-01  4.301e-03  -77.71   <2e-16 ***
factor(WeekInQtr)10 -2.424e-01  4.306e-03  -56.28   <2e-16 ***
factor(WeekInQtr)11 -1.735e-01  4.491e-03  -38.63   <2e-16 ***
factor(WeekInQtr)12 -8.197e-02  4.454e-03  -18.41   <2e-16 ***
pto_balance         -1.851e-01  2.328e-04 -795.37   <2e-16 ***
vac_balance         -7.938e-02  1.733e-04 -458.13   <2e-16 ***
fulltime_parttimeP  -6.933e-01  4.340e-03 -159.77   <2e-16 ***
fulltime_parttimeR  -5.283e-01  3.379e-03 -156.35   <2e-16 ***
fulltime_parttimeX  -1.124e+00  1.649e-02  -68.17   <2e-16 ***
sexM                 6.712e-02  1.774e-03   37.84   <2e-16 ***
sexU                 6.559e+00  4.857e-02  135.04   <2e-16 ***
sexW                 4.054e-01  1.312e-02   30.89   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 11243826  on 11342013  degrees of freedom
Residual deviance:  7949696  on 11341991  degrees of freedom
AIC: 7949742
```

The second model below identifies the factors showing the strongest link to the probability of associates incurring in injuries. This is not a causal model, but uses the data since the first week of 2019 to date. Based on the Z values, the predictors with largest signal-to-noise ratios are sex, tenure, and vac_balance.

```
glm(formula = injury ~ calc_age + tenure + factor(WeekInQtr) +
    upt_balance + pto_balance + vac_balance + fulltime_parttime +
    sex, family = binomial(), data = df)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-1.9313  -0.1302  -0.1132  -0.0942   4.7829

Coefficients:
                       Estimate Std. Error  z value Pr(>|z|)
(Intercept)         -4.498e+00  1.783e-02 -252.187  < 2e-16 ***
calc_age             3.311e-03  3.067e-04   10.798  < 2e-16 ***
tenure              -1.310e-02  2.353e-04  -55.680  < 2e-16 ***
factor(WeekInQtr)1  -1.752e-01  1.907e-02   -9.187  < 2e-16 ***
factor(WeekInQtr)2  -2.210e-01  1.934e-02  -11.428  < 2e-16 ***
factor(WeekInQtr)3  -1.496e-01  1.903e-02   -7.860 3.85e-15 ***
factor(WeekInQtr)4  -1.406e-01  1.900e-02   -7.403 1.33e-13 ***
factor(WeekInQtr)5  -1.636e-01  1.910e-02   -8.570  < 2e-16 ***
factor(WeekInQtr)6  -1.157e-01  1.888e-02   -6.130 8.77e-10 ***
factor(WeekInQtr)7  -1.256e-01  1.886e-02   -6.661 2.72e-11 ***
factor(WeekInQtr)8   4.686e-02  1.825e-02    2.568 0.010228 *
factor(WeekInQtr)9   6.396e-02  1.818e-02    3.517 0.000436 ***
```

```
factor(WeekInQtr)10  5.481e-02  1.827e-02    3.000 0.002701 **
factor(WeekInQtr)11  2.869e-01  1.816e-02   15.799  < 2e-16 ***
factor(WeekInQtr)12  2.429e-01  1.837e-02   13.224  < 2e-16 ***
upt_balance         -9.042e-04  5.029e-05  -17.980  < 2e-16 ***
pto_balance         -1.103e-02  4.440e-04  -24.846  < 2e-16 ***
vac_balance         -2.355e-02  4.565e-04  -51.591  < 2e-16 ***
fulltime_parttimeP  -1.112e+00  3.075e-02  -36.162  < 2e-16 ***
fulltime_parttimeR  -2.365e-01  1.429e-02  -16.553  < 2e-16 ***
fulltime_parttimeX   7.707e-01  4.576e-02   16.842  < 2e-16 ***
sexM                -3.155e-01  7.601e-03  -41.507  < 2e-16 ***
sexU                 1.173e+00  1.214e-02   96.552  < 2e-16 ***
sexW                -2.286e-01  6.310e-02   -3.623 0.000291 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

    Null deviance: 965627  on 11366139  degrees of freedom
Residual deviance: 931608  on 11366116  degrees of freedom
AIC: 931656

Number of Fisher Scoring iterations: 9
```

Appendix B: Deep Dive Survey

	Theme	Question	Answer	Expected Outcome
1.	Schedule flex	CHECK ALL CHOICES THAT APPLY. Reasons why you ran out of UPT.	a) N/A, I've never run out, b) Family emergency, c) Constantly stuck in traffic, d) Insufficient. [If choosing insufficient, ask how much is enough?]	Root causes for why associates run out of UPT.
2.	Schedule flex	CHECK ALL CHOICES THAT APPLY. Name the reasons why you have used UPT in the past.	a) Personal emergency, b) Needed a break, c) Running late for work, d) Was not feeling well, e) Not applicable	Understand what is UPT used for.
3.	Schedule flex	What is your current shift?	a) 10 hr, 4 days; b) 8 hr, 5 days; c) 10 hr, 3 days; d) 10 hr, 2 days	Baseline for current shift.
3.1	Schedule flex	Follow-up: Which type of work schedule would you prefer?	a) The one I have right now b) 8 hours/5 days c) 10 hours/3 days d) 10 hours/2 days e) Something else.	Schedule preference for associates.
4.	Schedule flex	Which best describes your work situation?	a) Amazon is my only job b) I work another job outside of Amazon	Data on proportion of associates holding more than 1 job.
4.1		Follow-up if b): Is your other job physically demanding?	a) Yes, more than Amazon; b)Yes, same as Amazon; c)No it is not physically demanding.	
5.	Schedule flex	Outside of work, are you actively doing additional physical labor?	a) Yes, b) No	Proportion of associates having physical labor.
6.	Psychosocial	How often do you feel stressed?	a) Always, b) Often, c) Sometimes, d) Rarely, e) Never (Not stressed	Stress mitigation practices
6.1		Follow up if a),b), or c): How do you manage stress?	a)Family time b) Hobbies c) Exercise d)Something Else	
7.	Psychosocial	When feeling physical discomfort, or pain at work, what do you do?	a) Slow down how fast I go, b) Call the AM to radio AMCARE, c) Take UPT/VTO if available, d) See a doctor, e) Do nothing.	Pain mitigation practices
8.	Psychosocial	I enjoy labor moves for at least one of the following reasons: provides a break from repetitive work, challenges me to see how I can perform in other roles,	a) Strongly Agree; b) Agree; c) Neither Agree or Disagree; d) Disagree; e) Strongly Disagree (if selecting d) or e) follow up question on why)	Labor moves: Love them, hate them?

		gives me a better perspective for other jobs I may like better, helps me understand the interconnectivity of processes to deliver customer value.		
9.	Psychosocial	I feel comfortable receiving care outside of the Wellness Center/AMCARE in my work station (Select One).	a) Strongly Agree; b) Agree; c) Neither Agree or Disagree; d) Disagree; e) Strongly Disagree (if selecting d) or e) follow up question on why)	Mobile AMCARE effect on reducing injury reports
10.	Psychosocial	With the current economic environment, but Amazon's strong position to fulfill customer demand I feel happy working for Amazon.	a) Strongly Agree; b) Agree; c) Neither Agree or Disagree; d) Disagree; e) Strongly Disagree (if selecting d) or e) follow up question on why)	Perception on job security

Appendix C: Causal Estimation of Injury Likelihood and Rates

We have obtained a large dataset of 43 variables, of which 8 can be used to control the injury rate. We identify the non-linear causal impact of the 8 variables on both injury likelihood and work rate. Using the two causal impact functions, we define an optimization that maximizes the productivity for every given injury likelihood.

Data: We have the data for all associates in the NACF sites from January 2020 until the end of June 2020. We choose the AR sortable sites and focus on pick and pack process paths. Our analysis uses the daily data aggregated at the FC-level. The names of all 43 variables are listed in *Appendix A*. The 8 actionable variables are "UPT-Balance", "Work Hours", "Writeups", "AVOC Score", "Work Rate", "VTO/Headcount", "Normalized Headcount", and "Bin Fulness".

Causal Inference Methodology: The goal of causal inference is to remove the confounding bias of the rest of the variables from our estimations. Using causal coefficients, we can ensure that our changes in the actionable variables will lead to changes in the target too. We use the "Inverse Propensity of Treatment Weight" (IPTW) technique. We compute the propensity scores for the 8 variables using the XGBoost algorithm and stabilize the weights using the marginal distribution.

Non-linear Causal Inference: We expect the impact of the action variables to be non-linear on both injury likelihood and rate. To capture the non-linearity, we use the neural additive models as follows

$$y = \beta_0 + \sum_{k=1}^{K} \beta_k x_k + \sum_{k=1}^{K} f_k(x_k) + \varepsilon$$

$$f_k(x_k) = \sum_{m=1}^{M} w_{mk} elu(\gamma_{mk} x_k - \alpha_{mk})$$

The model describes the target y as a constant plus a linear term, a nonlinear term, and an additive noise.

The non-linear function is defined as $elu(x) \equiv max(0, x) + min(0, e^x - 1)$. In *Appendix B*, we provide our estimated causal response curves for the injury likelihood.

Injury-Productivity Trade-off: Our causal analysis of the injury rate identifies the factors/policies that can be used to reduce the injury rate. Addressing the concerns over possible disruption of the productivity, we propose the following constrained optimization to identify the operating ranges for the factors/policies that maximize the productivity while keeping injury rate in low levels.

$$\max_{x_1,\dots,x_8} \; Productivity(x_1,\dots,x_8)$$
$$s.t. \quad inj(x_1,\dots,x_8) \le t_{inj}$$
$$|s_8 - rate(x_1,\dots,x_7)| \le s_{rate}$$
$$l_k \le x_k \le u_k \quad for \quad k = 1,\dots 8,$$

where $Productivity(x_1,\dots,x_8) = rate \times hours \times headcount = x_8 \times x_2 \times x_6$. Two causal functions $inj(\cdot)$ and $rate(\cdot)$ denote our causal prediction functions of injury likelihood and work rate. We vary the injury threshold t_{inj} and obtain different solutions. Rate slackness is chosen to be $s_{rate} = std(x_8)/10$. To avoid local minima problem, use 50 random initializations. Report the result with the largest objective function. In *Appendix C*, we plot the trade-off curve and analyze the current operating point.

Uncertainty Estimation: To quantify uncertainty in our estimates, we resample the data and create 100 new datasets. With each sample, estimate the causal models for the rate and injury likelihood. Using each set of causal models for rate and injury, solve the optimization problem and obtain the solution. We report the 90% confidence interval or the standard error for the estimated quantities.

Variable Used in Analysis:

Age, Gender, Tenure, Job Level, Fulltime Status, Employee Standing, UPT Balance, PTO Balance, Hours Worked, Attendance History, Injury History, Local Poverty Rate, Local COVID Spread, Site COVID Spread, Hourly Salary, Idle Time, Labor Move Count, Rate History, Forecasted Demand, Actual Demand, Bin Fullness, Negative VOA count, Cumulative VOA count, Cumulative Weight, Cumulative Volume, Small Ratio, Manager Tenure, Manager Feedback Rate, Unemployment Rate, Writeups, AVOC Score, Rate, VTO, Headcount, Pay Increase, Unlimited UPT, SPPR/SQPR Paused, Social Distancing, Mobile AMCARE, Working Well.

Action variables:

Variable	Description
x_1	UPT Balance
x_2	Hours Worked
x_3	Frequency of Writeups
x_4	AVOC Score
x_5	VTO/Headcount
x_6	Headcount/(Max Headcount)
x_7	Bin Fullness
x_8	Rate [log(1+rate)]

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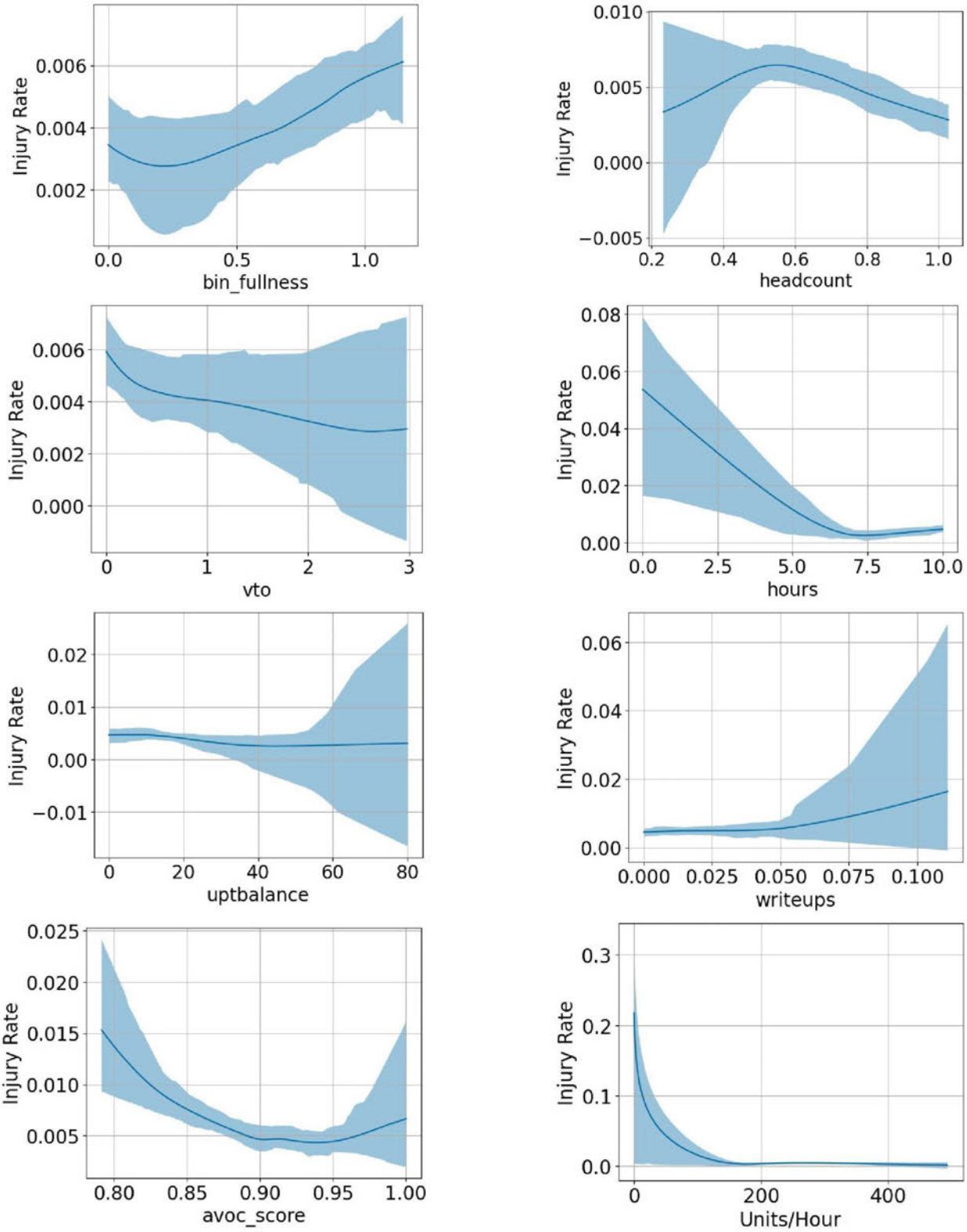

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Problem Statement

During the current COVID-19 pandemic, Amazon noted a reduction in total injury rates (TIR) from 30.4 (WK1-WK11) to 21.5 (WK12-WK40) and a reduction in recordable injury rates (RIR) from 7.2 (WK1-WK11) to 5.4 (WK12-WK40) across NACF sites (see Figure 1). Current rates represent historic lows and position us below the industry national average (BLS 2018) for the first time. In response to the injury rate reduction, Project Soteria was tasked with: first, determining and ranking the causal impact of policy changes on injury rates, and second, making recommendations to leadership on how to sustain or further reduce injury rates across our network.

Figure 1 – Total Injury Rate (TIR) and Recordable Injury Rate (RIR) across NACF, WoW: 2019 vs 2020 series

Overview: Results and Findings

Project Soteria reinforces and expands the understanding that reporting of injuries at fulfillment centers is influenced by more than undesired outcomes from hazardous conditions and at-risk behaviors in the workplace. Culture, management, policy changes, and external factors contribute to the occurrence of and subsequent reporting of injuries.

An early paper presented to GCF Leadership identified unlimited UPT, mobilization of AMCARE, and pausing of SPPR/SQPR as the top three influential policies to injury reduction during the COVID-19 pandemic. Our conjecture from these results highlights that providing more autonomy to associates by pausing the attendance policy and quality/performance writeups contributed to the observed injury rate reduction; in addition, we hypothesize the mobilization of AMCARE has reduced reporting of discomfort or non-work impeding injuries. With a new understanding of how operations, HR, environment variables, and policy changes influence reporting injury likelihood, Project Soteria has shown how causal models can be used to create recommendations, and evaluate new policies. However, causal models are not static, and we envision continuous improvement of injury rates will require model updates as new data, variables, or policies are evaluated for impact on safety.

Summary: Past and Present (Holistic Analysis of Policies)

Earlier in May, the Project Soteria team was put together with representation from WHS, WWBT, CVML and participation from an Amazon Scholar and two Ohio State professors with expertise in musculoskeletal disorders. The team was tasked with identifying the variables responsible for injury rate levels never before seen at Amazon. A total of 42 variables (see Appendix A for details) including socioecomic, operations, demographic, psychosocial[1], and eight policy-driven variables: 1) unlimited Unpaid Timeoff (UPT), 2) mobilization of AMCARE, 3) paused SPPR/SQPR programs, 4) increase HC from hiring, 5) virtual new hiring orientation (WorkingWell), 6) pay increase, 7) social distancing (AVOC scores), and 8) increased Voluntary Timeoff (VTO). The scope targeted exclusively NACF FCs, though similar injury rate reductions were seen for different business segments (AMZL, GSF, ATS) across regions (NA and EU). The results summarized in this paper include a maximum of 42 variables from

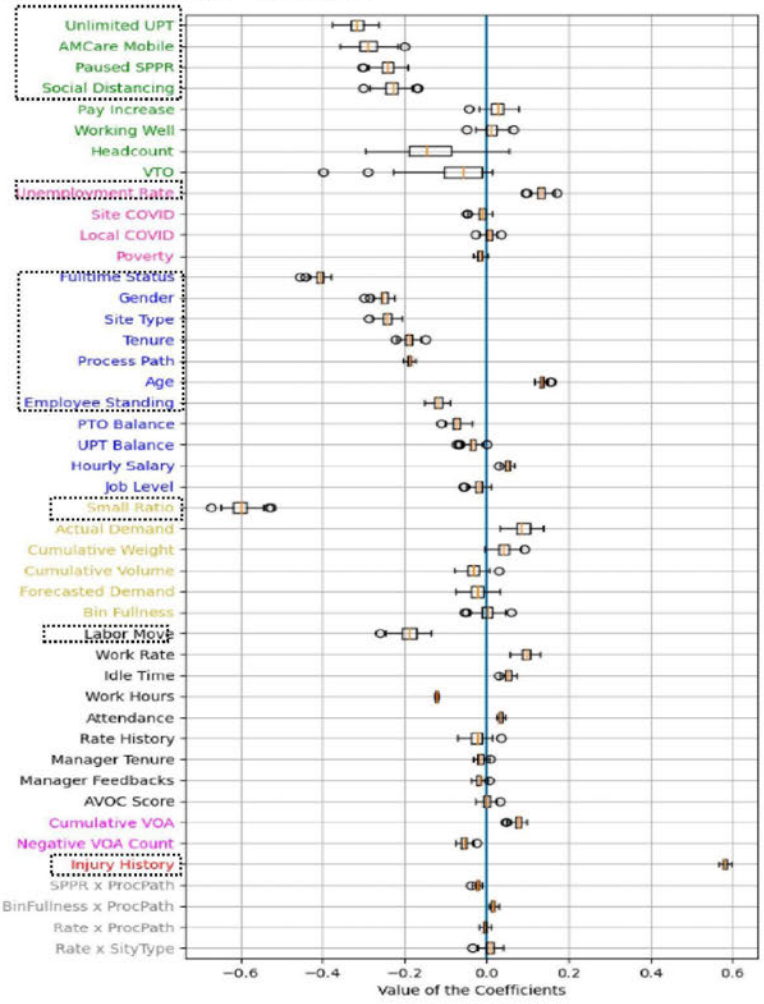
[1] The existing literature [Sandler and Blume (1997), Kumar (2001), Eatough et al. (2012), Thiese et al. (2020)] points to demographic, operational metrics but emphasizes the importance of psychosocial factors as an injury risk factor.

WK1-WK28, representing 422,895 Amazon Associates (AA's), and 4,012,319 associate-work-weeks in NACF. The history of the analyses is separated for simplicity into three stages, and introduced for the first time at Amazon a comprehensive causal analysis on injuries, which based on Amazon's size and complexity of our systems is unmatched when compared to similar studies available in the literature.

Stage 1 (intro of WHS causal models): The first analysis conducted included causal inference techniques to establish actionable recommendations that enable leadership to evaluate the injury-risk impact of current and future policies. Since the fitted model is causal, the treatment effect of input variables can be more accurately estimated than with simpler statistical associative models; in addition, causation requires an understanding of the mechanism of how business variables interact with one another and with environmental variables (see the Directed Acyclic Graph, DAG, Appendix B). The causal nature of the analysis required data access at finer granularity, i.e. at the associate-level.

One of the preliminary causal models is summarized in Figure 2 which ranks the eight policy variables (green) in descending order of impact on injury risk with 1) unlimited UPT, 2) Mobilization of AMCARE, and 3) Pausing of SPPR/SQPR as the top three treatment effects. All three policies are shown in Figure 2 (Right) and have a negative coefficient, implying they helped reduce the injury likelihood based on the causal model. Two of the policies (pay increase and the virtual new hire onboarding program), showed a negligible effect on injury reporting when compared to the other six policies.

Figure 2 — Causal Analysis Results by cluster. Each variable cluster is color-coded with Green = Actionable intervention policies, Red = Socioeconomic variables, Blue = HR variables, Yellow = Demand, ASIN variables, Black = Ops variables, interactions, Purple = Site psychosocial factors, Pink = Outcome injury related predictors, Gray = Interactions.



Stage 2 (refinement of causal model): In a review of results and recommendations, the GCF Leadership team indicated a desire to see more granular recommendations that allow business leaders to optimize key causal variables to reduce injuries. Based on this feedback, Project Soteria took a different modeling approach and switched the eight binary policy-driven variables to continuous variables that can be influenced by decision makers; for instance, instead of using a binary variable for the dates in which the SPPR program was on or off, the writeup rate (number of writeups per HC) was used instead as a model variable. The leadership team can influence the writeup rate by controlling the SPPR threshold percentile to define which associates are categorized weekly as bottom performers.

Using a causal model with continuous policy-driven variables, the team pivoted to focusing on what is actionable by leadership and made the following three recommendations.

R1. Based on the injury-risk reduction effect attributed to the unlimited UPT policy and the increase to 40 hours per quarter on 5/1, Project Soteria recommends sustaining the 40 hours per quarter policy while breaking UPT-usage group dynamics by moving away from the current UPT attribution model in favor of accrued UPT. Current UPT-usage shows 70% of associates use no more than 3 hours per week; thus, the recommendation is for associates to accrue 3.1 hours per week through the quarter.

R2. If reinstating SPPR, the team suggests to evaluate and monitor injury and rate impact of setting ADAPT's bottom performer threshold to 3%. Data shows both SPPR and SQPR writeups are linked to increased injury reporting; the team hypothesizes that this increased reporting is a result of stress and fear of being terminated, rather than ADAPT's effect on an associate's rate/speed.

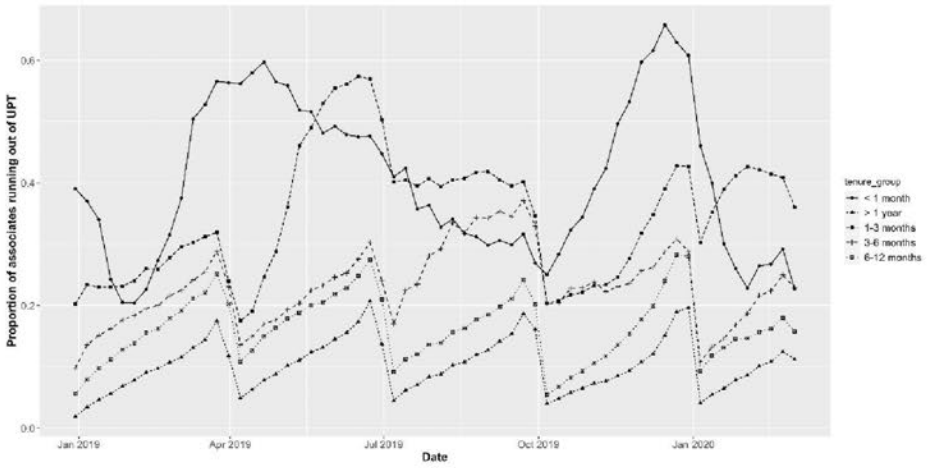
R3. Find a solution that defines the optimal rates keeping injury reporting low for each process path using a mathematical approach known as nonlinear programming.

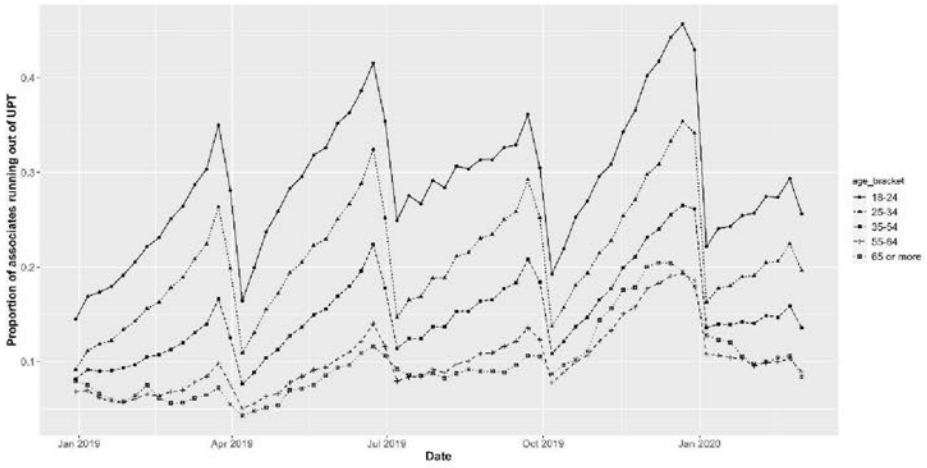
Stage 3 (Deep Dive into Recommendations): In this phase, we deep dive the three recommendations and rely on a causal model for a specific process path for AR Sortable sites. The number of variables is reduced from 42 to only 8 variables that can be controlled or influenced by leaders, and based on previous analyses has a significant causal effect on injury reporting.

R1. UPT Policy

The first deep dive (details in Appendix C) looks into which factors are associated with employees running out of UPT (zero or negative balance). The strongest signals linked to non-positive UPT balances are, in descending order: tenure, vacation balance, and age. Figure 3 (Left) shows the relationship between the cumulative proportion of associates and tenure, with new associates (<1 month, 1-3 months) running out of UPT the fastest, and the remaining groups seldom exceeding 30% of associates running out of UPT before the end of quarter. A similar pattern is observed in Figure 3 (Right) showing the five age groups follow the same general pattern of using UPT, with younger associates using UPT more quickly than older AA's; our recommendation is to promote better time management practices amongst all associates equally, regardless of tenure/age in order to create an inclusive environment accommodating the safety needs of all associates. This should prevent associates from depleting UPT immediately after attribution, the team recommends breaking the current group dynamic granting UPT based on an accrued model (**R1**), 3.1 hours per week for FTE. We hypothesize the benefits of UPT increase and the proposed grant attribution allows associates to take time off when not feeling well or sore, but it also promotes healthier UPT balances which reduces the stress from approaching negative UPT balances.

Figure 3 — Top: Weekly UPT cumulative percentage of associates running out of UPT by tenure group. Bottom: Weekly UPT cumulative percentage of associates running out of UPT by age.





An accrued UPT policy opens up the possibility that an associate initiates a quarter with an empty UPT balance and has an unforeseen emergency that requires the immediate use of UPT. This type of issue can be handled by granting 3.1 hours by default at the beginning of the quarter to all associates. Data on current UPT usage for the first two weeks of every quarter indicate P70 is 3 hours correspondingly.

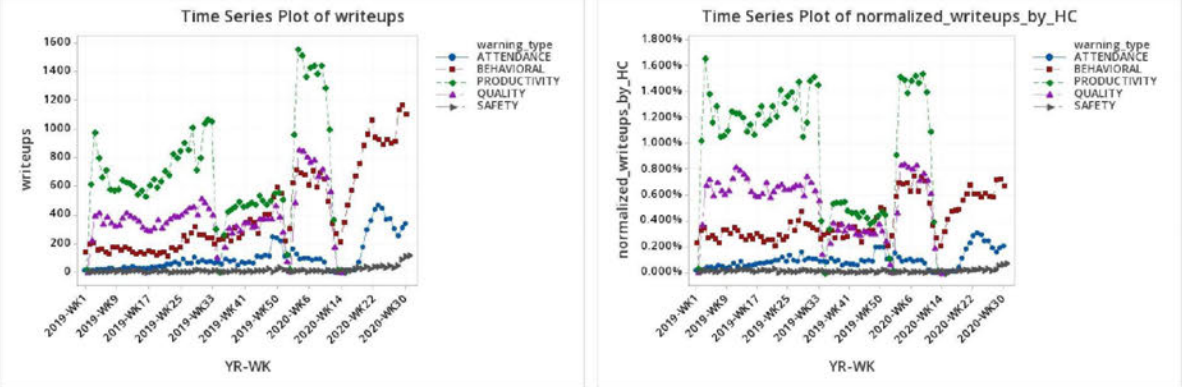
The discussion above on how to grant UPT leads to another question our current data cannot answer: why do associates take UPT? While this can be speculated based on the usage patterns, it is important to understand the different reasons associates take UPT. For this reason, Project Soteria team has recommended the creation of a survey mechanism (see Appendix D) to capture additional information and shape recommendations around schedule flexibility.

Expanding on the causal analysis presented in the last paper, additional data on injuries and UPT balance since 2019 has been included. Based on a logistic regression model (presented in Appendix C), for a full time, median age, and median tenure associate the impact of flextime (which is represented by the sum of UPT, PTO and Vacation) reduces the reported injury likelihood by 15% for every 15 hours of additional flex time.

R2. SPPR Policy

The data from ADAPT shows that from 2019 to date, 57% of all writeups/warnings in NACF are generated in ARS sites, while these sites represent 50% of the total labor. Productivity (SPPR) writeups and Quality (SQPR) writeups are more predominant in ARS and TSSL+, which could explain why NS sites have seen a smaller injury rate reduction (33%) from the pausing of SPPR/SQPR. A deeper look at ARS sites only (see Figure 4 – Left), shows that overall writeups remained low until end of April 2020 (WK18). And since SPPR/SQPR warnings were turned off, they have been followed by an increase in the percentage of Behavioral, Attendance, and Safety writeups.

Figure 4 — Left: ARS writeups WoW broken by feedback type (issues). Right: WoW Writeups normalized by Headcount.



The upward trend for behavioral and attendance writeups corresponds to May, June, and July of this year. Once normalized for changes in headcount, behavioral and attendance writeup rates exceed the 2019 levels, see Figure 4 (Right). The increase and shift in attendance and behavioral writeups coincides with a TIR/RIR increase in WK19 observed in NACF (see Figure 1). As SQPR is reinstated (9/21), the team hypothesizes the observed injury rate reduction observed from the pausing of SPPR/SQPR will be diminished as the percentage of associates written up goes from the current level 1% (inclusive of safety, behavioral, and attendance writeups) back to the 3.2% observed in 2020 prior to WK11.

A closer look at the ARS data for ADAPT writeups and injury rates shows that associates without writeups have a 0.51% chance of incurring in an injury. The first written performance warning increases this risk to 1.02% (2x), and second/final writings both increase the chances of injury to 1.2% (2.4x). This ties to the effect of psychological stress emanating from financial or interpersonal relation factors impacting injuries, as indicated in Kumar (2001). These statistics provide evidence to what the causal analysis concluded – the pausing of SPPR had a reduction effect on injury reporting, but most importantly, its effect could soon fade away as writeups for other causes rise up to the levels of productivity writeups pre-COVID. The recommendation for SPPR is to reduce the percentile threshold to 3% (**R2**) reducing AA eligibility by 40%; the current threshold of 5% flags bottom performing AA's processing units at 50% the rate-goal while a 3% percentile would flag bottom performers at 45% the rate-goal.

Also, similar to the statement above when a quality writeup is delivered injury reporting goes up to 1.1% (2.2x), showing both performance and quality writeups have a negative impact on injury likelihood; we hypothesize this is related to stress from the possibility of losing one's job since quality writeups are expected to promote a slower rate/pace. Last, Figure 4 (Right) shows the impact of three change points in writeups: 1) the first shift in WK34 2019 (September), where a change to ADAPT's support coaching eligibility is associated with a productivity writeup rate drop of 50%, 2) followed by an increase in writeups at the start of 2020, and 3) interrupted by COVID and the pausing of performance and quality writeups.

R3. Joint optimization of injury rate and productivity

Addressing the concerns over possible disruption of productivity, the operating ranges are proposed for the factors/policies that maximize rates/productivity while keeping injury likelihood below certain threshold levels (see Appendix C for technical details). Finding the optimal point for different values of injury likelihood thresholds creates the optimized operating curve. The optimization is performed using two nonlinear causal models, one for the process path specific rate and one for the injury likelihood.

ARS Pick Process Path optimization

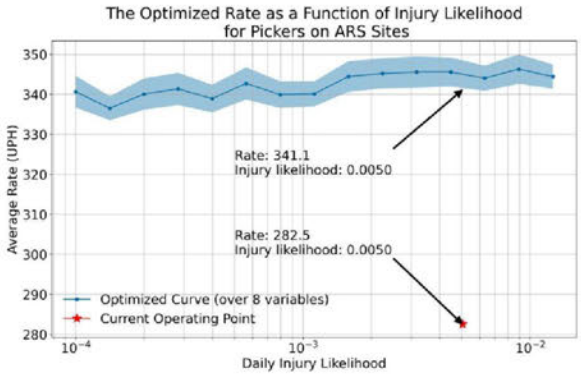
Figure 5 shows the optimized operating curve for pickers in ARS sites, where the daily productivity per site (rate * hours worked * headcount) is maximized.

Eight decision variables (UPT Balance, Hours, Writeups, AVOC Score, Rate, VTO, Bin fullness[2], and Headcount) are adjusted to obtain the optimized operating curve. Figure 5 shows the optimized rate as a function of injury likelihood. Each point on the optimized curve is a result of adjusting eight variables subject to the injury likelihood threshold in the X axis. This approach

[2] Bin fullness is not directly controllable, but can be influenced across the network by inbound activity.

allows us to find the maximum Pick rate at a given injury rate, while optimizing for the remaining decision variables (**R3**); this optimization framework can be generalized to other process paths.

Figure 5 – Maximum achievable rate for any given injury risk; in general, as rates increase so is the daily injury likelihood.



According to our causal model, for the average UPT balance (7.4 hr/quarter), hours worked (9.9 hr/day), writeups (0.52% of associates), AVOC scores (90%), rate (283 uph), VTO (0.79 hr/week), headcount (79% max HC), and Bin fullness (82%) we expect to see an injury risk of 0.5%. The same injury risk can be sustained by increasing the rate to 341 uph and optimizing the other variables as shown below:

Table 1 – List of decision variables and optimal compromised solution

Decision variable	Current operating conditions	Optimized solution
UPT balance	7.37 hr/quarter	52.65 hr/quarter
Hours worked	9.93 hr/day	10.00 hr/day
Writeups	0.52%	4.26%
AVOC scores	89.91%	92.45%
Rate	283 uph	341 uph
VTO	0.79 hr/week	2.84 hr/week
Headcount	79.12%	100%
Bin fullness	81.9%	80.0%

The table above suggests Pick can be run at 20% higher rates than today, the compromise is lowering bin fullness from 82% to 80%, increasing headcount to max capacity, and increasing UPT balance from 7.4 to 52.7 hours per quarter. Based on tenure groups described in Figure 3 (Left), UPT depletion can occur from 2%-60% during the first week of a quarter and thus, adding 10 hours of UPT (50 hr/quarter) may not necessarily increase UPT balance by 10 hours. For this reason, the team strongly suggested defining a 3.1 hour per week UPT grant for FTE to promote healthier UPT balance and higher attendance.

Project Soteria: Next Steps

To synthesize, Project Soteria's analysis revealed an overall common theme: "provide more autonomy at work for our associates". Consistent with published studies, the conclusions presented in the report suggest that psychosocial factors, such as stress reduction, autonomy, and the ability to choose, outweigh the benefit of policies that provide financial incentives to operate within certain conditions[3]. However, Project Soteria only had access to two psychosocial indicators: Governance data (site complaints) and Voice Of Associates site-level feedback. We have followed up with the Connections team and they have shared with us site level data on job satisfaction, safety leadership index (SLI), engagement index, and leadership behavior index (LBI). The analysis of the site-level Connections data shows higher engagement and lower SLI scores are associated with lower injury rates. The team has pursued getting Connections associate-level data to estimate causal effects but the data privacy policy prevents external teams from accessing data at the associate level; restrictive tokenized-data access exists only for a few members of the Connections team.

In parallel to pursuing access to associate-level psychosocial scores from Connections, Project Soteria designed a survey (see Appendix D) to gather data and create an associate-level psychosocial health score in collaboration with Project Milky Way (FieldSense owners, a solution to replace Qualtrics a 3P survey product). Project Soteria is scheduled to launch this survey on 10/12 at BFI4 to initiate our data collection process.

[3] Kumar [2001], Eatough et al. [2012], Thiese et al. [2020]

The initial causal models are based on static data tables dating from 1/1/2020 through 6/28/2020. Over the last month, our team has created data pipelines to join WHS, BMI (Ops), ADAPT, and HR tables within WWBT's Redshift cluster. This will enable us to recalibrate our model, and support further deep dives. Consequently, the Project Soteria team envisions its efforts evolving into a cross-functional tiger team to conduct WHS deep dive initiatives in the intersection of Operations, Safety, and HR policies.

Project Soteria has made recommendations on a) sustaining current UPT hours (40 hr per quarter) with a weekly grant attribution (3.1 hours per week for FTE), b) when reinstating SPPR reduce the bottom performing threshold from 5% to 3%, and c) modifying the process path rates using a mathematical formulation that determines the optimal conditions in our FCs that allow us to go faster without increasing injuries. To further increase the scale of the causal models built, a new service is proposed: an injury-risk calculator that enables leadership to check the impact of policies (new or enhanced) on safety.

In summary, the Project Soteria team has the following roadmap and requests leadership support:

1. Creation of a Tiger team to suggest phase-out experimentation for new policies. The team should help decision makers evaluate two-way door decisions: for instance, Project Soteria expects that reducing UPT from 40 to 26 hours will increase injury reporting by 25%. If the policy is deployed in a few sites at first, our team can evaluate using our causal model to assess the impact on injuries.
   During a WK39 meeting, GCF, HR, WHS leaders met and suggested two action items: a) the creation of a PRFAQ describing a service available for leaders to measure injury-risk impact for future policies, and b) the creation of a steering committee to assess the impact of new policies on safety.

2. Access to associate-level Connections scores. Project Soteria utilizes the associate's user_id as a primary key, so tokenized data prevents us from joining data.
3. In the absence of associate-level Connections scores, we request support to create an ongoing psychosocial health index using FieldSense, owned by WHS.
4. Approval and support to create an injury-risk calculator. In addition, the team is looking for feedback regarding the type of policies the OLT would like to check for impact on safety.

Appendix A – Causal Diagram

The following tables describe each of the eight policies analyzed in more detail, and a comprehensive list of defined input variables.

Table 2 – Causal policy-driven variables

Policy	Description	Start Date	Status
Unlimited UPT	Global Attendance Pause – Effective immediately, Amazon will not use any Unpaid Time (UPT) or assign attendance points if individuals are unable to come to work. Additionally, all attendance terminations reviewed for potential reinstatement if final incident occurred March 1 or later). A to Z banner and HR Cases banner launched on 3/9 to notify associates of attendance pause.	3/6 (WK10)	Ended on 4/30 (WK18) for NA, EU, APAC, ROW
Pay Increase	Additional pay of $2 announced for hours worked supporting customers by hourly Level 1 to Level 4 employees. OT rules changed to pay 2x the regular time rate.	3/15 (WK11)	Ended on 5/30 (WK22)
Paused SPPR/SQPR	Pause productivity and quality performance management feedbacks for WW Ops.	3/18 (WK12)	Ongoing for SPPR; SQPR ended on 9/20 (WK38)
WorkingWell (vNHO)	Virtual New Hire Orientation onboarding implemented for Ops Field sites.	3/23 (WK13)	Ongoing
Social Distancing	Social distancing policy requirements put into place must be communicated, adhered to and enforced by everyone within US Amazon facilities at all times. These guidelines include no stand-up meetings during shifts, spreading out tables, and moving chairs in break-rooms, staggering shift times, encouraging to avoid locker use, supplementing training with in-app tools and smaller formats.	4/1 (WK14)	Ongoing
Mobile AMCARE	All sites with AMCARE or Wellness Center office locations across all geographies will no longer be open. Onsite Medical Representatives (OMR) and Injury Prevention Specialists (IPS) will work in a mobile capacity by being notified via radio of any injury reports and will respond to the associate needs at the associate's work location.	4/14 (WK16)	Ongoing
Flexible VTO	Introduced the use of an existing tool, voluntary time off (VTO), for associate flexibility. VTO maintains the spirit of an attendance pause (unlimited UPT/points), but allows for nuance and precision. VTO may be extended to specific locations, days, and times, which allows leaders to react to current circumstances.	5/1 (WK18)	Ongoing
Hiring increase	Announcement of 100K (3/16) and 75K (4/13) full and part-time hires across the Operations network. Continuous hiring through Spring.	Throughout	Ongoing at smaller scale

Table 3 – List of input variables used in causal model

ID	Metrics	Description
1	UPT Balance	Primary tool to allow Amazon Associates (AA's) to take time off of work. Renewed every quarter. Associates that run out of time off options (UPT, PTO, VAC) and need time off run risk of losing their jobs.
2	PTO Balance	AA's use PTO when a personal issue comes up and have no available VAC or UPT.
3	Headcount	Influences the workload for associates in a Fulfillment Center (FC). Impacts rates when demand does not increase accordingly.
4	Attendance Rate	Percentage of associates shedule for work on a given day and show up for work (supplement of absenteeism).
5	Work Pay	Amount paid to an associate, varies state by state.
6	Tenure	Time on the job indicates the associate's exposure to a prolong period of time of constant physical activity. Time is a stress variable that increases injury likelihood.
7	Age	Potential factor influencing injuries. Age profile could have changed pre- vs. during COVID.
8	Gender	We have observed Females are more likely to report injuries than Males. If there are differences in the Gender mix population, it should be taken into account.
9	Job Level	The job level correlates with the number of physical motions done daily (Level 1, Level 3).
10	Employee Status	Referes to whether the associate is full time, part time, reduced time, or flex time.
11	Site Type	Captures the FC type where an associate works (AR-S, TS, TNS, AR-NS, TSSL, IXD).

12	Weight Lifted by associate	ASIN weight profile could have changed based on demand during COVID.
13	Volume processed by associate	ASIN volu,e profile could have changed based on demand during COVID.
14	Customer Demand	Number of orders per site.
15	Forecasted Demand	Expected number of orders or units per site.
16	Process path	Refers to the different jobs within the FC, based on the type and number of movements some jobs/process paths have higher injury risks.
17	Labor Moves	Number of times an associate was placed to work on a job different than their primary one (e.g. a Packer gets sent to Ship Dock).
18	Idle time	With rates not being monitored, idle time has gone up during COVID. We hypothesize this allows associate to reduce the long periods of time going at high speed.
19	Hours worked	Impacts the injury rate calculation, affected by PTO/UPT/VAC time taken off. Influences the recovery time for AA's.
20	UPH (Rates)	Units per Hour (considers direct labor only)
21	S/M/L Mix	Refers to the mix of small, medium, large ASINs handled by an associate.
22	Bin fullness	Bin fullness reduction (due to lower inventory levels) makes movements in Stow and Pick process paths less rigorous and less prone to cause injuries.
23	Voice Of Associate (VOA)	Voice of Associates feedback provided anonymously by AA's. Data available classify by sentiment (neutral, positive, negative) and different categories.
24	Cumulative VOA feedback	Looks at cumulative site negative Safety feedback.
25	Day1SendOut	Indicator of associate's willingness to see a doctor, a hypothesis is that this can influence injury reporting.
26	Injury History	Has the associate suffer injuries in the past?
27	Poverty	Percentage of population below poverty line by county
28	Unemployment Rate	Percentage of individuals in working age unemployed by county
29	Confirmed COVID cases by county	Confirmed case rates by FC
30	Site's COVID Spread	Confirmed case rates by FC
31	UPT Policy Change	Unpaid TimeOff (UPT) was set to unlimited early March and reinstated on 5/1.
32	SPPR/SQPR	These are feedback mechanisms for bottom performers (rate under benchmark, or quality defects exceeding a threshold)
33	Schedule Flexibility	Flexibility provided to associates as part of the Voluntary Extra Time (VET) program, and relaxation of Tardiness policies.
34	Social Distancing	We have building wide measures of social distancing.
35	AVOC scores	Percentage of frames captured in video with people within 6 ft of distance
36	Pay Increase	$2 on base salary per hour, 2X for overtime.
37	Working Well	To place an increased emphasis on injury prevention, health and wellness, Amazon is implementing a health and wellness program called WorkingWell – this program includes associate-facing support, education and injury-prevention initiatives. One initiative included in the WorkingWell program is a work conditioning program, designed for new hire associates. The program includes a ramp-up schedule, a two-week classroom course and ongoing safety huddle engagements.
38	Mobile AMCARE	Refers to the closure of AMCARE due to social distancing guidelines and the transition to a mobile (come to you) AMCARE service.
39	No Rate Monitoring	Rate Monitoring stopped in early March, but we are tracking this separately from the writeup mechanism which was paused two weeks later.
40	Writeups	Refers to the number of performance and quality writeups received weekly by an associate.
41	2-wk rolled UPH	Rolling two-week average UPH.
42	Manager's tenure	Number of weeks an associate's manager has been at Amazon.
43	Injury Event	Considers MSD and Non-MSD injuries.

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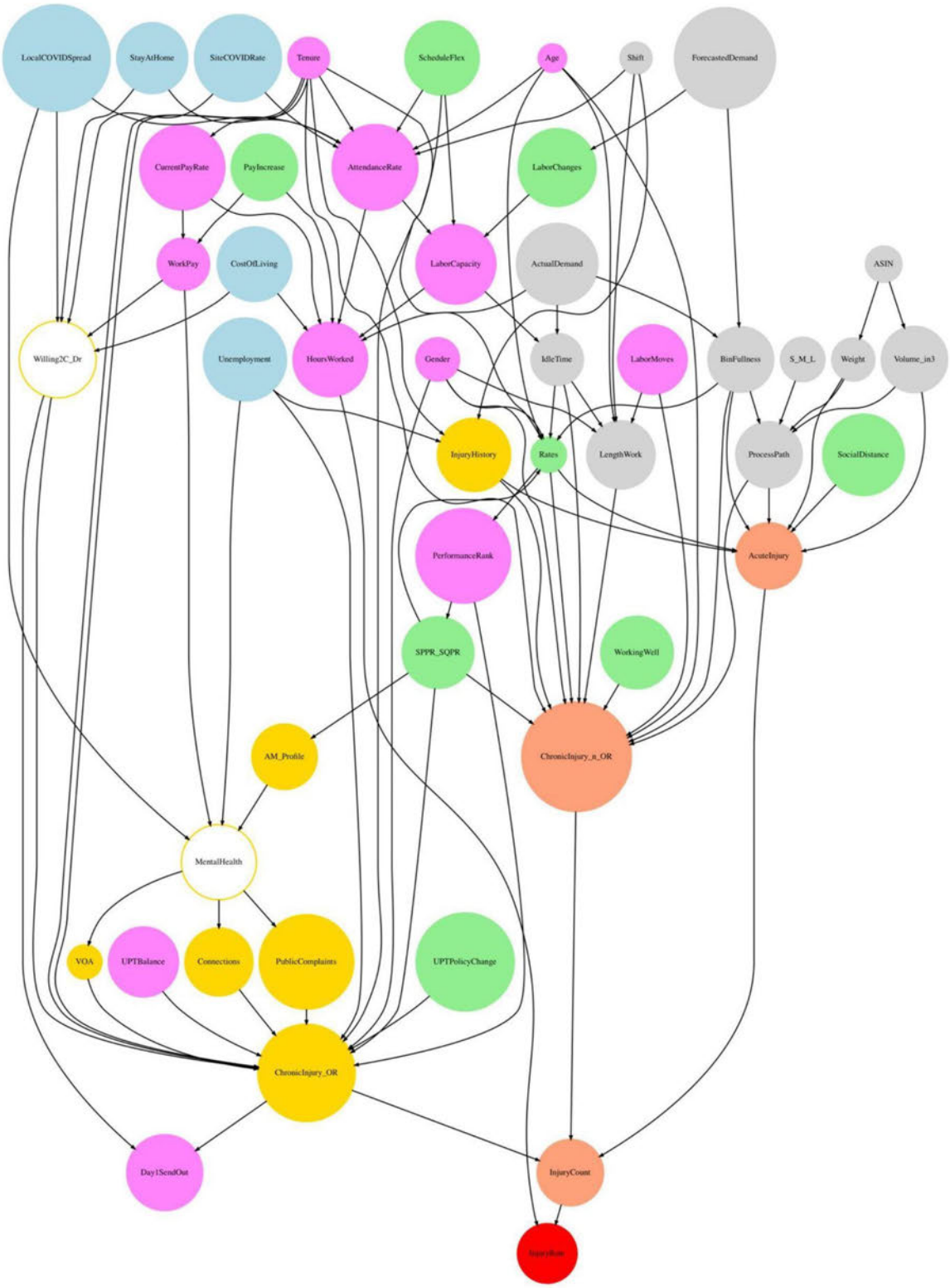
Appendix B – Directed Acyclic Graph



Appendix C: Supporting Statistical Analysis

Q. Is there evidence to support that accidents are more likely to occur in the last two hours of a shift? Would it be reasonable to reduce our daily work to 8 hours?

No, the data below shows that out of 65,336 recorded injuries with a timestamp, 10,770 occurred in the last 2.5 hours of a shift. Assuming injuries are constant across every hour of the day (even breaks, time between shifts), one would expect to see a 0.208 proportion associated with the last 2.5 hours of the day and night shift. The data below fails to show that injuries are more likely to occur at the end of shift (estimated proportion is 0.165), when associates are getting tired. A caveat to highlight is that over 25% of the injuries do not have a timestamp.

Statistics

Variable	N	N*	Mean	SE Mean	StDev	Sum	Minimum	Q1
Last_Two_And_A_Half	65336	23514	0.16484	0.00145	0.37104	10770.00000	0.00000	0.00000

Variable	Median	Q3	Maximum
Last_Two_And_A_Half	0.00000	0.00000	1.00000

Q. What are the most influential factors impacting UPT usage?

The first model below identifies the factors showing the strongest link to the probability of associates running out of UPT. Based on the Z values, the predictors with largest signal-to-noise ratios are pto_balance, tenure, and vac_balance.

Output from the logistic regression equation modeling the likelihood of associates running out of UPT:

```
Call:
glm(formula = RanOut ~ calc_age + tenure + factor(WeekInQtr) +
    pto_balance + vac_balance + fulltime_parttime + sex, family = binomial(),
    data = df)


Deviance Residuals:
    Min       1Q   Median       3Q      Max
-8.4904  -0.6439  -0.2914  -0.0234   8.4904

Coefficients:
                      Estimate Std. Error z value Pr(>|z|)
(Intercept)          1.417e+00  4.520e-03  313.37   <2e-16 ***
calc_age            -1.387e-02  8.455e-05 -164.09   <2e-16 ***
tenure              -3.163e-02  6.133e-05 -515.76   <2e-16 ***
factor(WeekInQtr)1  -4.380e-01  4.317e-03 -101.47   <2e-16 ***
factor(WeekInQtr)2  -1.090e+00  4.788e-03 -227.64   <2e-16 ***
factor(WeekInQtr)3  -9.794e-01  4.655e-03 -210.37   <2e-16 ***
factor(WeekInQtr)4  -8.523e-01  4.571e-03 -186.47   <2e-16 ***
factor(WeekInQtr)5  -7.732e-01  4.489e-03 -172.24   <2e-16 ***
factor(WeekInQtr)6  -6.717e-01  4.439e-03 -151.32   <2e-16 ***
factor(WeekInQtr)7  -5.973e-01  4.375e-03 -136.51   <2e-16 ***
factor(WeekInQtr)8  -4.038e-01  4.350e-03  -92.82   <2e-16 ***
factor(WeekInQtr)9  -3.342e-01  4.301e-03  -77.71   <2e-16 ***
factor(WeekInQtr)10 -2.424e-01  4.306e-03  -56.28   <2e-16 ***
factor(WeekInQtr)11 -1.735e-01  4.491e-03  -38.63   <2e-16 ***
factor(WeekInQtr)12 -8.197e-02  4.454e-03  -18.41   <2e-16 ***
pto_balance         -1.851e-01  2.328e-04 -795.37   <2e-16 ***
vac_balance         -7.938e-02  1.733e-04 -458.13   <2e-16 ***
fulltime_parttimeP  -6.933e-01  4.340e-03 -159.77   <2e-16 ***
fulltime_parttimeR  -5.283e-01  3.379e-03 -156.35   <2e-16 ***
fulltime_parttimeX  -1.124e+00  1.649e-02  -68.17   <2e-16 ***
sexM                 6.712e-02  1.774e-03   37.84   <2e-16 ***
sexU                 6.559e+00  4.857e-02  135.04   <2e-16 ***
sexW                 4.054e-01  1.312e-02   30.89   <2e-16 ***
---
```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 11243826  on 11342013  degrees of freedom
Residual deviance:  7949696  on 11341991  degrees of freedom
AIC: 7949742
```

The second model below identifies the factors showing the strongest link to the probability of associates incurring in injuries. This is not a causal model, but uses the data since the first week of 2019 to date. Based on the Z values, the predictors with largest signal-to-noise ratios are sex, tenure, and vac_balance.

```
glm(formula = injury ~ calc_age + tenure + factor(WeekInQtr) +
    upt_balance + pto_balance + vac_balance + fulltime_parttime +
    sex, family = binomial(), data = df)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-1.9313  -0.1302  -0.1132  -0.0942   4.7829

Coefficients:
                      Estimate Std. Error  z value Pr(>|z|)
(Intercept)         -4.498e+00  1.783e-02 -252.187  < 2e-16 ***
calc_age             3.311e-03  3.067e-04   10.798  < 2e-16 ***
tenure              -1.310e-02  2.353e-04  -55.680  < 2e-16 ***
factor(WeekInQtr)1  -1.752e-01  1.907e-02   -9.187  < 2e-16 ***
factor(WeekInQtr)2  -2.210e-01  1.934e-02  -11.428  < 2e-16 ***
factor(WeekInQtr)3  -1.496e-01  1.903e-02   -7.860 3.85e-15 ***
factor(WeekInQtr)4  -1.406e-01  1.900e-02   -7.403 1.33e-13 ***
factor(WeekInQtr)5  -1.636e-01  1.910e-02   -8.570  < 2e-16 ***
factor(WeekInQtr)6  -1.157e-01  1.888e-02   -6.130 8.77e-10 ***
factor(WeekInQtr)7  -1.256e-01  1.886e-02   -6.661 2.72e-11 ***
factor(WeekInQtr)8   4.686e-02  1.825e-02    2.568 0.010228 *
factor(WeekInQtr)9   6.396e-02  1.818e-02    3.517 0.000436 ***
factor(WeekInQtr)10  5.481e-02  1.827e-02    3.000 0.002701 **
factor(WeekInQtr)11  2.869e-01  1.816e-02   15.799  < 2e-16 ***
factor(WeekInQtr)12  2.429e-01  1.837e-02   13.224  < 2e-16 ***
upt_balance         -9.042e-04  5.029e-05  -17.980  < 2e-16 ***
pto_balance         -1.103e-02  4.440e-04  -24.846  < 2e-16 ***
vac_balance         -2.355e-02  4.565e-04  -51.591  < 2e-16 ***
fulltime_parttimeP  -1.112e+00  3.075e-02  -36.162  < 2e-16 ***
fulltime_parttimeR  -2.365e-01  1.429e-02  -16.553  < 2e-16 ***
fulltime_parttimeX   7.707e-01  4.576e-02   16.842  < 2e-16 ***
sexM                -3.155e-01  7.601e-03  -41.507  < 2e-16 ***
sexU                 1.173e+00  1.214e-02   96.552  < 2e-16 ***
sexW                -2.286e-01  6.310e-02   -3.623 0.000291 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

    Null deviance: 965627  on 11366139  degrees of freedom
Residual deviance: 931608  on 11366116  degrees of freedom
AIC: 931656

Number of Fisher Scoring iterations: 9
```

Appendix D: Deep Dive Survey

	Theme	Question	Answer	Expected Outcome
1.	Schedule flex	CHECK ALL CHOICES THAT APPLY. Reasons why you ran out of UPT.	a) N/A, I've never run out, b) Family emergency, c) Constantly stuck in traffic, d) Insufficient. [If choosing insufficient, ask how much is enough?]	Root causes for why associates run out of UPT.

