Worker Electrocuted While Servicing an Energized Air Conditioning Unit

SUMMARY

On July 14, 1992, a 42-year-old male heating and air conditioning company worker was electrocuted while he serviced an energized central air conditioning unit. NJDOH FACE investigators concluded that, in order to prevent similar incidents in the future, the following safety guidelines should be followed:

- ***Emplorers must ensure that workers are thoroughly trained before doing service or repairs involving electrical equipment.***
- ***Before working on electrical equipment, it must be deenergized.***

INTRODUCTION

On July 16, 1992, NJDOH FACE personnel learned about this work-related electrocution from the county medical examiner. The FACE site visit was conducted on August 21, 1992, after the victim's employer and incident site owner consented to participate in the FACE project. Information for this report was derived from the OSHA file, police report, medical examiner's report, and a witness interview. After agreeing to participate in the FACE project, the company owner was not available to discuss this incident.

The victim was a partner in a heating and air conditioning contracting company that employed six people. Although legal forms defining the partnership had not been filed, the victim functioned as a company partner and was recognized as such by his partner and employees. The victim's primary background was as a sheet metal mechanic and HVAC duct installer. He had been with the company for five months and was trying to learn the service work part of the business. The heating and air conditioning company routinely performs service work for the apartment complex that was the site of the fatality. It is not known what type of training the company provides to its employees.

INVESTIGATION

The site of the fatality was a large apartment complex. Each apartment has its own heating and air conditioning unit located in a locked closet-size room off of the balcony of the apartment. Circuit breakers are also located in the room. For other than first floor apartments, access to the closet is gained through sliding doors from the bedroom to the balcony.

On the day of the incident, the victim did service work on several air conditioning units at the apartment complex. A second company repairman, who had previously worked on the units, was also at the

apartment complex performing repairs. At approximately 4 p.m., the second repairman started work on this particular unit which he knew had a defective evaporating fan motor from a service call a few days before. He turned off the electrical disconnect switch and secured it in the off position with a piece of wire. He removed the old motor but did not disconnect the wiring, except for the green ground wire, and he installed new wiring. At that point (at 4:30 p.m.) the worker had to leave, as planned, and the victim arrived to take over the job. The repairman gave the victim verbal instruction and wrote the color codes for the wiring on the door molding because the old and new colors did not match. They traced the wires back to the controls physically; there was no schematic for the 23 year-old wiring.

The first repairman left the apartment. One of the two apartment residents left for a short time, aware the victim was working on the balcony unit. She returned, noticed a burning odor coming from the bedroom, and went outside to check on it. She observed a blue arc from the area of the victim's head, thought the victim was welding, and left him alone. She thought that the victim did not respond to her comments because the air conditioner unit was running and noisy. About an hour later a second resident went outside to check on the victim and found him on his knees, his head against an open section of the air conditioning unit, the same position he had been in earlier. Unable to elicit a response from the victim, they telephoned the police for help. Police and rescue squad personnel responded and immediately realized that the victim had been dead for some time.

Apparently the victim was electrocuted when he made contact with the energized, uninsulated electrical terminals of the capacitor in the air conditioning unit motor. He may have received an electric shock of up to 230 volts. The old evaporating fan motor had no capacitor; the new one did have one. The capacitor was packaged without a rubber boot to cover the terminals and without a mounting bracket although they did have a mounting bracket in their truck. The victim may have turned the power on to check the capacitor; police found it under the victim's body. Charring was noted by the police on a brown wire from the unit and a terminal of the capacitor.

CAUSE OF DEATH

The medical examiner determined that death was caused by electrocution. Thermal injuries were noted on the right anterior forearm, left thumb and chin. None of the sites were identified as entrance or exit points.

RECOMMENDATIONS/DISCUSSIONS

Recommendation #1: Employers must ensure that workers are thoroughly trained before doing service or repair work involving electrical equipment.

Discussion: Workers must have adequate training involving electrical wiring in air conditioning units to be able to safely service the units. Training should include basics of electrical theory, wiring, potential hazards, and safety. In this situation the victim had limited experience and training in performing service work. 29 CFR 1926.21(b)(2) requires that employers instruct each employee in the recognition and avoidance of unsafe conditions.

Recommendation #2: Before working on electrical equipment it must be deenergized.

Discussion: The victim reenergized the air conditioner that had been disconnected by his co-worker at the breaker box. Although it may be necessary to observe equipment while it is operating in order to trouble-shoot and determine the nature of malfunctions, it must be deenergized before beginning any work on it. 29 CFR 1910.333(c)(2) states that only qualified persons may work on electric circuit parts or equipment that have not been deenergized. Once deenergized, 29 CFR 1910.334(b)(2) states that the circuit may not be manually reenergized until it has been determined that the equipment and circuit can be safely energized.

REFERENCES

1. Code of Federal Regulations 29 CFR 1926, 1991 edition. US Government Printing Office, Office of the Federal Register, Washington DC.
2. Code of Federal Regulations 29 CFR 1910, 1991 edition. US Government Printing Office, Office of the Federal Register, Washington DC.

FATALITY ASSESSMENT AND CONTROL EVALUATION (FACE) PROJECT

Staff members of the FACE project of the New Jersey Department of Health, Occupational Health Service, perform FACE investigations when there is a work-related fatal fall, electrocution, or confined space death reported. The goal of these investigations 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.

To contact New Jersey State FACE program personnel regarding State-based FACE reports, please use information listed on the Contact Sheet on the NIOSH FACE web site. Please contact In-house FACE program personnel regarding In-house FACE reports and to gain assistance when State-FACE program personnel cannot be reached.