

# NJ FACE INVESTIGATION REPORT



*Fatality Assessment & Control Evaluation Project*

**FACE 04-NJ-059**

**October 4, 2005**

## **Hispanic Factory Worker Dies of Burns After Improperly Testing a 480-Volt Electrical Bus Bar**

On May 19, 2004, a 19-year-old Hispanic factory worker was fatally burned and his co-worker injured when an electrical test meter exploded as the victim was trying to test a 480-volt overhead electrical bus bar. The two workers were employed at a plant that used thermoforming machines to make plastic inserts for cosmetic packaging. These machines created a great deal of residual heat, so management ordered the installation of fans to exhaust the heat from the room. The two employees were working from a scissor lift to do the “non-live” installation of the wiring for the fans, which would later be inspected, connected, and energized by a licensed electrician. As the workers ran conduit along the ceiling of the room, they approached a partially-exposed, 480-volt, three-phase electrical bus bar that supplied power to the thermoforming machines. The victim reportedly used a voltmeter in the scissor lift to test the exposed electrical conductors at the uncovered end of the bus bar. He apparently connected the voltmeter across two of the phases, which overloaded the meter and caused it to explode. The explosion ignited the victim’s clothing and caused an electrical breaker to trip, plunging the area into darkness. The victim’s co-worker managed to lower the lift, but his own clothing ignited while trying to extinguish the victim’s burning clothing. Another employee put out the fires with a fire extinguisher. The victim was taken to the area burn unit with burns over 35% of his body, where he died of complications 14 days later. NJ FACE investigators recommend following these guidelines to prevent similar incidents:

- **Employers should permit only properly trained and qualified persons to carry out electrical work.**
- **The company should develop, implement, and enforce an electrical safety program.**
- **A qualified person should inspect work areas prior to permitting employees to work near electrical or other hazardous equipment.**
- **Employers should ensure that all personnel lifts are properly maintained and inspected.**



NJ Department of Health & Senior Services  
Occupational Health Service  
PO Box 360, Trenton NJ 08625-0360  
(609) 984-1863



## **INTRODUCTION**

On June 30, 2004, NJ FACE staff were notified by a county medical examiner of a 19-year-old factory worker who died as a result of burns suffered from the explosion of an electrical test meter. The victim was injured on May 19, 2004, and he died on June 2, 2004. A NJ FACE investigator contacted the employer and arranged to conduct a site visit, which was performed on October 14, 2004. During the visit, NJ FACE investigators interviewed the company safety officer and photographed the incident site. Additional information was obtained from the police report, the medical examiner's report, and the OSHA investigation file.

The victim's employer was a contract manufacturer for the personal-care products industry, specializing in manufacturing packaging materials, packaging, and product distribution. The company owned six plants in two states, and employed approximately 1,400 permanent employees, not including staff hired through a temporary agency. The plant where the incident occurred was purchased by the company about 18 months prior to the incident. This plant employed 170 permanent employees, and 200 to 300 temporary employees, most of whom worked on the assembly lines during a four-month-long busy season. The employer representative stated that most of the employees were from the Dominican Republic. The employees at this plant were not unionized.

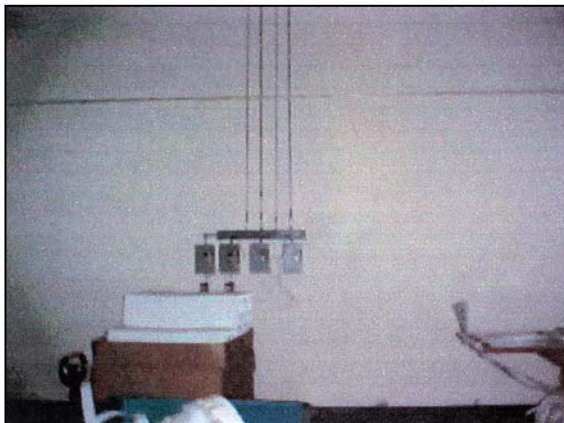
The victim was a 19-year-old Hispanic male who had worked for the company since November 18, 2002. Hired as a laborer-helper, he was being trained to work as a mechanic's assistant. Most of his training was on-the-job, and included a 45-minute machinery awareness training course. He had not had any training on electrical safety. The victim was born in the US and was bilingual in English and Spanish.

## **INVESTIGATION**

The incident occurred at a large, cosmetic packaging plant located in an urban-industrial area. The plant specialized in manufacturing plastic inserts for protecting and displaying the product in its box. Most of this manufacturing was done in the thermoforming department, a large room with 13 industrial thermoforming machines. Sheets of plastic were fed into the machine and pressed between two large, heated dies. The dies created multiple impressions of the form in the

plastic, each of which were cut out in the next production step. Cosmetics or other items were placed into the plastic insert, which was then placed into the box to make the final package.

