The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research

Maintenance Worker Electrocuted

FACE 88-21

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 March 9, 1988, a 20-year-old male maintenance worker trainee died when he contacted an energized conductor in an uncovered electrical junction box.

Contacts/Activities:

State Occupational Safety and Health Administration officials notified DSR of the fatality and requested technical assistance. On April 28, 1988, a safety specialist met with company representatives and witnesses, photographed the incident site, and met with local officials to investigate the incident.

Overview of Employer's Safety Program:

The victim's employer was a textile manufacturer producing synthetic fibers. The company has been in existence for 13 years and employs approximately 70 workers. Three workers (including the victim) were maintenance worker trainees. The company has a safety manual that all workers are required to read; however, no task-specific rules and procedures are contained in this manual. The company has had no serious incidents in the past. The victim had been employed by the company for 2 months at the time of his death.

Synopsis of Events:

The victim was a 20-year-old male maintenance worker trainee who performed various types of maintenance operations within the plant.

on the evening prior to the incident, a 440-volt electric motor on a texturing machine was replaced. However, the cover on the electrical junction box supplying power to the motor was not replaced.

On the day of the incident, the victim had the task of replacing a 4-inch flexible plastic suction (vacuum) hose on the texturing machine. First, electrical power to the machine was disconnected. Then the victim climbed a 3-foot-tall metal utility buggy and replaced the hose.

After replacing the hose the victim leaned down and told the operator to turn the machine on so that he could check the new hose for leaks. When the operator turned on the machine, the victim's left hand was in contact with one of the conductors within the uncovered junction box and his stomach was in contact with the metal frame of the texturing machine. The victim cried out and fell from the buggy to the floor. He then rose, walked ten feet to two supervisors, and began to collapse. The supervisors lowered him to the floor.

Two co-workers immediately began cardiopulmonary resuscitation (CPR) while another employee called the local fire department rescue squad. The ambulance and two paramedics were on the scene within 5 minutes of the time of the incident. The paramedics performed advanced cardiac life support while the victim was transported to the local hospital. The rescuers repeatedly checked but observed no vital signs.

The victim was pronounced dead at the local hospital 1 hour and 39 minutes after the incident.

Cause of Death:

The medical examiner's report gives the cause of death as accidental electrocution.

Recommendations/Discussion

Recommendation #1: The employer should develop and implement a written, step-by-step hazardous energy control (lockout/tagout) procedure, and ensure that workers use it while performing maintenance on, or otherwise servicing energized equipment.

Discussion: Although the electrical power to the texturing machine was properly disconnected before maintenance work was initiated, a very important step in hazardous energy control was omitted. The operator who re-energized the machine failed to verify that the victim was clear of danger. The use of written, step-by-step procedures is recommended for ensuring that hazardous energy control is effective. Such documented procedures are particularly important when workers are inexperienced and/or performing non-routine tasks. For more information on developing hazardous energy control procedures, see "Guidelines for Controlling Hazardous Energy During Maintenance and Servicing," DHHS (NIOSH) Publication No. 83-125.

Recommendation #2: All companies should have active safety training programs which stress the hazards posed by electrical equipment.

Discussion: In this case no formal safety training program existed. Although he did shut the power off to the machine before he replaced the hose, the victim failed to recognize the hazard posed by the uncovered junction box. A comprehensive safety training program which stressed the hazards posed by electrical equipment could have increased the employee's awareness of these hazards and prevented this fatality.

Recommendation #3: All maintenance and repair work should be performed in a competent manner with follow-up inspection by supervisors to ensure that existing safety features are not by-passed or deleted.

Discussion: The cover on the junction box had been removed the previous evening when the electric motor was replaced. However, the unit was placed back in service with this cover missing. This cover was in an easily accessible area and was readily visible to anyone standing near the machine; nevertheless, no one acted to report or repair this obvious safety hazard. If this cover had been replaced as required by the National Electrical Code, 370-18 (c), this fatality would not have occurred. Covers over electrical wiring and contacts provide a passive protection against electrical hazards.

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