The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research

Apprentice Sheet Metal Worker Electrocuted in Tennessee

FACE 87-04

Introduction

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR) is currently conducting the Fatal Accident Circumstances and Epidemiology (FACE) Project, which is focusing primarily upon selected electrical-related and confined space-related fatalities. By scientifically collecting data from a sample of fatal accidents, it will be possible to identify and rank factors that influence the risk of fatal injuries for selected employees.

On September 10, 1986, a sheet metal apprentice was electrocuted while guiding a “powered scaffold” being unloaded from the flatbed of a truck, using the crane mounted on the truck. The hoist cable of the crane was energized when it contacted an overhead, 6500 volt (phase to ground) power line. A co-worker, also standing on the ground and guiding the scaffold, received minor electrical burns.

Contacts/Activities

Officials of the Occupational Safety and Health Administration (OSHA) for the State of Tennessee notified the National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR) of this fatality and requested technical assistance. This case will be included in the Fatal Accident Circumstances and Epidemiology (FACE) Project. On November 4, 1986, a member of the DSR research team met with the company owner/manager and a representative of Tennessee OSHA. Photographs of the truck crane involved in the accident were taken, as were photographs of a “power lift” similar to the one being unloaded when the accident occurred. The overhead power line had been replaced with an underground cable shortly after the accident.

Background/Overview of Employer’s Safety Program

The victim worked as an apprentice sheet metal worker for a company which fabricates and installs awnings and canopies, primarily as overhead covers at gasoline pumps. The company does have a written safety program, but does not have safety meetings or specific safety training.

Synopsis of Events

The weather on the day of the accident was clear. Earlier in the day the victim had washed a truck in front of the company shop (the accident site) and the ground was still damp.

A powered scaffold, in need of repair, was being unloaded outside the shop door when the accident occurred (see Sketch). The outriggers of the truck were down. The crane operator (“C” on sketch) and another employee (“D” on sketch) were standing on the truck bed; the victim (“A” on sketch) and his co-worker (“B” on sketch) were standing on the ground guiding the power lift which was being unloaded. The ground where the victim stood was still damp from the runoff which resulted from washing the truck. The ground where his co-worker stood was at a slightly higher elevation and was dry.

A fifth employee (“E” on sketch) walking towards the truck, with a better view of the situation, warned them that they were too close to the overhead power line. Suddenly, a “ball of fire” appeared to engulf the hoist cable. The victim and his co-worker were held by the current for a few seconds; then both were released and fell to the ground as the hoist cable and power line separated.

Both the victim and his injured co-worker were conscious shortly after the accident. The victim, who had a pulse and was breathing, complained of difficulty swallowing. The ambulance arrived in approximately 10 minutes and was at the scene approximately 15 minutes. Details of medical care given at the scene are not available, but paramedics stated that the victim “crashed” while enroute to the hospital and could not be resuscitated. He was pronounced dead in the emergency room.

The injured co-worker received only minor electrical burns of his hands and feet. He was not hospitalized and reported to work the next day.

Cause of Death

The death certificate listed the immediate cause of death as electrocution.

Recommendations/Discussion

Recommendation #1: Employers should enforce existing regulations concerning crane operations in the vicinity of overhead powerlines.

Discussion: OSHA standard 1910.180(j)(1)(i) requires that a minimum clearance of ten feet be maintained between parts of truck cranes or loads and energized electrical power lines rated 50,000 volts or less, unless insulating barriers are erected. The truck was placed between the power lines and the company building, which were approximately 25 feet apart. The lift was then unloaded on the power line side of the truck (see sketch), which made compliance with the OSHA standard virtually impossible.

Recommendation #2: Hazard awareness regarding overhead powerlines should be stressed and management’s commitment to safety emphasized.

Discussion: The danger of overhead power lines appears to be obvious; indeed, the truck had a large sign mounted on the side which included the following phrases: “DANGER”, “ELECTROCUTION HAZARD – THIS MACHINE IS NOT INSULATED”, and “YOU MUST MAINTAIN A CLEARANCE OF AT LEAST 10 FEET BETWEEN ANY PART Of THE MACHINE OR ITS LOAD AND ANY ELECTRICAL LINE OR APPARATUS CARRYING UP TO 50,000 VOLTS, ...” The fact that this accident still occurred suggests that active, rather than passive, communication of hazard awareness and safe operating procedures is necessary. Management’s commitment to safety should be communicated by disciplinary action when safety standards are disregarded.

Recommendation #3: Every worksite should be evaluated and a procedure developed to eliminate or minimize hazards.

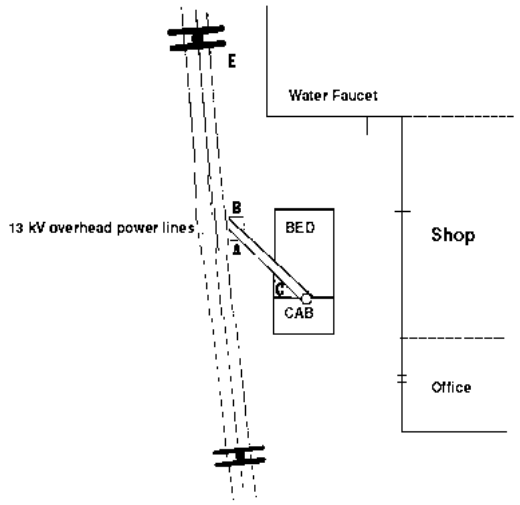
Discussion: Management arranged to have the overhead power lines at the company's shop removed and replaced with a buried cable. However, overhead power lines will continue to create hazardous situations at the company's installation sites; procedures to accomplish the work safely will have to be considered for each individual site.

Recommendation #4: When changes in personnel are made, the implications for safety should be considered.

Discussion: A few weeks prior to the accident the company supervisor was dismissed. The owner/manager, who was functioning as a supervisor, was not present when the accident occurred. Removal of key personnel can potentially impact the safe performance of work.

Recommendation #5: A safety observer with no other duties should monitor the work when there is even the remotest chance of contact with overhead power lines.

Discussion: While there seems to have been no attempt made to maintain the required clearance, one may question whether the distance between a vertical hoist cable and horizontal power line can always be determined accurately from the operator's position. The fact that another employee ("E" on sketch) warned of proximity to the power line immediately before the accident suggests that a safety observer could have helped prevent this fatality.



A represents the location of the victim.
B represents the location of the injured co-worker.
C represents the location of the crane operator.
D represents the location of an employee standing on the truck's bed
E represents the location of an employee walking towards the truck crane, who warned of proximity to the power lines.

Sketch. Plan View of the Accident Scene

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Last Reviewed: November 18, 2015