

FACE INVESTIGATION

SUBJECT: Machinist is Pinned Between Parts of Metal Materials Handling Equipment

SUMMARY: A 52-year-old male machinist (the victim) died as a result of crushing injuries he sustained after being pinned between a turnstile arm and a metal beam on a conveyor line. He had been working at the metal fabricating company where the incident occurred for six days prior to the incident. Prior to being hired at the new company, he had worked for twenty years at another company where he operated a manually operated tilt-table (downender). During his employment with the new company, he worked in the shipping department and had not been trained to operate the company's automatic downender. About ten minutes before the incident, the production control manager (the supervisor) asked him to help with the process of transferring rolls (coils) of metal alloy from a turnstile to the downender. This segment of the conveyor line was automatically controlled by buttons on a control panel, in front of the downender (Figure 1). On the afternoon of the incident, the supervisor was operating the control panel while the victim worked under his direction. During the first part of the cycle, the turnstile arm holding the coils turned 90E to align with a projecting beam from the center of the vertical downender. Usually, an automatic pusher transferred the coil from the turnstile to the beam. If the transfer was incomplete, a worker would manually push the coil onto the beam. The second part of the cycle consisted of the downender tipping to the horizontal position, then retracting the beam, and automatically moving the coil to the conveyor table. There were no warning lines around the turnstile or machine areas, nor were guards in place at the pinch point between the beam and the turnstile arm or pressure pads on the floor. Just prior to the incident, the first coil on the turnstile failed to completely transfer to the beam, so the victim was directed to push it off the arm and onto the beam. After the coil was transferred, the downender had tipped to the horizontal position and the victim was standing near the turnstile arm, when the supervisor left the control panel to remove materials from the conveyor. The victim apparently went to the control panel and pushed a button to resume the cycle, then returned to the turnstile area. A few moments later, the supervisor heard the victim call for help, and turned to see him pinned between the turnstile and the downender beam (Figure 2). The supervisor went to the control panel and tried to retract the beam, but was unsuccessful. He then pushed the emergency stop button, and cut the hydraulic line to retract the beam. The victim was transported to the hospital by EMS services, where he was pronounced dead. The FACE investigator concluded that, to prevent similar occurrences, employers should:

- C ensure that access to hazardous areas is sufficiently guarded**
- C develop, implement and enforce a written safety program which includes, but is not limited to, worker training in hazard identification, avoidance and abatement**
- C ensure that all workers receive instructions on safe work practices in a manner that is clear, complete, and understandable to the employee.**
- C encourage workers to actively participate in workplace safety**

INTRODUCTION:

On July 10, 1995, a 52-year-old machinist (the victim) at a metal fabricating company died after he was pinned between a turnstile arm and a metal beam on a downender. On July 12, 1995, the Wisconsin FACE field

investigator was notified of the incident by the Workers' Compensation Division of the Wisconsin Department of Industry, Labor and Human Relations. The investigation was initiated on July 16, 1995, with an interview with the coroner, and followed up with a site visit by the field investigator and an industrial hygienist. While at the company, the investigator and industrial hygienist interviewed the company's safety director and obtained photographs of the incident site. Reports were obtained from the OSHA area office and Workers' Compensation.

The employer in this incident was a metal fabricating company that had been in business since 1992. After receiving metal alloy rolls as raw material, the company thin-rolled, annealed and slit the metal rolls to customer specifications. Thirty workers were employed at the site, including the executive director who also performed the duties of safety coordinator. The company did not have written safety procedures for operating the turnstile and automatic downender machines involved in this incident. The victim had been working in the shipping department as a new employee of the company for six days before the incident. He was born in Mexico and spoke and read English as a second language. He had operated manual-cycle downenders at another company in the United States for about 20 years before being hired by this employer. At the time of the incident, the victim had not received training on operating a downender with automatic controls, but the supervisor knew of the victim's previous experience as a downender operator. The company policy required that employees be thoroughly trained prior to working with machines. This was the company's first fatality.

