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Tree Trimmer Falls 35 Feet to His Death in New Jersey

New Jersey Case Report: 90NJ018 (formerly NJ9014)

DATE: July 15, 1991

SUMMARY

On October 9, 1990, a 27-year-old tree trimmer fell to his death while trimming a tree. Although he used appropriate fall protection, the tree trunk section to which he was tied suffered a strong backlash, fractured, and broke off after the piece above it was cut away. The victim fell approximately 30 to 35 feet, with a section of the tree landing on top of him. NJDOH FACE investigators concluded that, in order to prevent similar occurrences in the future, the following safety guidelines should be followed:

- Tree trimmers should evaluate the tree and its environment to determine the best method of performing the job safely;
- Use appropriate cutting techniques;
- When possible, tree trimmers should use alternate methods of tree trimming or felling;
- Tree trimmers should have appropriate safety training.

INTRODUCTION

On October 9, 1990, a county medical examiner informed NJDOH FACE personnel about the work-related death of a 27-year-old tree trimmer. We informed the appropriate OSHA safety supervisor and visited the site at the same time as an OSHA compliance officer on October 10, 1990. We were unable to interview the employer or co-worker during the on-site investigation. Information regarding the incident was derived from conversations with the OSHA compliance officer, the OSHA file, emergency medical services report and medical examiner's report. The employer did not respond to our telephone calls or letters.

The employer was a non-unionized, tree trimming company which had been in business for three years. The victim worked with the company since its inception and at times functioned as a supervisor. There were five workers, including the company owner.

Although the employer had no written safety and health program, the owner reportedly functioned as the company safety officer. The OSHA compliance officer felt that workers were supplied with appropriate safety equipment and that they knew how to use them. Some of the equipment, he thought, was better than that used by many other tree trimming companies. Workers functioned as "associates" and participated in planning each job.

INVESTIGATION

The company had been hired to remove dead trees on the large property of a private home, located in a semi-rural area. They had been on the job for two days and had removed four large trees. They were working on the fifth tree (a maple of unknown species) and had cut off all the tree limbs. The victim apparently did not note any rot while in the process of removing the tree limbs. The crew checked the trees for rotting by rapping on the trunk, probably with a hatchet, and listening for the responding resonance. In this situation, they were unaware of the presence of rot in the upper trunk. The presence of wood wasps in upper areas of the tree, which is evidence of tree rot, apparently was not known at the time. The four man crew split into two, to work in separate areas on the property. At 10:30 a.m., immediately after a coffee break, the victim (wearing a saddle belt attached to a cloth lanyard) climbed the tree, planning to cut it away in sections. The deceased reportedly realized that the tree was more damaged than expected and stopped climbing at approximately 35 feet. Deciding that it would be dangerous to ascend any higher, he tied in at that height. The victim reportedly notched the tree (cut a wedge into the trunk) using a short chainsaw, and his co-worker guided the cut section with a stabilizing line (rope) as it fell to the ground. It was explained to the OSHA compliance officer that the dried out tree had a list of approximately 10 to 15 degrees, and as the top section was cut away, the tree bent with it. As it sprang back to its original position, the backlash was strong enough to fracture the trunk six feet below the cut area, about 18 feet from the ground, and below the area to which the victim was tied. The tree trimmer fell with the section, which landed on top of him. The tree section, to which he was tied, measured six feet in length and 11 to 15 inches in diameter.

His co-worker heard the victim yell and then heard the tree section crash to the ground. The victim appeared to be critically injured. No first aid was attempted.

Knowing they could not gain access to the private home at the site, the workers attempted to summon help using the telephone in their truck. The phone did not function because of the physical location of the site but workers were able to call for assistance by running to a neighbor two houses away in this sparsely populated area.

State police responded first and initiated cardio-pulmonary resuscitation (CPR). Members of the local rescue squad and an ambulance arrived at the scene, followed by a paramedic unit. The victim was pronounced dead at the scene after attempts at advanced life support by paramedics.

OSHA issued no citations; it was felt that the employer violated no federal standard.

CAUSE OF DEATH

The medical examiner determined that death was caused by a traumatic hemothorax, a consequence of transection of the descending aorta, caused by the fall from a tree.

RECOMMENDATIONS/DISCUSSIONS

The following recommendations are meant to be general to tree topping or felling by tree trimmers. We are not able to assess which of the procedures were or were not followed.

Recommendation #1: Tree trimmers must evaluate the tree and its environment to determine the best method of performing the job safely.

