



The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces
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Electrician Electrocuted when He Contacted an Energized Wire

FACE 88-37

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 July 7, 1988, a 31-year-old male electrician was electrocuted when he contacted an energized wire while attempting to install a floodlight on a new residential home.

Contacts/Activities:

On September 8, 1988, NIOSH met with a representative of the employer, discussed the incident with the occupational Safety and Health Administration (OSHA) compliance officer, and photographed the incident site.

Overview of Employer's Safety Program:

The employer is a multi-state electrical contractor employing 700 workers, including 350 electricians. The company's safety officer administers a comprehensive written safety program and the company's worksite foreman conducts weekly tailgate safety meetings with all workers. The victim had 2 years' experience as a journeyman electrician and had been working for the company for 4 months.

Synopsis of Events:

On the day of the incident the victim and his foreman were finishing the electrical wiring of an outdoor floodlight located on a side wall of a residential home. The victim borrowed a 35-foot aluminum extension ladder from an employee of another contractor working in the vicinity. He positioned the ladder and climbed to a height of approximately 18 feet, while the foreman stayed on the ground to steady the ladder.

The victim, using insulated wire strippers, began removing the insulation from the “14-2” standard house wiring (i.e., a cable containing two copper wires, size number 14) when his right thumb and right index finger contacted the uninsulated part of the wire stripper. The 110-volt circuit had not been de-energized at the panel box prior to the incident. The victim received an electrical shock and fell to the ground.

The foreman, unsure of what had happened, simultaneously checked the victim’s vital signs and requested help from a nearby worker. An ambulance was called while the foreman performed cardiopulmonary resuscitation (CPR) on the victim. The emergency medical service personnel arrived approximately 8 minutes later and continued CPR while transporting the victim to the hospital where he was pronounced dead on arrival.

Cause of Death:

The medical examiner’s report listed electrical injury as the cause of death.

Recommendations/Discussion

Recommendation #1: Employees working on electrical circuits should always de-energize circuits prior to initiating electrical work of any type.

Discussion: It is not clear whether the victim or foreman realized that the circuit was energized. However, work on electrical circuits should not be initiated until it is determined that these circuits are de-energized and cannot be inadvertently energized. To ensure the circuit remains de-energized during access, a lockout procedure should be used and enforced.

Recommendation #2: An accessible and properly labeled means of disconnecting energy to electrical circuits must be provided and used.

Discussion: The investigation revealed that the panel box containing the circuit breakers to de-energize the circuits was not labeled. Article 110-22 of the National Electric Code requires, “Breaker panels or other means for disconnecting electrical energy should be legibly marked, checked for their correctness, and constantly updated to indicate the corresponding fixtures or appliances that can be de-energized by the breaker, unless the disconnecting means is located and arranged so that the purpose is evident.” A clearly labeled panel would have informed the victim how to disconnect the power.

Recommendation #3: Employers should ensure that workers not only receive but understand and follow training in safe work procedures.

Discussion: Although the employer has comprehensive safety rules and procedures and the foreman conducts weekly tailgate safety meetings, the death still occurred. Employers should not only ensure that workers receive training in safe work procedures but that they understand and follow these rules and procedures. A recurring theme emerging from the investigations conducted by NIOSH is that properly trained and licensed electricians still may be electrocuted. Other factors (e.g., timesaving short cuts, over-confidence, monotony, lack of respect for electrical hazards, etc.) may contribute to these electrocutions. Employers should consider these factors in administering their safety programs.

Recommendation #4: Employers should not use portable metal ladders for electrical work or when they may contact electrical conductors.

Discussion: OSHA Standard 1926.450 (a) (11) states that, “Portable metal ladders shall not be used for electrical work or where they may contact electrical conductors.” Although the ladder did not contact the energized circuit it did provide a path to ground for the electrical current. If a ladder of non-conductive material had been used in this case, the fatality might have been prevented.

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