WASHINGTON State FACE Program
Fatality Assessment & Control Evaluation

FATALITY INVESTIGATION REPORT

Asphalt Plant Supervisor Dies after Falling down a Drag Slat Conveyor

INCIDENT FACTS

DATE:
April 22, 2017

TIME:
7:30 a.m.

VICTIM:
58-year-old supervisor/plant operator

INDUSTRY/NAICS CODE:
Asphalt paving mixture and block manufacturing, NAICS 324121.
Highway, street, and bridge construction, NAICS 237310

EMPLOYER:
Asphalt production and paving

SAFETY & TRAINING:
Had a written safety program and trained employees.

SCENE:
Asphalt plant

LOCATION:
Washington

EVENT TYPE:
Fall

REPORT #: 52-46-2020
REPORT DATE: 12/15/2020

SUMMARY

On April 22, 2017, a 58-year-old supervisor/plant operator employed by a hot mix asphalt manufacturer died after he slid down the cover of an inclined asphalt storage silo conveyor and then fell down a stairway, landing 67 feet below on concrete.

The supervisor and a coworker were setting up to do maintenance at one of their employer's asphalt production plants. They planned to replace two chain head sprockets located at the top of the conveyor that brings asphalt to two storage silos. In order to replace the sprockets, they first had to chip-off the asphalt that had built-up around the sprockets.

Their work area was located above the silos on a 50-degree inclined conveyor 67 feet above the ground. The sprockets were beneath a hinged lid on the cover of the conveyor box. The workers used an aerial lift to ascend to the work area where they set up their equipment on a work platform adjacent to the conveyor box lid. The platform did not extend over the conveyor. The coworker opened the lid and then went down to a lower platform to hand up equipment to the supervisor. The supervisor then took off his personal fall protection even though the employer required it for the task. He then climbed over the platform railing onto the inclined conveyor cover. Presumably, he supported himself using the hinges of the lid cover or conveyor slats as foot holds while he prepared to chip-off the asphalt with a pneumatic chisel. An employee working in another part of the plant saw the supervisor sliding down the conveyor. The supervisor's coworker and the employee who saw him fall rushed to the scene and found him unconscious. He was airlifted to a hospital, where he died four days later.

RECOMMENDATIONS

Washington State Fatality Assessment and Control Evaluation investigators concluded that to protect employees from similar hazards employers should:

- Provide a way for workers to safely inspect and maintain conveyors.
- Apply principles of Prevention through Design (PtD) to existing and new facilities, structures, equipment, and procedures to identify and eliminate safety hazards to workers.
- Provide fall protection and ensure that workers use it when necessary.
- Perform a job hazard analysis (JHA) of conveyor and similar maintenance tasks.
- Evaluate the safety management and safety culture within their organization and make a commitment to injury prevention.

WASHINGTON State FACE Program
Fatality Assessment & Control Evaluation

DEFINITIONS

ALS	Advance Life Support
ANSI	American National Standards Institute
APP	Accident Prevention Program
CEMA	Conveyor Equipment and Manufacturers Association
DOSH	Division of Occupational Safety and Health
HMA	Hot Mix Asphalt
JHA	Job Hazard Analysis
IUOE	International Union of Operating Engineers
L&I	Washington State Department of Labor and Industries
LOTO	Lock Out/Tag Out
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
PtD	Prevention through Design
SHARP	Safety and Health Assessment and Research for Prevention Program
WA FACE	Washington State Fatality Assessment and Control Evaluation Program

WASHINGTON STATE FACE PROGRAM INFORMATION

The Washington State Fatality Assessment and Control (WA FACE) program is one of many workplace health and safety programs administered by the Washington State Department of Labor & Industries' Safety & Health & Research for Prevention (SHARP) program. It is a research program designed to identify and study fatal occupational injuries. Under a cooperative agreement with the National Institute for Occupational Safety and Health (NIOSH grant# 5 U60OH008487), WA FACE collects information on occupational fatalities in WA State and targets specific types of fatalities for evaluation. WA FACE investigators evaluate information from multiple sources. Findings are summarized in narrative reports that include recommendations for preventing similar events in the future. These recommendations are distributed to employers, workers, and other organizations interested in promoting workplace safety. NIOSH-funded, state-based FACE programs include: California, Kentucky, Massachusetts, Michigan, New York, Oregon, and Washington. WA FACE does not determine fault or legal liability associated with a fatal incident. Names of employers, victims and/or witnesses are not included in written investigative reports or other databases to protect the confidentiality of those who voluntarily participate in the program.