Discussion: Among factors to be considered in planning a tree removal or trimming are: the species of the tree, its shape, and the direction of any lean. Trimmers must look for external signs which may indicate internal defects in the tree and must evaluate the tree in relation to other trees, vegetation and environmental activities. [1, 2, 3, 4, 5]

In this situation, we do not know what type of maple tree the workers were cutting; some species of maples are known to split easily. This maple had a reported lean of 10 to 15 degrees, which was important in planning tree removal techniques. External signs of internal defects include cracks, obvious rotting, fruiting bodies (such as fungus), and insect infestation. Wood wasps were noted in the upper part of the tree, but apparently not until after the fatality. The wasps did not cause the tree rot, but were present because of defects in the wood.

Tree trimmers have several methods to determine the health and quality of a tree. A long standing method of determining the soundness of the wood is to rap on the tree trunk with a heavy metal instrument such as an ax or hammer and listen for a hollow sound (sounding). This method is limited as the worker must be experienced in interpreting the sound and the test qualifies the wood only in that area. Although the tree in question was tested, the full extent of the rot was not discovered, possibly because the rotted wood was much higher in the tree than expected.

Other methods of determining soundness of the wood include visual inspection of tree cores and the use of electronic devices. An increment borer (a portable device about a foot long used to drill into the tree to obtain samples of the wood) should be used as part of the initial evaluation and planning process. If the decision is made to climb the tree, the worker should sample the tree at regular ascending intervals. The first wedge cut from the tree should also be visually inspected. These samples of the tree must be evaluated by an experienced individual.

An electronic instrument called a shigometer (a battery-operated ohmmeter) can be used to detect decay in living trees and wood products and determine the vitality of trees. The shigometer is considered expensive and users must become proficient in its use and in interpreting the readings. The device is not generally accepted as a working tool by the tree trimming industry and is considered by some to be a research tool only.

Recommendation #2: Tree trimmers must use appropriate cutting techniques.

Discussion: It is unknown what cutting or notching techniques were used by the victim and his co-workers. It is also impossible to know if a different method of cutting may have prevented the tree from snapping off.

ANSI standards on cutting techniques for felling trees are quite specific: A notch or back cut shall be used in felling trees over 5 inches in diameter, measured at breast height. No tree shall be felled by “ripping” or “slicing” cuts. The depth or penetration of the notch shall be about 1/3 the diameter of the tree. [1]

The opening or height of the notch shall be about 2½ inches for each foot of the tree’s diameter. The backcut shall be made higher than the point or apex of the notch to prevent kickback. [1]

According to professionals knowledgeable about arboring and tree felling, cuts are made only to form a hinge in the tree; the top of the tree follows the hinge. A guide rope is used and, if properly done, the cut tree should fall clean. Correct cutting techniques should prevent backlash.

Recommendation #3: Use alternate techniques of cutting trees when possible.

Discussions: If trees are unsound, workers should not attempt to climb them. In such a situation the job should be planned to include alternate methods of removing the trees. Aerial lifts can be used in some areas, which prevents the need to climb a tree. In this situation it would have been very difficult to bring trucks and aerial lifts into the location.

Recommendation #4: Tree trimmers should have appropriate safety training.

Discussion: As a supplement to on-the-job training, courses on safe planning and cutting techniques should be available. FACE personnel determined that courses or training materials on safe climbing and trimming were very difficult to find. Such materials should be produced and made accessible to owners of small tree trimming companies.

REFERENCES

1. American National Standards Institute, American National Standard for Tree Care Operations-Pruning, Trimming, Repairing, Maintaining, and Removing Trees, and Cutting Brush-Safety Requirements, Z133.1. New York, New York, 1988.
2. Blair, Donald F. Safety Training for the Professional and the Non-Professional. Journal of Arboriculture 15(9): September 1989.
3. Federal Register, Proposed Rules for Logging Operations, May 2, 1989,Vol. 54 No. 83, pp. 18798-18817.
4. National Safety Council, Tree Trimming, Data Sheet 1-244-Rev.84, Chicago, Illinois.
5. Shigo, Alex L.. A New Tree Biology. Durham, NH: Shigo and Trees, Associates, 1989; pp. 548-549, 553-554.

FATAL ACCIDENT CIRCUMSTANCES AND EPIDEMIOLOGY (FACE) PROJECT

Staff members of the FACE project of the New Jersey Department of Health, Occupational Health Service, perform FACE investigations when there is a work-related fatal fall or electrocution reported. The goal of these investigations is to prevent fatal work injuries in the future by studying: the working environment, the worker, the task the worker was performing, the tools the worker was using, the energy exchange resulting in fatal injury, and the role of management in controlling how these factors interact.

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