INVESTIGATION:

The production activities of the company were conducted in two main rooms of the building occupied by the company. Metal stock was rolled thin, annealed and wound into rolls (coils) in the first room. The second room had an annealing furnace, coil slitting machines, a turnstile, downender and a conveyor table to carry the slit coils to the shipping area. After the coils were prepared to the customer's specifications, they were transferred from the coil-slitter to a turnstile arm that then rotated 90° toward the downender. While this was occurring, the downender tipped down, and a metal beam pushed out from the center of the downender to receive the coils after the beam was aligned with the turnstile arm. (See Figure). The coils were transferred from the turnstile arm to the beam by an automatic pusher when the gap between the arm and the beam was closed. If the automatic pusher failed to completely transfer the coil to the beam, the company procedure involved having an employee manually push the coil. Then the vertical downender tipped back automatically to the horizontal position, the beam retracted, and the coil moved down the conveyor line. The supervisor controlled the machines by depressing buttons on the control panel, located in front of the conveyor. The machines operated automatically until each cycle was completed. There were no warning lines around the turnstile or machine areas, nor were guards in place at the pinch point between the beam and the turnstile arm.

On the day of the incident, the victim began work at 6:00 a.m., working in the shipping department until about 3:00 p.m.. Then, the supervisor asked the victim and another shipping department employee (the co-worker) for assistance with transferring coils to a conveyor, as the regular two-person crew had left for the day. Four coils, weighing 90-150 pounds each, were transferred from the slitting machine to the turnstile arm. The victim and the co-worker had transferred the first coil to the downender, under the direction of the supervisor, when the co-worker was called away. The supervisor and the victim loaded the second coil onto the downender beam, then

the supervisor pushed the button to lower the downender to the horizontal position. He left the control panel area to remove materials from the conveyor while the victim was standing near the turnstile arm. The event was unwitnessed, but apparently the victim pushed the control panel button that caused the downender to tilt to the vertical position, and the beam to project. The supervisor heard the victim call for help, and turned to see him pinned between the turnstile and the downender beam. He went to the control panel and tried to retract the beam by using the button controls, but was unsuccessful. He then pushed the emergency stop button, and cut the hydraulic line to retract the beam. The victim was transported to the hospital by EMS services, where he was pronounced dead.

CAUSE OF DEATH: The cause of death was crushing chest injury.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should ensure that access to hazardous areas is sufficiently guarded.

Discussion: Moving machine parts present dangers including pinching, crushing, entanglement, or shearing. Employers should ensure that access to hazardous areas is sufficiently controlled by guards or devices to prevent employee contact with the hazardous machine parts. In this case, a crush point between the turnstile arm and the downender beam was fully exposed to employees working near the machine. OSHA standard 29CFR 1910.212(a)(1) requires machine guarding to protect employees from hazards created by moving equipment. An additional factor of the hazard was the automatic feature of the machine controls, which permitted continued machine activity after the control buttons were pushed, regardless of an employee's presence in the hazardous area. Interlocked guards or gates, pressure sensitive floor pads, or presence-sensing devices or other physical measures to prevent employee contact with moving machine parts, and might have prevented this fatality

Note: At the time of the on-site, the company had removed the automatic features of the control panel. The machine operation was controlled by control buttons which needed to be continually depressed for machine operation. This would allow the operator to suspend machine operation if a person was exposed to a hazard.

Recommendation #2: Employers should develop, implement and enforce a written safety program which includes, but is not limited to, worker training in hazard identification, avoidance and abatement.

Discussion: The victim was crushed when he was positioned between the turnstile arm and the moving downender and apparently activated the downender machine by pushing the button which started the automatic cycle. Although he had experience in the manual operation of similar equipment from previous employment, he was not experienced in the operation of the machine with automatic operation features. Employers should evaluate tasks performed by workers; identify all potential hazards; and then develop, implement, and enforce written safe work procedures addressing these issues. The safety program should include, at a minimum, worker training in hazard identification, and the avoidance and abatement of these hazards. An effective training program includes written job safety analyses containing step-by-step procedures, a list of the hazards within each step of the procedures, and an explanation of ways to overcome these hazards. Employees should not be assigned to

jobs with hazardous components until they have demonstrated competency in the tasks they will perform.