Additional information regarding the WA FACE program can be obtained from:

www.lni.wa.gov/Safety/Research/FACE
PO Box 44330
Olympia, WA 98504-4330
1-888-667-4277

WASHINGTON State FACE Program
Fatality Assessment & Control Evaluation

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INTRODUCTION

In April of 2017, the Washington State Department of Labor and Industries' (L&I) Division of Occupational Health and Safety (DOSH) notified the Washington State Fatality Assessment and Control Evaluation (WA FACE) Program of the death of a 58-year-old supervisor/plant operator at an asphalt production plant. While performing maintenance work on an asphalt drag slat conveyor he slid down the conveyor's cover, then fell off the cover and down a stairway, and landed on concrete 67 feet below.

Washington State FACE investigators conducted an incident scene investigation and interviewed the incident company safety and casualty claims director. Documents reviewed during the course of this investigation included the DOSH inspection file, the worker's death certificate, police report, and medical examiner's report.

EMPLOYER

The employer was a hot mix asphalt (HMA) producer and paving contractor. The family-owned company had been in business since 1952 and had twelve divisions and two affiliated companies in Washington, Oregon, and Idaho. They produced HMA at 18 plants. They used the asphalt in their paving contracting business and sold it to regional contractors.

The company had approximately 700 employees. Companywide, there were about 30 employees who had the same job title of "plant operator" as the worker who fell. The company had operated the asphalt plant at the incident site since 2015. There were five employees on-site at the plant at the time of the incident. Four of these employees were engaged in maintenance work (two on the conveyor and two in other plant locations) and one was delivering plant components from a company warehouse.

WRITTEN SAFETY PROGRAMS and TRAINING

At the time of the incident, the employer had a formal, written accident prevention program (APP). They trained their employees on the requirements of the APP. New employees were given a safety and health orientation. They had a full-time safety director and a management safety and health committee.

The divisions of the company held monthly safety committee meetings. Each plant site held weekly toolbox talk safety meetings. At weekly safety crew meetings, management and employees would raise safety issues and strategize how to resolve them. The company had formal safety trainings for employees two to five times per year. Additionally, management held annual safety trainings for plant supervisors and crews.

The company conducted annual formal safety audits at their plants. These audits highlighted safety concerns that the company management determined the company should address. The company then developed a matrix of accountability and expectations in addressing these issues and proceeded to resolve them. They regularly made plant site safety visits, as well as responded to requests for assistance from plant supervisors. They also encouraged employees to call a "safety time out" if they did not understand what was happening and needed some help.

As part of their APP, they had created an employee safety manual on the use of fall protection. The company had a fall protection program in which they trained their employees and provided refresher training annually.

The company's APP required employees to have a pre-task meeting or toolbox talk to go over procedures they would be doing and ensure that everyone understood what they would be doing and what needed to be done to ensure safety. On the day of the incident, the employees had a pre-job toolbox talk.

The company had a near hit/near miss program where employees could report incidents and discuss how they impact safety and what they could do to prevent them. The employer had made an app available to employees. This app

allowed employees to record safety issues, including near-hits, safe behaviors or at risk behaviors, and job site inspections. From these reports and follow-up discussions, the employer created safety alerts to communicate hazards and best practices.

For regularly performed tasks, employees participated in job hazard analyses (JHA). However, at the time of the incident, there was no established written procedure or JHA for the task the workers were performing. Instead, they informally discussed how they were going to perform this task and control hazards including where they would stand and where they would tie off their personal fall arrest lanyard. Post incident the employer created a JHA.

Photo 1: Asphalt storage silos and the drag slat conveyor down which the supervisor slid and fell while performing maintenance on the upper part of the conveyor. The two workers used the aerial lift to access the silo platforms.

WORKER INFORMATION

The 58-year-old worker was a supervisor with the job title of "plant operator." He was the primary operator at the plant where he usually worked. His duties consisted of maintenance and mechanical repair of company plant facilities and heavy equipment along with supervising employees. He was a full-time seasonal employee. He had been a long-term member of his division's safety committee. For the past two years, he had been its chairperson. According to the company safety director, he was very vocal about safety issues and diligent about his responsibilities in that role. He was a member of the International Union of Operating Engineers (IUOE) and was a journeyman operator. He had worked in the asphalt production and paving industry for 40 years and been employed by the company for 20 years.

