

NJ FACE INVESTIGATION REPORT



Fatality Assessment & Control Evaluation Project

FACE 01-NJ-117-01

October 1, 2002

Landscaper Electrocuted and Two Workers Seriously Injured When a Felled Tree Landed on an Overhead Power Line

On October 18, 2001, a 21-year-old landscaper was electrocuted when a felled tree landed on an overhead power line and caused the power line to drop. A landscaping company had subcontracted to take down 110 trees and clear the area for a parking lot. The company hired two experienced tree trimmers to assist with tree removal. When they felled a 65-foot oak tree, one of the branches caught onto the 69,000 volt power line that was 29 feet above the ground. The porcelain insulators on the adjacent supporting utility poles broke and the power line dropped to within a few feet from the ground. The company owner's 21-year-old son was electrocuted and two workers (including the company owner) were seriously injured by the electric current. NJ FACE investigators concluded that, to prevent similar incidents, these safety guidelines should be followed:

- **A knowledgeable person should assess each work site for safety hazards and design a work plan that addresses those hazards.**
- **The employer should conduct a job briefing, based on the work plan, before starting work.**
- **The employer should establish a written safety and health policy.**
- **Safe tree removal techniques should be used.**
- **Employers should notify the utility company when work is planned in an area near overhead power lines.**
- **Employers and employees should become familiar with available resources on safety standards and safe work practices.**



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INTRODUCTION

The county medical examiner informed the FACE staff about this fatal work-related injury on October 23, 2001. The victim's employer (his father) consented, through his attorney, to participate in the FACE investigation. He was interviewed on January 22, 2002, in the presence of his attorney, immediately after the opening conference conducted by the federal Occupational Safety and Health Administration (OSHA) compliance officer. The compliance officer had been present at the incident site on the day of the fatal injury. A FACE investigator visited the site on January 22, 2002. At that time, all work had been done and construction and paving of the parking lot had been completed. Additional information was obtained from the police report, the medical examiner's report, worker interviews, a representative of the utility company that owned the power lines, and federal OSHA.

The employer was a family-owned landscaping company that had been in business for approximately twenty years and usually employed eight workers including the owner and his son. The company did landscaping, gardening, lawn maintenance and, occasionally, small tree removal. They did no tree trimming and did not climb trees. The company had no written safety program. All training was on-the-job. When new equipment was purchased, they were trained on its use by the equipment supplier. There was a verbal policy that forbade drug and alcohol use.

The victim was the 21-year-old son of the company owner. He had helped his father with jobs since his early teenage years and was considered by his father to be the company vice president. He arranged the contract for this job.

INVESTIGATION

The landscaping company was subcontracted by a paving company to remove and dispose of approximately 110 trees, as well as stumps, roots, and vegetation from a wooded area that was being cleared to extend a parking lot.

The site of the fatal injury was a wooded area being cleared to extend a corporate parking lot. Part of the area was sloping terrain and was located west of a busy 45-foot-wide road. Overhead power lines were suspended from utility poles located on the east and west sides of the road. The east pole was 39 feet from the curb and the west pole was 134 feet from the curb. The distance between the two utility poles was 218 feet. Three power lines supplied 69,000 volts, phase-to-phase. The top most line was the system ground. The lines were supported on the utility poles by porcelain insulators, each approximately 22 inches long. The height of the power lines varied, depending upon the topography of the area. At the incident site, the lowest line was 29 feet above the ground and stretched 31 feet over the road. The utility company that owns the lines maintains a right-of-way 50 feet on each side of the line, for the distance of the line. The right-of-way was clear of trees and brush.

According to the utility company representative, plans for the parking lot were developed in 2000 by an engineering firm. The engineers obtained necessary municipal permits and communicated with the utility company about their plans. They were advised by the utility company that it was necessary to coordinate with them about working in their right-of-way and they were given information about the New Jersey High Voltage Proximity Act. The utility company had not been notified that work was to be started. The landscaper received blue prints for the job from the general contractor.

The landscaping company started work at the site on October 17, 2001, late in the day. They had been there a few days earlier but left because certain permits had not been obtained. They took down trees that measured 6 to 12 inches in diameter, were 20 feet high, and grew on islands in the old parking lot. The trees were removed by cutting them at the base of the tree. The owner and work crew labored late into the evening and returned at 9:30 a.m. on October 18. Another contractor and work crew were also at the site doing excavations but were not in the immediate vicinity. The day was windy (17 miles per hour from the northwest, as measured at the nearest weather station) and clear, with a few scattered clouds. The temperature was 50 degrees Fahrenheit.

