Construction Laborer Electrocuted At School Renovation Site

June 22, 1994

SUMMARY

On August 9, 1993, a 33 year-old male construction laborer was electrocuted while working in a public school building. The incident occurred in the entrance vestibule where a lighting fixture was hanging down by its electrical cable. At about 8:30 a.m., the victim was in the vestibule apparently carrying discarded tiles outside when a second worker heard him scream and found him clutching a garbage can for support. The second worker (who was the victim's brother and a police officer) went to his aid and started CPR when the victim went into cardiac arrest. It is not known how the victim contacted the electrical energy that killed him. NJDOH FACE investigators concluded that, in order to prevent similar incident in the future, these safety guidelines should be followed:

- ***Employers and employees should ensure that all electrical circuits are de-energized and tested before working on them.***
- ***Employers should develop, implement, and enforce an electrical lock-out, tag-out procedure.***
- ***Employers should conduct a job hazard analysis of all work activities with the participation of the workers.***

INTRODUCTION

On August 9, 1993, NJDOH FACE personnel were notified by the NJDOH Public Employees OSHA Program of an apparent work-related electrocution at a public high school. On the same day, FACE investigators traveled to the school and met with the owner of the construction company working at the site. After viewing and photographing the scene, FACE investigators also briefly met with school officials and the local health officer. Later that day, a preliminary report from the county medical examiner stated that, pending further investigation, the apparent cause of death was due to heart disease. As there was no apparent evidence of an electrical incident, the FACE investigation was suspended until the exact cause of death could be determined.

On December 30, 1993, FACE investigators received an addendum to the medical examiner's report revising the cause of death to electrocution. The FACE investigation was re-opened at that time. In addition to the information gathered during the original site visit, information was obtained from the OSHA compliance officer, police, and medical examiner's reports.

The victim was a 33 year-old male hospital maintenance worker who was working for the construction company while on vacation from his regular job. He had been hired 11 days prior by the contractor as a laborer to install ceiling tiles in the school. The employer was a general construction contractor who had been in business for six years. The contractor hired both union and non-union workers as he needed

them, and had 5 employees at the time of the incident. The company did not have a written safety program or electrical lock-out, tag-out program but did conduct on-site safety meetings.

INVESTIGATION

The incident occurred at a public high school located in a suburban area. The high school administration had contracted with the victim's employer to replace the ceiling tiles and lights in the school's hallways during the summer break. The job required the contractor to first de-energize the power to the ceiling lighting fixtures before removing the old fiberglass ceiling tiles. As the tiles were removed, the light fixtures were left hanging from the ceiling suspended by their shielded metal electrical cables. These lights were to be replaced with new lights after the new ceiling tiles were installed.

The day of the incident, a Monday, was a seasonably warm summer's day. The crew of five arrived for work at 7 a.m. and were scheduled to work until 3 p.m. The crew, who were starting their fifth day on the job, consisted of two union carpenters, two non-union labors (including the victim), and the contractor. One of these workers was also the victim's brother, a police officer working a second job. The crew was removing tiles in one of the school's main corridors and was working from small mobile scaffolds. The power to the lights had been disconnected at the main breaker box which was located in a locked utility closet. A small unlocked breaker box in the nearby main office controlled power to the emergency lights. Most of the ceiling tiles in and around the vestibule area had been removed, and there were a number of light fixtures and wires hanging in the area. The area was dimly lit from light coming in through the window.

At about 8:20 a.m., the victim was alone in the vestibule leading to the corridor where the rest of the crew was working. The vestibule, which was empty except for a hanging light and a trash can, was used for moving the old ceiling tiles out of the building to a dumpster. A witness outside the building saw the victim bumping against the doors in the vestibule. The victim's brother, who was working around the corner in the building, heard the victim cry out. He immediately went to his brother's aid, found him on the floor, and started cardio-pulmonary resuscitation (CPR). The other workers (one of whom stated that the hall light went out right before the incident) heard the noise and also went to help. They were apparently able to resuscitate the victim for a short time as the police found him breathing when they arrived a few minutes later. He was transported to the local emergency room where he was pronounced dead at 9:55 a.m.

