OREGON State FACE Program
Fatality Assessment & Control Evaluation

Oregon Institute of Occupational Health Sciences • Oregon Health & Science University
3181 SW Sam Jackson Park Rd. L606 • Portland, OR 97239 • 503-494-3940

REPORT#: 2020OR010 **REPORT DATE:** December 7, 2020

Forklift Operator Crushed by Full Pallet of Soft Drink Cans - Oregon

INCIDENT HIGHLIGHTS

DATE:
February 28, 2020

TIME:
4:27 PM

VICTIM:
47-year old White male forklift operator

INDUSTRY/NAICS CODE:
Soft drink manufacturing/312111;

Warehousing and Storage/493110

EMPLOYER:
Manufacturing and Warehouse

SAFETY & TRAINING:
Irregular safety meetings

SCENE:
Warehouse adjacent to soft drink manufacturing facility

LOCATION:
Oregon

EVENT TYPE:
Struck by object

SUMMARY

On February 28th, 2020, a 47-year-old forklift operator was crushed by a loaded pallet of soft drink cans that weighed ~2000 pounds. The pallet was on the top layer of a pallet row. Pallet rows were oriented back-to-back. The warehouse inventory management system directed the operator to pull pallets from a row that didn't contain any product. The operator pulled 4 pallets from the back of the adjoining row, destabilizing the top layer of pallets. While cleaning up some cases that fell off one of the pulled pallets, the top layer pallet fell onto operator (from a height of approximately 20 feet), causing massive internal injuries. The forklift operator worked swing shift full-time at the warehouse, as well as another job that started at 6am, working ~70 hours/week total.

CONTRIBUTING FACTORS

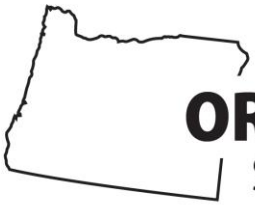
Key contributing factors identified in this investigation include:

- Back-to-back pallet row orientation without physical barriers or visual cues makes it difficult to distinguish where one pallet row ends and the other begins.
- Pallet retrieval procedures not followed while working under and/or adjacent to a live load.
- Fatigue due to lack of sleep may have adversely affected employee's judgment.

RECOMMENDATIONS

To help prevent similar occurrences, employers should:

- Ensure warehouse layout and pallet stacking procedures incorporate sufficient engineering controls to prevent distracted employees from inadvertently destabilizing multi-layer pallet rows.
- Ensure pallet stacking procedures are written and accessible to employees, and include instructions on how to perform spot checks on pallet rows to assure they are safe. Ensure employees follow these procedures and provide retraining if an accident occurs.
- Ensure employee training program includes training about the hazards of working around potentially unstable pallets, including awareness of potential pallet collapse areas while working on or below a live load.
- Treat sleep deprivation as a workplace hazard, especially for swing and night shift employees.



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Oregon Fatality Assessment and Control Evaluation Program

The Oregon Fatality Assessment and Control Evaluation (OR-FACE) Program is a project of the Oregon Institute of Occupational Health Sciences at Oregon Health & Science University (OHSU). OR-FACE is supported by a cooperative agreement with the National Institute for Occupational Safety and Health (NIOSH) (grant #U60OH008472) through the Occupational Public Health Program (OPHP) of the Public Health Division of the Oregon Health Authority. OR–FACE reports are for information, research, or occupational injury control only. Safety and health practices may have changed since the investigation was conducted and the report was completed. Persons needing regulatory compliance information should consult the appropriate regulatory agency.

OR-FACE supports the prioritization of safety interventions using a hierarchy of safety controls, where top priorities are hazard elimination or substitution, followed by engineering controls, administrative controls (including training and work practices), and personal protective equipment.

