MIFACE INVESTIGATION: #01MI039

SUBJECT: Logger Killed While Freeing Maple Log With Chainsaw During Skidding Operation

Summary

A 21-year old male laborer was fatally injured after being struck in the throat with a chain saw on a logging site. The victim was working with 2 other loggers, one was driving the cable skidder and the other was felling trees. The cable skidder had one main line with four chokers, and was removing the felled logs from the logging site. While moving the logs, a 7-inch diameter, 6-foot tall maple log became caught in the cables. The cable skidder operator stopped the skidder and, without lowering the logs to the ground, directed the victim to cut the maple caught in the cables. Using a XP371 Huskaverna chainsaw with a 20" bar, the victim made a straight cut through the maple. This was an unwitnessed event. Most likely, due to the pattern of injury, the chainsaw kicked back and struck the victim in the throat or the tree may have moved unexpectedly, pushing the saw into the victim's neck which fatally injuring the victim. The cause of the kickback is unknown. The victim dropped the chain saw between the choked logs and ran to a nearby car. The skidder operator called to the feller and the feller attempted to use a cell phone to call for an ambulance. No signal could be reached, and the feller drove out of the logging site to a nearby store and called for an ambulance. Emergency personnel and the police arrived shortly thereafter. The victim was declared dead at the scene.

RECOMMENDATIONS

- Employers should establish a daily maintenance inspection to ensure the chain saw is kept in proper working order.
- Employers should ensure that chain saw users receive training on the safe use of, hazards associated with, and proper maintenance of the chain saw.
- Employers should implement and enforce a written safety program, which includes but is not limited to development of safe work procedures and worker training in hazard identification, avoidance and abatement.
- Employers must provide and enforce the use of personal protective equipment.
- Employers must provide first aid equipment at jobsites and have at least one employee who is trained in Red Cross first aid or equivalent.
- Employees must follow General Industry Safety Standard, Part 51, Logging, Rule 5116 that describes employee responsibilities under Part 51.
- Employers should provide a means for emergency communication in case of injury.

INTRODUCTION

On June 26, 2001, a 21-year old male died from injuries sustained when he was struck in the throat by a chain saw while attempting to free a 6-foot log wedged in the logs being skidded. On June 26, 2001, MIFACE investigators were informed by the Michigan Occupational Safety and Health Administration (MIOSHA) 24-hour fatality report system that this work-related fatal injury occurred. On July 6, 2001, a MIFACE researcher accompanied the MIOSHA compliance officer to the interview conducted with the owner of the logging company. The company owner agreed to participate in the MIFACE project, and the MIFACE researcher observed the MIOSHA closing conference with the company. Following the closing conference, the MIOSHA officer left, and the MIFACE researcher completed the company interview. The death certificate, autopsy results, police report, and a copy of the MIOSHA citations issued to the employer were obtained during the course of the investigation. The employer received seven citations classified as "serious", and one citation classified as "other". Five of the serious citations were in reference to the lack of employer enforcement in the use of personal protective equipment, one serious citation referenced the lack of employee training, and the last serious citation referenced the inspection of the chain saw. The "other" citation referred to the absence of the MIOSHA poster at the workplace.

INVESTIGATION

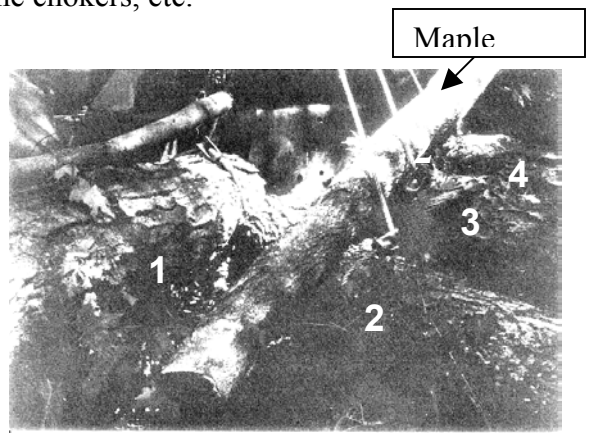
The small family owned logging company has been in business for approximately 5 years. The normal workday was approximately 6 hours. The victim was a part-time laborer employed for approximately 6 months. The victim was familiar with using a chain saw; he had been operating this chainsaw occasionally for about 3 months, mainly limbing felled trees. The logging site can be described as heavily wooded, naturally occurring hardwood. The land was privately owned, and the logging company was retained to selectively cut the hardwood timber. The company harvested sawlogs and veneer. This was the first day of the logging job.

The skidder was a 1970's Tree Farmer cable skidder utilizing four chokers on the main line.

