

IV. DEVELOPMENT OF STANDARD

Basis for the Recommended Standard

Logging has been shown to be an extremely hazardous occupation. The Bureau of Labor statistics for 1973 reported an injury incidence rate of 31.2%, or approximately one injury for every three loggers. This is 2.9 times the all-manufacturing sector rate of 10.6%. [15] The same report identified a lost workday incident rate of 16.1% which is almost five times the all-manufacturing rate of 3.3%. The incidence of lost workdays/100 full-time workers was 307.8 which is the highest rates of all industries in the private sector. The percent of disabling injuries resulting in death was more than five times greater than that of all manufacturing. [14]

The work practices portion of the recommended standard was developed after extensive review of published information, [3,12,11] the present federal code, applicable portions of state codes, [4-6,8-10,19-23] and the International Labour Office forestry recommendations, [27] consultations with logging professionals, and visits to sites of logging operations.

After consultation with a number of safety professionals, many with experience in logging operations, it is the judgment of NIOSH that compliance with these recommended work practices will reduce logging injuries. In a hazardous industry such as logging, the proper training of workers is a necessity. The training process permits the employer to determine whether employees demonstrate the knowledge, understanding and skills to safely perform their assigned tasks.

Because physical health of an employee affects his or her ability to perform the job safely, it is necessary that preplacement examinations be

required. They shall include an examination of the cardiovascular, musculoskeletal and central nervous systems, and emphasize the integrity of the extremities and digits, of hearing and visual acuity, and for chain saw operators, an examination of peripheral vasculature (Reynaud's syndrome). Due to the nature and environment of logging operations, determination of the need for tetanus immunization shall be necessary. Such examinations are necessary to ensure that workers are physically able to perform their tasks in a safe manner. Periodic examinations during employment are important to recognize developing conditions which might jeopardize worker safety.

Because of the hazards encountered in the logging industry and because of the frequent remoteness of work areas from medical facilities, it is recommended that trained first aid personnel, along with first aid equipment and means of transportation to medical care, be available at the worksite.

It is apparent that more research is needed in the field of logging safety. Ergonomic, behavioral, and motivational factors contributing to worker safety must be identified and methods developed to improve worker behavior to effect safer work conditions. Also, equipment must be designed to eliminate or minimize operational hazards and mechanization developed to separate the worker from uncontrollable hazards.

Comparison with OSHA Pulpwood Logging Standard (29 CFR 1910.266)

The NIOSH recommended standard differs from the present federal pulpwood logging standard 29 CFR 1910.266, in the following ways:

(a) The recommended logging standard from felling to first haul includes all logging operations such as those relating to sawlogs, veneer bolts, poles and pilings rather than being limited only to pulpwood operations.

(b) Preplacement and periodic medical examinations are prescribed. In addition, employers are required to provide their employees a copy of his or her medical report to take to the next job.

(c) Training of employees is required.

(d) The recommended standard does not include provisions dealing with equipment protective devices, personnel transport, off-highway truck transport, chipping operations, or the construction and maintenance of roads, trails, and bridges.

V. TRAINING GUIDELINES

In an industry as inherently hazardous as logging, the training of workers is vital. The training process permits the employer to train new employees in proper work practices and techniques from the beginning of their careers. An employee can learn the proper techniques to accomplish assigned tasks safely from a competent, experienced individual. Training also helps set the stage for molding employee attitudes by demonstrating employer concern and commitments to safe work practices.

Training Methods, Frequency, and Evaluation

(a) Methods

Training may be carried out through formal programs in classrooms, with field trips and practical testing, and/or on-the-job instruction. Utilizing the latter method, employees are shown a segment of the task and allowed to work at it. As they develop proficiency, more work segments are added. This method requires close supervision as each new step is introduced until each employee is judged competent to carry out the tasks. Reference material such as "Professional Timber Falling" by D. Douglas Dent [12] which emphasizes the procedural approach, plus other material such as the British Columbia "Fallers' and Buckers' Handbook," [10] are recommended.

(b) Frequency and Need

The frequency and need for training will vary depending on the individual and the complexity of the operation and/or as dictated by injury

reports. The results of monitoring should also be used as an aid in determining frequency. First-line supervisors may be the best judges of when, and in what areas, workers need training, as they see them frequently and are familiar with their work performance. Usually, they are the most cognizant of how employee accidents can be minimized, since they may have first-hand knowledge of accident circumstances.

(c) Evaluation

The evaluation of employee performance should be conducted by first-line supervisors. Supervisors can discern, through observation, whether employees are adhering to recommended work practices and can satisfactorily demonstrate skills required of the particular task.

Written tests or checksheets may also be used in conjunction with the above.