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SUMMARY

On February 28th, 2020, a 47-year-old White male forklift operator was crushed by a loaded pallet of soft drink cans. Each fully loaded pallet weighs ~2000 pounds. Pallet rows are oriented back-to-back, with the front of the pallet row showing a barcode label on each pallet (i.e., pallet label). The warehouse inventory management system (IMS) is managed and updated in real-time by a supervisor on the loading docks. The IMS directs forklift operators where product is located and where it needs to go. Forklift operators are supposed to scan the pallet label barcode prior to pulling product from pallet rows to make sure it is the correct product, as well as to update the IMS that the product is no longer in storage inventory. On the day of the incident, about an hour into the start of his shift, the IMS directed the decedent to pull pallets from a row that didn't contain product. For an unknown reason, the operator pulled 4 pallets from the back of the adjoining row, destabilizing the top layer of pallets. The back of this adjoining row did not have pallet labels, which was a visual cue missed by the decedent. There was a faded yellow line on the warehouse floor, marking the end of pallet rows. While cleaning up some cases that fell off one of the pulled pallets, a top layer pallet (~ 20 feet high at the top) fell onto the operator, causing massive internal injuries. In addition to working full-time at the warehouse, the decedent worked a part-time job, or ~70 hours/week total.

INTRODUCTION

On February 28th, 2020, an hour after the start of his shift, a 47-year old White male forklift operator was fatally injured when he was crushed by a falling pallet of soft drink cans weighing approximately 2,000 pounds. Oregon Fatality Assessment and Control Evaluation (OR-FACE) program was notified of the incident on March 3rd by OR-OSHA and an OR-FACE fatality investigator accompanied the OR-OSHA Safety Compliance Officer (SCO) on March 6th. The OR-OSHA SCO took pictures, audio recordings from interviews and witness statements. These documents, as well as documents provided by the employer, were reviewed in preparing this report.

EMPLOYER

The employer is a soft drink manufacturer and storage/distribution warehouse facility, and employs approximately 200 people at the facility where the incident occurred, and 7,000 people in the United States. The employer is a subsidiary of a conglomerate company based in the United Kingdom that employs over 130,000. The employer owns multiple facilities in Oregon and has owned the facility where the incident occurred for approximately 19 years. At the incident facility, the manufacturing operation is where soft drinks are produced and packaged. The warehouse operation is in an adjoining building, and is where product is stored for distribution to local and regional customers, as well as other employer-owned facilities in the region. The manufacturing (i.e., production) and warehouse operations have separate management. Employees in the manufacturing building are not unionized, whereas employees in the warehouse are members of a union. There were 97 people employed in the warehouse operation at the time of the incident.

WRITTEN SAFETY PROGRAMS and TRAINING

The employer had a written safety policy in an Employee Handbook, as well as written records of employee training, OR-OSHA Forms 300 (log) and 300A (summary) from 2017-2019, internal safety inspection records, internal accident reports, and safety committee report dated March 12, 2020 (after the incident). The decedent had completed refresher training in forklift operation on an annual basis, as per company policy and OSHA standards for operators of powered

industrial trucks (29 CFR 1910. 178(i)(7). These records were provided to the OR-OSHA SCO, who made the records available to OR-FACE. Several material movers interviewed by the OR-OSHA SCO said they were trained to always scan pallet label before pulling product, and to always pull product from the highest layer in a pallet row first (i.e., top to bottom retrieval order). However, the employer did not provide written records of this training.

WORKER INFORMATION

The decedent was a 47-year old White male who had worked for the employer for approximately 5 years. He had forklift operating experience from previous employment. The decedent worked full-time swing shift and his shift started at 3:30pm and ended at midnight. The decedent had another part-time job, approximately 24-hours/week, setting up and restocking grocery store displays. The part-time job's start time depended on the needs of the grocery store, but would sometimes start at 6:00am. The decedent had worked at the grocery store the morning of the incident for approximately 5 hours. The incident occurred on a Friday, shortly after his shift at the warehouse began. The decedent was pulling palletized finished product from the floor to replenish the staging area at the custom order fulfillment. Co-workers at the warehouse said the decedent was a hard worker, who showed up on time and worked his full shift, but kept to himself. The decedent had been involved in two near-miss incidents that resulted in equipment damage prior to the fatality incident. On August 1, 2017, he received a written warning as a result of the forklift he was operating colliding with a racking post, causing damage to the vertical rack support. On August 16, 2019, he received a verbal warning as a result of the forklift he was operating hitting a storage rack crossbar, damaging the forklift.