According to the company safety director, company management, and those that he supervised he was respected for his work ethic and commitment to enforcing safety rules. He would not let others break the rules when it came to safety. Though the safety director reported that occasionally, he would be impatient and do what he thought he needed to "get the job done."

INCIDENT SCENE

The incident occurred at a drum mix asphalt production plant. The plant produced HMA used as paving material. The plant had a drum mixer, two 55-feet-high storage silos and a drag slat conveyor.

The conveyor brought asphalt from the drum to the silos. The silos then converted the continuous flow of mix into a batch flow for discharge into a haul vehicles located below the silo. The top of the conveyor was 71 feet above the ground. It had non-overlapping, non-interlocking spaced slats connected by a drag chain that pulled asphalt up an enclosed 50-degree inclined conveyor. The chain rode on sprockets located at the head and tail shafts. The head, or

drive, shaft, was located at the top of the conveyor where the asphalt was deposited into the silos. Two head sprockets that drove the drag chain were mounted on the head shaft.

The conveyor box was 44 inches wide and was enclosed by a smooth metal cover. The slats on the chain conveyor were 33 inches long, 5 ½ inches wide, and 3 ½ inches high. All of the employer's plants had similar conveyors.

The silos had platforms and walkways equipped with standard guardrails consisting of a top rail, mid rail, and posts. Stairways were equipped with standard handrails. There were lower, mid, and upper platforms located in the upper parts of the silos (See photos 2, 3, and 4). A ten-foot caged metal ladder provided access between the lower and upper platform. The upper platform, 65 feet above the ground, was located adjacent to and on either side of the conveyor gearbox, and drag chain motor where the workers were to do maintenance. A 44 inch by 40 inch hinged metal cover on the top of the conveyor allowed for access to the gearbox from the upper platform.

The incident plant was between 30 and 40 years old, as were many of the employer's plants. When purchased, the plants had minimal guarding and platforms. Over the years, the employer, often consulting with the plant manufacturer, had retrofitted guarding, platforms, stairs, and other safety features. The plant manufacturer designed the plant for production and did not incorporate design features for employees performing maintenance procedures. At the time of the incident, the employer was making progress in upgrading various features of the plant.

WEATHER

At the time of the incident, the weather was dry, overcast with an approximate temperature of 60 degrees with a wind speed of 13 miles per hour. Weather does not appear to be a contributing factor in this incident.

INVESTIGATION

During the "off-season" of winter and early spring when there was not much demand for asphalt for paving projects, the company schedules maintenance work at its plants. During this time, the company assembles a maintenance crew that travels to their plants to assist individual plant staff in performing needed work. In April, the crew of one of the company's asphalt plants asked for assistance from employees at another company plant to help them with routine maintenance work. Two workers from this plant, the supervisor and a coworker, responded to this request. They both had been part of this "off-season" maintenance crew for many years and had previously performed maintenance tasks at the incident plant. Both were supervisors and plant operators at their plant where they worked different shifts. The maintenance was to take place over the course of a weekend when the plant was not in operation.

On the day of the incident, early on a Saturday morning, the two workers started their workday by driving to the asphalt plant where they usually worked. There they gathered the tools, supplies, and gear that they needed. They left their home plant at approximately 4:00 a.m. and drove together to the incident asphalt plant.

Shortly after arriving at the incident asphalt plant at 5:30 a.m., they met with the plant supervisor and a loader operator, both regular employees of the plant. During the brief meeting in the company break room, they discussed the work they would be doing that day. The supervisor and his coworker were to replace the two head sprockets of the asphalt storage silos drag slat conveyor. Depending on the level of production of the individual plant, employees performed this routine maintenance task up to twice a year. They both had previously worked together on numerous occasions while performing this task at their employer's other plants, but this was the coworker's first time doing it at this plant. The task would normally take approximately three hours. The other two workers were to do diagnostic work on the plant's dust recovery and control system. They then split up to perform their separate tasks.

Before working on the conveyor, the supervisor and coworker deenergized the conveyor's electrical components and went through lockout/tagout (LOTO) procedures. The coworker placed his lock on the conveyor; the supervisor did not.

This was to ensure that no one could start the conveyor while the workers were doing maintenance. A subsequent investigation by the OSHA approved State Plan Division of Occupational Safety and Health (DOSH) determined that when pressure was applied to the slats they moved slightly.

