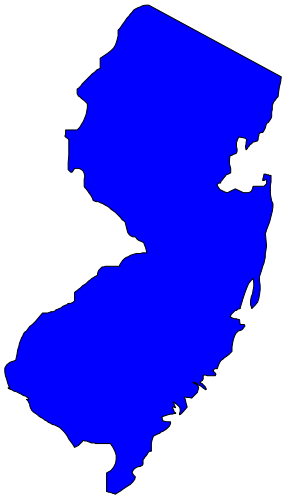
F.A.C.E.
INVESTIGATION REPORT

Fatality Assessment and Control Evaluation Project

FACE #96-NJ-010-01
Tree Trimmer Electrocuted
After Contacting an Overhead Power Line



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

SUBJECT: Face Investigation #96-NJ-010-01
Tree Trimmer Electrocuted After Contacting an Overhead Power Line

DATE: August 7, 1996

SUMMARY

On February 28, 1996, a 25-year-old tree trimmer was electrocuted when he contacted a 7,600 volt overhead power line while clearing a loose branch from a tree. The incident occurred at a private home where the company had just finished removing a tree from the back yard. The crew had completed the job and was beginning to clean the site when they noticed a loose branch hanging from a neighbor's tree. Using a climbing harness, the victim tied onto the ball of a crane line and was raised up to the hanging branch, which he cut down. As he was being lowered to the ground, the victim noticed a second loose branch hanging on another tree. The victim had started to swing toward the branch while on the crane line when he contacted a primary power line and was electrocuted. NJ FACE investigators concluded that, in order to prevent similar incidents in the future, these safety guidelines should be followed:

*Employers should ensure that a minimum clearance of 10 feet is maintained between cranes and energized power lines.

*Employers should ensure that crane operators are properly trained before using the machinery.

*Employers and employees should read and follow the recommendations in the attached *NIOSH Alert: Preventing Electrocutions of Crane Operators and Crew Members Working Near Overhead Power Lines*.

* Employers should conduct a job hazard analysis to identify and correct potential hazards prior to starting work.

* Employers and employees should be aware of the dangers of drugs and other substances that may impair judgement or alertness.

* Employers should be aware of educational and training resources for health and safety information.

INTRODUCTION

On February 29, 1996, New Jersey FACE personnel were notified by a compliance officer from the federal Occupational Safety and Health Administration (OSHA) of a work-related fatality that occurred the day before. After contacting the employer, a NJ FACE investigator was granted permission to observe the employer and employee interviews conducted at the OSHA area office on March 1, 1996. Following the interviews, the FACE investigator accompanied the OSHA compliance officers to the incident site. The site was examined and photographed, and investigators briefly spoke with neighbors about the incident. The employer interview was completed by telephone on April 29, 1996. Additional information was obtained from OSHA, the police report, and the medical examiner's report.

The employer was a small tree trimming company that had been in business for ten years and employed 15 workers. The company's job training program was primarily on-the-job training supplemented with videos on safety and other topics. Workers were also sent to various training courses and seminars. The victim was a 25-year-old male tree trimmer and climber who had worked for the company for 3½ years. Prior to this job, he had worked as a carpenter. The employer stated that the victim had completed a two-week course in aboriculture which included electrical hazard awareness training in July 1994.

INVESTIGATION

The incident occurred on the street in the front of a private home in a suburban residential neighborhood. In October 1995, the owner of the home contracted with the tree trimming company to remove a large maple tree in the back yard that had weakened due to age and rot. The company looked over the tree and estimated the job, but was unable to remove the tree until after the winter. In February 1996, the owner of the house again contacted the tree trimming company to remove a second maple tree that had been split in a storm. The damaged maple was one of several trees growing beside the front curb near the street. Running behind the trees parallel to the curb were a series of overhead utility lines, with the topmost being a single 7,500 volt primary power line (see Figure 1). On Saturday, February 24, the owner of the company and an employee went to the site and tied the split tree to stabilize it. A crew returned the following Monday and finished removing the tree with the use of a cherry-picker truck. The owner of the house also asked the company to remove the large maple tree in the back yard that they had estimated the previous October. On Wednesday, February 26, the company sent a crew to remove the tree.