Program Content

(a) Work Practices

A work practice can be defined as the methodology for the safe performance of a task. The work practices presented in Chapter I, Section 2, are intended to eliminate or minimize accidents and injuries occurring in felling to first haul operations where the majority of logging injuries occur.

The employer shall ensure that each employee knows, understands and regularly observes practices which are applicable to assigned duties, together with work practices generally applicable to all loggers. The employer must also ensure that each employee understands the relationship between the recommended work practices and the hazards they are intended to minimize.

(b) Hazards and Precautionary Measures

(1) Falling and Flying Objects

The category of falling and flying objects includes limbs, bark, dead trees, lodged trees, logs, and tools dropped by workers. It also includes objects which are propelled through the air such as trees kicking back at the stump, saplings springing back after being bent over by trees falling on them, or can result from chain reactions. For example, skidders or other yarding equipment may strike an item, causing it to be propelled, or to strike other objects which in turn are propelled into a worker.

The effect on workers from falling and flying objects can range in seriousness from eye irritation caused by sawdust propelled by a chainsaw to fractures, concussions, spinal injuries, or crushing injuries sometimes resulting in death caused by falling trees.

These hazards may be minimized by taking the precautions pertaining to falling and flying objects as recommended in Work Practices, Chapter 1, Section 2. Additional things to consider include tree species characteristics which may make them inherently more dangerous to fell than others as is the case with elder trees which splinter profusely.

(2) Rolling and Moving Logs

Rolling and moving log hazards can originate during felling, bucking, skidding, limbing, scaling, or loading at the landing. Logs that roll unexpectedly are cause for special concern. Logs left or placed in certain positions, because of their round configuration and large potential energy, can be veritable traps waiting to be sprung on the unwary logger.

The severity of the injuries in this category depends on the size and velocity of the log and the manner in which it strikes the worker.

Precautions which can be taken to minimize these hazards are review and compliance with the recommended work practices pertaining to rolling and moving logs.

(3) Chain Saw Operations

Chain saw operations, as denoted here, are those which utilize chain saws to fell trees, cut limbs from the felled trees, buck those trees into prescribed lengths, and trim knots and limbs from logs at the landing during loading.

Injuries in this category range from minor burns received from touching a hot chain saw muffler, to severe lacerations caused by contact with the running chain.

Precautionary measures which can be taken to minimize these hazards are review and compliance with the recommended work practices pertaining to chain saws. Protective clothing and equipment, especially face shields, hearing protection, and leg protection afforded by chaps, pads and inserts made from ballistic nylon, can play an important role in preventing injuries resulting from chain saw use.

(4) Slips, Trips, and Falls

By the very nature of his activities, the logger must climb over, on, under or proceed around numerous obstacles to perform his duties. Common sources of concern include vines, brushes, rocks, saplings, limbs and other parts of trees, as well as other natural debris. This situation is further complicated when the logger carries a chain saw during felling, bucking, and knot bumping activities, which increases the possibility of

injury. In other logging operations, such as skidding, yarding, or loading required duties include the handling of wire cables, hooks and grapples. In addition, moving equipment is constantly present and therefore the logger must continually watch his footing while keeping an eye on nearby operating equipment. In this environment, slips, trips, and falls are common. The logger does not consider many of these occurrences as accidents, but merely part of his occupation and environment. He accepts that frequent slips and falls are part of his normal work situation.

The result of slips, trips, and falls can range from an embarrassed worker to death. A slip and fall in the felling area can result in death if the cutter falls while moving away from a falling tree or other object. Slipping off a large tree in the bucking area could result in broken bones, strains and sprains, or lacerations from falling upon a running saw chain. Injuries at the loading site are usually related to tripping over debris, slipping from logs, and falling from log piles and trucks. Injuries in this area range from simple bruises to concussions.

Precautions which can be taken to minimize these hazards are review and compliance with the recommended work practices pertaining to slipping, tripping and falling. Another area of special concern is equipment operators who wear calked boots and must mount and dismount equipment frequently. The slipping-falling hazard can be minimized by skidproofing the stepping surfaces, by providing handrails, and by wearing appropriate footwear.

(5) Moving Equipment

The moving equipment associated with logging includes cables, skidders, rigging attachments, loaders and logging trucks. They present

hazards when they are in motion near the worker. Some loggers are actively involved with several of these at one time. For example, the choker setter is expected to hook a log, signal to someone, move to the next log, and be alert to hazards which other workers may create by their unsafe acts (such as moving a skidder before the signal is given, backing without looking, driving skidders at an unsafe speed through the woods without regard for fellow employees, and entering the landing without due care).

The severity of injuries from moving equipment often can be very serious depending on the size and velocity of the equipment, and the manner in which it strikes the worker.

