

F.A.C.E. INVESTIGATION REPORT

Fatality Assessment and Control Evaluation Project

FACE #95-NJ-080-01
Electrical Helper Electrocuted After Contacting
460 Volts While Servicing an Overhead Light Fixture



New Jersey Department of Health and Senior Services
Occupational Disease and Injury Services
P.O. Box 360
Trenton, New Jersey 08625-0360
(609) 984-1863

TO: Division of Safety Research
National Institute for Occupational Safety and Health
Morgantown, West Virginia 26505

FROM: Fatality Assessment and Control Evaluation (FACE) Project
New Jersey Department of Health (NJDOH)

SUBJECT: Face Investigation #95-NJ-080-01
Electrical Helper Electrocuted After Contacting 460 Volts While
Servicing an Overhead Light Fixture

DATE: March 18, 1996

SUMMARY

On August 1, 1995, a 36-year-old electrician's helper was electrocuted after cutting an electrical wire carrying 460 volts. The incident occurred in a retail store fitting room where the victim and a co-worker were replacing the overhead fluorescent light tubes and ballast transformers. The victim had set up a fiberglass ladder in a fitting room and was standing on it as he cut a wire with an insulated wire cutter. As he cut the live wire, he contacted the energized metal cutter while leaning against the grounded metal fitting room door frame. A co-worker saw the victim being shocked and broke the contact by clipping the wire, at which time the victim collapsed against the door frame. NJDOH FACE investigators concluded that, in order to prevent similar incidents in the future, these safety guidelines should be followed:

- o Employers should ensure that company lock-out/tag-out procedures are strictly enforced.

- o Only properly trained and authorized employees should be permitted to work on live electrical circuits.

- o All electrical workers should be trained in electrical rescue techniques and cardio-pulmonary resuscitation (CPR).

INTRODUCTION

On August 2, 1994, NJDOH FACE personnel were notified by the area OSHA safety supervisor of a work-related electrocution that occurred the previous day. FACE investigators conducted a visit to the incident site that same day. During the visit, investigators examined and photographed the incident scene and interviewed the incident site management. The victim's employer was not on site during the visit and did not respond to telephone requests for an interview. Additional information was obtained from the OSHA file and the police and medical examiners' reports.

The victim's employer was an electrical contractor who employed 40 workers. The employer had a written safety program which included lock-out/tag-out procedures, and employed a safety coordinator who conducted weekly safety meetings. The victim was a 36-year-old male helper who had worked for the company for 12 days.

INVESTIGATION

The incident occurred at a department store located in a suburban shopping mall. The store sold clothing and a variety of other merchandise in an open, single-story building lit by overhead florescent lights. To save on electrical costs, the store management contracted with their electrical utility company to upgrade the florescent lights in the store. This was done under the utility's energy conservation program, in which the utility conducted an energy audit of the customer's building and arranged with a local electrical contractor to have the lights replaced with more energy efficient units. In this case, the victim's company had been subcontracted by the utility to replace all the florescent light tubes and ballast transformers in two department stores. The store's management explained that they were familiar with the electrical contractor since the company had done work at the store before.

The day of the incident was a clear summer morning. A work crew of four men (a foreman-mechanic and three helpers) arrived for work between 8:00 and 8:30 a.m. This was the sixth day the electrical contractor was working at the site, with one more day needed to finish the job. It was also the victim's first day at work at this site, although he had previously worked on replacing the lights at the other department store being serviced under the contract. Under the direction of the foreman, the victim and a second helper started work on replacing the ballasts in the women's fitting room. The fitting room contained 10 metal-framed stalls with curtains, five on each side of the room. Above the stalls were six 460 volt fluorescent light fixtures, three on each side of the room. The foreman reportedly shut off the power to the lights by turning off and locking out the wall switch and then checked the lights with a circuit tester. This deenergized all but one center light fixture, which was on a separate "night light" circuit and remained on. The foreman went to

check the breaker box but was unable to find the switch to shut off the remaining light. He asked the victim if he had worked on live wires, and the victim said yes, he had worked on live wires the week before with another crew. The foreman told the victim to go ahead and do the job.