Recommendation #3: Employers should ensure that all workers receive instructions on safe work practices in a manner that is clear, complete, and understandable to the employee.

Discussion: Employees who are placed in situations that may present hazards to their health and safety need information and resources on recognition and avoidance of dangerous conditions. If the worker is not fluent in written and/or spoken English, the employer must ensure that the information is presented in another manner that is easily understood. This could be done by using verbal and written translations, audiovisual recordings in the worker's primary language, and/or bilingual signs. In this case, the victim spoke Spanish as a primary language, but used English as a second language. Although it is unknown if this had any impact on the outcome of the incident, the lack of clear communication about the automatic controls could have contributed to the victim's actions leading to the event. Companies could ensure that speakers of foreign-languages receive clear and complete safety instructions by using the resources available from literacy councils, workplace literacy programs offered by schools and colleges, and community social service organizations.

Recommendation #4: Employers should encourage workers to actively participate in workplace safety.

Discussion: Employers should provide opportunities for workers to carry out their responsibility to participate in making the workplace safer. This could be done by encouraging participation in safety committees and reporting hazardous conditions to those responsible for implementing the company's safety program. In this case, two untrained workers were asked to assist in tasks that involved exposure to hazards, although the company policy required training. Additionally, the hazards of unguarded moving machine parts had been present since the machine was installed. A company safety committee or other mechanism to identify and respond to worker-identified unsafe conditions could have dealt with these hazards. Increased worker participation will aid in the prevention of occupational injury.