At the site were the landscaper, his son (the victim), and six landscaper laborers. With them were the company trucks, a backhoe, a rented chipper, and other landscaping equipment. Because the landscapers were not skilled at removing large trees, the employer hired two tree trimmers for the day, both with many years of experience. One of them (tree trimmer No. 1), who formerly owned his own tree care business, was an experienced tree climber and brought his own truck and chipper to the site, although they were not used. He had been trained on-the-job many years earlier by a former employer. His truck, with the chipper in tow, was parked on the street. Tree trimmer No. 2 had several years experience in tree trimming. The company laborers were busy cleaning up brush and debris left over from the previous night's work. The victim was running the chipper to dispose of the brush, logs, and trees they had removed. Very large logs were to be deposited into a dump truck and taken to a landfill.

A large hickory tree grew approximately 50 feet from the power lines. Tree trimmer No. 1 and the landscaper removed the hickory tree after stabilizing it with the landscaper's backhoe. Tree trimmer No. 1 used his chain saw to drop the tree parallel with the power lines.

The next tree to be removed was a 65-foot-high oak tree, with a diameter of approximately 18 to 20 inches. The tree grew 52 1/2 feet from the power line, just outside of the utility right-of-way, and was in full foliage. Their impression was that the tree was no more than 35 feet tall and they should have no difficulty clearing the power line by ten to twelve feet. No other workers were in the vicinity. Tree trimmer No. 2 stationed himself down the slope from them in order to give verbal and hand signal directions for cutting and dropping the tree. On receiving directions from tree trimmer No. 2, tree trimmer No. 1 told the landscaper to position his backhoe behind the oak tree, with the articulated boom against the tree, to stabilize the tree and help direct it's fall. The backhoe's outriggers were lowered to the ground after it was positioned against the tree. After warning other workers to stay clear of the area, the tree trimmer used horizontal and 45 degree cuts to make a hinge for the tree to fall. After he made the final cut, he saw the tree fall, first in the direction that he had planned, and then rolling away and in the direction of the power lines. One of the branches of the tree caught and hung onto the lowest power line, with approximately a five-foot overhang. The butt end of the tree was resting on the ground, about two feet from the stump, while the branch at the top hung on the wire. Other tree

branches and foliage made contact with the next higher power line, approximately eight feet above the first. Because he wanted to free the branch from the line, tree trimmer No. 1 used his chain saw to cut two to three feet from the butt end of the tree. Since the tree was still caught on the wire, he cut off another two to three feet. The tree was still caught on the line so, for the third time, he cut another two to three feet from the tree trunk. The butt end of the tree was still resting on the ground and the top was caught on the power line. When they looked up, they saw the tree start to smoke, although there was no flame. The wind was blowing and it shook the top of the tree.

Events then occurred very quickly. Because of the weight of the tree on the line, the porcelain insulator on the western (the side of the road on which they were working) utility pole broke and the power line dropped down. The tree was still smoking. The tree trimmer put his chain saw down and alerted the landscaper to call 9-1-1, which he did. Then the porcelain insulator on the eastern pole broke and the line dropped lower. When the line dropped, it made contact with the metal chute on the chipper, parked on the street at the curb. Leaves on the ground near the curb were scorched.

The line did not break but dropped down to approximately four feet from the ground and the road. Since no workers were in the immediate area of the power line but cars were traveling on the road, the landscaper and tree trimmer No. 1 focused their attention on stopping traffic.

The landscaper and tree trimmers told the work crew to stay away from the area. For an unknown reason, a worker (who had been with the company for eight years) came into the area, through the debris, past them, and ran toward the wire (See graphic on page 11). The tree trimmer saw him and yelled for him to stop. He didn't stop but ran to the wire, crouched down, and bent under the power line. His back apparently touched the wire. Witnesses reported they saw a blue electric surge from the wire to the ground and observed the wire shaking. They also heard a loud "boom" sound. Reportedly, the injured worker did not scream but was critically burned from direct contact with the electric current.