The employer had rented a telescopic boom-supported elevating work platform (also known as an aerial lift) to bring them up to the silo work platform where they were going to be working on the conveyor. They put on their PPE including hard hats, hearing and eye protection, and fall protection harnesses with self-retracting lanyards. They loaded tools and other supplies onto the aerial lift. They then stepped onto the lift and tied off their lanyards to its anchor points. The coworker moved the lift to the east side of the silo where he elevated the lift platform to the lower of the two silo platforms.

With one lanyard tied off to the lift platform anchor and the other lanyard tied off to one of the poles of the silo platform guardrail, the coworker climbed over the lift guardrail and then over the silo platform guardrail to access its platform. They had brought up two hoses, one was for an oxy-acetylene cutting torch and the other was an air hose for a pneumatic chisel. The hoses ran to a truck below. Once on the silo platform the coworker began to pull these hoses off the lift onto the platform.

The supervisor then moved the boom lift platform to the west side of the silo and elevated it to the silo's upper platform where he exited to it. Guardrails protected the platform. It was 65 feet above the ground. While the supervisor was moving the lift, the coworker opened the hinged conveyor lid cover to provide access to the gearbox. The hinge of the lid cover was 67 feet above ground. He then brought hoses and tools from the lower platform to the upper platform via a caged metal ladder. This is where they would be changing out the two head sprockets of the drag chain conveyor.

Photos 2 and 3: Two views of the location where the supervisor stepped from the upper silo platform over the guardrail and onto the conveyor gearbox. He had removed his fall protection harness and placed it on the boom lift platform, so he was unable to follow the normal procedure of tieing-off his lanyard onto the tie-off point (shown in the upper right of photo 2 and lower left of photo 3).

Photo 4: Rails on platforms that employees climbed over to access the conveyor gearbox. The supervisor climbed over the rails on the upper left side of this photo.

The sprockets were located under a hinged cover on the conveyor box. The area over the conveyor they needed to access did not have a work platform. Workers accessed this area while using personal fall protection including a full body harness and a double self-retracting lanyard. There were employer approved crane pick points on either side of the gearbox that were intended to be used by workers as anchor points for their lanyards. To do this a worker would first tie-off to one point while standing on the platform, and then step over the guardrail onto the conveyor and tie off to the point on the other side of the gearbox. This was the only maintenance task on the silos and conveyor where personal fall protection was required. Workers could perform other maintenance tasks from guardrail protected platforms.

The process of changing out the sprockets required having a worker stand on either the conveyor slats and/or the opened conveyor lid cover. While doing this the worker would use a pneumatic chisel to remove asphalt that had built up around the two chain sprockets. After they had removed the asphalt build-up, they would then use a cutting torch to remove the bolts holding the sprockets.

After removing the bolts, they would take out the old sprockets and install new ones. The sprockets were manufactured as a matched set with three sections and must be replaced in the correct sequence. To do this, the worker on the silo platform would lay out the sprockets and then hand them to the worker on the conveyor to install. They would do the same with the other sections so that components stay matched up. All of the company's conveyors have the same type of sprockets. The employer considered replacing the sprockets to be a routine maintenance task.

Photo 5: Head sprocket that workers were intending to install.

Previously, when they had changed out sprockets, the coworker was the one to go out on to the conveyor and do this. There was no platform to stand on while doing this. Instead, he would tie off his double lanyard to the crane picking points they used as anchorage points that were located on either side of the conveyor (See photo 6). The supervisor would stay on the platform behind its guardrails and hand tools to the coworker. The coworker thought that on that day that they would do the work as they normally did. The supervisor did not communicate to the coworker that he intended to leave the guardrail-protected platform and go onto the conveyor where fall protection was required.

The coworker climbed down the ladder to the lower platform so that he could pass equipment up to the supervisor including the torch, an airline, and the welding lead. As he was doing this, the supervisor took off his fall protection harness and put it on the boom lift platform. The coworker told him to keep it on because he might need it. The supervisor replied he did not need to wear it. The coworker reported that he thought that since the platform was guardrail protected, and that he expected him to stay on the platform, he would not need his fall protection harness until he went back onto the boom lift at the completion of the job.

At this point, guardrails on the upper and lower platforms protected them both. On the platform below, the coworker could not see the supervisor. He began passing up supplies to him. The supervisor then asked him for a big airline. He went to look for the airline and when he found it, he shouted to the supervisor that he was ready to pass it up to him. There was no response. He called twice more, but still no answer. He assumed that the supervisor could not hear him because he was wearing hearing protection, so he started to go up to the upper platform.