2.	Schedule flex	CHECK ALL CHOICES THAT APPLY. Name the reasons why you have used UPT in the past.	a) Personal emergency, b) Needed a break, c) Running late for work, d) Was not feeling well, e) Not applicable	Understand what is UPT used for.
3.	Schedule flex	What is your current shift?	a) 10 hr, 4 days; b) 8 hr, 5 days; c) 10 hr, 3 days; d) 10 hr, 2 days	Baseline for current shift.
3.1	Schedule flex	Follow-up: Which type of work schedule would you prefer?	a) The one I have right now b) 8 hours/5 days c) 10 hours/3 days d) 10 hours/2 days e) Something else.	Schedule preference for associates.
4.	Schedule flex	Which best describes your work situation?	a) Amazon is my only job b) I work another job outside of Amazon	Data on proportion of associates holding more than 1 job.
4.1		Follow-up if b): Is your other job physically demanding?	a) Yes, more than Amazon; b)Yes, same as Amazon; c)No it is not physically demanding.	
5.	Schedule flex	Outside of work, are you actively doing additional physical labor?	a) Yes, b) No	Proportion of associates having physical labor.
6.	Psychosocial	How often do you feel stressed?	a) Always, b) Often, c) Sometimes, d) Rarely, e) Never (Not stressed	Stress mitigation practices
6.1		Follow up if a),b), or c): How do you manage stress?	a)Family time b) Hobbies c) Exercise d)Something Else	
7.	Psychosocial	When feeling physical discomfort, or pain at work, what do you do?	a) Slow down how fast I go, b) Call the AM to radio AMCARE, c) Take UPT/VTO if available, d) See a doctor, e) Do nothing.	Pain mitigation practices
8.	Psychosocial	I enjoy labor moves for at least one of the following reasons: provides a break from repetitive work, challenges me to see how I can perform in other roles, gives me a better perspective for other jobs I may like better, helps me understand the interconnectivity of processes to deliver customer value.	a) Strongly Agree; b) Agree; c) Neither Agree or Disagree; d) Disagree; e) Strongly Disagree (if selecting d) or e) follow up question on why)	Labor moves: Love them, hate them?
9.	Psychosocial	I feel comfortable receiving care outside of the Wellness Center/AMCARE in my work station (Select One).	a) Strongly Agree; b) Agree; c) Neither Agree or Disagree; d) Disagree; e) Strongly Disagree (if selecting d) or e) follow up question on why)	Mobile AMCARE effect on reducing injury reports
10.	Psychosocial	With the current economic environment, but Amazon's strong position to fulfill customer demand I feel happy working for Amazon.	a) Strongly Agree; b) Agree; c) Neither Agree or Disagree; d) Disagree; e) Strongly Disagree (if selecting d) or e) follow up question on why)	Perception on job security

Appendix E: Causal Estimation of Injury Likelihood and Rates

We have obtained a large dataset of 43 variables, of which 8 can be used to control the injury rate. We identify the non-linear causal impact of the 8 variables on both injury likelihood and work rate. Using the two causal impact functions, we define an optimization that maximizes the productivity for every given injury likelihood.

Data: We have the data for all associates in the NACF sites from January 2020 until the end of June 2020. We choose the AR sortable sites and focus on pick and pack process paths. Our analysis uses the daily data aggregated at the FC-level. The

names of all 43 variables are listed in *Appendix A*. The 8 actionable variables are "UPT-Balance", "Work Hours", "Writeups", "AVOC Score", "Work Rate", "VTO/Headcount", "Normalized Headcount", and "Bin Fulness".

Causal Inference Methodology: The goal of causal inference is to remove the confounding bias of the rest of the variables from our estimations. Using causal coefficients, we can ensure that our changes in the actionable variables will lead to changes in the target too. We use the "Inverse Propensity of Treatment Weight" (IPTW) technique. We compute the propensity scores for the 8 variables using the XGBoost algorithm and stabilize the weights using the marginal distribution.

Non-linear Causal Inference: We expect the impact of the action variables to be non-linear on both injury likelihood and rate. To capture the non-linearity, we use the neural additive models as follows

$$y = \beta_0 + \sum_{k=1}^{K} \beta_k x_k + \sum_{k=1}^{K} f_k(x_k) + \varepsilon$$

$$f_k(x_k) = \sum_{m=1}^{M} w_{mk} elu(\gamma_{mk} x_k - \alpha_{mk})$$

The model describes the target y as a constant plus a linear term, a nonlinear term, and an additive noise.

The non-linear function is defined as $elu(x) \equiv max(0, x) + min(0, e^x - 1)$. In *Appendix B*, we provide our estimated causal response curves for the injury likelihood.

Injury-Productivity Trade-off: Our causal analysis of the injury rate identifies the factors/policies that can be used to reduce the injury rate. Addressing the concerns over possible disruption of the productivity, we propose the following constrained optimization to identify the operating ranges for the factors/policies that maximize the productivity while keeping injury rate in low levels.

$$\begin{aligned} &\max_{x_1,\dots,x_8} \ Productivity(x_1, \dots, x_8) \\ &s.t. \quad inj(x_1, \dots, x_8) \le t_{inj} \\ &|s_8 - rate(x_1, \dots, x_7)| \le s_{rate} \\ &l_k \le x_k \le u_k \quad for \quad k = 1, \dots 8, \end{aligned}$$

where $Productivity(x_1, \dots, x_8) = rate \times hours \times headcount = x_8 \times x_2 \times x_6$. Two causal functions $inj(\cdot)$ and $rate(\cdot)$ denote our causal prediction functions of injury likelihood and work rate. We vary the injury threshold t_{inj} and obtain different solutions. Rate slackness is chosen to be $s_{rate} = std(x_8)/10$. To avoid local minima problem, use 50 random initializations. Report the result with the largest objective function. In *Appendix C*, we plot the trade-off curve and analyze the current operating point.

Uncertainty Estimation: To quantify uncertainty in our estimates, we resample the data and create 100 new datasets. With each sample, estimate the causal models for the rate and injury likelihood. Using each set of causal models for rate and injury, solve the optimization problem and obtain the solution. We report the 90% confidence interval or the standard error for the estimated quantities.

Variable Used in Analysis:

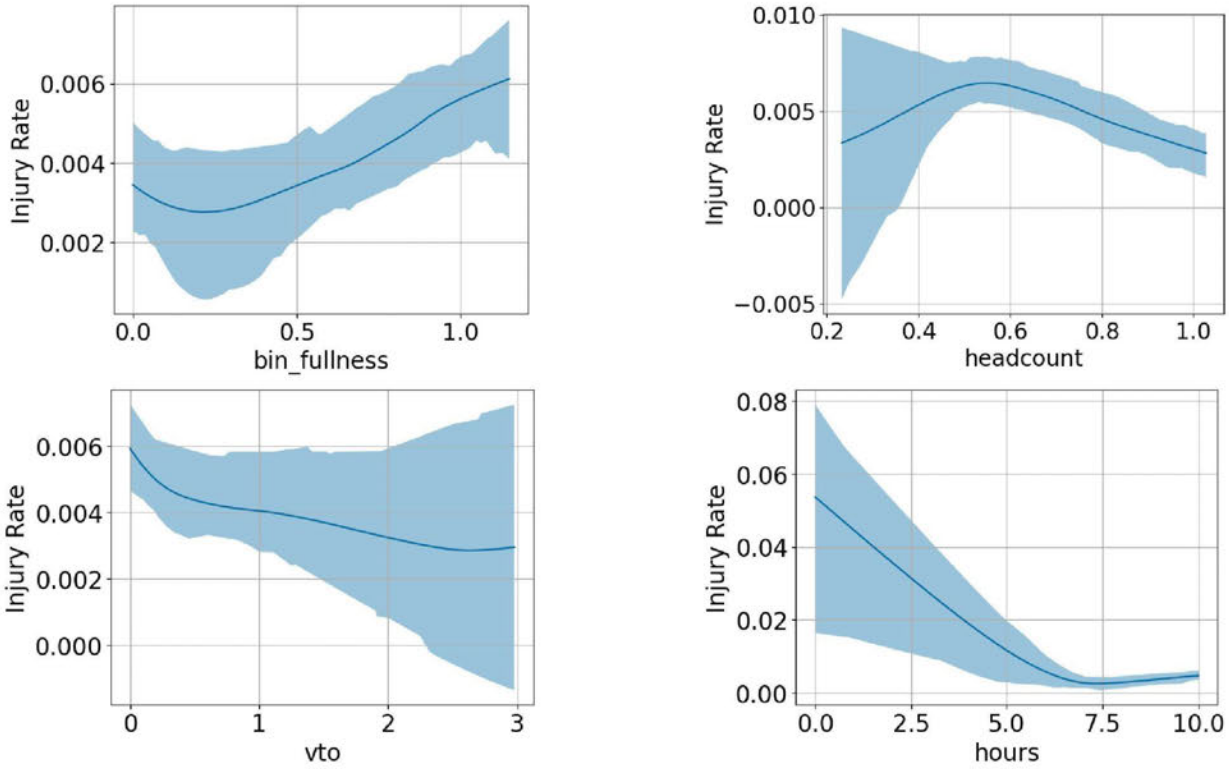
Age, Gender, Tenure, Job Level, Fulltime Status, Employee Standing, UPT Balance, PTO Balance, Hours Worked, Attendance History, Injury History, Local Poverty Rate, Local COVID Spread, Site COVID Spread, Hourly Salary, Idle Time, Labor Move Count, Rate History, Forecasted Demand, Actual Demand, Bin Fullness, Negative VOA count, Cumulative VOA count, Cumulative Weight, Cumulative Volume, Small Ratio, Manager Tenure, Manager Feedback Rate, Unemployment Rate,

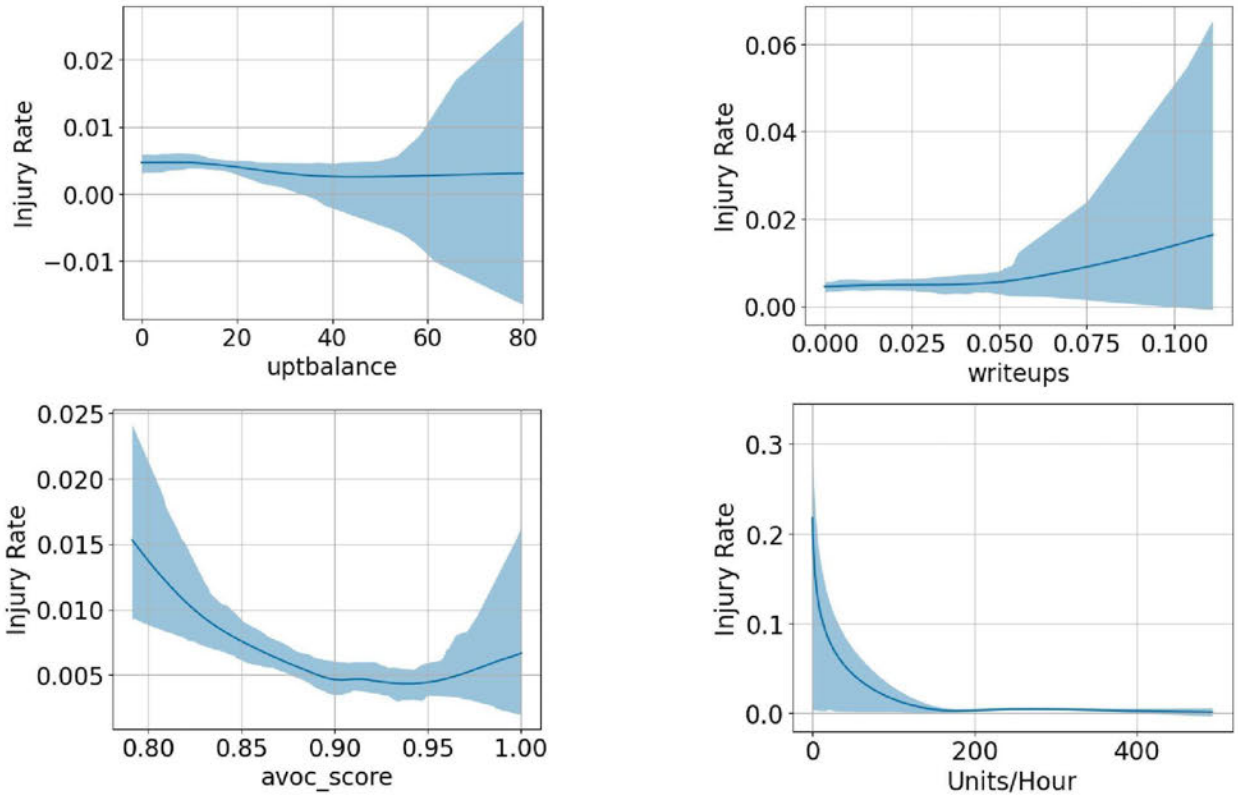
Writeups, AVOC Score, Rate, VTO, Headcount, Pay Increase, Unlimited UPT, SPPR/SQPR Paused, Social Distancing, Mobile AMCARE, Working Well.

Action variables:

Variable	Description
x_1	UPT Balance
x_2	Hours Worked
x_3	Frequency of Writeups
x_4	AVOC Score
x_5	VTO/Headcount
x_6	Headcount/(Max Headcount)
x_7	Bin Fullness
x_8	Rate [log(1+rate)]

Estimated Causal Dose-Response Curves of the Injury Likelihood for Pickers





Appendix F: Causal Analysis and Insights

Causation, defined as the establishment of cause-and-effect between inputs and output, requires an understanding of the mechanism of how business variables interact with one another and with environmental, workforce dynamics, and psychosocial variables. The causal analysis proposed herein removes the impact of these non-controllable factors. The analysis includes data from 42 variables, 422,895 AA's, representing 4,012,319 associate-work-weeks in NACF for 2020.

Multivariate Logistic Regression Model

To estimate the causal effect for policy-driven variables, the project team followed a five-step methodology:

1. Calculate propensity scores and adjust for observed associates' characteristics prior and during the interventions
2. Adjust the data using these propensity scores
3. Fit a multivariate logistic regression model and determine the coefficient for each variable
4. Rank the causal effects by impact
5. Estimate the counterfactual effect for these causal variables

Unlike previous association injury studies, differences in observed associate characteristics were adjusted by estimating propensity scores. These propensity scores were used to obtain unbiased causal effect estimates for flexible VTO & hiring increase which varied WoW. For the intervention binary variables (unlimited UPT, pay increase, social distancing, paused SPPR/SQPR, mobile AMCARE, and virtual WorkingWell), the project team implemented a technique known as regression discontinuity, suitable for pre- vs post- tests. While the analysis is causal for the eight policy-driven variables, the rest of the variables are measured in association. After fitting the multivariate logistic regression model, the results' precision was improved by resampling (also known as bootstrapping); resampling enables a resultant measure of significance for each variable.

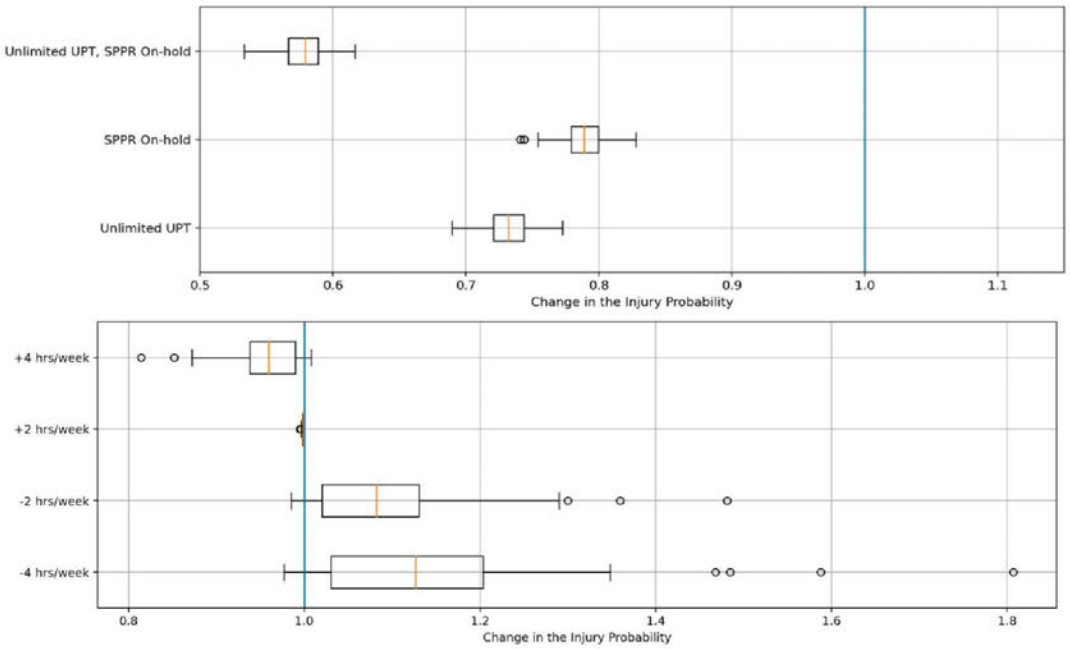
The intervention variables that had a reduction effect (highest to lowest) on reported injury rates are: Unlimited UPT, Mobile AMCARE, Paused SPPR/SQPR, Social Distancing, Flexible VTO, and Hiring (see Figure 2). Pay Increase, and WorkingWell[4] increase the likelihood of injury reporting; this means that increasing the levels of Pay (base salary) lead to an increase in reported injury likelihood. Finally, the WorkingWell (WW*) variable compares the variance in injury rates (see Q5, Appendix D) for three site groups: a) sites with an active WW* program pre-COVID, b) sites without a WW* program pre-COVID, and c) sites with a virtual WW* program during COVID. Total injury rates descend in order from a) to b) to c).

From the eight causal variables under consideration the following remain in effect: Flexible VTO, Mobile AMCARE, Social Distancing, Pausing SPPR/SQPR, and WorkingWell programs. Focusing on the most impactful variables, aside from those related to Social Distancing (Mobile AMCARE, WorkingWell), the main focus is on Unlimited UPT, Paused SPPR/SQPR, Flexible VTO, and Hiring. Pay increase has been eliminated from consideration since the analysis shows it increases injury reporting. While the coefficients displayed in Figure 2 (Right) can be used to predict the injury rate, the counterfactual analysis in the next section enables sensitivity analysis to answer questions such as "what would have happened to injury rates, had we implemented these policies a week early?"

Counterfactual Analysis

A counterfactual is a measure of what would have happened to associates if the intervention was changed; the impact is estimated by comparing counterfactual outcomes to the model's prediction. Figure 6 summarizes the effect/change on reported injury likelihood if the interventions (or a subset of them) had been activated during WK9, a week prior to the first set of policies deployed in March. The output below indicates that according to the causal model, turning on Unlimited UPT and placing SPPR/SQPR on hold in WK9, would have reduced the probability of injuries by 42%.

Figure 6 — **Top**: Counterfactual effects on reported injury likelihood for interventions activated. The change in injury probability for WK9 is quantified if one or both policies were activated. **Bottom**: Counterfactual effects on reported injury likelihood for increased or reduced flexible VTO. The change in probability in WK26 is quantified for 4 variations in flexible VTO.

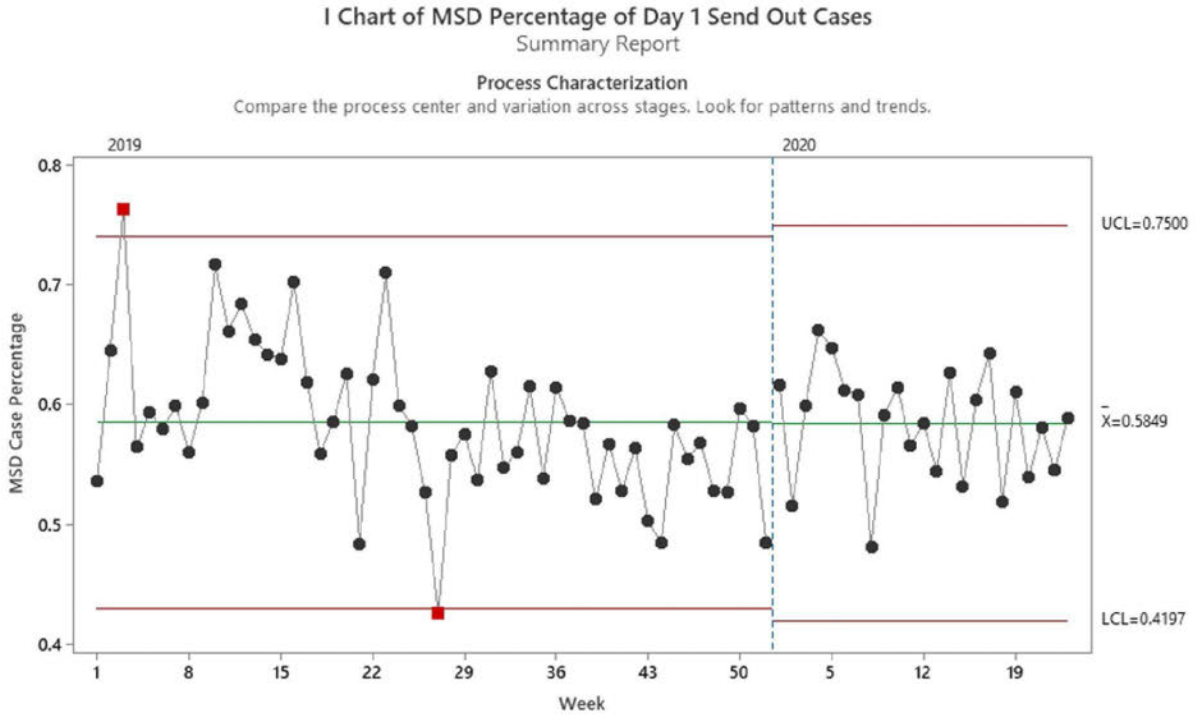


[4] WorkingWell encourages early intervention which is being captured as first aid injuries, so this increase would be expected.

Appendix G: Frequently Asked Questions

Q. How do the medical injury rates dropping compare with number of Day 1 Send Outs, and is there a relationship with the fear of going to the ER and/or medical doctor?

A. A Day 1 Send Out is considered a deviation from AMCARE policy when an associate suffers a non-acute injury and insists on seeing a doctor on the same day the injury is reported. To measure the potential fear factor in NACF, "Day 1 Send Out" was used to compare pre COVID and during COVID reporting behavior. The MSD injury type was used as the indicator since this type of injury usually does not have an incident/exposure event that triggers the injury and the complaints are usually symptoms related. A reduction of Day 1 Send Outs could be from workplace risk reduction (people injured less), and/or people do not want to see a doctor, due to either better "in house" care or, fear to see a doctor. And, the "fear to see a doctor during COVID" idea would likely appear in the trend as a sudden change (reduction) of percentage of Day 1 Send Out for injuries that were not urgent in nature. However, if fear were the main reason for injury reduction the MSD Day 1 Send Out case percentage should be in same magnitude with injury rate reduction. Day 1 Send Out data in 2019 and 2020 were reviewed (up to WK23), and the mean of MSD case % in total Day 1 Send Out cases in 2019 and 2020 are almost identical with only a 0.1% difference. At least for this comparison, any anxiety related to COVID-19 did not appear to over-ride an associate's need to bypass policy to seek treatment following a non-critical injury at work. This analysis is based on "report date", not "case date", as it's intended to evaluate reporting behavior, not the corresponding safety risks in the workplace. This is one of multiple ways to evaluate associates' predisposition to visit a doctor.



Statistics	2019	2020
N	52	23
Mean	0.58576	0.58486
StDev(overall)	0.064273	0.046740
StDev(within)	0.051751	0.055052

Q. Have Associates stayed home or avoided medical treatment for injuries due to COVID-19 fears and/or concerns?

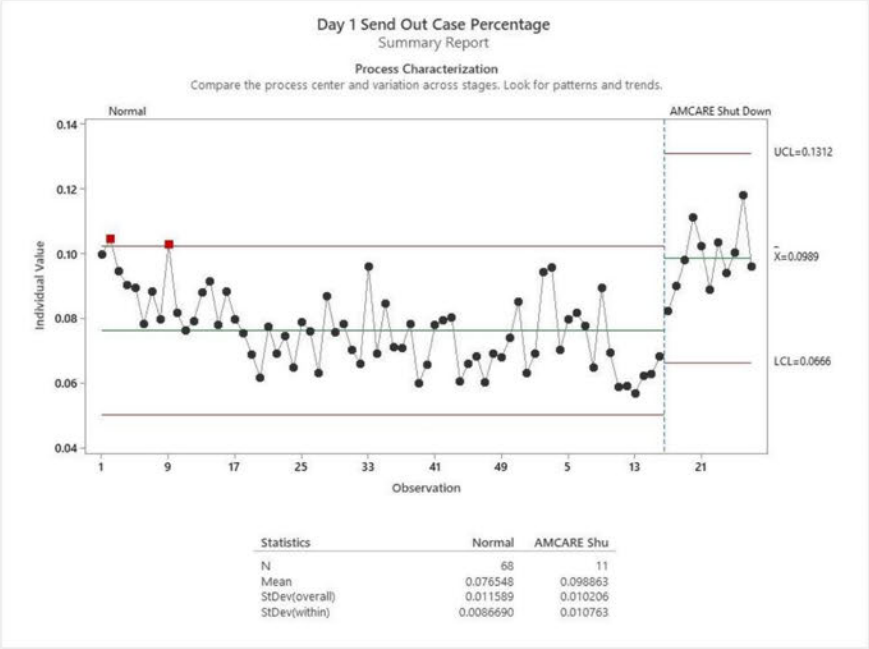
A. Potentially, and for that reason it is important to obtain true Associate sentiment/feedback. This team would like support in using the Connections tool to ask questions that and other questions.

Q: What has been the impact of AMCARE operations changes (4/14-4/16)?

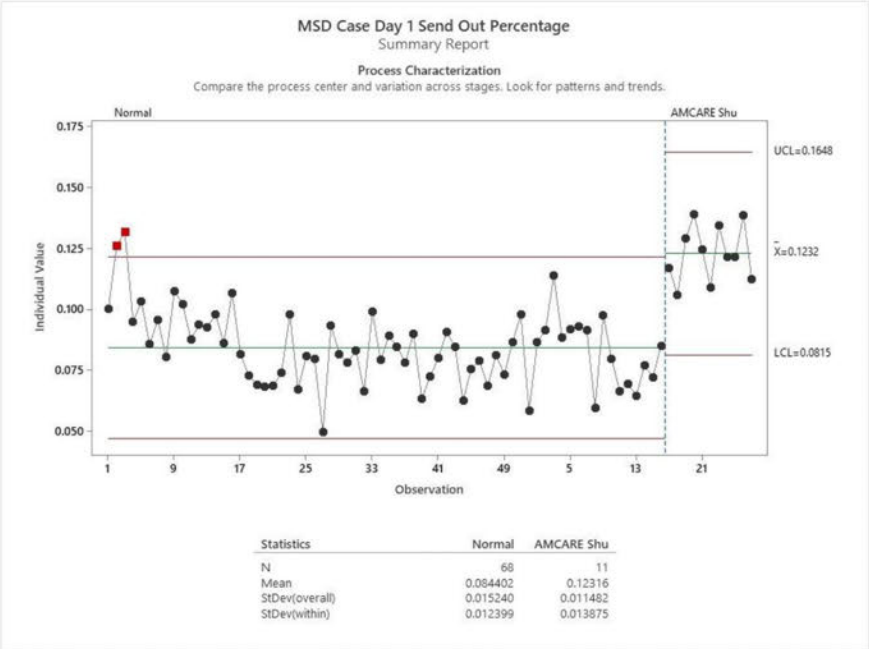
A: Dataset includes 2019 and 2020 NACF Injury (up to WK 27). Case Date (NOT DATE REPORTED) is used in this analysis for Day1 Send Out.

Observation: 2-stage control charts were created to compare the percentage of day 1 send out cases in total injury cases, and the percentage of MSD cases that resulted in Day 1 send out. a significant difference was observed in percentage of day 1 send out in total cases since AMCARE shut down. the mean raised from 7.6% to 9.9% since AMCARE shut down.

Same trend was observed in percentage of MSD cases that resulted in Day 1 Send out. The Mean raised from 8.4% to 12.3%. However, the week over week total injury rate and recordable rate did not raise accordingly.



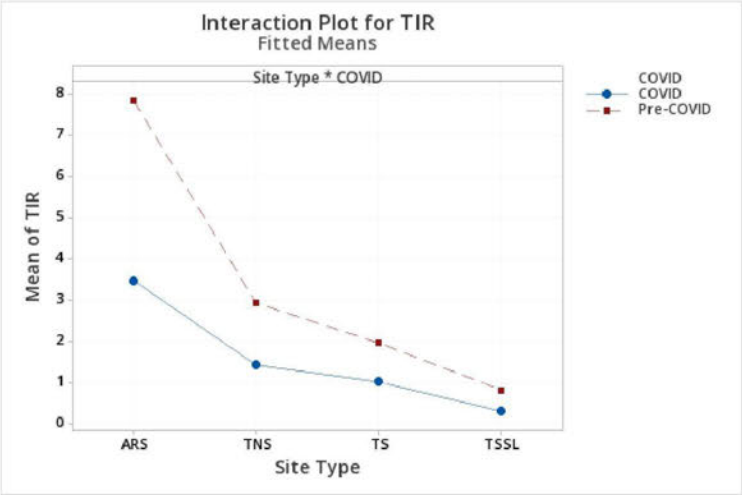
Statistics	Normal	AMCARE Shu
N	68	11
Mean	0.076548	0.098863
StDev(overall)	0.011589	0.010206
StDev(within)	0.0086690	0.010763



Additionally, on April 14th all NACF sites were instructed to close physical AMCARE offices and transition to a mobile AMCARE model. In an effort to understand associate perception towards mobile AMCARE a voluntary survey was made available on June 10th. A potential indicator of fewer injury reports could be attributed to the lack of privacy and inconveniences of AMCARE services at a workstation rather than a physical space. From associates who did not receive mobile AMCARE services, 73% stated there would be benefits from a more private setting (21% neutral). Additionally, 76% stated there would be benefits from a quieter environment (19% neutral). Despite the perceived inconveniences, the overall satisfaction from associates who did receive care from mobile AMCARE is favorable with 83% of associates stating satisfaction with the care provided by the mobile AMCARE/Wellness Center team (11% neutral).

Q. Has there been an injury rate reduction in the historically top injury process paths during COVID? Is this reduction different across site types?

A. 37% of all NACF reported injuries in 2020 have happened in Pick and Stow, with a 40% reduction in injuries during COVID. Accounting for the hours worked variances across different site types, the total injury rate (TIR) reductions that have been seen across ARS, TNS, TSSL, and IXDs appear consistent percentage-wise as shown in the figure below. This led to the conclusion that while the majority of the injuries happen at ARS sites, similar injury rate reductions across other business types have been seen, thus suggesting the root causes driving injury rates are common to all site types.



Q. Has the age profile of Amazon Associates changed during the pandemic?

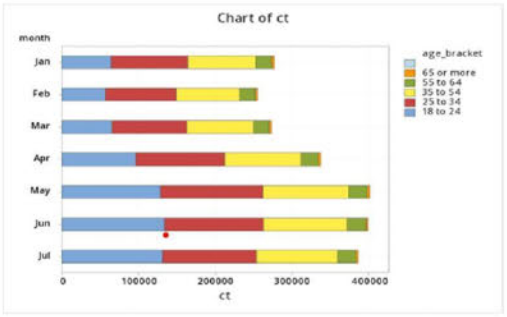
While accelerated hiring since late February has brought many new associates into our NACF network, the proportion of AA age groups has changed since April. Statistically speaking, the proportion of associates in each age group is not constant (January through July). The most variance is observed in the 18 to 24-year-old associates; this group saw a 40% increase representing 23% of the entire population early this year and increasing to 32% from April through July. The figure below shows this group represents about a third of the AA population consistently in May, June, and July with a corresponding reduction in the 25 to 34, 35 to 54, 55 to 64 groups with the 35 to 5-year-old group seeing the greatest reduction (31% to 27%). The importance of this shift in population dynamics is the association between age and injury rate, which is summarized in Figure 2 as an increasing factor to the likelihood of reported injuries. This leads us to believe that a younger AA population has led us to maintain the injury rates low beyond the initial TIR shift seen as a result of the policies deployed in March.

The graph on the left shows a contingency table (Chi-square test of association between age and month) which shows there is an association between age groups and month, meaning the population constitution is dynamic. The stacked bar chart on the right, shows the count increase for the 18 to 24 group since COVID-19.

Rows: age_bracket Columns: month

	Jan	Feb	Mar	Apr	May	Jun	Jul	All
18 to 24	64239	56865	65622	96252	128863	133758	131759	677358
	80562	74079	79427	98083	116722	116156	112330	
	3307.3	3999.9	2399.3	34.2	1262.9	2667.5	3360.4	
25 to 34	100026	92142	97443	116459	133489	128967	122068	790594
	94030	86462	92705	114480	136235	135574	131109	
	382.4	373.1	242.2	34.2	55.3	321.9	623.4	
35 to 54	88397	82942	86766	99322	111466	109404	105664	683961
	81347	74801	80201	99039	117860	117288	113425	
	610.9	886.1	537.4	0.8	346.9	529.9	531.1	
55 to 64	21268	19966	20528	22433	24490	24287	23821	156793
	18648	17147	18385	22704	27018	26887	26002	
	368.0	463.3	249.7	3.2	236.6	251.5	182.9	
65 or more	3246	2954	2910	2991	3277	3220	3163	21761
	2588	2380	2552	3151	3750	3732	3609	
	167.2	138.5	50.3	8.1	59.6	70.2	55.1	
All	277176	254869	273269	337457	401585	399636	386475	2330467

Cell Contents
Count
Expected count
Contribution to Chi-square



Q. With policies in Table 2 (Appendix A) suspended, why are the injury rates relatively low?

A. Our analysis shows that not all policies had an injury reporting reduction effect. For instance, Pay increase had a small but incremental effect in injury reporting. The top four causal treatment effects (unlimited UPT, mobilization of AMCARE, no SPPR/SQPR, and social distancing) are still in effect to some extent, and all four have been shown to have a reduction effect on injury reporting. To be specific, the unlimited UPT policy ended, however UPT was increased from 20 to 40 hours, and in addition VTO was granted to hot spot sites to support associates in need of greater schedule flexibility; also, SQPR was reinstated but only until recently (9/21).

Figure 1 shows a change point in injury rates after WK18, right after the unlimited UPT policy was eliminated. The team hypothesizes that the injury rates did not go back to pre-COVID levels primarily for a couple of reasons: a) UPT was increased to 40 from 20 hours per quarter granted to associates pre-COVID with VTO supplements in hot spot sites, b) SPPR/SQPR remained off after WK18 (until recently), and c) the mobilization of AMCARE reduced minor injuries previously reported when associates sought a break from physical discomfort.

Q. Why is this analysis focused on Total Injury Rate (TIR) and not Recordable Injury Rate (RIR)?

A. Reductions have occurred in all measures of injury rate determination at Amazon following the onset of the COVID-19 event. This was first noticed in NACF. A broader look globally identified similar changes in other regions and other business groups, as well. Being OSHAs primary injury rate, RIR is the specific metric that is most easily benchmarked across the general warehousing industry classification and the industry at large. RIR is a simple subset of TIR based on medical care outcomes. The TIR dataset is richer in data and represents the entire bandwidth of injury occurring to associates. This makes it the most appropriate dataset from which to determine both correlation and causation of the observed drop in injury rates.

Q: Has there been a change in injury type during COVID19 compared to before COVID19

A: During COVID19 policy changes, sprains and strains make up 62% of all injuries compared to 64% prior to COVID19 policy changes.

Injury Type	Before (%)	During (%)
Sprain/strain	64	62
Bruise	28	28
Abrasion/scratches	3	4
Eye Irritation	3	3
Laceration/cuts	2.8	2

Q. How is objectivity ensured in this analysis?

A. Emphasizing what is stated in the *Current State* section, this team (composed of WHS, HR, Ops, Health Computer Vision and Machine Learning (CVML) specialists, research scientists, and statisticians) initially reviewed all variables that could impact injury rates going beyond the readily available data. The variable list has been complemented via consultation with leaders (internal and external) to capture other potential explanatory factors. The DAG and the data will guide the assessment of what is the causal impact of the main seven policy variables at

the associate level. The approach is to look at the associate level grain to avoid losing information which is a common issue with traditional statistical analysis on aggregated data.

Q. What are the limitations of this analysis?

A. Our study has two parts: the current retrospective (observational) study and the proposed randomized controlled trial. We use the latter study to circumvent the potential biases in observational studies. As called out above, one of the modelling limitations is that the retrospective analysis is causal, relative only to the 10 actionable variables derived from the seven deployed policies. Since the rest of the variable effects are associative and many of these effects are collinear (highly correlated with each other), the coefficients are volatile so we rely on resampling at least 100 times to get more accurate and precise coefficient estimates. Because of this multicollinearity and the computational expense with analyzing this data (a single random sample would take about 10 minutes to completion), we selected a few interactions we suspected were meaningful.

We use a linear model without much concern about it. Because in a separate predictive modelling task designed on this data, the deep neural network did not perform significantly better than the linear model. Because the current study does not have access to all of the potential factors influential on the injury rate, such as mental state of the associates and their activities outside work, they model is not 100% accurate in prediction of injuries. Thus, the recommendations are valid within the degree of accuracy of the model. Moreover, in our model, we have assumed that the impact of the causes is immediate and policies do not have long lasting effects. To account for these effects, more sophisticated models are needed.

Q. Why is the focus on NACF instead of GSF, AMZL, and/or ATS?

A. NACF was selected as the starting point due to the large and mature injury data set in comparison with all other Amazon business groups.

Q. Can any other business benefit from the results and recommendations of this project?

A. Further investigation is necessary to understand HR practices, socioeconomic variances, and population differences across businesses.

Q. Why is this project titled 'Soteria'?

A. Soteria was the Greek goddess or personified spirit (daimona) of safety, and deliverance and preservation from harm.

Correlation Analysis: Injury Rates and Productivity Metrics

We considered analyzing the correlation between Injury Rates and Productivity metrics to understand how these two elements are related. For injury metrics we considered Recordables Incident Rate by Case Date (RIR CD) and Days away, Restrictions and Transfers by Case Date (DARTs CD). For the productivity metrics we considered Inbound (IB), Outbound (OB) and Throughput per hour (TPH).

We considered analyzing these metrics for Fulfillment Centers in United States (US) . The business units included are: AR Sortable (AR), Cross Dock (IXD), Legacy Non Sort (NS) and TSSL. These business units located in US are collectively termed United States Customer Fulfillment (USCF) for this analysis.

We considered monthly data for the period – January 2017 through April 2022. This yields 64 data points for the analysis. (N = 64).

Summary

In summary, we observe that there is a strong correlation between injury and productivity metrics in the AR Sortable business unit. Since AR Sortable is the dominant business unit within USCF (approximately between 50-55% hours worked in the last 5+ years), the correlation coefficients for USCF also follow the trend that is similar to AR Sortable. However, the other business units do not show a similar correlation between injury and productivity metrics.

Hours Share between Business Units:

	2,017	2,018	2,019	2,020	2,021	2,022	L5Y+CY[1]
AR Sortable	36%	42%	49%	54%	53%	53%	50%
Cross Dock	9%	9%	9%	8%	9%	9%	9%
Legacy Non Sort	18%	18%	17%	15%	16%	15%	16%
TSSL	26%	21%	16%	14%	14%	13%	16%

Findings

When we look at correlation between injury rates and productivity metrics for all business units combined, that is USCF, we observe the following correlation coefficients.

USCF (N=64)	**DARTs CD**	**RIR CD**
IB	0.47	0.49
OB	0.61	0.61
TPH	0.60	0.60

The correlation coefficients are between 0.47 and 0.61. Both the injury metrics, namely RIR CD and DARTs CD indicate strong positive correlation[2] with productivity metrics – OB and TPH. The correlation is 0.47 and 0.49 for IB with DARTs CD and RIR CD respectively, which indicate moderately positive correlation.

We then proceed to take a look at the correlations in each Business Unit individually.

AR Sortable (AR):

We observe the following correlation coefficients between injury and productivity metrics in AR Sortable:

AR (N=64)	**DARTs CD**	**RIR CD**
IB	0.66	0.69
OB	0.74	0.76
TPH	0.75	0.76

[1] L5Y+CY = Last 5 years + Current Year

[2] https://sphweb.bumc.bu.edu/otlt/MPH-Modules/PH717-QuantCore/PH717-Module9-Correlation-Regression/PH717-Module9-Correlation-Regression4.html

We find that all the correlation coefficients lie between 0.6 and 0.8 indicating a strong positive correlation between the injury and productivity variables.

Cross Dock (IXD):

In case of Cross Dock (IXD) we see the following correlation coefficients.

IXD (N=64)	**DARTs CD**	**RIR CD**
IB	-0.17	-0.15
OB	0.23	0.22
TPH	0.08	0.09

We see that the correlation coefficients for OB with DARTs CD and RIR CD are 0.23 and 0.22 respectively indicating a weak correlation. The rest of the correlation coefficients, are in the range of either -0.2 to 0 or 0 to +0.20, indicating no correlation.

Legacy Non-Sort (NS):

In case of Legacy Non Sort (NS) we see the following correlation coefficients.

NS (N=64)	**DARTs CD**	**RIR CD**
IB	-0.06	-0.01
OB	-0.07	-0.01
TPH	-0.06	0.01

We see that all the correlation coefficients are in the range of either -0.2 to 0 or 0 to +0.2 indicating no correlation.

TSSL:

In case of TSSL we see the following correlation coefficients.

TSSL (N=64)	**DARTs CD**	**RIR CD**
IB	0.18	0.21
OB	0.26	0.26
TPH	0.26	0.28

In this case, all the correlation coefficients except the pair IB and DARTs CD are in the range of 0.2 to 0.4, indicating weak correlation, wile IB and DARTs CD show no correlation at 0.18 which is in the range 0 to 0.2

For Further Research

We can dive deeper to find out why AR Sortable follows this trend while the rest of the business units in this analysis do not show a similar trend and why not.

Appendix

Correlation Analysis - Productivity vs Injuries

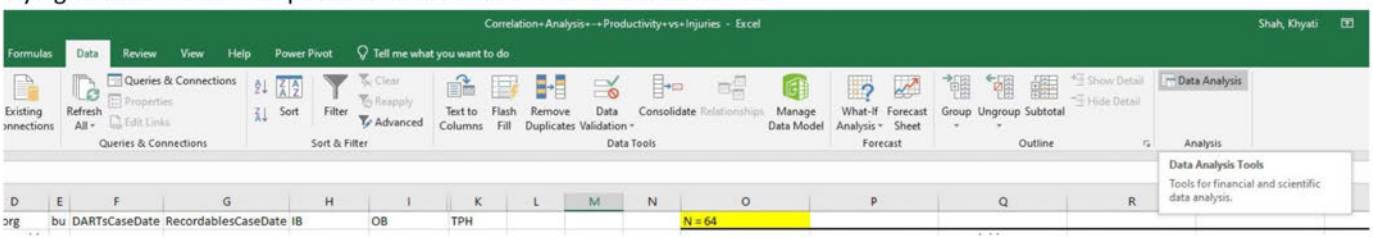
Methodology

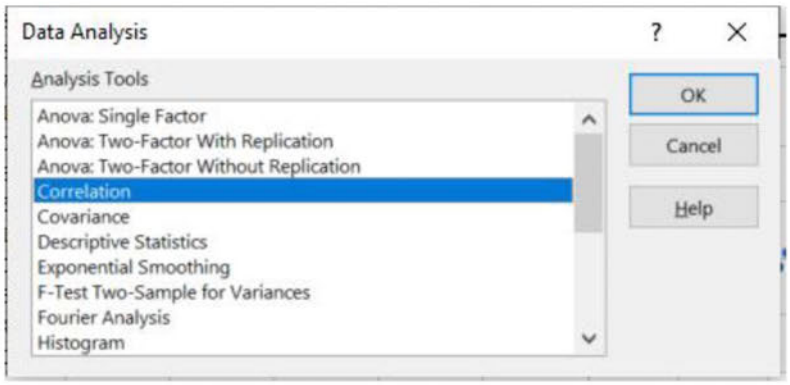
We collected productivity the data provided for USCF and its sub organizations and reformatted it to be used for running the model. We gathered the injury rates for these business units and time periods from our central database and collated with the productivity data, in one location, demonstrated below:

fiscal_year	date_name	date_begin	suborg	bu	DARTsCaseDate	RecordablesCaseDate	IB	OB	TPH
2017	January	1/1/2017	AR Sortable	AR	6.264	7.159	133.1289057	67.96768429	71.71226
2017	February	1/29/2017	AR Sortable	AR	8.548	9.402	138.6699107	71.73009858	76.34374
2017	March	2/26/2017	AR Sortable	AR	8.859	9.894	137.8523646	72.60839087	76.8178
2017	April	4/2/2017	AR Sortable	AR	8.453	9.109	134.8776091	70.51146095	76.58836
2017	May	4/30/2017	AR Sortable	AR	7.699	8.694	130.0260975	68.87895481	74.42722
2017	June	6/4/2017	AR Sortable	AR	6.339	7.73	125.6364058	67.80863569	71.82759
2017	July	7/2/2017	AR Sortable	AR	7.683	8.299	118.5156662	66.73305049	69.67996
2017	August	7/30/2017	AR Sortable	AR	7.628	8.805	124.1276863	63.80748554	66.64148
2017	September	9/3/2017	AR Sortable	AR	7.116	8.595	125.4645134	61.82143784	66.63809
2017	October	10/1/2017	AR Sortable	AR	6.029	7.264	122.8073815	61.20062194	68.15391
2017	November	10/29/2017	AR Sortable	AR	7.872	8.96	116.8868383	55.71593149	66.16259
2017	December	12/3/2017	AR Sortable	AR	9.088	10.638	133.3936139	59.74358277	72.68177
2018	January	12/31/2017	AR Sortable	AR	7.105	8.054	138.1237377	67.75180319	78.86042
2018	February	2/4/2018	AR Sortable	AR	7.768	9.054	139.0543947	69.40408399	80.43501
2018	March	3/4/2018	AR Sortable	AR	7.387	8.411	142.774363	70.26507641	82.37628
2018	April	4/1/2018	AR Sortable	AR	7.69	8.719	142.5707635	71.0849994	83.43826
2018	May	4/29/2018	AR Sortable	AR	7.871	8.981	144.3319937	70.96036256	84.11853
2018	June	6/3/2018	AR Sortable	AR	9.06	10.044	147.0899202	69.16218757	83.24786
2018	July	7/1/2018	AR Sortable	AR	9.218	10.391	145.3194647	69.86366333	84.04592
2018	August	7/29/2018	AR Sortable	AR	9.612	10.802	148.4495283	69.91764493	85.73175
2018	September	9/2/2018	AR Sortable	AR	7.623	8.56	145.1886103	67.56477449	82.07169
2018	October	9/30/2018	AR Sortable	AR	8.134	9.067	136.6941331	63.66034683	77.47358
2018	November	11/4/2018	AR Sortable	AR	10.406	11.547	135.254612	61.17647201	74.98491
2018	December	12/2/2018	AR Sortable	AR	10.847	11.825	156.494438	66.2652947	84.14302

Once the data was in a format that could be used by the model, we used Excel's Analysis ToolPak add-in, to run the correlation as follows:

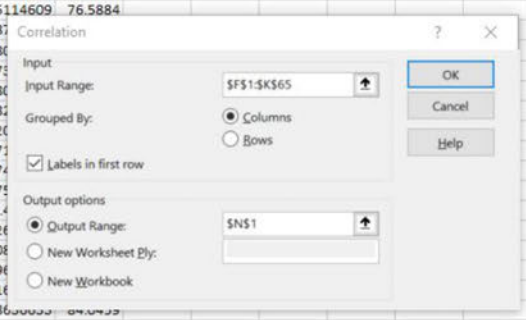
With the Analysis ToolPak add-in, we can use the 'Data Analysis' option in the 'Data' tab to perform different kinds of statistical analysis, like Regression, Correlation, Descriptive statistics etc. We chose to go with correlation since we are trying to determine the impact of one set of data elements on another.





Next, we select the range for the input and output. The input consists of all the variables under evaluation for correlation. Output specifies the location where the results will be delivered by the analysis.