The victim used a model XP371 Husqvarna chain saw, with a 20-inch bar. The chainsaw was in disrepair, with a bolt missing from the chain brake, which made it inoperable, and the handle base taped together. The company owner did not have a safety operation manual for the saw. The company owner did not have a written safety program nor established safe work procedures. Personal protective equipment, such as head, hand, eye/face, leg, ear or foot protection was not available for use by the employees. There was not a first aid kit nor a person trained in first aid on the logging site.

There were no witnesses to the incident. As told to the MIFACE researcher by the company owner and son, the incident description is as follows:

Prior to beginning the work at the logging site, the owner, son and victim met for coffee at a local restaurant and discussed the upcoming day's work. Proceeding to the logging site, work began at about 7:30 am. There was a two-track road leading to the logging site, which was approximately ½ mile into the woods. At the site, the son felled the trees, the company owner operated the cable skidder, and the victim was the general laborer; clearing the site, limbing felled trees, setting the chokers, etc.



Police Department Photograph

The victim and the owner attached and secured 4 felled logs (See Figure 1, 1-4) to chokers at the rear of the skidder. While the son was cutting trees approximately 30 yards away, the cable skidder was driven to the landing area. While the skidder was being driven to the landing area, a 7-inch diameter, 6- foot tall maple log became entangled in the logs/winching cables. The owner stopped the skidder, and directed the victim to cut the maple so it could be removed from the cables. There were three logs on the right side of the skidder and one log on the left side of the skidder. The owner thought that the victim was standing on the right side of the skidder among the 3 logs, facing west. The skidder operator did not lower the logs to the ground releasing the tension from the main line, choker or logs because it did not appear to him any of the logs or the maple were under tension. The skidder was stopped approximately 60 feet from the feller.

The victim climbed over the logs and began to cut the maple. It is probable that the victim was standing on the ground. It is unknown how the victim cut the log, whether he began his cut from the underside to avoid pinching, then finished from the topside, or whether he cut straight through beginning at the topside. It is also unknown if the victim was using one or two hands to hold the chainsaw when he cut the maple. Using pictures taken by the police at the incident site, it appears that that victim was cutting below shoulder height. The owner was standing near the victim with his back to the victim while the victim attempted to cut free the maple. It is unknown if the victim was standing directly over the maple or standing slightly to the side, out of the cutting plane.

The circumstance(s) causing the chain saw to strike the victim's throat is unknown. Based on the location of the injury (neck), it is likely that kickback of the chain saw was the major event that caused the injury. Chain saw kickback could have occurred by striking a nearby felled log or the main cable line or one of the chokers. Other possible scenarios could include one or a combination of the following: (1) the victim lost his balance (maple piece fell to the ground, hit in face by flying piece of wood, etc) (2) the maple was under tension and experienced springback when the maple was cut through, (3) the maple rolled unexpectedly and either directly hit the victim or hit a winched log which caused the victim to fall, or (4) the victim could not properly place the chain saw to make the cut, forcing him to use the saw tip to cut the maple. The owner stated that the

maple log was completely cut through, and the chain saw was found on the ground in between the felled logs hauled by the skidder.

The owner observed the victim run toward a nearby car. While at the car, the victim attempted to control the bleeding from his throat. The owner, seeing the victim was injured, called to his son, who ran to the victim to assist him. While assisting the victim, the victim collapsed to the ground.

The son attempted to call 911 on his cell phone, but was unable to get a signal. He drove to a nearby store to obtain emergency assistance. Emergency personnel arrived, and declared the victim dead at the scene.

The police examined that chain saw and stated that the chain brake was not functioning properly at the time of the incident. The police report states that the brake mechanism was fixed to the drive side of the chain saw, but on the opposite side, the bolts that hold the brake to the main chassis of the saw were missing. This condition caused the brake handle, when pulled back and forth to spring back to its neutral (non-brake) position; the braking mechanism would not lock in place.

CAUSE OF DEATH

The medical examiner recorded the cause of death as a chainsaw laceration to neck. The blood and urine of the victim was sent to the laboratory to determine if there was alcohol or other drugs of abuse present. The laboratory detected 0.05 grams methanol per and 0.01 grams isopropanol per 100 milliliters of blood. There were no drugs of abuse detected in the urine.

RECOMMENDATIONS/DISCUSSION

- Employers should establish a daily maintenance inspection to ensure the chain saw components are securely attached and functional and that the saw is kept in proper working order.

The employer did not have a daily inspection of the chain saw. To ensure that the chain saw is in proper working order, a visual and operational inspection should occur prior to the saw's use. A visual inspection of the machine should include: outside screws and fasteners; front and rear handle condition; cracked or broken housing; condition of the drive sprocket; broken lines or wires; condition of air filter; chain lubrication; air inlets and cooling fins clean; saw chain condition (wear, sharpness, proper depth gauge setting, proper chain tension); guide bar condition (rotation and tip condition, gauge and condition of bar rails); a V mount condition; fuel or oil leaks and if the fuel and oil caps are tight. An operational inspection could include: throttle trigger, trigger interlock and master control lever; chain catch and chain brake; and actual operation of the chain saw.

