**FACE-93-03**

**DATE: March 9, 1993**

**TO: Director, National Institute for Occupational Safety and Health**

**FROM: Division of Safety Research, NIOSH**

**SUBJECT: Truck Driver Killed when Struck by Log that Rolled off Truck During Loading Operation - Alaska**

## SUMMARY

A 49-year-old male truck driver (the victim) was preparing to secure a load of logs - approximately 40 feet long and averaging 18 inches in diameter - on his truck with a binder (chain). The last logs to be loaded lay above the top of the 4-foot-high stakes located at each corner of the trailer. As the shovel-loader placed the last log on the trailer, the top log on the right side, measuring 40 feet long by 20 inches in diameter at the base and 14 inches in diameter at the top, shifted and rolled off the trailer. The shovel-loader was unable to see the victim who was at the trailer's right front corner. When the log fell it struck the victim, fatally crushing his head and chest. NIOSH researchers concluded that, to prevent similar occurrences, employers should:

- *ensure that log truck drivers and other workers stay clear of log loading operations until loads are stabilized*
- *ensure that all logging employees receive adequate training in safe work procedures*
- *conduct periodic inspections to ensure that workers follow company safety procedures.*

Additionally, manufacturers and employers should:

- *consider manufacturing and/or retrofitting log trucks with retention stakes high enough to adequately secure anticipated log loads.*

## INTRODUCTION

On November 7, 1992, a 49-year-old male truck driver (the victim) was fatally struck by a log that rolled off a truck during a loading operation. 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 investigated the incident. Although an on-site visit was not made, information pertaining to the incident was obtained from company representatives, the state trooper's report, the coroner's report, photographs of the site, and the AKOSH compliance officer assigned to the case.

The employer in this incident was a logging company that had been in operation for 12 years. The employer had 85 employees, 4 of whom were log truck drivers. The employer had a written safety policy, safety program, and basic safe work procedures at the time of the incident. There was no full-time safety manager, although one of the company managers was responsible for the safety program as a collateral duty. Meetings were conducted weekly to discuss safety issues pertaining to logging operations. The victim had been employed by the company for 4 years before the incident, and had a total of 15 years experience as a log truck driver.

**INVESTIGATION**

At about 7 a.m. on the morning of the incident, the victim and a log shovel-loader began their usual task of loading and hauling logs. This task involved the following sequence of activities: (1) piggybacking a double-axle log trailer assembly on a tractor trailer and driving the tractor trailer to a loading site; (2) lifting the trailer off the tractor with a shovel-type loader and connecting the trailer to the tractor; (3) loading the trailer with logs; (4) securing the logs with cables or chains (wrappers or binders); (5) hauling the logs to the sort yard for off-loading with a yard loader; (6) disconnecting the trailer assembly and hoisting it onto the log truck; and (7) returning the loading site to pick up a new load.

The victim drove to a designated wide spot on the unpaved logging road for his first load. After the victim and shovel-loader connected the trailer to the tractor, the victim returned to the truck cab and the shovel-loader began loading the logs onto the trailer - thus far in accordance with standard operating procedures. The shovel-loader was approximately 12 feet behind and to the left of the trailer; he was loading the logs from this point.

The logs being loaded were hemlock, approximately 40 feet long and averaging 18 inches in diameter. When the trailer was about 75% loaded, the center of the top logs nearly reached the top of the 4-foot-high stakes at each corner of the trailer. At this point the victim used his CB radio to ask the shovel-loader, “Can I stretch my wrappers out?” Wrappers or binders are chains/cables - usually two or more - which are cinched around logs on a trailer to secure them for transport. The shovel-loader answered affirmatively, according to another truck driver listening on his CB radio. The victim then exited the truck cab, walked around the front of the truck to the trailer’s forward right side, and began laying out the first of two binders. The shovel-loader was unable to see the victim, who according to the shovel-loader, had used this same procedure several other times for securing a load of logs. The shovel-loader placed about five logs above the top of the stakes to top off the load. As the shovel-loader topped off the load, the top log on the right side - measuring 40 feet long by 20 inches in diameter at the base and 14 inches in diameter at the top - shifted, rolled off the trailer, and struck the victim, who suffered fatal injuries to his head and chest.