INCIDENT SCENE

Product stored on the warehouse floor is placed there by the manufacturing forklift operators, who stack pallets 2 across, 4 layers high, and 9 pallets deep, except for the 4th layer, which is 8 pallets deep. Pallet rows are arranged back-to-back (***See Image 1 on following page***) so that pallet labels are on the front side of a pallet row.

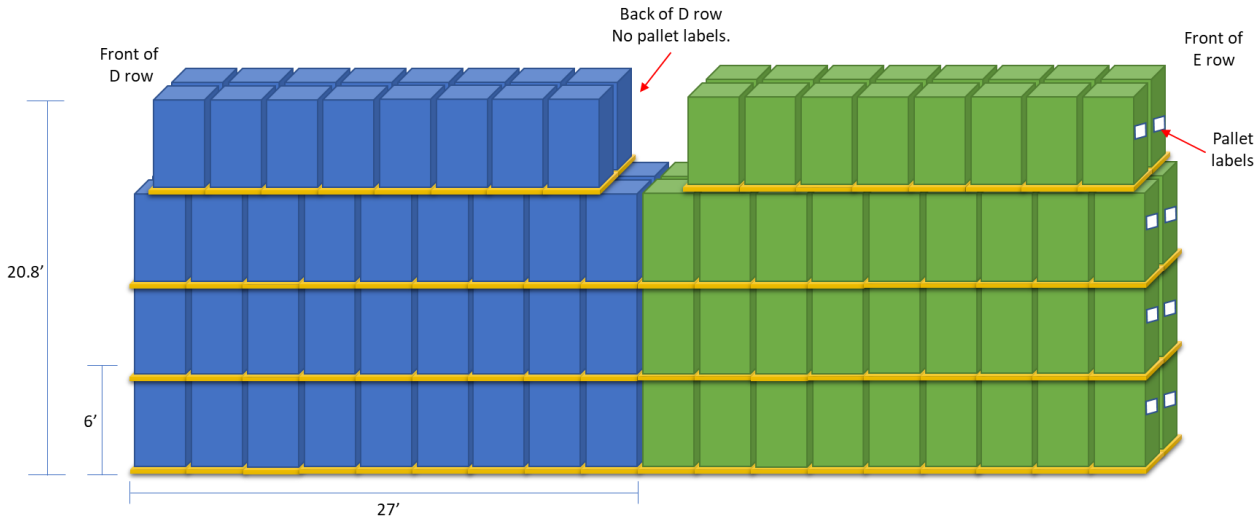

Image 1. Diagram of the back-to-back pallet row configuration utilized for product stored on warehouse floor.

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The 4th layer is offset from lower layers. The pallets of the 4th layer are placed so the front edge is offset behind the front edge of the 3rd layer (***See Image 2***). The last pallet at the back of the 4th layer last two pallets on the 3rd layer (***See Image 3***), which is why the 4th layer is only 8 pallets deep. This offset technique, combined with the weight of a pallet, stabilize the pallet row.

Image 2. Front of pallet row. Note top (4th) pallet layer offset behind 3rd layer (yellow arrow). Also, note pallet labels with barcodes on shrink wrap, indicating this is the front of the pallet row (green arrow).

Image 3. Back of pallet row. Note offset of top (4th) pallet layer overhangs rear edge of 3rd layer (yellow arrow). Also note back of pallet row abuts back of adjoining pallet row containing a different product.