There were no witnesses to what the supervisor was doing just prior to this point. Evidence indicates that he stepped over the platform guardrail onto the conveyor. He was not wearing his personal fall protection harness. The pneumatic chisel with its airline was found dangling on the conveyor; it appeared that he intended to start chiseling away at the asphalt buildup on the head sprockets. To do this he would have been standing on either the conveyor's slats and/or the hinge of the gearbox cover.

While standing on the conveyor slats or gearbox cover (See photo 8) the supervisor either slipped or lost his balance. An equipment operator, a member of the maintenance crew, was working below the conveyor when he saw him sliding feet-first, face-down on the 50-degree incline of the conveyor cover (See photo 9). His arms appeared to be trying to grab onto the conveyor in an attempt to arrest his descent. He slid 36 feet down the conveyor cover until he hit the blue smoke emission-control fan housing. After hitting the housing, he fell 5 feet from the conveyor to the silo access platforms stairs. He then fell another 26 feet, landing on a concrete slab at ground level (See photos 10-12).

The equipment operator who had seen the supervisor slide down the conveyor cover lost sight of him behind the drum mixer unit. He then heard the impact of him hitting the blue smoke fan housing and falling down the stairs. He got down from the stepladder on which he was working and yelled "man down, call 911."

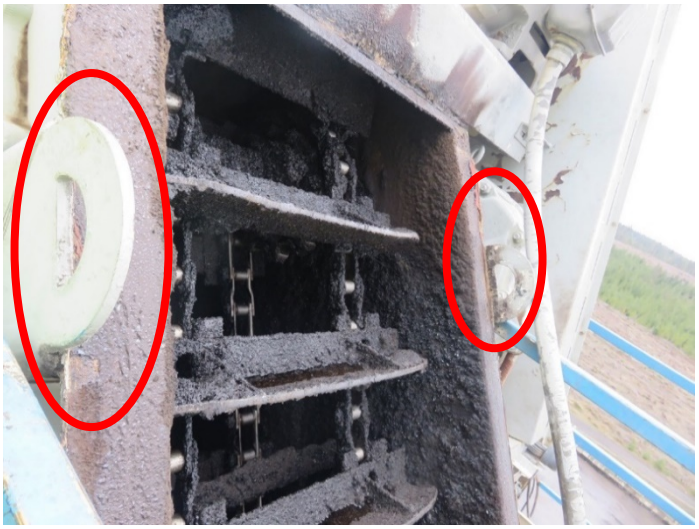


Photo 6: Crane pick points that company employees use as personal fall protection tie-off points located on either side of the conveyor gearbox. While performing maintenance on the conveyor head sprockets, workers normally use double lanyards attached to a full body harness.

Photo 7: Conveyor gearbox with asphalt buildup on slats, drag chain, and head sprockets (circled) located under the drag chain. Workers use a pneumatic chisel to remove the asphalt from the sprockets so that they could remove and replace them.

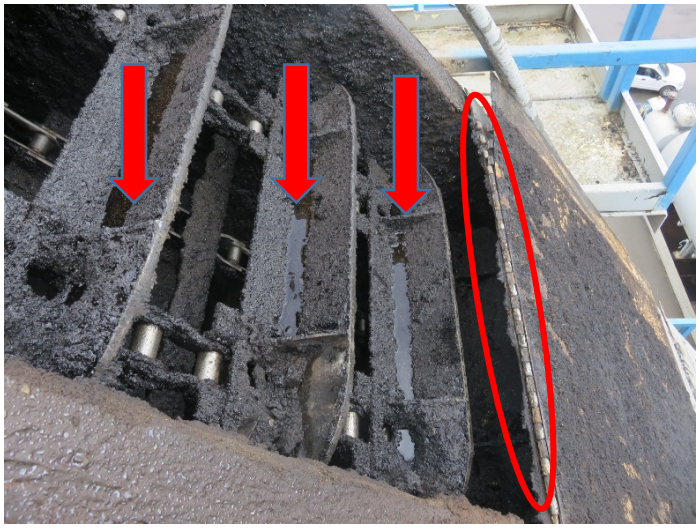


Photo 8: Conveyor slats (indicated by arrows) and the hinge of the open lid of the gearbox cover (circled) on which the supervisor may have been standing prior to falling.

Photo 9: The conveyor cover down which the supervisor slid feet first, face down and then fell to the concrete slab below. Arrow shows the airline and the pneumatic chisel that the supervisor was preparing to use.

The other member of the weekend maintenance crew, the plant manager, ran around the corner and the equipment operator told him "bad fall, call 911." The plant manager, who had not seen the incident, called 911 at 7:29 a.m. and, gave the dispatcher the address. The dispatcher told him to meet emergency responders at the plant gate.