	A	B	C	D	E	F	G	H	I	K
1	fiscal_year	date_name	date_begin	suborg	bu	DARTsCaseDate	RecordablesCaseDate	IB	OB	TPH
2	2017	January	1/1/2017	AR Sortable	AR	6.264	7.159	133.128906	67.9676843	71.7123
3	2017	February	1/29/2017	AR Sortable	AR	8.548	9.402	138.669911	71.7300986	76.3437
4	2017	March	2/26/2017	AR Sortable	AR	8.859	9.894	137.852365	72.6083909	76.8178
5	2017	April	4/2/2017	AR Sortable	AR	8.453	9.109	134.877609	70.5114609	76.5884
6	2017	May	4/30/2017	AR Sortable	AR	7.699	8.694	130.026097	68.8	
7	2017	June	6/4/2017	AR Sortable	AR	6.339	7.73	125.636406	67.8	
8	2017	July	7/2/2017	AR Sortable	AR	7.683	8.299	118.515666	66.7	
9	2017	August	7/30/2017	AR Sortable	AR	7.628	8.805	124.127686	63.8	
10	2017	September	9/3/2017	AR Sortable	AR	7.116	8.595	125.464513	61.8	
11	2017	October	10/1/2017	AR Sortable	AR	6.029	7.264	122.807382	61.2	
12	2017	November	10/29/2017	AR Sortable	AR	7.872	8.96	116.886838	55.7	
13	2017	December	12/3/2017	AR Sortable	AR	9.088	10.638	133.393614	59.7	
14	2018	January	12/31/2017	AR Sortable	AR	7.105	8.054	138.123738	67.7	
15	2018	February	2/4/2018	AR Sortable	AR	7.768	9.054	139.054395	69.4	
16	2018	March	3/4/2018	AR Sortable	AR	7.387	8.411	142.774363	70.2	
17	2018	April	4/1/2018	AR Sortable	AR	7.69	8.719	142.570764	71.0	
18	2018	May	4/29/2018	AR Sortable	AR	7.871	8.981	144.331994	70.9	
19	2018	June	6/3/2018	AR Sortable	AR	9.06	10.044	147.08992	69.1	
20	2018	July	7/1/2018	AR Sortable	AR	9.218	10.391	145.319465	69.8	



The model runs and generates a matrix of correlation coefficients between the input variables as below:

N = 64					
	DARTsCaseDate	*RecordablesCaseDate*	*IB*	*OB*	*TPH*
DARTsCaseDate	1				
RecordablesCaseDate	0.982648665	1			
IB	0.660517811	0.688459781	1		
OB	0.738212735	0.758588997	0.863062191	1	
TPH	0.749820959	0.75965233	0.938250574	0.927713322	1

How to interpret results:

The correlation coefficient (a value between -1 and +1) tells you how strongly two variables are related to each other. A correlation coefficient of +1 indicates a perfect positive correlation. As variable X increases, variable Y increases. As variable X decreases, variable Y decreases. The closer the correlation coefficient is to (+/-) 1, the stronger the correlation. Generally, correlation coefficient less than (+/-) 0.5 is considered inconclusive.

Executive Summary

Exposure to repetitive motions is universally recognized as a contributing risk factor to musculoskeletal disorders (MSDs).[1] [2] The Workplace Health and Safety (WHS) Human Factors and Ergonomics (HFE) team conducted an ergonomic analysis for the pick process path within Amazon Robotics Sortable (ARS) sites. The study concluded that an upper limit for repetition rate is 1940 units handled per ten-hour shift based on the low back cumulative compression (Appendix 1). By comparison, the ARS network averaged 2398 units picked per ten-hour shift in August 2021 and an upper limit of 1940 units per ten-hour shift will therefore reduce MSD risk by 19.1%. The HFE Global Health Technology (GHT) team is developing a software solution that could be used to effectively limit repetition and the People Experience and Technology Central Science (PXTCS) team is designing an experiment to measure the impact of this change in repetition on MSDs within the pick process path at ARS Sites (Project Elderwand).

Validating the impact of repetition limits on MSD Recordable Incident Rates (RIR) will require a comprehensive field experiment. The HFE GHT will support the field experiment testing the impact of repetition limits on MSD RIR by taking ownership of the Mind and Body Moments (MBM) software from Amazon Fulfillment Technologies (AFT), and modifying MBM microbreak duration and frequency. The changes will enable the MBM software to intelligently limit the number of units handled over the shift for Amazon Associates (AAs) participating in the study, based on repetition limits developed by HFE Engineering. Based on preliminary power calculations, PXTCS recommends running an experiment in which these revised pick rates are implemented at 25 US ARS sites for 4 months. Before launching the intervention to all sites in the treatment arm of the study, the project team plans to run a pre-pilot in which the intervention is deployed to a single site. This document describes the experimental design as currently-envisioned, the need of pre-pilot and the current status of the project.

Repetition Limit Pre-Pilot Study

Repetition limit pilot is a novel approach to creating safe boundaries for associates. The team acknowledges that it could have a huge operational impact and cause unintended consequences if launched at 25 sites at once. Also, the solution is a one-way door solve to reduce the MSDs at Amazon sites and thus a thorough study on the negative impact to operations, associate and customer experience needs to be studied before we roll out the intervention. In the pre-pilot phase, one ARS building will be identified and repetition limits will be enforced to all the pick associates in the building. The team will evaluate the impact of the change to the operational metrics, associate sentiments through connection questions and feedback surveys and any negative impact to customer experience. As the sample size will be too small to statistically validate the impact on MSD reduction, the pre-pilot will focus on surfacing any unintended consequences to Amazon operations.

Current State

In the current state, HFE GHT team has taken the ownership of MBM software from AFT and plans to deliver the software changes required for to support Project Elderwand in the month of August based on the support from AFT. The project team is partnering with leaders from ACES, Central Flow, AFT, Sales and Operations Planning (S&OP), Production planning team (PPT) Finance, HR and ER teams to seek inputs on assumptions and risks. The team partnered with operations leaders to identify GYR1 as the pre-pilot site and is working backwards to conduct the pre-pilot starting in August 2022. A jump team at site led by HFE Ergo will lead the pre-pilot and provide site level support. Currently, the team is currently finalizing metrics to be evaluated in pre-pilot.

Background - Repetition and Musculoskeletal Risk

The terms repetitive motion, repetition, and frequency are often used interchangeably when discussing musculoskeletal risk factors. This document will standardize on the term repetition to refer to the risk associated

[1] National Institute for Occupational Safety and Health. (1997). Musculoskeletal disorders and workplace factors (DHHS NIOSH Publication 97-B141). Cincinnati, OH.

[2] National Research Council & Institute of Medicine. (2001). Musculoskeletal disorders and the workplace: Low back and upper extremities. Washington, DC: National Academy Press.

with the frequency of exposure to performing the same motion, over and over, throughout the course of a work shift. Repetition can best be thought of as contributing to the accumulation of damage to tissues resulting from repeated loads, up to the point where the applied load exceeds the tissue tolerance. Tissue damage accumulates over time based on the: (1) task force, (2) quantity and duration of repetitions, and (3) shift length. Injury can be thought to occur at the point when the force required to perform the task exceeds the tissue tolerance. The most recent MSD research indicates that repetition should be considered across a full work shift (Appendix 3). HFE Engineering is therefore recommending a full shift approach to setting Amazon-wide productivity limits that make provisions for musculoskeletal risk by process path.

Mind and Body Moments (MBM): Current and Future states

MBM is a WorkingWell (WW) product aiming to educate Amazonians about their bodies, health, and wellness. The MBM software product displays an animated series of physical and mental activities at regular intervals throughout the work day. In FCs specifically, MBMs pop up on an AA's workstation monitor after 60 minutes of work. AAs can choose to participate in either a body exercise, which will facilitate 30 seconds of stretches for various parts of the body, or a mind exercise, which will facilitate breathing exercises and personal reflection time to focus on mental health. During the MBM, the associate is not able to continue working as their workstation monitor is fully occupied by the MBM content. These 30-second microbreaks are intended to recharge and re-energize Amazonians while reducing muscle fatigue and stress. In its current state, MBMs have not demonstrated any reduction to MSD Recordable Incident Rate (RIR). MBM is available in 451 sites (240 FCs and 211 Whole Foods Markets (WFM)) across 12 countries. ARS and Traditional Sortable Soft Lines (TSSL) sites host the largest volume of daily MBM users, where the software displays at four primary process paths (Stow, Pick, Pack, and Induct). Workstations not equipped with AFT software do not receive MBMs. By the end of 2021, MBM reached a total of 719k yearly unique users.

For this pilot, MBM will continue running in its legacy version for all process paths and sites not involved in Project Elderwand. The adjusted software will affect only the ARS-Pick path within a specified, experimental group of sites. The new, basic logic for the Elderwand software will periodically (as described below) compare an individual AA's current rate to a limit set by HFE, and adaptively modify the frequency and duration of breaks in order to keep the associate from exceeding that limit. For ARS-Pick, this limit will be 1940 units per ten-hour shift, assuming nine hours of actual worktime due to scheduled breaks.

After an AA logs on to a station, they will work uninterrupted for 30 minutes. This time will allow the Elderwand software to capture an average working rate for the individual. After this initial 30 minutes, the software will compare the AA's current hourly rate with the target 216 units per hour rate (based on the full 1940 repetitions per shift limit). If the AA is working at or below the target rate, no interruption will occur and work will be allowed to continue. If the AA is working above that target rate, they will receive a message asking if they'd like to receive a short break since they are working faster than Amazon recommends. If they choose to accept the break, content will launch on the workstation screen similar to a conventional MBM. The duration of this content will be determined by the software to bring the AA back to the target rate. If they choose to not accept the microbreak now, they may continue working and they will be re-evaluated for another break opportunity in next cycle.

Following the 30-minute check-in, the Elderwand software will again compare the AA's rate to the target limit after 15 minutes. At this time, a message will be launched if the AA is working above the target rate. This message will communicate that the AA is working faster than recommended and encourage them to slow their pace in order to reduce their risk of injury. This message will time out automatically and will also include a "close" button since it is only meant to communicate with the user[3]. Once again, if the AA is working at or below the rate limit, no message will be displayed and they may continue working uninterrupted.

[3] Note: the actual verbiage for this communication will explain the reasoning behind the reminder, but will also make clear that this is a pilot experiment and if it is determined to be ineffective on reduction to MSD risk, the duration and frequency of microbreaks may be adjusted.

The final evaluation of the hour will occur after an additional 15 minutes. At this point, the Elderwand software will compare rates, determine if an AA has worked above the target rate through the hour, and will launch content to the screen without an option to skip. The duration of this content, as before, will last as long as needed to bring the AA's workrate as close to 216 units per hour as possible. If the AA worked at or below the hourly rate target and did not receive a break after 30 minutes, they will receive a traditional MBM which includes a 30-second microbreak. If the AA received a 30-minute break message but then corrected their pace to be below the target at this final evaluation, a message will also be delivered as positive reinforcement for meeting the desired work rate. To this end, the total amount of time an individual AA spends on break per hour will be based on their working rate. Ownership will be given to the individual on how they would like to receive that break time, either once at the end of the hour, or once every 30-minutes, assuming they continuously work above the target rate. The one exception to this cadence will be for AAs working at very high rates (above approximately 3000 units per 10-hour shift). For this case, mandatory breaks will launch every 15 min while the AA continues working at this very high rate. Once an AA slows down, the normal, 30 min break cadence will resume, controlling the length of breaks. This is to remove any "incentive" to work faster and thus receive longer breaks.

Appendix 4 illustrates this software logic with a flow chart. Since the overall rate for an individual AA is being monitored, AAs can take scheduled breaks as intended and when they return to working, the software can evaluate their adjusted rate since their total stoppage time may have been disrupted. Any missing downtime will be made up in the next hour of work and may simply require a longer duration for the next microbreak. Overall, this is the planned method for targeting the shift-level, ergonomic repetition limit amongst participating AAs.

Figure 1 below demonstrates several examples of how the Elderwand software would interact with an AA. This illustration specifically looks at the differences in breaks and "skippable" messages for various repetition rate examples.

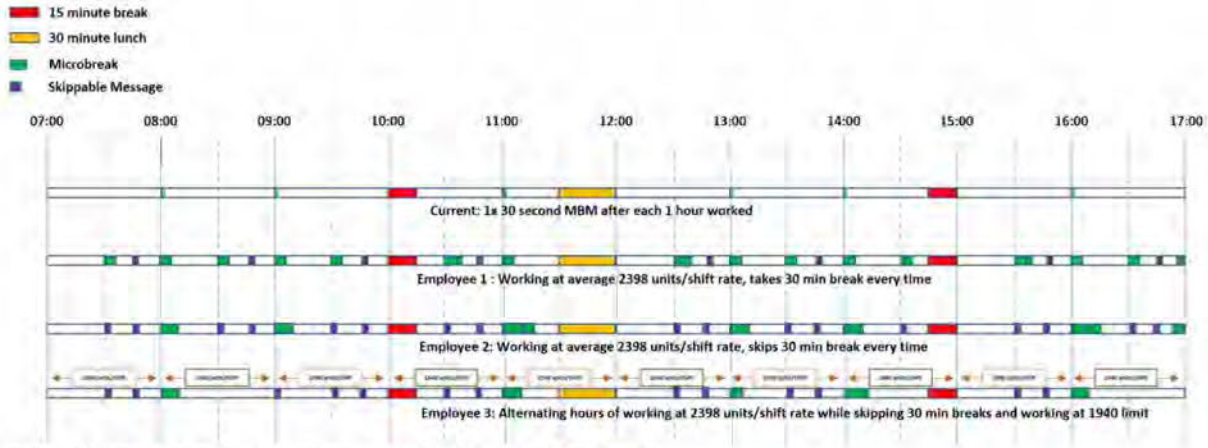


Figure 1: Examples of AA Experience with Elderwand Software

Repetition Limit Pilot Study

We will evaluate the impact of this change in units per shift through a clustered randomized control trial. The unit of treatment will be the fulfillment center, more specifically, the entire pick department at the ARS sites. There will be two treatment arms, defined as follows:

- *Arm 1: Treatment* – All Pick associates within these sites will be limited to no more than 1940 units handled per 10-hour shift.
- *Arm 2: Control* – All Pick associates within these sites will operate in a "business as usual" mode.

Among the sites in the treatment arm, the repetition limit for pick associates will be enforced by the frequency of MBMs as described above. This study will be limited to ARS sites within the United States, and we plan to further restrict the study to the 60-worst performing ARS sites based on pick MSD incident rate in Q1 of 2022.[4] From this set of sites, we will randomly assign a fraction to be in the treatment arm and the rest will be in the control arm. Within the study sites, our analysis will be restricted to pick associates, who we define as those associates who spend the majority (associate who spends 50% or more of their PPR hours under the Pick process path over the study duration) of their worked hours in the pick process path over the study duration. Based on Monte Carlo simulations (using 2021 data), the PXTCS team estimates that there would need to be 25 sites in the treatment arm for 4-month study to achieve adequate statistical power (80% power at a 5% significance level). The remaining ARS sites from the study population would be in the control arm. The WHS HFE team estimates a 19.1% reduction in MSD risk by limiting units per shift, so PXTCS conducted simulations under a 25% and 20% treatment reduction in MSD incidence. Appendix 5 provides more details on these power calculations. These power calculations are intervention agnostic; they assume every US ARS site is eligible to participate in the study and that the intervention achieves a given impact (e.g. a 25% reduction in MSD incidence).

In our final modelling, we will estimate the impact of treatment on the incidence of MSDs (recordable or non-recordable) at the individual level. We will then translate this treatment effect estimate into an overall MSD Incident Rate for the pick process path. Additionally, the project team plans to measure the impact of treatment on a set of secondary outcomes including attrition, attendance, tenure, incidence of non-MSD injuries, and job satisfaction. Given the content delivered through MBMs, any decrease in MSD incidence from the intervention could be due to two separate mechanisms: (a) Reduced repetition; (b) Increased awareness of MSD risks leading to behavior changes. To measure the impact of the second mechanism, we will measure associate knowledge of healthy work habits, such as proper posture and adequate stretching, in both treatment and control sites before and during the pilot. The assessment will be undertaken through a set of focused Connections questions. Appendix 6 discusses how we can express our estimated treatment effect for MSD incidence in terms of MSD Incident Rate (which is more consistent with WHS' key performance metrics).

Success Criteria

For Pre-Pilot (one site – GYR1):

The success of the pre-pilot will be linked to the extent of the disruption to operational metrics and any negative impact to the associates or customer experience. The pre-pilot will also help us identify any unintended consequences on operations, associate communication, and system configuration challenges. The team is currently finalizing the metrics to be evaluated in partnership with AFT team. Appendix 7 provides the insights to some frequently asked questions (FAQ).

For Pilot:

HFE Engineering estimates a 19.1% MSD risk reduction by limiting AA in the ARS pick process path to 1940 units per shift. Project Elderwand's primary success criteria will be linked to MSD Incident Rate performance. Project Elderwand will be a success if MSD Incident Rate for the treatment arm – the group of sites limited to 1940 units picked per 10-hour shift – is lower than that of the control arm – the group not limited to 1940 units picked per 10-hour shift – to a statistically significant extent. We are also investigating comparing secondary measures between the two treatment arms including: (1) quality measures, (2) employee engagement via Connections and Safety Leadership Index, and (3) absenteeism.

[4] It is easier to detect a reduction in MSD incidence as statistically significant if the baseline level of incidence is higher (e.g. it is easier to detect a 50% reduction from 20% to 10% than it is from 4% to 2%). By focusing this study to those ARS sites with the highest incidence of pick MSDs, we are increasing the baseline incidence for this study and thereby increasing our statistical power. It often takes 10-13 weeks before incident data is considered finalized, hence we do not consider incident data from Q2 of 2022 or afterwards in defining the study sample.

Appendix 1 - Current Repetition Limit Analysis Example - ARS Pick

There are multiple approaches to develop repetition limits that consider musculoskeletal risk. For example, the HFE Engineering team has used Digital Human Modelling (DHM) alone to calculate low back cumulative compression risks from repetition in ARS Pick. Low back cumulative compression, a strong predictor of low back pain reporting, provides an estimate of the sum of compression forces acting on the low back from multiple subtasks over the course of a work shift. Peak low back compression values by task are fed into the low back cumulative compression algorithm along with task frequency and duration. The example low back cumulative compression risk measurement is presented as a range to make provisions for the impact of posture variations and station ladder compliance usage differences directly observed among AAs. The example low back cumulative compression risk measurement assumes current state workstation designs.

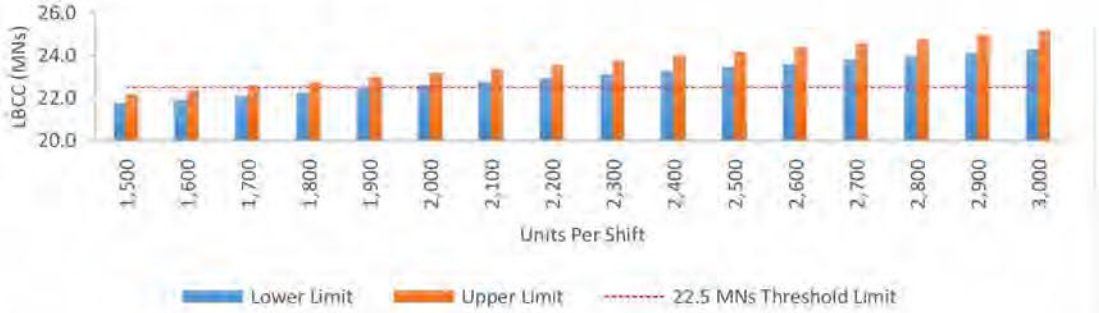


Figure 2: Low back cumulative compression values across multiple daily frequency exposures. The low back cumulative compression values are inclusive of 90% of a mixed gender population by stature and weight. The proposed threshold limit for low back cumulative compression is 22.5MNs represented by the dotted line on the graph.

In this analysis, the low back cumulative compression risk exceeds the recommended level of 22.5MNs between 1690 and 1940 units picked per shift for a 10-hour shift in ARS Pick. The ARS network average for August 2021 was 2398 units picked per shift over a 10-hour shift. Anecdotes from conversations with ARS site leaders suggests that individual pick AAs in ARS can exceed 3,000 units per day. The network average exceeds the recommended frequency exposure limit range for August 2021 by 19.1% to 41.8%. Figure 2 plots the relationship between low back cumulative compression and the number of units picked per shift. From the graph above, we can see that for each 100 unit-per-shift increase, injury risk rises by 0.7% to 0.9% by adding 0.16MNs to 0.20MNs to the cumulative low back loading.

Appendix 2 – Project Team and RACI matrix

- HFE Integration – Manage programmatic changes, lead the project calls and drive discussions, help in escalations and clearing blockers, identify opportunities to partner with teams across Amazon, identify sites, stakeholders and gain alignment, ensure the project plan is defined. Drive development of project WPs, coordinate and facilitate alignment meetings with Ops, Legal, HR, ACES and other stakeholders.
- HFE Design – Create and manage Project plan, manage changes, call out risks, create working backwards plan. Support in creating WPs and own the content changes in MBM.
- HFE NA Ergo Engineering – Own the pilots, whitepapers, provide ergonomic expertise, recommend boundaries, validate process and workstation redesign, conduct ergo assessments (if required)
- HFE GHT – own MBM and all the software changes to MBM to ensure test associates work within boundaries during pilots.

- PXTCS team – designing experimental design, provide data science support in conducting design of experiments, validate underlying hypothesis during pilot phase and conduct statistical analysis
- Legal: provide guidance to ensure compliance and guidance on internal communications.

The below RACI matrix defines the responsibility and accountability of each group involved:

Deliverable	HFEi	HFE Ergo	GHT	PXT	HFE Design	Legal
POC	Shivam	Vince Racco	Eli White	Gouri	Brian	Joe Herbster
Meeting facilitator	R/A	I	I	I	I	I
Prepare meeting agenda (Drive discussion)	R/A	C	C	C	C	C
Prepare escalations or support required from the group	R/A	C	C	C	C	C
Maintain project timelines, deliverables	A	C	C	C	R	C
Own Project WPs	R	A	C	C	C	C
Tech changes (software updates)	A	C	R/A	C	C	C
Conduct design of experiments	A	C	C	R/A	C	C
Identify pilot site and gain alignment	R	A	C	C	C	C
Consolidate actions and minutes of meeting	R/A	C	C	C	C	C

Appendix 3 – Injury Mechanisms

MSD are the result of a complex interaction of physical, social, and individual risk factors. Despite the complexity associated with MSD causality, exposure to the primary physical risk factors of high force, non-neutral working postures, and repetitive motions are universally recognized as contributors to MSD risk.[5] [6] The terms repetitive motion, repetition, and frequency are often used interchangeably when discussing musculoskeletal risk factors. This document will standardize on the term repetition to refer to the risk associated with the frequency of exposure to performing the same motion, over and over, throughout the course of a work shift.

Repetition is most commonly quantified by ergonomists as the number of similar actions, for example, lifts performed per minute. Standard industrial engineering and ergonomics texts provide guidance for establishing a representative job sampling strategy that quantifies repetition as a rate of actions per minute or actions per hour. For example, the job sampling strategy presented in the Applications Manual for the Revised National Institute for Occupational Safety and Health (NIOSH) Lifting Equation is to calculate the average number of lifts performed per minute as measured over a 15-minute work sampling period. Short duration job sampling strategies that quantify repetition as a rate per minute are practical for determining the inputs to simple evaluation tools, but can lead to

[5] National Institute for Occupational Safety and Health. (1997). Musculoskeletal disorders and workplace factors (DHHS NIOSH Publication 97-B141). Cincinnati, OH: Author.

[6] National Research Council & Institute of Medicine. (2001). Musculoskeletal disorders and the workplace: Low back and upper extremities. Washington, DC: National Academy Press.

an over simplification of repetition as a musculoskeletal risk factor without considering the impact during the entire shift, and are not always well-suited to complex work environments like Amazon.

Pace of work is an important consideration, especially as a social and individual risk factor, that should be thought of as separate to repetition. Repetition can best be thought of as contributing to the accumulation of damage to tissues resulting from repeated loads up to the point where the applied load exceeds the tissue tolerance (Figures 3 – 6[7]). Tissue damage accumulates over time based on the: (1) task force, (2) quantity and duration of repetitions, and (3) shift length. Injury can be thought to occur at the point when the force required to perform the task exceeds the tissue tolerance.

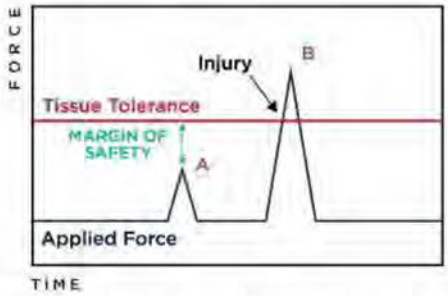


Figure 3: Injury caused by a single high force event (graph reproduced from S. McGill)

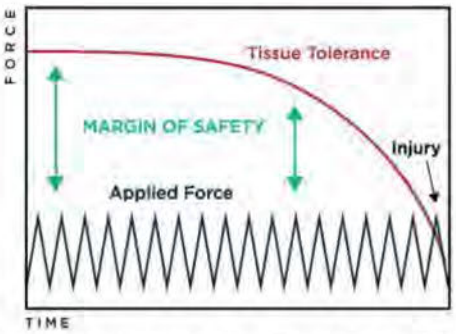


Figure 4: Injury caused by a repetitive force task (graph reproduced from S. McGill)

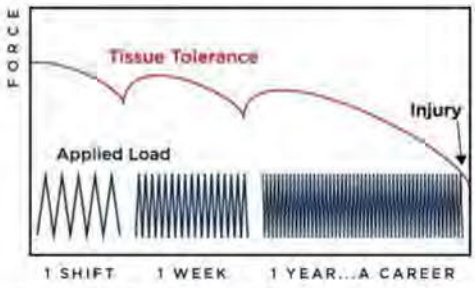


Figure 5: Injury caused by cumulative trauma over time (graph reproduced from S. McGill)

[7] McGill, S.. Low Back Disorders, Evidence-Based Prevention and Rehabilitation, 2nd Edition. 2007. Human Kinetics.

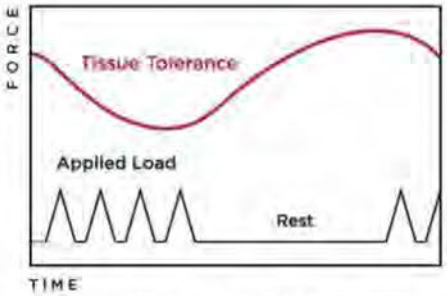


Figure 6: Optimal amount of stress and recovery to minimize injury (graph reproduced from S. McGill)

The most recent MSD research on cumulative biomechanical loading[8], duty cycle[9], and tissue level failure[10] [11] indicates that repetition should be considered across a full work shift. HFE Engineering is therefore recommending a full shift approach to setting an Amazon wide repetition limits that make provisions for musculoskeletal risk by process path.

[8] Norman R, Wells R, Neumann P, Frank J, Shannon H, Kerr M. A comparison of peak vs cumulative physical work exposure risk factors for the reporting of low back pain in the automotive industry. Clin Biomech. 1998;13(8):561—73.

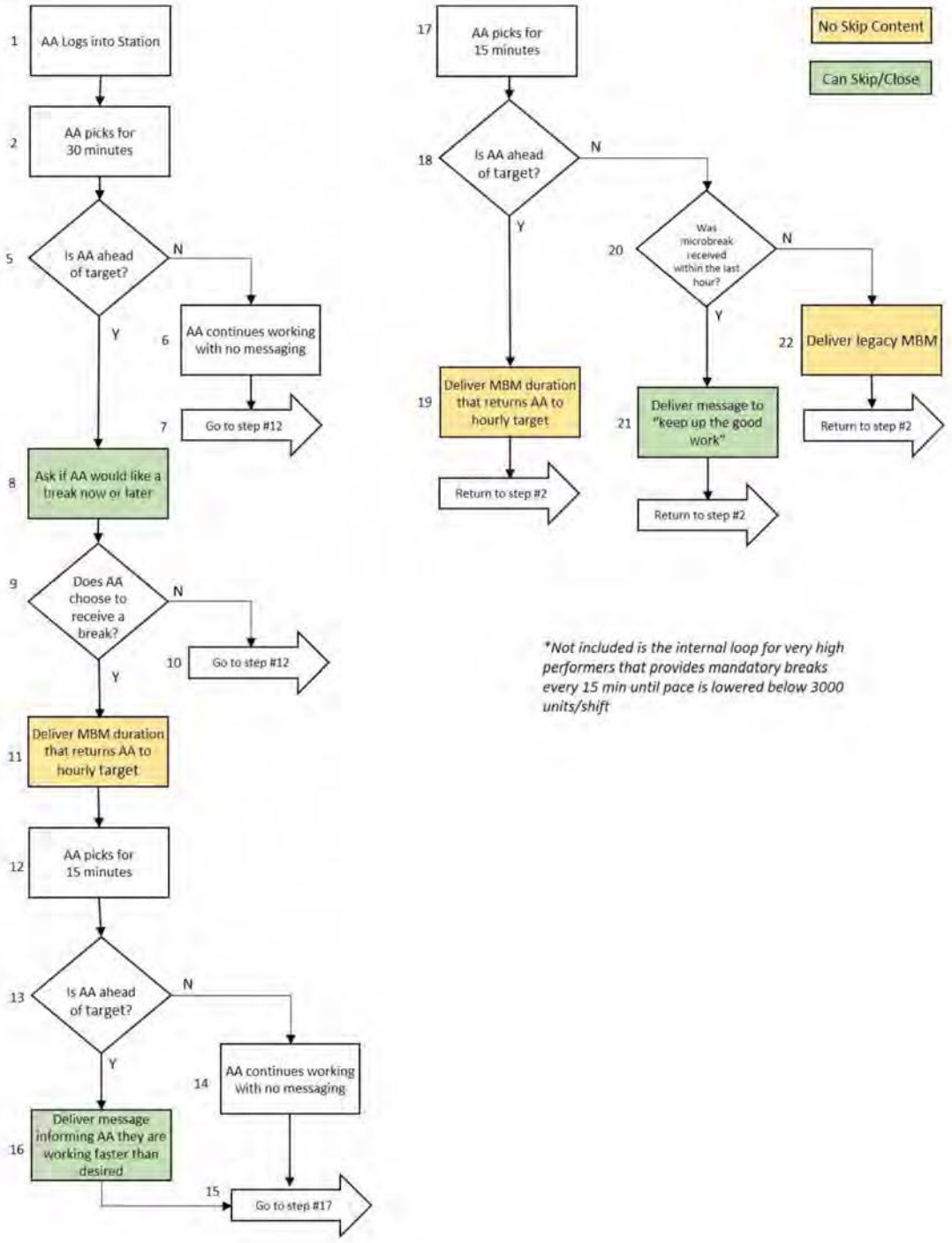
[9] Potvin, J. (2012) Predicting maximum acceptable efforts for repetitive tasks: an equation based on duty cycle. Human factors 54 (2), 175-188.

[10] Gallagher, S., Sesek, R. F., Schall, Jr., M. C., & Huangfu, R. (2017). Development and Validation of an Easy-to-Use Risk Assessment Tool for Cumulative Low Back Loading: The Lifting Fatigue Failure Tool (LiFFT), Applied Ergonomics 63, 142-150.

[11] Gallagher, S., Schall, Jr., M. C., Sesek, R. F., & Huangfu, R. (2018). An Upper Extremity Risk Assessment Tool Based on Material Fatigue Failure Theory: The Distal Upper Extremity Tool (DUET). Human Factors, 60(8), 1146-1162.

Appendix 4 – Project Elderwand Software Logic Flow Chart for Repetition Limit Pilot

Below is a visual representation of the MBM logic after being modified for the pilot described in this paper.



**Not included is the internal loop for very high performers that provides mandatory breaks every 15 min until pace is lowered below 3000 units/shift*

Figure 7: Project Elderwand Software Logic for Repetition Limit Pilot Study

Appendix 5 – Power Calculations and Analysis Approach

We simulate running the proposed experiment using historical, person-level data from 2021. The steps below are specific to modeling MSD incidence, a binary outcome, but we will follow the same general approach for all study outcomes.

We first specify the number of sites, **N**, number of months, **K**, and a minimum detectable effect size, **MDE.** Then we repeat this process 1000 times:

- We randomly sample **K** contiguous months of historical data
- Randomly sample **N** sites from the eligible population of sites, and randomly assign a fraction of them to treatment. The remaining sites are assigned to control.
- Collapse data to the individual associate level. For each associate compute whether they experienced an MSD during the study duration (0/1).
- For each MSD experienced in the treatment group, randomly draw a number between 0 and 1 (uniform distribution).
  - If this random number is less than the **MDE**, we simulate this MSD as having been prevented and set it to 0.
  - MSDs in the control group are unchanged.
- Estimate the following logit model and record the results:

$$MSD_i = \lambda + \alpha * trt_i + \vec{\beta} * \vec{X}_i + \epsilon_i$$

Where:

- $\boldsymbol{i}$ is an index for each individual associate
- $\boldsymbol{MSD_i}$ is an binary indicator for whether the associate experienced an MSD during the study
- $\boldsymbol{trt_i}$ is a binary indicator for whether the associate was in the treatment arm
- $\boldsymbol{X_i}$ is a vector of characteristics including:
  - Associate tenure at the start of the study (in months)
  - Squared associate tenure (in months)
  - Site age as the start of the study (in months)
  - Squared site age (in months)
  - A factor variable capturing whether the associate works full-time, part-time or reduced-time
  - A factor variable for the associate type (Blue badge, temp or seasonal)
  - Pick rate decile in the two months preceding the study
    - We impute a sentinel value for missing values as well.
- ϵ_i is the error term
  - Standard errors are clustered by site

We repeat this process for a variety of constellations of **N**, **K** and **MDE**, and for each constellation record what proportion of times the α coefficient is negative and statistically significant at the 5% level against a one-sided t-test.

The graph below summarizes the power results when modeling MSD incidence. Within each graph, the x-axis represents the number of sites in the treatment arm of the study, and the y-axis represents the study duration. The number within each tile represents the estimated statistical power of an experiment run for that many months with that many sites. In the upper graph, we assume a treatment leads to a 20% reduction in MSD incidence, while we assume a 25% reduction due to treatment in the lower graph.

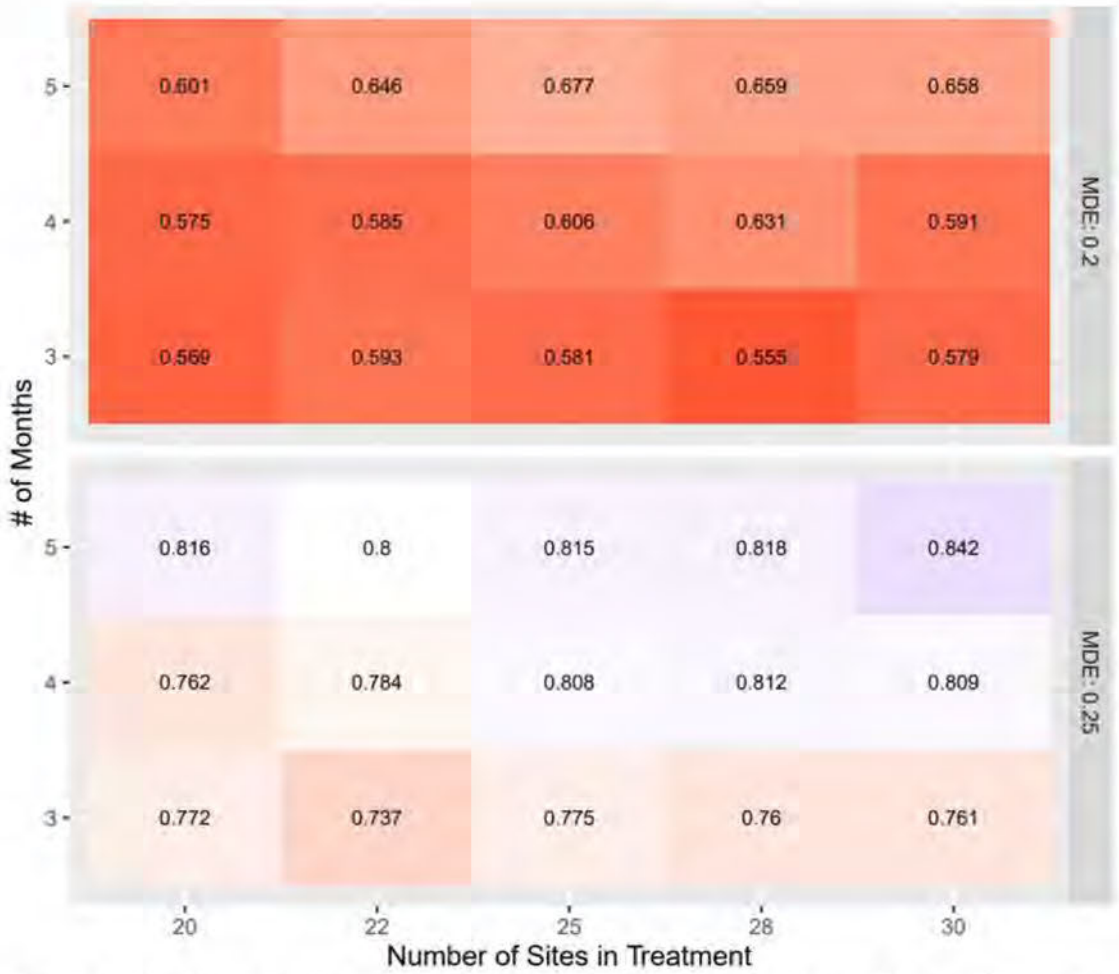


Figure 8: Statistical Power CalculationsThese power calculations are undertaken for two effect sizes (Minimum Detectable Effect): 25% and 20% reduction in MSD incidence among pick associates. Each cell represents the statistical power of the experiment given the MDE, duration in months, number of sites where the intervention is rolled out. For example, the first cell in the above graph indicates that an experiment running for 5 months at 20 sites will have a 60.1% probability of detecting a 20% reduction in MSD incidence as statistically significant. We have adopted a significance level of 5% and cluster standard errors by site.

Finally, the project team is also exploring other variables that can be included in the final modelling, such as manager tenure and team size, and if time permits will revise the power calculations accordingly.

Appendix 6 – Expressing the Study Results in Terms of MSD Incident Rate

WHS has communicated their goals related to musculoskeletal disorders (MSDs) in terms of the MSD Recordable Incident Rate (MSD RIR) which is defined as:

$$200{,}000 * \frac{[\#of\ Recordable\ MSDs]}{[\#\ of\ Hours\ Worked]}$$

The MSD RIR represents the number of recordable MSD incidents per 100 fulltime-equivalents over the course of the year.

The outcome of interest for our study – the incidence rate of MSDs at the individual level - differs from the MSD RIR in two key ways:

- First, we consider all MSDs not just recordable MSDs. Restricting ourselves to only recordable MSDs inhibits the power of our study.
- Second, we consider the incidence rate at the individual level, not per 100 full-time equivalents.

We can express our estimated treatment effect in terms of the MSD incident rate in a "back of the envelope" calculation by scaling it up by a factor of 100 (for 100 full-time equivalents) and scaling for an entire year (e.g. if the study is 3 months, would scale it by a factor of 4).

Appendix 7: Frequently Asked Questions (FAQ)

Q1 – How is this project different from project TAZ?

A - The principle of job rotation is to alleviate physical fatigue and biomechanical stress for an individual by moving the individual among jobs that use different joints and muscle-tendon groups. Job rotation does not change the MSD risk in the workplace as a system. The risk profile for all the jobs remains the same, the only thing that changes is an individual's exposure to a particular job. Successfully executing a job rotation requires the workplace to have enough jobs and positions to allow individual employees to move to among jobs that are different enough to make a difference. Job rotation alone does not change the risk factors present in the workplace, it only distributes the risk factors differently across a larger group of people. While the risk for some individuals will be reduced, the risk for other employees may be increased due to the new exposure to different and sometimes higher-risk job demands. Limiting repetition changes the risk profile of the job by reducing the absolute number of motions that an individual is performing.

Q2 – Can the pilot have the opposite impact where associate start working faster and take longer breaks?

A- The pilot software aims to pace an associate through monitoring their work-rate multiple times during an hour and launching microbreaks to target the shift-level repetition limit. While an associate is able to choose how fast they work between microbreaks, the software does have several rate thresholds where forced, shorter duration microbreaks are launched more frequently, in order to prevent an extremely long break. If working under this threshold, an associate is able to choose their own pace, until the end of an hour, where a forced microbreak occurs to essentially "reset" their pace to the shift-level repetition target. It is important to note that even within the one hour of work, an associate will receive up to two "pace" notifications to help coach them towards the repetition target.

Q3 – What is the long-term solution for the project?
A - At this point, a long-term solution has not been identified. The purpose of this pilot is to determine the correlation between shift level repetition limits and MSDRIR. Once this data is gathered, elegant solutions can then be proposed and designed if the data suggests this is the correct direction. This pilot is operating under a bias for action to gather the necessary data to determine if this is in fact an area of opportunity for MSDRIR reduction or not. The data will determine next steps.

Q4 – MBM will be used for pre-pilot. What are the scalable alternatives to limit the repetition beyond pre-pilot?
A – While we do acknowledge that MBMs will be used as a interim solution for pre-pilot and pilot, we are yet to determine the scalable solutions for the project. We will explore alternatives with pick scheduling, central flow and finance teams to deploy the intervention beyond pre-pilot.

Q5 – What will be the impact to Critical Pull time (CPT) since there are periods where the associate is not working?
A – The impact to CPT will be evaluated as part of the pre-pilot at GYR1.

Q6 – What will be the impact to pod congestion and drive utilization if the picker is not picking when the pod is available?
A – The impact to pod congestion and drive utilization will be evaluated as part of the pre-pilot at GYR1.

Q7 – What will be the operations metrics assessed during the pre-pilot?
A – AFT team has partnered on this and will share a set of metrics to be assessed by 7/7. Evaluation of the recommended metrics will help determine the operational impact and the unintended consequences of the project.

Q8 – What type of content will the associates receive?
A - The theme of the initial message is to communicate to the Associate they should "not rush" and focus on "safety and quality". Messaging will include an "indicator" graphic to give coaching feedback to the Associate to trend towards the pace target. After this initial screen, content will include general safety and WorkingWell messaging. This messaging will be reused from other sources already in use throughout FCs. The team is working with Legal and HFE Content experience team to ensure that the message is approved.

Q9 – How will the associate feedback be gathered?
A – Project Elderwand will gather associate feedback in two ways. First, all HFE Engineering pilots gather Voice of Associate (VOA) feedback. The VOA surveys are purpose designed for each specific pilot. The Project Elderwand VOA survey is presently under development and will focus on associates' sentiment on how their bodies feel generally during and following their shift. The VOA survey will be available for associates to complete leveraging a QR code that will be placed at every station used in this study. Additionally, ratings of perceived fatigue (RPF) will be gathered for the baseline and experimental condition using a modified Borg CR-10 scale (Whittaker et. al. 2019). We plan to gather the RPF data manually at defined, regular intervals.

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BFI4 Soteria Testing Support Request – July 2021

Purpose

The intent of this document is to review the current status and results of Soteria testing at BFI4 and request support to offset some of the cost of Soteria at BFI4.

Background

Project Soteria is a job rotation program targeting reducing the potential for Musculoskeletal Disorder (MSD) injuries in Pick associates by limiting the number of units picked on a given shift. Original research suggested limiting to 1,900 units, but for the sake of simplification, BFI4 targeted leaving AAs in path for no more than 7.5 hours or ~ three quarters of a shift. BFI4's major objective is to inform the end state solution on how to apply job rotation effectively into OSP and SCC execution with long term application of the program as a rule set similar to "Remove Alternatives" in SCC to systematically prevent the behavior.

Initial testing started at BFI4 the week of 3/28 on Front Half Nights to understand feasibility and operational impact. Testing was expanded to Back Half Nights the following week with full testing across all shifts on 5/2. During this time, all BFI4 teams continued to work on operationalizing rotation between outbound, count, and pick and invested in cross training across the departments to enable rotation.

At the end of June, BFI4 did a one shift test with a rule enabled in SCC that did not allow staffing plans to include any AAs that had picked for 3 consecutive quarters. The test highlighted the need for additional cross training between Pick and Pack functions to simplify operations while maximizing associate experience.

Initial Results

Since beginning to test Soteria, BFI4 has seen a 50% reduction in MSD. The results at BFI4 are statistically significant when compared to the control group of the rest of the ARS network. (Appendix 1)

From a total productivity standpoint from 3/7 to 6/6, BFI4 saw degradation on direct rates across Pick (300 to 260, -14%) and Pack (Chuting 167 to 141, -16% / Singles 89 to 74, -17%) departments (Appendix 2, Appendix 3). This degradation was based on a combination of fullness, new hires, and increased cross training dilution. From 5/2 to 6/13, BFI4 saw the percentage of LC1 Hours as a percentage of the total increase to average of 12% for Pick, 15% for Chuting, and 5% for Singles (Appendix 4). In addition, the cross training on top of the new hires impacted Pick Support (2,789 to 1,621, -42%) and Pack Support (823 to 672, -18%) due to the need to staff ambassadors and absorb training hours. (Appendix 5)

However, during this time, after normalizing for fullness impacts, BFI4 observed Pick rates improve for LC5 associates. From 5/2, the fullness adjusted rate for LC5 pickers increased from 307 to averaging 330 from 5/23 through 6/20. (Appendix 6) This provides the team confidence that the impacts to pick rates from the Soteria program are purely based on fullness impacts to pick and learning curve dilution.

Next Steps / Support Needed

BFI4 plans to continue to test Soteria to inform a longer term network solution for fulfillment related to job rotation and integration into our staffing systems. The goal is to boost BFI4's cross training such that 100% of Pick AAs are cross trained to a different process path and 85% of each cohorts Pick headcount is available from a different department (Count / OB, currently avoiding IB to stay within OSP / SCC). The target completion date for full cross training is 9/19 to enable two months of sustained execution before Peak.

To accomplish, BFI4 is requesting support for one of the following cost options:

1. Build in a OP rate degradation for direct and indirect rates without a net neutral offset
2. Build in a OP rate degradation for direct rates and utilize a ghost project bucket for Ambassadors until Soteria specific training is complete (no more than 160 hours / week, covers 2 ambassadors supporting 5 AAs for each shift)

3. BFI4 absorbs rate degradation for direct rates and utilizes a ghost project bucket for Ambassadors until Soteria specific training is complete (no more than 160 hours / week, covers 2 ambassadors supporting 5 AAs for each shift)

Appendix 1 – MSD Analysis performed by [redacted]

Injury rate analysis for BFI4 (preliminary results)

In 2021, since April 4 the leadership team has been executing a manual rotation program for pickers to ensure at least 60%-70% of pickers spend no more than three quarters in pick. Table 1 shows the top sites exhibiting the greatest reduction in MSD TIR over the last 11 weeks with BFI4 showing a 50% reduction in MSD TIR. The bottom six performing sites all show a 123% (or higher) increase in MSD TIR. Table 2 shows additional output as to the effect of rotations on the test group (i.e. BFI4).

Table 1 — Change in MSD TIR for the last 11 weeks versus the first 13 weeks of 2021.

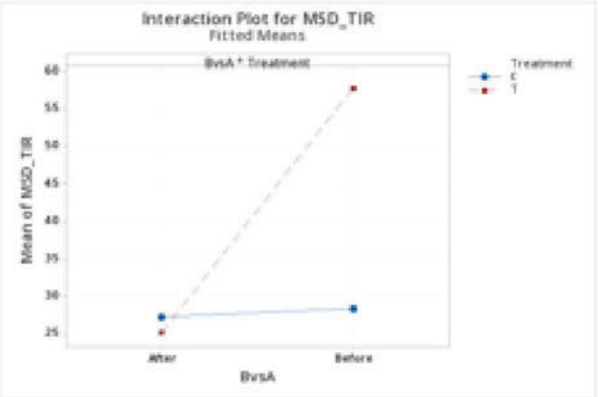
Top 6	WK14-24 vs WK1-13	Bottom 6	WK14-24 vs WK1-13
FTW4	-100%	DTW1	333%
GYR1	-67%	OAK4	254%
DSM5	-61%	DAL3	174%
MGE1	-52%	DCA1	169%
STL8	-52%	TUS2	132%
BFI4	-50%	HOU2	123%

The analysis of variance (ANOVA) below, shows that the interaction between test (BFI4) and control (rest of ARS sites) and the before vs after was statistically significant. The control group did not really change much when comparing MSD TIR before vs after (4/4). BFI4 shows a 50% reduction in MSD TIR after rotations were implemented.