The facility uses an IMS to track the location of product from manufacturing into the warehouse, and from the warehouse to the loading docks for order fulfillment. An inventory manager or floor supervisor manages the IMS in real-time at a station near the loading docks. Forklifts are equipped with displays linked to the IMS. The IMS informs manufacturing staff where space is available to store product, as well at directing warehouse staff where product is located and where it needs to go for order fulfillment. Some product is stored on metal racks bolted into the concrete floor. Other products are stored in pallet rows on the warehouse floor. Palletized products are either loaded directly onto trucks via the loading docks, or are taken to a custom order fulfillment staging area, where pallets are loaded with a mixture of products for stores in the region.

The warehouse is large and can store over 1 million cases of product. Warehouse forklift operators are trained to use a handheld barcode scanner and scan the pallet label barcode prior to pulling product from pallet rows. The handheld scanner is linked to the IMS, which updates product relocation in real-time.

Forklift operators pull pallets by inserting the forks all the way into the pallet, lifting the pallet slightly, tilting the tips of the forks up to stabilize the pallet on the forks, and then pulling the pallet from the pallet row. Some warehouse forklifts are capable of lifting and carrying 2 pallets at a time side-by-side. There are several material moving machines and devices in use in the warehouse during business hours, such as single-lift and dual-lift forklifts, straddle-type motorized pallet lifts, manual pallet jacks, and hand trucks. Video cameras monitor the inside the warehouse, but were not in use where the incident occurred.

WEATHER

The incident took place indoors and there were no weather events that day that would have been a factor in this incident (Weather Underground, 2020).

INVESTIGATION

The incident occurred in the warehouse on a Friday, February 28th, 2020 at 4:27pm, approximately an hour into the beginning of swing shift. The decedent's task assignment that day was to retrieve palletized product from the floor and move it to the staging area for custom order fulfillment. The IMS directed the decedent to pull product from D1-116 pallet row and relocate it to the custom order fulfillment staging area. However, there was no product in the pallet row D1-116. For an unknown reason, the decedent pulled the 3rd layer from the back of adjoining E1-117 pallet row instead, and in doing so, 8 cases fell off of one of the pulled pallets. Because this was the back of the row, the decedent most likely did not see the 4th layer from his location inside the forklift. When the decedent lifted the 3rd layer and pulled it, it is likely this action dragged the 4th layer toward the edge, creating an even greater overhang (***See image 4***). Pulling the 3rd layer out from under the overhanging 4th layer is likely what caused the 8 cases to fall off of the 3rd layer pallet.

Image 4. Side view of end of pallet row where incident occured. Top (4th) pallet layer overhanging 3rd layer and leaning away from top pallet row. The pallet next to this leaning pallet was the one that fell on the decedent.

The decedent placed the 2 pallets pulled from the 3rd layer of E row on the floor near the pallet row, and pulled the 2nd layer from the back of E row, placing it on the floor near the pallet row as well. This was to ostensibly to reach some of the fallen cases from the 3rd layer pallet that were on the top of the 2nd layer. The decedent left the area to retrieve a containment pallet, a special pallet with a plastic grid on top and a solid trough on the bottom, designed to hold leaking product so it can be moved to the spillage/wastage area in the warehouse. The decedent returned to the back of E row with the containment pallet, shut off his forklift, walked to the back of E row and began picking up the spilled product. The 4th row pallets, destabilized when the decedent removed the lower layers (***See Image 4***), were now overhanging and tipping away from the E1-117 pallet row, toward the empty D1-116 pallet row. While the decedent was cleaning up the spilled product at the back of E1-117 pallet row, the pallet on the right side of the 4th row (***See Image 5***) fell down onto the decedent, striking him in the head and upper body, causing massive internal injuries.