The victim returned from the area where he had been chipping logs and brush. When he saw that his co-worker (his cousin) was badly injured, he apparently tried to rescue him and approached the area near the downed wire. He somehow made contact with the electric current. There were electric burns through his right and left shoes and socks, to his right and left foot. His lower legs and forearms also showed some burns, as well as his left hand. Seeing his son injured, his father left the road where he had been directing traffic to help his son. The witness heard another "boom" and saw a blue electric arc. He reported that he felt the ground vibrate. The landscaper, the victim's father, also made contact with the electric current and went down. He remembers touching nothing at the time and reports that the electric current entered his body through his knees as he walked. The police arrived, initially under the mistaken impression that the loss of electric power in the area was due to terrorist activity. When they realized what had happened, they called for emergency medical assistance and notified the utility company.

The three injured workers were transported to three hospitals. The victim was transported to the nearest hospital where he was pronounced dead one hour and seven minutes after the initial 9-1-1 call. His father was transported to another hospital where he was admitted and underwent surgery. The initially injured worker was transported to the regional hospital burn unit and remained an inpatient for approximately three months.

Tree trimmer No. 1 was hired by the paving contractor to finish the job. He remained at the site for the next three days.

RECOMMENDATIONS/DISCUSSIONS

Recommendation # 1: A knowledgeable person should assess each work site for safety hazards and design a work plan that addresses those hazards.

Discussion: This job site contained at least three important hazards: a tree that was taller than the distance to the overhead power line, interior rot of the tree (although it is not known if any exterior rot was visible), and wind. The tree could potentially contact the power line and the tree rot and wind could cause the tree to fall in an unexpected manner. The landscaper realized he did not have the skill to remove large trees and hired an experienced tree trimmer to assist him. When estimating the cost of the job, a qualified (experienced) person should inspect the work site to assess hazards and plan techniques to eliminate or reduce hazards and ensure safety. Based on the inspection, the employer or supervisor should design a work plan.

Recommendation # 2: The employer should conduct a job briefing, based on the work plan, before starting a job.

Discussion: The work plan should be devised prior to the work day so it is clear how the landscaping and/or tree removal will be done and necessary precautions taken. The landscaper and tree trimmer apparently talked about the job before starting work but did not realize the proximity to the overhead power lines. It is not known what directions were communicated to the work crew. The job briefing should be based on the work plan and should include a description of the work to be done, the environmental and safety hazards of the job, work assignments, and instructions on how to deal with those hazards.

Recommendation # 3: The employer should establish a written safety and health policy.

Discussion: Safety and health policies and company operational policies should be in writing. Although the landscaping company had a policy against alcohol and drug use, it was not in writing. Having policies in writing fosters consistency and makes rules and standards clear to all workers. A written safety and health policy should include organized training and education of workers.

Recommendation # 4: Safe tree removal techniques should be used.

Discussion: Several factors indicated that the oak tree should not have been felled. The tree was taller than the distance to the power lines and it was a windy day. Tree removal could have been accomplished by working from an aerial lift and taking the tree down in sections. It would not have been appropriate to climb the tree because of the internal rot of the tree (although the external appearance of the tree is unknown). Climbing a tree with interior rot would have been dangerous for a climber.

Workers should remain out of the area around a tree being felled. The landscaper, in his backhoe, could have been injured if the tree fell onto the machine. The backhoe would have offered little protection.

Regulations that pertain to the safe methods of tree removal include 29 CFR 1910:266, Logging Operations, and ANSI Z133.1-2000, American National Standard for Arboricultural Operations – Pruning, Repairing, Maintaining, and Removing Trees, and Cutting Brush – Safety Requirements. All employers and workers who fell, trim, or work around tree removal should become familiar with the regulations appropriate for their jobs.

Recommendation # 5: Employers should notify the utility company when work is planned in an area near overhead power lines.

Discussion: When the utility company that owns the power lines reviewed the engineering plans for constructing the parking lot, it was stipulated that the utility company would be notified when work was to be started in the area of their right-of-way. It is not known who, according to the plans, had the responsibility to carry out the notification. If the power company had been notified, they would have been able to de-energize the power lines and therefore eliminate the potential of contact with the electric current.

When the tree came down on the power line, the utility company was notified by the police. No attempt should have been made to remove or dislodge a tree or equipment from contact until the line had been de-energized. In this event, serious injury or death could have resulted from indirect contact with the electric current. Electrical current could have flowed from the power line to the tree, to the chain saw, and to the worker.

Recommendation # 6: Employers and employees should become familiar with available resources on safety standards and safe work practices.

