

# **ALASKA FACE**

## **FATALITY ASSESSMENT & CONTROL EVALUATION**

### **Logger killed when struck by a dislodged limb**

**FACE 99-AK-015**

**Released: December 1, 1999**

#### **SUMMARY**

A 37-year old male logger was killed by a limb that fell from a tree. The logger (the victim) and his partner were working separately in marked stands of trees within voice and visual contact of each other. The victim was attempting to fell the first of two trees. While making the backcut on the first tree, a limb from the canopy directly above him became dislodged. The limb fell and struck his head. When the victim failed to return to the truck on the access road, the victim's partner walked back to the victim's last location. The victim was found at the foot of a felled tree. A large limb was near his body, and his hard hat had a large dent near the front right side which corresponded to bruising and swelling on the victim's head and face. Finding no pulse or signs of breathing, the victim's partner called to another co-worker waiting near the truck on the access road. The co-worker started CPR, however the victim remained unresponsive. The

victim's partner went back to the road and notified a road crew supervisor who radioed the log yard for assistance. The victim was pronounced dead at the scene.

Based on the findings of the investigation, to prevent similar occurrences, employers should:

- **Ensure that timber cutters and cutting supervisors evaluate trees and surrounding areas so that potential hazards can be identified and control measures implemented;**
- **Ensure that timber cutters are aware of the extreme hazard of cutting trees potentially tied together and use appropriate control measures;**
- **Ensure that all workers are trained in first aid and CPR.**

## **INTRODUCTION**

At approximately 1:00 p.m. on May 26, 1999 a 37-year old male logger (the victim) was struck and killed by a tree limb. On May 27, 1999, the Alaska Department of Labor (AK-DOL) notified the Alaska Division of Public, Section of Epidemiology. An investigation involving an injury prevention specialist for the Alaska Department of Health and Social Services, Section of Epidemiology ensued on June 1, 1999. Due to the remote location of the incident, the injury prevention specialist did not conduct a site examination. Telephone interviews were conducted, and the incident was reviewed with an AK-DOL official and Alaska State Troopers. Alaska State Troopers and AK-DOL reports and photographs were requested.

The company in this incident was a privately owned timber cutting operation that had been in business for eight years. The company had nine employees of which six were timber cutters. The victim was an experienced cutter and had been employed by the company for seven consecutive cutting seasons.

The company had a written safety manual, and the company owner acted as the safety manager. Upon initial hire, all employees were given safety training that included the use of personal protective equipment, hazard identification, right-to-know work practices, machinery and equipment use, and emergency contact protocols. All employees were required to have CPR and

first aid training. The owner had informal discussions daily with employees and monthly safety meetings. Employees were assessed for individual skills and knowledge by the company owner prior to cutting alone (singlejacking) or with a partner (doublejacking).

## **INVESTIGATION**

The incident occurred at a site on a remote hillside in southeast Alaska. Transportation to and from the work sites was by truck. The site was approximately 55 to 60 miles from the company's staging office and approximately 200 feet upslope from an access road. Each cutter carried a small emergency first aid packet, personal protection equipment, and logging equipment. Timber cutters did not carry two-way radios, however cutting partners maintained voice and visual contact.

The primary type of timber harvesting being done was clear-cut. The terrain of the harvest area varied in slope, altitude, and ground condition. The incident site was located on a slope of approximately 50 degrees. Ground conditions consisted of mild to moderate brush and mossy undergrowth. Forest composition was mixed hemlock, spruce, and cedar. At the time of the incident weather conditions were intermittent rain with heavy to broken clouds and little to no wind.

The company was subcontracted to cut timber owned by a private corporation. Upon completion of a site survey, the cutting supervisor marked stands of naturally occurring timber and assigned stands to individual cutters. The logging operation was on-schedule. Timber cutters were paid by the day. On the day of the incident, the victim and his cutting partner were working approximately 50 yards apart. They had worked approximately six to seven hours in their assigned stands and had last spoken to each other at approximately 11:30 a.m.

Two trees, both hemlock, were located on a small rise, 15 to 20 feet uphill from other trees that were felled in a pattern across the hillside (perpendicular to the slope). The two trees were less than 1 foot apart at the base of their trunks. Trunk diameters were 30 to 36 inches; tree heights were estimated to be 90 to 120 feet. Based on the cuts to one of the tree (described below), the victim apparently intended to fell the first tree across the hill, which was consistent with the

pattern of previously felled trees in the stand (Figure 1). If the victim intended to fell the second tree in the same direction, its intended lay (an area on the ground where the tree would fall) would have been over the stump of the first tree. An escape route was brushed uphill, approximately 120° from the position of the intended lay of the first tree.

Figure 1. View of fallen tree, stump, and uncut tree



The victim completed a face cut on the first tree and moved between the trees to make a backcut. The backcut was parallel with the inner edge of the face and level with the lower surface. Wedges were not placed into the backcut. The holding wood was approximately 4 inches thick and appeared symmetrical in shape. The tree fell across the hill in the direction of the intended lay. It was surmised from the evidence that a limb fell from the canopy directly above the victim while he completed the backcut on the first tree. The victim's hard hat was found with a large

dent near the forehead area, which corresponded to the bruising and swelling on the victim's head and face. The limb was 5 to 6 inches in diameter at its base and approximately 9 feet long. The end of the limb (where it had broken off from the trunk) did not have any bark strips attached. This indicated that the limb was older and was probably snapped as the tree began to fall. It could not be determined if the limb broke off the felled or the uncut tree.