Image 5. Looking at front of D row and the back of E row. Note 1: The faded yellow line on the floor that marks the end of one pallet row and the beginning of another (yellow arrow). Note 2: The pallets at the end of E row do not have pallet labels on the shrink wrap, indicating these pallets are at the back of a row. Note 3: Most of the product on floor were on the pallet on the 4th layer (light blue arrow) that fell on top of the decedent. Eight additional cases fell off one of the pallets the decedent pulled from layers 2 or 3 that the decedent was cleaning up when the incident occurred.

There were no witnesses to the incident, but co-workers and supervisors/managers heard the noise when the pallet fell and rushed to scene, where they removed the fallen product from on top of the decedent and attempted to render aid. The warehouse manager did not detect a pulse and started CPR, while another employee called 911. Emergency Medical Services (EMS) arrived within 5 minutes, as a fire station is 2 blocks away from the warehouse. Local police also arrived and secured the scene. The decedent was declared dead at the scene. The local police informed OR-OSHA shortly after the body was removed by EMS personnel. The warehouse closed temporarily following the incident to preserve the incident scene, and so that OR-OSHA could start an investigation the next day (Saturday). Operations resumed Monday morning.

The OR-OSHA SCO interviewed family members who said that, in addition to working a full-time swing position at the warehouse, the decedent was also working a part-time job setting up product displays at local grocery and convenience stores. The swing shift job ended at midnight and the product display job started at 6:00am.

CAUSE OF DEATH

According to the Medical Examiner report, the cause of death was blunt force trauma to the head and body causing multiple and massive internal injuries.

CONTRIBUTING FACTORS

The unrecognized hazards or inadequately controlled exposures that contributed to this incident include:

- Back-to-back pallet row orientation without physical barriers or visual cues makes it difficult to distinguish where one pallet row ends and the other begins.
- Pallet retrieval procedures were not followed while working under and/or adjacent to a live load.
- Fatigue due to lack of sleep may have adversely affected employee's judgment.

Occupational injuries and fatalities are typically the result of one or more immediate contributing factors or key events that are part of a larger context or sequence of events. While the direct cause of death was being struck by the falling pallet of goods, there were indirect or upstream contributing factors that led to the employee being exposed to the fatal hazard.

First, while there were visual cues that the decedent was located at the back of a pallet row (yellow line on floor, no pallet labels), there were no engineering controls to physically prevent a distracted employee from pulling product from the wrong side of a pallet row, and creating a serious, and in this case, fatal struck by hazard.

Second, the decedent did not attempt to scan the pallet label barcode prior to pulling product or it would have been obvious there were no pallet labels visible where he was located, indicating this was the back of a pallet row. The yellow line on the warehouse floor was another visual cue marking the back of the pallet row.

Third, it is presumed that sleep deprivation may have contributed to fatigue that led to distraction and poor decision-making with regards to following the warehouse pallet retrieval procedures.

RECOMMENDATIONS/DISCUSSION

***Recommendation #1*: Ensure warehouse layout and pallet stacking procedures incorporate sufficient engineering controls to prevent distracted employees from inadvertently destabilizing multi-layer pallet rows.**

Discussion: The warehouse floor in the pallet row storage area was painted with a yellow line, delineating the end of a pallet row. In addition, metal rails had been installed into the concrete floor in some sections of the warehouse, to prevent material moving equipment from pulling products from the back of pallet rows (***See Image 6***). However, there were no rails installed in the section of the warehouse where in the incident occurred. A disadvantage of using floor mounted metal rails is that it doesn't prevent a distracted forklift operator from removing product from the 2nd, 3rd or 4th layer of the pallet row. A better solution would be to use a warehouse retractable curtain wall (***See image 7***), that is not only a visual cue, but also a physical barrier marking the end of the pallet rows. An internet search returned several brands of warehouse curtain walls available.