REFERENCES

29 CFR 1910.212.(a)(1) Code of Federal Regulations, U.S. Government Printing Office, Office of the Federal Register.

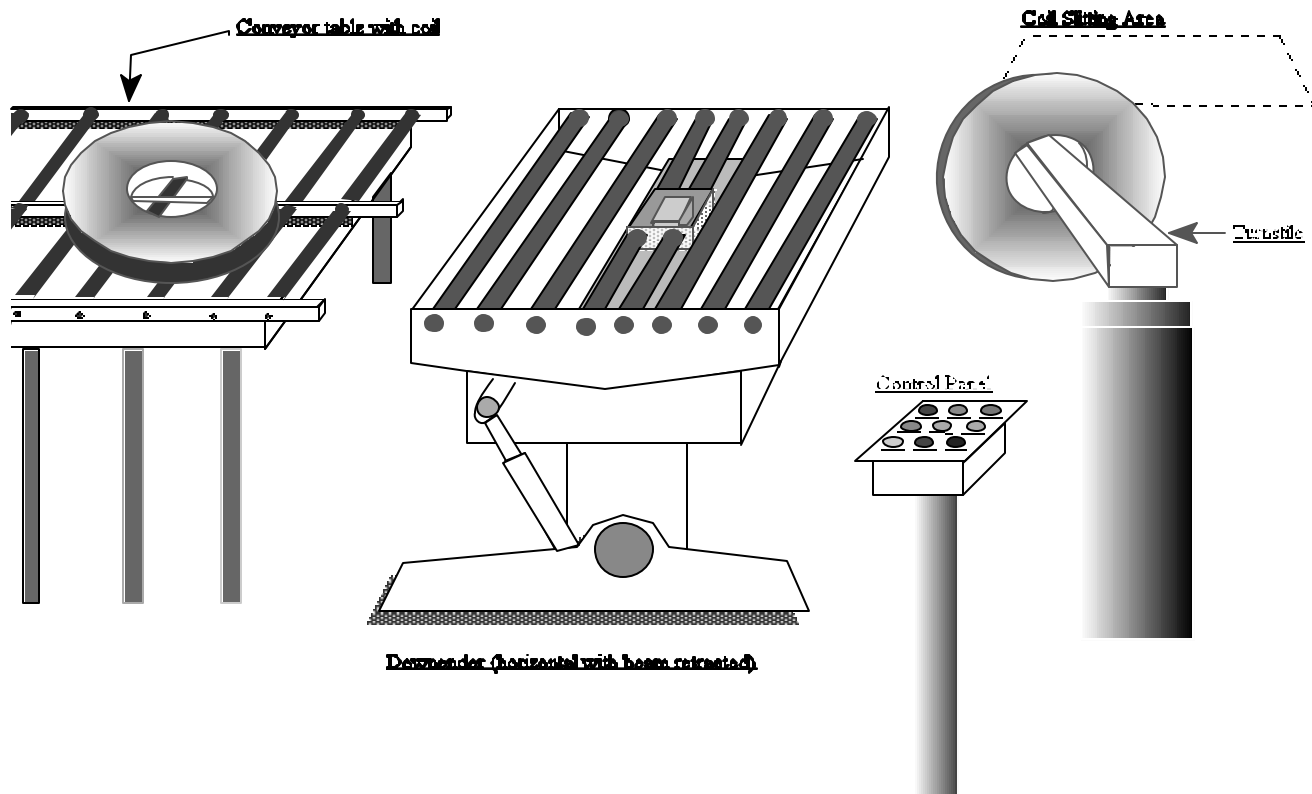


Figure 1 - 95WI05501

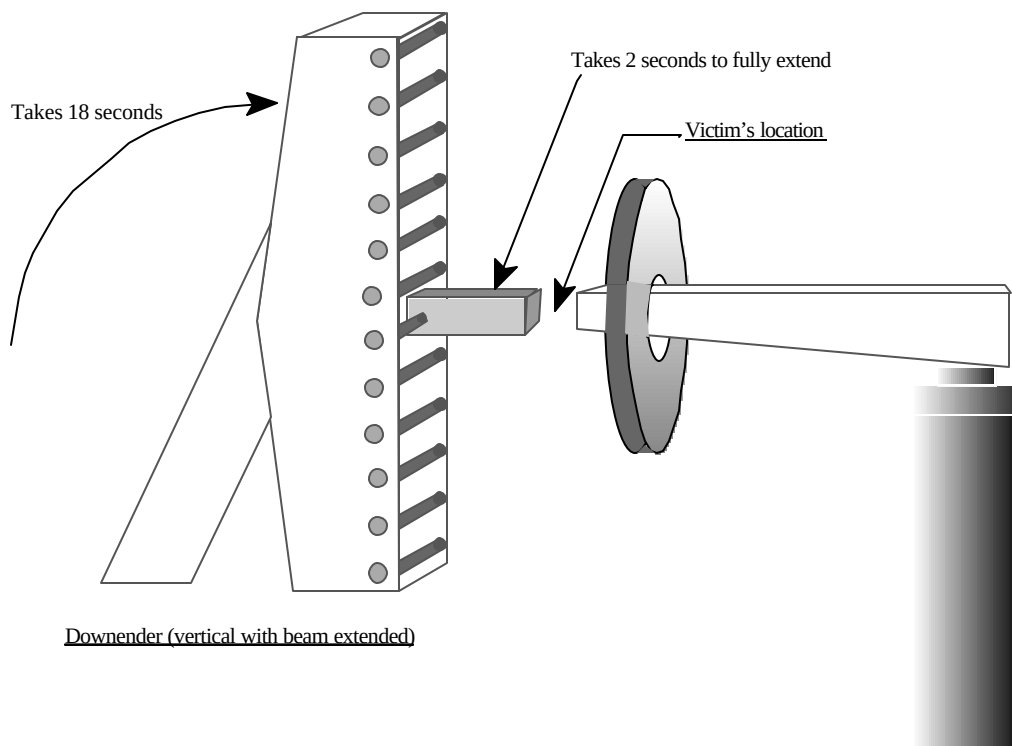


Figure 2 - 95WI05501