The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research

Laborer Electrocuted When He Contacts 4160-volt Power Line on Rooftop

FACE 89-37

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 June 1, 1989, a 21-year-old male laborer was electrocuted when his hand contacted a 4160-volt power service line.

Contacts/Activities

State officials of the occupational safety and health program notified DSR of this fatality and requested technical assistance. On June 21, 1989, a research team consisting of a research industrial hygienist and a medical officer met with company officials and state OSHA compliance personnel to gather information, and traveled to the site of the incident to conduct an investigation.

Overview of Employer's Safety Program

The employer is a painting contracting company which has been in operation for 15 years and currently has approximately 50 employees. The majority of the work performed by the employer is sandblasting and painting on the outside of buildings. Most of the employees are painters and general laborers. The victim in this incident was a general laborer (doing sandblasting) and had been employed for 1 month. The company has no written safety program. However, the owner conducts weekly safety meetings with all employees. He also conducts a hazard communication program on chemicals used in paint, and training in the use of respirators for spray painting and sandblasting. Material safety data sheets (MSDS) are available to employees from the employer's office. All workers are required to report to the office at the beginning of each workday to receive their assignments and a briefing before going out to various job-sites. At the time assignments are given, the owner briefly reviews individual work crew progress, and discusses safety information and concerns specific to the job being performed.

Synopsis of Events:

The employer had been contracted by a large textile manufacturing company to sandblast and paint several air conditioning units on the roof of a 35-foot-high textile plant building. The roof is flat and has a 2-foot-high, 8-inch-wide parapet wall border. Electrical power to the building is provided by a three-phase, 4160-volt service line. The service line is anchored 5 feet above the roof surface to two galvanized pipes, which are located 2 feet apart on the top of the roof, and 2 feet in from the edge. The power lines and anchorage are guarded on all sides (except the roof edge) by a 6-foot-high chain link fence forming an 8-foot by 20-foot enclosure. The fence has a locked access gate and a 10-inch by 12-inch sign on the gate which states “DANGER – HIGH VOLTAGE – KEEP OUT.”

Two days before the incident, the owner and two workers (the victim and a painter) who had been assigned to the job, met at the office and then at the jobsite. While at the site, the owner discussed the job with the two workers, cautioning them to stay away from the edge of the roof and not to enter the power service enclosure.

On the day of the incident, the victim was sandblasting the air conditioning units. The painter was spray painting each unit after it had been sandblasted. The victim was wearing a dust/mist respirator, sandblasting hood, and leather gloves. At 11:40 a.m., the victim completed the sandblasting work. Noting this, and that it was almost lunch time, the painter told the victim to sit down and “cool off” (due to the heat of the day) while he finished spray painting. Five minutes later, the painter ran out of paint and decided to break for lunch. When he turned around to look for the victim, he saw him inside the power service enclosure. The victim’s legs were wrapped around one of the anchor poles with his back arched over the edge of the parapet wall.

The painter ran to the roof access door and yelled to a textile company employee to call the emergency medical service (EMS). The painter then entered the fenced-in enclosure by climbing around the end of the fence on top of the parapet wall. He pulled the victim away from the anchor pole into the middle of the enclosure and began administering cardiopulmonary resuscitation (CPR). He was assisted by the textile plant engineer who arrived at the scene within a few minutes of the incident. Personnel from the local EMS arrived approximately 15 minutes after the painter called for help. Efforts by the EMS crew to resuscitate the victim were unsuccessful, and the victim was pronounced dead at the scene.

There were no eyewitnesses to the incident. However, evidence indicates that the victim removed his respirator, sandblasting hood, and leather gloves and then, for unknown reasons, entered the enclosure either by climbing over the fence or by walking around on the parapet wall. Presumably the victim sat down on the roof under the power line, and contacted one of the energized power line conductors with his left hand. The victim’s body provided a path to ground for the current and the victim was electrocuted. The medical examiner’s report indicated deep thermal burns on the victim’s right hand and the inside of his right thigh.

Cause of Death:

The medical examiner listed accidental electrocution as the cause of death.

Recommendations/Discussion

Recommendation #1: Owners of buildings should ensure that electrical installations are adequately guarded to prevent unauthorized access.

Discussion: The building in this incident did have a fenced enclosure around the power service entrance in accordance with the National Electric Code (NEC), Article 110-31. Yet, an unauthorized worker entered the power service entrance enclosure, contacted an uninsulated conductor, and was electrocuted. Therefore, the building owner should consider an additional or alternate means for guarding service entrance conductors in accordance with the NEC Articles 110-31 and 230-202.

Recommendation #2: The employer should develop a safety program designed to recognize and control hazards.

Discussion: The ever-present danger of overhead power lines appears obvious; however, contact with overhead power lines and subsequent occupational electrocutions continue. OSHA Standard 1926.21(b)(2) states that “the employer shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury.” The tasks performed by workers should be evaluated and the associated hazards identified prior to beginning any work. A safety program should then be developed that addresses the control of these hazards. Although the employer had conducted weekly safety meetings and had given verbal safety instructions to workers, there was no written safety program, and in this incident verbal safety instructions were not followed. Admittedly, a written safety program is no guarantee that worker fatalities will not occur. However, a written safety program does help to establish the fact that the employer has initiated the process of taking reasonable measures to protect workers.

Return to In-house FACE reports

Last Reviewed: November 18, 2015