

Tree Feller Dies After Being Struck by Entangled Tree While Felling Tree in West Virginia.

SUMMARY

On July 22 1999, a 36-year-old male tree feller (the victim) died of injuries sustained when he was struck in the back of the head by a tree which had been pulled over onto him as he was felling. The victim had finished cutting for the day and was on his way back to the landing site. He decided to fell one last tree on the way out. The victim was felling a tree on terrain with a 70% slope. The slope was rocky and laden with grapevines. He was in the process of felling a yellow poplar. The poplar was approximately 30 inches in diameter at breast height and 90 feet tall. Eighteen feet directly behind and uphill from the victim was a small tree approximately 6 inches in diameter. The smaller tree had grapevines which were attached to the top of the tree being felled. His felling technique was uncontrolling, often referred to as "stump jumping." As the tree began to fall, the entangled vines snapped off the smaller tree approximately 9 feet above ground level. The felled tree continued pulling the smaller tree down hill until it struck the victim who was 4 feet from the base of the tree. He was not wearing a hard hat and was struck in the head. Fellow workers who had also finished for the day and were on their way out heard the fell but got no response from the victim when they yelled to him. A cable puller was first to discover the victim. He ran to the landing site, at which time a cellular phone was used to summon rescue. Fellow workers administered first aid and CPR. The EMS arrived within approximately 25 minutes. The victim was transported to the local trauma center and died two hours later.

The WV FACE Investigator concluded that, to reduce the likelihood of similar occurrences, employers should:

- *ensure that tree fellers properly evaluate the timber and the area around the timber to be felled so that potential hazards can be identified and appropriate control measures implemented.*
- *ensure that tree fellers prepare an escape path and move a safe distance from the base of the tree as it is falling.*
- *ensure that tree fellers utilize proper directional felling techniques.*
- *develop, implement, and enforce a written safety program which includes, but is not limited to, training in hazard identification, avoidance, and abatement as well as methods dealing with worker non-compliance.*

INTRODUCTION

On July 22 1999, a 36-year-old male tree feller (the victim) died of injuries sustained when he was struck in the back of the head by a tree which had been pulled over onto him as he was felling. On July 23 1999, the West Virginia FACE Investigator was notified of the death by the West Virginia Department of Health and Human Resources via a phone call. On August 24, 1999, the WV FACE

Investigator conducted an on-site investigation. The Investigator reviewed the incident with the West Virginia Division of Forestry representative, who then accompanied the Investigator to the site. The logging company's owner also was interviewed. The incident site was examined and photographed. Other informational sources and contacts included: death certificate, medical examiner's report, newspaper articles, West Virginia Division of Forestry, and the National Weather Service.

The employer in this incident was a commercial logging company that had been in business for twenty-two years and employed fifteen. Four employees, including the victim, were present the day of the incident. The land was industry-owned. The unmarked, 400 acre timber stand was being selectively logged for saw timber. It was reported that the operation was on schedule.

The site's loader held Certified Logger status in West Virginia. [Note: The Logging Sediment Control Act of West Virginia (1992) requires that each timbering operation in West Virginia be supervised by a certified logger. To become a certified logger, an individual is required to successfully complete training and pass a test for best management practices (a soil erosion prevention plan) and chain saw safety and possess a current first aid card.¹]

The company had no written safety program. The employer (owner) did not provide formal company-specific training. The employer did, however, provide his employees with personal protective equipment. It was reported that fellers were issued hard hats, chaps, safety glasses, and hearing protection. It was also reported that the victim would not utilize the issued PPE. The owner indicated that he would counsel his workers in a preventative manner as well as corrective manner when necessary. Prior to this incident, the employer had never experienced a similar incident, and no fatalities had occurred in the company. It should be noted that two weeks after the incident the victim's brother, who also was a feller for the company, was hospitalized after being hit in the head with a dead branch while felling. He was wearing his hard hat.

The victim's job at the time of the incident was felling trees. He had been a logger for 15 years. The victim had been cutting for the employer for a total of one and one half years when the incident occurred. He had attended the West Virginia Division of Forestry's chain saw safety workshop five years earlier. At the time of the incident, the victim was not wearing a hard hat, eye protection, hearing protection or chaps. He had been cutting nine hours prior to the incident.

INVESTIGATION

On July 22, 1999, the company was selectively harvesting the tract and had begun work at approximately 7:00 a.m. It was reported by the National Climatic Data Center within the area to be a dry day. The victim and three other employees were working that day. The victim had finished cutting for the day and was on his way back to the landing site. At approximately 4:50 p.m., he decided to fell one last tree on the way out. The victim was felling a tree on terrain with a 70% slope. The slope was rocky and laden with grapevines. He was in the process of felling a yellow poplar. The poplar was approximately 30 inches in diameter at breast height and 90 feet tall (see [Figure 1](#)). Eighteen feet directly behind and uphill from the victim was a small tree approximately 6 inches in diameter (see [Figure 2](#)). The smaller tree had grapevines which were attached to the top of the tree being felled. His felling technique was un-controlling, often referred to as "stump jumping" (see [Figure 3](#)). As the tree began to fall, the entangled vines snapped off the smaller tree approximately 9 feet above ground level (see [Figure 4](#)). The felled tree continued pulling the smaller tree downhill until it struck the victim who

was 4 feet from the base of the tree (see [Figure 5](#)). There was no established escape path (see [Figure 6](#)). He was not wearing a hard hat and was struck in the head. Fellow workers who had also finished for the day and were on their way out heard the fell but got no response from the victim when they yelled to him. At approximately 5:00 p.m., the cable puller discovered the victim. He ran to the landing site, at which time a cellular phone was used to summon rescue. Fellow workers administered first aid and CPR. The EMS arrived within approximately 25 minutes. The victim was transported to the local trauma center and died two hours later.