Investigations of the incident by OSHA, FACE, and other agencies did not discover how or where the victim contacted the electrical energy. One witness statement reports that the witness turned off the lights in the hallway immediately after the incident, indicating all the circuits in the area may not have been de-energized. FACE investigators arrived at the site at about 2:30 p.m. on the day of the incident and used an Adams Enterprises ground fault detector to check the electrical cables hanging in the area. No ground faults or electric currents were found. It was noted that the emergency exit signs in the vestibule were lit, and a wire junction box in the ceiling near the vestibule had been opened.

CAUSE OF DEATH

The county medical examiner attributed the cause of death to cardiac dysrhythmia due to electrocution.

RECOMMENDATIONS AND DISCUSSION

Recommendation #1: Employers and employees should ensure that all electrical circuits are de-energized and tested before working on them.

Discussion: It is not known how or where the victim contacted the electrical energy at the school. It is possible that all the circuits in the area were not de-energized and the victim contacted an energized circuit. To prevent accidents such as this, we recommend that employers and employees de-energize all circuits that they may potentially contact. All circuits should be tested to verify that they are de-energized. It may be useful to do this with a voltage detector (such as a tic-tracer) which senses a circuit's electric field without making direct contact with the wires.

Recommendation #2: Employers should develop, implement, and enforce an electrical lock-out, tag-out procedure.

Discussion: In this situation, the employer's lock-out, tag-out procedure was limited to shutting off the breakers in a closed utility closet. It is recommended that the employer implement an effective electrical lock-out, tag-out procedure that includes de-energizing and locking out all circuits at the breaker box. All employees should receive lock-out, tag-out training and one employee should be responsible for locking out and testing the circuits. The locking out and tagging of electrical controls is required by the OSHA standard 29 CFR 1926.417.

Recommendation #3: Employers should conduct a job hazard analysis of all work activities with the participation of the workers.

Discussion: Due to the variety of hazards at construction sites, we recommend that employers conduct a job hazard analysis of the work area with the employees. A job hazard analysis (as described in the attached OSHA publication) should examine all work areas for electrical, fall, chemical, or other hazards the workers may encounter. We recommend that small employers hire a safety consultant to conduct their initial job hazard analysis. If the employer can not afford a consultant, then the NJ Department of Labor OSHA Consultative Service may provide this service at no charge (see references).

REFERENCES

Code of Federal Regulations 29 CFR 1926, 1991 edition. U.S. Government Printing Office, Office of the Federal Register, Washington DC.

It is important that employers obtain correct information about OSHA regulations and methods of ensuring safe working conditions. Because it is often difficult for a small business to obtain this type of information, the following sources may be helpful:

U.S. Department of Labor, OSHA

On request, OSHA will provide information on safety standards and requirements for fall protection. OSHA has several offices in New Jersey which cover the following areas:

Hunterdon, Union, Middlesex, Warren and Somerset Counties.....(908) 750-3270
Essex, Sussex, Hudson and Morris Counties.....(201) 263-1003
Bergen and Passaic Counties.....(201) 288-1700
Atlantic, Gloucester, Burlington, Mercer, Camden, Monmouth,
Cape May, Ocean, Cumberland and Salem Counties.....(609) 757-5181

NJDOL OSHA Consultative Services

The New Jersey Department of Labor OSHA Consultative Service will provide free advice for business owners on methods of improving health and safety in the workplace and complying to OSHA standards. Their telephone number is (609) 292-3922.

New Jersey State Safety Council

The NJ Safety Council provides a variety of courses on work-related safety. There is a charge for the seminars. Their address and telephone number is:

NJ State Safety Council
6 Commerce Drive
Cranford, New Jersey 07016
Telephone (908) 272-7712

Other Sources

Building trade organizations and labor unions are a good source of information on suppliers of safety equipment and training. Suppliers of roofing and building materials may be able to refer roofing contractors to suppliers of fall protection equipment.

ATTACHMENTS

Job Hazard Analysis. OSHA 3071, US Department of Labor, Occupational Safety and Health Administration, Washington DC. 1988.

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.