The day of the incident was cool, clear, and damp from an earlier rain. A crew of four consisting of a foreman, crane operator, climber (the victim), and a groundsman arrived at about 7:30 a.m. After looking over the job, they positioned the crane in the driveway where it could reach the tree in the backyard and set up the chipper and log truck in the street in front of the house. The foreman put on his climbing harness, attached it to the crane line near the ball and hook, and was lifted by the crane to the top of the tree that they were removing. He then tied himself off to the

tree and started to trim the branches. After removing the branches, the foreman used a sling to attach the crane line to the trunk of the tree and cut the trunk off below the sling. This left the section of trunk supported by the crane line, which was lifted over the house and lowered to the ground. This method was used to cut down the rest of the tree while the remainder of the crew worked at removing and chipping the branches.

After the tree was cut down, the foreman proceeded to remove the tree stump. The victim brought a saw over to the foreman, who then noticed a loose branch hanging from a neighbor's pin-oak tree across the street. The foreman asked the victim to take care of it and returned to cutting the stump. The victim borrowed the foreman's climbing harness, attached himself to the crane line, and was lifted up about 40 feet to the hanging branch which he cut down. At about 10:00 a.m., the victim was being lowered to the ground when he saw a second branch hanging on the maple tree near the utility lines. When the victim was about 15 feet from the ground, he began to swing on the crane line and reach for the hanging branch. On his second attempt, the crane operator saw a flash of light as the victim slumped back in his harness.

The crane operator immediately started to lower the victim to the ground. The groundsman came over and helped guide the victim the last few feet to the ground. The foreman, who had been talking to a neighbor, removed the victim's gear and checked his vital signs. At this time the victim was unconscious and had labored breathing. The foreman called 911 on a neighbor's phone while another worker called for help on the truck radio. The police arrived a few minutes later and started cardio-pulmonary resuscitation after the victim when into cardiac arrest. The paramedics and ambulance arrived soon after, took over treatment, and transported the victim to the local hospital. He was pronounced dead at the hospital at 10:57 a.m.

Investigations by the area OSHA office and power company could not conclusively determine the point or manner of contact with the power line. The electrical burns noted in the ME report indicate that the power entered through the victim's right hand and exited through his hip region (presumably grounding into the crane cable). This suggests that the victim may have contacted the power line directly, or, it is possible that the tree contacted the power line, with the electricity passing through the tree and to the victim when he grabbed at the branch.

CAUSE OF DEATH

The county medical examiner determined the cause of death to be from accidental electrocution while trimming a tree. The ME report noted electrical entrance burns on the victim's right hand, and electrical exit burns on his right hip region.

RECOMMENDATIONS AND DISCUSSIONS

Recommendation # 1: Employers should ensure that a minimum clearance of 10 feet is maintained between cranes and energized power lines.

Discussion: One factor of this incident was the inadequate clearance between the crane and the power line. This hazard is addressed in the federal OSHA standards 29 CFR 1910.181 (j)(I)(ii) (general industry) and 29 CFR 1926.550 (a)(15)(I)(ii) (construction industry) which requires a minimum clearance of ten feet from power lines up to 50,000 volts and greater clearances for lines with higher voltages. In addition, the New Jersey High-Voltage Proximity Act (N.J.S.A. 34:6-47.1) requires a minimum clearance of six feet from power lines exceeding 750 volts.

Recommendation # 2: Employers should ensure that crane operators are properly trained before using the machinery.

Discussion: Although he had experience from his previous job, the crane operator had not received any formal training from the company in operating the equipment. He was also apparently unaware of the OSHA regulations on operating the crane near power lines and lifting personnel on crane lines. To ensure the safety of the equipment operators and crews, FACE recommends that employers properly train the equipment operators before allowing them to operate the machinery. If the employers are unable to provide this training, they may need to get assistance from the equipment manufacturer or an outside training agency.

Recommendation #3: Employers and employees should read and follow the recommendations in the attached *NIOSH Alert: Preventing Electrocutions of Crane Operators and Crew Members Working Near Overhead Power Lines.*

Discussion: The National Institute for Occupational Safety and Health (NIOSH) published an alert after studying a number of electrocutions involving cranes and overhead power lines. This alert presents case studies and gives recommendations for preventing future incidents. Some of these recommendations include:

* Training crane operators and participating in crane safety programs.
* Knowing the location and voltage of all nearby power lines.
* Assume all lines are energized and maintain the minimum clearance required by OSHA.
* Designating a spotter to warn the operator if the crane approaches the power lines.
* Notifying the power line owners and requesting that they deenergizing the lines.