In the meantime, the supervisor's coworker went down the silo stairs and saw the supervisor lying face down at the bottom of the stairs. He steadied the supervisor's head and checked for breathing and a pulse. He was not breathing. The equipment operator arrived and they rolled him over onto to his back. The coworker continued to steady his head while the equipment operator began CPR chest compressions. After a several minutes, the coworker took over CPR. Local fire and rescue department Advance Life Support (ALS) paramedics arrived at 7:36 a.m. and began treating him. Additional EMS responders arrived, as did a Sheriff's Department officer. An air medical transport service helicopter arrived at 8:33 a.m. He was loaded into the helicopter and transported to the regional level one trauma care hospital. He received treatment and was placed on life support. He died four days later.

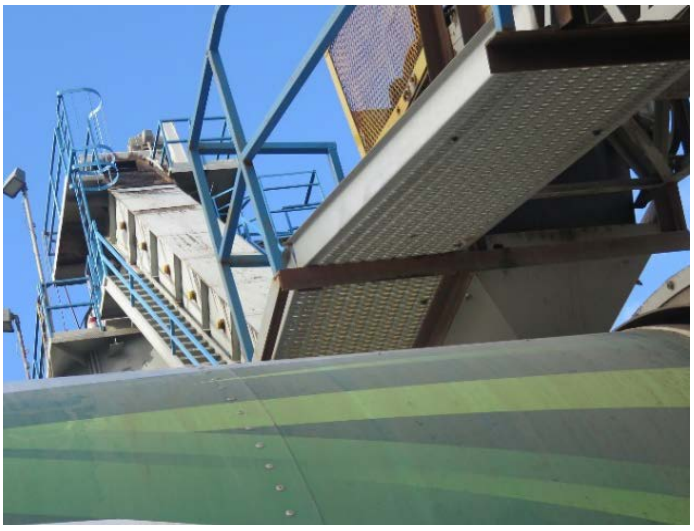


Photo 10: Location from where the equipment operator saw the supervisor sliding down the conveyor.

Photos 11 and 12: Views of the conveyor and silo access stairs. After sliding down the conveyor cover, the supervisor struck the blue smoke fan housing and fell down the silo stairs, landing on the concrete slab.

CAUSE OF DEATH

According to the death certificate, the medical examiner reported the cause of death as "multiple blunt force injuries."

CONTRIBUTING FACTORS

Occupational injuries and fatalities are often the result of one or more contributing factors or key events in a larger sequence of events that ultimately result in the injury or fatality. Washington FACE investigators identified the following as key contributing factors in this incident.

- Lack of fall protection.
- Lack of fall protection enforcement.
- Work area was not designed to include fall protection.
- No written maintenance procedure for task.

POST-INCIDENT CORRECTIVE ACTIONS TAKEN BY EMPLOYER




Photos 13 through 16: Following the incident, the employer installed a work platform with guardrails to protect workers from a fall hazard or the necessity of using personal fall protection while performing maintenance on the conveyor's head sprockets.

RECOMMENDATIONS/DISCUSSION

- ***Provide a way for workers to safely inspect and maintain conveyors.***

Discussion: The employer had instructed workers to use personal fall protection for this task even though the conveyor needed to be routinely inspected and maintained. A dedicated work platform would have allowed workers to more safely inspect and maintain the conveyor system.

- ***Apply principles of Prevention through Design (PtD) to existing and new facilities, structures, equipment, and procedures to identify and eliminate safety hazards to workers.***

Discussion: Employers should follow PtD guidance by applying prevention considerations in all designs that impact workers to help prevent or reduce injuries and fatalities. According to the American Society of Safety Professionals, PtD is intended to address "occupational safety and health needs in the design and redesign process to prevent or minimize the work-related hazards and risks associated with the construction, manufacture, use, maintenance, retrofitting, and disposal of facilities, processes, materials, and equipment". PtD is not limited to using engineering controls like platforms or guarding to control hazards. PtD guidance can be applied to the redesign of fall protection systems and procedures to reduce fall hazards and can influence and change worker behavior.

Because there was no safe work platform over the conveyor, the employer required employees doing this maintenance task to use personal fall protection to protect themselves from a fall hazard. For an unknown reason the supervisor did not use his personal fall protection harness. This decision would have been unnecessary if a work platform had been in place.