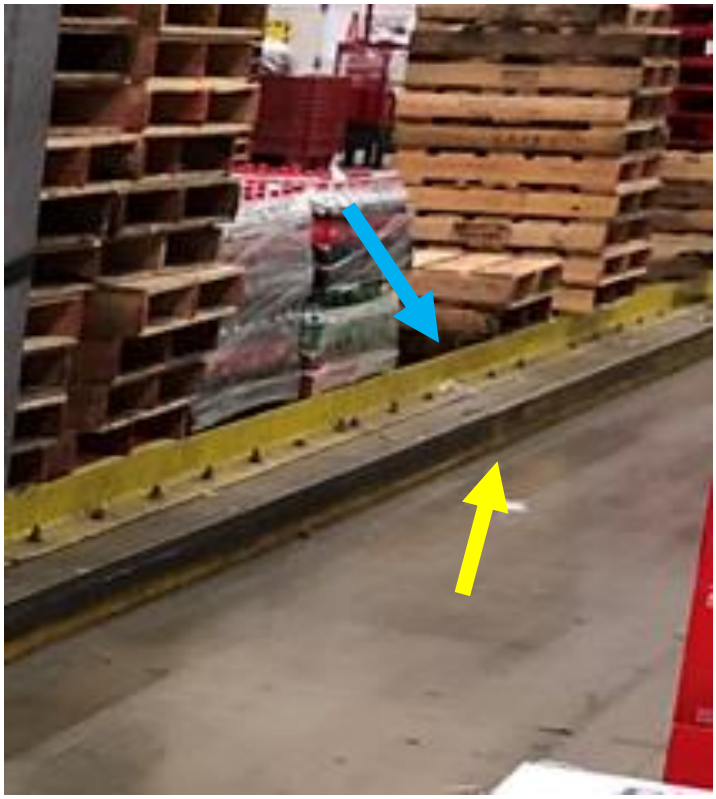

Image 6. Metal rails installed into concrete floor at the warehouse. Yellow and blue arrows mark end of each row. Rails prevent pulling product from back of adjoining pallet row. Rails were not installed in the area of the warehouse where the incident occurred.

Image 7. Example of a retractable warehouse curtain wall, that would create a physical barrier between pallet rows, while also allowing for visibility through curtain wall at pedestrian or forklift operator height. Photo credit: TMI, LLC warehouse partitions sales brochure (TMI LLC, 2020).

***Recommendation #2*: Ensure pallet stacking procedures meet engineering guidelines for the material stored, are written and accessible to employees, and include instructions on how to perform spot checks on pallet rows to assure they are stable and safe from falling/collapsing.**

Discussion: Oregon Administrative Rules (OAR) adopted the federal OSHA standards pertaining to handling materials by reference. This standard requires that "storage of material shall not create a hazard. Bags, containers, bundles, etc., stored in tiers shall be stacked, blocked interlocked and limited in height so that they are stable and secure against sliding or collapse." (29 CFR 1910.176(b)). Oregon has adopted additional rules related to Materials Handling and Storage requiring that "all material stacks and piles shall be placed on level and solid supports and shall be stable and self-supporting" (OAR 437-003-0221(5)). Pallet heights are regulated only to the extent of material stability and so that the stored material does not interfere with lights, fire suppression, and electrical fixtures.

Although having a written pallet stacking procedure is not required by law, it is good general safety practice to have a written palletized material stacking procedure designed or reviewed by an engineer so that pallet rows are stacked in such a way to maximize stability. This written procedure should be accessible to warehouse employees, and provided in a language that each employee understands, so they can reference how pallets should be stacked for safe storage. The procedure should also include guidance for employees on how to perform spot safety checks on pallet rows, to look for potential unsafe conditions that might lead to pallet row destabilization.