MIOSHA General Industry Safety Standard Part 51, Logging Rule 5130 (2), Hand and portable powered tools states "An employer shall assure that each tool, including any tool

provided by an employee, is inspected before initial use during each work shift. The rule also describes what aspects of the tools must be inspected. Rule 5130 (2) (a-e) addresses the chain saw. An inspection of the chain saw would have highlighted the need to take the saw out of service and repair the chain break. The chain break is designed to stop a moving chain in a fraction of a second if kickback occurs. Because the chain is stopped so quickly, the potential for injury is reduced. The saw's chain break was inoperable and did not stop the chain from rotating around the bar. It is unknown if the chain break was operating correctly whether this would have prevented the incident.

- Employers should ensure that users of chain saws have received training on the safe use of, hazards associated with, and proper maintenance of the chain saw.

The victim had operated a chain saw in the past, but did not receive formal training on the safe use of, hazards associated with, and proper maintenance of the chain saw. The employer assumed that the victim knew how to properly operate the chain saw. Training should include instruction on safe working techniques, operating conditions, including unusual or dangerous conditions, basic information about the chain saw including its control, attachments and components, design, capacity, stability and limitations, correct stoppage and starting techniques, cleaning and servicing, hazards of kickback, and chain sharpening techniques.

One of the hazards associated with chain saw use is kickback of the chain saw. When the upper tip of the guide bar contacts an object or when wood closes in and pinches the saw chain, kickback can occur. When this occurs, the energy of the saw is redirected back and up towards the operator, and can result in severe injury. It is unknown if the chain depth gauge (raker) was reduced below the manufacturer's recommendation, a raker that is too low can increase the potential for kickback.

Another hazard associated with chain saw use is cutting of trees that are under tension. It is probable that the maple was under tension. The logs were not lowered to the ground prior to the cut; keeping the logs in a raised position automatically places the logs, mainline and chokers under tension. It is unknown if the cut was made at the bend (from above or below the bend). When the maple cut was complete, it is possible that the maple could have rolled or snapped toward the victim, striking the victim directly or causing the victim to attempt to move quickly out of the way causing him to fall or lose his balance.

The use of a chainsaw when cutting felled logs that are in a pile also increases the risk of chainsaw kickback. While cutting an exposed log, the chainsaw tip can strike nearby logs and kickback in the direction of the operator.

- Employers implement and enforce a written safety program, which includes but is not limited to development of safe work procedures and worker training in hazard identification, avoidance and abatement.

The skid trail was not adequately cleared of debris and thus the maple was caught up in the skid logs. A safety program should include having workers conduct an initial and

daily jobsite survey to identify hazards and implement appropriate controls. In this incident, the jobsite was not adequately assessed and hazards, such as cleared trees and debris, were left in the skid trail.

Employers should review each job to identify potential hazards and design safe work procedures to eliminate or control the identified hazards. The victim was directed to cut the maple while the logs were held in a raised position by the skidder. Logs held in this position are automatically under tension, increasing the risk to an operator using a chain saw.

Part 51, Rule 5119 describes the elements of an employee training program. The victim had not been trained before the owner permitted the employee to work on a job site. The employee did not receive training on health and safety issues specific to this incident. He was not trained in the recognition of safety and health hazards associated with his specific tasks or in the safe use, operation and maintenance of tools that he uses. The lack of training in the recognition of an unsafe piece of equipment, the chain saw, may have been a contributing factor in this incident. Ongoing health and safety meeting must be conducted, at a minimum of one time per month is also required by Part 51.

- Employers should provide, inspect, and enforce the use of personal protective equipment.

General Industry Safety Standard, Part 33, Personal Protective Equipment directs employers to conduct a workplace hazard assessment to determine if hazards that require the use of personal protective equipment are present or likely to be present. Employers should evaluate tasks performed by workers; identify all potential hazards; select and require the employee to use appropriate personal protective equipment. The hazard assessment process can also assist an employer in the development, implementation, and enforcement of written safe work procedures.

The employer did not provide all necessary pieces of personal protective equipment, did not inspect the equipment, and did not enforce the use of the equipment. Part 51 Rule 5121-5125 describes the personal protective equipment that must be worn during logging operations. Of specific concern in this fatality was the absence of a steel wire or nylon mesh screen to protect the face to below the nose from chips or sawdust from a chain saw or where these potential for facial injury. The victim, while cutting the maple, could have had a chip of wood hit his face or eye causing him to suddenly react in a protective mode. This could have lead to a loss of balance or a loss of control of the chain saw.

- Employers must provide first aid equipment at jobsites and have at least one employee who is trained in Red Cross first aid or equivalent.

