The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research

# Laborer Electrocuted

FACE 88-24

## 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 8, 1988, a 23-year-old male laborer was electrocuted when he contacted a 115-volt power source while adjusting the limit switches on an overhead door opener.

## Contacts/Activities:

State Occupational Safety and Health officials notified DSR of this fatality and requested technical assistance. On June 22, 1988, a DSR research team met with employer representatives to review this incident and photographed the motor operator wiring panel involved in the incident.

## Overview of Employer's Safety Program:

The victim was employed by a company that installs and maintains overhead doors. The company has been in operation 37 years and employs 26 people. The company has no written safety policy or safety program; training is provided on-the-job. Since the incident, the company has obtained electrical safety pamphlets for all workers and is in the process of establishing a safety training program.

## Synopsis of Events:

Two months prior to the incident, the company installed a 14-foot overhead door at a manufacturing plant. The door was subsequently struck by a piece of machinery and damaged. The victim and his crew leader were sent to replace the two damaged bottom panels of the door and adjust the limit switches so that the door would open and close properly. After the damaged door panels were replaced, the crew leader began to adjust the limit switches.

The limit switches were located in the lower portion of the door opener below the motor operator wiring panel. The voltage of the motor operator wiring panel was 115 volts. The voltage was stepped down to 24 volts in the lower portion of the door opener where the limit switches were located.

A 25-foot aluminum extension ladder was used to reach the limit switches. The crew leader stood on the ladder, removed the door opener cover, and began to adjust the limit switches. The victim periodically raised and lowered the door by operating the control switch at ground level to test the adjustments. The crew leader informed the victim that he needed a different screwdriver, then descended the ladder and went outside to his service truck. When he returned the victim was standing on the ladder. The victim told the crew leader to clean up the area while he made the final adjustments. As the crew leader began to gather the tools he heard a groan and looked up to see the victim on the ladder, but slumped forward into the door opener. The crew leader ran into the next room to throw the power switch and de-energize the door opener. When he returned he found the victim slumped forward in a sitting position on the ground. The victim was bleeding profusely from a cut on his forehead and right cheek.

Manufacturing plant personnel summoned the emergency medical service (EMS) and a medical doctor whose office was next door. When the doctor arrived (within 2 minutes) the victim had no vital signs. Cardiopulmonary resuscitation (CPR) was initiated and continued enroute to the hospital by EMS personnel. The victim was pronounced dead on arrival.

Although there were no eyewitnesses to the incident, circumstantial evidence suggests that the victim contacted the 115-volt power source with his right arm. As a result, current passed through his chest and legs to the ladder and to ground. When he lost consciousness and slumped forward, his head struck the sharp edge of the door opener causing the facial lacerations.

## Cause of Death:

The medical examiner listed electrocution as the cause of death.

## Recommendations/Discussion

**Recommendation #1: All workers required to work near electrical equipment and/or circuits, particularly those which must remain energized, should be trained to: 1) recognize associated hazards, and 2) employ effective, documented control methods and safe work practices to prevent contact.**

**Discussion:** NIOSH recognizes the need to perform certain maintenance and troubleshooting tasks on energized equipment. However, to maximize safety, procedures for performing such tasks should be developed, tested, and documented. Workers should be trained to recognize hazards and to use established control methods, including safe work procedures (Guidelines for Controlling Hazardous Energy During Maintenance and Servicing, DHHS (NIOSH) Publication No. 83-125).

The victim had 5 years' experience in installing overhead doors and adjusting the limit switches. Apparently, however, he did not realize the hazards associated with working around energized circuits. The victim was working on a 24-volt circuit, but was directly below a 115-volt circuit. OSHA Standard 1926.416(a)(1) prohibits an employee from performing work in such proximity to any part of an electric circuit that the employee might contact in the course of work.

Additionally, the victim was standing on an aluminum ladder, which is an excellent conductor of electricity. OSHA Standard 1926.450(a)(11) prohibits the use of aluminum ladders for electrical work. Workers involved in the installation and maintenance of door openers are required to work in the vicinity of electrical circuits. These workers should receive training in safe electrical work practices.

**Recommendation #2: A means to de-energize the door opener should be installed within reach of the opener.**

**Discussion:** The employees in this company routinely adjusted the limit switches with the door opener circuitry energized. One reason is the lack of access to the means for disconnecting the circuit. A disconnecting device such as a simple toggle switch incorporated into the wiring of the door opener and within reach of the opener would provide access. After the

worker on the ground has raised and lowered the door to test the limit switches, the worker making the adjustments could de-energize the door opener and make further adjustment if necessary. Since the incident, the company has required this disconnecting means in all new contracts.

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