

DATE: September 15, 1992

FROM: Fatal Accident Circumstances and Epidemiology (FACE) Project
Minnesota Department of Health (MN FACE)

SUBJECT: MN FACE Investigation MN9212
Tree Trimming/Removal Worker Electrocuted after Making Indirect Contact
With a 8000 Volt Overhead Power Line

SUMMARY

A 44-year-old female (victim) tree trimming/removal worker was electrocuted when she made indirect contact with a 8000V overhead power line. The incident occurred as a tree was being prepared for removal from beneath overhead primary (8000V) and secondary (240V) power lines at a private residence. The secondary line was 6 feet below the primary line. A boomed truck equipped with a one-man fiberglass bucket was being used to trim the tree. The west side of the tree was trimmed without incident. Because of heavy rain the night before, the truck could not be moved to the other side of the power lines to trim the other side of the tree. The operator of the bucket, therefore, attempted to maneuver it between the primary and secondary lines. The boom made contact with the upper 8000V line just as the ground worker was reaching for a chain saw sitting on the truck. The truck became energized when the boom contacted the primary line and the worker, completing the circuit to ground, was electrocuted. Despite quick medical response, she died of the injuries she received. MN FACE investigators concluded that, in order to prevent similar occurrences, the following guidelines should be followed:

- > request that power to overhead lines be shut down when it is necessary to work in close (within 10 feet) proximity to them;
- > use personal protective equipment such as blankets, mats, or line hoses to insulate power lines or cover booms likely to contact power lines with a sheath of non-conductive plastic; and
- > ensure that ground personnel stand clear of equipment which could become energized while performing work near overhead power lines.

INTRODUCTION

On August 3, 1992, MN FACE personnel received notification from the Minnesota Occupational Safety & Health Administration Division (MN OSHA) of a work-related electrocution that occurred on July 24, 1992. Information was taken from the MN OSHA compliance officer assigned to the incident. The county sheriff and coroner were contacted and reports were requested. On August 7, 1992, the surviving owner of the company was contacted and arrangements were made to conduct a site investigation on August 15, 1992.

The company was a small family-owned tree service. The husband and wife team, with help from a son, had been in the business of tree moving, trimming, and removal for 13 years. The city often contracted with the company to assist city crews with the removal of tree branches. The husband had previous military experience with electrical work and was, therefore, acquainted with electrical safety hazards. The company did not have a formal written safety program.

INVESTIGATION

The incident occurred on the property of a private residence at 11:45 in the morning. The three tree service personnel and two city workers were on the scene and in the process of removing an elm tree from beneath 30-foot high overhead primary (8000V) and secondary (240V) power lines that ran north and south. The secondary power line was 6 feet below the primary line. Both lines ran almost directly through the middle of the tree branches. It appeared from ground observation during the site investigation that the insulation of the primary line was in very poor condition at the section where the incident took place. This was a completely routine and standard tree removal.

It had rained heavily the night before and the ground was wet. An area to the east side of the power lines was not suitable for parking the company's boomed truck due to the sogginess of the ground. It was, therefore, parked along the side of the garage on the west side of the lines, and faced south. It was equipped with a one-man fiberglass bucket, which went to a maximum height of 50 feet.

The husband operated the bucket and was trimming branches from the tree while the other members of the crew were on the ground at various locations clearing brush away. The west side of the tree, towards the truck, was cut without incident and a large part of the east side had also

been completed. In order to finish cutting the east side of the tree, it was necessary to maneuver the bucket between the two power lines to that side of the tree. As this process was underway, the top of the boom hit the bottom of the upper, primary line at least once and the truck became energized.

It is unknown why the wife approached the truck, but apparently she was reaching for a chain saw, which was sitting on the truck. At the same time the truck boom hit the 8000V primary line, she touched the truck, completing the circuit to ground. When the boom was removed from contact with the power line, she slid to the ground. Despite prompt and intensive medical care, including electric shock therapy within three minutes of the incident, she died from the injuries received. It was reported that there were electrical burns on her small, right finger and both feet.

CAUSE OF DEATH

The cause of death was electrocution.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Request that power to overhead lines be shut off when it is necessary to work in close proximity (less than 10 feet) to them.

Discussion: The Occupational Safety and Health Act (OSHA) requires that a ten-foot clearance around power lines be maintained for boomed vehicles. If workers must perform work closer to the lines than this, as in these circumstances, they should consider requesting that the lines be completely shut down by the electric company. Any mistake in judging distances or inability to see clearly because of tree limbs cannot, then, result in electrical hazards.

Recommendation #2: If shutting off power lines is not feasible, use personal protective equipment and devices to insulate sections of power lines, which may contact boomed vehicles or insulate the boomed vehicle by covering the boom with a sheath of non-conductive plastic.

Discussion: The insulation of the 8000V primary line was in poor condition. Workers should not depend on this insulation as protection. The surviving owner in this incident did possess high voltage gloves and these may have protected him if he had contacted the power line. To protect the workers on the ground, however, and to avoid contact of the boom with bare lines, the lines could be covered with electrical blankets, mats, or line hoses. In addition, booms can

be covered with dielectric insulating sheaths of plastic so electricity cannot pass through the boom to the workers on the ground.

Recommendation #3: Ensure that ground workers stay clear of any vehicle or equipment that may become energized while performing work near overhead power lines.

Discussion: Safety rules and training for employees working around boomed vehicles should include instruction on the hazards of unintentional contact with energized equipment by workers on the ground. They should stay clear of any vehicle while the boom is raised in the vicinity of overhead power lines. Barricades around boomed trucks could be used to emphasize and remind ground workers of the danger.

REFERENCES

1. MacCollum, David V., P.E.,C.S.P., Avoiding Power Line Contacts, reprint by Sigalarm, Inc., Hillsboro, OR.