

NJ FACE INVESTIGATION REPORT



Fatality Assessment & Control Evaluation Project

FACE 13-NJ-074

February 5, 2016

Tree-care Worker Electrocuted While Trimming Branch Near Power Line

A 39-year-old male tree-care worker was electrocuted after his power pole saw made contact with a 7,200-volt primary transmission line. The incident occurred on a residential property in southern NJ. On the day of the incident, the victim (who was also the company owner) and two coworkers, functioning as ground crew were trimming a large maple tree. The victim, working from an aluminum extension ladder approximately 30' up in the tree, was using an extendable power pole saw (or stick saw) trimmer to cut branches adjacent to power lines. As the victim was preparing to cut a branch, the power pole saw contacted the power line. The current passed through him and went to ground via the ladder. He remained motionless for about 15 seconds, and then fell from the ladder. One of the ground crewmen attempted to catch the victim, and sustained a broken leg. The victim died 31 hours later; cause of death was high voltage electrocution.

Contributing Factors:

- Working in close proximity to overhead high voltage lines
- High voltage lines were energized throughout job
- The power pole saw was “drop started” (simultaneously pulling start cord while dropping saw)
- Use of aluminum ladder in close proximity to high voltage lines

NJ FACE investigators recommend that these safety guidelines be followed to prevent similar incidents:

- **When working near overhead lines, the lines should be de-energized and grounded.**
- **When working near any electrical hazard, ladders should be made of a non-conductive material.**
- **Any tree-care worker that intends to cut, trim, or prune trees within 10 feet of energized power lines should have appropriate training and certification for line-clearance tree trimming.**
- **A safety and health plan based on a job hazard analysis should be developed by the employer and followed where workers are assigned tasks.**



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INTRODUCTION

In winter 2013, NJ FACE staff was notified of the death of a 39-year-old male tree-care worker who was electrocuted after the power pole saw he was using to trim a maple tree contacted a high voltage line. The incident occurred on a private residence in southern NJ. The victim was the owner of the company (a home improvements and tree care-company), and had been in business over 20 years (of which, 6-7 years was conducting tree work). The only tree-work related training the owner had was a “two-week tree-trimming course” in Pennsylvania. It was uncertain the exact content of the training, and there was no record that the ground crew had any formal tree-work specific training.

A NJ FACE investigator contacted the OSHA Area Office and conducted a concurrent investigation. Additional information was obtained from the medical examiner’s report, death certificate, police report, and the news.

INVESTIGATION

The incident occurred on a clear, dry winter day (approximately 52° F at the time of the incident, maximum wind speed was about nine miles per hour, and no recorded precipitation). The incident site was the front yard of a residential property in southern NJ (Figure 1). The homeowner had hired the victim’s company to trim some trees on the property, including a large maple tree in the front yard. The victim was sole proprietor of the company, who would hire general laborers as needed to assist in larger tasks. For this particular job, the victim hired two laborers to work as ground crew. Their tasks included cutting, roping off the area, clearing branches, cleaning debris, etc.

The job required three days to complete and the incident occurred on the third day. The first day was allocated for assessment; the second day involved trimming another tree on the side of the property; and the third day was to trim the maple tree in the front yard. On the day of the incident, the three workers arrived at 10:00 am, the victim set up a 40-foot aluminum extension ladder in the maple tree (Figure 1), tying off the ladder to the tree with rope. According to the two ground crew workers, the goal was to trim several of the branches near the power lines using a power pole saw (Figure 2a). The saw was extendable to 16 feet, although at the time of the incident, it was extended to 10 feet. It had a control end with a throttle (Figure 2b), and a cutting end (Figure 2c).

Once the ground workers had prepared for the cut (roping the area, sharpening the saws, etc.), the victim climbed the ladder, approximately 30 feet, and began trimming (the ground crew would attend to the branches that would fall to the ground). He was wearing a hard hat, gloves, eye protection (goggles), and

a harness (which was not attached to the tree). Shortly after starting, a neighborhood resident came over to inquire about hiring the company to do work. The victim stopped trimming, came down from the ladder, and spoke with the neighbor. Afterwards, he went back up the ladder (to a point approximately 30 feet high) to cut a “nub” that was next to the power line (Figure 3).

Based on measurements from scene by the local power company, the lateral distance from the point where the victim was working to the primary power line was six feet. The victim “drop started” the saw (i.e. pulling the starting cord handle and simultaneously allowing the saw to drop) and it is believed that this is when the pole contacted the 7.2-kilovolt transmission line (see Figure 2d). The ground crew and neighbor stated they saw the victim “go rigid” and witnessed sparks and smoke. The victim remained in this rigid state for approximately 15 seconds, and then fell backwards off the ladder. One of the ground crew workers attempted to catch him, and sustained a broken femur. The police were called and arrived in about three minutes. The victim was transported to the hospital and died 31 hours later due to high voltage electrocution.

