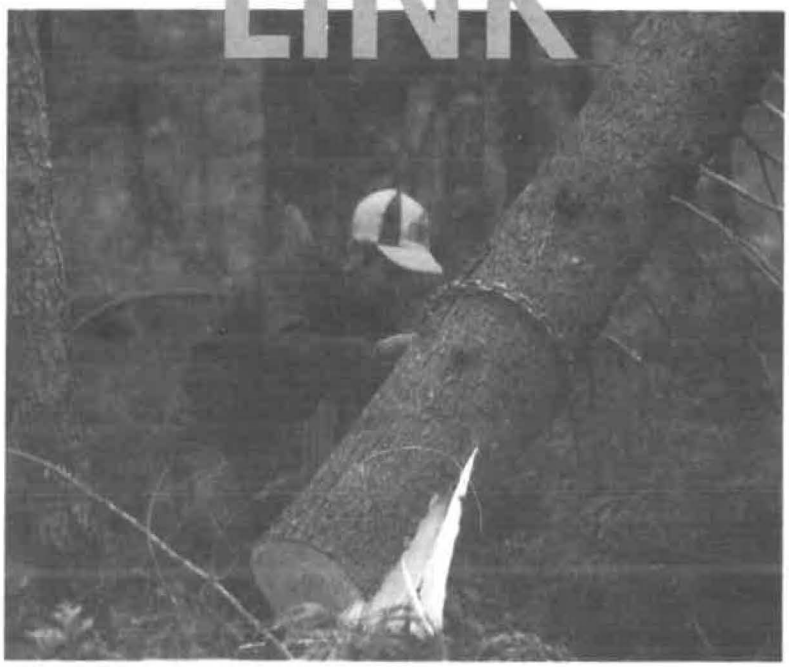
Logging Safety and Forest Management Education

A Necessary LINK

By David Elton Fosbroke and John R. Myers

Logging continues to be an important but dangerous component of forestry. In spite of tremendous advances in harvesting technology over the past 30 years, the logging industry has seen little improvement in injury statistics (McCormack 1963; Myers and Fosbroke 1994). In 1993, 147 logging industry workers died as a result of work-related injuries (US Department of Labor 1995a). There were also 13,800 nonfatal injuries—5,875 resulting in time away from work (US Department of Labor 1995b, 1995c).

Forest management decisions directly affect logging safety. The decision to leave den trees may raise a logger's risk of being hit by a falling snag. The selection of a residual stand density influences whether a logger will be injured in the type of incident described by Peters (1991) as hit-tree reactions (e.g., when a felled tree strikes another tree causing a branch, snag, or tree to fall on, or bounce back at, the logger). Decisions about the length of a cutting contract may make it difficult for loggers to complete a job safely. In the future, not only will forest management decisions affect worker safety, but worker safety issues will also influence forest management decisions (Myers and Fosbroke 1995). It is thus necessary to teach forestry students about worker safety issues they will face in their professional lives.



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Decisions about residual stand density, type of harvest, road placement, and silvicultural treatment greatly influence logger safety. Here, a logger wrestles to free a felled spruce entangled in nearby trees.

Even forestry graduates who do not make harvesting decisions may be employed in supervisory positions in which their decisions affect the safety of other employees. Under the provisions of the 1970 Occupational Safety and Health (OSH) Act (Public Law 91-596), employers are responsible for assuring safe and healthful working conditions for all employees. Graduating forestry students need to be aware of their responsibility for understanding and following the regulations that apply to their jobs.

Teaching safety to forestry students is also an ethical obligation for forestry programs. The Code of Ethics set forth by the Society of American Foresters (1992), states in its preamble that compliance with the SAF canons "ensures just and honorable professional and human relationships, mutual confidence and respect, and competent service to society." Professional foresters are morally and ethically bound to ensure that their decisions and actions do not jeopardize the safety of others. Graduating forestry students should understand how their future management decisions can affect the safety and health of other workers.

Safety in Forestry Programs

Traditionally, safety training has been considered less important for students in professional programs than those in technical programs because technicians

are out in the field facing greater hazards. Consequently, programs that train students to become professional foresters tend to devote less time to safety than do those that train technicians. This reality is reflected by differences in SAF requirements for accreditation of professional programs versus recognition of technical programs (Society of American Foresters 1994a, 1994b).

In May 1993, the authors sent a request for information to the 45 professional degree programs accredited by SAF. Each program was asked to provide a college catalog describing the program, course syllabi of management and policy-related courses, and a copy of the most recent self-evaluation report. These materials were reviewed to determine how prominent a role safety topics played in the way courses and programs are described to prospective students. Thirty-one forestry programs provided materials (26 schools sent catalogs, 22 sent course syllabi, and 18 sent self-evaluation reports). Only 17 programs referenced any safety concept within the material they provided, and these references were generally limited to the harvesting course.

Although the numbers above suggest that safety is not advertised as an emphasis area in forest management programs, most programs do have some safety components. Frequently, the strongest safety content in four-year programs is encountered in summer forestry camps. Here, a few days are spent teaching the technical aspects of harvesting, road construction, and chainsaw use.

