



The National Institute for Occupational Safety and Health (NIOSH)

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30-Year-Old Electrician Electrocuted in Maryland

FACE 87-63

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. The purpose of the FACE program is to identify and rank factors that influence the risk of fatal injuries for selected employees.

On July 29, 1987, an electrician was electrocuted when he contacted an energized conductor while installing new wiring.

Contacts/Activities:

Officials of the Occupational Safety and Health Program for the State of Maryland notified DSR concerning this fatality and requested technical assistance. This case has been included in the FACE Project. On September 9, 1987, a member of the DSR research team met with the employer's representative, interviewed comparison workers and an eyewitness to the incident, photographed the accident site, and discussed the incident with the Maryland OSHA compliance officer for this case.

Overview of Employer's Safety Program:

The employer is an electrical contractor specializing in commercial and industrial electrical services and employing 40 full-time workers. The safety function is managed by the owner of the company on a collateral duty basis. Individual foremen are also responsible for on-site safety. A safety program addressing electrical safety had been developed and is administered on a routine basis.

Synopsis of Events:

On July 29, 1987, the victim and a co-worker were continuing work on the relocation of conduit and wiring for a CO₂ system (carbon dioxide – coolant used for the facility refrigeration system).

Two electrical supply systems powered the CO² unit: 1) a No. 8 AWG, three-phase, 480 VAC, 50 ampere system supplied power to the compressor motor, and 2) a No. 10 AWG, three-phase, 480 VAC, 15 ampere system supplied power to the controls and gauges. Disconnect switches for the two systems are located in adjacent panel boxes.

On the afternoon of the incident the victim and a building maintenance man proceeded to the panel box area to disconnect the power to the CO² unit. The two panel box covers were marked in pencil and the pencil marking for the compressor motor was barely legible. The power supply for the controls and gauges was disconnected, but the power supply for the compressor motor was apparently overlooked and the circuit remained energized.

The victim disconnected the energized conductor from the compressor motor and taped the ends with electrical tape. He then pushed a fish tape (an uninsulated, stiff, steel wire) through the conduit until its end protruded. The victim then attached the conductor to the fish tape. The fish tape was pulled back through the conduit until the end of the energized wire protruded from it. At that time the victim removed the electrical tape from the energized wire while part of the fish tape remained in the conduit. The victim was holding the fish tape, which was grounded against the conduit, and contacted the energized wire. This action completed the path to ground and the victim was electrocuted.

After contacting the energized wire the victim collapsed, breaking contact. A co-worker, working in the vicinity, saw what had happened and ran to a telephone to call for assistance. The local emergency medical service (EMS) responded in approximately five minutes and began cardiopulmonary resuscitation (CPR). The victim was transported to a nearby hospital where he was pronounced dead.

Cause of Death:

The medical examiner listed the cause of death as electrocution.

Recommendations/Discussion:

Recommendation #1: Disconnecting means and circuits should be adequately identified.

Discussion: The control panel box cover for the compressor motor circuit disconnect had been marked in pencil. Only with close scrutiny were the markings legible. Current OSHA standard 1910.303(f) states that: "Each service, feeder, and branch circuit, at its disconnecting means or overcurrent device, shall be legibly marked to indicate its purpose." An inspection and adequate marking of all the disconnecting devices should be initiated immediately.

Recommendation #2: Employers should reinforce their standard operating procedures concerning circuit testing.

Discussion: Although the victim had a volt meter available, he failed to test the circuit and this omission led to his death. Standard operating procedures should be reviewed, revised as needed, and consistently enforced by the employer.

Recommendation #3: Employees and/or employers should be trained in cardiopulmonary resuscitation (CPR).

Discussion: CPR should begin within four minutes (in accordance with American Heart Association guidelines) in order to achieve the best results. To meet this criteria for successful resuscitation, workers should be trained in CPR to support the victim's circulation and respiration until trained medical personnel arrive. No one at the accident site was trained in CPR and, therefore, resuscitation was delayed until the EMS arrived.

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