The victim used a six-foot fiberglass ladder to reach the lights and began removing the tubes and ballast transformers. At about 9:20 a.m., the victim was working on the ladder in the middle fitting room when he cut the energized black 460 volt wire with an insulated wire trimmer. As he cut the wire with his right hand, the fingers of his left hand came in contact with the metal trimmer. The power entered through his hands and exited to the grounded metal door frame that he was leaning against. The victim's co-worker, who was working in the stall beside him, heard the victim say "help me" and saw sparks flying from the wire. The co-worker cut the black wire, breaking the contact and releasing the victim who collapsed against the metal frame.

At this time, the foreman entered the room and helped move the victim to the floor. He then went to the front desk and asked the store manager for help, telling him there was "a man down." The store manager called 911 and paged another store employee to the fitting room. The store employees found the victim on the floor with the lights out. A store employee turned on the lights at the switch, which had been reportedly unlocked by the foreman. The police arrived within five minutes and found the victim unresponsive. They started cardio-pulmonary resuscitation until the rescue squad and paramedics arrived. The victim was transported to the local hospital where he was pronounced dead at 10:38 a.m.

CAUSE OF DEATH

The county medical examiner attributed the cause of death to cardiac arrhythmia due to electrocution. The medical examiner's report noted electrical burns on both hands and a possible exit burn at the lower midback.

RECOMMENDATIONS AND DISCUSSION

Recommendation #1: Employers should ensure that company lock-out/tag-out procedures are strictly enforced.

Discussion: The company had a written lock-out/tag-out program and the necessary lock-out devices on site, however, these procedures were not fully followed. To prevent future incidents, the employer must ensure that lock-out/tag-out and other company safety procedures are strictly followed. This should include fully training supervisors and employees, deenergizing all circuits at the breaker box, and testing circuits to ensure deenergization.

It was reported that the employer conducted additional lock-out/tag-out training immediately following the incident. The company also dismissed several employees after the training for not following these procedures. It should be noted that lock-out/tag-out is required under the federal OSHA standard 29 CFR 1910.333.

Recommendation #2: Only properly trained and authorized employees should be permitted to work on live electrical circuits.

Discussion: It was apparent that the victim did not have the necessary training or experience to work on energized circuits. Employers should only permit specifically trained employees to work on energized circuits, and only when working on energized circuits is unavoidable. In addition to the training, employees should be provided with the necessary personal protective equipment to do the job safely.

Recommendation #3: All electrical workers should be trained in electrical rescue techniques and cardio-pulmonary resuscitation (CPR).

Discussion: In this incident, the victim's co-worker also placed himself at risk by cutting the energized wire. FACE recommends that all electrical workers should be trained in electrical rescue techniques and administering CPR. This will allow employees to safely perform rescues and begin life-saving resuscitation in the event of an electric shock. Further information can be found in the attached *NIOSH Alert: Request for Assistance in Preventing Fatalities of Workers Who Contact Electrical Energy*.

REFERENCES

Code of Federal Regulations 29 CFR 1910, 1992 edition. US Government Printing Office, Office of the Federal Register, Washington DC.

NIOSH ALERT: Request for Assistance in Preventing Fatalities of Workers Who Contact Electrical Energy. DHHS (NIOSH) Publication 87-103, National Institute for Occupational Safety and Health, Cincinnati OH, telephone (513) 533-8287.

DISTRIBUTION LIST

Immediate Distribution

NIOSH

Employer

Incident Site Owner

NJ State Medical Examiner

County Medical Examiner

Local Health Officer

NJDOH Census of Fatal Occupational Injuries (CFOI) Project

General Distribution

USDOL-OSHA Region II Office

USDOL-OSHA New Jersey Area Offices (4)

NJDOL OSHA Consultative Service

NJDOL Public Employees OSHA

NJDOH Public Employees OSHA

NJ State Safety Council

NJ Institute of Technology

NJ Shade Tree Federation

NJ Utilities Association

University of Medicine & Dentistry of NJ

Jersey Central Power & Light

Public Service Electric and Gas Company

Atlantic Electric

Liberty Mutual Insurance Company Research Center

Private Consultants and Companies (3)