After this incident, the employer redesigned the upper work area to extend a work platform over the conveyor shaft to eliminate the risk of falls. This redesign allows safe access for workers performing inspection and maintenance to conveyors in the future. Employers should extend the application of PtD to other worksites, especially older plants that likely have legacy safety hazards.

According to the Conveyor Equipment and Manufacturers Association (CEMA),

> "It is well established that the best way to reduce accidents is to design out the hazards. When it comes to maintenance, access and ease of service are key design requirements for improving safety. Providing adequate access for maintenance and easy to service components cuts maintenance time and reduces exposure and therefore improves safety."

- ***Provide fall protection and ensure that workers use it when necessary.***

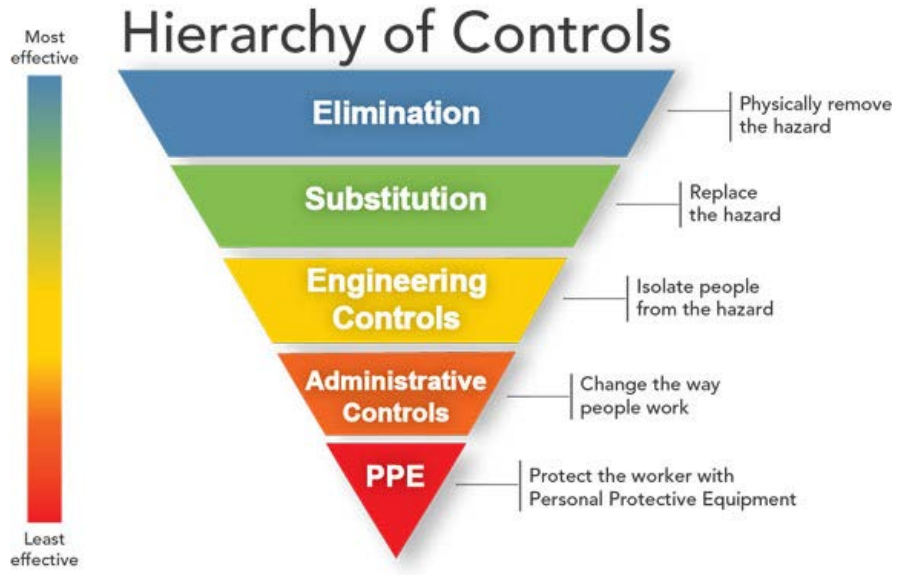
Discussion: The employer had identified that personal fall protection was required to do the task safely and had provided workers with the appropriate equipment. Employers must also ensure that workers use fall protection. In this case, direct observation by the safety director likely would have been the best way to ensure the use of fall protection. Other than directly observing, a pre-task hazard analysis with the company safety director may have helped ensure the supervisor used fall protection.

- ***Employers should perform a job hazard analysis (JHA) of conveyor and similar maintenance tasks.***

Discussion: Employers should start by assessing the hazards associated with maintenance tasks and implementing the controls that ensure worker safety. To do this, the JHA process should be done jointly by management, the safety committee, and maintenance staff. During the JHA, the hierarchy of controls should be used as a guide, where

engineering controls are preferred over administrative or personal protective equipment (PPE). Last, the results of JHAs should be documented in the form of safe and effective written procedures that workers can follow and these procedures should be incorporated into their existing APP.

According to the National Institute for Occupational Safety and Health (NIOSH), "controlling exposures to occupational hazards is the fundamental method of protecting workers. Traditionally, a hierarchy of controls has been used as a means of determining how to implement feasible and effective control solutions."



The concept behind the hierarchy of controls is a systematic approach to eliminating or reducing risks. The steps used to achieve this are ranked in sequential order from the most effective (elimination of the hazard) to the least effective (use of PPE, such as a personal fall arrest system).

The employer and maintenance crew had identified the hazards associated with the conveyor. The workers used an administrative control in the form of LOTO and PPE in the form of personal fall protection during the planned maintenance. Because the work area above the conveyor cover did not have a work platform, the employer required workers to use fall protection when doing this task. If a thorough JHA had been applied to this task, involving management and crew and consulting the hierarchy of controls, it should have identified the safe engineering control for protecting workers from falls was a work platform providing access to the conveyor cover. Decisions about safety and PPE use should not be the responsibility of workers when feasible engineering solutions are an option.

Shortly after the incident, the employer built a work platform with guardrails over the conveyor from where workers could safely do maintenance.