Additional safety information on tree trimming is also included in the attached *NIOSH Alert: Preventing Falls and Electrocutions During Tree Trimming*.

Recommendation #4: Employers should conduct a job hazard analysis to identify and correct potential hazards prior to starting work.

Discussion: Prior to starting a job, employers should conduct a daily job hazard analysis with their employees to identify potential hazards. This would include looking over the job site for potential safety hazards such as the location of power lines, fall hazards, loose branches, and other problems. Once identified, these hazards can be corrected or avoided before starting work.

Recommendation #5: Employers and employees should be aware of the dangers of drugs and other substances that may impair judgement or alertness.

Discussion: The medical examiner's report noted a positive toxicology for drugs in the victim's blood. The FACE investigation did not determine if the victim was under the influence or the extent that this may have contributed to the incident. However, the FACE project recommends that employers and employees should be aware of the dangers that drugs (including prescription, non-prescription, and illegal drugs) and alcohol may present in the workplace. Safety training should include strong warnings about the use of drugs that may impair a worker's judgement, alertness, and physical abilities.

Recommendation #6: Employers should be aware of educational and training resources for health and safety information.

Discussion: It is important that employers obtain current information on 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:

The Committee for the Advancement of Arboriculture. This organization offers courses on basic and advanced tree climbing and other pertinent courses in tree safety and arboriculture. For information, contact David Shaw, Monmouth County Shade Tree Commission, P.O. Box 1255, Freehold, NJ 07728-1255. The telephone number is (908) 431-7903.

National Arborists' Association offers videos on safety and a manual titled "Tailgate Safety for Tree Care Professionals." The address of the Association is The Meeting Place Mall, Route 101/P.O. Box 1094, Amherst, NH 03031-1094. The phone number is (603) 673-3311.

U.S. Department of Labor, OSHA:
On request, the federal Occupational Safety and Health Administration (OSHA) will provide information on safety standards and requirements. 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 consultation to business owners on improving health and safety in the workplace and complying with 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 6 Commerce Drive, Cranford, New Jersey 07016, telephone (908) 272-7712

Other Sources: Local utility companies offer seminars for tree trimmers in avoiding electrical hazards. Trade organizations and labor unions are a good source of information on suppliers of safety equipment and training.

REFERENCES

Code of Federal Regulations 29 CFR 1910 and 29 CFR 1926. U.S. Government Printing Office, Office of the Federal Register, Washington DC.

New Jersey High-Voltage Proximity Act. New Jersey Statutes Annotated (NJSA) 34:6-47.1 et seq., amended May 20, 1987. NJ Department of Labor, Division of Workplace Standards, Trenton NJ. pp 1-4.

NIOSH ALERT: Preventing Electrocutions of Crane Operators and Crew Members Working Near Overhead Power Lines. DHHS (NIOSH) Publication 95-108, May 1995. NIOSH Publications Dissemination, Cincinnati OH. Phone 1-800-356-4674.

NIOSH ALERT: Request for Assistance in Preventing Falls and Electrocutions During Tree Trimming. DHHS (NIOSH) Publication 92-106, August 1992. NIOSH Publications Dissemination, Cincinnati OH. Phone 1-800-356-4674.

American National Standard for Tree Care Operations-Pruning, Trimming, Repairing, Maintaining, and Removing Trees, and Cutting Brush-Safety Requirements. ANSI Z133.1-1988. American National Standards Institute, Inc., New York, NY. Phone (212) 642-4900.

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

ATTACHMENTS

NIOSH ALERT: Preventing Electrocutions of Crane Operators and Crew Members Working Near Overhead Power Lines. DHHS (NIOSH) Publication 95-108, May 1995. NIOSH Publications Dissemination, Cincinnati OH. Phone 1-800-356-4674.

