

Fatality Assessment and Control Evaluation Project

Public Health

KY FACE #96KY028

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To: Carl Spurlock, PhD, Director, Kentucky Injury Prevention and Research Center

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Subject: Welder is Crushed by Rock Chipper

Summary

A 28-year-old male welder died after being crushed by the rock chipper and conveyor he was working on. The victim was welding reinforcement beads on the ends of the chipper/shredder unit when the hydraulic system which was holding the unit in place lost pressure. The unit, weighing over 1500 pounds, descended on the victim. He was removed from the unit after a tow motor lifted it off him. He was pronounced dead at the hospital a short time later. A safety pin on the chipper had not been engaged prior to the victim's entering the area to work on it. The FACE investigator concluded that, in order to prevent future similar occurrences, employers should:

-  Ensure that contractors use available safety procedures when entering areas where a potential for equipment failure exists, and monitor work being performed by contractors.
-  Develop, implement and enforce a written safety program which includes employee and contractor equipment repair procedures.
-  Designate a competent person to conduct regular safety inspections on the site.

Introduction

On March 12, 1996, a 28-year-old welder was killed when an industrial chipper/shredder he was working on lowered onto him. FACE investigators learned of the incident on March 14, and an investigation was initiated in order to determine the circumstances surrounding the event and develop prevention strategies. On April 9 an investigator traveled to the

site to discuss the incident with the employer. On April 19, a FACE investigator again traveled to the scene of the incident. The case was discussed with the coroner, the emergency medical service personnel who responded to the incident, and a safety engineer in Ireland where the equipment was manufactured. Photographs and measurements were taken of the equipment. (Please see Notes at the end of this report.)

The employer in this incident began operation in 1985 as a heavy equipment welding repair and fabrication shop. The company works on and repairs farm equipment and other machinery, and employs five workers. It has a contract with a rock-quarrying equipment dealership to perform welding on the dealer's property. A large portion of the company's business is with the dealership where the incident occurred. In most cases the work is brought to the company site, but on bigger jobs such as the one involved in this incident employees take a service truck and travel to the welding site.

The victim had worked for the employer a total of six years and had specialized in the particular piece of equipment he was working on at the time of the incident. On several occasions, the victim had traveled around the country to set up this type of equipment. He had completed a course at the local vocational school about seven years prior to the incident. On-the-job training, including safety training and CPR, is provided by the employer. The victim had had no prior injury. He had previously been an employee of the equipment dealership, but when the dealer began contracting out all repairs, he took a job with the contractor to continue his career as a heavy equipment set-up and repair man.

Investigation

The employer welds and repairs various types of equipment, tools and parts for a wide variety of customers including farmers, service stations and large equipment dealers. Most of the employer's work is on heavy equipment such as earth moving and road construction equipment. The normal work day starts at 7:30 am in the shop, when the day's assignments are reviewed by the company owner. On the day of the incident the victim was asked to go to the chipper dealer's site, some 32 miles away, and perform the necessary repair work on the chipper/shredder.

This is a large piece of equipment used in quarries for rock crushing. It includes a 10.3 cubic yard hopper into which rock is dumped. The rock passes through a rotating chipper made of flailing blades which crush the rock and then screen it for size. It is then transported on a 36-inch wide by 43-foot long conveyor belt to a distribution pile. The unit is powered by a 136-hp turbocharged diesel engine. Its hydraulic system holds 124 gallons. Total equipment weight is 20 tons. Frequently it is easier for the welder to go to the site of the equipment rather than transporting the equipment to the welding shop. If this piece of equipment is transported to the welding shop, a ceiling-mounted hoist is used to keep the shredder elevated for welding.

The rock chipper/shredder in which the victim was injured had been returned to the dealer by a customer for repair. Several components had been replaced and the unit was having final service completed, including replacing the shredder teeth. To access the 7-inch x 2 3/4 x 3/4-inch teeth, the portion housing the chipper unit, which is hinged to the hopper, is raised

with two side-mounted hydraulic cylinders. Once the unit is raised, the welder lies down on the conveyor and welds the unit from below. A safety pin is available for insertion prior to such an operation to prevent the unit from descending if the hydraulic system should fail or lose pressure.

On the day of the incident, the victim arrived at the dealership about 9:00 am. He completed the teeth replacement in the usual time of 5-6 hours. About 3:00 pm, the victim reported to the dealer that the project was complete and asked if further work was required. The dealer asked that he harden the teeth with a bead. The victim then returned to the piece of equipment. The truck-mounted gas generator which powered the stick welder was arked about 15 feet from the shredder when the victim began the hardening process. The safety pin was not inserted.

About 5:30 pm, the victim's welding machine could still be heard, and an employee of the dealer went to check on him. Finding the victim folded in half under the chipper, the employee summoned help. EMS was called and a fork lift was used to lift the shredder off the victim. CPR was initiated and continued by paramedics when they arrived. The victim never regained consciousness.

Cause of Death

The coroner listed the cause of death as positional asphyxia.

Recommendations/Discussion

Recommendation #1: Employers should ensure that contractors use available safety procedures when entering areas where a potential for equipment failure exists.

Discussion: In this case, the site is managed by the contracting dealership. Procedures should be in place to monitor the work being performed on the site in order to prevent injury. Monitoring the work being performed by contractors may identify potential hazards in the work area created by the contractor, who may not be familiar with the site. In this case, inspection of the work area by a designated safety specialist might have identified the missing safety pin that would have held the chipper up in the event of hydraulic failure. This pin is chained to the side of the equipment, but was not inserted into the hole by the victim prior to positioning himself underneath the unit.

Recommendation #2: Develop, implement and enforce a written safety program which includes employee and contractor equipment repair procedures.

Discussion: In this case the dealership had a safety manual; however, specific procedures to address the functions the victim was engaged in at the time of injury were not thoroughly detailed. Company-wide formal written safety procedures should be developed, which describe safe work procedures for all tasks to be performed at the site, including a discussion of appropriate tools, protective equipment and safety devices. Additionally, training should be provided to all workers to ensure they are aware of safe work procedures even if the work is being performed by a contractor.

Recommendation #4: Designate a competent person to conduct regular safety inspections on the site.

Discussion: Conducting regular safety inspections of all tasks at the site, including areas where contractors are performing work, by designating a competent person* will help ensure that established company safety procedures are being followed. Additionally, scheduled and unscheduled safety inspections of work areas where contractors are doing a job clearly demonstrate that the employer is committed to the safety program and to the prevention of occupational injury.

* Competent person: One who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous or dangerous to employees, and who has the authority to take prompt corrective measures to eliminate them.

Notes:

According to the dealer, the unit was checked thoroughly for hydraulic leaks following the incident. A hose crimp was discovered to have a leak and the parts were sent to a lab for analysis. Reports from this analysis could not be obtained by the FACE investigator. The dealer also reported that an insurance company had conducted an investigation. This report also was unavailable. Discussion with the manufacturer (safety engineer) in Ireland did not help to identify possible mechanical problems in the equipment.