The National Institute for Occupational Safety and Health (NIOSH)

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Owner of Logging Company Crushed by Rootwad of Windfall Tree During Bucking Operation–Alaska

FACE 9304

SUMMARY

A 32-year-old male tree faller/bucker (the victim) was killed while bucking an uprooted hemlock windfall (a tree blown down by the wind) approximately 115 feet long and 26 inches in diameter at the base. The windfall's root system (rootwad) was about 3 feet deep, and had a diameter of about 15 feet. The windfall was located on a mountain where the average slope was between 60 and 70%. The victim first cut 30 feet off the tree top and then tried to cut the rootwad off near the tree base, but was unable to do so because the chain saw bar bound up in each of 4 cuts made approximately 80% of the way through the tree. The victim then moved downslope of the tree and began driving a wedge into his last cut using a sledge hammer. Within seconds the rootwad broke loose from the tree and rolled and slide about 25 feet downslope, completely engulfing and fatally crushing the victim. NIOSH researchers concluded that, to prevent similar occurrences, employers should:

- **ensure that falters and buckers property evaluate felled trees and the area around the trees, so that potential hazards can be avoided during bucking**
- **ensure that all logging workers receive adequate training in safe work procedures**
- **designate a competent: person to conduct inspections to ensure that workers follow established safe falling and bucking procedures.**

INTRODUCTION

On November 8, 1992, a 32-year-old male tree faller/bucker (the victim), who was also part owner of a logging company, was fatally crushed by a rootwad that broke loose from a windfall tree that he was bucking. On November 10, 1992, officials of the Alaska Department of Occupational Safety and Health (AKOSH) notified the National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), Alaska Activity, of the death. On November 11, 1992, a safety specialist from the Alaska Activity conducted an investigation of the incident site. The safety specialist reviewed the incident with company representatives, witnesses, and the AKOSH compliance officer assigned to the case. Photographs were taken of the incident site, and investigative reports from the state troopers and medical examiner were obtained during the investigation.

The employer in this incident was a logging company that had been in operation for 5 years and employed eight workers. The two co-owners and eight workers did only timber falling and bucking, mostly on a subcontract basis for larger logging companies. The company had a written safety policy, safety program, and basic safe work procedures for falters and buckers. The safety program was managed by the victim, who conducted monthly safety meetings to discuss a variety of safety issues pertinent to tree falling and bucking operations. Although the victim had been part owner of the company for 5 years, he continued to work as a faller and bucker. He had a total of 14 years of logging experience, mostly as a faller and bucker.

INVESTIGATION

The victim began falling and bucking trees at about 8 a.m. on the day of the incident. At approximately 11 a.m. the victim drove to a landing (an area where logs are held for loading out) with the bullbuck (foreman) of the primary contracting logging company. His intention was to prepare new tree stumps as guyline anchors for the yarding operation. Cable logging operations use several cable guylines anchored to tree stumps to stabilize the yarder's cable tower.

After walking about 300 feet downslope from the landing, the victim felled and bucked a hemlock tree, creating a stump for use as a guyline anchor point. As he walked back to his truck, he came to an uprooted hemlock windfall (a tree blown down by the wind) that was approximately 115 feet long and 26 inches in diameter at the base. The tree was lying on terrain averaging 60-70% slope in an area that had been clear cut. The tree's root system (rootwad) was about 3 feet deep, as with most trees in this area, and had a diameter of about 15 feet. After noticing the windfall, the victim yelled to the bullbuck, who was on the logging road approximately 300 feet upslope, that he was going to buck the windfall. The bullbuck witnessed the following sequence of events as the victim bucked the windfall: After measuring the tree, the victim used a 32-inch bar chain saw to cut 30 feet off the tree top. Then standing on the tree's upslope side, the victim started the second bucking cut about 18 inches above the base, however, he was only able to cut about 80% through the tree when the saw began to bind. He next began a third cut about 12 inches from the base, and again he cut about 80% through the tree when the saw bound up. Because he could not free the saw, the victim borrowed a similar saw from a chaser working nearby. (A chaser works in the landing to unhook chokers, to buck and stamp logs, etc.) Starting a fourth bucking cut about 30 inches above the base, the victim cut about 80% through the tree when the saw began to bind. Finally, the victim began a fifth cut about 36 inches from the tree base, and he could not remove the saw when it bound up. He walked to the landing for a sledge hammer and a wedge, and returning to the tree's downslope side, he began driving the wedge into the fifth cut. Within seconds the rootwad broke loose from the tree and rolled and slide about 25 feet down the slope completely engulfing the victim.

The bullbuck ran to the rootwad, but he could not see the victim, who was covered by the mass of dirt and roots. After yelling to the victim and hearing no response, the bullbuck summoned help from several loggers at the landing, and then called for help on the truck's two-way radio. The emergency call was immediately relayed to a hospital which dispatched an emergency medical service (EMS) team via helicopter to the site. The loggers considered using the yarding equipment to pull the rootwad off the victim. They attached cables to the rootwad; however, they rejected the idea for fear of causing further injury. The loggers made several attempts (with the yarding equipment) to lift the rootwad vertically off the victim; however their efforts were unsuccessful because of the rootwad's location in relation to the yarding equipment. The EMS team arrived about 45 minutes after being notified, and were on hand when the rootwad was finally removed from the victim. The victim, who had been under the rootwad nearly 90 minutes, was blue from the waist up. The EMS team administered cardiopulmonary recitation and first aid to him at the site and during the 20- minute flight to the nearest hospital, where the victim was pronounced dead on arrival by the attending physician.