The residual heat created by the thermoforming machines caused the room to become uncomfortably warm for the employees, so management decided to install large exhaust fans in the walls. The exhaust fans would redistribute the heat from the thermoforming room into the plant's adjoining warehouse area. Plant employees were to install most of the non-live wiring, and an electrical contractor was hired to do the actual electrical connections. Management assigned the plant's mechanic to do the non-live wiring. The mechanic was a 21-year-old Hispanic male who was responsible for performing maintenance and minor repairs on the thermoforming machines. Assisting him was a laborer (the victim) who was being trained as a mechanic's assistant. Both workers had been hired by the company on the same day in November, 2002.



**Photo 1**  
**Conduit leading to switches at floor level**

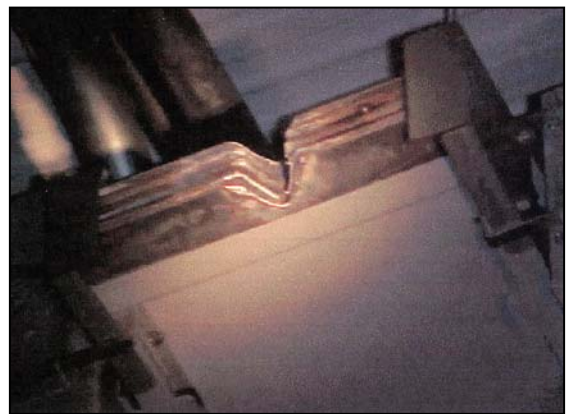
The wiring project required the installation of metal conduit from four switching/breaker boxes mounted on the wall underneath the fans. The conduit ran up the wall to the fans (see Photo 1), then extended up to the ceiling joists of the room where it was to terminate near a three-phase, 480-volt electrical bus bar that supplied power to the thermoforming machines. The mechanic was to mount the conduit and run the electrical wires through it. The two workers were instructed not to

do any electrical connections, which were to be done later by a contracted licensed electrician. The electrical bus bar was an enclosed system made of four copper conducting plates mounted in a steel enclosure measuring approximately 14 inches wide by five inches high. The bus bar was mounted on the bottom of the roof joists, approximately five feet beneath the ceiling and 20 feet above the floor. Switched electrical junction boxes were mounted to the side of the bus to transfer power to the machines. The bus bar had been installed by a contractor hired by the new company management in April, 2003.

The incident occurred on the afternoon of Wednesday, May 5, 2004. The two-man crew started work on the project, which was expected to take two to three days to complete. The crew began in the morning during their usual 7:00 a.m. to 4:00 p.m. shift. They used a powered scissor-lift to raise them up the wall and to the ceiling joists of the thermoforming room. Work proceeded uneventfully through the morning and into the early afternoon. At approximately 3:00 p.m., the two workers were on the lift, installing conduit near the end of the electrical bus bar. The end of the bus enclosure was open due to a missing end-cap, exposing the four electrical conducting plates. While the mechanic had his back turned, the victim picked up a voltmeter that was kept in the lift for use by the electrical contractors. The victim, who was not trained to test circuits, connected the two testing probes across the copper plates. The mechanic reportedly saw this and shouted “No!,” but the connection caused an electrical arc and overloaded the voltmeter, which exploded near the victim.



**Photo 2**  
**Scissor Lift**



**Photo 3**  
**Burned “V” Shape in Bus Bar Plates**

The arc burned a deep “V” into the four metal bus plates, caused the power and lights to go out, and set off the fire alarm. Sparks from the arc and/or exploding voltmeter set the victim’s clothing on fire. The mechanic tried to extinguish the victim, setting his own clothes on fire. The mechanic managed to lower the lift back down to ground level, where a plant employee used a fire extinguisher to put out the fires. The mechanic then lost consciousness. The darkness and fire caused a panic among the employees in the area, and everyone was evacuated to the outside.

The police received a 911 call from the plant at 3:19 p.m. and dispatched a unit. The first officers arriving reported finding the area dark and smoke filled, with the two workers unconscious on the platform of the scissor lift. As one police officer started to evaluate the

workers, the second went to have the power shut down in the plant. The fire department and paramedics arrived and removed the victims after the area was declared safe. The two workers were transported to the local emergency room where they were treated for burns. The attending physicians did not find evidence of electrical injuries to either worker, and determined that the mechanic had 10% total body burns to his hands and chest. The mechanic was treated for his burns and released. The victim suffered far more extensive burns and was transferred to the area burn unit with 35% total body burns and smoke inhalation. He was admitted in critical condition, and despite treatment, he succumbed to his injuries on June 2, 2004, 14 days after the incident.