Based on burn damage found on both the throttle (Figure 2b) and the victim’s right hand, it was concluded that the current traveled down the pole to where the victim was holding the saw. The current then passed through the victim to the ground via the aluminum ladder, as evidenced by a burn mark on the victim’s shin.

FIGURE 1: Incident site; front yard of residential property.



FIGURE 2. Extendable power pole saw; a. full view (10°); b. throttle end; c. saw end; d. close-up view of contact point with 7.5kv transmission line.



a
c



b
d

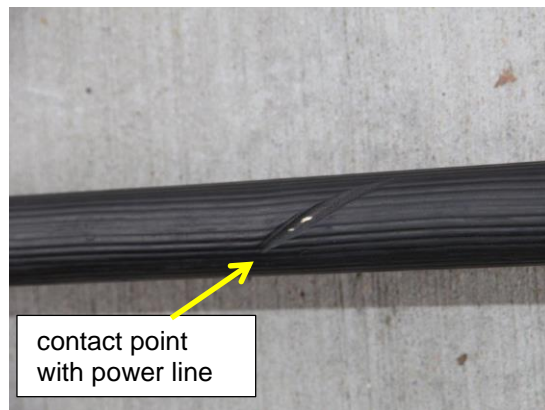
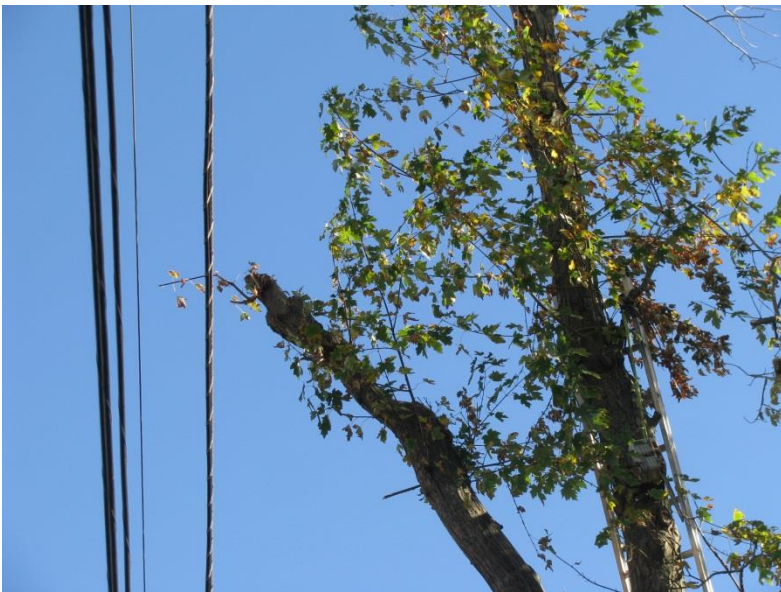


FIGURE 3. Branches to be cut near power line: a) full view; b) close up near wire.



a

b



RECOMMENDATIONS/DISCUSSIONS

Recommendation #1: When working near overhead lines, the lines should be de-energized and grounded.

Discussion: As per 29 CFR 1910.333(c)(3), when working in proximity to overhead power lines, the lines must be de-energized and grounded.¹ Alternatively, other protective measures such as guarding, isolating or insulating can be employed which will prevent a worker from contacting the line directly or through conductive material or equipment.¹ For example, electrical workers working on an energized power line might wear insulating gloves and sleeves. Insulating Protective Equipment (IPE) might also be used, such as line hose, blankets, and covers. However, in this case, NJ FACE recommends that overhead power lines be de-energized during tree-related work in close proximity (<10 feet) of the lines.

Recommendation #2: When working near any electrical hazard, ladders should be made of a non-conductive material.

Another factor in this incident was that the victim used an aluminum ladder. According to ANSI Z133-2012, ladders made of conductive material shall not be used where electrical hazards exist.² Only wooden ladders or ladders made from nonconductive materials should be used when working near energized power lines.

Recommendation #3: Any tree-care worker that intends to cut, trim, or prune trees within 10 feet of energized power lines should have appropriate training and certification for line-clearance tree trimming.