Following this incident the employer created a JHA which addressed administrative actions and PPE used by workers. It is recommended that the employer should identify workers at risk of falls and ensure they receive refresher training on the requirement and importance of using appropriate fall protection equipment when exposed to falls of 4 feet or greater.

Based on the results of the JHA, employers should create a written guide to performing maintenance safely. The guide should be added to the APP and used to train employees on the procedures and as a reference to ensure procedures are followed. Post-incident the employer did create a guide.

- ***Evaluate the safety management and safety culture within their organization and make a commitment to injury prevention.***

Discussion: This employer had a robust safety plan and activities at the time of the incident. The employer used this incident as an opportunity to assess their company-wide safety management and culture. For example, after this incident, the employer with the assistance of their employees evaluated all of their plants for fall hazards. They asked their employees if they saw areas in the plants where they could eliminate the need for the use of personal fall protection by building a work platform for example. With their employees input, they have made many safety improvements to their plants. The employer, through management, has made a commitment to their workers to emphasize the importance of preventing injury incidents.

It is recommended that all employers should ask workers and managers to, in-turn, make a similar commitment to a culture of safety and injury prevention. The commitment should be in writing and allow for no exceptions based on experience, rank, or individual attitudes about safety. Had the supervisor made a commitment to always use fall protection when required, he may have felt more compelled to use it.

To build on an employer-worker commitment to safety and to grow a positive safety culture, employers can reward workers who demonstrate safe behaviors and report unsafe conditions.The supervisor who died was the supervisor at the plant where he worked and was the chairperson of his division's safety committee and was experienced in this particular maintenance task. The reason he did not use his employer-supplied fall protection is unknown.

The company's safety director suggested that the supervisor might not have understood the risk involved because he was so focused on completing a task that he had done many times previously and was impatient to get to work. The safety director had spoken to him about his tendency to rush ahead without thinking of the safety consequences of his actions. The supervisor had been making progress in correcting his behavior, but he still struggled with his attitude of "just get the job done, it will only take minute." His coworker reported that the supervisor was known by his coworkers to take risks, especially when it came to using fall protection. It is also possible that the supervisor's willingness to impose upon himself the unnecessary risk of a fall had to do with personal and workplace cultural beliefs and norms that relate to the socialization of being male in the workplace. Occupational health and safety researchers and social scientists have examined how the acceptance and normalization of risk in the workplace primarily by men can lead to unsafe work practices and injuries. These ingrained ideas and practices on the part of individuals weaken the workplace safety culture. Recognition of this by both employees and management will allow for better safety outcomes and an improved safety culture.

A tool employers can use to achieve these and other safety goals is OSHA's Using Leading Indicators to Improve Health and Safety Outcomes. Leading indicators are proactive, preventive measures that help assess the performance of your safety program. Leading indicators can also provide information to take action BEFORE an injury incident occurs. Lagging indicators, on the other hand, measure things like near misses and injury incidents AFTER they happen.

After choosing leading indicators, employers should be sure to communicate the goal to workers. Include why it was chosen, how and when it will be measured, and what results are expected. Make sure to check the progress toward goals, share it within the company, and respond accordingly. For example, if not all workers at risk of falls have had refresher training, investigate the reasons and strive for 100% participation.

ADDITIONAL RESOURCES

1. OSHA, Recommended Practices for Safety and Health Programs. www.osha.gov/shpguidelines/docs/OSHA_SHP_Recommended_Practices.pdf
2. OSHA, Job Hazard Analysis. www.osha.gov/Publications/osha3071.pdf
3. NIOSH. Prevention through Design Program. www.cdc.gov/niosh/programs/ptdesign/default.html#:~:text=The%20mission%20of%20the%20National,all%20designs%20that%20impact%20workers.
4. American National Standards Institute (ANSI)/ American Society of Safety Professionals (ASSP), Prevention through Design Guidelines for Addressing Occupational Hazards and Risks in Design and Redesign Processes, ANSI/ASSP Z590.3-2011(R2016). https://webstore.ansi.org/Standards/ASSE/ANSIASSEZ5902011R2016
5. OSHA, Using Leading Indicators to Improve Safety and Health Outcomes. www.osha.gov/leadingindicators/docs/OSHA_Leading_Indicators.pdf
6. OSHA, Fall Protection. www.osha.gov/SLTC/fallprotection/
7. OSHA, Job Hazard Analysis. www.osha.gov/Publications/osha3071.pdf
8. Washington State Department of Labor and Industries. Job Hazard Analysis. www.lni.wa.gov/Safety/Topics/AToZ/JHA/

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