Precautions which can be taken to minimize these hazards are review and compliance with the recommended work practices pertaining to moving equipment.

(c) Medical and First Aid

Treatment of the injured logger by well-trained first aid personnel can mean the difference between life and death. More often, however, it will reduce the lasting effects of an injury and will comfort and protect the injured. All employees should know the location of the trained first aid people, first aid supplies, and how to secure ambulance services.

One source of first aid training that should be considered is the American Red Cross training course, available from the local Red Cross chapter.

The book Standard First Aid and Personal Safety, [31] should be read by all loggers. Special reference should be made to the chapters concerning first aid treatment of head wounds, shock, and electric shock. Because many logging injuries occur in remote areas and involve the spinal

column, loggers should be familiar with proper immobilization procedures and appropriate short distance transport techniques.

Because chain saw injuries are common, loggers should be thoroughly familiar with techniques to stop bleeding and be aware of first aid for strains, sprains and fractures. The employer should ensure that medical personnel are readily available for consultation on matters of health, particularly as they may also relate to logging-type injuries. All employees should be appraised of where to go, or whom to call should a need arise for professional medical care.

(d) Suggested Topics for a 1-Day Safety Orientation Program

(1) Introduction

(A) Discuss the objectives of the training program and the general environment to be encountered in the workplace.

(B) Present and discuss "What the Occupational Safety and Health Law Means to Loggers." [34]

(2) Work Practices

(A) Present work practices concerning hand tools.

(B) Present work practices pertinent to workers present, and to each type of worker, and show the relationship required to prevent injuries during a mix of tasks, ie, skidding and felling, skidding and bucking, etc.

(C) Discuss the five hazard categories and how they can be minimized by adherence to the recommended work practices.

(3) Protective Equipment

(A) Eye and Face Protection

(i) Show films (for list of films, contact the Society for the Prevention of Blindness).

(ii) Demonstrate proper and safe use of equipment.

(B) Ear Protection

(i) Discuss possibility of hearing loss from saws and equipment engines.

(ii) Demonstrate ear protectors.

(C) Hard Hats

(i) Display hard hats.

(ii) Demonstrate proper method of wearing.

(iii) Explain limitations of hats.

(D) Leg Protection

(i) Show different types of leg protection.

(ii) Explain under what circumstances leg protection is to be worn and how it protects the workers against kickback injuries.

(E) Loggers' Safety Footwear

(i) Show different types of boots.

(ii) Explain the type of operation for which each type of boot is used.

(iii) Select a boot to be used in the locale.

(4) An Example of a Dangerous Operation - Skidding

(A) Show film "Round Trip to Danger." This and other films are available from forestry associations.

(B) Discuss film highlights.

(C) Ensure that equipment operators and personnel working with them are aware of signals being used to control movements at the workplace.

(5) First Aid

(A) Detail location of first aid supplies.

(B) Detail procedure for obtaining first aid, medical help, and ambulance.

(6) Summary

Summarize by asking questions pertaining to each segment of training.

VI. Research Needs

The most basic research need is to develop and implement an adequate nationwide system for injury data collection. This is necessary to identify the problems in sufficient detail to permit an assessment of priorities for further research. The data collection vehicle must identify not only the effect on the worker (ie, the injury) but the causative and contributing factors that led to the injury. Data should also be collected on accidents in which a reportable injury does not result (the near miss). By identifying all factors involved in the accident sequence, we can determine where the appropriate injury control techniques can be most effectively applied to eliminate the potential adverse consequences.

Once problems are identified and priorities set, further research can be undertaken to develop the corrective measures necessary to eliminate the hazardous situations. One general area of effort probably should be to evaluate present techniques and develop new techniques of work practices applicable to the various operations under existing technologies. This type of corrective measure probably can be accomplished most expeditiously and with a minimum time delay.

Research to apply existing engineering technologies to meet the needs of present operations in this industry is necessary. The development of new equipment to increase worker safety as well as efficiency can serve to reduce the number of accidents and resulting injuries to the worker population. This area of research may permit the worker to accomplish his assigned task without exposing himself to the potentially hazardous

situations which cannot be eliminated.

High priority must be given to the development of protective clothing and equipment to safeguard the worker from hazardous situations until the condition can be eliminated by other methods. These should be considered as temporary controls of injury and not as ultimate solutions to the problem.

Research in the area of behavioral and motivational factors affecting the worker's safe accomplishment of his assigned task must be undertaken to determine the interaction of these factors as compensating or contributing mechanisms to the accident sequence. The role of supervision in this area must be studied. In addition, effective training programs must be developed if appropriate. The previously mentioned factors must be researched and the knowledge obtained to train a safe, efficient worker who can adequately master his work environment.

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