***Recommendation #3*: Ensure employees are adequately trained to recognize the hazards of working around potentially unstable pallets, including awareness of potential pallet collapse areas, especially while working on or below a live load. Ensure employees follow these procedures, through periodic inspections and reminders, and provide retraining if an accident occurs.**

Discussion: In addition to the pallet stacking procedure, employers should conduct a job hazard analysis (JHA) to identify the hazards associated with material handling and storage in their facility. Employers should then train employees so they can recognize these hazards, and are aware of the risks of working on, adjacent or below a pallet row that has not been stabilized, i.e., a live load. Employees should understand the potential risk of injury if exposed to an unstable pallet, which can lead to falling material or a pallet row collapse. Employers or their delegates should routinely inspect the material stored in the warehouse to make sure it is stable, and remind employees of their hazard training though job talks, daily or weekly in-person reminders, and/or newsletters and bulletin boards.

***Recommendation #4*: Treat sleep deprivation as a workplace hazard, especially for swing and night shift employees.**
Discussion: Sleep deprivation is known to impair cognitive abilities and judgment and is considered a contributing factor. Although physical barriers were installed in some areas of the warehouse to prevent forklift operators from pulling pallets from the back of pallet rows, there was no physical barrier installed in the pallet row area where the incident occurred.

Sleep is necessary for optimal physiological and mental functioning (Eugene and Masiak, 2015). Adequate sleep improves memory, focus, and reduces both mental and physical fatigue (Eugene and Masiak, 2015). Sleep is so important that moderate chronic sleep deprivation (< 7 hours sleep in a 24-hours period) has been found to impair cognitive and motor performance similar to alcohol intoxication (Williamson and Feyer, 2000).

Chronic sleep deprivation is a workplace hazard because the risk of workplace injury increases when amount of sleep decreases. Lombardi, et al., (2010) found the injury rate/100 workers increased 41% for employees who got 6 to 6.9 hours of sleep per workday, 74% for those who got 5 to 5.9 hours of sleep, and 107% for those who slept less than 5 hours (Lombardi, et al., 2010). This exposure-response relationship has been referred to as "shift-lag", analogous to jetlag in the symptoms of fatigue, disorientation, impaired concentration, short-term memory loss, irritability, decreased social interaction, and increased time to recover (Costa, 2003).

Although it is recommended that healthy adults sleep 7-9 hours per day, 30% of adult workers in the U.S. workers (approximately 40.6 million) reported in 2012 getting $\leq$ 6 hours of sleep per day on average (CDC, 2012). This is twice the number of U.S. workers exposed to excessive noise (Tak, Davis, and Calvert, 2009), and about 40 times higher than the number of U.S. workers exposed to lead (OSHA, 2015).

Working a non-day time job (i.e., shift work), or working long hours (> 10 hours/day) is linked to chronic sleep deprivation because of disruption of the body's circadian rhythm, the natural biological cycle of wakefulness during daylight, and sleep when it is dark (Akerstedt and Wright, 2009). The U.S. Bureau of Labor Statistics reported that on average for 2017-2018, over 24 million full-time employees 15+ years of age work a non-day time schedule, a 14% increase in shift work from 2004 (BLS, 2019, BLS, 2005). The highest number of shift workers, as a percentage of all salary and wage workers per industry category, are in leisure and hospitality services (37%), transportation and utilities (26%), and wholesale and retail trade (25%), which includes the warehouse and storage industry (BLS, 2019). Workers in the transportation and warehousing industries reported the highest prevalence of short sleep duration (<6 hours in a 24-hour period, 37%) in the National Health Interview Survey (Luckhaupt, et al., 2010).

U.S. employment in warehouse and storage has grown 79% from June 2010 to June 2020 and is expected to grow by 9% per year through 2029 (BLS, 2020a, BLS, 2020b). The push for faster order fulfillment and delivery has driven the demand for increased warehouse workers across multiple shifts, but has also increased the incidence of warehouse worker injury and fatality. In the general warehouse and storage industry category (NAICS 49311), workplace injuries increased 72% between 2010-2018 (from 27,800 to 47,900), and fatalities increased 86% (from 7 to 13) (BLS, 2020c). According to their report, *The Future of Warehouse Work: Technological Change in the U.S. Logistics Industry*, "warehouse workers experience work-related injuries at a rate nearly twice that of other private industry workers – higher than construction, coal mining, and most manufacturing industry." (Gutelius and Theodore, 2019).