CAUSE OF DEATH

The medical examiner's report listed the immediate cause of death as head injury.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should ensure that tree fellers properly evaluate the timber and the area around timber to be felled so that potential hazards can be identified and appropriate control measures implemented.

Discussion: A small tree was located 18 feet behind and uphill of the tree selected for cutting. Grapevines were present throughout the forest and entangled in many trees. The tree being felled was connected to the small tree by a series of grapevines located in the tree tops. The fact that the two trees were entangled would make the smaller tree a danger tree. OSHA Regulations 29 CFR 1910.266(h)(1)(vi) and (h)(2)(ii) require that each danger tree shall be felled, removed, or avoided. Each danger tree, including lodged trees and snags, shall be felled or removed using mechanical or other techniques that minimize the logger's exposure before work is commenced in the area of the danger tree. Also, before each tree is felled, conditions, such as, but not limited to, snow and ice accumulation, the wind, the lean of the tree, dead limbs, and location of other trees, shall be evaluated by the feller and precautions taken so a hazard is not created. In this case, it appears the victim may not have evaluated the area around the tree to be felled. Appropriate precautions (e.g., removing the danger tree first) may have been implemented, thereby eliminating the potential hazard.

Recommendation #2: Employers should ensure that tree fellers prepare an escape path and move a safe distance from the base of the tree as the tree is falling.

Discussion: Preparing an escape path before felling any tree is imperative for a safe felling operation. Doing so will allow the feller to quickly reach a safe distance from the falling tree. A way of retreat must be planned before felling a tree. CFR 1910.266h(2)(I) requires that before felling is started, the feller shall plan and clear an escape path, and once the back cut has been made, the feller shall immediately move a safe distance away from the tree on the escape path.² The victim did not establish a path. Having established a path and retreating the recommended diagonal 45 degrees from the expected felling line would have placed the victim in a safe area even with the entanglement.

Recommendation #3: Employers should ensure that tree fellers utilize proper directional felling techniques.

Discussion: Directional felling is the safest manual felling method of getting trees on the ground. The proper notch directs the tree's fall, and the hinge wood keeps the tree under control as it falls. CFR 1910.266h(2)(v) requires that a directional undercut be made, and 1910.266h(2)(vi) requires that a back cut be made leaving sufficient hinge wood to hold the tree to the stump during most of its fall so the hinge is able to guide the tree's fall in the intended direction.² The victim did not utilize proper directional felling techniques. Having left the proper amount of hinge wood would have ensured that the tree would have fallen at a slower, more controlled, rate. In doing so, the victim would have had more time to react and retreat from the entangled "pullover."

Recommendation #4: Employers should develop, implement, and enforce a written safety program which includes, but is not limited to, training in hazard identification, avoidance, and abatement as well as methods for dealing with worker noncompliance.

Discussion: The evaluation of tasks to be performed at the work site form the basis for the development, implementation, and enforcement of a safety program. The key elements of the program should include, at a minimum, training in hazard identification and the avoidance and abatement of these hazards. Additionally, the program should address the steps to be taken in the event of identifying a worker who fails to follow company-established safe work practices. In this incident, the employer did not have a written safety program and therefore had no formally established means for communicating and enforcing safety expectations. Having established, communicated, and enforced the worker's responsibilities concerning the company's safety program may have changed the victim's behavior concerning unsafe work practices such as not wearing his personal protective equipment.

REFERENCES

1. West Virginia Logging Sediment Control Act, 1992.
2. Office of the Federal Register: Federal Register, Vol. 59, No. 196, 29 CFR 1910.266.

ILLUSTRATIONS



Figure 1. Arrow points to stump of poplar which was felled.



Figure 2. The arrow on the left points to the remaining section of the tree which was pulled over. The arrow on the right points to the section which hit the victim.



**Figure 3. This picture shows the stump of the felled tree.
The mating section of the felled tree indicated that a directional felling notch was not executed.
The tree was allowed to "jump" off the stump.
"Stump jumping" results in less time to react to the falling tree.**



**Figure 4. The arrow points to the remaining section of the tree which was snapped off during pull over.
This photo was taken from the victim's point of reference.**



**Figure 5. The lower arrow points to the spot where the victim was hit.
The upper arrow points to tree which was snapped off.**



**Figure 6. The arrow depicts the recommended escape path.
Note the trees on the ground obstructing the path.
These trees were knee level at the time of the incident due to the uneven terrain.**

FATALITY ASSESSMENT AND CONTROL EVALUATION PROGRAM

The WVU Center for Rural Emergency Medicine, through a contract with the West Virginia Department of Health and Human Resources, conducts investigations on the causes of work-related fatalities within the state. The goal of this program is to prevent future fatal work-place injuries. West Virginia FACE intends to achieve this goal by identifying and studying the risk factors that contribute to work-place fatalities, by recommending intervention strategies, and by disseminating prevention information to employers, employees, trade associations, unions, equipment manufacturers, students, teachers, and others with an interest in work-place safety.

Please use information listed on the Contact Sheet on the NIOSH FACE website to contact [In-house FACE program personnel](#) regarding In-house FACE reports and to gain assistance when State-FACE program personnel cannot be reached.