The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research

Welder/Pipefitter Electrocuted

FACE 88-31

Introduction:

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), performs Fatal Accident Circumstances and Epidemiology (FACE) investigations when a participating state reports an occupational fatality and requests technical assistance. The goal of these evaluations is to prevent fatal work injuries in the future by studying: the working environment, the worker, the task the worker was performing, the tools the worker was using, the energy exchange resulting in fatal injury, and the role of management in controlling how these factors interact.

On July 20, 1988, a 26-year-old male welder/pipefitter died when he contacted an energized electrical conductor, was electrocuted, and fell to a concrete floor 29 feet below.

Contacts/Activities:

State officials notified DSR of this case and requested technical assistance. On August 11, 1988, a research safety specialist conducted a site evaluation, met with the county coroner and company officials, and photographed the incident site.

Overview of Employer's Safety Program:

The employer is a pipefitting and steel erection company with 15 employees. Six other employees perform the same type of work as the victim. The victim had received training at a local technical school and on the job. The company had no formal safety program in place.

Synopsis of Events:

The victim was a member of a crew involved in the assembly and installation of a large steel storage rack in a carpet warehouse. The top of the 29-foot-high rack formed an open-sided platform. Safety belts and lanyards were available but were not being used by employees. A row of 23 6-foot-long fluorescent light fixtures was located 2 feet above the rack; one additional fixture was mounted beyond the end of the rack. The lights were wired so that every fourth fixture was on a circuit that provided "nightlights" in the warehouse. The temperature in the warehouse was high due to the summer weather.

The victim was helping one co-worker (an electrician) remove these light fixtures at the time of the incident. The main power supply to the lights had been disconnected; however, the power for the “nightlights” had not been disconnected and these units remained on during the entire operation.

The electrician and the victim had removed all the fixtures above the storage rack including those on the “nightlight” circuit, which were removed while still energized. The electrician used insulated hand tools to remove the lights from the energized circuit, leaving the energized “pigtail” hanging from the joist-supported conduit. The final fixture could not be reached from the rack. The electrician told the victim they would remove the remaining light after the cluttered area below was cleared so that a hydraulic manlift could be used. The electrician left the room, leaving the victim on the rack to gather the tools.

When the electrician returned, he observed the victim sitting on a bar joist of 2-inch angle iron preparing to remove the remaining light. The electrician told the helper to get down, but the victim replied that he was almost finished, and cut the energized 110-volt power lead for the light with a pair of uninsulated metal wire cutters. A path to ground was established from the victim’s hand (holding the wire cutters) to his legs which were in contact with the metal joist. The victim was electrocuted and fell from the joist to the concrete floor 29 feet below, landing on his head.

Cardiopulmonary resuscitation was begun within 2 minutes of the incident; however, when local emergency medical personnel arrived they were unable to find any vital signs. The incident occurred at approximately 5:00 p.m. and the victim was pronounced dead at the scene at 5:53 p.m. by the county coroner.

Cause of Death:

The coroner listed the cause of death as electrocution.

Recommendations/Discussion

Recommendation #1: Employers should ensure that all employees are adequately trained for their assigned tasks.

Discussion: The victim in this case had formal vocational training as a welder/pipefitter; however, at the time of the incident he was working as an electrician’s helper. He did not understand the hazards of electrical work or he would not have cut an energized electrical conductor with uninsulated wire cutters. A knowledge of the danger posed by this act could have prevented this incident. Employees should also be trained in the use of “lockout” procedures to ensure that all electrical conductors are de-energized.

Recommendation #2: Employers should ensure that hazards in a work area are identified and proper control measures are implemented and explained to the employees prior to the start of work. In addition, employers should periodically monitor the performance of their personnel to ensure that safe work practices are followed.

Discussion: The employer failed to identify the problem posed by two separate circuits servicing the light fixtures in the warehouse. While the one circuit was de-energized, the second was allowed to remain “hot” throughout the job. In this case, the second circuit should have been de-energized and locked out to prevent re-energization while the workers were exposed to contact with the conductors. This measure may have prevented this death. The victim and his co-worker had already removed several energized lights while working from steel decking. With only a 2-foot clearance between these lights and the metal decking it is fortunate that the employees had not previously contacted the energized “pigtails.”

Recommendation #3: Employers must ensure that personal protective equipment appropriate for the hazards encountered is both available to and used by workers. All tools and other equipment should be appropriate for the work being performed.

Discussion: Employees assigned electrical work should be provided with and required to use appropriate insulated tools. In addition, employees required to work from elevated workstations should be provided some form of fall protection. Employees in this case were working from an open-sided platform 29 feet above a concrete floor. Although safety belts and

lanyards were available, they were not used by the workers during actual job operations. The victim's safety belt was found in the manlift following the incident. Although the coroner listed the victim's cause of death as electrocution, both workers were exposed to a fall hazard without appropriate fall protection.

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