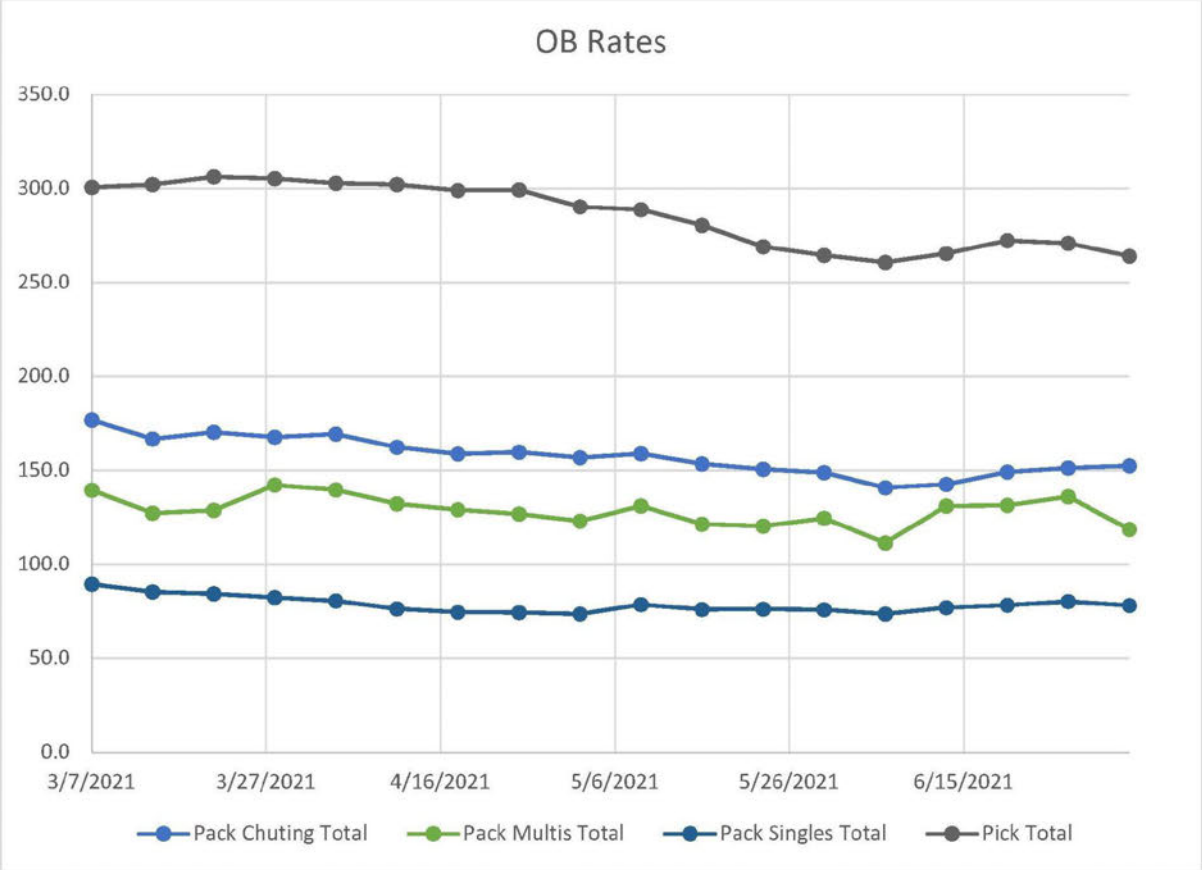
Table 2

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
BvsA	1	10184	10183.9	5.41	0.020
Treatment	1	6876	6876.1	3.65	0.056
Year	1	402	401.9	0.21	0.644
BvsA*Treatment	1	9222	9222.0	4.90	0.027
Error	3884	7316409	1883.7		
Lack-of-Fit	1	721	720.6	0.38	0.536
Pure Error	3883	7315688	1884.0		
Total	3888	7375940			



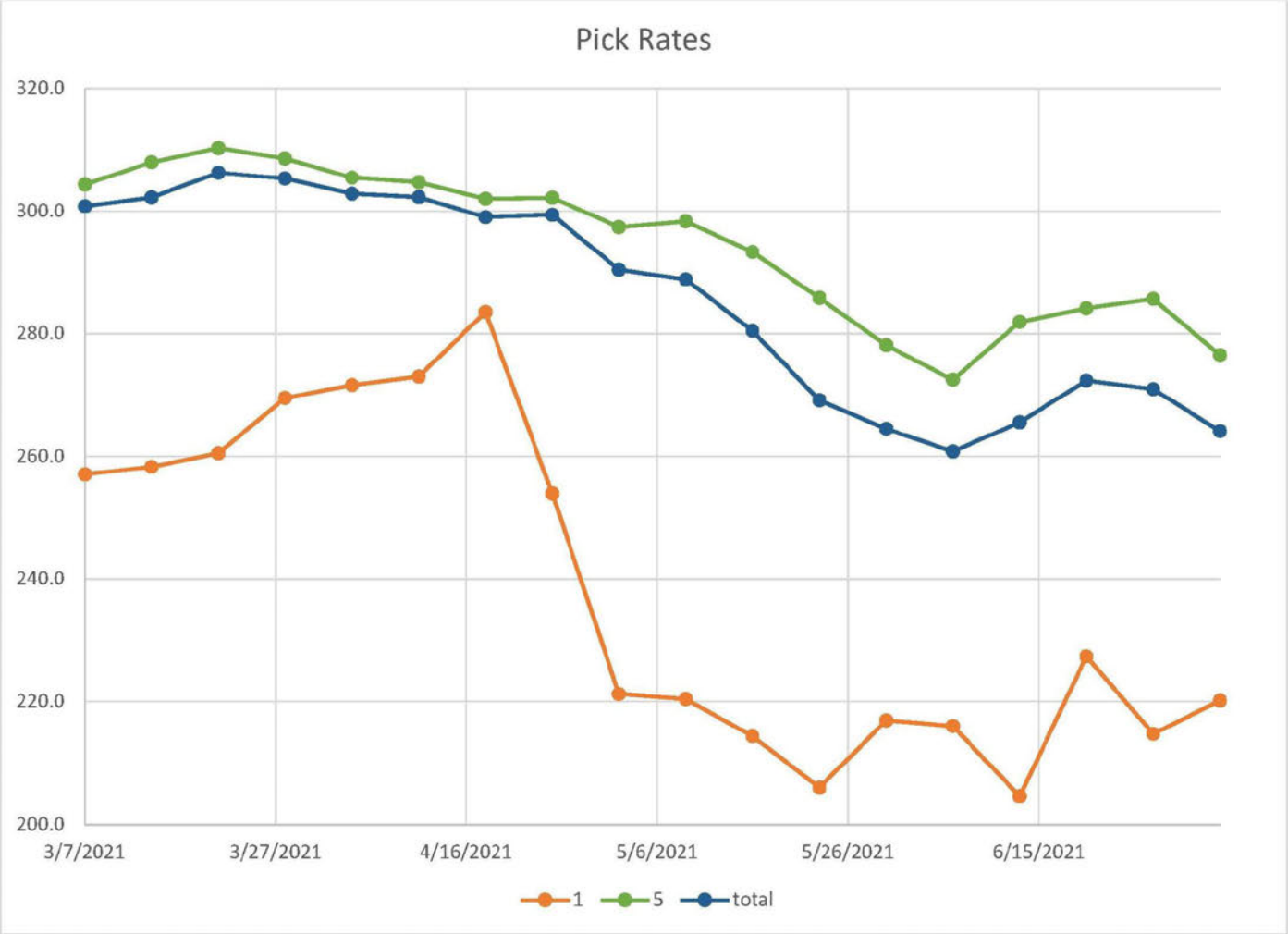
Appendix 2 – Rates



Rate	Pack Chuting Total	Pack Multis Total	Pack Singles Total	Pick Total
3/7/2021	176.9	139.5	89.5	300.8
3/14/2021	166.8	127.3	85.4	302.2
3/21/2021	170.5	128.8	84.4	306.3
3/28/2021	167.8	142.3	82.5	305.3
4/4/2021	169.4	139.8	80.7	302.9
4/11/2021	162.4	132.3	76.4	302.3
4/18/2021	158.8	129.3	74.6	299.0
4/25/2021	159.8	126.9	74.5	299.4
5/2/2021	156.8	123.1	73.5	290.4
5/9/2021	159.0	131.1	78.7	288.8
5/16/2021	153.5	121.5	76.1	280.5
5/23/2021	150.7	120.5	76.3	269.1
5/30/2021	148.9	124.6	75.9	264.5
6/6/2021	140.9	111.5	73.6	260.8
6/13/2021	142.7	131.1	77.0	265.5
6/20/2021	149.3	131.5	78.3	272.4
6/27/2021	151.4	136.1	80.3	271.0
7/4/2021	152.5	118.6	78.2	264.1

Appendix 3 – Pick Rates only by LC

Rate



Rates	1	2	3	4	5	total
3/7/2021	257.1	279.8	290.7	300.7	304.3	300.8
3/14/2021	258.3	274.2	279.4	288.0	308.0	302.2
3/21/2021	260.5	274.8	281.7	280.3	310.3	306.3
3/28/2021	269.5	288.5	284.3	296.9	308.6	305.3
4/4/2021	271.6	278.4	284.4	295.6	305.4	302.9
4/11/2021	273.0	266.6	278.4	297.1	304.7	302.3
4/18/2021	283.5	278.9	280.0	268.5	302.0	299.0
4/25/2021	253.9	278.0	285.6	293.1	302.2	299.4
5/2/2021	221.2	273.2	292.4	308.5	297.4	290.4
5/9/2021	220.4	241.9	275.0	296.5	298.3	288.8
5/16/2021	214.4	252.2	255.7	282.3	293.3	280.5
5/23/2021	206.0	250.2	262.5	257.9	285.8	269.1
5/30/2021	216.9	241.5	259.3	257.4	278.2	264.5
6/6/2021	216.0	240.2	255.2	266.2	272.5	260.8
6/13/2021	204.5	239.2	258.6	268.1	281.9	265.5
6/20/2021	227.4	238.1	257.8	285.9	284.2	272.4

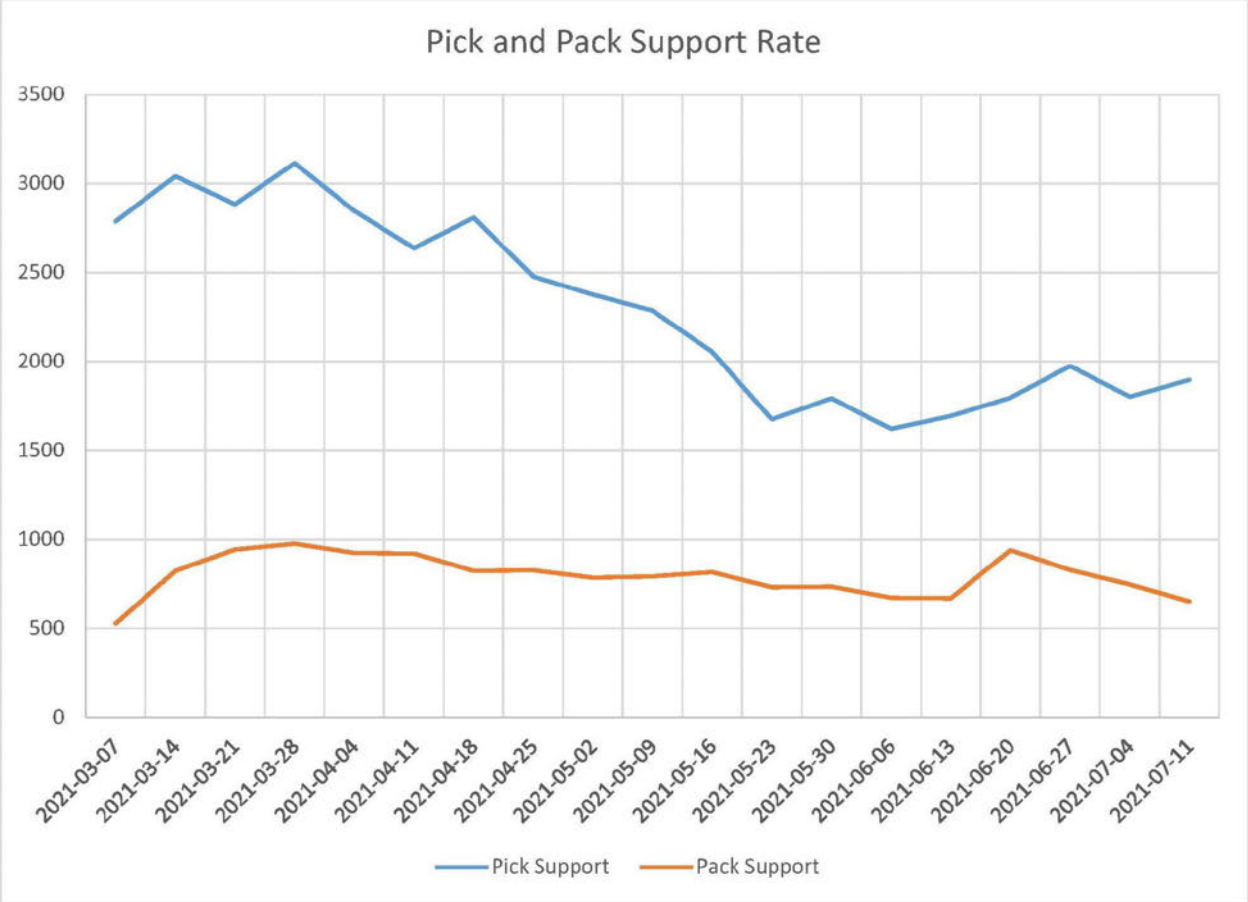
6/27/2021	214.7	241.4	250.0	258.5	285.7	271.0
7/4/2021	220.2	230.6	239.2	245.7	276.5	264.1

Hours	1	2	3	4	5	total
3/7/2021	401.8	240.1	294.9	250.6	7255.0	8442.5
3/14/2021	426.9	438.8	366.7	300.1	7557.0	9089.5
3/21/2021	146.6	329.9	325.5	216.0	7669.2	8687.2
3/28/2021	272.2	301.9	358.1	278.3	7588.6	8799.1
4/4/2021	164.2	284.9	282.7	385.8	7796.9	8914.5
4/11/2021	108.2	271.2	211.7	353.6	8038.3	8983.0
4/18/2021	141.8	309.1	279.3	337.1	8055.3	9122.6
4/25/2021	273.9	278.9	210.4	223.3	8125.3	9111.8
5/2/2021	743.8	426.6	289.0	244.5	7732.4	9436.3
5/9/2021	693.4	518.5	404.1	257.7	7943.3	9816.9
5/16/2021	861.4	510.7	374.2	317.1	6227.4	8290.8
5/23/2021	1542.9	425.0	298.7	367.7	6686.3	9320.6
5/30/2021	1578.8	785.7	439.4	350.2	7156.2	10310.3
6/6/2021	1303.8	1146.7	475.5	334.6	7098.1	10358.7
6/13/2021	1352.8	865.0	551.8	338.4	6612.8	9720.8
6/20/2021	1034.3	1364.1	801.8	492.0	8334.6	12026.8
6/27/2021	696.0	765.4	710.9	297.0	5442.6	7911.8
7/4/2021	765.9	667.6	610.0	450.5	6414.9	8908.9

Appendix 4 - % Of Total Hours at each LC curve for Chuting, Singles, and Pick

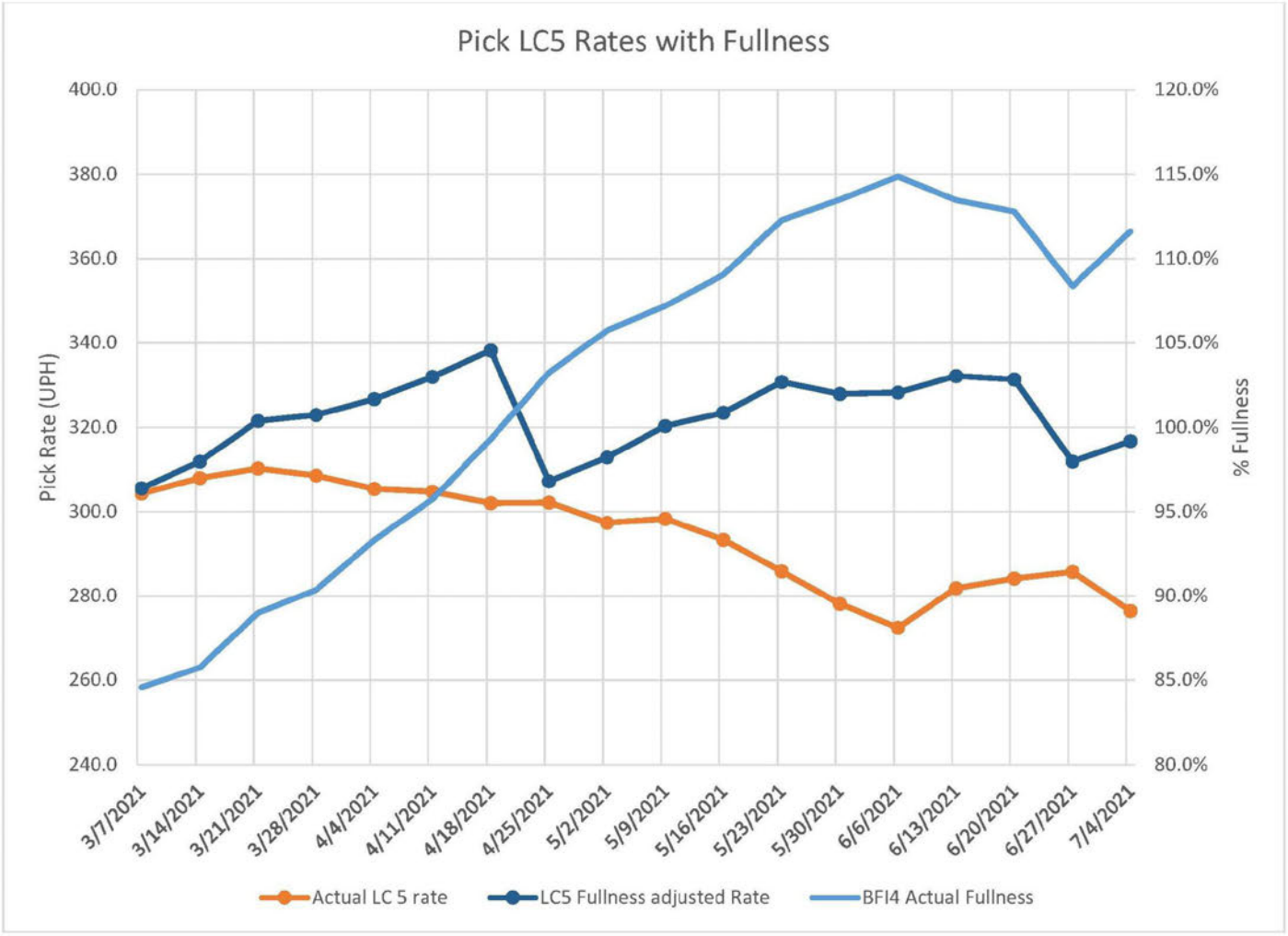
% of Hrs	Pack Chuting					Pack Singles					Pick				
LC	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
3/7/2021	3%	5%	5%	4%	83%	5%	4%	3%	3%	85%	5%	3%	3%	3%	86%
3/14/2021	4%	6%	5%	5%	79%	5%	3%	4%	4%	84%	5%	5%	4%	3%	83%
3/21/2021	4%	6%	6%	5%	78%	5%	4%	3%	4%	85%	2%	4%	4%	2%	88%
3/28/2021	5%	6%	7%	5%	77%	2%	4%	3%	4%	88%	3%	3%	4%	3%	86%
4/4/2021	4%	6%	6%	5%	79%	1%	3%	3%	2%	91%	2%	3%	3%	4%	87%
4/11/2021	6%	5%	7%	5%	77%	5%	4%	3%	4%	84%	1%	3%	2%	4%	89%
4/18/2021	4%	6%	5%	5%	81%	2%	4%	4%	3%	88%	2%	3%	3%	4%	88%
4/25/2021	8%	5%	6%	5%	76%	2%	3%	4%	3%	89%	3%	3%	2%	2%	89%
5/2/2021	10%	5%	6%	6%	73%	1%	3%	4%	2%	89%	8%	5%	3%	3%	82%
5/9/2021	12%	8%	6%	6%	68%	5%	3%	3%	5%	85%	7%	5%	4%	3%	81%
5/16/2021	12%	11%	8%	5%	63%	4%	5%	4%	4%	83%	10%	6%	5%	4%	75%
5/23/2021	13%	9%	9%	4%	64%	4%	5%	4%	5%	82%	17%	5%	3%	4%	72%
5/30/2021	19%	8%	7%	7%	59%	2%	4%	4%	5%	85%	15%	8%	4%	3%	69%
6/6/2021	18%	12%	6%	8%	56%	8%	3%	2%	4%	82%	13%	11%	5%	3%	69%
6/13/2021	18%	16%	8%	5%	53%	9%	3%	3%	2%	83%	14%	9%	6%	3%	68%
6/20/2021	11%	15%	12%	6%	56%	7%	6%	2%	2%	83%	9%	11%	7%	4%	69%
6/27/2021	10%	10%	9%	10%	61%	4%	4%	3%	2%	88%	9%	10%	9%	4%	69%
7/4/2021	11%	7%	8%	8%	66%	3%	3%	1%	2%	91%	9%	7%	7%	5%	72%

Appendix 5 – Support Rates



	Pick Support	Pack Support
2021-03-07	2789.242	527.5328
2021-03-14	3041.912	822.9355
2021-03-21	2883.522	943.3431
2021-03-28	3115.095	976.7098
2021-04-04	2847.034	924.1791
2021-04-11	2637.107	921.4832
2021-04-18	2808.993	823.4187
2021-04-25	2477.9	827.963
2021-05-02	2376.437	785.1767
2021-05-09	2286.89	793.2303
2021-05-16	2054.949	816.6787
2021-05-23	1674.529	732.2346
2021-05-30	1793.668	735.6969
2021-06-06	1621.184	672.2031
2021-06-13	1694.961	669.8808
2021-06-20	1797.341	940.3381
2021-06-27	1975.458	828.6352
2021-07-04	1802.24	747.7669
2021-07-11	1898.074	651.669

Appendix 6 – Pick LC5 normalized for fullness



Week	BFI4 Actual Fullness	Actual LC5 rate	Gap from baseline	Fullness adjustment threshold	Fullness impact per %	LC5 Fullness adjusted Rate
3/7/2021	84.6%	304.3	0.6%	84%	0.007	305.6
3/14/2021	85.8%	308.0	1.8%	84%	0.007	311.9
3/21/2021	89.0%	310.3	5.0%	84%	0.007	321.5
3/28/2021	90.4%	308.6	6.4%	84%	0.007	322.9
4/4/2021	93.3%	305.4	9.3%	84%	0.007	326.7
4/11/2021	95.7%	304.7	11.7%	84%	0.007	332.0
4/18/2021	99.3%	302.0	15.3%	84%	0.007	338.3
4/25/2021	103.2%	302.2	1.2%	102%	0.0132	307.2
5/2/2021	105.8%	297.4	3.8%	102%	0.0132	312.9
5/9/2021	107.2%	298.3	5.2%	102%	0.0132	320.3
5/16/2021	109.1%	293.3	7.1%	102%	0.0132	323.4

5/23/2021	112.3%	285.8	10.3%	102%	0.0132	330.8
5/30/2021	113.5%	278.2	11.5%	102%	0.0132	327.9
6/6/2021	114.9%	272.5	12.9%	102%	0.0132	328.3
6/13/2021	113.5%	281.9	11.5%	102%	0.0132	332.2
6/20/2021	112.8%	284.2	10.8%	102%	0.0132	331.4
6/27/2021	108.4%	285.7	6.4%	102%	0.0132	311.9
7/4/2021	111.6%	276.5	9.6%	102%	0.0132	316.7

Estimating the Impact of Process Path Rotations on KPIs

Summary: Project Soteria proposes process path rotations to reduce injuries, lower attrition, positively affect time off (i.e., reduce UTO and VET), increase productivity (i.e., UPH and VCPU), and improve work experience (as measured by Connections-based job satisfaction scores). While cross-sectional correlation between injury rates and productivity supports this view, there might be reason to question a causal interpretation of this finding. For example, injury rates may be higher among Associates with lower UPT balances because certain types of Associates are especially prone to injury independent of job characteristics. WW Biz Transformation partnered with WW Employee Relations (ER) to estimate a causal impact of process path rotations on key performance metrics (KPIs).

Background: Project Soteria piloted a rotation program at BFI4, providing a natural variation for the analysis. At BFI4, Associates working for more than seven consecutive hours on pick are rotated to one of: pick support, ICQA, pack singles, ship dock, or AFE. At this stage in the pilot, Associates have been cross-trained across process paths and are being rotated automatically.

Empirical Strategy: We propose comparing each KPI between Associates who are eligible for the process path rotations before and after the pilot began. Since there may be other changes occurring at the same time as the pilot, we will need to identify a suitable control group.

- We could use as a control group Associates working in stow, as long as stow injury rates follow pick injury in the site, and Associates working in stow are not included in the rotation program.
- A second choice could be to compare Associates working in pick with longer shifts to those with shorter shifts who do not participate in the program. The suitability of this control group would also depend on whether the trends in, even if not levels of, injury rates among the groups track each other closely.
- A final option would be to use a synthetic control to match BFI4 with similar sites. This option will be most useful if the rotations have significant spillovers on other Associates at the site, or if the parallel trends assumptions for the other two methods do not hold.

Another source of variation to study could be cross-sectional variation across Associates or sites in cross-training. With this methodology, it will be important to carefully control for individual and site characteristics. Individuals who are cross-trained may look different from those who are not. During our site visit at BDL3, we learned from a pick manager that she cross-trains slower, typically older Associates who struggle with pick in count. This cross-training can only occur after 30 days, however. Cross-trained Associates in pick-count could thus have longer tenures and be older than those who are not cross-trained and work in pick. Since both age and tenure could independently influence injury risk, it may be difficult to isolate the influence of path rotations and these underlying characteristics. Understanding the circumstances under which cross-training is somewhat random will be helpful. One option could be to use variation in machine breakdowns or slow packers that cause more pickers to go to their cross trained functions and see how KPIs vary on those days.

Next steps: To develop an analysis plan, it would be useful to get the following information.

1. Where does the 18% estimated reduction in injury odds come from? That was the exp(coef), using the coefficient for Labor_Moves from a logistic regression model (logit link function).
2. Is the rotation program only for Associates working in pick? Why? Does this mean that each site is hiring more pick Associates to compensate, or other Associates from the cross-trained process paths then trained on pick? Initially, it is only for pick (in AR Sortable) since this is the process path with the highest injury count across NACF. This implies that other associates (primarily in Pack Multis, Pack Singles) are getting cross-trained to come to Pick.
3. How were the cross-training paths chosen? Are these common cross-training paths for pick? They are not common cross-training paths for pick; the common processes are in RSP and include ICQA (simple bin count), tote runner, amnesty floor monitoring, and stow. The cross-training paths were selected based on two criteria: a) size of the destination process path (pick is one of the largest cohorts in our FCs), b) ergonomic use of muscle groups that are supplementary to pick.
4. The Project Soteria document mentions a pilot at BFI4 and a pilot with 8 test sites. What is the status of the 8 test sites? We are putting a request to Alicia Boler-Davis in OP1 for the 8 sites to launch a test in Q1 2022.
5. What is the underlying theory for the injury reductions? Should we expect to see a drop immediately after there is increased cross-training, or should it take time? We expect no immediacy on cross-training. However in one of our papers, we assessed the rate profile 45 days prior to an MSD injury taking place. We anticipate that cross-training and rotations will extend this "wear-out" curve.

BFI4 test site

6. When did the pilot start? What exactly does the pilot entail? For which dates will we be evaluating the pilot? Pilot started on 4/4. The rotations targeted pickers on an LC3 minimum, expected to work more than 7.5 hours in pick per shift. They were manually rotated to three process paths: a) tote runner, b) amnesty floor monitoring, c) simple bin count. I am waiting to hear back from our POC at BFI4 to hear about next steps, but as a minimum the rotation test ran from 4/4 through 6/30.
7. Who is included in the pilot? See question 2 specifically for BFI4. Pickers from BFI4 and targeted process paths which include packers, counters, and indirect AAs in RSP.
8. Who is explicitly excluded from the pilot? Perhaps we could construct a control group from those individuals. Flex associates, and others not expected to surpass 7.5 hours in pick in a shift.
9. Why was BFI4 chosen as a test site? What other sites were considered? Perhaps those could be used as a control. I was contemplating using BWI2 and MDW7 as having similar volume, injuries, VTO/VET, pick HC as BFI4. BFI4 was selected by the ARS VP at the time (Scott Anderson) based on the flexibility and leadership in this site.
10. For the pilot, who decides whether the Associate should be cross trained? How is this decision made? Anyone passed LC3 working for more than 7.5 hours per shift is eligible to cross-train. I need more details on here, as there may be some selection bias on who gets cross-trained first.

11. When cross-training individuals for the pilot, who decides which process path the Associate with be cross-trained in? How is this decision made? Perhaps there may be selection to worry about. I need clarity on this.
12. Could we talk to some folks at BFI4 to learn about their experience with the project? Who are your contacts? POC is John Chai and he can give us more Area Managers to give us further perspective.
13. Cross sectional analysis
    a. Why do some sites do more cross training? This is the result of demand and attendance variations. Cross-training is the answer to non-taken VTO.
    b. When does more path rotation occur? TBD.
    c. For which types of Associates would cross-sectional analysis be useful for? Just pick? All Associates? All associates.

Privileged and Confidential | Analysis of Bins, Pods, and UPH

Executive Summary

WHS asked Core AI to conduct analysis of the relationship between the rate of work -- measured by units per hour (UPH) -- and the recordable injury rate (RIR). WHS also asked for analysis of the effects of two policy levers -- pod gapping and bin fullness -- that may influence UPH and RIR. In this document, we summarize the findings of those analyses and recommend next steps for developing and testing policies to reduce the RIR. In short:

1. We find no strong evidence that higher UPH is associated with higher injury. On the contrary, our best estimate shows no statistically significant relationship, and in the data higher UPH is correlated with **lower** RIR.
2. This observational study of the relationship between UPH and RIR may be subject to selection bias: more productive workers may be less prone to injury regardless of other conditions. Caution therefore suggests we should not interpret the negative correlation between UPH and RIR as the causal impact of work rates on RIR.
3. The analyses suggest longer pod gaps or lower bin fullness are unlikely to lower RIR, and might actually raise RIR. Other interventions such as more paid breaks in a shift, or more flexible Unpaid Time off (UPT) policies, might more effectively lower RIR. A small "pilot" experiment in 2022 to test the likely size of impacts could inform a larger, better one in 2023.

Data

We use data provided to us by Project Soteria on July 7, 2022. The data are at daily frequency for Amazon associates (AA) in Pick and Stow process paths in 58 fulfillment centers (FCs) in NACF for the period May 2020 to Mar 2022. We employ three alternative econometric techniques to pin down the relationship between daily UPH and RIR while controlling for various confounding factors. An important limitation is that the data do not allow us to track an individual associate over time, and that precludes an investigation of the relationship between past rate of work and current rate of injury; we are only able to measure the relationship between UPH and RIR on the same day.

UPH and RIR

Our main finding is that the data provide no strong evidence of a relationship between UPH and RIR. Two of the three methods find a negative and statistically significant association -- higher UPH is associated with lower RIR. The third method finds a much smaller negative association that is not statistically different from zero. We caution against interpreting this, perhaps counter-intuitive, finding as causal. Our data are observational, and not generated by an experiment. Our finding could be driven by unobserved confounders, e.g., associates with intrinsically higher productivity might also be intrinsically less prone to injuries.

Policy levers: pod gapping & bin fullness

We find that longer pod gaps are associated with lower UPH, and higher bin fullness with lower UPH, but both have mixed effects on RIR. On net, these findings indicate that an intervention to prolong pod gaps or to decrease bin fullness would lower UPH but have no effect on RIR.

Recommendations

Our findings do not support an experiment to manipulate UPH through pod gapping or bin fullness (or other levers) to test for a reduction in RIR. Instead, we recommend experiments with other interventions that could deliver meaningful reductions in RIR without substantially impairing productivity. One such intervention would be offering more paid breaks during a shift. Another would be increasing UPT and/or PTO allowances. Additional paid breaks are obviously a costly intervention to consider, but so are pod gapping floors and bin fullness caps; risks associated with a temporary increase in paid breaks seem low relative to floors and caps. An experiment at a set of FCs could well test multiple combinations of these policies at once, but the effects are likely to be much smaller than those suggested by this quasi-experimental analysis, and could be of the wrong sign. An experiment should be powered to detect very small impacts (e.g., 1 injury per 2 million hours, an increment to RIR of 0.1), but incorporate optimal stopping rules that monitor outcomes to detect deleterious effects on productivity and/or injury rates. A small pilot in 2022 could well inform us about likely effect sizes to use in powering an appropriately sized experiment.

FAQ

1. Does the observed negative relationship between UPH and RIR imply that UPH can be raised safely?
   No, we cannot draw that conclusion based on the current analysis of observational data. While we adjust for possible confounders for which data are available, there are unobserved confounders that could be generating the negative

relationship. For instance, the more productive associates might also be less prone to injuries. We do adjust for tenure but that does not fully capture productivity. Another explanation could be that some associates report injuries after slowing down i.e., in the data, low UPH precedes and accompanies injuries. Only a carefully designed experiment can credibly measure the *causal effect* of a change in UPH on RIR.

2. Why are the findings reported here different from those reported by Project Soteria?
   Project Soteria's analysis focuses on total, not just recordable, injuries and uses FC-level aggregates. In contrast, our analysis investigates the RIR, and is done at the AA level. We recommended both of these changes to the analysis in our review of Project Soteria's study, shared with WHS on July 13, 2022. Indeed, we find notable differences in the relationship between UPH and RIR when estimated using FC-level aggregates versus more granular AA-level data. Yet another reason for the different findings could be a difference in the methods used. As explained in the main text of the doc, we have used standard linear and non-linear regression techniques.

3. Can further analysis of existing data glean additional insights?
   The data shared by Project Soteria could be augmented in a number of ways to allow for additional useful analysis. First, adding AA identifiers would allow us to track AAs over time, and investigate not just the concurrent relationship between rate of work and injuries, but also the relationship between past UPH and injury. Second, adding bin fullness data at the AA level would allow us to a more careful investigation of the relationships between bin fullness and UPH, and bin fullness and RIR. The data we received only has bin fullness at the FC level. Third, adding intra-day data on bin fullness and pod gapping will let us test whether there are potential gains from smoothing work flow. We understand that such data might be available at 5-minute intervals at the AA-level. Intra-day data on bin fullness and pod gapping will also enable us to directly investigate the effect of policies such as pod gapping floors or bin fullness caps.

Technical Note

Introduction

We seek to understand the relationship between rate of work (units per hour, or UPH) and injury rates after adjusting for possible confounders. One might expect injury rates should depend on the flow rate of packages handled in Pick and Stow paths, so injuries may depend on UPH. However, there are reasons to suppose there is selection, so that an Amazon Associate (AA) who has a high rate of work may also have a lower injury rate i.e., those who are more productive may also be intrinsically less prone to injury. This would result in days with higher (than expected) productivity in a Fulfillment Center (FC), due to random variation in staffing, also having lower injury rates. However, other causal pathways also apply. It may be that associates who face a relatively high UPH target rush to complete work, resulting in a higher injury rate per unit handled, so that UPH and injuries become positively correlated. A UPH target for an FC and day is a policy variable that can be manipulated, but we do not have data on those targets. There are at least two other variables which are amenable to manipulation, bin fullness (average number of units per bin in an FC in a day), and pod gapping (time between pods), both of which appear in our data. However, the measured variables do not correspond to the likely policy of capping bin fullness or setting a floor on pod gaps, so we must bear this caveat in mind while interpreting relationships. Further, variation in the measured variables within an FC across days may arise from changes in the number or types of inducted packages or targets for workflow, or other random variation due to traffic patterns within the FC. We investigate relationships between injury rates, mean bin fullness, pod gapping, and UPH with an eye to a future experiment that could lower injury rates without severely compromising FC operation. That is, we are seeking to generate testable hypotheses using a quasi-experimental analysis of these relationships that suggests strong causal evidence for an experiment that could plausibly identify a desirable policy change. But we must bear in mind throughout that the data we use are observational, and not generated by an experiment. Therefore, the variation is not randomly assigned, and instead results from shifts in demand or supply that shift multiple variables at once to induce spurious correlations.

Additional Caveats

The data shared by Project Soteria on July 7, 2022, does not include any AA identifiers that would allow for a panel analysis at the AA-level. So, we can either conduct a pooled analysis which does not permit us to account for the serial correlation of relevant factors, and does not use only within variation (within AA), or conduct a statistical match of the AA-level data to FC-level data. We have opted for the latter, and constructed a match of the FC-level and AA-level data, using FC-level characteristics common to both viz. *binfulness headcount gen*,* and *unicorn.* We do this for separately for both, Pick and Stow. This results in a matched dataset of 10,163,705 AA-day observations for Pick, and a matched dataset of 13,910,642 AA-day observations for Stow. The match rate is nearly 100% (there are 3 FC's missing from AA-level Pick data and 5 missing from Stow), but there are small gaps in summary statistics by FC-day, presumably because some of the AAs used to compute FC medians are missing from the AA-level data; the correlations are 99% but not perfect. Because some AAs may appear in Pick and Stow data on the same day, we analyze these datasets separately, but obviously it would be preferable to have AA identifiers and track associates over time, to account for the extremely high serial correlation in work attributes and injury rates which we have seen in other data (e.g. the chance an associate is injured falls dramatically directly after a prior injury, which naturally suggests the use of a hazard model for first injury with baseline hazard evolving smoothly over time at risk). Note however that the final panel datasets we have built from data shared by Project Soteria on July 7, 2022, allow for analyzing FC fixed effects, but not AA fixed effects i.e., we do not know which AA's are observed across days, so AA's must be treated as repeated cross sections. We control for calendar week effects in all regressions, and cluster by FC to account for arbitrary serial correlation.

Methods

We investigate the association between UPH and RIR, and the effects of two operational levers (bin fullness and pod gapping) in three different ways. First, we graph the best fitting bivariate nonlinear relationship between injuries and UPH the associate level, with and without adjustment for available confounders at the associate and FC-level. We also graph the relationship between injuries and bin fullness, and between injuries and pod gapping. Second, we estimate linear regression models for injuries as a function of UPH with a host of controls including fixed effects for FCs and for time. Finally, we estimate an Instrumental Variable regression model that UPH productivity of an individual is instrumented by unpredictable FC—level shocks to UPH (UPH residuals from an FC-level regression that are above the 95th percentile, or below the 5th). In the next section, we summarize and briefly discuss the main findings. More technical details and full results are presented in Appendices A to C.

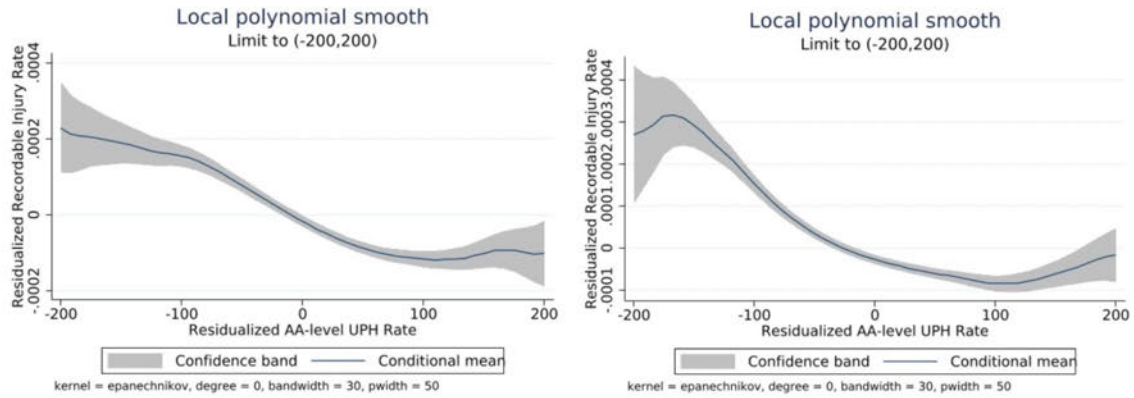
Findings: Relationships Between Injury Rates and Key Variables

Figure 1 graphs how the injury rate varies with UPH at the AA-level. This graph is constructed using residuals from regressions of injury and of UPH on the available set of AA and FC-level characteristics, separately for Pick and for Stow. Using residuals allows us to control for confounders such as age, tenure, gender, FC type, seasonality etc. that can affect the probability of

injury and/or the UPH rate. The figure shows that once we control for confounders, the injury rate falls with increasing UPH at the AA level. We hypothesize this reflects AA-level "frailty" (or, intrinsic likelihood of injury) being negatively correlated with intrinsic skill, which translates into higher UPH directly. An AA working at 250 UPH has an injury rate per day nearly half as high as one working at 100 UPH.

The full set of such bivariate relationships with and without controls for FC characteristics are presented in Appendix A. While our analysis focuses on AA-level data, we also present FC-level relationships. We do so mainly so as to facilitate comparison with Project Soteria's analysis, and also for sake of completeness. In contrast to the AA-level analysis, the FC-level analysis of injuries and UPH produces a confusing pattern (see Figure A1). The FC average results could arise from the fraction of AA's in an FC on a given day whose intrinsic UPH rate is 150 or lower, leading to higher average injury rates on those days.

Figure 1: Residualized RIR vs Residualized AA-level UPH, Pick (left panel) & Stow (right panel)



The residualized local polynomial regressions illustrate an approximately linear effect of UPH on injury rates at both the FC and AA level, with a higher UPH tending to produce lower mean injury rates. Looking at regression tables in Appendix B, we can see the confidence intervals for a regression of the residualized variables on each other, equivalent to a regression that conditions on FC and calendar week fixed effects, with controls for mean age and tenure, FC headcount, percent male, peak, and station type. The inclusion of FC fixed effects and time-varying characteristics mean that UPH is within-FC variation over time, conditional on FC factors, so more plausibly unrelated to confounders and possibly arising from idiosyncratic "as if random" variation in work conditions. Appendix C shows that this holds true in an Instrumental Variables (IV) analysis as well, where UPH productivity of an individual AA is instrumented by unpredictable FC-level shocks to UPH (UPH residuals above the 95th percentile, or below the 5th).

While higher UPH tends to produce lower injury rates when both variables are measured at the AA level, the relationship is a statistical zero when UPH is measured at the FC level - see column (1) of Tables B1 and B3. The striking differences in the findings of the FC-level analysis as compared to the AA-level analysis point towards the importance of AA-level confounders, and support our preference for AA-level results.

Linear regressions predict lower injury rates when the FC-level bin fullness is higher, conditional on other characteristics. Column 6 in Tables B1 and B3 show that this negative relationship is only significant when conditioning on UPH and only for Stow, not for Pick. We note once again that bin fullness is only available at the FC level, and the results might well be different if data were available at the AA-level. So, we do not wish to emphasize the bin fullness finding.

Pod gapping exhibits relatively large partial correlations with injuries; pod gapping is measured in minutes, so a one-unit change is too large and we should probably consider a 0.1 unit change of 6 seconds instead. Those partial correlations are of opposite signs: all else equal, Pick has lower injury rates when pod gapping is longer but Stow has higher injury rates (see columns 5 & 7 of Tables B1 and B3.)

The results in Appendix B on UPH and bin fullness suggest that interventions that lower UPH or bin fullness could lower productivity of AA's while simultaneously increasing injury rates. The results on pod gapping suggest possible heterogeneity between Pick and Stow in the sign of the effect. If an experiment altered minimum pod gaps appreciably, it should be designed carefully with an optimal stopping rule that looks for evidence of deleterious impacts on both productivity and injuries.

Appendix A. Explorations of Nonlinear Effects in Bivariate Relationships

We construct residualized variables by regressing a variable on indicators for peak, calendar week and day of week fixed effects, FC fixed effects and characteristics (FC mean age, tenure, daily headcount, percent male, and type), and AA characteristics (age, tenure, and gender), then saving the residuals from the regression as a measure of the component of the variable that is uncorrelated with those predictable factors.

Injuries and UPH

Fig A1: Recordable Injuries (RI) vs FC-level UPH Rate for Pick (left) & Stow (right)

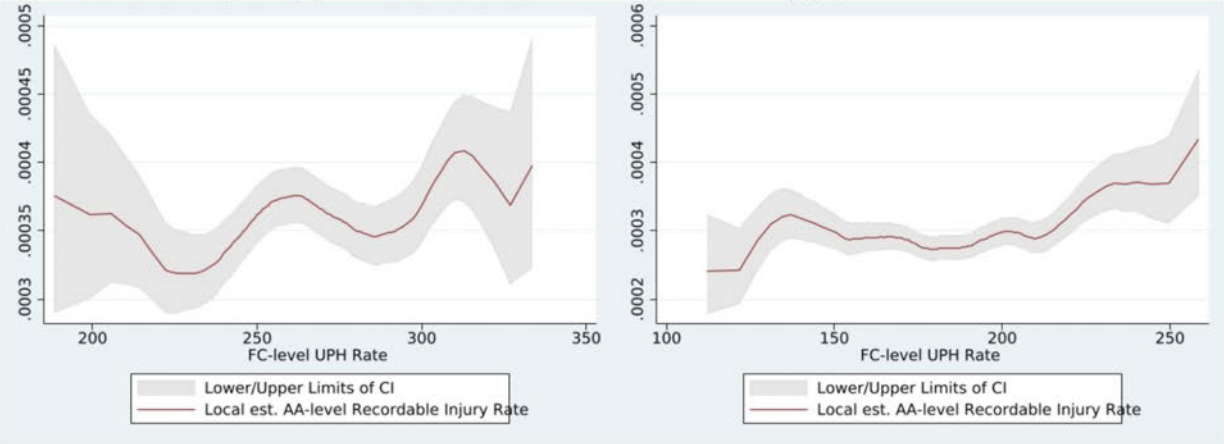


Fig A2: Residualized RI vs residualized FC-level UPH for Pick (left) & Stow (right)

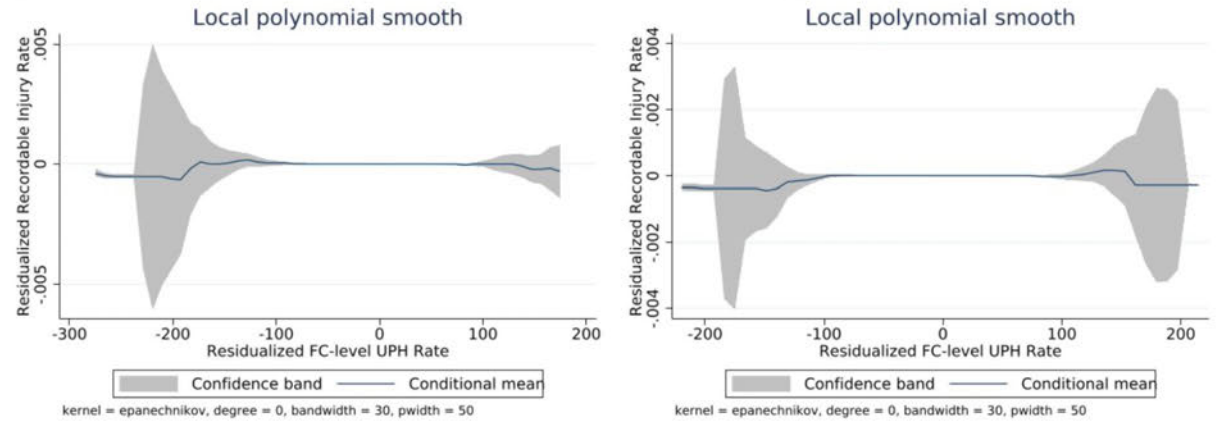


Fig A3: Recordable Injuries (RI) vs AA-level UPH Rate for Pick (left) and Stow (right)

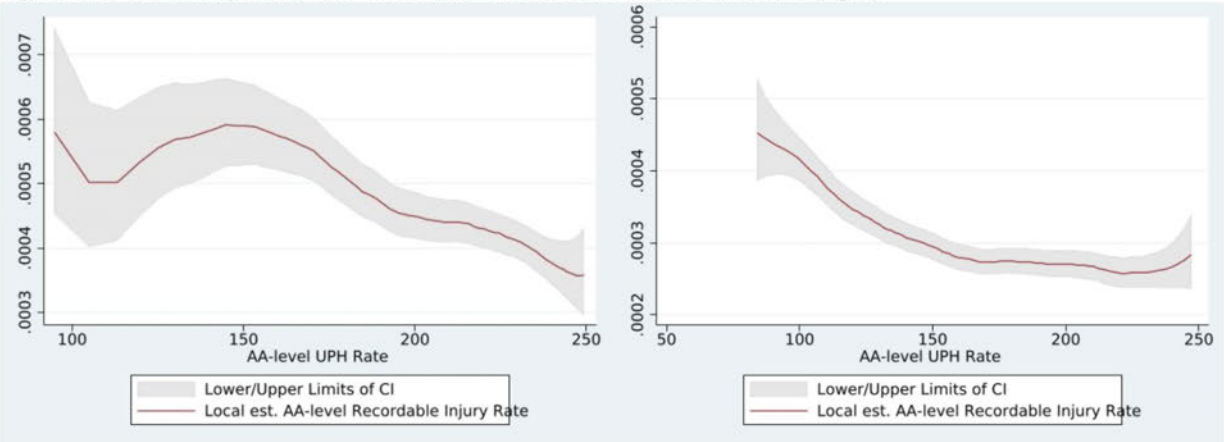


Fig A4: Residualized RI vs residualized AA-level UPH Rate for Pick (left) & Stow (right)

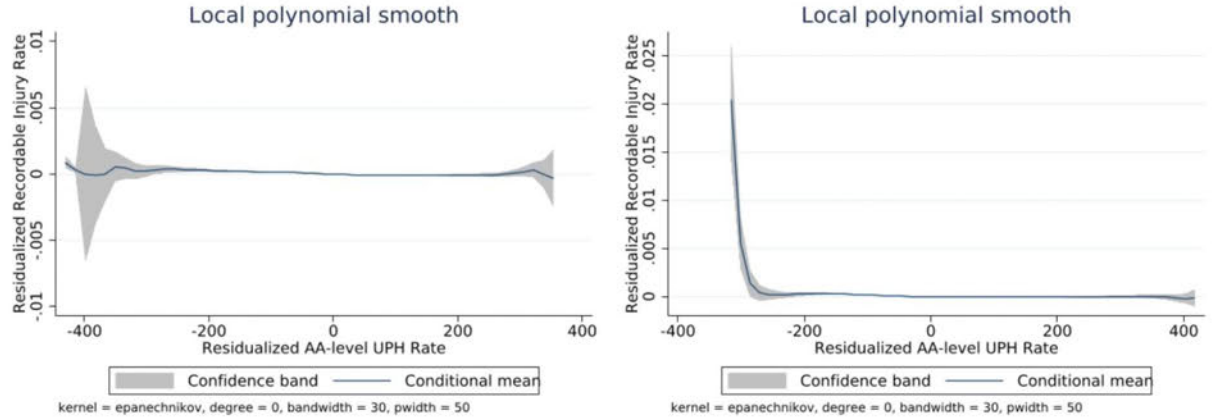
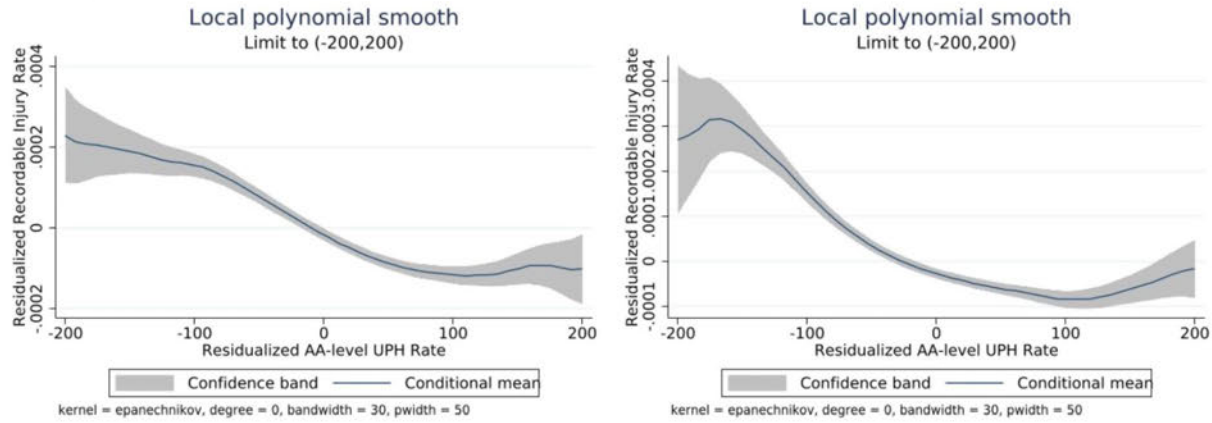


Fig A5: Residualized RI vs residualized AA-level UPH Rate for Pick (left) & Stow (right), Limiting to Residualized UPH in (-200,200)



Injuries and Bin Fullness

Note that bin fullness data are only available at the FC-day granularity; residualized bin fullness is accordingly at the same granularity.