Following the incident, plant management brought in a crisis counselor to help with the psychological impact to the employees who witnessed the incident. Investigations by company management and OSHA found that the electrical contractor who installed the electrical bus bar apparently neglected to place an end-cap on the bus enclosure, leaving the electrical conductors exposed.

## **RECOMMENDATIONS/DISCUSSIONS**

**Recommendation #1: Employers should permit only properly trained and qualified persons to carry out electrical work.**

**Discussion:** In this incident, the two workers were injured as they installed electrical conduit near an exposed electrical bus bar. The workers had little or no training in electrical hazards, and were unqualified to do electrical work. Despite the fact that they were doing non-live wiring and were clearly instructed not to do any electrical connections, the victim's inexperience and lack of training was evident in his failing to recognize the danger of the exposed bus bar. To avoid this type of incident, NJ FACE recommends that only properly trained and authorized employees are permitted to work on electrical circuits. Close supervision may be necessary to ensure that unauthorized employees are kept a safe distance from electrical circuits.

**Recommendation #2: The company should develop, implement, and enforce an electrical safety program.**

**Discussion:** In this case, the plant used licensed electrical contractors to do their electrical work. However, the plant mechanic and other personnel responsible for maintaining machinery may

come in close proximity to electrical circuits. To ensure the safety of these workers, NJ FACE recommends developing, implementing, and enforcing an electrical safety program. This program should include training in electrical safety practices, lock-out/tag-out procedures, circuit testing (to ensure that circuits were de-energized), and other safety training commensurate with the duties of the workers. This would include correctly storing electrical test equipment away from unauthorized personnel.

**Recommendation #3: A qualified person should inspect work areas prior to permitting employees to work near electrical or other hazardous equipment.**

**Discussion:** The end-cap of the electrical bus bar was apparently left off during the installation of the electrical system, a hazard that was not known by the plant management. To help find and avoid unidentified hazards, NJ FACE recommends that the work area be closely inspected by a qualified person before allowing employees to work in the area. This inspection should be done as part of a formalized job-hazard analysis, which examines each task for potential mechanical, electrical, chemical, or any other hazard the worker may encounter. Additional information is available in the publication, *Job Hazard Analysis*, which is available on the federal OSHA website at [www.osha.gov/Publications/osha3071.pdf](http://www.osha.gov/Publications/osha3071.pdf).

**Recommendation #4: Employers should ensure that all personnel lifts are properly maintained and inspected.**

**Discussion:** FACE investigators briefly viewed the scissor lift involved in the incident. Investigators did not do an operational check of the equipment, however, it was noted that the lift's identification and load limit plate was missing. The lifts instruction manual was also not with the lift. NJ FACE investigators recommend conducting periodic inspections of all personnel lifts to ensure their safe operation and to make sure that all necessary equipment and manuals are present.

**RECOMMENDED RESOURCES**

It is extremely important that employers obtain accurate information on health, safety, and applicable OSHA standards. NJ FACE recommends the following sources of information which should help both employers and employees:

## **U.S. Department of Labor, Occupational Safety & Health Administration (OSHA)**

Federal OSHA will provide information on safety and health standards on request. OSHA has four area offices in New Jersey that cover the following counties:

- ☎ Hunterdon, Middlesex, Somerset, Union, and Warren counties..... (732) 750-3270
  - ☎ Essex, Hudson, Morris, and Sussex counties..... (973) 263-1003
  - ☎ Bergen and Passaic counties..... (201) 288-1700
  - ☎ Atlantic, Burlington, Cape May, Camden, Cumberland, Gloucester,  
Mercer, Monmouth, Ocean, and Salem counties..... (856) 757-5181
- 🌐 Federal OSHA Website: [www.osha.gov](http://www.osha.gov)

## **New Jersey Public Employees Occupational Safety and Health (PEOSH) Program**

The PEOSH Act covers all NJ state, county, and municipal employees. Two state departments administer the act; the NJ Department of Labor and Workforce Development (NJDLWD), which investigates safety hazards, and the NJ Department of Health and Senior Services (NJDHSS) which investigates health hazards. PEOSH has information available that may also benefit private employers.

### NJDLWD, Office of Public Employees Safety

- ☎ Telephone: (609) 633-3896
- 🌐 Website: [www.nj.gov/labor/lse/lspeosh.html](http://www.nj.gov/labor/lse/lspeosh.html)

### NJDHSS, Public Employees Occupational Safety & Health Program

- ☎ Telephone: (609) 984-1863
- 🌐 Website: [www.nj.gov/health/eoh/peoshweb](http://www.nj.gov/health/eoh/peoshweb)

## **New Jersey Department of Labor and Workforce Development, Occupational Safety and Health On-Site Consultation Program**

This program provides free advice to private businesses on improving safety and health in the workplace and complying with OSHA standards.