NIOSH ALERT: Request for Assistance in Preventing Falls and Electrocutions During Tree Trimming. DHHS (NIOSH) Publication 92-106, August 1992. NIOSH Publications Dissemination, Cincinnati OH. Phone 1-800-356-4674.

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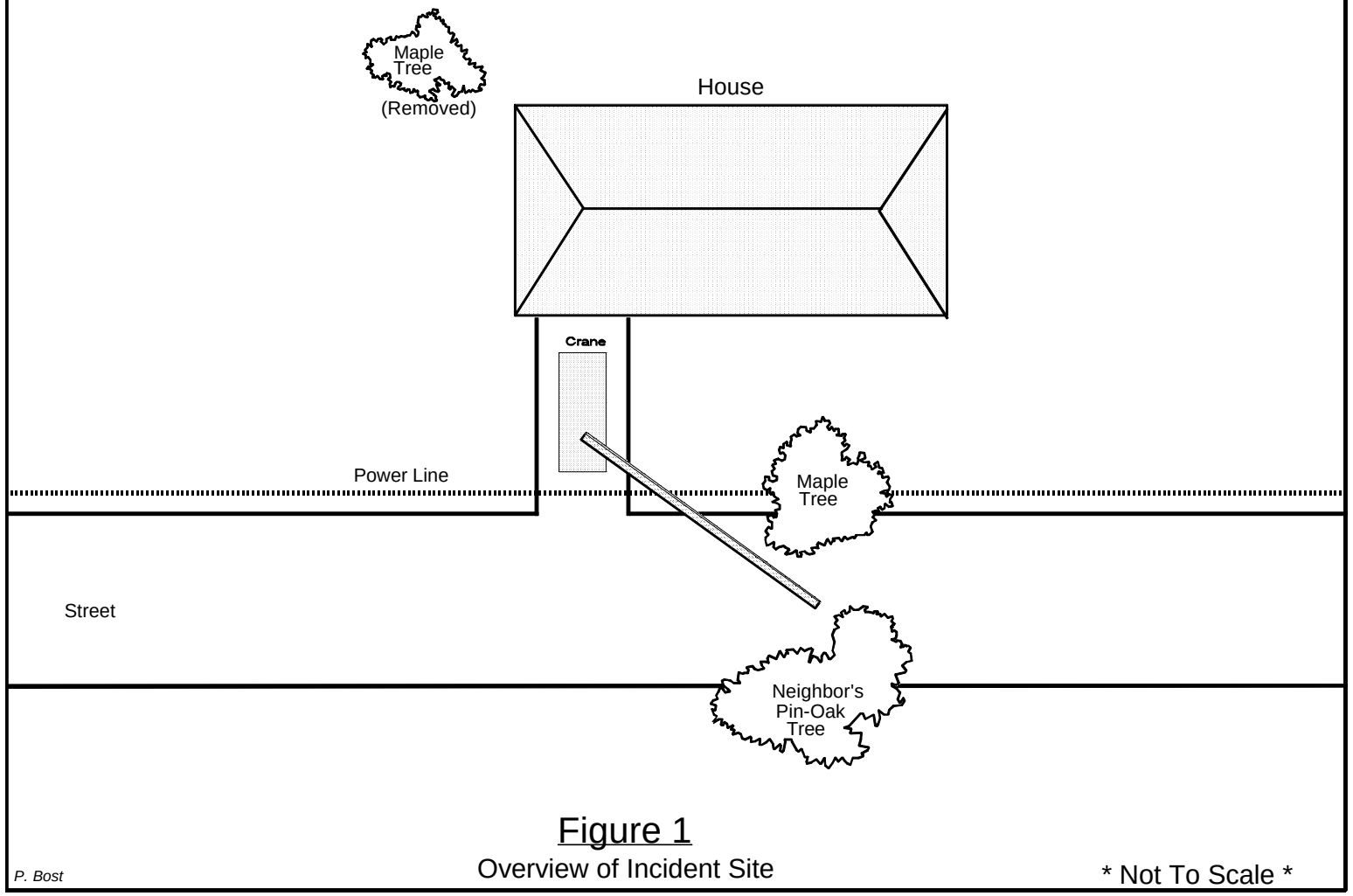

Figure 1

Overview of Incident Site

P. Bost

* Not To Scale *