Fig A6: RI vs FC-level Bin Fullness for Pick (left) and Stow (right)

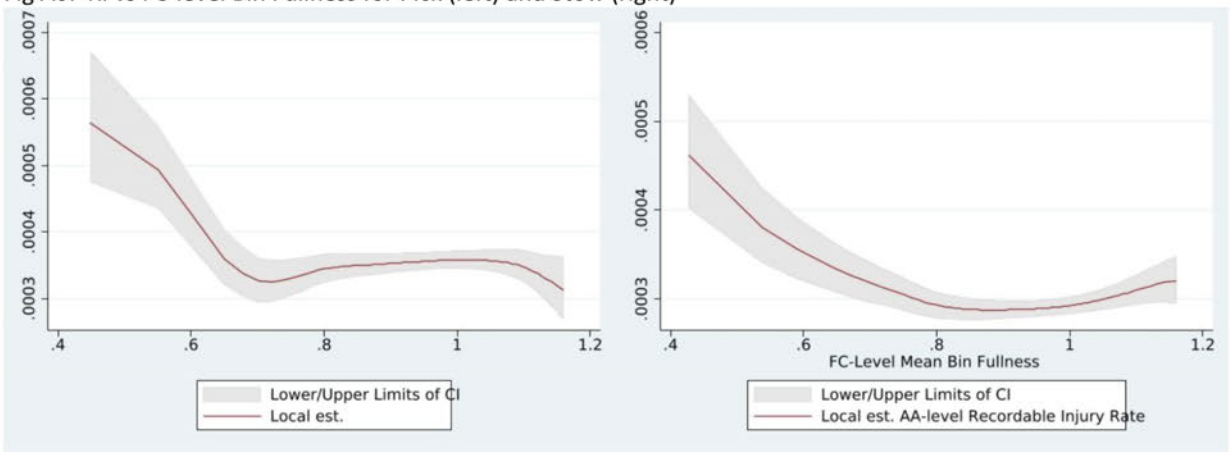
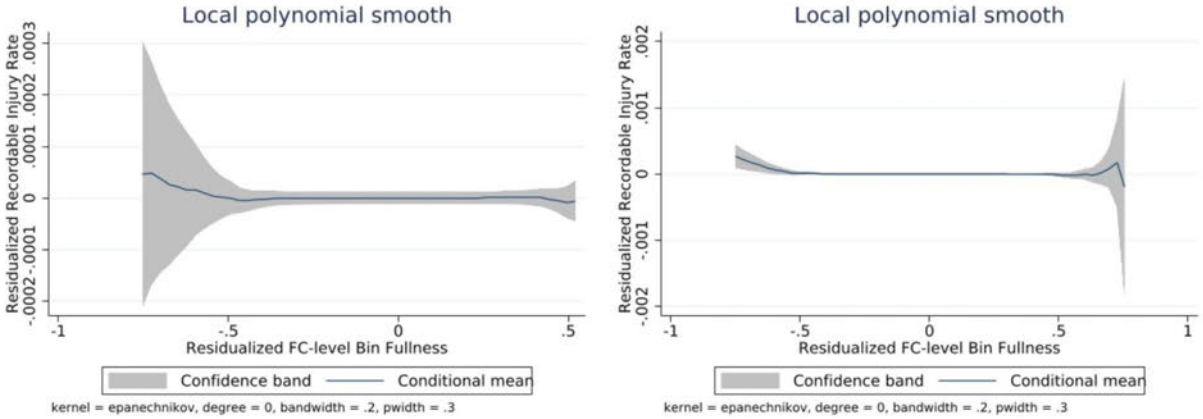


Fig A7: Residualized RI versus residualized FC-level Bin Fullness for Pick (left) and Stow (right)



Injuries and Pod Gapping

Fig A8: Recordable Injuries (RI) vs FC-level median pod gap for Pick (left) & Stow (right)

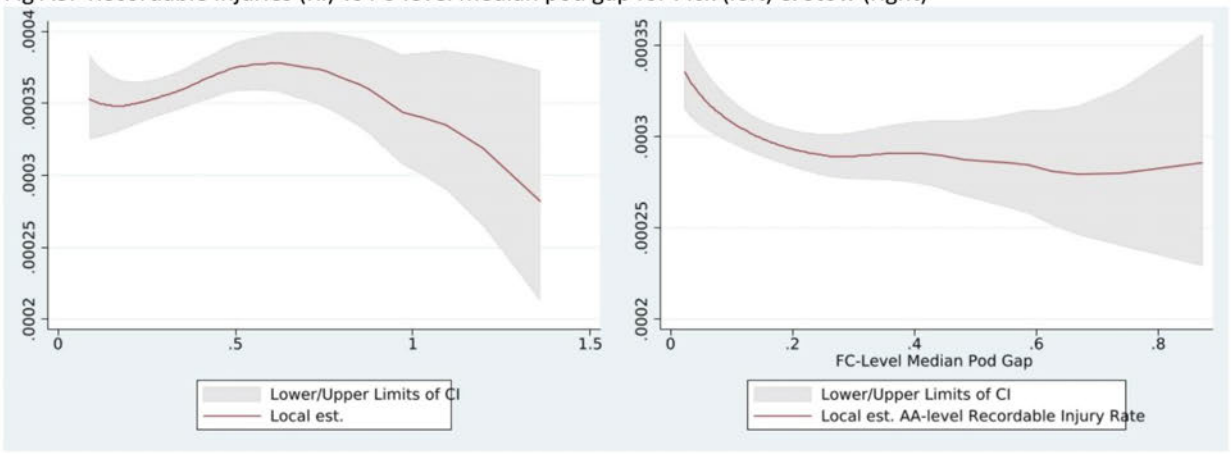


Fig A9: Residualized RI vs Residualized FC-level pod gap for Pick (left) & Stow (right)

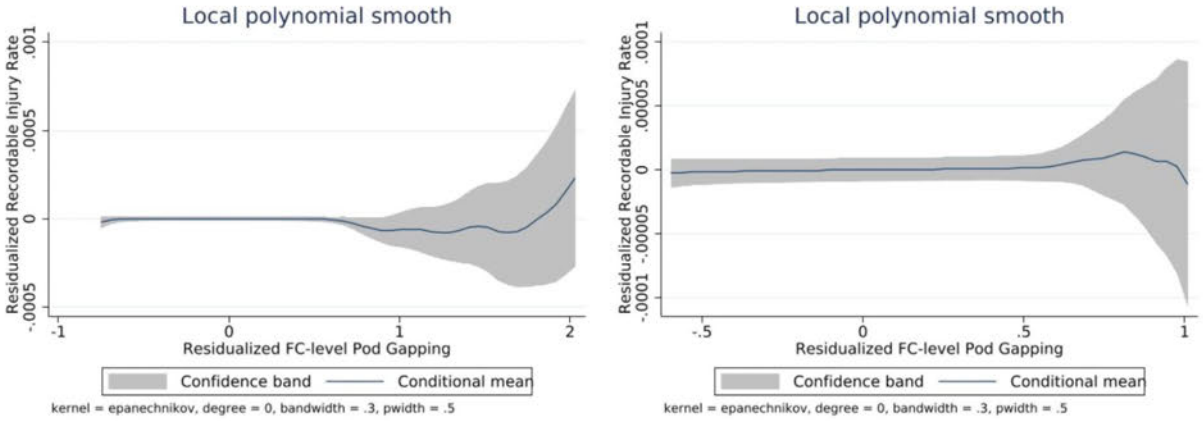


Fig A10: RI vs AA-level Pod Gapping for Pick (left) and Stow (right)

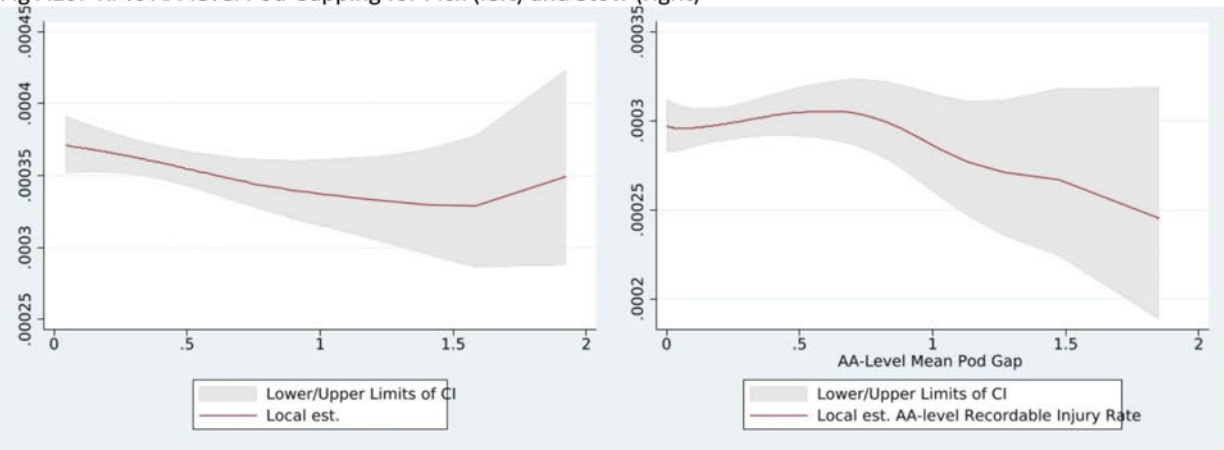


Fig A11: Residualized RI versus Residualized AA-level pod gap for Pick (left) & Stow (right)

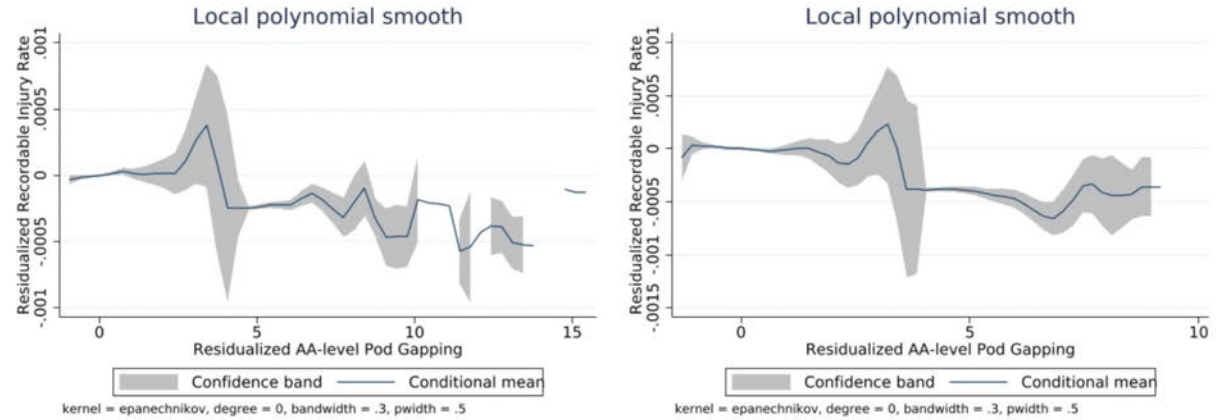
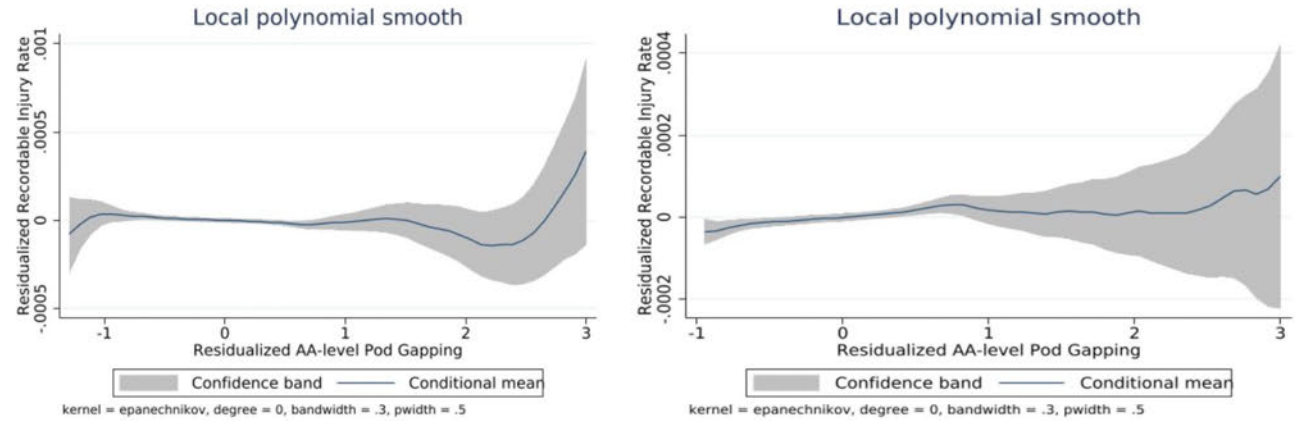


Fig A12: Residualized RI versus Residualized AA-level pod gap for Pick (left) & Stow (right), constrained to residualized pod gap<3)



Appendix B: Linear Regressions with Fixed Effects

Pick

Table B1: Partial correlations of AA-level Recordable Injury Rate

	AA-level RIR						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FC-level UPH Rate	-0.0163 [-0.0414,0.00889]						
AA-level UPH Rate		-0.0374*** [-0.0441,-0.0307]				-0.0375*** [-0.0442,-0.0307]	-0.0375*** [-0.0442,-0.0308]
FC-Level Mean Bin Fullness			0.190 [-4.238,4.618]			-1.551 [-5.989,2.886]	-1.160 [-5.652,3.333]
FC-Level Median Pod Gap				-0.605 [-3.097,1.887]			
AA-Level Mean Pod Gap					-1.274** [-2.110,-0.437]		-1.304** [-2.155,-0.452]
Observations	10163705	10163705	10163705	10163705	10163705	10163705	10163705

Note: Note: Linear regressions for effects on RIR (recordable injury counts for 200,000 working hours), conditioning on age, tenure, gender, FC-level fixed effects and characteristics, calendar week FE, and day of week FE. Significance indicated with * p < 0.05, ** p < 0.01, *** p < 0.001 (95% confidence interval in parentheses account for clustering at the FC level to allow for arbitrary serial correlation).

Table B2: Partial correlations of AA-level UPH

	AA-level UPH			
	(1)	(2)	(3)	(4)
FC-Level Mean Bin Fullness	-46.46*** [-65.99,-26.94]			-46.32*** [-66.02,-26.62]
AA-Level Mean Pod Gap		-1.448 [-4.541,1.646]		-0.478 [-3.668,2.713]
FC-Level Median Pod Gap			-40.00*** [-46.74,-33.27]	
Observations	10163705	10163705	10163705	10163705

Note: Linear regressions for effects on UPH, conditioning on age, tenure, gender, FC-level fixed effects and characteristics, calendar week FE, and day of week FE. Significance indicated with * p < 0.05, ** p < 0.01, *** p < 0.001 (95% confidence interval in parentheses account for clustering at the FC level to allow for arbitrary serial correlation).

Stow

Table B3: Partial correlations of AA-level Recordable Injury Rate

	AA-level RIR						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FC-level UPH Rate	-0.00880 [-0.0249,0.00731]						
AA-level UPH Rate		-0.0285*** [-0.0333,-0.0236]				-0.0292*** [-0.0341,-0.0243]	-0.0289*** [-0.0338,-0.0240]
FC-Level Mean Bin Fullness			-2.206 [-5.540,1.129]			-4.950** [-8.300,-1.600]	-5.268** [-8.684,-1.853]
FC-Level Median Pod Gap				0.820 [-1.479,3.119]			
AA-Level Mean Pod Gap					1.111** [0.442,1.781]		0.735* [0.0512,1.420]
Observations	13910642	13910642	13910642	13910642	13910642	13910642	13910642

Note: Note: Linear regressions for effects on RIR (recordable injury counts for 200,000 working hours), conditioning on age, tenure, gender, FC-level fixed effects and characteristics, calendar week FE, and day of week FE. Significance indicated with * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (95% confidence interval in parentheses account for clustering at the FC level to allow for arbitrary serial correlation).

Table B4: Partial correlations of AA-level UPH

	AA-level UPH			
	(1)	(2)	(3)	(4)
FC-Level Mean Bin Fullness	-93.97*** [-112.6,-75.33]			-86.59*** [-104.8,-68.41]
AA-Level Mean Pod Gap		-17.78*** [-19.63,-15.93]		-15.53*** [-17.40,-13.65]
FC-Level Median Pod Gap			-58.61*** [-71.18,-46.04]	
Observations	13910642	13910642	13910642	13910642

Note: Linear regressions for effects on UPH, conditioning on age, tenure, gender, FC-level fixed effects and characteristics, calendar week FE, and day of week FE. Significance indicated with * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (95% confidence interval in parentheses account for clustering at the FC level to allow for arbitrary serial correlation).

Appendix C: Instrumental Variable Analysis of UPH and RI

In this appendix, we present the results of Instrumental Variable (IV) regression analyses to isolate the relationship between UPH and RI from the effect of confounding variables. There is substantial variation in the workload (as measured by units processed) both, across and within FCs, over time. Much of that variation is non-random; it stems from differences in the age and size of the FC, seasonal patterns, the available headcount, and the composition (e.g tenure, age etc) of that headcount. But some of the variation is inherently random, reflecting unpredictable daily changes to the flow of work and the stock of labor at an FC. On some days, an FC could be busier than usual, all else equal, which implies that associates end up working faster. On other days, associates might end up working at a more leisurely pace because the workload is unexpectedly low and/or the headcount is unexpectedly high. We isolate this random part of UPH, and measure its relationship with RI.

Table C1 summarizes the findings from the IV analysis scaled to the RIR rate as defined by OSHA. There are two key takeaways:

1. The point estimate of the change in RI for a 10 units reduction in UPH is not statistically significant i.e., not different from zero.
2. The confidence intervals are wide ranging from [-0.313, 0.583] for Pick and [-0.127, 0.36] for Stow.
3.

Table C1: IV point estimates & 95% confidence interval for RIR for 10 units reduction in UPH

	Point estimate	z-stat	Lower bound	Upper bound
Pick	0.135	0.59	-0.313	0.583
Stow	0.117	0.74	-0.127	0.36

Notes: The effects reported are for the OSHA RIR metric which measures RI counts for 200,000 working hours. To convert from the estimates in Table B3 that are the changes in probability of an RI for an AA at the daily level, we assume that the typical AA-day is 8 hours. Next to rescale to the OSHA metric we multiply those effects by 200,000/8=25,000, and then by -10 to get the effect of a 10pt reduction in UPH.

More formally, we 'instrument' for the endogenous UPH, separately for Pick and for Stow as follows.

Step 1: Construct the instrument

$$U_{jt} = \alpha_j + \alpha_t + \beta X_{jt}$$

We regress the total output (units) at FC *j* in day *t* on FC fixed effects, day fixed effects, and a vector of FC-day level covariates. The latter includes a spline in headcount, counts of associates in 5 different tenure bins, counts of associates in 5 different age bins, the fraction of associates that are male, and total hours worked. In other words, we include all observed covariates that could explain the FC output on a given day. The instrument is constructed from the predicted residuals (*e*) from the above FC-day level regression. Specifically, we define the instruments as dummy variables that take the value 1 in the right (95th percentile and higher) or left (5th percentile or lower) tails of the distribution of the residuals:

$z_{95}=1(e>e_{95th})$
$z_{5}=1(e<e_{5th})$

The instruments capture the 'big' unpredictable changes to workload at the FC-day level.

Step 2: Check the 1st stage

We check the ability of the FC-day level instrument to predict the UPH of associates by running the following AA-day level regression:

$$uph_{ijt} = \gamma Z_{jt} + \alpha_j + \alpha_{month} + \beta X_{ijt}$$

Step 3: IV regression

We believe that *uph* is endogenous in the following regression:

$$RI_{ijt} = \alpha_j + \alpha_{month} + \theta uph_{ijt} + \beta X_{ijt}$$

We instrument for *uph* using z_{95} and z_5 that we constructed in step 1.

Results

Table C2: IV 1st stage

	Pick	Stow
z_{95}	19.79***	23.25***
	(1.74)	(1.44)
z_5	-28.78***	-31.12***
	(1.34)	(1.41)
Observations	10,163,705	13,910,642
R-squared	0.1547	0.1629
F-stat (excluded)	291.15	409.672

Notes: The excluded instruments, z_{95} and z_5, are the 95th and 5th percentiles of the residuals of the FC-day level regressions; see main text for details. The other instruments are FC and month FE, age (in years), tenure (in days) and a dummy for male gender. Robust standard errors clustered on FC are in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

As displayed in Table C2, the 1st stage is strong for both Pick and Stow IV regressions. The IV estimates are displayed in Table C3. The OLS estimates are shown for comparison. Note that the OLS estimates are negative and statistically significant, while the IV estimates are close to zero and statistically insignificant.

Table C3: IV estimates

	Pick		**Stow**	
	OLS	IV	OLS	IV
uph	-1.47E-06***	-5.39E-07	-1.13E-06***	-4.69E-07
	(1.39E-07)	(9.15E-07)	(9.55E-08)	(4.97E-07)
Observations	10,163,705	10,163,705	13,910,642	13,910,642
R-squared	0.0002	0.0002	0.0002	0.0001

Notes: Regression at AA-day level . The excluded instruments for rate are z_{95} and z_5 (1st stage reported in table C2), FE for month and FC, and associate age, tenure, and a dummy for gender. Robust standard errors clustered on FC are in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The RIR is higher for newer AA, and we run the IV separately for associates with less than 1 month (31 days) of tenure. As shown in Table C3.1, the estimates remain qualitatively unchanged.

Table C3.1 IV estimates for new AA (tenure <31 days)

	Pick		Stow	
	OLS	IV	OLS	IV
uph	-1.60E-06***	-1.88E-07	-1.22E-06***	-5.80E-07
	(1.63E-07)	(1.24E-06)	(1.19E-07)	(7.81E-07)
Observations	6,395,147	6,395,147	8,504,214	8,504,214
R-squared	0.0002	0.0002	0.0002	0.0002

Notes: Regression at AA-day level . The excluded instruments for rate are z_{95} and z_5 (1st stage reported in table C2), FE for month and FC, and associate age, tenure, and a dummy for gender. Robust standard errors clustered on FC are in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

BEFORE THE BOARD OF INDUSTRIAL INSURANCE APPEALS

STATE OF WASHINGTON

IN RE: AMAZON.COM	)	DOCKET NOS.	21W0156
	)		22W0000
	)		22W0056
CLAIM NOS. 317961850	)		22W0121
317964648	)		
317965157	)		
317965723	)		
	)		

Stephen Pfeifer, Industrial Appeals Judge

Hearing taken at 2815 Second Ave, Suite 550
Seattle, Washington

Scheduled: 9:00 a.m. Actual: 9:02 a.m. End: 2:52 p.m.

Tuesday, October 3, 2023

REPORTED BY: Wade J. Johnson, CCR #2574

A P P E A R A N C E S

Stephen Pfeifer, Industrial Appeals Judge

For the Employer, Amazon.com Services, LLC DBA Amazon.com:

Jeffrey B. Youmans
Danielle Kim
Joseph P. Hoag
Davis Wright Tremaine

For the Department of Labor & Industries:

Elliott Furst
Sarah Kortokrax
Assistant Attorneys General
Washington State
Office of the Attorney General

Also Present:

Lynn Hendrickson, BIIA
Nick Miller, DWT paralegal
Andrea Carino, DWT paralegal
Vanessa Lee, Amazon
Sara Hollister, L&I

I N D E X

* * *

215	Undated. Project Soteria. Estimating the Impact of Process Path Rotations on KPIs.		148
705	Analysis of Bins, Pods, and UPH.	100	

JUDGE PFEIFER: This is a continued hearing before the Board of Industrial Insurance Appeals concerning the ergonomics and other citations against Amazon by the Department. The lead Docket number is 21 W0156, and today is October 3rd, 2023.

And we're continuing with Amazon's case-in-chief, and Amazon has identified witnesses it will be calling this morning.

So show us off the record.

(A brief recess was taken.)

JUDGE PFEIFER: Back on the record.

Raise your right hand.

KAREN GAMBREL, witness herein, having been first duly sworn on oath, was examined and testified as follows:

JUDGE PFEIFER: All right. You may be seated.

And I understand, Ms. Kim, you're going to be asking direct examination questions?

MS. KIM: Yes, I will be, Your Honor.

JUDGE PFEIFER: Ms. Kortokrax, we've discussed that Mr. Furst isn't here; however, you've

assured me that it was the plan that you would ask cross-examination questions of our witnesses this morning.

MS. KORTOKRAX: Yes, Your Honor.

JUDGE PFEIFER: Great. We'll proceed.

Ms. Kim.

DIRECT EXAMINATION

BY MS. KIM:

Q. Good morning, Ms. Gambrel.

A. Hi.

Q. Good morning. Who is your employer?

A. Amazon.

Q. And when did you start working for Amazon?

A. It would have been October 26th, 2020.

Q. And if you could, maybe just speak up a little bit to help our court reporter.

A. Oh, I'm sorry. My throat is kind of --

Q. I'll try to do the same.

JUDGE PFEIFER: We're trying to make sure our court reporter transcribes everything accurately. So you can be as loud as you want.

THE WITNESS: Thank you.

Q. (By Ms. Kim) Was that September 2020 that you said you started working for Amazon?

A. October.

Q. And what facility did you start working at?

A. I work at Amazon fulfillment center in Kent.

Q. And is that also known as BFI4?

A. Yes.

Q. And do you still work at BFI4?

A. Yes.

Q. And are you currently an associate or a manager?

A. Associate.

Q. And what process paths have you worked at while at BFI4?

A. I started out in Stow, then I was trained in AFE, Pack Singles, loading dock, outbound loading dock, and ICQA.

Q. And did you also work in Water Spider?

A. Yeah, I know Water Spider.

Q. And when you said outbound Ship Dock, do you also mean Fluid Load and Scanning?

A. Yes.

Q. Have you also worked in ICQA.

A. Yes.

Q. And could you please explain, just for the record, what is ICQA?

A. ICQA is kind of like an inventory. The pods

come up, we take everything out of the pods, count items, and enter it into the scanner. If it beeps at us, then we recount it again, put it in, and enter the final number into the scanner.

Q. And why did you start working in ICQA.

A. I was having a heart issue, and so I had to have heart surgery. So I asked if there was something else I could do other than Stow because it became hard for me to lift items. And they had told me that, yeah, they could transfer me to ICQA.

Q. And so you said you had asked to work in ICQA because of your heart condition.

A. Yeah.

Q. Did you request that, or was that management's idea?

A. I requested a different path.

Q. And did you feel comfortable talking with your manager about this request?

A. Oh, yeah.

Q. And how did you feel BFI4 management addressed this issue?

A. They addressed it as soon as possible.

Q. Did you feel they were supportive?

A. Yes, I did.

Q. And you don't need to go into anymore detail

about your medical condition, but is it correct that you had to take some time off while you were working in ICQA?

A. Yeah, I took three months off.

Q. And when you returned to work, what process path did you return to work in?

A. I returned to ICQA.

Q. And how were things for you when you returned to work in ICQA?

MS. KORTOKRAX: Objection, Your Honor, the relevance.

JUDGE PFEIFER: Go ahead.

MS. KIM: If I can respond to that.

Yeah, Your Honor, so there's been some allegation in this case that Amazon treats its workers poorly. And so the purpose of this testimony is to just respond and show how Amazon treats its workers after they return to work after an injury.

Yeah, and this also relates to the process path that Ms. Gambrel has worked in after she returned to work, which is coming back to her cited process path.

JUDGE PFEIFER: Ms. Kortokrax, did you have something to say? I didn't catch it.

MS. KORTOKRAX: No, Your Honor.

JUDGE PFEIFER: I'm going to overrule the objection. You asked about her returning to work after her three months off and returning to ICQA. Can you ask the next question because I've forgotten it.

MS. KIM: The question I just asked?

JUDGE PFEIFER: Yes.

MS. KIM: Yeah, I can repeat that.

Q. (By Ms. Kim) So the question was: You testified that you had to take some time off for your heart condition. Is that correct?

A. (Nods head.)

Q. And when you returned to work, what process path did you return to?

A. ICQA.

Q. Okay. And how were things for you in ICQA when you returned?

MS. KORTOKRAX: Your Honor, I do have to object. I don't think ICQA is a cited process path.

JUDGE PFEIFER: It's not.

MS. KIM: I'll get there.

JUDGE PFEIFER: But we're getting there.

Q. (By Ms. Kortokrax) Would you like me to ask the question again?

A. No. Things were good when I returned. I started having some complications due to my medical,

where I was kind of having brain fog, so it became hard for me to count. So I then let my manager know that "Hey, this is really not working out. I would prefer to go back to Stow." And so they said that they would transfer me back to Stow.

Q. Okay. And were you transferred back to Stow?

A. Yes.

Q. And did you feel physically able to work in Stow?

A. Yeah, physically, I was able to work. It was the mental thing that I was having issues with.

Q. And were you medically clear to work in Stow, as well?

A. Yeah. I just needed to go into my doctor, get a note saying I was cleared.

Q. Ms. Gambrel, did you receive any safety training when you started at BFI4?

A. We received safety training when we start, and then we get it once a month.

Q. And did that safety training include information about proper body mechanics?

A. Yes.

Q. And what body mechanics information did you learn in that training?

A. So it focuses on the muscles, how to use the

muscles for specific lifting, bending, turning, and we get that once a month.

Q. Did that training also include information on how to work in your power zone?

A. Yeah. It covers a lot of lifting and what to do and what not to do.

Q. Did you receive that training before or after you started working in various process paths?

A. You receive it when you first start. They do an orientation. And then, like I said, we do it every month.

Q. Did you receive any training on what to do if you experienced workplace injuries or aches or pains?

A. Yeah. Our manager -- we have what's called stand up twice a day, in the morning and then after lunch, and they always cover that, what we're to do, and not to ignore it, but to report it.

Q. And were you trained to report any symptoms of aches and pains as soon as they occurred?

A. As soon as they occur. And a manager will try to send you to AmCare. It's up to you if you want to go, but they recommend you go to AmCare and get checked.

MS. KORTOKRAX: Your Honor, I need to object to this line of questioning. Amazon has time

and again precluded the Department from presenting evidence on AmCare and reporting injuries saying it wasn't relevant, and we haven't been able to. And I think at this point, either they've opened the door to us presenting evidence of that or this evidence should be excluded.

JUDGE PFEIFER: I have to confess I don't recall what evidence about AmCare that the Department wanted to present.

MS. KORTOCRAX: That was part of their motion in limine, Your Honor, if I recall correctly.

JUDGE PFEIFER: Well, let's take that up after the witness testifies.

Next question.

MS. KIM: I can withdraw that question, as well.

JUDGE PFEIFER: Okay.

MS. KORTOCRAX: I'm sorry, is her answer stricken then, just to clarify?

JUDGE PFEIFER: No.

MS. KIM: That's okay.

JUDGE PFEIFER: The answer's not stricken. We'll take up this issue after the witness testifies.

Q. (By Ms. Kim) Ms. Gambrel, you testified about

these stand-up meetings.

A. Yes.

Q. Who attended them?

A. We all attend them in the morning.

Q. And are they mandatory?

A. They're not mandatory, but they are part of our morning routine.

Q. And did these stand-up meetings discuss anything related to body mechanics or ergonomic safety?

A. They discuss our safety for the day and what's going to go on throughout the day.

Q. Has anyone ever, at BFI4, observed you work to determine if you were using proper body mechanics, such as lifting and bending properly, that kind of thing?

A. There's people that go around all day and check us. I've had a PA, which is like a manager's assistant, correct me once out of my three years there on my bending process, but I've explained that I've got a knee issue, and he said, "Okay, but, that can cause back injury after a long time."

Q. And what was the result after the PA came and talked to you about this?

A. He just suggested it, we had a conversation about it, and I just went back to work.

Q. And did you continue to -- did you follow the

coaching provided to you by the PA?

A. Yes, to the best of my ability.

Q. Do you know if the safety team, would ever do inspections for work areas?

A. Safety team comes through a couple times a day.

Q. Okay. And how do you know that?

A. Because you see them.

Q. You see them on the floor?

A. You see them. And if four-wheelers turn the wrong way, they'll let you know "Hey, turn the handle this way when you park it." Or they're just going through -- they take time and walk through and examine all the different areas.

Q. Do you know if the safety team would include making sure if associates were following their safety training?

MS. KORTOCRAX: Object to personal knowledge. Foundation.

JUDGE PFEIFER: Ms. Gambrel, would you just limit your answer to what you experienced, please.

THE WITNESS: Yes.

JUDGE PFEIFER: I'm not chastising you.

I'm just saying, you need to ask her about her experience, please.

MS. KIM: Would you like me to reask the question?

JUDGE PFEIFER: Yes, with the word "what has she experienced."

Q. (By Ms. Kim) Ms. Gambrel, from your experience, do you know if the safety team would make sure associates are following their safety training?

A. Yeah. They make sure that, like I had three hands -- or a hand and both feet -- on the stairs. You have to have three points of contact at all times.

Q. And would that also include proper body mechanics information, such as lifting and proper bending?

A. Yes. They make sure that, if you're lifting something that's too heavy -- one time he did stop me and ask me to get someone else to help lift, so team lifting.

Q. Do you recall the Department of Labor & Industries inspecting BFI4 in 2021?

A. Yes. I was called into the office.

Q. Okay. Do you recall somebody interviewing you from L&I?

A. Yes.

Q. Do you recall L&I asking you about whether you received safety training?

A. Yes.

Q. And what did you tell L&I?

A. I told them the same thing I told you, that we receive training every month.

Q. Did you tell L&I that you were trained to let managers know if you were injured and to report any concerns that you had, as well?

MS. KORTOKRAX: Same objection about reporting injuries. Again, this is something Amazon has refused to acknowledge in discovery and motions to limine.

JUDGE PFEIFER: We will talk about it later.

Overruled.

Do you remember the question about what you told L&I?

THE WITNESS: No.

Q. (By Ms. Kim) I can ask the question again.

A. Yes, please.

Q. Do you recall telling L&I that you were trained to let managers know if you were injured?

A. Yes.

Q. And during L&I's inspection at BFI4, did anyone from Amazon tell you to work more slowly while they were on-site?

MS. KORTOKRAX: Objection. Calls for hearsay.

JUDGE PFEIFER: Overruled.

You may answer.

A. No.

JUDGE PFEIFER: No.

Q. (By Ms. Kim) Have you ever felt pressure to work at a particular speed while at work?

A. No. No.

Q. Has any manager ever told you to work faster?

MS. KORTOKRAX: Objection. Calls for hearsay.

JUDGE PFEIFER: Overruled.

You may answer.

Q. Would you like me to ask the question again?

A. No.

I did have one manager, when I was in -- I went to AFE for labor share, and he had come up to me and asked me what he could do to get me to work faster. And I told him I was going at the speed that I was comfortable at. And needless to say, two weeks later, that manager was gone. He had several complaints.

MS. KORTOKRAX: Objection. Calls for hearsay, lack of foundation, as to how she knows why the manager left or what the complaints were.

JUDGE PFEIFER: Overruled.

Q. Were there any other instances where another manager told you to work faster?

A. No.

Q. Do you feel that you've been able to do your job at BFI4 while following your safety training safely?

A. Yes, I do.

Q. And have you ever been disciplined for not working fast enough?

A. No.

Q. Were you ever coached for low productivity?

A. No.

Q. Have you experienced a workplace injury at BFI4?

A. Yeah, my first day of work.

Q. And what happened?

A. It was my first day. I had only been there a few hours. I was up on the ladder and didn't realize there were three steps. And the coach that was coaching me came up to say something to me, and I stepped down off the ladder, not realizing there was a third step, and I fell backwards into some totes.

Q. Have you experienced any other injuries?

A. No.

Q. During your time at BFI4, have you felt like Amazon cares about the safety of its associates?

MS. KORTOKRAX: Objection. Lack of foundation, personal knowledge.

JUDGE PFEIFER: Overruled.

You may answer what your opinion is.

A. Yes, I feel they do.

Q. Why do you feel that way?

A. Just because of all the coaching that we get, the managers are coming through every day to check on us, the PAs check on us throughout the day, and it's always the topic at our stand-ups in the morning and after lunch.

Q. And do you enjoy working for Amazon?

A. I do.

Q. Why?

A. I feel that, out of all the jobs that I've had, that they care the most.

MS. KIM: I don't have any more questions, Your Honor.

JUDGE PFEIFER: Thank you, Ms. Kim.

MS. KORTOKRAX: Just a second. I'm not sure I have any other questions.

JUDGE PFEIFER: Show us off the record.

(A brief recess was taken.)

MS. KORTOKRAX: I don't have any questions, Your Honor.

JUDGE PFEIFER: Thank you, Ms. Kortokrax.

Ms. Gambrel, thank you very much for your time and testimony.

THE WITNESS: You're welcome.

JUDGE PFEIFER: You're excused as a witnesses.

Show us off the record.

(A brief recess was taken.)

JUDGE PFEIFER: Would you stand with me, and I'll swear you in after Mr. Hoag calls you as a witness.

Mr. Hoag?

MR. HOAG: Yes, Your Honor. Amazon calls Jarrett Dorband.

JARRETT A. DORBAND, witness herein, having been first duly sworn on oath, was examined and testified as follows:

JUDGE PFEIFER: You may be seated. Thank you very much. Some of us here in this room are soft-spoken, but we would like you to speak loudly so

our court reporter can transcribe your testimony.

THE WITNESS: Understood.

JUDGE PFEIFER: That goes for you, too, Mr. Hoag.

MR. HOAG: Yes, your Honor.

JUDGE PFEIFER: Go ahead. Mr. Hoag. Thank you.

MR. HOAG: Thank you, Your Honor.

DIRECT EXAMINATION

BY MR. HOAG:

Q. Good morning, Mr. Dorband. Thank you for being here today.

A. You're welcome.

Q. Mr. Dorband, who is your employer?

A. My employer is Amazon.

Q. Okay. And when did you start working for Amazon?

A. I started first as a temp, back in December of '16.

Q. Okay. And at some point, did you convert to a full-time employee?

A. Yeah, that was August of '17.

Q. Okay. And what facility did you start working at initially?

A. At BFI4.

Q. And what city is BFI4 located in?

A. It's in Kent.

Q. And what position were you hired into?

A. I hired into a warehouseman.

Q. Is that -- sometimes we've heard the word "associate" -- is that the same thing?

A. Associate, yes. It's the same thing, yeah.

Q. Were you working at BFI4 in September 2021?

A. I was.

Q. What was your position at the time?

A. I was still an associate.

Q. Okay. Do you recall the Washington Department of Labor & Industries conducting an inspection at BFI4 in September of 2021?

A. I do. I was, yes.

Q. Do you recall someone from L&I interviewing you regarding your work experiences at BFI4?

A. I was interviewed.

Q. Do you recall very much about the topics or subjects that you and L&I discussed?

A. We talked about various working methods on how we did our job, things like how we load trailers, I think we briefly discussed about ergonomics of how we did our job.

Q. Okay. Do you recall what you informed L&I about any of those issues?

A. One of them I do remember talking how we loaded trailers, how we have a MaxxReach thing, that's a big, gigantic conveyor that goes all the way into the back of the trailer that allows us just to stand still as we're loading into the trailers.

Q. Do you recall discussing your views with L&I on whether you believed Amazon was a safe place to work?

A. I do, yeah.

Q. And do you recall what you shared with L&I about that?

A. I do. I believe that Amazon was a safe place to work.

Q. Okay. And just so the record is clear, did you inform L&I of that view?

A. I believe I did, yes.

Q. During the L&I inspection in September 2021, did anyone tell you to work more slowly while L&I was on-site?

A. No.

MS. KORTOKRAX: Objection. Calls for hearsay.

JUDGE PFEIFER: Overruled.

The answer is no, correct?

THE WITNESS: The answer is no, yes.

JUDGE PFEIFER: Thank you.

Q. (By Mr. Hoag) During your time at BFI4, have you ever seen a conveyor stop running?

A. There's been times where it's shut down due to jams or whatnot.

Q. Are there other reasons besides jams why a conveyor might shut down?

A. Sometimes if someone were to hit an e-stop, emergencies. If they see an item drop somewhere, they could hit that, or for any other emergency.

Q. Okay. So jams, other emergencies.

Would there ever be conveyor shutdowns due to the overall flow of product through the facility?

MS. KORTOKRAX: Objection. Leading.

JUDGE PFEIFER: Overruled.

Go ahead, you can answer.

A. All right. We do have an anti-gridlock system. There are sensors all along the lines in the warehouse that, if it feels -- that if the computer senses that there's too much work and could cause a jam later on, it will shut down for a time.

Q. Okay. And did I understand your testimony that you've seen conveyors stop, or have you just heard

about them stopping?

A. I've seen them once in a while. It's rare, but it does happen.

Q. Okay. And what area -- do you still work at BFI4?

A. I do.

Q. What area of BFI4 do you work in?

A. I work in the outbound Ship Dock.

Q. And you mentioned the MaxxReach conveyors that go into the trailers.

A. Mm-hmm.

Q. Are there very many other kinds of conveyors in the Ship Dock portion of the facility?

A. There's a number of them. There's other ones we call spurs, which are basically just big, long with roller bearings, where the boxes will come down and then our associates will take those and put them on pallets or carts or whatnot.

Q. Are there other conveyors in the facility beyond what's in Ship Dock?

A. There's conveyors all over the building, yes.

Q. How long have you worked in the Ship Dock?

A. It's been a little over four years now.

Q. Do you recall when you started working in Ship Dock?

A. It was August of '19.

Q. And what roles or process paths have you worked in in the Ship Dock?

A. Most all of them actually.

Q. Can you share with us which process paths you specifically have worked in.

A. Okay. So I was one of those people when I started out who was palletizing on the spurs I was talking about. I've loaded the trailers. I've done what we call CPT, which is basically you're the person in charge of making sure everything that needs to get into a trailer is in by the time it needs to go out.

Q. Oh, I'm sorry, did you have more?

A. I've also -- I've done TDR, trailer dock and release. They are the ones in charge of making sure the doors for the trailers get opened and shut safely.

Q. Okay. And we've heard some testimony in this case about a process path that involves -- in the Ship Dock area -- that involves scanning packages into pallets or carts.

A. Right.

Q. Are you familiar with that process path?

A. I am.

Q. Have you worked that process path?

A. Yes, many times.

Q. Is there any job rotation in the Ship Dock?

A. Yeah. We rotate. Well, whatever job we did, then at lunch we will get assigned a new role somewhere else.

Q. Okay. Sorry, I have one more question about the conveyor stopping issue. About how frequently would you estimate conveyors stop for one reason or another if you were to put a number on it --

MS. KORTOKRAX: Objection.

Q. I was going to say, say, in a given week?

MS. KORTOKRAX: Objection. He has already answered that question. It was asked and answered.

JUDGE PFEIFER: What's that?

MS. KORTOKRAX: It was asked and answered. He said it was rare.

JUDGE PFEIFER: Right. I recall that testimony, but now he's been asked to give a number, so I'll overrule the objection.

Q. (By Mr. Hoag) I guess, more just to clarify what you mean by rare.

A. Okay. I'd say once or twice a week. It usually depends on the amount of volume that we're dealing with. Say, at Christmastime, we deal with a little more volume, and it's maybe three times a week

because it's a little busier during that time of year.

Q. And your observations, is that just applicable to the Ship Dock, or would that be applicable to the rest of the facility?

A. That would be for the Ship Dock. I have not worked enough in other areas to know how the conveyor works.

Q. Okay. The reasons for conveyor stoppages though you testified about, would those also apply to the rest of the facility, if you know?

A. I wouldn't know.

Q. Did you receive any safety training when you started at BFI4?

A. That was one of the first things that we trained in.

Q. Okay. Did that training include any information about proper body mechanics?

A. That was most of the training, yes.

Q. Okay. What kind of information did you learn about body mechanics?

A. For example, a very common phrase we use is "nose over toes," so making sure that you're moving your whole body as you're turning around rather than twisting at the waist, is a common one.

Very common, if we see an object falling, they

tell us, let it fall, don't try catching it.

When reaching down, they recommend going down on one knee to pick up things from down below versus trying to bend down at the waist.

Q. And this training, did it have a particular name or title?

A. At the time, it was called Safety School. It's changed names a few times. I don't know the current name.

Q. Aside from Safety School, did you receive any training specific to process paths that you would work in?

A. I've had -- when I was first working through a temp agency, we had people come by who would be assessing us as we're working and then give tips and pointers on some unsafe practices we were doing.

Q. Okay. I think my question may have been a little different, but thank you for that.

Did you receive any training that would have been specific to a particular process path?

A. When -- eventually I had a point becoming a trainer, and we would actually -- before Safety School was kind of a thing where we have a class outside of the learning room. And now the process is we actually take them to the area they're going to work in and show

them the process path as we're doing it. And that would apply to each role that we train new hires in.

Q. Okay. Aside from what we've talked about in terms of training, did BFI4 have any follow-up safety trainings or reminders?

A. We have what we call WorkingWell huddles, where we gather about 5 to 20 people on shift, and then we go through a video where -- there's one every month. Each one would cover different aspects of safety. One would be proper box handling, how to push/pull a pallet safely, et cetera.

Q. Did you feel that these WorkingWell huddles, were they helpful for you?

A. They were. It's good reminders for things we learned in Safety School and whatnot. And also good to help remind us and see it, how it works and applies to our job.

Q. Okay. Is there something -- or during the time you've worked at BFI4 -- has there been something called a stand-up meeting?

A. We have those twice a day actually, the first thing in the morning and then right after lunch.

Q. Okay. And is safety information covered in these stand-ups?

A. Every time, yes.

Q. Is ergonomics or body mechanics information covered in these stand-ups?

A. Frequently, yes.

Q. Did you ever receive any training on what to do if you had a safety concern?

A. Yeah. We are very -- managers are very like much like, if you see something, say something.

Q. Okay. Have you ever reported a workplace safety concern to BFI4?

A. I have, yes.

Q. And can you share with us an example of that.

A. Okay. Yeah. The spurs-type thing, I noticed one day the bracing on it was -- had come off, maybe just worked its way loose, and it was kind of wobbly. So I brought it up to one of my managers, and she immediately put in a case for our security -- or facilities team -- to haz. that, and I believe it was done within a day or two.

Q. During your time at BFI4, have you felt comfortable raising safety concerns with Amazon?

A. Every time, yes.

Q. Have you had any training regarding what you should do if you experience a workplace injury?

MS. KORTOKRAX: Your Honor, I've got to object. Again, Amazon has argued that they were not

cited for reported injuries, which, again, they refused to provide stuff in discovery and have, again, precluded the Department from presenting any evidence on that. So I would still object to relevance at this point.

JUDGE PFEIFER: During the break, I looked to see what it is you're discussing, and I was unable to understand. So I'd like to talk about this after the witness. Just keep objecting to when you feel you need to.

The objection is overruled.

Q. (By Mr. Hoag) I will reask the question.

Did you receive any training at BFI4 regarding what you should do if you experience a workplace injury?

A. Yes. They say it many times. If you feel anything, immediately speak up, and our managers will take us over to our AmCare facility, where we have experienced personnel on how to diagnose and treat injuries, some of whom I believe have been like EMT technicians.

MS. KORTOKRAX: Same objection, Your Honor.

JUDGE PFEIFER: Thank you.

Overruled.

Q. Have you ever experienced a workplace injury at BFI4?

A. I have not, no.

Q. Would you feel comfortable telling Amazon if you experienced a workplace injury?

A. I would.

Q. Are there productivity goals at BFI4?

A. There are.

Q. And from your personal experience, which process paths are you aware of that have productivity goals at BFI4?

MS. KORTOKRAX: Objection. At this point it's cumulative, Your Honor. We've heard lots of testimony about which process paths --

JUDGE PFEIFER: Right, that's true, but I'd like to hear what Mr. Dorband has to say about it.

A. Anything that we can measure usually does have some kind of productivity goal.

Q. Okay. During your time at BFI4, have you felt these goals were difficult to meet?

A. In one place, a previous department I worked in, the first month or so was a little just as I was getting used to the process, but with time and practice, it became actually pretty easy.

Q. Okay. And when you say at first, was that

back in like 2016, 2017?

A. 2017, yes.

Q. Okay. Do you feel you've been able to meet your productivity goals while still following the safety training you've been provided?

A. Yeah.

Q. Have you ever been disciplined for not working fast enough?

A. Yeah. My first month in 2017, I did for, the first two weeks it was, yeah, I had gotten a little bit, but I just pressed on and was able to meet it eventually.

Q. And was that like a written warning, or was it like someone coming and talking with you or coaching you?

A. It was both.

Q. Okay.

A. Yeah.

Q. We'll kind of, say, put a timeframe on these questions, from your time in Ship Dock. That was from 2019 forward. Is that right?

A. Yes.

Q. So we'll say your Ship Dock time. During that time, have you ever been disciplined for not working fast enough?

A. No.

Q. Have you felt pressure to work at a specific speed during that time?

A. No.

Q. From 2019 forward, have you ever had a manager tell you to work faster?

A. No.

Q. Do you recall the issue of productivity goals or pace of work coming up during your interview with Labor & Industries in September of 2021?

A. I don't recall.

Q. Do you recall telling the L&I inspector that productivity goals were reasonable or easy?

MS. KORTOKRAX: Objection. Your Honor, it's hearsay.

JUDGE PFEIFER: It's unnecessarily leading, too. Why don't you ask him what he was told.

Q. Do you remember giving any description of how you felt or viewed the productivity goals at BFI4 to the L&I inspector?

A. I don't recall that, no.

Q. Do you ever feel that there's maybe a little too much work to do in the Ship Dock without more help?

MS. KORTOKRAX: Objection. Leading.

JUDGE PFEIFER: Can you rephrase that it?

MR. HOAG: Sure.

Q. Mr. Dorband, are you comfortable raising concerns with management at BFI4?

A. Yes.

Q. What types of issues are you comfortable raising with management at BFI4?

A. Safety, definitely one. Honestly, productivity isn't as big an issue. In our department, it's more dealing with the volume that's coming with us. Most of the time, it's just a matter of getting -- shifting people from one area to another. It's usually a case where one area in the department is pretty slow, and then some -- busy in another area, and then it could easily shift back to the slow area. So it's just a matter of moving head count over there.

Q. Do you feel that your work at BFI4 is stressful?

A. No.

Q. Did you feel it was stressful in 2021?

A. No.

Q. Do you recall talking to L&I about how you viewed your work?

A. I don't recall much, honestly, about that interview.

Q. Okay. I'll leave off the rest of that.

Have you heard of something called a Power Hour?

A. Yes. We've had those in some of the previous departments I've worked in.

Q. Again, kind of focusing your time from when you started at Ship Dock in 2019 forward, have you seen a Power Hour at BFI4 during that timeframe?

MS. KORTOKRAX: Objection. Again, it calls for -- well, lack of foundation as to which areas. He's just talking specifically about Ship Dock?

JUDGE PFEIFER: That's what I understand. He's been asked about Ship Dock from 2019 forward and whether a Power Hour occurred.

Can you answer that?

A. We do not do power hours in Ship Dock, no.

Q. (By Mr. Hoag) So, Mr. Dorband, when is the last Power Hour that you recall observing at BFI4?

A. Somewhere in 2018.

Q. During your time at BFI4, have you felt like Amazon cares about the safety of its associates?

MS. KORTOKRAX: Objection. Lack of foundation, calls for speculation, and lack of personal knowledge.

JUDGE PFEIFER: Would you rephrase that as to how -- is Amazon concerned about him?

MR. HOAG: Right. My follow-up question is why.

JUDGE PFEIFER: Well, first of all, I want you to ask him what his personal feeling is about Amazon's attitude towards him.

MR. HOAG: Sure.

Q. (By Mr. Hoag) Mr. Dorband, during your time at BFI4, how have you personally felt regarding how Amazon cares about the safety of you as an employee?

A. I view -- I think they would -- do agree and care about safety that way.

Q. Do you feel from your experiences and your observations that you've been treated differently or specially apart from other associates in that regard?

MS. KORTOKRAX: Objection. Leading. Calls for speculation.

JUDGE PFEIFER: Overruled.

A. No. I think I've been treated fairly in that regard, yes.

Q. And why do you feel the way you feel?

A. It's -- they've -- I have worked at other places where definitely safety was not a concern. And, if anything, I feel Amazon is maybe a little too far in the other direction.

Q. Okay. Do you enjoy working for Amazon?

A. Yes.

Q. Why is that?

A. I enjoy working with the people I have. I find it very fulfilling getting the customer orders out on time.

MR. HOAG: Thank you very much.

No further questions, Your Honor.

CROSS-EXAMINATION

BY MS. KORTOKRAX:

Q. Good afternoon, Mr. Dorband. I just have a few questions for you. You mentioned job rotation in the Ship Dock. That would happen -- the job rotations -- would happen within the Ship Dock itself, correct?

A. Most of the time, yes.

Q. And when working in the Ship Dock and loading trailers, sometimes you would have large, awkward boxes. Is that correct?

A. Sometimes.

Q. And heavy boxes?

A. Yes.

Q. And then you also mentioned, when you were working, I think it was in 2017, your first month, that you had trouble keeping up with productivity. Which

process path were you working in at that time?

A. I was in Stow.

MS. KORTOKRAX: I just need one second, Your Honor.

Q. (By Ms. Kortokrax) And you talked about getting things out to the customer. Are there time limits by which something has to go out the door?

A. Yeah. We have -- all trailers are scheduled to go out at a certain time.

Q. So you have to have the trailer loaded by a certain time?

A. Yes.

MS. KORTOKRAX: No further questions, Your Honor.

JUDGE PFEIFER: Thank you.

MR. HOAG: No redirect, Your Honor.

JUDGE PFEIFER: All right. Thank you, Mr. Dorband. Thank you so much for your time and testimony. You're excused as a witness.

Show us off the record.

(A brief recess was taken.)

JUDGE PFEIFER: Let's go back on the record. We'll have you called as a witness, swear you in, then you can testify.

Ms. Kim, will Amazon please call its next

witness.

MS. KIM: Yes, Your Honor. Amazon would like to call Ms. Laurie Condo.

JUDGE PFEIFER: Ms. Condo, would you please raise your right hand with me.

LAURIE CONDO, witness herein, having been first duly sworn on oath, was examined and testified as follows:

JUDGE PFEIFER: Thank you. You may lower your hand and be seated. Ms. Kim is going to ask you some questions, and we want to speak loudly so our court reporter can transcribe your answers. And then Ms. Kortokrax will have some questions possibly for you afterwards. So thank you. I appreciate it.

THE WITNESS: You're welcome.

DIRECT EXAMINATION

BY MS. KIM:

Q. Good morning, Ms. Condo.

A. Good morning.

Q. Could you please state and spell your full name for the record.

A. Yes. Laurie Condo. First name L-a-u-r-i-e, last name C-o-n-d-o.

Q. Who is your employer?

A. Amazon.

Q. And --

A. Sorry. BFI3.

Q. BFI3. And is that located in DuPont?

A. Yes.

Q. And when did you start working at BFI3?

A. May 27, 2018.

Q. Do you still work at BFI3?

A. Yes, I do.

Q. Are you an associate?

A. Yes, I am.

Q. At BFI3, which process paths have you worked at since you started?

A. The Stow process, Receiving process, Mega Sort, Process Guide, Learning Ambassador. Should I keep going?

Q. Sure.

A. Gatekeeping, Cubiscan, taking -- sorry.

Q. Sorry, I'll try to let you finish before I ask my next question.

And have you worked in any other process paths since you started working at BFI3?

A. In other departments, do you mean?

Q. Yes.

A. A little bit in Pack.

Q. And, earlier, when you said you worked in Receiving, is that the same thing as Each Receive?

A. Yes, it is.

Q. And have you also worked the Water Spider role?

A. Yes. I apologize, I forgot that one. I did.

Q. Ms. Condo, you mentioned that you worked as a learning ambassador. What is a learning ambassador?

A. A learning ambassador is an associate that teaches the other new employees how to do the processes at Amazon.

Q. And when did you start working in that role as a learning ambassador?

A. Oh, that would have been 2019.

Q. In that role, are you involved with training associates during their first day of training?

A. Yes, I was, yeah.

Q. And what does that look like?

A. The first day of training -- at that time. I know things have changed now -- at that time, the new, the brand-new employees would come in, and we would do the Safety School first. And then each new employee

would have hands-on, the equipment and the experience. And then we would go to lunch. And then after lunch, take them out to on the floor to start learning the process.

Q. Are you also involved in training associates during their second day of training?

A. Yes, I was.

Q. And what does that look like?

A. Pretty much the same thing, but they will stay in process for the whole day, which is a 10-hour day.

Q. And is this new hire training in the classroom, on the job, or a mix of both?

A. It was actually on the floor. I believe, at that time, they did some Knet! learning over the computer, and I know they do that now.

Q. Do you know if the training is the same in 2020 and 2021?

A. Yes.

Q. And during this training, what do you tell the associate is important to focus on?

A. I personally would always say importance is safety, and I would always give them that information first, even before we started training each day.

Q. Is there an emphasis during the training for the associates to focus more on quality or

productivity?

A. It's quality.

Q. And after they complete their training, do you check in with the associates?

A. Yes, I did.

Q. And how often do you do that?

A. When I had a chance. Usually, maybe once a day, I would go by and see them and check in on them.

Q. Which process path have you trained new associates in as a learning ambassador?

A. I trained the new associates in the Stow process and Receiving process and also Prep -- I forgot that one -- Prep Receive.

Q. Ms. Condo, while you worked in the Stow process path, would you ever rotate with other paths?

A. Do you mean while I was stowing and then go work in another process path while training or when I was individually --

Q. Yes. Not while as training, while you were an associate.

A. Yes, while I was an associate, yes.

Q. And which paths would you rotate in?

A. Normally, we would start out in Stow and/or Receive, and then at lunchtime, then they would switch me to one of the other, either one, where the need

would be.

Q. And so you would work in part of the day in Stow, and then you said about that much time rotate to the Each Receive process?

A. Yes.

Q. Did you ever rotate into the Water Spider role from Stow?

A. Yes, sometimes, not that often though.

Q. Did you have the option to rotate into Water Spider if you wanted to?

A. Yes, we did.

Q. Did you receive any safety training before you started at BFI3?

A. Yes, I did.

Q. And could you describe that training just a little bit.

A. Well, I started as a temp at BFI7, so I did get most of the training there, and then transferred to BFI3. And then we got a little bit of hands-on, but it was more watching videos because I was a transfer.

Q. Got it. Did that training include information about proper body mechanics?

A. Yes, it did.

Q. Did you learn about what a power zone is in that training?

A. Yes, I did. I already kind of knew that beforehand, too.

Q. Did you receive training on how to properly grip or hold a package?

A. Yes, we did.

Q. And did you receive training on what to do if you were injured on the job?

A. Yes, we did.

MS. KORTOKRAX: Same objection as before, Your Honor. This is information Amazon has alleged is irrelevant to the Department citation.

JUDGE PFEIFER: All right. The objection is overruled, but we are going to discuss that after this testimony.

Q. Would you like me to repeat the question?

A. Yes.

Q. The question was: Did you receive training on what to do if you were injured?

A. Yes, we did.

Q. And what was that?

MS. KORTOKRAX: Same objection, Your Honor.

A. Well, when we were at the Stow station, if something were to happen, got ahold of your manager right away and/or go to AmCare, if possible. If not,

the manager would notify the proper people through AmCare to come over.

Q. Did you receive refresher courses on these trainings?

A. On who to notify?

Q. Not specifically on who to notify. On the overall training you received on safety and proper body mechanics.

A. Most of the time.

Q. And how often would you receive these refresher trainings?

A. Maybe -- well, we have Knet!s that we have to do, and they are usually quarterly. And then safety would be brought up when we have our stand-up in the morning and at lunchtime.

Q. Did you receive training specifically relating to the process paths that you worked in?

A. Yes.

Q. And this was before you worked in those process paths?

A. Training for safety, is that what you're asking?

Q. Yeah. So receiving training before working in Stow, for instance. Did you receive that training prior to going out and working in Stow?

A. Yes. Sorry, I had to stop and think back. It's been a while.

Q. Did that training cover proper body mechanics?

A. Most of the time, yes.

Q. Ms. Condo, are you aware of any productivity goals that applied to you individually while working in Stow or Each Receive?