The employer did not have a first aid kit on the jobsite or on each employee transport vehicle and did not have an employee trained in first aid or its equivalent as required by Part 51, Rule 5114. The Logging Standard requires that each employee, including supervisors receives or has received first aid and cardiopulmonary resuscitation (CPR) training that is in compliance with the first aid training component of rule 5114. The lack

of first aid training and a first aid kit was not a factor in this incident due to the severity of the victim's injury. Under different circumstances, however, the lack of a first aid kit and qualified first aid responders could play a crucial role in surviving a serious injury and preventing a fatality.

- Employees must follow General Industry Safety Standard, Part 51, Logging, Rule 5116 that describes employee responsibilities under Part 51.

Rule 5116 requires employees to: (1) Comply with and follow all job safety procedures developed by the employer, (2) examine the work area and equipment that is going to be used before work begins and report a dangerous or unsafe condition in the work area or equipment to the immediate supervisor, (3) Do not engage in a reckless practice or action which could result in an accident or injury, and (4) do not operate a machine without experience, instruction and authorization.

The employee training program required in Rule 5119 plays a crucial role in providing employees the tools needed to adequately assume their responsibilities under Part 51, Rule 5116. Training provides an employee the tools to examine the work area and equipment to be used and recognize dangerous or unsafe work area conditions. Training also enables an employee to recognize a reckless practice or action that could result in an accident or injury.

The lack of employee training may have been a contributing factor for this employee to not assume his responsibility for working safely and using safe tools, i.e. not reporting the chainsaw disrepair.

- Employers should provide a means for emergency communication in case of injury.

Cellular telephones must be tested in each logging site to determine if a signal can be obtained before the telephone is relied upon to provide emergency communication. The lack of the telephone's capability to obtain a transmission signal was not a factor in this fatality due to the severity of the victim's injury. Under different circumstances, however, the lack of communication to emergency responders could play a crucial role in the survival of a serious injury and preventing a fatality.

Employers working in remote areas should contact a local cellular phone or 2-way radio company for methods to insure communication to either the company's corporate site or to emergency response personnel.

The external antenna plays a major factor in the capability of the communication device to pick up a signal. The external antenna should be selected based on the terrain of the area the phone will be used in. If the area is mountainous or in the city, an antenna with a unity gain or 0 decibel antenna should be selected because they radiate the same horizontally as vertically. Antenna height is also a factor in how well a cellular phone or a 2-way radio can pick up a signal. The taller the antenna, the better it is in picking up a signal. A local repeater can be used to increase the range of communication. A repeater is

a specially built receiver and transmitter pair that receives signals from low power handheld or mobile radios and retransmits them using a better antenna and more transmitter power. An employer can rent use of an existing repeater system that is shared. There is also a Specialized Mobile Radio Service (or SMR) system that operate similar to the basic repeater and provide coverage over wide areas. If a 2-way radio is selected, a license may be required from the Federal Communications Commission.

REFERENCES

MIOSHA Standards cited in this report can be directly accessed from the Consumer and Industry Services, MIOSHA website www.michigan.gov/mioshastandards.

The Standards can also be obtained for a fee by writing to the following address: Department of Consumer and Industry Services, MIOSHA Standards Division, P.O. Box 30643, Lansing, MI 48909-8143. MIOSHA phone number is (517) 322-1845.

1. MIOSHA General Industry Safety Standard Part 51, Logging.

2. MIOSHA General Industry Safety Standard, Part 33, Personal Protective Equipment.

3. Husqvarna http://international.husqvarna.com/. Click on Work Tech for Working Technique for chain saw technique.

4. NIOSH Logging Alert – DHHS (NIOSH) Publication No. 95-101, Preventing Injuries and Deaths of Loggers. This document can be downloaded from the Centers for Disease Control and Prevention Website. http://www.cdc.gov/niosh/logging.html.

5. James P. Dougovito, Training Specialist, Michigan Technological University. Coordinator/Trainer, Safety Training Program for the Forest Products Industry in Michigan. State Director, Past President, Association of Woodslands Trainers, Prince Albert. Saskatchewan. Soren Eriksson's game of Logging, 1994. Recipient, H.H. Jefferson Memorial Safety Award, National & Lake States, Forest Resources Association, 2002.

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10/9/03

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Investigation Report # 01 MI 039
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Please rate the following on a scale of:

Excellent	Good	Fair	Poor
1	2	3	4

What was your general impression of this MIFACE investigation report?

Excellent	Good	Fair	Poor
1	2	3	4

Was the report…	**Excellent**	**Good**	**Fair**	**Poor**
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Clearly written?	1	2	3	4
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Were the recommendations …	**Excellent**	**Good**	**Fair**	**Poor**
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Useful?	1	2	3	4

How will you use this report? (Check all that apply)

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