Discussion: It is extremely important that employers and workers obtain accurate information on safety, and applicable OSHA standards. The following sources of information may be helpful:

U.S. Department of Labor, OSHA

Federal OSHA will provide information on safety and health standards on request. OSHA has several 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 Web site: www.osha.gov

NJ 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 (NJDOL) which investigates safety hazards, and the NJ Department of Health and Senior Services (NJDHSS) which investigates health hazards. PEOSH has information that may also benefit private employers. Their telephone numbers are:

- ☎ NJDOL, Office of Public Employees Safety(609) 633-3896
- 🌐 Web site: www.state.nj.us/labor/wps/psosh/peosh/peosha.htm
- ☎ NJDHSS, Public Employees Occupational Safety & Health Program.....(609) 984-1863
- 🌐 Web site: www.state.nj.us/health/eoh/peoshweb

NJDOL Occupational Safety and Health On-Site Consultation Program

Located in the NJ Department of Labor, this program provides free advice to private businesses on improving safety and health in the workplace and complying with OSHA standards. For information on

how to get a safety consultation, call ☎(609) 292-3923.

🌐 Web site: www.state.nj.us/labor/wps/psosh/onsite/onsite.htm

New Jersey State Safety Council

The NJ State Safety Council provides a variety of courses on work-related safety. There is a charge for the seminars. Their telephone number is: ☎(908) 272-7712.

🌐 Web site: www.njsafety.org

Professional Organizations

National Arborist Association (NAA) - P.O. Box 1094, Amherst, NH 03031-1094

Phone (800) 733-2622

🌐 Web site: www.natlarb.com

Committee for the Advancement of Arboriculture – Monmouth County Shade Tree Commission,

P.O. Box 1255, Freehold, NJ 07728-1255, Phone (732) 431-7903

International Society of Arboriculture – P.O. Box 3129, Champaign, IL 61826-3129

Phone (217) 355-3516

🌐 Web site: www.isa-arbor.com

Society of Commercial Arboriculture – P.O. Box 3129, Champaign, IL 61826-3129

Phone (217) 355-3516

🌐 Web site: www.aces.uiuc.edu/~isa-sca/

ACRT, Inc., Utility Forestry Specialist, P.O. Box 401, 2545 Bailey Road, Cuyahoga Falls,

OH 44221-0401, Phone (800) 622-2562

Shigo and Trees Association, 4 Denbow Road, Durham, NH 03824, Phone (603) 868-7459

Additional Internet Resources

Information and publications on safety and health standards can be obtained from the Internet.

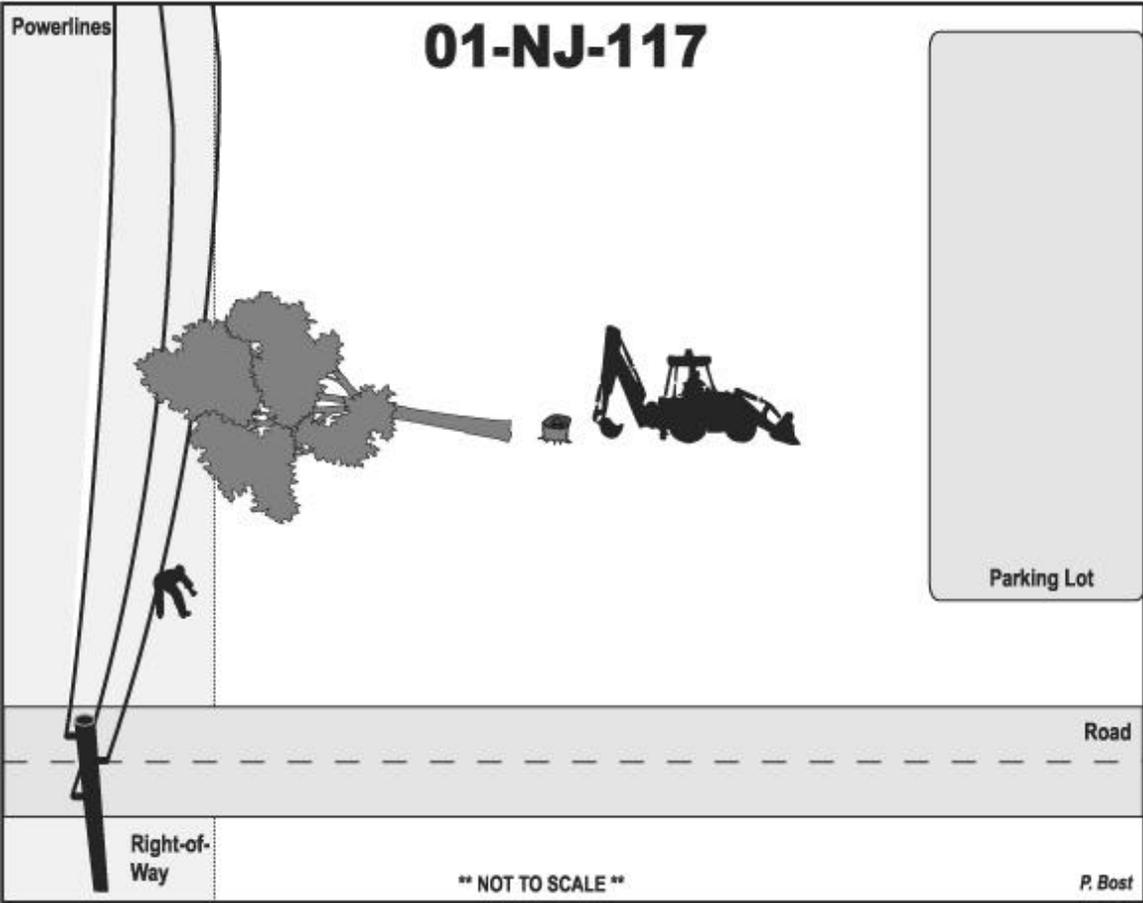
Some useful Web sites include:

www.cdc.gov/niosh - The Centers for Disease Control and Prevention (CDC) / NIOSH.

www.dol.gov/elaws -USDOL Employment Laws Assistance for Workers and Small Businesses.

www.nsc.org – National Safety Council.

www.state.nj.us/health/eoh/survweb/face.htm – NJ Department of Health and Senior Services
FACE reports.



REFERENCES

1. ANSI Z133.1-2000, 1994, for Arboricultural Operations - Pruning, Repairing, Maintaining, and Removing Trees, and Cutting Brush – Safety Requirements, American National Standards Institute, Inc., October 19, 2000.
2. Electrical Hazard Awareness Program Manual, National Arborist Association, 2002.
3. *Job Hazard Analysis*. US Department of Labor Publication # OSHA-3071, 1998 (revised). USDOL, OSHA/OICA Publications, PO Box 37535, Washington DC 20013-7535.
4. OSHA Logging Operations 29 CFR 1910.266.
5. Preventing Injuries and Deaths of Loggers, NIOSH Alert: May 1995, DHSS (NIOSH) Publication No. 95-101.

DISTRIBUTION LIST

Immediate Distribution

NIOSH

Employer

Incident Site Owner

State Medical Examiner

Committee for the Advancement of Arboriculture

County Medical Examiner

Local Health Officer

NJ Department of Health and Senior Services' Occupational Health Service Internet Site

NJ Department of Health and Senior Services' Census of Fatal Occupational Injuries Project

General Distribution

US Department of Labor-OSHA New Jersey Area Offices (4)

NJ Department of Labor-Office of Public Employees Safety

NJ Department of Health and Senior Services Public Employees' Occupational Safety and Health Program

NJ Department of Labor OSHA Consultative Service

NJ Institute of Technology

University of Medicine & Dentistry of NJ

Rutgers University

Stevens Institute of Technology

NJ Shade Tree Federation

NJ Utilities Association

NJ School Boards Association

Public Service Electric and Gas Company

Liberty Mutual Insurance Company Research Center

Private Consultants (2)

Private Employers (5)

Public Employers (4)

Other Government Agencies (2)

Fatality Assessment and Control Evaluation (FACE) Project
Investigation # 01-NJ-117-01

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 fatal injury, and the role of management in controlling how these factors interact. FACE investigators evaluate information from multiple sources that may include interviews of employers, workers, and other investigators; examination of the fatality site and related equipment; and review of records such as OSHA, police, and medical examiner reports, and employer safety procedures, and training plans. The FACE program does not seek to determine fault or place blame on companies 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, Ohio, Oklahoma, Washington, West Virginia, and Wisconsin. For further information, visit the NJ FACE website at www.state.nj.us/health/eoh/survweb/face.htm or the CDC/NIOSH FACE website at www.cdc.gov/niosh/face/faceweb.html.

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