A. We were aware -- yes, I was aware. We -- I always say we because I think of a team. They would give us our rate at the beginning when we had stand-up in the morning. And so most -- if people were paying attention, they would hear what our rate was supposed to be, but it fluctuates, so it depends on the day.

Q. Did you find those goals difficult to meet or easy to meet or something else?

A. Sometimes the goals were hard to meet, yes, because of what we were stowing into the bins. And if the bins were full, sometimes it was a little bit difficult. But the way it's set up, if the Water Spider delivers the right amount of boxes in the cages, the right sizes, then it's easier, of course, to stow those items into the bins, so your rate would be a little higher.

Q. Got it. And when you said sometimes the goals were difficulty to meet in Stow, would you say that was

more in the beginning while you were first learning the job or --

JUDGE PFEIFER: Leading. I see the objection. Can you ask a nonleading question, please?

MS. KIM: Yes.

JUDGE PFEIFER: When?

Q. At what point while working in Stow did you find the goals difficult to meet?

A. That were hard to meet?

Q. That were hard to meet.

A. Well, when the bins are full and maybe -- I mean, honestly, we don't know what we're getting into the facility. We don't know. So we unload the trucks, and they could be huge boxes, they could be small boxes, master packs. So whatever gets received into the cages, that's what the stowers stow into the Kivas, the bins that the little robot moves around for us.

So, if you do your job properly and stay focused, yeah, you could make your rate, but it may not be as high as it normally would if you have smaller items and items that weigh less that you can stow into the bins.

Does that make sense.

Q. Have you felt that you were able to follow your safety training while you worked in Stow or Each

Receive?

A. Yes.

Q. Have you ever received corrective feedback during your time at BFI3?

A. Yes.

Q. And do you recall if that corrective feedback was for quality or productivity reasons?

A. It was for quality, when I first started.

Q. Which is separate and distinct from productivity reasons?

A. Yes.

Q. Has anyone from management ever told you that you were not working fast enough?

MS. KORTOKRAX: Objection. Hearsay.

JUDGE PFEIFER: Overruled.

You may answer.

A. No.

Q. Did you ever feel pressure to work at a particular speed?

A. No. But when you see a lot of boxes in front of you, you want to get them done.

Q. Did you ever feel pressure to work at a speed that would prevent you from following your safety training?

A. Not really, no.

Q. As a learning ambassador, have you ever told other associates that they need to work faster?

A. No, I haven't. That comes over time.

Q. Ms. Condo, are you familiar with something called Power Hour?

A. Yes, I am.

Q. And what is that?

A. Well, when I first started there, we would have it. It was just like who could stow the fastest and how many items into the bin within the hour.

Q. Do you recall which process paths that you observed the Power Hour was taking place in?

A. That would be Stow.

Q. In Stow.

Do you recall if they are still happening at BFI3?

A. No, they're not.

Q. Do you recall when the last Power Hour took place?

A. I do not know exactly. Probably in the year of -- maybe end of 2018, maybe 2019.

Q. Ms. Condo, do you know how to raise concerns you have to Amazon?

A. I do.

Q. And how would you do that?

A. Well, I'd tell a lot of management. I don't just start with one.

Q. Do you feel comfortable raising those concerns to management?

A. I do.

Q. Have you ever submitted any concerns?

A. I'm sorry, could you repeat that?

Q. Sure. Have you ever submitted any concerns you had to management?

A. I have, yes.

Q. Okay. Could you provide us with maybe an example or two.

A. Let me see. Well, I could probably mention a lot, but I'll just think of the more recent ones, which would be, when we moved the Prep Receive stations, I noticed some of the setup in the 5S area was kind of cluttered, it wasn't like enough space. So I submitted a ticket for that and let the manager know.

And there were a few other things. There was a station where they had a water bottle in the corner by the conveyors, and we're supposed to have it 3 feet away from the conveyors, so I submitted a ticket for that.

Those were the most recent that I can remember right now.

Q. How did you feel Amazon responded after you submitted that request?

A. Well, it was submitted. And then, of course, in passing, I mentioned it verbally to several other managers and the safety team. And then the person from the safety team came over with the ticket, and we went over it, suggesting different things. And then I think it was like the next day or two that our 5S team came over and moved the tape in the proper area where it should have been in the first place.

Q. Have you ever been injured at BFI3?

A. No, I haven't.

Q. If you did experience an injury at work, what would you do?

MS. KORTOKRAX: Same objection, Your Honor, as to relevance, considering Amazon's argument.

JUDGE PFEIFER: All right. I have noted.

Overruled.

Do you remember the question?

THE WITNESS: Yes.

A. If I were injured, if I could still walk, I would probably just go over to AmCare. And if not, then, hopefully, my teammate would go get me help, if I was incapacitated and couldn't do it myself.

Q. Do you feel like Amazon cares about the safety

and well-being of its workers?

MS. KORTOKRAX: Same objection, Your Honor, to relevance to whether there's a recognized hazard in the workplace.

JUDGE PFEIFER: You may answer that question. The objection is overruled.

A. That's -- I mean, yes, I do, but, I mean, we work in a warehouse, so there's items moving all over the place, I mean, behind you, on your side, I mean, you really have to be mindful of your surroundings and watch out for your teammates. I mean, yell at them if they're going to trip over a hazard or if something is coming at them, you know, alert them.

You know, they have -- I mean, I guess the best they can, set up safety-wise in the building. I don't really have a comparison, I'm sorry, because --

Q. Thank you.

A. -- I've never worked in a warehouse before. This is my first warehouse job.

Q. Thank you, Ms. Condo.

JUDGE PFEIFER: Thank you.

Q. Do you enjoy working at Amazon?

MS. KORTOKRAX: Objection. Relevance.

JUDGE PFEIFER: Overruled. You can answer that question.

A. Actually, I do. It's something different, and there's always something different. So I do enjoy it. Or, if not, I wouldn't have been there as long as I already have. I just have to find, I guess, ways of moving up the ladder.

Q. Thank you for that answer.

A. You're welcome.

MS. KIM: I have no further questions, Your Honor.

JUDGE PFEIFER: Thank you.

THE WITNESS: You're welcome, Your Honor.

JUDGE PFEIFER: Ms. Kortokrax, do you have any questions?

MS. KORTOKRAX: I just have a few follow-up questions.

CROSS-EXAMINATION

BY MS. KORTOKRAX:

Q. You mentioned that you provide -- as an ambassador -- you might provide training to associates, correct?

A. Yes, I did. I'm no longer a learning ambassador.

Q. How often would there be new associates?

A. Well, we get a lot of new associates, almost

weekly now.

Q. And you also mentioned rotating -- when you worked in Stow -- rotating into other paths within the facility. You said you would rotate where the need is. Is that correct?

A. Yes, sometimes. And I can remember being in Stow and asking just to be moved because I like variety. It keeps my mind sharp.

Q. And then you were asked about productivity goals and rates. Was your answer relevant to individual productivity goals or productivity goals for the path that you were working in?

A. Well, there's quality. Quality is the most important because we want to ensure that our customers get their items, and, if you don't do that, then they're not going to get their item they've ordered. So productivity comes over time of doing that process, building your memory muscle, doing it over and over and over.

Q. But you were talking about, you were aware that a rate was given at the beginning when you would have this stand-up. Was that for the process path or for you individually?

A. Oh, that was everybody. Everybody knew what the rate was.

Q. For the process path?

A. Yes. Yes.

MS. KORTOKRAX: I have no further questions, Your Honor.

JUDGE PFEIFER: Thank you.

Ms. Kim, do you have anything further?

MS. KIM: I do not have any redirect.

JUDGE PFEIFER: Thank you very much.

Thank you for your time and testimony here today. You're excused as witness.

Show us off record.

(A brief recess was taken.)

JUDGE PFEIFER: Show us back on the record.

Mr. Youmans, you may call your next witness.

MR. YOUMANS: Thank you.

Amazon calls Austin Nichols.

JUDGE PFEIFER: Mr. Nichols, would you please come up to the witness chair and raise your right hand with me.

///

AUSTIN NICHOLS, witness herein, having been first duly sworn on oath, was examined and testified as

follows:

JUDGE PFEIFER: All right. Thank you very much. You may be seated.

Show us off the record for a minute.

(A brief recess was taken.)

JUDGE PFEIFER: All right. Back on the record.

Mr. Youmans.

MR. YOUMANS: Thank you.

DIRECT EXAMINATION

BY MR. YOUMANS:

Q. Good morning, Mr. Nichols.

A. Good morning.

Q. Do you work for Amazon?

A. I do.

Q. And what is your job title?

A. Principal economist.

Q. And I take it from your job title that you're an economist. Is that correct?

A. I am.

Q. And what kind of economist are you?

A. I'm a microeconomist, applied microeconomist.

Q. Mr. Nichols, if you can just project your

voice a little bit more.

A. Oh, sorry. Applied microeconomist.

Q. Thank you.

What does that mean, that you're an applied microeconomist?

A. That means that I study individuals, rather than the economy as a whole. I work with data to answer causal questions.

Q. And studying individuals, would that be --

A. Individual people, firms, et cetera.

Q. As opposed to?

A. Rather than the system of equations that defines an economy as a whole. That would be macroeconomics.

Q. And about how long have you been an economist?

A. I got my Ph.D. in 2004, so --

Q. And let's go there. Before we get into your work for Amazon, let's discuss your educational background and your professional background.

You mentioned a Ph.D. Do you have any college degrees before that?

A. Yes. I have a bachelor's degree from the University of Chicago and master's degree from Harvard in public policy.

Q. And the bachelor's degree from University of

Chicago, what subject was that in?

A. In linguistics.

Q. And when did you earn that degree?

A. 1992.

Q. And I think you said master's of public policy at Harvard. Is that correct?

A. Yes.

Q. Again, if you could just wait until I get the question out, that will make it easier for the court reporter.

A. Sorry.

Q. Sure.

Again, the master's of public policy at Harvard, you would have received that in what year?

A. 1997.

Q. And you mentioned the Ph.D. Where did you earn that?

A. The University of Michigan, Ann Arbor.

Q. And what subject was that in?

A. In economics.

Q. And I think you said that was 2004 that you earned that?

A. 2004, yes.

Q. Okay. Let's just briefly discuss your work experience prior to coming to Amazon. And why don't we

go ahead and start at 2004, which is when you received your Ph.D. What work experience do you have since getting your Ph.D. in 2004?

A. I was a research associate and senior research associate at the Urban Institute from 2004 to 2014. And then I was a senior research director at the DeBruce Foundation from 2014 to 2016. And then a principal associate at Apt Associates from 2016 to 2022.

Q. And DeBruce Foundation, can you spell DeBruce, please.

A. D-e-B-r-u-c-e.

Q. And I think you said Apt Associates. Can you spell Apt.

A. That's A-p-t & Associates. It's a last name, Apt.

Q. And going back to the first job you mentioned at the Urban Institute, you mentioned you were a research associate. Just briefly, what sorts of research did you do when you worked for the Urban Institute?

A. I wrote papers on a number of different topics, including poverty, antipoverty programs, low-wage labor markets, income volatility and mobility, educational interventions, health and health insurance,

a wide variety of topics. And disability, I should say, as well.

Q. Disability. Okay.

And the DeBruce Foundation, when you were there from 2014 to 2016, I think you said -- well, what was your job position there?

A. I was a senior research director.

Q. And just briefly, what were your duties as senior research director?

A. I generated content. It was designed to inform future interventions to study. So particularly focused on, again, poverty and a low-wage labor market.

Q. And would this research and these projects you've described, would those be some sort of economic analysis or research?

A. Exactly.

Q. And what sort of economic analysis or research would you do?

A. So one project, for example, was a study of transitions across jobs in the low-wage labor markets. So using different categories and seeing where people transition over the course of their job career, their job ladder.

Q. Okay. And the most recent position you mentioned was with Apt Associates. And you may have

already mentioned this, but what was your job title there?

A. I was a principal associate.

Q. And briefly what were your job duties as a principal associate for Apt?

A. I was often a director of analysis or sometimes project director or principal investigator on a series of projects on educational interventions, again, disability projects, a large number of disability projects, also topics that relate to low wage labor markets, again, and income support programs, as well, and a few on health, as well.

Q. And what sort of organization is Apt Associates by the way?

A. It's a contract research firm. So it does a lot of work for government agencies but also for foundations under contract.

Q. And a similar question about the DeBruce Foundation, what sort of organization is that?

A. It was a research organization funded by a single living donor, so it was tied to a private foundation.

Q. And then going back to Apt Associates, I think you mentioned that at least some of that work was for government agencies. Is that correct?

A. Yes.

Q. And can you give us any examples that you did for government agencies when you were working at Apt?

A. I did a large number of projects for the Social Security Administration, also for Department of Labor, for Housing and Urban Development, the Department of Education, and for Health and Human Services, primarily.

Q. And these projects that you mentioned, would those be some sort of economic analysis or other types of analysis?

A. Yeah, some kind of economic analysis, often experiments or quasiexperimental analysis.

Q. And you mentioned work for the Social Security Administration. What sorts of projects or research did you do relating to Social Security?

A. I did a large number of quick turnaround projects for them, convening expert panels. We did data analysis. We did evaluation designs. We ran the largest ever experiment ever conducted in this space called BOND, Benefit Offset National Demonstration, which was published I believe in 2018.

I also published a book in late 2021, which reviewed the previous three to four decades of their demonstration in the disability space.

Q. And if you recall, what was the title of the book that you published in 2021?

A. Lessons from SSA demonstrations.

Q. Lessons from SSA demonstrations?

A. Lessons -- yeah, lessons for disability policy, yeah.

Q. And would that be a result of sort of the research and projects you just described relating to Social Security?

A. Well, it was a review of over 30 years of demonstrations. So it was not all projects that I had worked on, but it was all projects that the Social Security Administration had funded. So we went back and reviewed all of the prior research, as well as the projects --

Q. You said demonstration. Just briefly, what does that mean?

A. So the Social Security Administration has demonstration authority to run different kinds of demonstrations, most of which are structured as experiments. So under Title II and Title XVI, they have two different authorities to run experiments, essentially, to improve the administration of disability insurance programs.

Q. And so what would the nature of those

experiments be, pilots or some sort of an assessment?

A. Well, some of them would be small pilots run in one city or one state. The BOND experiment that I just mentioned, the Benefit Offset National Demonstration, was a very large experiment run in ten locations over five years, where the entire structure of disability insurance was changed for a randomly selected subgroup of individuals.

Q. And other than this book that you mentioned that you authored, have you published any other papers relating to economic research or assessments?

A. Yes. I've published many papers specifically on the disability area. My first published paper was related to research in 1998, so I think the paper was published in 2003, also in 2004. So over the past 20 years or more, I've been publishing papers on disability. But I've also published on education and accountability and other topics, as well, health, as well.

Q. Just going back the last 20 years or so, just roughly about how many papers do you think you've published?

A. Well, it depends on whether you count peer-reviewed journal articles or all publications, but peer-reviewed journal articles probably ten, all

publications several hundred, perhaps.

Q. And would all of these publications relate to some sort of economic analysis?

A. Yes.

Q. Okay. And when did you begin working at Amazon?

A. February 2022.

Q. And what was your job title at Amazon when you started?

A. Principal economist.

Q. Okay. And that's your current position, as well, correct?

A. Yes, it is.

Q. And do you work for a particular department or team?

A. Yes, I work in the CoreAI group.

Q. And is that C-o-r-e?

A. Yes, capital C-o-r-e and then capital A-I.

Q. And what does CoreAI do?

A. We function in a sense a little bit like an internal consulting company within the company, going around and studying everything the company is involved in and trying to improve processes around the company.

We also serve an auditing role, where we review other people's scientific work. And we try to

look around the corner, as well, to see what's coming down the pike in terms of future things that should be studied.

Q. And about how many people are on the CoreAI team?

A. It's about 70 people.

Q. And can you give us just some approximate breakdown in terms of the different subject matter expertise?

A. Yes. So, excluding managers, I think there's certainly an equal division among engineers, applied scientists, and economists. So there might be 15 or so economists and equal numbers of applied scientists and engineers.

Q. And you mentioned an audit function that the team provides. Is that right?

A. Yeah. We're frequently asked to weigh in on other groups' research.

Q. And since you've been part of the team, about how often is the team performing that type of audit function?

A. I have certainly been involved with that continually since I joined. I don't know about the organization as a whole, but I have been involved in some auditing function since I joined.

Q. And just briefly, can you describe your job duties as a principal economist on the CoreAI team.

A. It includes everything from data analysis, to writing documents, to thinking about big problems that the company should be addressing.

Q. And can you give us just an example of the types of projects that you've worked on since you came to Amazon?

A. An example? Well, we were asked to audit work that the top-line forecasting team was doing. We were asked to audit work that the Workplace Health and Safety team was doing. We have project on last mile of deliveries. We have projects on -- we have projects within the worker health and safety space and projects on a wide variety of other topics related to the website, for example.

Q. Okay. Does it have to be related to health and safety for your team to be brought in?

A. No. I probably have a disproportionate amount of health and safety work just given my background in disability research. We certainly -- it's not our bread and butter.

Q. So, Mr. Nichols, there's been testimony in this case about something called Project Soteria. Are you familiar with that project?

A. Reasonably familiar, yes.

Q. And what's your understanding of what that project was about?

A. My understanding is that it was a re-analysis -- or analysis of -- policies that Amazon had either put in place or could consider putting in place, originally related to the Covid pandemic, but then expanding into other different kinds of policies related to workplace injuries.

Q. Okay. And you say relating to policies during the Covid pandemic. Are you talking about new policies that were put in place?

A. I think some of them were change policies. I'm not sure if there were any new policies. So this began, obviously, before my time at Amazon. So Soteria was ongoing at the time that I joined Amazon. I'm not sure exactly what it started with.

Q. Okay. And what's your understanding in terms of why Soteria was looking at these policies, whether it was a new policy or some policy change during Covid?

A. I believe it was related to a promise that the company made to reduce injuries and a leadership principle that was newly installed to be the Earth's best employer. So I think it was designed to focus on finding policies that would reduce injuries by at least

half over the coming years.

Q. And did your team become involved in Project Soteria at some point?

A. Yeah. So, shortly after I joined, I was asked to consult on Project Soteria's ongoing workstream stream. I think that was probably in April of 2022.

Q. Okay. And who is it that -- what department, I guess, is it -- that asked your team to become involved in consulting with Soteria?

A. I presume it was the VP, the then-VP of WHS, who asked our VP, so my supervisor's supervisor, to provide some of that auditing function on the ongoing work.

Q. Okay. Your understanding though, it was safety basically?

A. Yes. WHS asked CoreAI to investigate, yes.

Q. So, after your team was asked to, I guess consult on this ongoing research by Soteria, did you do that?

A. Yes. We started meeting. So my teammate, [redacted], and I started meeting multiple times per week with the team that was doing the Project Soteria analysis.

Q. You mention [redacted]. Can you spell his first and last name.

A. [redacted], is the first name.

[redacted], is the last name.

Q. And you mentioned he's your teammate. Is he a coworker with you on the CoreAI team?

A. Yes. He's also a principal economist in CoreAI.

Q. And so you and [redacted] were involved, it sounds like in a series of calls or meetings. And let me ask you this: When you did get involved in consulting with Soteria, what was Soteria doing at that point, in terms of what they were looking at and what they were analyzing?

A. I think they were continuing with the tradition that Soteria had established doing a nonexperimental analysis of existing variation in different policies. And at the time that we started talking to them, they were specifically focused on pod gapping and bin fullness as policy levers.

Q. And you mentioned I think a nonexperimental analysis. What did you mean by that?

A. So nonexperimental means that you don't actually manipulate these policy levers directly, you just use the existing variation that you can see in the data, which could come from a variety of sources.

Q. Okay. And so would an experimental analysis

be something like a pilot then?

A. Right, a pilot could be one form of experiment, yes.

Q. Okay. And you mentioned they were looking at, I guess one of the things, pod gapping. What is pod gapping?

A. Pod gapping refers to the time between pods that arrive at a workstation. So these are pods typically run by a robotic device, similar to a, Roomba, that brings a pod with a lot of bins where items can be stored. Associates pull those items out of the bin or puts items in the bin.

Q. And what process paths would that apply to, if you know?

A. Well, the two I just referred to are Pick and Stow. So Pick refers to pulling something out of a bin, and Stow refers to putting something in a bin.

Q. And bin fullness you mentioned. What's that?

A. Bin fullness refers to the average -- typically, the average -- proportion of that sort of maximum capacity that that bin can hold is filled with items already.

Q. And for the bins, are we talking about these same pods that you described earlier?

A. Exactly.

Q. And when you came in and started consulting with Soteria, what's your understanding of why that team was looking at pod gapping and bin fullness? What was the goal?

A. I think that they had found in prior analysis that there was some correlation between the average bin fullness and injury rates, at least that was the assertion, and that pod gapping was a hypothetical way that they thought -- I don't know if they had existing evidence -- but they thought that that could have an impact on injury rates.

Q. We've heard some testimony in this case about UPH or units per hour. Do you know what that is?

A. Yes.

Q. And what is that?

A. So that's the, typically, average number of units that a person working in a particular workstation or in a particular path would touch in an hour. So either stowing or picking or some other variety.

Q. And was that also one of the variables that Soteria was looking at, at the time you came in, in early 2022?

A. I'm not sure that they were looking at that at the beginning, but it certainly was a topic of their ongoing investigation.

Q. And over what period of time approximately did you and your coworker, Vikram, have these meetings and discussions with the Soteria team?

A. I would say April, May, June, and then into July. So three months approximately.

Q. And this is all 2022?

A. Yes.

Q. And what did you discuss with Soteria during those meetings?

A. We met with various people on the Soteria team, but we spent most of our time meeting with an applied scientist who was working the data analysis. And he would present various aspects of his analysis, perhaps, or findings that he was working on, and then we would provide comments on the analysis.

Q. And when that team would provide their analysis to you, did you express any concerns to their team that you had?

A. Yes. We expressed that we thought the analysis should be pursuing a different path, essentially, that they shouldn't be looking at site level aggregates, they should be looking at individual workers and their exposure risk over time.

Q. And when you say site level aggregates, what do you mean by that?

A. I mean the total number of injuries at a site compared to various averages of the behavior at that site. So how many units are processed? What's the average bin fullness? What's the average pod gapping at that site?

Q. So would these be facility-wide numbers?

A. Exactly.

Q. And was that your understanding, basically, of what Soteria was looking at, at that point in their analysis?

A. That was all the analysis that was presented to us in those meetings, yes.

Q. Okay. And did you have any other concerns, other than the site level aggregates that they were using?

A. Yeah. So, in addition to not using site level but rather individual level analysis, we said they should be exploring finding exogenous sources of variation. So sources of variation that are not just naturally occurring but occur because of some policy change that's unpredictable, it's not manipulatable by site managers or something like that.

And we also said that the analysis, in essence, that they should be working towards developing a pilot that should -- that could -- produce the kinds

of injury impacts, the kinds of reductions in injuries that the company was hoping to achieve.

Q. And that earlier point you made, finding or looking at exogenous factors, did you say?

A. Right.

Q. Can you break that down and explain what you meant in terms of what your concern was there.

A. Right. So the thing that economists typically worry about with a nonexperimental analysis is that there are sources of variation that both drive the main predictor of variables in something like pod gapping and also drive injury rates on that same day.

So, even at the individual level, you could see that somebody has, for example, a sort of low rate of work and like there's a lot of gaps between the pods, but it could be related to something that's going on with that associate or with the site on that day.

That's also correlated with injury rates, but it's not driven by the pod gapping itself. So it could just be the volume of work on that day. It could be the nature -- the types of associates who are working that day. These are all sources that we call confounding variables, so variables that could also explain the results of a correlation, but imply that it's not causation, but just correlation.

Q. Okay. So, if I'm following, were you asking them what could better account for confounding variables?

A. For sure to look for other confounding variables that could explain the correlations, but also to think about other source of variation that could be used.

Q. Okay. And when you shared these concerns with the Soteria team, how did they respond to your feedback?

MR. FURST: Objection. Calls for hearsay.

JUDGE PFEIFER: Overruled.

You may answer.

A. They mostly did not respond, that is, they continued producing the same type of analysis. The primary analyst did make some changes based on our suggestions, but not in the direction that I've just outlined. They were pushing for individual level analysis and additional confounders and additional modeling of other sources of variation.

Q. And at some point after you began working with Soteria and you expressed these concerns, did the Soteria team present their analysis to the Workplace Health and Safety team?

A. Yes. There was a meeting to which I was invited where that team presented their analysis.

Q. And when did that meeting occur?

A. That was in July of 2022. So I think it was July 11th of 2022.

Q. And what did Soteria propose at that meeting?

A. Well, they proposed running a pilot that would affect pod gapping and, potentially, also bin fullness that would, essentially, impose a lower limit on the frequency with which -- or gap between pods. Rather than appearing every few seconds, they would basically be prevented from appearing every few seconds, and you would have to wait 10 or 15 seconds before showing up with the next pod.

Q. And what, if anything, did you say at that meeting?

A. So, after they presented and several other people had spoke, I said that I was worried that the analysis was incomplete and that the findings that they were presenting, themselves, did not support the intervention that they were proposing. That is, their findings did not support the pilot that they were proposing to run.

Q. And how did others respond after you said that at the meeting?

A. There was a pause where no one said anything, and then I don't think anyone really responded to my comment.

Q. Okay. After that meeting, did Workplace Health and Safety, did they ask your team to do anything further with respect to Soteria?

A. Yes. We followed up with more detailed critiques of that initial analysis and proposal, and they asked us to do an independent analysis of the same data.

Q. The same data that, what, Soteria used?

A. The same data they used to run their analysis to support the pilot, yes.

Q. Okay. Let's take a look at Exhibit 705, please.

JUDGE HENDERSON: This has a confidential assertion on it.

MR. YOUMANS: Yes, Your Honor. This is a confidential trade secret, so we would ask that it not be shared.

JUDGE PFEIFER: Exhibit 705 will not be displayed on the webinar.

Q. (By Mr. Youmans) So you mentioned, Mr. Nichols, that you were asked to do, I think you said an independent analysis. Did you then go ahead

and do that?

A. Yes, we did.

Q. Was that just you, or was that others on your team, that assisted with that?

A. That was me and Vikram Pathania.

Q. And looking at what's been displayed on the screen, this is Exhibit 705. It says "Privileged and confidential" and then "Analysis of bins, pods, and UPH." Do you see that?

A. Yes.

Q. And have you seen this document before?

A. Yes.

Q. Did you write this document?

A. I was one of the primary authors, yes.

Q. And what is this document?

A. This is a record of our independent analysis that was requested by WHS.

Q. And did you present this document to WHS?

A. We sent to them, yes.

Q. And do you remember about when you would have sent this independent analysis to WHS?

A. It would have been late July or early August of 2022.

Q. Okay. And looking at page 1 of Exhibit 705, a little bit down from the top of the page, there's a

section that says "Data" there. And can you just summarize the data that you and your team reviewed for the independent analysis that you did.

A. Yes. This was a data set that was shared with us by WHS. So it was constructed by them. And it was daily data, both -- they had separately site level or facility level data and associate or worker level data for two different process paths in 58 sites for a period of two years, roughly.

Q. Okay. And the process paths would be Pick and Stow. Is that correct?

A. Pick and Stow, yes.

Q. And then it looks like the period for the data would have been May of 2020 to March of 2022. Is that the range of the data that you reviewed?

A. That is correct.

Q. And do you have an understanding of how that data compares to the data that Project Soteria used for its analysis?

A. My understanding is that it was the same exact data.

Q. Okay. And just briefly, can you explain sort of the methods that you used to review and analyze this data.

A. Yeah. We employed a few different methods,

one which is effectively a nonparametric regression or a regression that controls for a lot of other factors but then explores the nonlinearity relationship between two variables. And then we also ran linear regressions, and we also then ran instrumental variables regression.

Q. I'm sorry, I didn't catch the last one.

A. Instrumental variables, is the third method.

Q. And you mentioned the difference, I think between site level data and associate level data. What level did you use for your analysis?

A. We explored the site level data just to try to understand the differences between the two different types of analyses, but our focus was entirely on the individual level analysis, since that's what we thought was the most reliable source of information.

Q. And can you just -- I understand site level, and you've described that as facility-wide sort of aggregate data, but, for the individual data, are we talking about data relating to each associate in the sample or something else?

A. Yeah, so it would be the data related to an individual associate on a given day.

Q. And so what variables or data are you looking at for an individual associate on a given day?

A. So, for example, the pod gapping that that individual experiences on a day, the average time between pods that they see on a given day in either Pick Or Stow and the average bin fullness of the bins that they're exposed to, as well.

Q. And would you look at any associate level data relating to injuries?

A. Yes.

Q. And what was that data that you reviewed?

A. We were focussed on recordable injuries, the recordable incidents, the injuries that are recordable. So those are the more serious injuries.

Q. And the recordable injuries, was that what Soteria had been focused on as part of its analysis?

A. I understand that they looked at recordable incidents and also total injuries, so all injuries, including those that require only first aid or no treatment at all.

Q. If I understand you, your team decided to focus on the recordable injuries. Is that correct?

A. Yes.

Q. And why focus on the recordables, as opposed to the total injuries which would include first aid?

A. Well, we thought that recordable incidents were the object of interest and had been from the

start, that the serious injuries were what we were committed to reducing and that that was the original -- I thought that was the original stated goal of Soteria, as well.

Q. Okay. So you mentioned, I think, some methods you used to analyze the data. You mentioned the individual versus the site level. You mentioned the recordable injury versus the total injuries. Any other differences in terms of how you went about analyzing this data compared to what the Soteria team had done?

A. Yeah, so we used different methods on the same data, and we, obviously, analyzed individual level data. I believe that they also had at least one analysis that was at the individual level which contradicted their results at the site level. So that was consistent with what we found, as well.

Q. And tell me more about that. They had one analysis at the individual level. Do you recall what they had analyzed at the individual level?

A. I believe they were looking at individual level pod gapping. I'm not -- I'm not sure.

Q. Okay. And just briefly, what were your conclusions or your team's conclusion based on this analysis of the data that you just described?

MR. FURST: I have to object, Your Honor,

to any sort of opinion testimony. We were never given notice that he was an expert. They never updated their interrogatories on as to who their experts were and what opinions they would be expressing, et cetera.

MR. YOUMANS: Your Honor, just for the record, again, we are producing Mr. Nichols here today in response to the Court's instructions that we have someone who could get Soteria-related documents into evidence for the Department. Mr. Nichols is that person. He's obviously done his own assessment, as well, relating to that, which we think is highly relevant.

And I would also note that, when we found Mr. Nichols, I emailed the Department's counsel back on September 5th, and I said "We have Austin Nichols. He's on the CoreAI team." I specified the four documents he would be able to get into evidence. And I also told them that he would also be talking about his team's own assessment of Project Soteria.

So, once the Court ordered us to find a custodian and once we found one, we notified L&I as soon as we could, and we absolutely made clear that he would be testifying to his own team's analysis. And one of the four documents we listed was Exhibit 705, which he's just talked about.

JUDGE PFEIFER: So the four documents you listed were Exhibits 164, 165, 166, and 705. Are those the four documents you referred to in this communication you're discussing?

MR. YOUMANS: Yes.

JUDGE PFEIFER: I think they all get in and testimony about them all get in with this witness or none of them get in.

It's your choice because you raised it.

MR. FURST: What my concern is, basically, two things, Your Honor. There's a difference between calling someone as a records custodian and have that person express an expert opinion. There's a huge difference.

And, yes, we got that email, but we certainly didn't email back and say "Oh, yeah, that's fine with us."

JUDGE PFEIFER: Well, I understand, but here's my ruling. All the exhibits related to Project Soteria have to be accompanied by Mr. Nichols' testimony for me to make any sense of it whatsoever. So either we abandon this entire line of inquiry about Project Soteria and we can excuse Mr. Nichols as a witness, or we get his testimony on all four of the exhibits and potentially 214 and 215, too.

MR. FURST: There's a difference, Your Honor, between the exhibits we're trying -- there's a difference in topics. The exhibits we're trying to get in, 164 through 166, talk about Project Soteria and one aspect of the project where they were looking at things like a pause of parts of the, basically, performance metrics, to shortcut it. He's talking about an entirely different part of Project Soteria that we've never even raised as to this issue as to bins.

JUDGE PFEIFER: But if you're going to raise that issue that you've just discussed, then Amazon is allowed to bring in testimony about Exhibit 705. You certainly can cross-examine Mr. Nichols on Exhibits 164, 165, and 166, because he's here to authenticate those. And you can ask him to read parts of it in the record or explain what it means.

MR. FURST: Which I do appreciate, Your Honor.

JUDGE PFEIFER: So that's how we're going to proceed. So it's up to you. Do you want to continue and discuss Project Soteria, or are we going to abandon ship on it?

MR. FURST: Yes, I want to continue.

JUDGE PFEIFER: All right. So I am

overruling any objection to testimony about Exhibit 705.

You may proceed.

MR. YOUMANS: Thank you, Your Honor.

Q. (By Mr. Youmans) Mr. Nichols, what were your team's conclusions based on this independent analysis that you've described for us?

A. We found very different impacts of the daily average UPH and individual UPH, which was something that they specifically asked us to look into on injury rates. We also found different impacts on bin fullness and pod gapping on injury rates at the site for individual level, which, again, that supported our contention that individual analysis was a better way to proceed.

A different analysis produce slightly different results, as well, but, in general, we found that sites that had -- that when the work rate was higher, when UPH was higher, injuries were lower. And we cautioned WHS that this was probably not a causal impact, that it would not be the case that when work rates were higher injuries would be lower as a causal effect, but rather that was due to some other observed variation that was driving that. And we also found similar results for pod gapping and bin fullness.

Q. Okay. Let's unpack that a little bit. So could we scroll up a little bit. We're still looking at page 1 of Exhibit 705. In the executive summary section, No. 1 there, it says "We find no strong evidence that higher UPH is associated with higher injury," correct?

A. Right.

Q. And you wrote that?

A. Yes.

Q. And I think you've explained that, but I want you to unpack the next sentence. It says "On the contrary, our best estimate shows no statistically significant relationship, and, in the data, higher UPH is correlated with lower RIR."

A. Right. So, in periods of time when the UPH, units per hour, is higher, it tends to be the case that there's a lower recordable injury rate, recordable incident rate. But in our preferred estimates, that relationship is still negative but not statistically significant, so it could be due to chance alone.

Q. And in terms of your assessment of pod gaps, I think that's No. 3 in the executive summary. Is that correct?

A. Yes. No. 3 says "Longer pod gaps or lower bin fullness are unlikely to lower recordable injury rates

and could actually raise recordable injury rates."

Q. And how, in your assessment, could manipulating those variables actually increase recordable injury rates?

A. Well, that would go to the mechanism, so I can't speak directly to that. I could hypothesize. But I think what we found, just in the data, was that, when there are longer pod gaps, sometimes there are higher incident rates. So longer pod gaps don't necessarily reduce injury rates. And lower bin fullness could also be correlated with higher injury rates.

Q. And did your team develop a hypothesis of why those values could be moving in opposite direction?

A. Why the pod gaps and bin fullness? I'm sorry.

Q. Yeah, why there was this negative relationship that you've described, right, where you could actually increase injury rates by, for example, lowering the UPH.

A. Oh, for units per hour. I think, in that case, at the individual level, it's plausible to think that what economists term selection is in play, that is, the types of individuals who tend to have higher productivity and process more units per hour are also simply more adept at their job and less likely to get

injured. And the folks who have lower units per hour processed on average are also more prone to injury. And that induces a correlation where, in fact, it's not a causal correlation.

MR. FURST: Your Honor, I have to object again. At this point, we're getting beyond what his conclusions were in Exhibit 705, and he's expanding on that to give other opinions generally.

MR. YOUMANS: Your Honor, this is actually just, as he said, a hypothesis, and it's actually written in the report. And it's just their team's hypothesis as to why some of these relationships they found or didn't find exist.

JUDGE PFEIFER: All right. And that's how I'm considering the testimony. So the objection is overruled.

How deep are we going to get into Exhibit 705? Because I don't think it's particularly relevant to me to get into anything beyond -- well, because I have been skimming it as you've been talking about it -- anything beyond page 2.

I'm certainly not an expert, and I really don't think it's a good use of our time to have Mr. Nichols try to explain pages 3 through 13 to me because he's going to fail because I'm not going to be

able to comprehend it.

MR. YOUMANS: Right. And, actually, we just had a little bit more on this document, Your Honor.

JUDGE PFEIFER: Okay.

Q. (By Mr. Youmans) Did you make any recommendations based on the analysis you've just described?

A. Yes. We recommended that they not proceed with the pilot they had initially proposed but that they do additional analysis to support a pilot. We also suggested that they explore other interventions, including paid breaks or other policies, that could have a larger -- we hypothesized -- could have a larger impact on recordable incident rates, in addition to having the right signed impact.

Q. Why did you recommend they not pursue the pilot that Soteria was proposing?

A. Well, we were concerned that, in fact, that policies they were proposing could actually raise injury rates instead of lower injury rates.

Q. Why were you concerned about that? Why did you believe that?

A. Well, there are correlations in the data that we explain in the document that it looked like it could

either raise or lower injury rates. But at least the evidence that we saw said there's either a zero impact or it's going to raise injury rates, what they were proposing to do.

Q. So I wanted to ask you just about one other detail in the report, but in terms of your analysis of pod gapping, you analyzed that with respect to both Pick and Stow, correct?

A. Yes.

Q. And did you get the same result basically for both of those process paths with respect to pod gapping?

A. I think there were a variety of results. Is it possible that we can scroll down the document so I can remind myself.

Q. Sure.

MR. YOUMANS: And, Your Honor, I apologize, if we can quickly look at page 4, please. And if we can scroll down to the bottom of page 4, please.

Q. (By Mr. Youmans) I'll direct you to it, but, if we look at the second paragraph from the bottom there and the second sentence in, you talk about, basically, the results, right, with respect to Pick and with respect to Stow, when you were looking at this

issue of pod gapping.

A. Yes.

Q. Does that refresh your recollection?

A. Yeah, opposite signed effects, but that's conditional on other things, including units per hour, I believe.

Q. Okay. And then you write "Pick has lower injury rates when pod gapping is longer, but Stow has higher injury rates." Is that correct?

A. That was our finding, yes.

Q. And so did you conclude from that that, for Pick at least, they should introduce longer gaps between the pods?

A. No. Because all of this is nonexperimental analysis. It's true that, if you were going to design a pilot, you would want to focus entirely on Pick and not on Stow because the nonexperimental analysis would support that, perhaps.

But because this is all nonexperimental analysis, it's very hard to say this is a causal relationship. And, in fact, if you did impose a pilot in Pick that increased pod gapping and lowered UPH, that nonexperimental analysis, because you have longer gaps between pods, necessarily you have a lower UPH, the nonexperimental analysis still doesn't show that

you would lower injury rates. Because lower UPH, as I just -- as you lower UPH, you could actually increase the injury rate.

You get longer pod gaps, which has this effect, and you get, also, at the same time, lower UPH, which, according to that nonexperimental analysis, which, again, I don't think is causal, it would say that the injury rate effect could be positive or negative.

MR. FURST: Your Honor, can I have a continuing objection to these opinions?

JUDGE PFEIFER: And your objection is because you consider this expert opinion testimony?

MR. FURST: Yeah, and really beyond what my understanding was as to what he would be testifying to, Your Honor.

JUDGE PFEIFER: All right. You do have a continuing objection.

MR. FURST: Thank you.

Q. (By Mr. Youmans) Mr. Nichols, going back to your team's recommendation, which you've already summarized, I think you said one of them was the possibility of looking into more paid breaks. Is that correct?

A. Yes.

Q. And what did you mean by that?

A. Well, there was a hypothesis that additional paid breaks would serve a function of lowering injury rates because people would be able to take time off if they felt tired or if they needed a break in their day. That was just a hypothesis that we thought should be explored.

As it turns out, the WHS already had a program that was sort of a form of paid break, but once every four weeks, called the WorkingWell huddle. So instead of pursuing the paid breaks analysis, we started studying WorkingWell huddle instead.

Q. Okay. We'll get to your involvement in that project in a minute.

MR. YOUMANS: Your Honor, at this point, we would move to admit Exhibit 705.

JUDGE PFEIFER: Other than the objection that you've already stated, Mr. Furst, do you object to the admissibility or admission of Exhibit 705?

MS. KORTOKRAX: I don't have any new objections.

JUDGE HENDERSON: We need a confidentiality ruling.

JUDGE PFEIFER: Yes. I rule that this implicates a confidential trade secret. And

Exhibit 705 shall be kept confidential.

Can we go off the record for a minute.

(A brief recess was taken.)

JUDGE PFEIFER: Back on the record.

Mr. Youmans, I've just, off the record, expressed my concerns about my ability to understand anything beyond page 2, and I'm asking you for what purpose are you offering the entire exhibit.

MR. YOUMANS: Your Honor, we're happy to explain any part of this exhibit, but it's obviously very lengthy and some of it's complex. We're offering the whole thing, just in the interest of completeness, so that the entire assessment and report that CoreAI did is part of the record.

But, as I explained when we were off the record, Amazon's is offering this for the larger point that CoreAI did do this assessment of the same data that Soteria looked at, and they came to very different conclusions.

JUDGE PFEIFER: All right. I am admitting Exhibit 705, subject to admitting the Department's proposed Exhibits 164, 165, and 166 and potentially, 214 and 215, as well.

(Exhibit 705 admitted.)

MR. YOUMANS: Can we take a look at

Exhibit 166, please.

JUDGE PFEIFER: Exhibit 166 has already been designated as implicating a trade secret so will not be displayed.

Q. (By Mr. Youmans) Mr. Nichols, we're looking at Exhibit 166, which is being displayed on the screen, and it's titled "Correlation analysis injury rates and productivity metrics." Do you see that?

A. Yes.

Q. Have you seen this document before?

A. Yes.

Q. And have you reviewed the analysis in this document?

A. Yes.

Q. There's already been testimony from the Department's experts about what that analysis shows or doesn't show. Based on your review, do you agree with the analysis that's summarized in this document?

A. No.

Q. And why don't you agree with it?

A. So they summarize that there's a correlation between injury and productivity methods, but they failed to control for any of the confounding factors that one would ordinarily control for.

MR. FURST: Same objection as to him

expressing opinions, Your Honor.

JUDGE PFEIFER: Can we put this in some context. Would Exhibits 164 through 166 be part of the documents that Mr. Nichols considered in putting together Exhibit 705, his report?

MR. YOUMANS: So 166 -- and I can ask Mr. Nichols -- that was prepared by a different team, but there has been testimony about 166 by Dr. Rempel where he basically relied on it and summarized its conclusions. And so Mr. Nichols also reviewed that document and can speak to that.

JUDGE PFEIFER: Can we get some context as to -- this is totally separate from Project Soteria? Okay. I need to know what this is about.

MR. YOUMANS: Sure.

Q. (By Mr. Youmans) Mr. Nichols, what's your understanding of what team put Exhibit 166 together?

A. It is my understanding that it was yet another completely independent analysis produced by a Business Intelligence team.

Q. Okay. And what sort of things is Business Intelligence tasked with, if you know?

A. They typically produce dashboards to track metrics for business performance over time.

Q. And did this analysis, as far as you know,

that is, 166, did that have anything to do with Soteria?

A. I believe that the Soteria team also received a copy of this and had a similar reaction to what I just expressed.

MR. YOUMANS: So, Your Honor, that's what we know about this particular document. And, again, this was something that the Department offered as part of their case and Mr. Rempel was allowed to basically summarize in his testimony.

JUDGE PFEIFER: And you want this eventually admitted?

MR. FURST: Yes, we do.

Your Honor, this really gets into the issue we've raised before as to why we have so many unsigned documents. Even Exhibit 705 -- we now know who wrote it, but, if I had just seen this a month ago, I would have no clue. Could either I ask in voir dire in aid of objections or can we have some testimony as to why in general sometimes we know who wrote a document, sometimes we know which team, sometimes we have no clue?

JUDGE PFEIFER: That's a good point.

Is this witness able to answer that question?

MR. YOUMANS: I do not know if he is able to do that. Your Honor, that is just the reality. It depends on what team is producing the document, who the audience is. It varies. Some of these documents we're lucky enough to have a date on them, other documents we don't.

JUDGE PFEIFER: Okay.

MR. YOUMANS: There's no rhyme or reason for that, as far as I know. It's just different teams within Amazon creating different documents for different purposes and not always following the same conventions.

JUDGE PFEIFER: I know I rejected Exhibit 166, but I don't recall if I -- Amazon objected to Dr. Rempel's testimony about this.

MR. FURST: Yes.

JUDGE PFEIFER: Did I sustain or overrule?

MR. FURST: My understanding is that you did not overrule it. I mean, I wasn't there the whole time. I don't know if Sara remembers, but --

MS. KORTOKRAX: I think you may have allowed testimony over it.

JUDGE PFEIFER: Yeah, I think I allowed testimony. Someone's reminding me I allowed testimony,

but not the exhibit in.

MR. YOUMANS: You did, Your Honor.

JUDGE PFEIFER: All right. So then I'm going to allow the testimony that Mr. Nichols has given to us today to remain in the record.

MR. FURST: Your Honor, I understand your ruling. Part of the problem -- and this is part of what I was getting at a minute ago -- is, obviously, there's folks at Amazon who are also experts that have different opinions. When we got these documents, we couldn't figure out who these people were to name them --

JUDGE PFEIFER: Right.

MR. FURST: -- or anything else. It really puts us in an unfair place that they can call -- that they're having some sort of internal argument about these documents. They're able to call their folks to say why other folks at Amazon are wrong. And it's just inherently unfair for him to be able to be here saying why these other experts at Amazon are wrong.

JUDGE PFEIFER: And these are -- Exhibit 166 in particular is a document that was shared with you late pursuant to my ruling.

MR. FURST: Yes.

JUDGE PFEIFER: Okay. So your point is very well-taken, and I think you should raise that with me in your motion for rebuttal.

MR. FURST: Okay.

JUDGE PFEIFER: Because --

MR. YOUMANS: Your Honor, again, just for the record, once we understood that you wanted Amazon to produce someone to get this in, we disclosed that to the Department as soon as we could. We disclosed it on September 5th. We disclosed who would be testifying to it. We disclosed that he was on a different team and that he would be offering his new analysis. And that was almost a month ago.

There was no request from the Department about deposing Mr. Nichols, for example, which we expected. There was no request for getting other custodians there who might be able to speak to these things. So we disclosed it as soon as we reasonably could after we understood what your direction to us was. And this last four weeks, there was nothing from the Department that was following up on this.

MS. KORTOKRAX: Your Honor, I just need to point out that that came in. I responded and said I could not respond until -- Mr. Furst was on vacation, which everybody knew was going to happen. He was not

around when the email came in talking about this witness.

JUDGE PFEIFER: Right. I understand.

MR. YOUMANS: And that's true, Your Honor, and Ms. Kortokrax did ask would he be able to attest to other documents, and I responded to her, and I said I don't think so. And I explained again, this is the team he's on, he can testify to 164 through 166, and he can testify to 705.

MR. FURST: And if I could just add one more thing. In light of everything Your Honor has heard from mid-May on, I can only imagine what the reaction would have been if we had said we want to take this new deposition at this point.

JUDGE PFEIFER: I understand.

So do you have any questions as it relates to Exhibit 166 to voir dire Mr. Nichols about how it was prepared that might aid in an objection, or are you going to agree that 166 can be admitted?

MR. FURST: I obviously don't have any objection to it being admitted.

JUDGE PFEIFER: Okay. So then let's save for cross-examine any questions you have about 166.

MR. FURST: Thank you.

Q. (By Mr. Youmans) So, Mr. Nichols, you were

starting to describe, I think, some concerns or disagreements you had with the analysis in this. And can you repeat what those concerns were. I think you talked about correlation and confounding factors.

A. Yes. This is simply a raw correlation over time in two variables, without accounting for any confounding factors, which would change the whole analysis potentially.

Q. What do you mean by a raw correlation?

A. It's just looking at the correlation of two variables over time without conditioning on anything else. So nothing about the time, nothing about the tenure distribution within associate populations, nothing about other conditions that might apply. So it's just looking at the raw correlation.

Then you could imagine that, for example, it's all driven by -- all of that correlation is driven by confounding factors or could even change the sign literally.

Q. And so does anything in this analysis establish or purport to establish any sort of causal relationship?

A. No.

Q. And what value does this analysis have, in your opinion, when it comes to identifying

opportunities to reduce MSDs at Amazon?

A. None whatsoever.

JUDGE PFEIFER: Mr. Furst, did you want to say something, or did your co-counsel want you to say something?

MR. FURST: I assume I have a continuing objection to all these opinions.

JUDGE PFEIFER: The opinions, yes, you have a continuing objection to them.

Q. (By Mr. Youmans) So I want to loop back to something you said when you were talking about your recommendations based on your analysis of the Soteria project. And I think you said one of the things you recommended was looking at the issue of paid breaks and whether those would be leveraged to somehow have an impact on the injury rate. Is that correct?

A. That is.

Q. Okay. And you were about to talk about, I think, your team's involvement in terms of looking at that issue, at least in one context. Is that correct?

A. So, in the document, we advised Soteria to look into this, but I don't have any information about what Soteria did with that information. We discovered that WHS had an ongoing program that was similar to paid breaks, called WorkingWell huddles, and that's

when we started working with WHS on the WorkingWell huddles analysis.

Q. Okay. And who at WHS were you working with as part of that project?

A. I think we initially connected with Marty Kuhl and then with his reports, including Chase Bricker.

Q. Just briefly, can you describe what work you've a done on that project with Mr. Kuhl's team.

A. Yeah. So, in summer of 2022, we did a nonexperimental analysis of WorkingWell huddles, again, at the individual level and exploiting instrumental variables. We found strong negative impacts on injury rates of WorkingWell huddles, surprisingly strong I would say, but that the impacts were concentrated entirely among lowered tenured workers, and there was almost no effect or no effect on experienced workers.

And so as a result of that analysis, we advised them to implement a pilot testing different cadences of huddles with different types of workers.

Q. You mentioned this nonexperimental analysis that your team did. And I think you defined that earlier, but could you just remind us what that means, as opposed to the pilot that came after.

A. Right. So that's just exploiting variation that we see in when people took a huddle or didn't.

That could occur for other reasons aside from randomly assigned variation. So it's subject to the same kind of selection bias that I brought up before.

Q. And when you're doing the nonexperimental analysis, do you remember the timeframe basically of the data that you were looking at with respect to the huddles?

A. I think the data we had was from mid-2020 through mid-2022.

Q. And can you give us a sense of the volume of data you were looking at with respect to the huddles from mid-2020 to mid-2022.

A. Many millions of observations on millions of associates.

Q. And about how many facilities were you getting data from relating to the huddles?

A. Hundreds.

Q. And you mentioned then, as a result of the nonexperimental analysis, you worked to put together a pilot. Is that correct?

A. Yes. So we suggested they might want to consider increasing the frequency of huddles for low tenured workers, for new hires in particular, because we saw, not only were those relatively high injury rates, but that's where the impact of the huddles was

strongest. And so they developed a pilot in consultation with us. We randomized sites across North America in particular. And so across 446 sites, we randomized into groups that were either treatment or control, and the treatment sites increased the frequency of huddles for low tenured workers.

Q. And about when did that pilot start?

A. That started in January of 2023.

MR. FURST: Your Honor, at this point, we're now well beyond Exhibit 705 or anything we were told would be part of his testimony.

MR. YOUMANS: Your Honor, two things. So, No. 1, this is relating to the followthrough on one of the things they recommended in Exhibit 705. And, No. 2, Mr. Kuhl did testify on this issue yesterday, and Mr. Nichols is the one who's in a position to actually tell the Court what the results were.

JUDGE PFEIFER: Right. And I sustained the Department's objections to this yesterday, and we took it in colloquy. And I think I have even more reason to do that now. If you're going to get into the results of the pilot, of the studies on huddles, I'm going to sustain the Department's objection.

MR. YOUMANS: I understand that, Your Honor. Just for the record, again, this is a pilot

that's being launched based on a study of data that goes back to mid-2021 -- or mid-2020 actually.

JUDGE PFEIFER: Right.

MR. YOUMANS: So this is basically the end of the story of an analysis that was looking at the impact of the huddles right in the core period that's relevant to this case.

JUDGE PFEIFER: But this notion of huddles is a new one, is it not, Mr. Furst?

MR. FURST: Yes. Before the discovery cutoff, there was no mention of this witness or anything like that. Mr. Kuhl at least was listed as a potential witness.

JUDGE PFEIFER: Right.

MR. YOUMANS: The issue --

JUDGE PFEIFER: Let's just have you proceed with the questions, but I'm going to take the results of this pilot into colloquy when we get to it.

MR. YOUMANS: All right. Understood, Your Honor.

Q. (By Mr. Youmans) So you mentioned, I think, when the pilot began. And has that pilot been concluded at this point?

A. Yes. It concluded in July.

Q. And about how many sites were participating in

this pilot?

A. There were 446 sites that were randomized.

Q. And have you and your team reached any findings based on the completion of this pilot?

A. We've been producing internal findings all along, and we are in the process of finalizing a report for WHS on those findings.

MR. YOUMANS: And what are those findings, if you could summarize what those findings are?

JUDGE PFEIFER: Just a minute. At this point, with that last question, we're going into colloquy based on the Department's objection to this.

Correct, Mr. Furst?

MR. FURST: Yes.

JUDGE PFEIFER: All right. So you may answer.

THE WITNESS: So the impacts were larger than we had found in the nonexperimental estimate, which was surprising, I would say, but -- so the impacts were very large for low tenured workers, particularly for MSD RI. So there's about a 40 percent reduction in MSD RI for low tenured workers who got the doubled huddle scheduled.