At approximately 1:00 p.m., the victim's cutting partner walked down to the access road to be transported from the site. During the last 1½ hours of work on the slope, he had periodically seen the victim and heard his chainsaw. However, he did not see the victim at the truck and attempted to make voice contact. When the victim did not respond, he walked up the slope to the victim's last known location. He found the victim lying face down at the base of the cut tree. The victim's chainsaw was near the right side of the body, which was oriented with the bar pointing between the uncut tree and the stump. A limb was near the left side of the victim's head (Figure 2).

Figure 2. Position of tree limb, victim, and chainsaw



The victim's partner turned the victim onto his back and checked for a pulse or signs of breathing. Finding none, he called down to a co-worker on the road. The co-worker climbed up

to the incident site. After checking for a pulse or signs of breathing, the co-worker started CPR as the victim's cutting partner went back to the road for help. A road crew supervisor near the incident site radioed the log yard for assistance. The victim was declared dead at the scene.

The events immediately preceding the incident were unknown. The evidence strongly suggested that the tree fell prematurely, of which lean (of the tree) could have been a contributing factor. While the holding wood was unusually thick, it could not be determined if the victim was making the backcut or had completed the cut when the tree began to fall. Nor could it be determined if the victim was beginning to move toward his escape route when the limb struck him. The following are possible sequences leading to the incident:

- 1) The victim had intended to fell the trees separately. The limb may have broken off the felled tree as it began to fall or as a result of vibration of the chainsaw as the cuts were made. It cannot be dismissed that the limb may have broken off the uncut tree. The limb may have been weakened from the trees pulling apart or by vibration from the chainsaw.
- 2) The victim had intended to fell the two trees together since they appeared to be "tied together" (trees standing close together with limbs intertwined or entangled in the canopy above). Since the cuts made on the first tree indicated that the cutter's intention was for the tree to fall away from the second tree, the only way the trees could be made to fall together would be to cut the second tree so that it would fall into the first tree, creating a domino effect. However, 29 CFR 1910.266(h)(1)(ix) prohibits domino felling unless the first tree was assessed as a danger tree (due to physical damage, direction, or lean of the tree.) When cutters cannot see all the limbs in the canopy between the trees, they should assume that some limbs may be intertwined or entangled. A standard logging practice for felling trees that are tied together is to cut the trees so that they fall at the same time. Normally, the face cut and the backcut are completed on one tree, leaving enough holding wood to maintain the tree in an upright position and using wedges in the backcut to help control it. Then, the second tree is cut, and both trees fall simultaneously.

## **CAUSE OF DEATH**

The medical examiner's report listed the cause of death as impact injuries to the head due to being struck by a fallen tree limb.

## **RECOMMENDATION/DISCUSSION**

**Recommendation #1: Employers should ensure timber cutters and cutting supervisors evaluate trees and surrounding areas so that potential hazards can be identified and control measures implemented.**

*Discussion:* Manual timber felling is the most hazardous job in the logging industry.

Historically, falling objects caused more than 30% of all logging injuries, of which the majority were due to dislodged tree limbs. In addition, forest canopies in coastal environments tend to be thicker, which increases the potential of entangled limbs. Employers should ensure that timber cutters are aware of potential hazards associated with manual felling and emphasize assessing the tree to be felled and other nearby trees for potential hazards. The cutting supervisor should conduct daily general inspections of the work area to identify potential hazards such as logs, rootwads, rocks, snags, spring poles, lodged trees, overhanging limbs, etc. and assess felling technique of the individual cutters. Appropriate safety procedures and escape plans should be developed and implemented to promote safe felling practices and to avoid hazards.

**Recommendation #2: Employers should ensure that timber cutters are aware of the hazard of cutting trees tied together and use appropriate control measures.**

*Discussion:* In this incident, the victim may have been felling two trees simultaneously.

However, the direction of the lay of the first tree and the felling pattern would have required the second tree to fall across the stump of the first tree, producing a domino effect (Figure 1). This is not an accepted industry practice unless the first tree is assessed as a hazard. Timber cutters have the greatest risk of logging-related injury due to their close proximity to trees. A limb or other loose material, also known as a "widow-maker," can fall or be thrown from a tree at any time and may not be seen nor heard due to the noise and the cutter's attention to the immediate activity. Because trees that may be tied together present one of the greatest hazards (due to the danger of a limb or dry top that may break and fall onto the cutter), they should be evaluated

carefully. If either tree appears particularly hazardous (due to lean, rot, dead branches, wind conditions, etc.), then the trees should be left and the cutting supervisor consulted about removal by an alternative method.

**Recommendation #3: Employers should ensure that all workers are trained in first aid and CPR.**

Discussion: All employees should have current first aid and CPR training. In the event of an emergency, basic skills in first aid and life support can reduce suffering and limit further complications, and may keep a seriously injured person alive long enough to get more expert care.

**References**

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Fatality Assessment and Control Evaluation (FACE) Project

The Alaska Division of Public Health, Section of Epidemiology performs Fatality Assessment and Control Evaluation (FACE) investigations through a cooperative agreement with the National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR). The goal of these evaluations 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.

Additional information regarding this report is available from:

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