Discussion: According to OSHA, line-clearance tree trimming is the pruning, trimming, repairing, maintaining, removing, or clearing of trees or the cutting of brush that is near (within 10 feet of) energized power lines.³ OSHA has established the following categories for line-clearance tree trimmers: 1) unqualified employees: these workers must maintain a distance of at least 10 feet from overhead power lines. Their work is covered by 1910.333(c)(3); 2) “269-qualified” employees: which means workers in compliance with all of CFR 1910.269 except paragraph (r)(1); 3) tree-clearance tree trimmers: those who have received specialized training that allow them to work within 10 feet of energized power lines (1910.269(r)(1) applies).³

In this case, the victim had no record of training certifying him to carry out work within the minimum distance requirement (10 feet) of energized power lines. In addition, according to the ground crew, the victim “drop started” the power pole saw. According to the American National Standards Institute’s

(ANSI) Z133-2012, drop starting a chain saw is prohibited.⁴ A chain saw should be started with the chain brake engaged while the saw is held in a way that minimizes movement when the starter cord handle is pulled.⁴ When a saw is drop started, the bar is completely unsupported and can therefore move in an unintended direction. It is believed that after the victim drop started the saw, he lost control and it contacted the power line.

Recommendation #4: A safety and health plan based on a job hazard analysis should be developed by the employer and followed where workers are assigned tasks.

Discussion: Employers should conduct a job hazard analysis, with the participation of employees, of all work areas and job tasks. A job hazard analysis should begin by reviewing the work activities for which the employee is responsible, and the equipment that is needed. Each task is further examined for mechanical, electrical, chemical, or any other hazard the worker may encounter. In this case, a job hazard analysis may have prevented this fatality by targeted the idea of de-energizing the power lines, utilizing a nonconductive ladder, and/or eliminating drop starting the saw. A source of information on conducting a job hazard analysis can be obtained from the US Department of Labor.⁵






APPENDIX

RECOMMENDED RESOURCES

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

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

Federal OSHA can 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 counties732-750-3270
-  Essex, Hudson, Morris, and Sussex counties973-263-1003
-  Bergen and Passaic counties201-288-1700
-  Atlantic, Burlington, Cape May, Camden, Cumberland, Gloucester,
Mercer, Monmouth, Ocean, and Salem counties856-596-5200
-  Web site: 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 (NJDOH), which investigates health hazards. PEOSH has information that may also benefit private employers.



NJDLWD, Office of Public Employees Safety

-  Telephone: 609-633-3896
-  Web site: www.nj.gov/labor/lsse/lspeosh.html

NJDOH, Public Employees Occupational Safety & Health Program

-  Telephone: 609-984-1863
-  Web site: www.nj.gov/health/peosh

On-site Consultation for Public Employers

-  Telephone: 609-984-1863 (health) or 609-633-2587 (safety)
-  Web site: www.state.nj.us/health/eoh/peoshweb/peoshcon.htm

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

💻 Web site: www.nj.gov/labor/lsse/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.

💻 Web site: www.njsafety.org

Internet Resources

Other useful Internet sites for occupational safety and health information:

- CDC/NIOSH – www.cdc.gov/niosh
- USDOL Employment Laws Assistance for Workers and Small Businesses – www.dol.gov/elaws
- National Safety Council – www.nsc.org
- NJDOH FACE reports – www.nj.gov/health/surv/face/index.shtml
- CDC/NIOSH FACE – www.cdc.gov/niosh/face/faceweb.html
- OSHA – www.osha.gov
- ANSI – www.ansi.org

REFERENCES

1. CFR 1910.333(c)(3) Electrical, selection and use of work practices, *Overhead Lines*.
2. ANSI Z133-2012; 7.5.2 *Ladders*.
3. OSHA. Line-Clearance Tree Trimming Operations. Available at:
https://www.osha.gov/SLTC/etools/electric_power/overheadlinework_lineclearance.html
Accessed November 5, 2015.
4. ANSI Z133-2012; 6.3.4. *Chain Saws*.
5. *Job Hazard Analysis*. US Department of Labor Publication # OSHA-3071, 1998 (revised). USDOL, OSHA Publications, PO Box 37535, Washington DC 20013-7535.

Fatality Assessment and Control Evaluation (FACE) Project
Investigation # 13-NJ-049

This report was prepared by staff members of the New Jersey Department of Health's Occupational Health Surveillance Unit. The goal of FACE is to prevent fatal work-related injuries by studying the work environment, the worker, the task, the 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: California, Iowa, Kentucky, Massachusetts, Michigan, New Jersey, New York, Oregon, and Washington. Please visit the NJ FACE Web site at www.nj.gov/health/surv/face/index.shtml or the CDC/NIOSH FACE Web site at www.cdc.gov/niosh/face/faceweb.html for more information.

The NJ FACE Project is supported by the Centers for Disease Control and Prevention (CDC). The contents of this report are solely the responsibility of the authors and do not necessarily represent the official views of the CDC.



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