CAUSE OF DEATH

The medical examiner listed the cause of death as multiple traumatic injuries to the head and chest.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should ensure that falters and buckers properly evaluate felled trees and the area around the trees so that potential hazards can be avoided during bucking.

Discussion: Although the victim was a part owner of the logging company, he also worked as a faller and bucker. In this incident, as a bucker, the victim put himself in an extremely dangerous location when he moved downslope from the hemlock windfall to drive a wedge into the nearly completed bucking cut. Before starting any bucking cut or driving a wedge into any bucking cut, falters and buckers should carefully analyze potential log movements and other hazards that might develop as the log is released. Section 07.130(f)(2) of the AKOSH Logging Standard states, “The bucker shall carefully examine the tree before making a cut to determine which way the logs will roll, drop or swing when the cut is completed. The safe position found shall be used in finishing the cut.,, The careful evaluation of trees and logs to be bucked is also addressed on pages 85-90 of the Fallers’ and Buckers’ Handbook: “Before starting any cut, buckers should think ahead. Plan the work by analyzing log movements and other hazards that may develop as a cut log is released ... and never start a bucking cut if you consider the log to be in a dangerous position.” A careful evaluation of the tree before bucking may reveal such hazards as unstable rootwads, which are often encountered during bucking operations and can be extremely dangerous. The Fallers’ and Buckers’ Handbook (page 90) also addresses unstable windfalls and rootwads. The handbook recommends that when bucking an unstable uprooted windfall, the faller or bucker should secure the tree and rootwad against movement or reposition them to alleviate the hazard.

Recommendation #2: Employers should ensure that all logging workers receive adequate training in safe work procedures.

Discussion: In addition to regular employee safety meetings (which the victim conducted on a monthly basis), logging employers should also ensure that all workers, including working owners, periodically receive formal safety training pertinent to their tasks. The University of Alaska periodically offers a 10- hour course in logging safety operations that uses the train-the-trainer format. The Alaska Department of Labor has a voluntary compliance program which offers safety consultation and training to employers and employees on a request basis. Both safety training programs are free. The Fallers’ and Buckers’ Handbook (pages 25-27) states, “Every employer must ensure that falters and buckers are adequately trained or have an established safety training program. An effective training program includes a written job description containing step-by-step procedures, a list of the hazards within each step of the procedures, and an explanation of ways to overcome these hazards. A training program for buckers should contain, at a minimum, the following:

1. instruct ions in the proper use and maintenance of a chain saw

2. explanation of the importance of personal protective and safety equipment

3. description of safe work procedures, such as assessing hazards like bucking windfalls

4. assessment of the work area, such as recognizing the hazards when bucking a tree, finding a safe place to stand, and establishing an escape path.

Currently neither the U.S. nor Canada has criteria outlining how much training is necessary; however, the Fallers, and Buckers’ Handbook (page 27) suggests that training for falters and buckers be conducted, at a minimum, during safety meetings, through on-the-job training, and by direct supervision on a continuous basis. A visiting logging safety scientist from Finland noted that the lack of safety training may be a risk factor among Alaska loggers (Ojanen, 1993). In Finland, where the logging fatality rate is comparatively low (25 per 100,000 workers, 1981-1985) as compared to the U.S. (162 per 100,000 workers, 1980-1985) or Alaska (270 per 100,000 workers, 1990- 1992), a safety training “guidance system” was found to be the most effective way of improving safety at work. Under this system, highly skilled loggers trained in safe logging techniques and employed by the logging companies spend 50% of their time as work safety trainers. These experienced loggers regularly conduct personal on-the-job safety training with each less experienced logger (Ojanen, 1993). Effective periodic safety training in the logging industry will raise employees, awareness of the hazards confronting them.

Recommendation #3: Employers should designate a competent' person to conduct inspections to ensure that workers follow established safe falling and bucking procedures.

Discussion: In this incident, although the victim was a co-owner of the logging company, he worked primarily as a faller and bucker. He was also responsible for the company's safety program. Employers should designate a competent person to conduct regular scheduled and unscheduled safety inspections of logging tasks performed by all workers, including tasks performed by working owners. These inspections will help ensure that

[1] Competent person – one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authority to take prompt corrective measures to eliminate them.

established company safety procedures are being followed. Additionally, scheduled and unscheduled safety inspections clearly demonstrate that the employer is committed to the safety program and the prevention of occupational injury.

REFERENCES

Fallers' and Buckers' Handbook. Workers Compensation Board of British Columbia, 1990, pages 25-27 and 85-90.

Occupational Safety and Health Standards on Logging. Alaska Department of Labor, Division of Labor Standards and Safety, August 1990.

National Institute for Occupational Safety and Health. NIOSH Criteria for a Recommended Standard: Logging from Felling to First Haul. NIOSH Publication Number 76-188, July 1976.

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