The fast-paced work environment in a warehouse, coupled with close proximity of material moving equipment, require employee attentiveness to recognize and mitigate potential exposure to workplace hazards, such as collisions with other people, material or machines. Adequate sleep is necessary to maintain alertness and focus and thus, sleep deprivation should be recognized as a workplace hazard and chronic exposure to sleep deprivation should be managed similar to other workplace hazards such as noise or lead.

As part of a positive safety culture, employers can provide leadership in the recognition of chronic sleep deprivation by adopting recommendations from the National Institute for Occupational Safety and Health (NIOSH) on coping with shift work and managing fatigue (NIOSH, 2020). This includes providing training, so employees understand:

- Why adequate sleep is important to workplace safety and their own health and well-being.

- The aspects of good sleep hygiene.
- The signs and symptoms of chronic sleep deprivation in themselves and co-workers.

For example, fatigue is an identifiable symptom of chronic sleep deprivation and can range from slight fatigue that affects alertness and response time, to severe fatigue that can result in microsleep episodes, in which the brain produces theta waves (that normally occur in sleep or deep meditation) for brief periods, between 3 and 15 seconds (Harrison and Horne, 1996). During episode of microsleep, a worker might be operating machinery, but be briefly unaware of their surroundings. Fatigue, combined with repetitive tasks, is associated with increased microsleep episodes (Yung, et al., 2017).

In addition to the varying levels of fatigue, other identifiable symptoms of chronic sleep deprivation are sleep quantity and quality. When work schedules cannot be modified to accommodate a worker's natural sleep schedule, employees can complete a simple self-assessment at the start of their shift to gauge their level of alertness (***See Image 8***).

HOW DO YOU FEEL RIGHT NOW?	
Current Fatigue State	Very fatigued, having difficulty staying alert
	A bit tired, some effort required to stay alert
	Very alert – wide awake
DID YOU SLEEP IN THE LAST 24 HOURS?	
Sleep Quantity	No
	Yes, but I did not get my ideal amount of sleep
	Yes, I got at least my ideal amount of sleep
HOW WOULD YOU RATE THE QUALITY OF THAT SLEEP?	
Sleep Quality	Bad
	Average
	Good
Do you feel you can safely work today?	
Fitness for Work	No
	Yes, with additional risk controls
	Yes

Image 8. One-minute self-assessment tool for fatigue. (Fletcher, 2018).

If an employee is feeling very fatigued and they do not feel they can work safely without intervention, the employee should feel safe to discuss with their supervisor without retaliation. Recommended options for employers include (Knauth and Hornberger, 2003):

- Assign the employee to different tasks for the shift so employee is not operating machinery.
- Allow the employee to take additional short breaks to stretch and exercise.

- Assign a co-worker to check in the fatigued employee more frequently.
- Allow short-term shift swapping.
- Encourage the employee to eat protein meals during lunch breaks; this is in place of carbohydrate meals, which can provide a short-term burst of energy, but then an increased feeling of fatigue.

Napping at work is not recommended because of the negative consequences of sleep inertia, as well as the impact it may have on the regular sleep schedule. Workers should also be made aware that shift work tolerated as a younger worker, becomes less tolerated as workers age due to decreased restorative properties of sleep (Costa, 2003).

ADDITIONAL RESOURCES

NIOSH information on Work Schedules: Shift Work and Long Hours.
https://www.cdc.gov/niosh/topics/workschedules/default.html.

Oregon Institute of Occupational Health Sciences Resource Directory. https://apps.ohsu.edu/oregon-institute-occupational-health-sciences/resources/

Oregon Healthy Workforce Center. https://www.ohsu.edu/oregon-healthy-workforce-center

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FACE INVESTIGATION INFORMATION

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