Q. You said MSD RI. What is that?

A. Musculoskeletal recordable incidents, injuries related to musculoskeletal disorders.

Q. And when you say you observed that reduction for low tenured associates, can you define low tenure for us.

A. So that's anyone who was hired during the course of the pilot, during the January to July period.

Q. So that 6-month period?

A. (No verbal response.)

Q. Is that correct?

A. Yes.

Q. And just so the record is clear, the pilot I think you said you were increasing the frequency of the huddles. So you increased them from what frequency to what frequency?

A. They increased from once every four weeks to once every two weeks.

Q. And based on these findings that your team has come up with, have you made any recommendations in terms of next steps?

A. Yeah. So we've encouraged WHS to explore alternative additional cadences for huddles and to consider a pilot in the EU. The European Union countries are also interested -- the UK, I should say -- also interested in exploring these alternative

cadences to lower injury rates.

MR. YOUMANS: I don't have any further questions. Thank you.

JUDGE PFEIFER: All right. Show us out of colloquy and show us off the record.

(The noon recess was taken at 11:58 a.m.)

JUDGE PFEIFER: Show us back on the record.

Mr. Furst.

MR. FURST: Thank you, Your Honor.

CROSS-EXAMINATION

BY MR. FURST:

Q. I'm going to start with a general question for you. Your Exhibit 705 -- and we don't have to pull it up or anything -- it doesn't have your name anywhere, it doesn't have a date when it was written, or anything, right?

A. Mm-hmm.

JUDGE PFEIFER: Is that a yes?

THE WITNESS: Yes.

Q. Why is that?

A. Standard practice at Amazon to not put names on documents. I'm not sure why that is.

Q. In various documents we've gotten in this case, there's a fair amount of studies we've seen that have someone's name and a date or maybe several authors' name, and, then, as you said, there's a number that don't. I'm wondering if there's some sort of policy as to when you put your name and date on a document versus when you don't.

A. I'm not aware of any such policy.

Q. Do you know why it's standard practice not to put your name and date on a memo or study or something?

A. My impression is that it's common in tech companies just as a way that they operate. I'm not sure why.

Q. And that applies to the dates, too?

A. I think it's quite common, yeah.

Q. Moving off of that topic, you're an economist, not an ergonomist, correct?

A. That is correct.

Q. And you don't claim to have any specialized knowledge in ergonomics, right?

A. I do not.

Q. And you started looking at Project Soteria in April of 2022?

A. That's correct.

Q. And your first criticism of the project in general was that it was a nonexperimental method of analysis, correct?

A. Yes.

Q. And then you also had concerns with how they addressed or didn't address various, what I'll call confounding variables, correct?

A. Yes.

Q. What is your understanding of the overall purpose of Project Soteria?

A. I understood it to be an exploration of various factors that could affect injury rates, including both policy-relevant variables and, let's call them environmental factors, as well.

Q. And is my understanding correct that, under the general, I'll call it umbrella of Project Soteria, there are a large number of different groups of people at Amazon that were studying different topics to determine what impact, if any, that topic had on injury rates?

A. I believe so. I'm only familiar with the three people that I talked to directly about it, but -- but I believe there were others involved, as well.

Q. Is my understanding correct -- I believe in one of these documents I saw a reference that there was up to 42 different topics that Project Soteria was looking at. Is that right? I'm not asking whether 42 is correct, but that it's a very large number like that.

A. The number 42 that I remember is the number of variables, these factors that are both environmental and also policy relevant that they looked at, not the projects, not topics, but the variables that they

included in their analysis.

Q. Do you know how many different topics -- or maybe topic isn't the right term. Do you know how many different -- well, strike that.

What's the difference between a variable that they're looking at and what I'm calling a topic?

A. Well, a topic could map to many different variables, or a variable to address many different topics.

Q. But say the policies of performance metrics could be, say, one topic, right?

A. Yes.

Q. And then WorkingWell huddles and its impact could be a separate topic, right?

A. Yes.

Q. And, say, job rotation, could be yet another variable or another topic, right?

A. Yeah, so those would be topics, and then you would measure them with the variable. So the measurement itself would be the variable.

Q. Each of these what I'm calling topics would be a different confounding factor, right?

A. Could be. Could be, yes.

Q. If each one is in play at the same time that another one of these topics is being studied and if

each one potentially may impact positively or negatively injury rates, then it would be a confounding variable, right?

A. It could be, yes.

Q. And I'm not sure that we really have a disagreement here. Wouldn't you agree that each of these confounding variables makes it hard to make any given causal connection as to any one change that's made as to whether that change impacted injury rates?

A. That's true for nonexperimental analysis but not experimental analysis.

Q. And, again, I'm talking about Project Soteria, which was a nonexperimental analysis.

A. Then yes.

Q. And I'm probably not accurately or entirely accurately summarizing it, but wasn't that your main criticism of Project Soteria, that it wasn't properly accounting for all the various confounding variables?

A. I'd say the main criticism was that it didn't use individual level data and then, secondly, that it didn't account for all the potential confounders.

Q. Okay. So you had two separate criticisms?

A. Yes. Or I should say three.

Q. Okay. Getting back to a project like Project Soteria in general. So we know that it was looking at

a number of different factors that might reduce injuries, right?

A. Yes.

Q. And we know that that there were other groups looking at other things like, say, engineering controls that might reduce injuries, right?

A. I believe so.

Q. And if I understand it right from your discussion of Exhibit 166, that there was a business group that was also looking at this issue, right?

A. Briefly. I believe so, yes.

Q. So was there a group or a person at Amazon who is looking at the big picture of what all various groups are studying as possible ways to reduce injuries? Is there some entity or some part of the organization that's saying, okay, let's look at all these findings and see which ones will actually reduce injuries the most?

MR. YOUMANS: Objection. Foundation.

JUDGE PFEIFER: Overruled.

You can answer if you know.

A. I believe that was the remit of the VP in charge of WHS.

Q. What does the remit of the VP mean? I just don't know the terms.

A. I believe she was responsible for looking across the numbers of studies and making decisions based on them.

Q. And do you know whether she actually came up with any sort of final opinions as to what would do the most good to reduce injuries?

A. I did not hear from her directly, but I know that Project Soteria did not proceed with the pilot they had proposed and we did proceed with the pilot that we proposed.

Q. And that was for WorkingWell huddles?

A. Exactly.

Q. But I take it there were also pilots that had been proposed for engineering controls that were approved of, right?

A. I believe so, yes.

Q. In Exhibit 705 that you discussed, isn't it true that you did not find that there was no causal relationship between units per hour requirements and injuries?

A. We argued that there probably was no causal relationship. We found that, if there was a relationship, it went the opposite direction to what Soteria was claiming it went.

Q. So, if I understand the answer you just gave,

you felt that there was no causal relationship between units per hour requirements and injuries?

A. We did not find such relationship in our conclusions, yeah.

Q. But wasn't that because of the limitations of the nature of Project Soteria?

A. Well, it's true we didn't have experimental data.

Q. Right.

A. So we cannot conclude a causal relationship without experimental data. But even the correlation did not support an experimental pilot.

Q. You're saying based on what you had in front of you.

A. Exactly.

Q. How would you define confounding variables?

A. So those are any factors that affect what we call selection of treatment. So receiving some different level of a policy-relevant variable and also the outcomes, in this case injury rates. So, for example, tenure would be a confounding factor.

Q. Okay. And when you're including things like tenure, you would probably have a pretty long list of confounding factors.

A. Yes.

Q. And we've discussed a number -- I mean, you and I have discussed over the last few minutes -- a number of factors that various groups at Amazon were investigating to determine their role in lowering injury rates during Covid, right?

A. Yes.

Q. Wouldn't you agree that it would be difficult to determine all the factors that led to the lowering of injury rates during Covid at Amazon?

A. Certainly, for the purpose -- in a nonexperimental estimate, for sure, yes.

Q. And isn't it likely that there's not one single reason that the injury rates were lowered?

A. Yes.

Q. And isn't it likely that all of the factors that were being investigated as potentially being the reason that injury rates were lowered, that it was all those factors in some combination that lowered the injury rates?

MR. YOUMANS: Objection. Speculation.

JUDGE PFEIFER: You may answer.

Overruled.

A. In combination only in the sense that some could have positive and some could have negative impacts, and determining which is which is quite

difficult.

MR. FURST: Could we have Exhibit 166.

Q. This is the exhibit that you were shown before lunch, correct?

A. Yes.

Q. And you say this was written by the Business Intelligence team?

A. That is my understanding.

Q. What is the Business Intelligence team?

A. As I said, my impression is that they're mostly tasked with pulling metrics and making dashboards to track performance over time.

Q. And how does that differ from your team, the CoreAI team?

A. CoreAI is composed primarily of applied scientists and engineers, so data engineers and economists, economists typically with substantial training in causal inference specifically.

Q. And what would be the main type of expertise in the Business Intelligence team?

A. Presumably, some familiarity with data science, basic statistics.

Q. So that would have some overlap with your group, right?

A. A very small amount of overlap, yeah.

Q. And does your group usually interact with the Business Intelligence team?

A. Typically, only in the discussion of what should be in a dashboard.

Q. What is a dashboard?

A. So that's just an interactive -- for example -- an interactive web page that tracks performance over time. So it might show, for example, volume at different sites over time, injury rates, perhaps, at different sites over time.

Q. And one of your criticisms of Exhibit 166 was that they didn't consider properly confounding variables, right?

A. Yes.

Q. And the purpose of Exhibit 166 is in the first sentence, correct, that they were analyzing the correlation between injury rates and productivity metrics to understand how these two elements are related? Is that right?

A. That's the purpose, stated purpose, yes.

Q. And moving down to the next section, the summary, their summary was that I think we observed there is a strong correlation between injury and productivity metrics in the AR sortable business unit. That was their summary, correct?

A. That's what it says.

MR. FURST: Move for admission of Exhibit 166.

MR. YOUMANS: No objection.

JUDGE PFEIFER: Exhibit 166 is admitted.

(Exhibit 166 admitted.)

MR. YOUMANS: Your Honor, I think you've already addressed this, but this would contain confidential trade secrets.

JUDGE PFEIFER: Yes. It's been designated as containing confidential trade secrets.

MR. YOUMANS: Thank you.

MR. FURST: Could we have Exhibit 164.

JUDGE PFEIFER: Exhibit 164 has also been designated as implicating a confidential trade secret, so it will not be displayed.

Q. (By Mr. Furst) Have you seen Exhibit 164 before?

A. Yes, I have.

Q. And what is it?

A. This is Project Soteria findings and recommendations from August 2020.

Q. And have you read this exhibit before?

A. Yes.

Q. And what was the general topic that's

addressed in 164?

A. They modeled 42 variables and their correlation with injury rates.

Q. And what is meant by the acronym SPPR?

A. I don't know what that stands for, but I believe it's related to -- I can't remember what it stands for, but I believe it's related to some kind of productivity measurement.

Q. And is it your -- now in the first sentence -- well, let me ask the second question. It will probably be the same answer.

After that acronym is a slash SQPR. Do you know what that stands for?

A. I don't know what it stands for, but it's a related metric, I believe.

Q. And it relates to -- and do you think the Q relates to quality?

A. That's my understanding, yeah.

Q. And that's the Q in the second acronym.

A. Yes.

Q. And the first sentence talks about the pausing of SPPR and SQPR, correct?

A. That and UPT and VTO, as well.

Q. Right. Just to sort of flesh that out, what is UPT?

A. That's unpaid time off.

Q. And what is VTO?

A. Voluntary time off.

Q. And when they mention the pausing the SPPR, isn't that that certain parts of the ADAPT process were paused during Covid?

A. I believe that's correct, yeah.

Q. And is it your understanding that SPPR is part of the ADAPT process?

A. I don't actually know the ADAPT process.

Q. You don't know what it is?

A. I believe that it is part of the ADAPT process, but I don't know what it is.

Q. You don't know what SPPR is?

A. I don't know what SPPR stands for, and I'm not sure what the ADAPT process is.

Q. Okay. If I represent to you that the ADAPT process is related to performance expectations of associates in direct process paths, would that make sense to you?

A. Is it the system that results in coaching of associates to improve performance?

Q. Yes.

A. So, yes, I'm aware of that process.

Q. And if I represent to you that SPPR is part of

that coaching process --

A. That seems entirely plausible.

Q. And do you have an understanding that at least parts of that process were paused during Covid?

A. I do.

Q. And in the first paragraph they mention that Project Soteria has asked for approval by leadership to allow further study of the impact of pausing these processes, right?

A. That's certainly what the document says, yes.

Q. And it says that that request was not granted, right?

A. That's what the document says.

Q. And it was not granted because of concerns about negatively impacting rate/productivity and the ability to deliver on time to customers, right?

A. It does not say that. That's what's implied based on the author of the document saying that, but I don't know that that's the case.

Q. Right. But I'm saying that's what the document says.

A. It does not say that that's -- they don't attribute a reason for the disallowance of that suggestion.

Q. But am I reading the document correctly?

MR. YOUMANS: Well, objection, the document speaks for itself.

JUDGE PFEIFER: Yeah, I would agree. I think you're focusing on part of the sentence instead of the entire sentence.

THE WITNESS: I can read the sentence, but I don't see that there's --

JUDGE PFEIFER: Yeah, go ahead.

Q. (By Mr. Furst) Sure. You can finish answering.

A. I don't see that the reason for the lack of approval by leadership is given in that sentence. I see that they chose one option versus another, but I don't know what the reasoning was.

Q. And what is your understanding as to what this part of Project Soteria was studying?

MR. YOUMANS: Objection. Vague.

JUDGE PFEIFER: Overruled.

You may answer if you know.

A. What was this project studying?

Q. Right.

A. I thought I answered that it was looking at the correlation of 42 variables and injury rates. Is that not what you're asking?

Q. It seems in the first paragraph that it's a

little more specific than 42 variables, as to what 164 talking about, because there's different parts of Project Soteria.

A. 164 being?

Q. Being this document, Exhibit 164.

A. Oh, you're saying Soteria is different than Exhibit 164.

Q. No. Let me backtrack. Project Soteria looked at several different topics, correct?

A. Yes.

Q. And I'm trying to focus on which topic they were looking at in Exhibit 164, which is this document.

A. As far as I know, Project Soteria did not look at more topics than were included in this document. This is dated August 2020. Is that right?

Q. Yes, that's right.

Could we turn to page 4 of this. And I'm looking at around line 131, 132. It's called page 4. I don't know if it's really the fourth page. Yeah, there we go. It looks like in Figure 6 they're talking about what would be a maximum achievable rate for any given injury risk. Is that right?

A. That seems to be the case.

Q. And it goes on to say "In general, as rates increase, so is the daily injury likelihood." That's

what that statement says, right?

A. That's what the title of the figure says, but I don't see that in the figure.

Q. But that's the statement made after the word "Figure 6," correct?

MR. YOUMANS: Objection. The document speaks for itself.

JUDGE PFEIFER: I can see that it says that, and we're going to admit it, but what does it mean? That's really what would be helpful to me.

Q. (By Mr. Furst) Do you have an understanding as to what this statement means in the topic heading for Figure 6?

A. My understanding is that they have done a simulation based on their nonparametric regression that shows maximum achievable rates, holding injury rates constant, but then graph that over injury rates. And that they're claiming -- the title of the figure -- that that curve on the graph is upward sloping, but they do not present a test of the hypothesis that that curve is upward sloping.

Q. And in this document from August of '20, they are suggesting other tests, correct?

A. What do you mean by other tests?

Q. Well, they start out talking about --

JUDGE PFEIFER: What page, Mr. Furst, so we can display it?

MR. FURST: I'm back on the first page, but I'm also talking in general.

Q. Let me rephrase this.

Is my understanding that the purpose here of Exhibit 164 is to make the case to be able to do further testing on their hypothesis?

MR. YOUMANS: Well, objection to foundation on that, Your Honor.

JUDGE PFEIFER: That's overruled. I'm going to allow him to testify fully about this exhibit as to what he knows.

A. Are you asking what the purpose of the document was?

Q. Right.

A. So I don't know that except from what the document says.

Q. And --

A. This was written long before I joined Amazon.

Q. Right. I understand that, and I understand you weren't part of meetings during that time, et cetera. I got the impression reading it that this was a sort of advocacy piece asking to be able to do more work on this issue and more testing. I'm asking

your opinion whether I'm right.

A. I think that's very plausible. When you say more testing, you mean to run pilots or additional nonexperimental analysis?

Q. Right. Right. And I was using testing because that use that phrase in the first --

A. Where do they use that? Oh, test several levels?

Q. Yes. Yes. That's why I was using the phrase.

A. Okay.

Q. One thing I'm struggling with on this -- they're talking about maximum achievable rates, and my understanding is they're talking about UPH, units per hour. Would that be correct as to what they mean by rates?

A. I believe so. If we could go back to page 4, I could answer that because it might say directly.

Q. Sure.

A. It would actually be page 5 in the PDF, I suppose. Yeah, it's rate times hours worked times head count. So it's actually -- that rate is probably UPH times hours worked times head count. So it's actually the number of units processed at a site in each of those process paths, I believe.

Q. But when they were talking about a rate,

wouldn't that be the units per hour that's expected of any individual?

A. No. I think that's average UPH, not an expectation.

Q. Do you know whether the authors of Exhibit 164 were ergonomists?

A. I do not.

Q. Do you know -- let me move it out of 164. Do you know whether -- strike that.

You testified before lunch that you met with people from Project Soteria, correct?

A. Yes.

Q. Were the people you met with ergonomists?

A. The main person I met with is not an ergonomist. I'm not sure if other people on that team were ergonomists.

Q. Do you know whether any of these documents were written -- well, 164 or 166 -- were written by ergonomists?

A. I do not know who the authors of 164 were.

Q. Do you know if they were part of Amazon's safety group?

A. I believe that they were in Project Soteria, which would probably mean they were in the WHS group.

Q. Okay.

MR. FURST: I move for admission of 164.

MR. YOUMANS: No objection.

JUDGE PFEIFER: Exhibit 164 is admitted.

(Exhibit 164 admitted.)

MR. FURST: Could we have Exhibit 165.

MR. YOUMANS: And, Your Honor, I apologize, I think you've already ruled that 164 --

JUDGE PFEIFER: Yes.

MR. YOUMANS: Thank you.

JUDGE PFEIFER: 164 and 165 are both implicating confidential trade secrets, and they are not going to be displayed, and they are designated as confidential.

Q. (By Mr. Furst) Have you seen Exhibit 165 before?

A. I have.

Q. And have you read it?

A. I did at one point, yes.

Q. Do you need some time just to sort of skim it?

A. That's fine, I'll catch up.

Q. And this is another Project Soteria document, correct?

A. Yes.

Q. And it's from October of '20, a few months after the other one we just talked about, right?

A. Yes.

Q. Could we go to the third section at the pop of page 1. So a little bit further down. Yes. The summary, present and past. And it says "Project Soteria was put together with representation from," and then there's some acronyms I want to ask you about.

What is WHS?

A. Workplace Health and Safety.

Q. What is WWPT?

A. I don't know.

Q. What is CVMI?

A. CVML, I think.

Q. Yes.

A. I don't know what that stands for.

Q. And what is an Amazon scholar?

A. It's typically an academic who works with Amazon approximately one day a week.

Q. And two Ohio State professors with expertise in musculoskeletal disorders, right?

A. That's what it says.

Q. And so we know at least that the two Ohio State professors are likely to be ergonomists, correct, if they have expertise in MSDs?

A. No.

MR. YOUMANS: Objection. Speculation.

JUDGE PFEIFER: He has answered no. That's the answer.

Q. No, as in you don't know?

A. No, I don't think we know that at all.

Q. Okay. And they say the team was tasked with identifying the variables responsible for injury rates never before seen at Amazon, which is what we've talked about, right?

A. Have we talked about that?

Q. We've talked about it in -- I don't think we've used the phrase "never before seen at Amazon," but we've talked about the fact that there was a lowering of injury rates during Covid.

A. Right. And they wanted to explore the correlation of various variables with injury rates. But "is responsible for" and "never before seen," that seems different to me from what we've talked about.

Q. It is. This is the only place that I've seen that phrase.

A. Okay.

Q. And then they go on to talk about the 42 variables, which we've already talked about.

A. Yes.

Q. Could we turn to what's labeled as page 3 of this report, line 68. That would be R-2. And it looks

like this section of this report is talking about what their three recommendations were, right?

A. It does.

Q. And their second recommendation relates to their statement "The data shows that both SPPR and SQPR write-ups are linked to increased injury reporting," correct?

A. That's what it says.

Q. And then they go on to say that they hypothesize that this increased injury -- they don't say injury -- but this increased reporting is the result of stress and fear of being terminated?

A. Yes. I would strongly disagree with that statement, but yes.

Q. And then their third recommendation is to find a solution that defines the optimal rates of keeping injury reporting low for each process path.

A. Using a simulation, yes.

Q. And those are two of their three recommendations, correct?

A. Yes.

Q. If we could turn to what's labeled page 4, which is the next page, towards the bottom of the page R-2, SPPR policy. And in this paragraph, in the second sentence, it looks like they're explaining that SPPR

are productivity write-ups.

A. Is that line 109?

Q. Yes. Yes.

A. Yes.

Q. And SQPR are quality write-ups.

A. That's what it says.

Q. And if we could turn to page 6, what's labeled page 6, and I just want to get to the bottom of the page. And they're talking about next steps there in that topic, and they want a survey. And the last sentence says that they're scheduled to launch this survey on 10/12 -- I assume that that's October 12th of '20 -- at BFI4. Is that right?

A. You're looking at lines 179 to 182 then?

Q. Yes.

A. Yes.

Q. Do you know if they ever did have that survey at BFI4?

A. I do not.

MR. FURST: Move for admission of Exhibit 165.

MR. YOUMANS: No objection.

JUDGE PFEIFER: Exhibit 165 is admitted.

(Exhibit 165 admitted.)

MR. FURST: Could we have Exhibit 214.

JUDGE HENDERSON: I don't think we have a determination on this one yet.

JUDGE PFEIFER: Let me just summarize my understanding from an off-the-record discussion. Exhibit 214 is related to Project Soteria, but Mr. Youmans has indicated that this is a document that was just filed, I think yesterday, by the Department. And this morning when Mr. Nichols was asked if he had seen it, he has not. Is that correct?

MR. YOUMANS: That's correct, Your Honor.

JUDGE PFEIFER: Okay. And this obviously would implicate confidential trade secret, correct?

MR. YOUMANS: Yes, Your Honor.

JUDGE PFEIFER: So I'm designating Exhibit 214 as implicating a confidential trade secret.

Mr. Furst.

MR. FURST: Thank you, Your Honor.

Q. (By Mr. Furst) Have you seen Exhibit 214 before? I mean outside of seeing it earlier this morning.

A. No.

Q. And is my understanding correct that this was part of Project Soteria?

A. The document says that Project Soteria is a job rotation program. The document seems to imply this

is all of Project Soteria. I don't understand how that's possible.

Q. And it mentions BFI4, correct?

A. It does, yes.

Q. And it's some type of testing support request from July of '21?

MR. YOUMANS: Your Honor, I would object based on foundation. And I'll object if counsel is just going to try to read hearsay into the record through a witness who says he's never seen this document before I showed it to him this morning.

JUDGE PFEIFER: Right. I don't think any questions about this document to this witness who has indicated he's never read it before --

Is there a stipulation, Mr. Youmans, that Exhibit 214 can be admitted, as one of the purposes of Mr. Nichols being here is basically be able to confirm the authenticity of certain Project Soteria documents?

MR. YOUMANS: No. Your Honor, we would object. 214 and 215 are different. So these are related to Soteria. These were not part of the Department's exhibit list during their case-in-chief. They didn't offer these documents or try to offer these documents. There was no testimony from their experts.

And so after they rested, based on the

Court's instructions, we made a good faith effort to go through the documents they had actually raised in their case-in-chief and tried to admit, and we found appropriate witnesses to testify about those.

And so that's why we produced Mr. Nichols for Exhibits 164 through 166. Mr. Racco was able to testify about some of the other documents that they had raised there their case-in-chief. Mr. Yu was able to do that.

But these documents, the first that counsel has raised these documents with me, I believe was yesterday. And so Mr. Nichols is not prepared obviously to talk about these documents, and we have not designated anybody because, again, the first we heard that this was even going to be part of their case was yesterday.

JUDGE PFEIFER: Let me read the document or at least part of it.

Show us off the record.

(A brief recess was taken.)

JUDGE PFEIFER: Let's go back on the record.

I specifically asked Amazon to make a records custodian available for Project Soteria as it related to Exhibits 164 and 165. So I'm not inclined

to admit a document that was provided -- labeled in the file as a potential proposed exhibit yesterday. But I do want to give you, Mr. Furst, a chance to ask questions in colloquy over objection to this document and move to admit it, and I'm going to reject it, just so the record is preserved on this issue.

So do you have any questions for Mr. Nichols about the Exhibit 214?

MR. FURST: Not in detail. Maybe we could just work it out as a stipulation. Our purpose in this is it does discuss job rotation, and, in our view, some of what it says is not entirely consistent with what some of the testimony has been regarding job rotation. And we would, at a minimum, want it as a rejected exhibit.

JUDGE PFEIFER: All right. First, I'm asking, do you have any questions of Mr. Nichols about this? If so, we'll go into colloquy.

MR. FURST: Since he knows nothing about it, I really don't.

JUDGE PFEIFER: Okay.

MR. FURST: Because I've been warned earlier that he didn't. So I didn't prepare a lot of questions on it.

JUDGE PFEIFER: All right. So would you

move to admit Exhibit 214 and make any argument you wish to make at this time.

MR. FURST: Yes. We move to admit Exhibits 214 and 215, if I can do both at once.

JUDGE PFEIFER: Sure. Do you want us to pull up Exhibit 215?

MR. FURST: Sure.

JUDGE PFEIFER: This also has been designated. I am going to designate it as a trade secret and deem it confidential.

So let's see if Mr. Nichols recognizes 215. And I understand from Mr. Youmans' representations that he didn't see this document until this morning either.

Mr. Furst, do you want to ask if the witness is familiar with Exhibit 215.

Q. (By Mr. Furst) Mr. Nichols, have you seen Exhibit 215 before this morning?

A. No.

Q. And do you have any knowledge about this exhibit?

A. I don't know how to answer that.

Q. Other than what's written on the exhibit, do you know anything about it?

A. I have heard about a rotation, job rotation

program. I've not -- I have no knowledge of this exhibit.

Q. And just looking at it, is it your understanding that this exhibit talks about a job rotation, a pilot of a job rotation program at BFI4?

A. It does say that, yes.

JUDGE PFEIFER: All right. You've identified the document sufficiently. Do you have any questions about it in colloquy, or should we move to admit Exhibits 214 and 215?

MR. FURST: Since this witness does not have knowledge of it, I don't want to ask him just to read things from the exhibit. So I would move to admit it. And I would note, Your Honor, we do believe that this is relevant to arguments that have been raised in Amazon's case as to job rotation, and it may be relevant towards the rebuttal that we haven't fleshed out yet.

JUDGE PFEIFER: Anything to make a further record, Mr. Youmans, before I reject Exhibits 214 and 215?

MR. YOUMANS: Your Honor, just to restate, we object based on foundation, hearsay, and relevance.

JUDGE PFEIFER: All right. I'm rejecting

Exhibits 214 and 215. They will remain in the record as rejected exhibits.

(Exhibit 214 rejected.)

(Exhibit 215 rejected.)

MR. FURST: I don't have any further questions, Your Honor.

JUDGE PFEIFER: Show us off the record.

(A brief recess was taken.)

JUDGE PFEIFER: Back on the record.

Mr. Youmans.

MR. YOUMANS: Thank you, Your Honor.

REDIRECT EXAMINATION

BY MR. YOUMANS:

Q. Mr. Nichols, you were asked some questions about your main criticisms of the analysis that Project Soteria performed. Do you recall that?

A. Yes.

Q. And you were allowed, I think, to state a couple of your criticisms, but can you state sort of your primary criticisms of Soteria, just so we make sure we have all of them on the record.

A. Well, so I guess there's a zero, which is it's a nonexperimental analysis, a conditional nonexperimental analysis. I said there are three main

issues, which I talked about the first two, but the third one is that, often, the figures and tables in their documents don't support the statements that they make in the same documents. So, even conditional on having a nonexperimental analysis that's not at the individual level that doesn't control for all the relevant nonconfounding factors, even then I think sometimes the findings they present don't support the statement about those same findings.

MR. FURST: The same continuing objection, Your Honor, as to new opinion testimony.

JUDGE PFEIFER: So your questions you asked on cross were not meant to waive your objection. Is that what you're telling me?

MR. FURST: Yes.

JUDGE PFEIFER: Because you asked about this on cross.

MR. FURST: I asked about his -- well, it was already in there, right?

JUDGE PFEIFER: Yes. So, without waiving your objection, you asked what you asked on cross. Is that correct?

MR. FURST: Yes.

JUDGE PFEIFER: Okay. That's fine.

MR. FURST: I'm just making my record.

JUDGE PFEIFER: Right. I know.

Q. (By Mr. Youmans) Can we take a look at Exhibit 166 again, please. And if you could take a look at the first page, the section about a third of the way down that says "Summary." And you were asked a question about the first sentence there that talks about a strong correlation between injury and productivity metrics in the AR sortable business unit. Do you recall being asked a question about that?

A. Yes, I do.

Q. And is there a difference between correlation and causation?

A. Yes.

Q. And what is that difference?

A. Correlation just shows the two variables have co-moved, in this case over time together. And causation says something about a true scientific relationship between them. And so the two can be completely independent of each other, in the sense that you can have a strong positive correlation with no causal relationship, or you can have a negative causal relationship that can be at different signs. There's no necessary relationship between the two.

Q. If we could look at that same paragraph, Mr. Nichols, and the last sentence in the paragraph it

says "However, the other business units do not show a similar correlation between injury and productivity metrics." Is that statement significant in your opinion?

A. Yes, because, if you thought that there was an underlying scientific connection between the injury and productivity metrics, you would expect that to be observed across business units and not just in one business unit. That implies to me that the correlation is not a causal relationship.

Q. Let's take a look again at Exhibit 164, please.

A. August 2020?

Q. Yes. It's the August 2020 document.

And looking at the first page of Exhibit 164 -- actually, I won't direct you to a particular part yet. But one of the things Soteria looked at was a potential relationship between pausing the SPPR feedback or write-ups and the injury rate. Is that your understanding?

A. Yes.

Q. And do you see anything, based on your review of Exhibit 164 and 165 or your knowledge of what Soteria has done, do you see anything in these documents or Soteria's analysis that establishes a

causal relationship between pausing SPPR feedbacks and the injury rate?

A. No, I don't.

MR. YOUMANS: Let's take a look at page 4 of the exhibit again, which would be the fifth page of the PDF, Your Honor.

Q. And you were asked some questions on what's been marked as page 4 about the title to Figure 6, which says "Maximum achievable rate for any given risk. In general, as rates increase so does the daily injury likelihood." Do you recall being asked about that?

A. Yes.

Q. And I believe you said that you don't believe that Figure 6 actually supports the statement that's made in the title. Is that what you said?

A. That's correct.

Q. And why did you say that?

A. So it seems like the title is making a causal statement about impacts of average rate on daily injury likelihood, so effectively swapping the X and Y axes. But, furthermore, for that to be true, there would have to be an upward slope in the figure for the simulated maximum rate they're modeling there.

So it's very unclear from the wording of the title of Figure 6, but it says, "As rates increase so

is the daily" -- I think they mean -- "so does the daily injury likelihood, which would imply a positive slope to that curve. Even swapping the X and Y axes, it would still have to be a positive slope. And they don't test that, and I don't see any evidence that there necessarily is a positive slope there.

Q. And so when we're looking for a positive slope on the figure, what are we looking at? Are we looking at the dotted line or the blue band or something else?

A. Yeah, the blue band. You'd want to not be able to draw a line through there at about 342, where it looks like a constant across different injury likelihoods. But, in reality, you'd have to swap that X and Y axes because what they're talking about is a change in average rate, I believe.

When they say "As rates increase," I think they want to change the average rate as a thought experiment there, changing the average rate and then seeing an increase or decrease in injury likelihood.

So it actually implies an entirely different graph altogether. And you would need a hypothesis test to support that statement that's in the figure, too.

MR. FURST: Your Honor, I have a different objection to this line of testimony. One, if I'm understanding, he's saying he doesn't entirely

understand how they even set up this graph, it doesn't make sense to him. And second, when I was on cross, he explained that he doesn't really know what the performance metrics are and what the performance expectations are of associates. So I don't know how he could have an opinion that the correlation that Project Soteria is apparently drawing is right or wrong.

MR. YOUMANS: Your Honor, he specifically said when he was asked about this figure during cross that he didn't think that the figure itself supported the title of the figure, and that's all I asked him, and that's what he testified to.

JUDGE PFEIFER: All right. It just goes to the question that was asked on cross and clarifying it. It's your typical why question on redirect. So it's overruled.

Q. (By Mr. Youmans) And if we could scroll down just a little bit below Figure 6. And I wanted to ask you about the last sentence of that paragraph where it says "The same injury risk can be sustained by increasing" -- strike that. "The same injury risk can be sustained by increasing the rate to 341 UPH and optimizing the other variables as shown below."

And can you explain -- well, do you have an understanding of what that sentence is saying based on

your review of the document?

A. Yeah. So, in their simulation, you could keep the injury rate constant and increase the rate by a very large fraction. So that's increase the average UPH. So, again, they're never talking about SPPR, SQPR. They're only talking about the average UPH in all these. So they say you could increase the average rate from 283 to 341. So that's a very large increase in average rate. And the injury rate would be held constant according to just making some other changes.

Q. And can you tell us or remind us again what the average rate is or what your understanding is when they're talking about the average UPH.

A. So I believe they're looking at Pick and Stow, and they're looking at, divided by the number of hours worked, how many units are processed by people working in Pick and Stow. So units per hour on average in a facility.

Q. Let's take a look at Exhibit 165 again, please.

MR. YOUMANS: And if we could take a look again at page 3, Your Honor, and about a third of the way down where it says "R-2."

Q. And you were asked some questions about this portion of the document by Mr. Furst, correct?

A. Yes.

Q. And I believe you said in response to one of his questions that you would strongly disagree with at least one of the statements in R-2. Is that correct?

A. Yes.

Q. And can you explain to us which statement there you strongly disagree with.

A. It says data shows both types of write-ups are linked to increased injury reporting and then hypothesize about a mechanism. But linked seems to imply a causal mechanism to me, and I don't think that's established anywhere in the document. And there are very plausible alternative explanations that are not discussed here. So it seems misguided at least to state it that way.

MR. YOUMANS: I don't have any further questions.

JUDGE PFEIFER: Mr. Furst, do you have any recross?

MR. FURST: Just one question, Your Honor.

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RECROSS-EXAMINATION

BY MR. FURST:

Q. Mr. Nichols, you were asked some questions about what Project Soteria found about the causal relationship between what I'll call performance metrics and injuries, correct?

A. Yes.

Q. And if my understanding of your earlier testimony is correct, you don't know what the performance requirements are in various business units at Amazon, do you?

A. Not off the top of my head. I know about them in general, but I don't know what they are.

Q. But when I asked you about the ADAPT process, you said you didn't know what that was.

A. I don't know what that stands for, and I'm not sure everything that's in there, yeah.

Q. And if the ADAPT process is one of the processes that sets performance expectations of associates, then you wouldn't know what those performance metrics are, correct?

A. Again, I know a little bit about the performance metrics, but I don't know what ADAPT stands for or everything that's in that process.

Q. And you don't know how performance expectations are set for associates who are under the

ADAPT process, correct?

A. I know only a little bit about it.

MR. FURST: No further questions.

MR. YOUMANS: Just a few, Your Honor.

FURTHER EXAMINATION

BY MR. YOUMANS:

Q. So these questions about performance expectations, again, you've talked or you've pointed out parts of these Soteria documents that talk about the average UPH, correct?

A. Yeah.

Q. Does that have anything to do with the individual associate performance expectations, whatever those might be?

A. Not necessarily.

Q. And just putting aside what the individual performance expectations may be, one of the things that Soteria looked at was just pausing the write-ups altogether during Covid, correct?

A. Yes.

Q. And you were aware of that change that was made during Covid?

A. I heard about that, yeah.

Q. And you've already testified, correct, as to

your opinion about whether or not Soteria established any kind of causal link between those two variables?

A. I have.

MR. YOUMANS: No further questions.

JUDGE PFEIFER: Mr. Furst.

MR. FURST: Just one on that.

FURTHER EXAMINATION

BY MR. FURST:

Q. But the pause that was instituted during Covid was a pause in the write-ups for individual performance expectations, correct?

A. Yes.

MR. FURST: No further questions.

MR. YOUMANS: Just one more, Your Honor.

JUDGE PFEIFER: Well, I understand exactly what point you're trying to make. This isn't going to go on forever. I don't need to hear any more testimony on this. I understand what the witness is saying.

MR. YOUMANS: All right, Your Honor.

JUDGE PFEIFER: Someone is trying to do apples and oranges here. So I get it. So I'm going to excuse Mr. Nichols as a witness, and I'm going to thank him very much. Thank you for your time and testimony.

THE WITNESS: Thank you, Your Honor.

JUDGE PFEIFER: Show us adjourned.

(A brief recess was taken.)

JUDGE PFEIFER: Show us back on the record. We've been discussing the Department's objections this morning with Amazon associates and the questions that were asked about whether these associates that testified this morning were aware of the importance of reporting injuries and how to do so. And they testified about the AmCare process of on-site reporting of injuries, among other things that they testified to. And I find that that is relevant testimony, given the nature of the citations in both DuPont and Kent. And I'm affirming my rulings this morning overruling all of those objections from the Department.

Any questions from the Department?

MS. KORTOKRAX: I don't believe so, Your Honor.

JUDGE PFEIFER: Anything from Amazon?

MR. YOUMANS: No, Your Honor.

MR. HOAG: No, Your Honor.

JUDGE PFEIFER: All right. Show us back off the record.

(A brief recess was taken.)

JUDGE PFEIFER: Let's just go on the record and summarize what we're doing. So this is the plan. We have hearings scheduled for October 12th and 13th. I'm keeping those on the books. But, Mr. Youmans, will you confirm that you do not intend to call the witness you had identified for Thursday, October 12th.

MR. YOUMANS: That's correct.

JUDGE PFEIFER: Okay. So, as of this date, you have no additional witnesses, pending your work on reaching a stipulation on the peer-reviewed scientific studies that I admitted as exhibits and shouldn't have. But, if there's no prejudice to either party doing what I did, I'm willing to keep them admitted as exhibits, so long as the parties can reach an agreement.

So you're going to report back to me next week whether we need October 12th or October 13th kept as hearing dates for Mr. Mitchell to testify. Because absent an agreement, I'm go going to be rejecting all of those exhibits that I previously admitted regarding the peer-reviewed scientific studies.

And then Amazon can just write me a letter in the events things are all worked out and we don't need that hearing time, indicating just briefly

that you're resting.

And then by October 20th, the Department will move for rebuttal, and Amazon will respond by November 3rd. And I will have a ruling issued in writing for you to review well in advance of our conference on November 17th at 1:00.

Are there any other issues we need to address, Mr. Furst?

MR. FURST: I don't have anything, Your Honor.

JUDGE PFEIFER: Anything other we need to address, Mr. Youmans?

MR. YOUMANS: No, Your Honor.

JUDGE PFEIFER: All right. That's the plan. Show us adjourned and possibly adjourned for quite some time, but we'll know more next week.

(Proceedings adjourned at 2:52 p.m.)

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April 5, 2024

Confidential Treatment Requested

U.S. Senate
Committee on Health, Education, Labor and Pensions
Washington, DC 20515

Dear Mr. Carter and Ms. Kiernan:

I write on behalf of our client, Amazon.com, Inc. ("Amazon") in response to the Committee on Health, Education, Labor and Pensions' letter request dated June 20, 2023.

Amazon will transfer to the Committee on Health, Education, Labor and Pensions today via FTP server a twelfth production of documents responsive to Requests 7(d), 7(e), and 7(f). The documents are bates stamped AMAZON_00004050 – AMAZON_00004058.

In response to Request 7, Amazon is producing three spreadsheets showing unknown idle time at STL8, BHM1, and BFI9 between December 16 and December 23, 2023. When an associate is not logged on to their workstation software for at least 30 minutes of cumulative time (consisting of at least two 15-minute consecutive gaps or one 30-minute gap), a manager will have a "seek to understand discussion" with the associate to determine the reason they were logged out of the work software. There are legitimate reasons why an associate might be idle (i.e., logged off), which might include time spent talking to a manager, a work imbalance, a mechanical failure, a bathroom break, or many other reasons—this time is called "exempted idle time." When there is not a valid reason for the associate to be idle, this is considered "unknown idle time." In the case of unknown idle time, managers are instructed to have a conversation with the associate on expectations and to coach where appropriate. Exempted idle time is not captured in the spreadsheets Amazon is producing today.

In response to other subsections of Request 7, Amazon is producing three spreadsheets showing "automated flags" sent to management at STL8, BHM1, and BFI9 between December 16 and December 23, 2023. An automated flag is generated when an associate is found to have behaved inconsistently with an Amazon policy, typically a safety-related policy. Prior to any disciplinary actions (initial or progressive), a manager is required to conduct a conversation with the associate to understand the reason behind an incident. Documented counseling, which is reflected in the "automated flags," is the first disciplinary step and serves as notification to employees whose conduct is inconsistent with expectations. The purpose of documented

coaching is to define the behavior that was inconsistent with an Amazon policy, discuss what is acceptable in the workplace, and provide clarity to the employee.

Amazon is also producing three spreadsheets showing voluntary and involuntary terminations that occurred at STL8, BHM1, and BFI9 between December 16 and December 23, 2023. Note that this date range comprises a peak holiday period, during which non-automated warnings, reprimands, write-ups, and improvement plans are paused; as a result, while requested, these are not part of this production.

* * *

The materials provided today include non-public confidential information, including sensitive and proprietary business information the disclosure of which would cause Amazon substantial harm. Accordingly, we have stamped those materials as "Confidential." If the Committee should consider the public release of such materials, Amazon respectfully requests that Amazon be given advance notice and opportunity to discuss the matter with you, so that we may explain and preserve Amazon's objection to disclosure. Additionally, Amazon has applied redactions to protect personally identifiable information.

Amazon does not intend to waive any privilege or other right that may be applicable to this response, including the attorney-client and work product privilege, and Amazon expressly reserves all rights to assert the same as appropriate in the future. This response is subject to supplementation, correction, and/or modification.

Sincerely,

Karen L. Dunn

cc: Roberto Gonzalez

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May 22, 2024

Confidential Treatment Requested

BY EMAIL

U.S. Senate
Committee on Health, Education, Labor and Pensions
Washington, DC 20515

Dear Mr. Carter and Ms. Kiernan:

I write on behalf of our client, Amazon.com, Inc. ("Amazon"), with regard to the Committee on Health Education, Labor and Pensions' ongoing inquiry regarding worker safety.

As requested in your March 19, 2024 email, Amazon is producing to you today several documents related to Projects Soteria and Elderwand,[1] two projects undertaken by teams within Amazon to assess potential ways to reduce the risk of ergonomic injury where feasible. As detailed below, we are providing these documents in the spirt of cooperation, but must note that the documents provided reflect a snapshot in time of these projects and the hypotheses of the specific teams undertaking them at the time the documents were created—not the final determination of those teams or Amazon more broadly. Among other things, for example, statistical experts within Amazon's Core AI team responsible for conducting and vetting statistical analyses assessed Project Soteria's initial conclusions and determined they were inaccurate, including because they utilized aggregate data and analyzed that data incorrectly. As a result, we note the produced documents have the potential to generate significant confusion, and Amazon cautions the Committee against relying on them for any purpose beyond what they actually represent. This letter summarizes the relevant background.

In 2020, following a decline in employee injury rates early in the COVID-19 pandemic, Amazon initiated Project Soteria, which was designed to try to assess whether any workplace policy changes might have caused or contributed to the decline in injury rates within the North American Customer Fulfillment Center ("NACF") network and to propose steps for achieving further injury rate reductions.[2] While Project Soteria involved multiple analyses over the course of multiple years, one initial assessment identified a potential correlation between the pausing of

[1] *See* AMAZON_00004089-AMAZON_00004358.
[2] *See* AMAZON_00004101.

the NACF network's employee productivity feedback system ("Standardized Productivity Performance Review" or "SPPR") during the pandemic and a decrease in injury rates and inferred a causal connection. Based on its findings, the Soteria team recommended, among other things, considering an extended pause to SPPR. Another Project Soteria assessment identified a potential positive correlation between Units Per Hour ("UPH") metrics in the pick and stow process paths within ARS Fulfillment Centers and recordable injury rates and recommended considering increased use of "pod gapping"[3] to decrease associate UPH.

Project Soteria's findings were later reviewed and deemed inaccurate by expert economists within Amazon. Specifically, in April 2022, Amazon's Core AI team began reviewing and providing comments on Project Soteria's ongoing work. Core AI is comprised of engineers, applied scientists, and economists trained in statistical models assessing causal inference, and serves as internal consultants for Amazon, including by auditing the research of other teams within the company.[4] (Our production today includes the transcript of testimony by a Core AI PhD economist addressing Project Soteria,[5] as well as a memorandum written by CoreAI.[6]) The Core AI team's review identified flaws in Project Soteria's methodology, including its use of facility-level aggregate data rather than associate-level data[7] and its failure to control for confounding factors that affect injury rates.[8] Put simply, Project Soteria looked at facilities that had higher productivity across the entire facility and used facility-based data instead of looking at UPH metrics on an associate-by-associate level to assess whether associates with higher productivity are more likely to sustain an injury.[9]

Core AI conducted an independent review of the data, but did so at the associate-level and while controlling for confounding factors. Specifically, using standard linear regression techniques, Core AI analyzed daily frequency data for employees in the pick and stow process paths at 58 fulfillment centers between May 2020 and March 2022 by using regression models to gauge the relationship between rate of work and recordable injury rate.[10] The analysis found no statistically significant relationship between employees' work speed and injury rates.[11] In fact, Core AI found that higher UPH numbers were correlated with lower injury rates (though the team

[3] "Pod gapping" is the amount of time between the departure of one pod and the arrival of the next pod for pickers and stowers working in ARS Fulfillment Centers.
[4] *See* AMAZON_00004169 at -238, -294.
[5] *See* AMAZON_00004169-4358.
[6] *See* AMAZON_00004156-4168.
[7] *See* AMAZON_00004169 at -245-6, -253.
[8] *See* AMAZON_00004169 at -246-8, -269, -275-6.
[9] *See* AMAZON_00004124. This document was produced by the Business Intelligence team at Amazon. The Business Intelligence team is typically responsible for producing dashboards to track metrics for business performance over time. AMAZON_00004169 at -270, 294. The testifying member of the CoreAI team expressed that the analysis in that document was also flawed and failed to account for any confounding factors. *See also* AMAZON_00004169 at -275-6, -295.
[10] *See* AMAZON_00004156.
[11] *See* AMAZON_00004169 at -259-60; AMAZON_00004156. Of the three tested analytical methods, two found a negative and statistically significant association between employee injury rates and employees' rate of work, while the third method found a much smaller negative association that was not statistically different from zero. AMAZON_00004156.

cautioned that this should not be interpreted as a causal relationship based on limitations with the Soteria team's dataset).[12] The Core AI team also found no causal relationship between productivity metrics (i.e., UPH and bin fullness) and injury rates.[13] Core AI's conclusions further demonstrate that there was no causal relationship between the pausing of Amazon's employee productivity feedback system during COVID and injury rates.[14] The Project Soteria recommendation for an extended pause of SPPR was ultimately not implemented.

Project Elderwand involved an attempt to assess whether Amazon's proprietary software for Mind and Body Moments (30-second microbreaks associates receive through their equipment throughout their shifts in addition to their scheduled breaks) could be utilized to influence the number of repetitions for associates in the pick process path within ARS Fulfillment Centers.[15] The team proposed a pre-pilot, which was approved by Amazon, to determine whether the Mind and Body Moment software could be used in that manner and determined that the software's suggested microbreaks were not effective. After conducting the pre-pilot, Amazon elected to pursue other means of reducing ergonomic risk in the process path.

Projects Soteria and Elderwand are examples of Amazon's efforts at continuous improvement in associate safety, including ergonomic safety. As you know, Amazon has pursued—at significant time and expense—a number of successful projects and initiatives that are making or expected to make genuine improvements to worker safety. Many of these efforts were summarized in our July 26, 2023 letter and in Amazon's most recent report on March 8, 2024, on its worker safety performance.[16] Amazon's safety performance continues to improve year over year, as shown by the continued improvement in the company's recordable incident rates and lost time incident rates reported to OSHA. As conveyed in a recent briefing by an Amazon senior ergonomist, Amazon continues to identify, test, and implement new innovations to improve worker safety.

* * *

The materials provided today include non-public confidential information, including sensitive and proprietary business information the disclosure of these documents would cause Amazon substantial harm. Accordingly, we have stamped those materials as "Confidential." Additionally, several of these materials were determined in the *In re Amazon.com* proceedings (Docket Nos. 21W0156, 22W0000, 22W0056, 22W0121) to contain trade secret information. If the Committee should consider the public release of Confidential materials, Amazon respectfully requests that Amazon be given advance notice and opportunity to discuss the matter with you, so that we may explain and preserve Amazon's objection to disclosure. Additionally, Amazon has applied redactions to protect personally identifiable information.

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[12] *See* AMAZON_00004169 at -259-60; AMAZON_00004156.
[13] *See* AMAZON_00004156.
[14] *See* AMAZON_00004169 at -320-1.
[15] *See* AMAZON_00004128.
[16] *See* https://www.aboutamazon.com/news/workplace/amazon-workplace-safety-post-2023.

Amazon does not intend to waive any privilege or other right that may be applicable to this response, including the attorney-client and work product privilege, and Amazon expressly reserves all rights to assert the same as appropriate in the future. This response is subject to supplementation, correction, and/or modification.

Sincerely,

Karen L. Dunn
Karen L. Dunn

cc: Roberto Gonzalez

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June 14, 2024

Confidential Treatment Requested

U.S. Senate
Committee on Health, Education, Labor and Pensions
Washington, DC 20515

Dear Mr. Carter and Ms. Kiernan:

I write on behalf of our client, Amazon.com, Inc. ("Amazon") in response to the Committee on Health Education, Labor and Pensions' ongoing inquiry regarding worker safety.

In our call on May 14, 2024, we described the data we produced in our fourteenth production on May 10, 2024, in response to Request 7(d). Per your request, we are memorializing below certain definitions and other information that we provided during that call.

The data you requested (Unknown Idle Time and Time Off Task data) are primarily collected for operational and facility management purposes. Amazon utilizes productivity-related data for performance feedback in very limited cases, as explained in further detail below.

Unknown Idle Time

Unknown Idle Time is a term used for (1) periods of inactivity by an associate who is logged into a workstation or (2) periods where an associate, who is working in a process path that requires logging into a work station, is not logged in for more than 30 minutes at a time. Only some associates work in process paths that involve logging into a workstation, and whether Unknown Idle Time is logged for those associates can vary by site. At some sites, for example, Unknown Idle Time is only logged for associates who are among those with the most Unknown Idle Time during a shift relative to their peers. At other sites, Unknown Idle Time is logged for associates who are logged into a workstation but are not working (e.g., an associate is logged into a picking station, but has not picked an item for 50 minutes).

There are various reasons why an associate might be idle (i.e., logged in but not working), which might include a bathroom break, time spent talking to a manager, a work imbalance, a mechanical failure, or many other reasons. There are no automatic adverse employment consequences that flow from Unknown Idle Time; rather, in certain circumstances, like where an associate is among those with the highest Unknown Idle Time, a manager will have a "seek to understand" discussion with that associate to determine the reasons for the inactivity and any barriers the associate might be experiencing.

Total Direct Hours

"Total Direct Hours" is time worked in a direct process path, meaning a process path that includes workplace software that logs scanning, picking, packing, receiving, water spidering, or container staging. Many associates work for all or part of their day in indirect process paths. That time is not recorded under Total Direct Hours. Total Direct Time includes Unknown Idle Time.

Productive Time

"Productive Time" refers to time that an associate is "active," while working in a direct process path.

Time off Task

Time off Task is logged for associates who have more than one cumulative hour of unknown idle time during their shift.

As with Unknown Idle Time, there are no automatic adverse employment consequences that flow from Time Off Task. Instead, in certain circumstances and at certain sites, where an associate is among those with the highest Time Off Task, a manager might have a "seek to understand" discussion with that associate to determine the reasons and what barriers the associate might be experiencing.

Comparison of Amazon's Productions 12 and 14

Starting with STL8, the data Amazon produced in its fourteenth production closely matches the Unknown Idle Time data that was provided as part of Amazon's twelfth production. In our twelfth production, the data showed that associates at STL8 had a total of 14,173.31 hours of Unknown Idle Time during the period of Dec. 16-23, 2023. In Amazon's fourteenth production, the STL8 data now shows 14,257.93 hours of Unknown Idle Time. The slight discrepancy in the data sets is because the data in Amazon's twelfth production reflected Unknown Idle Time from 6:00 AM on December 16 through 5:30 AM on December 24. Amazon's fourteenth production now includes data through 6:00 AM on December 24. This extra 30 minutes of logged time accounts for the 84.62 additional hours of Unknown Idle Time.

With respect to BFI9, the data in Amazon's twelfth production showed 5,505.59 total hours of Unknown Idle Time from December 16 through December 23. In Amazon's fourteenth production, the total Unknown Idle Time for BFI9 increased slightly, showing 5,505.91 total hours of Unknown Idle Time for the same period. This change is likely the result of some routine backend hours data updates that occurred between the date Amazon initially pulled the datasets for its twelfth production and when Amazon repulled the data for its fourteenth production. These data updates occur in the ordinary course of Amazon's business.