- ☎ Telephone: (609) 984-0785
- 🌐 Website: [www.nj.gov/labor/lse/lsonsite.html](http://www.nj.gov/labor/lse/lsonsite.html)

## **New Jersey State Safety Council**

The New Jersey State Safety Council provides a variety of courses on work-related safety.

There is a charge for the seminars.

☎ Telephone: (908) 272-7712.      💻 Website: [www.njsafety.org](http://www.njsafety.org)

## **Internet Resources**

Other useful Internet sites for occupational safety and health information:

- 💻 CDC/NIOSH website - [www.cdc.gov/niosh](http://www.cdc.gov/niosh)
- 💻 Employment Laws Assistance for Workers and Small Businesses - [www.dol.gov/elaws](http://www.dol.gov/elaws)
- 💻 National Safety Council - [www.nsc.org](http://www.nsc.org)
- 💻 American National Standards Institute (ANSI) - [www.ansi.org](http://www.ansi.org)
- 💻 Product recall information - [www.recalls.gov](http://www.recalls.gov)
- 💻 NJDHSS FACE reports - [www.nj.gov/health/eoh/survweb/face.htm](http://www.nj.gov/health/eoh/survweb/face.htm)
- 💻 CDC/NIOSH FACE website - [www.cdc.gov/niosh/face](http://www.cdc.gov/niosh/face)

## **REFERENCES**

1. *Job Hazard Analysis*. US Department of Labor Publication # OSHA-3071, 2002 (revised).  
U.S. Department of Labor, OSHA Publications, P.O. Box 37535, Washington D.C. 20013-7535  
Telephone (202) 693-1888, Fax (202) 693-2498

## **DISTRIBUTION LIST**

NIOSH

Employer

NJ State Medical Examiner

County Medical Examiner

Local Health Officer

USDOL-OSHA New Jersey Area Offices (Avenel, Hasbrouck Heights, Parsippany, and Marlton)

NJDLDW Office of Public Employees Safety

NJDLDW Occupational Safety and Health On-Site Consultation Program

NJDHSS Public Employees Occupational Safety & Health Program



NJDHSS Occupational Health Service Internet Site

NJDHSS Census of Fatal Occupational Injuries (CFOI) Project

**Fatality Assessment and Control Evaluation (FACE) Project**  
**Investigation # 04-NJ-059**

Staff members of the New Jersey Department of Health and Senior Services, Occupational Health Service, perform FACE investigations when there is a report of a targeted work-related fatal injury. The goal of FACE is to prevent fatal work injuries by studying the work environment, the worker, the task and tools the worker was using, the energy exchange resulting in the fatal injury, and the role of management in controlling how these factors interact. FACE gathers information from multiple sources that may include interviews of employers, workers, and other investigators; examination of the fatality site and related equipment; and reviewing OSHA, police, and medical examiner reports, employer safety procedures, and training plans. The FACE program does not determine fault or place blame on employers or individual workers. Findings are summarized in narrative investigation reports that include recommendations for preventing similar events. All names and other identifiers are removed from FACE reports and other data to protect the confidentiality of those who participate in the program.

NIOSH-funded state-based FACE Programs include: Alaska, California, Iowa, Kentucky, Massachusetts, Michigan, Minnesota, Nebraska, New Jersey, New York, Oklahoma, Oregon, Washington, West Virginia, and Wisconsin. Please visit the NJ FACE website at [www.state.nj.us/health/eoh/survweb/face.htm](http://www.state.nj.us/health/eoh/survweb/face.htm) or the CDC/NIOSH FACE website at [www.cdc.gov/niosh/face](http://www.cdc.gov/niosh/face) for more information.

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Patrick Bost, M.S.  
FACE Principal Investigator  
Occupational Health Surveillance Program

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Daniel Lefkowitz, Ph.D.  
FACE Investigator  
Occupational Health Surveillance Program

---

Emily O'Hagan, R.N., M.P.H.  
FACE Investigator  
Occupational Health Surveillance Program

---

Barbara Gerwel, M.D.  
Project Coordinator  
Occupational Health Surveillance Program

---

Donald Schill, M.S., CIH  
Research Scientist  
Occupational Health Surveillance Program

---

David Valiante, M.S., CIH  
Program Manager  
Occupational Health Surveillance Program

---

Gary Ludwig, M.S.  
Director  
Occupational Health Service

---

Eddy A. Bresnitz, M.D., M.S.  
Deputy Commissioner/State Epidemiologist  
Public Health Services