The shovel-loader saw the log fall off the trailer. He immediately dismounted from the shovel cab and ran to the victim who was lying unconscious on the ground and bleeding from the head. The log was lying a few inches from the victim’s head. The shovel-loader called for aid on the truck CB radio, and within 5 minutes other company employees arrived and helped administer cardiopulmonary resuscitation (CPR) to the victim. An emergency medical service team arrived

via helicopter in about 60 minutes and continued CPR on the victim for about 2 1/2 hours, both at the site and enroute to the nearest hospital, where he was pronounced dead on arrival.

## CAUSE OF DEATH

The medical examiner listed the cause of death as blunt force trauma to the head and chest.

## RECOMMENDATIONS/DISCUSSION

***Recommendation #1: Employers should ensure that log truck drivers and other workers stay clear of log loading operations until loads are stabilized.***

Discussion: In this incident the victim was working directly below the logs which were being loaded onto the trailer and had not yet been stabilized. Section 07.155 (f) of the AKOSH Logging Safety Code states, "Logging trucks shall be loaded in such a manner that the logs rest securely and the load is stable and well balanced before any binder is placed thereon … Employees shall not walk alongside or be underneath any truck being loaded." Loads which have logs resting above the ends of the retention stakes are inherently unstable, especially during loading operations. Therefore, before workers secure the loads with binders or wrappers for transport, they should use the loading equipment to stabilize the load. In this incident, the hazards of an unstabilized load were compounded when the victim walked out of the shovel-loader's view. The Yarding and Loading Handbook (page 133) states, "Before using the loader, the operator must be able to see or know the whereabouts of log truck drivers as well as the landing workers. He must be sure that they are out of the danger area."

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

Discussion: In addition to regular employee safety meetings, which in this case were conducted weekly by the owner, logging employers should also ensure that employees periodically receive formal safety training pertinent to their work. The University of Alaska periodically offers a short 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 Yarding and Loading Handbook (page 11) states that every employer must have an established safety training program, and must ensure that workers are adequately trained. 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 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 conduct periodic inspections to ensure that workers follow company safety procedures.***

Discussion: Conducting regular, scheduled, and frequent, unscheduled, safety inspections of all logging tasks by qualified individuals will help ensure that established company safety procedures are followed. Additionally, scheduled and unscheduled safety inspections clearly demonstrate that the employer is committed to the safety program and the prevention of occupational injury.

***Recommendation #4: Manufactures and employers should consider manufacturing and/or retrofitting log trucks with retention stakes high enough to adequately secure anticipated log loads.***

Discussion: Normal operating procedures permitted using the 4-foot-high trailer bed stakes as long as the load was properly and adequately bound. In this incident, a log rolled off the top of the load which was above the top of the stakes. Retention stakes which extend above the top of the log load - assuming the states are properly constructed - would help to secure the load not only during transport, but also during loading operations as well, most critically while the binders or wrappers are being manually secured around the load.

**REFERENCES**

Yarding and Loading Handbook. Workers' Compensation Board of British Columbia, 1981, pages 11 and 133.

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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Jan C. Manwaring
Safety Specialist
Alaska Activity
Division of Safety Research

George Conway, M.D., M.P.H.
Chief
Alaska Activity
Division of Safety Research

James C. Helmkamp, Ph.D.
Acting Chief
Trauma Investigations Section
Surveillance and Field
Investigations Branch
Division of Safety Research

Timothy J. Pizatella, M.S.
Chief
Surveillance and Field
Investigations Branch
Division of Safety Research

*Fatality Assessment and Control Evaluation (FACE) Project*

*The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), performs Fatality Assessment and Control Evaluation (FACE) investigations when a participating state reports an occupational fatality and requests technical assistance. 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.*

*States participating in this study:*
*Kentucky, Maryland, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia.*

Additional information regarding this report is available from:

Division of Safety Research
National Institute for Occupational Safety and Health (NIOSH)
944 Chestnut Ridge Road
Morgantown, West Virginia 26505-2888
Phone: (304) 284-5722
FACE 93-03