The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research

Electrician Electrocuted in North Carolina

FACE 87-55

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 June 23, 1987, while repairing a fluorescent light fixture over a kitchen sink in a single-family residence, a 33-year-old journeyman electrician was electrocuted when he contacted an energized wire on the load side of the ballast (400 volts).

Contacts/Activities:

Officials of the Occupational Safety and Health Program for the State of North Carolina notified DSR concerning this fatality and requested technical assistance. This case has been included in the FACE Project. On July 9, 1987, the DSR research team (two safety engineers) met with employer representatives and interviewed comparison workers.

Overview of Employer's Safety Program:

The employer is an electrical contractor that employs approximately 20 people. The largest percentage of the company's income is generated as a subcontractor on commercial projects.

The employer has adopted "Safety Information and Instructions" developed by a major U.S. company and complies with the safety regulations of the company contracting for their services. However, the safety program is not implemented on a daily basis.

Synopsis of Events:

On June 23, 1987, a journeyman electrician (the victim) and an electrician's helper were repairing several electrical malfunctions found throughout a single-family residence. The workers had started at 7:30 a.m. and had worked at the house all day, except for approximately two hours when they went to check on another job. At 4:25 p.m. the victim called his office and notified his supervisor that they would not be able to finish the job by their normal quitting time of 4:30 p.m.

The electrician's helper had been trying to repair a 110 volt, four foot fluorescent light over a stainless steel sink in the kitchen. He had replaced the ballast; however, he could not get the light to operate properly. The electrician's helper asked the journeyman electrician if he would try to repair the light. The electrician was sitting on the sink when he apparently contacted an energized wire on the load side of the ballast. The circuit had not been de-energized at the panel box or at the single-pole switch on the wall beside the sink. (The day following the accident a representative of the employer measured the voltage on the load side of the ballast to be 400 volts. The ballast was rated at 430 mA.)

At 4:35 p.m. the owner of the residence discovered the victim and pulled him away from the light. The electrician's helper and the home owner contacted the local fire department and attempted to make the victim comfortable. The victim responded that he was all right. Fire department personnel were notified and they arrived at 4:50 p.m. The victim was transported to a nearby hospital emergency room where he was pronounced dead a short time later. (The reason the fluorescent light would not operate properly was later determined to be the result of a burned out lamp.)

Cause of Death:

The medical examiner determined that the cause of death was cardiac arrhythmia due to electrocution.

Recommendations/Discussion:

Recommendation #1: Employees who work around electrical circuits and equipment should de-energize those systems prior to initiating maintenance or repairs.

Discussion: It is not clear if the victim realized that the circuit was energized or not. However, maintenance and repair of electrical systems should not be initiated until it is determined that these systems are de-energized and that they cannot be inadvertently energized.

Recommendation #2: Employees who work around electrical circuits and equipment should be trained in cardiopulmonary resuscitation (CPR).

Discussion: To optimize results CPR should begin within four minutes (in accordance with American Heart Association guidelines). To meet this criteria, workers should be trained to support circulation and ventilation until trained medical personnel arrive. Because the home owner and the co-worker were not trained in CPR, critical care was not provided in a timely manner. The employees working around electrical circuits and equipment should be trained in CPR.

Recommendation #3: When working on energized circuits or equipment cannot be avoided, employers should implement the safeguards necessary to complete such work safely.

Discussion: The NIOSH report entitled "Guidelines for Controlling Hazardous Energy During Maintenance and Servicing" dated September, 1983, identifies several considerations that must be addressed prior to working on energized circuits. When these considerations are not addressed electrical circuits and equipment must be de-energized prior to maintenance or servicing.

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