Finally, regarding BHM1, the data produced in the spreadsheet with Bates AMAZON_00004051 in Amazon's twelfth production contained two inadvertent errors. First, the

data table inadvertently provided Time off Task data rather than Unknown Idle Time data. Then, when aggregating the data, the total reflected the sum of the hours worked by associates that had Time off Task, not the total hours of Unknown Idle Time for each associate. Consequently, the aggregate data reflected the total number of hours worked by associates that spent some part of their day off task. Also, when Amazon repulled the Time off Task data to make a revised production, some entries appear to have been updated as part of the Company's ordinary course backend updates, leading to a 41.09 hour discrepancy in the associate-level Time off Task data inadvertently produced as part of Amazon's twelfth production and the data in Amazon's fourteenth production. Specifically, the BHM1 data produced as part of the fourteenth production now shows 2,240.12 hours of Time off Task as opposed to the 2,281.21 hours of Time off Task included in the twelfth production.

On our call on April 16, you also asked why certain associates appeared to have worked for more than 12, and in some cases, more than 24-hours in a single day.[1] As discussed, the primary reason for such entries is because the data collected by the sites is based on individual associate-level punch-card data. As such, if an associate forgets to clock out or clocks out, but then inadvertently clocks right back in, their time will continue to accrue for that day. These types of errors are generally corrected, but because there are no automatic consequences that are associated with this data, these errors do not impact associates.

We hope this letter proves useful as you continue to review the data.

* * *

The materials provided today include non-public confidential information, including sensitive and proprietary business information, the disclosure of which would cause Amazon substantial harm. Accordingly, we have stamped the materials as "Confidential." If the Committee should consider the public release of such materials, Amazon respectfully requests that Amazon be given advance notice and opportunity to discuss the matter with you, so that we may explain and preserve Amazon's objection to disclosure.

Amazon does not intend to waive any privilege or other right that may be applicable to this response, including the attorney-client and work product privilege, and Amazon expressly reserves all rights to assert the same as appropriate in the future. This response is subject to supplementation, correction, and/or modification.

Sincerely,

Karen L. Dunn

cc: Roberto Gonzalez

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[1] Amazon warehouse employees are prohibited from working over 12 hours per shift and over 60 hours per week.

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August 22, 2024

Confidential Treatment Requested

BY EMAIL

U.S. Senate
Committee on Health, Education, Labor and Pensions
Washington, DC 20515

Dear Mr. Carter and Ms. Kiernan:

We write on behalf of our client, Amazon.com, Inc. ("Amazon"), with regard to Chairman Sanders' July 15, 2024 interim report and your indication that the Chairman plans to release a second report.

Amazon's voluntary, good-faith cooperation with the Chairman's workplace safety investigation—in which the company, among other things, produced thousands of pages of documents, tens of thousands of rows of data, and provided briefings and facility tours—was premised on the reasonable expectation that any report would be balanced and reflect a good-faith attempt to include facts even if they contradict the allegations made by the Chairman at the outset of the investigation. Amazon's voluntary production of information was also premised on your assurance that Amazon's confidential business information would be protected. The interim report released last month violated both of these important principles. We have serious concerns that the upcoming report will do the same, and we strongly urge you to take a different course.

First, the interim report painted a fundamentally misleading picture, including by purposely relying on outdated numbers and relying on a "total injury rate" statistic that is not tracked by OSHA or any other government agency. The interim report was also wholly one-sided and made no meaningful effort to report to the public the evidence Amazon provided about its significant reduction in injury rates, its large investments in safety, as well as other evidence that contradicts the Chairman's allegations. The interim report likewise failed to withdraw or modify any of the Chairman's previous allegations, such as the statement that Amazon facilities are "uniquely dangerous," despite the evidence that Amazon submitted to the contrary. In these respects, the interim report violated basic principles of investigative fairness and due process, and did not provide the public with accurate, balanced information.

We have every reason to believe that the Chairman's second report will be similarly selective and misleading and will ignore countervailing evidence favorable to Amazon. We urge the Chairman to accurately report the information that Amazon has provided, including regarding its significant year-over-year reduction in injury rates and the numerous safety initiatives described in the briefing provided to you by a senior Amazon ergonomist.

Additionally, in all fairness, the second report should acknowledge the recent decision by a Washington state administrative judge, following a months-long hearing, rejecting allegations—similar to the Chairman's—that Amazon workers were at risk of injuries due to "repetitive motions" and "fast pace of work." The judge vacated all of the safety citations at issue, finding that "Amazon presented persuasive evidence it has a robust safety and health program." *In re: Amazon.com Services, LLC*, Board of Industrial Insurance Appeals State of Washington, 21 W0156, 22 W0000, 22 W0056 & 22 W0121, 14:7-12 (2024) (Decision and Order).

Second, contrary to your assurances about respecting confidential business information, the Chairman's interim report wrongly disclosed several pieces of Amazon's confidential business information and data. As we documented in our July 11, 2024 letter, this information satisfied well-established standards of business confidentiality developed by courts, yet you released this information without responding to our letter and declined to even define the standard for business confidentiality you were purporting to apply. For the upcoming report, you have indicated that the Chairman is contemplating producing hundreds of pages of Amazon information. As we describe further below, a number of these documents contain information—such as internal data and internal analyses—that similarly satisfies well-established standards of business confidentiality, the release of which threatens Amazon with competitive harm. While the report could potentially refer to some of this information in a manner that mitigates competitive harm, your apparent plan to simply attach in full a number of internal company documents signals a serious disregard for business confidentiality and the trust upon which Amazon voluntarily produced information to assist your inquiry.

In light of the serious concerns we have outlined, we request a meeting with you at the earliest possible date, so that we can try to reach an agreement that will cover the upcoming report. Specifically, we seek your agreement to (1) permit us to review a draft of the upcoming report so that we can point out factual inaccuracies and propose clarifications, and that you commit to present the facts in a balanced and accurate manner, even if the facts contradict the Chairman's allegations made when the investigation began; and (2) define an objective standard for business confidential information and reach a resolution with us on the Amazon information that Chairman will protect on these grounds. Failing to address these urgent concerns would further compromise the integrity of the Chairman's investigation and would seriously impact Amazon's—and likely other companies'—willingness to voluntarily produce information to the Committee in the future.

Below, we discuss our significant substantive concerns with the Chairman's interim report, that report's breach of Amazon's confidential business information, and our concerns and requests relating to the upcoming second report.

The Interim Report was Misleading and One-Sided

The Chairman announced his workplace safety investigation in a public June 20, 2023 letter to Amazon that contained a number of scathing and inaccurate allegations about Amazon's safety record. Those allegations and predetermined conclusions about Amazon's safety practices were roundly refuted by countervailing evidence provided by Amazon in this investigation, but they nonetheless appear unmodified in the Chairman's interim report.

This investigative bias is epitomized by the solicitation on the Committee's website for present and former Amazon associates to come forward—not to present their experiences with safety, good or bad—but rather to "help the Committee investigate **how the company fails to protect workers and evades responsibility for their medical care**." *See* Amazon Investigation: Amazon Workers, Share Your Story, available at https://www.help.senate.gov/amazon-investigation (emphasis added). Rather than signaling an objective inquiry, this solicitation belies a desire to find anecdotes that reinforce the investigation's predetermined conclusions.

A government report should strive for balance and contain facts that both support and rebut the investigator's theories. An investigation is a process designed to "find out the truth about something." *See* Investigation Definition, *Black's Law Dictionary*, (12th ed. 2024). As you know, federal law requires that government reports be "accurate, reliable and unbiased, as a matter of presentation and substance." *See* PL 106-554, enacted Dec. 21, 2000. Although Congress imposed that standard on executive agency reports, there is no principled reason that standard should not apply to congressional reports. As we have noted, we were surprised and disappointed that during our July 12, 2024 call, you declined to even agree in the abstract with the proposition that the interim report should reflect what Staff perceives to be both "good" and "bad" facts that the Committee has learned about worker safety at Amazon. You stated, among other things, that the purpose of the interim report was not to highlight what you characterized as "Amazon's good stats" and that the company was free to post a blog post summarizing these statistics when the interim report was released. Disappointingly, the one-sided interim report lived up to your promise.

The interim report failed to withdraw or modify any of the Chairman's previous allegations, such as the false narrative that Amazon facilities are "uniquely dangerous" and Amazon has a "corporate culture that treats workers as disposable." Moreover, the report ignored much of the positive evidence that Amazon submitted, including:

- Amazon's Recordable Incident Rate (RIR)—which includes any work-related injury that requires more than basic first-aid treatment—has improved 28% from 2019-2023.

- In the general warehouse and storage industry, Amazon's RIR improved 24% over the past four years. Amazon's 2023 rate is 6.5, which is better than the latest Bureau of Labor Statistics (BLS) average of 6.8 for employers of similar size.

- Amazon's Lost Time Incident Rate (LTIR)—which includes any work-related injury that requires someone to take time away from work (the most serious injuries)—has improved by 75% from 2019-2023. Amazon's 2023 LTIR rate is 1.1, which is better than the latest BLS average of 2.6 for employers of similar size.

- The Chairman's allegation that Amazon's injury rates are "double the industry average," (*see* June 20, 2023 Ltr. from B. Sanders), is inaccurate. As Amazon explained in its letter of July 26, 2023, the "industry average" injury data created to

support the Chairman's allegation actually reflects only a small subset of the companies that have businesses similar to Amazon. For example, when Walmart, Target, and Costco are added into the relevant "industry average" for 2022, the result is 5.72 for RIR and 2.68 for LTIR. Amazon's figures for its warehouses in 2022 are 6.96 for RIR and 1.11 for LTIR based on OSHA-reported data, showing that Amazon is slightly above the RIR industry average and less than half the LTIR industry average. The Chairman has never acknowledged this data or taken any steps to retract the claims that Amazon's injury rates are "double the industry average" or that Amazon warehouses "are uniquely dangerous."

- Over the past four years, Amazon's MSD Recordable Incident Rate has improved 27%.

- From 2019-2023, Amazon invested more than $1.5 billion in safety projects and initiatives (unrelated to COVID-19). Amazon plans to invest over $760 million in safety initiatives in 2024 alone.[1] That includes over $400 million for process engineering and retrofit initiatives that further improve ergonomics, over $150 million in additional fork truck safety controls, over $100 million for on-the-road safety enhancements, and over $80 million for truck yard safety improvements. *Id.*

- An Amazon senior ergonomist briefed you on a number of completed and ongoing safety initiatives to reduce the risk of injury at Amazon warehouses. These initiatives include, for example, the implementation of height-adjustable tables, height-adjustable platforms, traditional non-sort pack table redesign, and spring platform carts. These initiatives are designed and implemented using state-of-the art ergonomic modeling techniques, cost in some cases tens of millions of dollars to implement, and represent leading practices in the industry. We also provided you documentation about a number of these and other initiatives. While the interim report contains extensive ad hominem attacks about Amazon's safety record, it remarkably makes no mention of any of these safety initiatives.

In addition to failing to include the above key facts about Amazon's safety record, the interim report made a number of inaccurate or misleading statements. These include:

- ***Purposely selecting outdated numbers.*** The interim report relies on data from *four and five years ago*—2019 and 2020—to make claims about current working conditions in Amazon warehouses. Those figures are outdated, do not reflect current reality, and were affected by an unprecedented pandemic. It is extremely disappointing that, over our objections, the interim report purposely selected this outdated data and did not request current figures from Amazon or rely on more

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[1] *See* Amazon's Safety Performance Continues to Improve Year Over Year, Mar. 8, 2024, available at https://www.aboutamazon.com/news/workplace/amazon-workplace-safety-post-2023.

current, publicly available OSHA data, which shows significant improvements in injury rates over the last four years.

- ***Misleading reliance on "total injury rate."*** Even putting aside the outdated nature of the data, the interim report wrongly relies on total injury rate ("TIR") data to draw the inaccurate conclusion that Prime Day is a "major cause of injuries." TIR data is not tracked by OSHA or any other government entity. The government tracks recordable injuries, which include anything that requires more than basic first-aid. TIR is an internal number that only certain teams within Amazon have ever used and encompasses a broad range of events, including any instance in which an employee needed a Band-Aid. Not only did the interim report use TIR to make exaggerated claims about Amazon's injury rates, but you never sought clarification or information from Amazon about what TIR represents. You also insinuated that Amazon should be reporting its TIR to OSHA, yet OSHA clearly does not want or need this information—if it did, the agency would have implemented the requirement when it changed its recordkeeping rule this year.

- ***Inaccurate portrayal of staffing.*** The report relies on pandemic-era figures about Amazon's staffing challenges and says nothing about its current staffing levels. It is accordingly incorrect to suggest that Amazon's sites are under-staffed during Prime Day and Peak. Each year, Amazon hires thousands of seasonal employees to supplement staffing during busy times. Moreover, if customer demand significantly increases, orders are automatically routed to sites that can handle the volume. It is notable that over the year-long span of the investigation, you never requested information or a briefing from Amazon about its safety record or staffing levels during Prime Day. We learned this was your focus only a few days before you released the interim report.

- ***Wrongful accusations of under-reporting.*** In an apparent effort to counter Amazon's continued year-over-year injury rate improvements, the interim report broadly accuses Amazon of intentionally underreporting its injury rates. Amazon in fact follows OSHA's reporting requirements and provides employees with multiple paths for reporting potential injuries, including by using resources on their smart phones or at kiosks throughout each site, or by going directly to their leaders. And while the report accuses Amazon of failing to record injuries, OSHA's investigations, when looked at in totality, have found otherwise. The minor issues OSHA says it found were all one-off clerical errors. Notably, OSHA has not alleged these errors were intentional, willful, or systemic. And none of those alleged errors would have materially changed Amazon's injury rates. Additionally, as with other aspects of the interim report, during the year-long investigation, you never raised a concern about underreporting injury rates.

- ***Misleading statements about AMCARE.*** As is done throughout the interim report, the Chairman extrapolated information from a single datapoint—here a single OSHA

citation from one fulfillment center—to claim that Amazon has a "practice of failing to refer workers for outside medical care" and "a documented history of failing to properly record injuries for OSHA." Making such a false over-generalization in a public report is harmful and misleading. Amazon associates are encouraged to report injuries, seek outside treatment, and, if they want, use AMCARE for first aid. Amazon's Wellness Centers and AMCARE locations are staffed by over 1,200 Onsite Medical Representatives ("OMR"s). OMRs are required to follow a detailed procedure manual, and they are not permitted to provide more than first aid to associates, offer medical diagnoses, or discourage employees from seeking medical care. At any time, an associate is permitted to seek medical care off-site.

The Interim Report Disclosed Amazon's Confidential Business Information

In addition to being misleading and one-sided, the interim report also wrongly released several pieces of Amazon's confidential business information, contrary to the assurances you provided about respecting business confidentiality.

As we detailed to you in our July 11, 2024 letter prior to the release of the interim report, certain of Amazon's data at issue—including AMAZON_00001314 and AMAZON_00004101—falls within the heartland of confidential business information that must be protected to avoid competitive harm. *See e.g.*, *Nevro Corp.* v. *Boston Sci. Corp.*, 2017 WL 2687806, at *2 (N.D. Cal. Jun. 22, 2017) (finding good cause to seal information related to "levels of staffing and resources" that "could be used by competitors in their strategic planning and resource allocation"); *United States ex rel. Holmes* v. *Northrop Grumman Corp.*, 2013 WL 12166185, at *1–2 (S.D. Miss. Jun. 7, 2013) (holding that "labor rates" are confidential business information with "competitive value"); *Muench Photography, Inc.* v. *Pearson Edu., Inc.*, 2013 WL 4475900, at *4 (N.D. Cal. Aug. 15, 2013) (finding that even "old" sales and distribution data is entitled to protection from disclosure because the data reveals a Company's "thought processes and strategies even if the data are historical"); *Phillips Petrol. Co.* v. *Rexene Prods. Co.*, 158 F.R.D. 43, 47 (D. Del 1994) (holding that old data may "be extrapolated and interpreted" to "reveal a business' current strategy, strengths, and weaknesses"); *Torres Consulting and L. Grp.*, v. *Dep't of Energy*, 2013 WL 6196291, at *4 (D. Ariz. Nov. 27, 2013) (knowledge of cost components are confidential business information because their knowledge can cause "substantial competitive harm").

These legal precedents, developed by courts over decades, provide an objective and publicly accessible standard against which to judge claims of business confidentially. While you dismissed this judicial precedent as non-binding, you notably declined to even articulate the standard you were using to judge business confidentiality. It is a fair inference that, rather than applying an objective standard, you simply overrode Amazon's business confidentiality concerns in the interest of writing a one-sided report.

Releasing Amazon's confidential business information has significantly undercut the trust under which Amazon voluntarily and in good faith shared confidential business documents and data in this investigation to date. This will undoubtedly discourage other companies from which you voluntarily seek information.

Amazon's Concerns Regarding the Second Report

Amazon has even more significant concerns with respect to the new report that you have said you plan to release. Although you have provided us a list of documents that you plan to disclose for our reactions about business confidentiality, you have not provided us any information about the purpose or contents of the second report.

We request an opportunity to review a draft of the upcoming report, so we can identify any inaccurate statements or outdated data in advance, and so that we have the opportunity to explain how the report might be made more accurate and even-handed. To avoid compounding the errors in the interim report, we urge that the upcoming report include the countervailing facts that we have outlined above—which were available to the Chairman before the first report was issued. The second report should, at a minimum, explain that Amazon's injury rates have declined significantly year over year and that they are in the range of the warehouse industry average, as well as outline the numerous safety initiatives described by Amazon's senior ergonomist in the briefing you requested.

Also, in the interest of fairness and balance, we request that the report describe the recent decision of administrative law judge Hon. Stephen Pfiefer following a months-long hearing on citations brought by Washington's Department of Labor & Industries. The decision, dated July 29, 2024, rejected as unsupported the Department's allegations that Amazon workers were at risk of injuries due to "repetitive motions" and "fast pace of work" and that Amazon was willfully putting workers in harm's way and prioritizing speed over safety. Indeed, the judge found that "Amazon presented persuasive evidence it has a robust safety and health program. It fully communicates safety and health policies to its employees. Employees are involved in Amazon's safety program and are encouraged to provide input and raise concerns. Amazon does not intentionally disregard or act with plain indifference to safety requirements." *In re: Amazon.com Services, LLC*, Board of Industrial Insurance Appeals State of Washington, 21 W0156, 22 W0000, 22 W0056 & 22 W0121, 14:7-12 (2024) (Decision and Order). In light of the Chairman's intent to produce transcripts from this month-long hearing as part of his upcoming report, it is necessary context to report on the judge's decision and findings of fact.

Substantively, although we have not been told anything about the contents of the upcoming report, we are concerned that the report will make a number of inaccurate statements that will mislead the public. We have particularly serious concerns given that you have notified us that you plan to cite and release several documents from an internal Amazon project called "Project Soteria." As we explained in detail in our May 22, 2024 letter, the Soteria team's conclusions finding a correlation between the pausing of Amazon's employee productivity feedback system and injury rates were mistaken. A review by another data analysis team within Amazon (called Core AI) determined that there were flaws in Project Soteria's methodology, including its use of facility level aggregate data rather than associate-level data, which led to inaccurate conclusions. The Core AI team also found that Project Soteria failed to control for confounding factors that affect injury rates, thus rendering the Soteria findings unreliable. Although we see from your list that you intend to also release the Core AI report, we think it would be inappropriate and misleading to present the Soteria findings given that it is undisputed that Core AI was correct that Soteria's methodology and conclusions on this point were flawed.

If you believe that the Soteria team's analysis was sound and should be referenced, please provide us your rationale.

Additionally, we have serious concerns that the second report will contain even more of Amazon's confidential business information than the interim report.

With respect to the new Amazon documents identified in Mr. Carter's August 8, 2024 email, 23 of these documents contain confidential business information and should therefore not be publicly released under well-established legal precedents.[2] These are all internal documents that Amazon maintains as confidential and include (1) internal data showing disciplinary actions taken against certain associates;[3] (2) internal policies and procedures;[4] (3) internal training and safety materials developed by Amazon that reflect a hypothetical, fictional scenario;[5] (4) internal data showing the number of overall calls to the Physician's Hotline;[6] (5) internal studies showing Amazon's proprietary ergonomic designs and improvement plans[7]; (6) and two internal teams' attempts to identify and analyze operations and injury data and propose changes to work

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2 *See, e.g.*, *Northrop Grumman Corp.*, 2013 WL 12166185, at *1–2 (S.D. Miss. Jun. 7, 2013) (finding "internal processes" confidential business information); *see also Nevro Corp.*, 2017 WL 2687806, at *2 (N.D. Cal. Jun. 22, 2017) (finding good cause to seal information related to "levels of staffing and resources" that "could be used by competitors in their strategic planning and resource allocation"); *Lucas* v. *Breg, Inc.*, 2016 WL 5464549, at *2 (S.D. Cal. Sept. 28, 2016) (sealing training manuals and material given the business advantage their disclosure would provide to competitors); *Encyclopedia Brown Prods., Ltd.* v. *Home Box Off., Inc.*, 26 F. Supp. 2d 606 , 614 (S.D.N.Y. 1998) (sealing "[c]onfidential business information [that] may provide valuable insights into a company's current business practices that a competitor would seek to exploit"); *Simpson Strong-Tie Co. Inc.* v. *MiTek Inc.*, 2023 WL 350401, at *2–3 (N.D. Cal. Jan. 20, 2023) (granting sealing request of "confidential business development and internal business strategy documents and intellectual property of MiTek, including internal MiTek research and development information").

3 *See* AMAZON_00004054.

4 *See* AMAZON_00001679–AMAZON_00001681, AMAZON_00000477–AMAZON_00000511, AMAZON_00000281–AMAZON_00000300, AMAZON_00000320-AMAZON_00000363, AMAZON_00003658–AMAZON_00003710.

5 *See* AMAZON_00001314, AMAZON_00002394–AMAZON_00002635, AMAZON_00002735–AMAZON_00002799.

6 *See* AMAZON_00003236–AMAZON_00003283.

7 *See* AMAZON_00003554–AMAZON_00003566, AMAZON_00003913–AMAZON_00003929, AMAZON_00003930–AMAZON_00003937, AMAZON_00004000–AMAZON_00004024, AMAZON_00004044–AMAZON_00004045, AMAZON_00003300–AMAZON_00003301.

processes.[8] Each of these documents reflects investment by Amazon and internal proprietary information, which is maintained as confidential and would provide insight to competitors regarding Amazon's internal processes, strategies, and planning. Amazon has taken significant steps to maintain the confidentiality of this information to avoid competitive and economic disadvantage and has highlighted its confidentiality concerns with each of its productions to the Committee.

In the event that Chairman Sanders decides, over our objections, to release some of this confidential business information, we ask that you at a minimum make certain redactions that we will share with you for particularly sensitive confidential business information.

According to the list provided, the Chairman also appears to be contemplating producing two letters submitted by Paul, Weiss as part of the investigation. Not only do these letters contain confidential business information, but we believe it would be an inappropriate departure from longstanding practice to release our confidential correspondence with you.

* * * *

To recap, we respectfully request a meeting at the earliest opportunity to come to an agreement on (1) permitting us to review the draft second report and taking other steps to ensure that the report is balanced and does not contain misleading and inaccurate statements; and (2) defining a standard for confidential business information and ensuring that Amazon's confidential business information is not released as part of the second report. Also, in light of the breach of Amazon's confidential business information that has already occurred, we consider it essential to agree on a confidentiality protocol before Amazon produces any further information as part of this investigation. Amazon has a duty to protect its confidential business information and cannot continue to provide such information knowing that it can and likely will be freely publicized.

Sincerely,

Roberto J. Gonzalez

cc: Karen L. Dunn

Enclosures

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[8] *See* AMAZON_00004089–AMAZON_00004100, AMAZON_00004101–AMAZON_00004123, AMAZON_00004124–AMAZON_00004127, AMAZON_00004128–AMAZON_00004142, AMAZON_00004143–AMAZON_00004152, AMAZON_00004153–AMAZON_00004155, AMAZON_00004156–AMAZON_00004168.

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September 24, 2024

Confidential Treatment Requested

BY EMAIL

U.S. Senate
Committee on Health, Education, Labor and Pensions
Washington, DC 20515

Dear Mr. Carter and Ms. Kiernan:

We write on behalf of our client, Amazon.com, Inc. ("Amazon"), to follow up on our August 22, 2024 letter and our September 3, 2024 meeting regarding Chairman Sanders' interim and upcoming reports. We continue to have significant concerns about the one-sided nature of the investigation and the failure to correct key allegations about Amazon's safety record. We also have significant concerns about the protection of Amazon's business confidential information and hope that you will accept the reasonable accommodation we proposed.

Opportunity to Review a Draft of the Upcoming Report

In our prior letter and during our meeting, we requested an opportunity to review your upcoming draft report so that we could point out any inaccuracies and propose clarifications. During the meeting, you stated that you had "never heard of that happening in a congressional investigation," and you invited us to provide precedents for this practice.

Without limitation, we are aware of instances where the Senate Finance Committee, the Senate Permanent Subcommittee on Investigations, the House Oversight Committee, and the House Financial Services Committee have shared all or portions of draft reports with investigative targets before those reports were released to the public. This practice is designed to promote factual accuracy and to ensure the dissemination of appropriate and accurate reporting to the public, which is a goal that we assume Chairman Sanders shares. During our meeting, you did not mention any drawback to allowing Amazon the opportunity to fact-check the report. Please let us know at your earliest convenience whether you will agree to share a draft.

Providing a draft is particularly important in these circumstances because, as we understand it, your report will include various accounts based on your interviews of over 100

former and current Amazon associates.[1] In the interest of fairness and accuracy, Amazon should have an opportunity to assess these accounts so that it can provide you with any additional context or factual corrections. Moreover, following the report's release, Amazon is constrained in its ability to publicly point out inaccuracies or additional contextual information about these personal accounts due to employee privacy. Amazon should have the opportunity to confidentially convey to you any relevant information about these accounts, including factual corrections, prior to your publication of the report.[2]

Additionally, during our meeting you stated that the upcoming report will provide information about Amazon's alleged "use of rates to force workers to move quickly" and the report will document the "rates [workers] are required to move at." It would be important to the factual integrity of your report for Amazon to have an opportunity to review these claims specifically so that Amazon can provide factual feedback. This is particularly important given that, as a factual matter, Amazon does not require employees to meet specific productivity speeds or targets. As a result, it is likely that allegations in your report about purportedly "required" rates are inaccurate or lack necessary context. Disseminating and reinforcing misconceptions about Amazon's policies disserves not only Amazon but the public at large.

The SPPR (Structured Productivity Performance Review) process, which is Amazon's only formal performance management feedback process based on productivity metrics, is sometimes a source of misconceptions in this regard. This process is limited in scope and thoughtfully structured, and Amazon continues to review and improve it in response to associate and other feedback. SPPR applies to only a minority of Amazon associates who work at fulfillment centers, specifically Tier 1 (entry level) associates who have worked in an SPPR-eligible process path for at least five hours in a given week and for at least 160 hours over the course of the associate's tenure. Managers use the SPPR process to compare each eligible associate's performance in a given week to the performance of other employees doing the same work at the same facility. The bottom 5% of performers might receive feedback, but only in certain circumstances like if a manager determines that there is no reason (such as equipment issues, meeting with a supervisor, or seeking first aid treatment) that impeded the associate's work. Managers have "seek to understand" conversations with these associates to identify any obstacles to performance before managers deliver any negative SPPR feedback. For example, lower productivity might be indicative of poor technique and safety habits, and coaching and additional training could—and often does—resolve these issues. If an associate receives repeated, progressive feedback for productivity, the associate can eventually be terminated, but the rate of termination is very low. Indeed, only 0.06% of all NACF Tier 1 associates are terminated via the SPPR process in a given week.

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1 For context, Amazon employs over one million associates in the United States. *See* Amazon Employer Information Report, 2023, available at https://assets.aboutamazon.com/64/79/d3746ef14fd99cc6be94532c9db5/2023-eeo1-amazon-report.pdf.

2 We have been provided few specifics about the upcoming report, so there may well be additional topics that would benefit from our fact checking.

Unfounded Reliance on Soteria and Elderwand Documents

We are also concerned that Chairman Sanders intends to rely on internal Amazon documents related to Project Soteria that were reviewed and determined to be unreliable by the company long before this investigation began. As we explained in detail in our May 22, 2024 and August 22, 2024 letters, the Soteria team's conclusions—finding a correlation between the pausing of Amazon's employee productivity feedback system and injury rates—were incorrect. A review by Core AI[3] determined that there were fundamental flaws in Project Soteria's methodology that undermined the validity of the analysis and Soteria's conclusions, including the use of aggregate facility-level data as opposed to associate-level data and a failure to account for confounding factors that contributed to injury rates. Utilizing the same data as Project Soteria, Core AI determined there was no causation and, in fact, a negative correlation between higher productivity rates and injuries.

When we inquired during our meeting as to why your upcoming report nonetheless intended to rely on Soteria's conclusions, your response was concerning. While it appears that you are willing to credit a Core AI report that criticizes Soteria's findings (AMAZON_00004156–AMAZON_00004168), you appear—without explanation—to not accept the testimony provided at the Washington hearing by Dr. Nichols, the lead Core AI PhD economist who analyzed Soteria. And you appear to believe there is a significant difference between the Core AI report and Dr. Nichols' testimony. Each of these views is mistaken.

First, Dr. Nichols' testimony is consistent with the Core AI report—which is unsurprising given that Dr. Nichols was the principal author of the Core AI report. The Core AI report found "no strong evidence that higher UPH [Units Per Hour] is associated with higher injury. ***On the contrary, our best estimate shows no statistically significant relationship, and in the data higher UPH is correlated with lower RIR.***" *Id.* (emphasis added). This is exactly what Dr. Nichols testified—that Soteria found no evidence of a causal relationship between pace of work and injuries and that in fact the individualized data that Core AI analyzed pointed towards the opposite conclusion. *See* AMAZON_00004169 at -4259-60. The Washington judge who reviewed this evidence and likewise found the Soteria conclusions unpersuasive did not raise any concerns about inconsistencies between Dr. Nichols' testimony and his report.

Second, you offered no substantive reason at our meeting for refusing to accept Dr. Nichols' testimony. Instead, you suggested that there is a difference between a report, on the one hand, and "one person out of seventy" (a reference to the full Core AI team numbering seventy) who offers an "opinion" during testimony. This is unpersuasive. Again, Dr. Nichols was the PhD economist who led Core AI's review of Soteria. There is no reason that his well-reasoned testimony regarding Soteria should have any less weight than his written report on the topic. Further, the Washington judge heard Dr. Nichols' testimony, which was subject to rigorous cross examination by the Washington State Department of Labor & Industries (L&I) seeking to prove

[3] Amazon's Core AI team is comprised of engineers, applied scientists, and economists trained in statistical models assessing causal inference, and serves as internal consultants for Amazon, including by auditing the research of other teams within the company.

that Amazon's "pace of work" was a hazard to employees, and credited Dr. Nichols' analysis in his decision, noting that Dr. Nichols' "team completed an independent analysis and found the data did not support a statistically significant relationship between the pace of work and recordable injuries in Pick and Stow." *In re: Amazon.com Services, LLC*, Board of Industrial Insurance Appeals State of Washington, 21 W0156, 22 W0000, 22 W0056 & 22 W0121, 12:1-7 (2024) (Decision and Order). As we explained during our meeting, given that Chairman Sanders specifically referred to the Washington L&I's investigation of Amazon in his June 20, 2023 letter announcing his investigation of Amazon, fairness demands that the upcoming report acknowledge that the judge in that litigation (a) squarely rejected the Washington L&I's allegations, including the allegation that Amazon's "pace of work" created an ergonomic danger and (b) found that "Amazon presented persuasive evidence it has a robust safety and health program." *Id*. at 14:7-12.

In sum, you have not provided any cogent reason to reject Dr. Nichols' and Core AI's findings. Relying on Soteria's flawed conclusions would knowingly mislead the public and undermine the integrity of Chairman Sanders' report.

We are similarly concerned about Chairman Sanders' intention to cite to the unsuccessful Project Elderwand pilot in the upcoming report. As we described in our May 22, 2024 letter, Elderwand found no evidence that introducing Mind and Body Moments—forced intermittent pre-set breaks—as a means to reduce pace of work affected the rate of MSDs in the pick process path that was studied.

As Mr. Racco, a senior Amazon ergonomist who led Elderwand, explained during his in-person briefing at your office, there are many factors, including posture, force, and repetition, that contribute to the potential risk of an MSD, and the overall ergonomic risk can be affected when one of these factors is changed. The upper limit for repetitions used in Elderwand was based on specific factors and assumptions, including assumptions about the frequency with which products were picked from certain shelves, the weight distribution of those products, and specific physical characteristics of the model used in the analysis. As a result, it would be inappropriate from an ergonomics perspective for Chairman Sanders' upcoming report to suggest based on the Elderwand pilot that there should be an upper limit on repetitions generally across process paths or that attempting to limit repetition is the only or even the most effective means of addressing MSD risk.

In fact, Amazon has successfully piloted and implemented several improvements to reduce the risk of MSDs that focus on changing relevant factors other than repetition.[4] For example, as documents produced to the Committee show, Amazon has fully deployed a pick process path technological solution, ErgoPick, that prioritizes products that are placed at a height within associates' power-zones and therefore reduces the frequency of bending and lifting when

[4] *See, e.g.*, AMAZON_00004359–AMAZON_00004362 (ergonomics projects list); *see also* July 26, 2023 Ltr. from B. Huseman to B. Sanders at 4-5 (describing safety measures Amazon has adopted, including, for example, ErgoPick, height adjustable workstations, and job rotation).

an associate is "picking" that product.[5] Amazon is in the process of rolling out similar technology in the stow process path to direct high turnover items to associates' power-zones, which benefits both stow and pick associates. This demonstrates how, following the failed Elderwand pilot, Amazon has changed another relevant factor—height of the product—to mitigate ergonomic risk. As we have noted, it is disappointing that Chairman Sanders' reporting to date has not described this and various other Amazon safety improvements, even though this topic is a focus of Chairman Sanders' investigation, as indicated in his July 20, 2023 letter.

Failure to Correct Allegations that Amazon is Uniquely Dangerous and Has Injury Rates More Than Double the Industry Average

Chairman Sanders' investigation—and the decision to target Amazon among other companies—was premised on the claim that Amazon's warehouses are "**uniquely dangerous**" and that Amazon's injury rate **"was more than double the rate at non-Amazon warehouses**" (June 20, 2023 Ltr. from B. Sanders to A. Jassy; emphasis added). However, as we have pointed out several times, this premise is false. And as we have repeatedly stated, fairness and accuracy require that Chairman Sanders acknowledge this in the upcoming report and retract his prior inaccurate claims. During our meeting, we did not understand you to disagree that these claims should be retracted if they are inaccurate, but rather you asked for clarification about the statistics we were citing.

As the latest Bureau of Labor Statistics ("BLS") data demonstrate, Amazon's injury rates are generally **lower** than the relevant industry averages, and only in one instance are they slightly higher than the industry average. In no event can Amazon's current injury rates be described as "uniquely" higher than or "more than double" the industry average. The graphs below, which were published in Amazon's 2023 Safety blog, compare the 2022 average injury rates in relevant industry categories (2023 BLS industry averages are not yet available) with Amazon's 2022 and 2023 RIR and LTIR statistics.[6] **Amazon's injury rates are below the latest industry averages reported to OSHA in every case but one** (in 2022, Amazon's RIR in the general warehousing and storage category was .1 higher than the industry average).[7]

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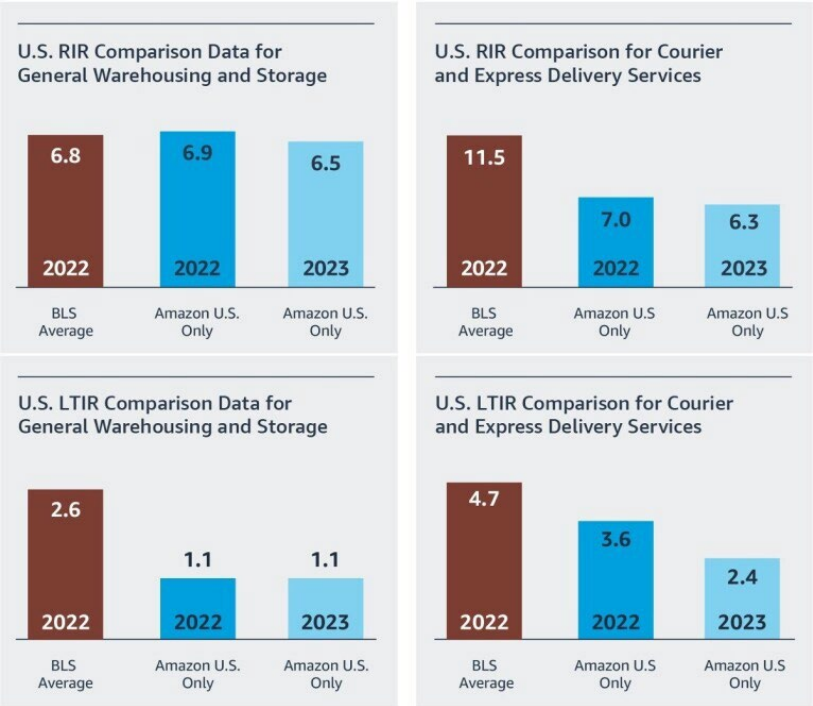
[5] *See* AMAZON_00004359–AMAZON_00004362; July 26, 2023 Ltr. from B. Huseman to B. Sanders at 4-5.

[6] *See* Mar. 8, 2024, Amazon 2023 Safety Blog, https://www.aboutamazon.com/news/workplace/amazon-workplace-safety-post-2023; Bureau of Labor Statistics, Industry Injury and Illness Data – 2022, "Quartile Data", https://www.bls.gov/iif/nonfatal-injuries-and-illnesses-tables/soii-summary-historical.htm.

[7] *Id.*



Given these statistics, it is difficult to understand why Chairman Sanders is targeting Amazon rather than other companies that have higher injury rates—especially given Amazon's significant investment in and commitment to workplace safety. At a minimum, and in the interest of fairness and providing the public with balanced information, Chairman Sanders' second report should clearly and accurately explain how Amazon's injury rates compare to the industry average and should retract the prior allegations to the contrary.[8]

Moreover, to address the one-sided nature of this investigation, we believe that Chairman Sanders' second report should also recount the various safety measures (both engineering and administrative) that Mr. Racco briefed you on at your request in your offices. Please see our letter of August 22, 2024 and also AMAZON_00004359-AMAZON_00004362 (projects list) for more details. As we discussed in our prior letter and in our meeting, there are several other facts that Chairman Sanders should include to help balance what has been a one-sided investigation.

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[8] Chairman Sanders' June 20, 2023 letter cites to a third-party group's report for the proposition that Amazon's injury rates are more than double the industry average. *See* June 20, 2023 Ltr. from B. Sanders to A. Jassy and July 15, 2024 Interim Report. As we explained in our August 22, 2024 letter—and as you have never rebutted— this statistic is flawed because the industry category that Amazon was being compared to was missing Amazon's major peers, Walmart, Target, and Costco. According to 2022 data reported to OSHA, when these companies' injury rates are factored in, Amazon's injury rate is slightly above the RIR industry average and less than half the LTIR industry average.

Amazon's Confidential Business Information

Releasing Amazon's confidential business information in your July 15, 2024 interim report has significantly undercut the trust under which Amazon voluntarily and in good faith shared internal documents and data in this investigation. We continue to have significant concerns about your indication that you might publicly release twenty-five documents reflecting Amazon's internal processes, analyses, and data as part of your upcoming report.

Our discussion of confidential business information at our September 3, 2024 meeting has only heightened our concerns. During the meeting, you (a) did not dispute that the twenty-five documents contain confidential business information under the well-established standard developed by the courts, as described in our August 22, 2024 letter; (b) stated that Chairman Sanders did not follow this standard (you did not provide a substantive reason other than to say that Congress is a different branch of government); and (c) declined, despite our repeated requests, to describe the objective standard by which Chairman Sanders would judge business confidentiality and suggested that there was in fact no such standard.

When we observed that this approach amounted to a policy of ignoring business confidentiality, you stated that it was common for Chairman Sanders and other committees to release sensitive, confidential business information (you pointed to a recent release of sensitive company internal emails discussing the pricing of pharmaceuticals) and that it appeared we had an issue with "congressional investigations" more generally. Respectfully, this response is disappointing and insufficient.

There is a well-recognized policy rationale for not publicly releasing a company's confidential business information—a rationale reflected in court decisions[9] and in multiple congressional enactments that protect business confidential information.[10] Companies invest time and resources in developing internal policies, procedures, analyses, and data, and they make great efforts to maintain this information as confidential. Releasing such information to the public would allow a company's competitors to reap valuable insight into the company's procedures without the effort or cost of developing them. *See Davis* v. *Social Serv. Coordinators, Inc.*, No. 1:10–cv–02372–LJO–SKO, 2012 WL 1940677, at *2 (E.D. Cal. May 29, 2012). Accordingly, we believe you should have the burden of demonstrating why releasing confidential business information is necessary and justified in particular circumstances. While congressional committees sometimes release confidential business information, there are many more examples where, after a company provides information voluntarily to a committee, the

[9] *See e.g.*, *Nevro Corp.* v. *Boston Sci. Corp.*, 2017 WL 2687806, at *2 (N.D. Cal. Jun. 22, 2017) (finding good cause to seal information related to "levels of staffing and resources" that "could be used by competitors in their strategic planning and resource allocation"); *Muench Photography, Inc.* v. *Pearson Edu., Inc.*, 2013 WL 4475900, at *4 (N.D. Cal. Aug. 15, 2013) (finding that even "old" sales and distribution data is entitled to protection from disclosure because the data reveals a Company's "thought processes and strategies even if the data are historical").

[10] *See, e.g.*, 5 U.S.C. § 552(b)(4) (prohibiting federal agencies from releasing a company's confidential business information in response to a FOIA request).

committee studies the information but respects its confidentiality and does not gratuitously publish it. Here, you have not articulated a compelling rationale for overriding Amazon's confidentiality concerns and making public the company's internal policies, procedures, analyses, and data. Indeed, we see no valid governmental purpose for targeting Amazon—a company whose injury rates have been falling year over year and are within the industry average and that has voluntarily provided documents to assist your inquiry—for this treatment.

At a minimum, we ask again that you accommodate our concerns to some degree by not publicly releasing these documents in full, but rather summarizing or quoting the relevant content in your report in a targeted fashion.[11] This would, in our view, mitigate the breach of confidential business information and provide some measure of protection for the underlying documents. Please let us know at your earliest opportunity whether you agree to this approach.

Furthermore, as we noted in our August 22, 2024 letter, Chairman Sanders appears to be contemplating producing two letters submitted by Paul, Weiss as part of the investigation. Not only do these letters contain confidential business information, but we believe it would be an inappropriate departure from longstanding practice to release our confidential correspondence with you.

* * * *

Despite our differences on several of these issues, we appreciate the dialogue and hope that we can reach an accommodation. Please let us know if it would be helpful to meet again to discuss.

Sincerely,

Roberto J. Gonzalez

cc: Karen L. Dunn

[11] We do not believe it is viable to propose redactions without knowing the standard by which you would judge confidential business information. Also, as a practical matter, it is difficult to parse documents that contain business confidential information throughout.

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October 24, 2024

Confidential Treatment Requested

BY EMAIL

U.S. Senate
Committee on Health, Education, Labor and Pensions
Washington, DC 20515

Dear Mr. Carter and Ms. Kiernan:

We write on behalf of our client, Amazon.com, Inc. ("Amazon"), to follow up on our September 24, 2024 letter, our October 8, 2024 phone call, and your October 9, 2024 email. We continue to have significant concerns that Chairman Sanders' second report, like the first report, will contain misleading and erroneous findings and be one-sided, omitting information that Amazon has provided that does not fit a pre-conceived and unsubstantiated narrative.

We are disappointed that you have not responded to all of the specific points in our September 24 letter, and will repeat only some of those points here. We will also address the follow up questions you asked us regarding Projects Soteria and Elderwand, and Amazon's injury statistics.

Opportunity to Review a Draft of the Upcoming Report

In our September 24 letter, in response to your statement that you have "never heard of that happening in a congressional investigation," we cited multiple congressional committees that have shared draft reports with investigative targets for fact checking purposes. Despite these examples, during our October 8 discussion you declined Amazon's request to review a draft of the report because doing so is not in line with HELP committee precedent. You did not, however, dispute our statement that sharing a draft would "promote factual accuracy" and "ensure the dissemination of appropriate and accurate reporting to the public," nor did you dispute our observation that you have not noted any drawback to sharing a draft for fact checking purposes. We would appreciate knowing your substantive rationale—apart from your committee's prior practice—for not affording an investigative target the opportunity to identify factual inaccuracies. Doing so would only promote more accurate reporting to the public.

We have spent the last several months answering data- and document-related questions that suggest that you remain uncertain about how to properly interpret what we have produced. This highlights the benefit of Amazon having an opportunity to review your draft for factual accuracy. As we described in our August 22 letter, your first report had a number of erroneous and misleading statements, and we fear that the upcoming report will contain similar errors. For example, we explained in our recent letter that Amazon does not have "required rates," but you have given no indication whether you still plan to make this claim.

Project Soteria

During our September 3 meeting, you stated that you were willing to credit Core AI's report about Project Soteria's findings, but you were unwilling to credit the testimony of one of Core AI's Principal Economists during the Washington hearing. In our September 24 letter, we pointed out that the Core AI report (which was principally authored by this Economist) was consistent with his testimony and clearly found the Soteria team's conclusion—finding a correlation between rates of work and injury rates—to be invalid. Upon reviewing individual-level data, rather than facility-level data, the Core AI report found the opposite correlation: "***our best estimate shows no statistically significant relationship, and in the data higher UPH is correlated with lower RIR.***" AMAZON_00004156 (emphasis added).

After we pointed this out, it appears that you have pivoted your approach. During our October 8 call, you said that the upcoming report was now merely going to "describe" what Project Soteria found and what Core AI found without expressing any substantive view on the matter, because you are "not economists." You also stated that you are going to allege that there was a two-year gap between Soteria's findings and Core AI's report, and you implied that you would suggest in the report that Amazon was wrong to not accept and act on Soteria's findings during this interim period.

To be clear, there was not a two-year period between when Project Soteria finished collecting its data and when Core AI analyzed the results. Although Project Soteria issued preliminary recommendations in August 2020,[1] the Project Soteria team continued collecting data until March 2022. *See* AMAZON_00004156. Core AI was brought in to review Project Soteria's data set in April 2022—just two months after Project Soteria finished its data collection. *See* AMAZON_00004169 at -4241 (testimony stating that Core AI was asked to consult on Project Soteria in approximately April of 2022).

For the reasons given by one of Core AI's Principal Economists in his report and his testimony—which was credited by the Washington judge and Washington's Board of Industrial Insurance Appeals—the Soteria findings were invalid because Soteria used facility-level, rather than individual-level data, and failed to control for confounding variables. It is well-understood

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[1] These recommendations were still being studied at the time this paper was published. The "Recommendations and Next Steps" section of that document outlines additional research that would be necessary to "further shape the recommendations." *See* AMAZON_00004089 at 4094-4095.

that using aggregate rather than individual data can produce erroneous correlations—an error known as Simpson's Paradox.[2] It would do the public a great disservice for the upcoming report to not acknowledge this statistical truth and instead indulge in the assumption that both sets of findings have equal standing. And while Soteria's initial findings might appear useful to your allegation that faster rates of work cause ergonomic injuries, respecting sound statistical methodology is more important. Again, we believe it is highly relevant that after hearing months of testimony, including expert testimony, the Washington judge (and the Board that denied Washington's petition for review of the judge's decision) rejected Washington L&I's allegations about Amazon's pace of work creating an ergonomic hazard.

Project Elderwand

During our October 8 call, you stated that there were inconsistencies between the statements in our May 22 and September 24 letters about Project Elderwand and the document we produced describing the then-anticipated pre-pilot for Project Elderwand. The pre-pilot tested whether the Mind and Body Moments tool would keep associates' repetitions under a pre-selected value. Had the pre-pilot achieved that result, the project would then have needed to be piloted more broadly, with a larger sample size, to validly measure the impact of this intervention on MSD reporting. The pre-pilot, however, showed that the tool did not work effectively. *See* AMAZON_00003306 at -3509 (Q. I think you said this was not effective. Why not? A. The – for the technical reasons that the sampling could still – could not enforce the upper limit. The way the mind and body moment sampled the associate work, it was not able to enforce the upper limits. Q. Didn't have an impact on it? A. No."). As a result, no broader pilot was undertaken, and the WESE Engineering team went on to pilot and implement alternative interventions. *See* AMAZON_00004359-AMAZON_00004362.

You also stated that you were discounting our letter because, in your view, an Amazon Senior Ergonomist previously testified that he did not know that the Elderwand pre-pilot took place. This is a misreading of that testimony. *See* AMAZON_00003306 at -3485-3486. In fact, the same Senior Ergonomist, supported by members of the WESE Engineering team, was responsible for carrying out the Project Elderwand pre-pilot. That team traveled to a facility in Arizona for the pre-pilot and monitored and collected information (such as heart rate information) on associates participating in the pre-pilot. It was the WESE Engineering team that determined that Project Elderwand's pre-pilot did not achieve the desired results.

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[2] *See* Stefanos Bonovas and Daniele Piovani, Simpson's Paradox in Clinical Research: A Cautionary Tale, J Clin Med. 12(4):1633, pub. Feb. 18, 2023, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9960320/ ("Simpson's paradox is a statistical phenomenon in which an observed association between two variables at the population level (e.g., positive, negative, or independent) can surprisingly change, disappear, or reverse when one examines the data further at the level of subpopulations. . . . Simpson's paradox is a compelling demonstration of why rigorous and thoughtful statistical analyses are needed in clinical research, and how easy it is to draw the wrong conclusions when relying solely on intuition.").

Failure to Correct Allegations that Amazon is Uniquely Dangerous and Has Injury Rates that are More than Double the Injury Average

As we stated in our September 24 letter, Chairman Sanders' investigation and his decision to target Amazon were purportedly predicated on the belief, expressed in his June 20, 2023 letter, that Amazon warehouses are "uniquely dangerous" and that Amazon's injury rates were "more than double the rate at non-Amazon warehouses." June 20, 2023 Ltr. from B. Sanders to A. Jassy. We have made clear that these claims are statistically untrue, and we have asked you multiple times to retract and correct these statements. You have in turn responded with questions about Amazon's injury rate benchmarking.

As reflected in Amazon's safety reports and our letters, Amazon has traditionally benchmarked its warehouse RIR and LTIR against the Bureau of Labor Statistics (BLS) average for warehouses with over 1,000 employees because (1) on average an Amazon fulfillment center has approximately 1,400 employees, and (2) Amazon facilities with less than 1,000 employees are technologically sophisticated and have more in common with Amazon's over-1,000 employee facilities than they do with similarly sized facilities operated by a smaller company with a different operational profile.

But even if Amazon benchmarked itself against the BLS warehousing industry average across all facility sizes, the numbers would still disprove the allegation that Amazon warehouses are "uniquely dangerous" and that its injury rates are "more than double" the industry average. The overall BLS industry average for general warehousing and storage facilities for 2022 was 5.7.[3] Although Amazon's RIR was higher than the industry average, it is far less than the "more than double" you have publicly claimed. Further, Amazon's RIR continued to improve in 2023, contributing to a 24% improvement over the past four years.[4] Additionally, Amazon's LTIR—used for recording the most serious injuries—is 1.1, which is half the industry average across all facility sizes of 2.2 for 2022.[5]

Thus, under any reasonable view of the data, the Chairman's allegations are inaccurate and should be corrected.

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[3] Bureau of Labor Statistics, *TABLE 1. Incidence rates of nonfatal occupational injuries and illnesses by industry and case types, 2022*, https://www.bls.gov/iif/nonfatal-injuries-and-illnesses-tables/table-1-injury-and-illness-rates-by-industry-2022-national.htm.

[4] *See* Mar. 8, 2024, Amazon 2023 Safety Blog, https://www.aboutamazon.com/news/workplace/amazon-workplace-safety-post-2023.

[5] Bureau of Labor Statistics, *TABLE 1. Incidence rates of nonfatal occupational injuries and illnesses by industry and case types, 2022*, https://www.bls.gov/iif/nonfatal-injuries-and-illnesses-tables/table-1-injury-and-illness-rates-by-industry-2022-national.htm.

Amazon's Confidential Business Information

We were disappointed to learn during our October 8 meeting that you declined the reasonable compromise that Amazon proposed to better protect its confidential business information. We do not understand why quoting and summarizing these documents in your upcoming report would not be sufficient for your reporting purposes; this would at least provide some degree of protection for Amazon's confidential internal processes, analyses, and data.

Again, your intention to release the documents in full undermines the trust that Amazon placed in the Committee, while it voluntarily cooperated with its investigation. And although you have asked for additional documents, as we stated in our August 22 letter, it would not be responsible for Amazon to provide these documents without negotiating a confidentiality protocol that would give Amazon much greater assurance that its business confidential information would be protected. You have continued to decline to even explain the standard that you use to define business confidential information, which is a foundational step in providing any sort of comfort about protecting business confidentiality.

* * *

There are several important points in our previous letter that we will not elaborate on here, including our request that you include in your upcoming report information on all of the safety initiatives (engineering and administrative) that Amazon has rolled out over the last years and continues to implement. Again, in our view, fairness, balance, and accuracy demand that you appropriately reflect this information in your reporting to the public.

We urge you to reconsider your position on the points discussed above, and we ask again that you endeavor to produce a factually accurate and even-handed report.

Sincerely,

Roberto J. Gonzalez

cc: Karen L. Dunn