



The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces
through safety and health research **NIOSH**

19-Year-Old Electrician's Apprentice Electrocuted In Georgia

FACE 87-34

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 March 17, 1986, a 19-year-old electrician's apprentice was electrocuted when he contacted live conductors while disassembling an energized switch box in an office building.

Contacts/Activities:

Officials of the Georgia Department of Human Resources notified DSR concerning this fatality and requested technical assistance. This case has been included in the FACE Project. On March 3, 1987, the DSR research team coordinator conducted a site visit, collected incident data, interviewed comparison workers and a surrogate for the victim, and discussed the incident with the Federal OSHA compliance officer and the employer representative.

Overview of Employer's Safety Program:

The employer is a small electrical contractor which employs 106 workers. The company has written safety rules that are communicated to the employees both in writing and verbally. Safety training consists of on-the-job training and safety meetings. A foreman is assigned safety responsibilities on a collateral-duty basis.

Synopsis of Events:

On March 17, 1986, an electrician's apprentice (the victim) and a journeyman electrician were installing two new switch boxes on the walls of a room being renovated in an office building. The circuits in the room where the new switch boxes were being installed were de-energized with the exception of the circuit to an existing metal switch box suspended by conduit from the ceiling. Prior to installing the new boxes, the journeyman electrician momentarily left the room and told the victim that "they would figure out how to wire the boxes" when he returned. The victim was expected to wait for the return of the journeyman electrician prior to performing any work; however, while the victim was alone, he elected to

disassemble the energized switch box suspended from the ceiling. The box was adjacent to one of the walls and located 39½” from the floor. Due to the relocation of walls during the renovation, this suspended switch box was to be replaced by a new box. The suspended switch box was energized by a 277 volt circuit from the adjacent room. A metal sheathed cable provided electricity to this switch box; however, this cable was outside of the conduit and entered the switch box through the side of the box. Apparently, the victim thought the suspended box was de-energized since it was in the same room as the new boxes being installed.

The victim reached into the suspended box and, using wire cutters, cut the conductors from each of the four terminal connections in the box. There was no evidence of arcing or sparking. Then with his left hand the victim pulled the metal sheathed conductor out of the switch box which he was holding in his right hand. Apparently, the bare conductors contacted the box and/or his left hand. The victim provided a path to ground and was electrocuted. Burn marks found on the victim's right hand were consistent with the shape of the box.

The victim was found 14 feet from the switch box. Emergency medical service (EMS) personnel responded (time interval between incident occurring and arrival is unknown) and administered advance cardiac life support (ACLS) procedures. Attempts to resuscitate the victim were unsuccessful. The victim was pronounced dead on arrival at a nearby hospital.

Cause of Death:

Cause of death was listed as cardio-respiratory arrest due to electrocution.

Recommendations/Discussion:

Recommendation #1: Electrical circuits should not be repaired, moved or otherwise accessed unless de-energized and de-energization personally verified.

Discussion: Apparently, the victim assumed the power to the suspended switch box was disconnected and did not present a hazard. Personnel working around sources of electricity should personally verify that all power is disconnected. This verification should minimally consist of disconnecting the circuit at the distribution panel (i.e., circuit breaker, fuse, etc.) and testing the circuit to assure de-energization.

Recommendation #2: Electric circuits should be properly labelled at the distribution panel and any circuits disconnected at the panel should be either locked out or tagged out.

Discussion: All the circuits in the room in which work was being performed should have been de-energized and the circuit breakers at the panel should have been either locked out or tagged out. In addition, the circuits at the distribution panel should have been checked for proper labelling. This would have eliminated any confusion as to which circuits in the room were actually de-energized prior to the installation of the new switch boxes.

Recommendation #3: Hazard awareness should be stressed at safety meetings.

Discussion: The company had written safety rules, conducted safety meetings, and provided on-the-job training for apprentices which consisted of working with a certified electrician. In this incident, the victim was only employed with this company for one month, but he had worked with a certified electrician for three years prior to working for this company. Even though the victim should not have been working on the energized switch box, it is apparent he was not aware of the hazard. Had he checked to see if the circuit to the switch box was de-energized prior to disassembling the switch box, the incident would not have occurred.

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Last Reviewed: November 18, 2015

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