Most four-year programs also touch briefly on safety issues in a variety of courses. For example, logging hazards are discussed in harvesting classes, although the effects of these hazards in terms of lives and work time lost is typically not emphasized. Pesticide labeling is covered in planting, silviculture, and entomology courses. Ecology and wildlife management courses also cover pesticide safety, although usually from the environmental contamination standpoint. Each year, a few students gain practical experience in safe woods operations from forest managers while working at the university woodlot or forest. Most programs make other attempts to instill a safety consciousness among forestry students, including the requirement that all students wear hard hats and sturdy boots during field labs and industry tours.

What Is Missing?

Professional foresters need to make rational decisions based on an understanding of safety principles and an

The Game of Logging

In 1978, veteran logger Soren Eriksson of Sweden brought to the United States training methods he had used around the world for a number of years. Eriksson believes logging involves strategies like those used in US football, in which a properly equipped team of professionals chooses the right combination of plays to succeed. Loggers must choose the right "plays" to achieve maximum productivity, increase business profits, and preserve the environmental integrity and ecological balance of the forest. So as Eriksson trained loggers in the United States, he thought of a name for his program: The Game of Logging. Game of Logging training teaches the practical skills that help loggers meet diverse objectives.

Eriksson soon enlisted the help of Tim Ard, a forest applications instructor. Together they formed The Game of Logging, Inc., which has since trained some 2,000 loggers, skidder operators, and others to conduct safe and efficient harvesting operations.

The training, which takes four days, teaches loggers how to combine various "plays" to get the most out of their hard work. Classes are kept small so that loggers can practice their skills during the sessions. In addition, each session of training usually is separated by at least one month so loggers may hone the skills they've learned. Loggers also receive scores based on their mastery of each skill.

Game of Logging training uses a competitive-response format to help participants retain the skills they learn. Here, for example, loggers are timed on how fast they make their cuts.

Photo courtesy of Husqvarna Forest & Garden Co.

A Course Outline

On the first day of training, loggers are introduced to personal protective equipment and chainsaw safety features. They learn about the reactive forces of chainsaws, as well as the face-notch, bore-cut, and hinge methods used in directional felling.

Instructors stress the importance of gathering information and planning before felling trees. Loggers learn to evaluate trees for potential hazards to people and other trees in the area. Hazards include those caused by environmental factors, such as wind, or by the tree itself, such as overhead limbs. Loggers must plan their cuts and escape routes accordingly. They also learn why it is critical to follow through on their plans: Changing plans while cutting creates safety hazards, Eriksson notes.

During the second session, loggers learn how to maintain equipment so they can reduce downtime. The session covers chainsaw maintenance, hands-on carburetor adjustment, and chisel bit chain filing.

Loggers also receive instruction on how to log awkwardly positioned trees and on how to avoid dangerous situations. For example, they learn the important safety skill of releasing tension on trees bent beneath the weight of larger trees on a logging site. Loggers also receive instruction in wedging, which allows them to fell trees so they land in the best places for the overall harvesting operation and with minimal damage

awareness of safety issues that affect forest (and any other management) operations. Forestry programs should prepare students for challenges they will face by making them aware of relevant safety issues, including: the safety record of the logging, sawmilling, and paper manufacturing industries; the existence of safety regulations, standards, and policies; the identification and control of hazards; the management of safety; methods of preventing injuries; the effect of safety programs on insurance premiums; the concepts of insurance and shared risk; the effects of injuries on operating costs and employee morale; the responsibility and liability of decisionmakers and managers; and the influence of management decisions on worker safety.

When the National Research Council (NRC) surveyed academic and nonacademic forestry groups to identify needs in forestry education (NRC 1990), respondents suggested a need to "move from technician-type courses to more analytical, decisionmaking, conflict-resolution types of courses." Expansion of coursework beyond technical safety topics (e.g., first aid and tool safety) toward the legal, economic, and moral aspects of safety and health fits well with this NRC recommendation. Such indepth coverage of safety and health issues can provide future foresters with the analytical tools they will need to fully evaluate management options.

Integrating Safety Concepts

Integration of safety and health concepts into current forestry education will not require a new "Safety in Forest Operations" course. Forestry curricula already contain a full complement of course requirements—any new course might require elimination of an existing one. The ultimate goal should be to teach future foresters to consider the safety implication of all decisions. To do this, safety thinking needs to be broadly incorporated into courses across the curriculum, wherever a safety issue is relevant. This need not be difficult because most safety issues relate in some way to concepts that are taught in existing courses.

For example, forest policy courses traditionally include tax laws, environmental regulations, recreational development programs, and resource funding programs because of the influence of these regulations and programs on forest management decisions. The inclusion of safety and health regulations, the regulatory process, and safety research organizations fits into the concept of teaching policies and programs that influence

to surrounding timber. At the end of session two, loggers learn how the side lean of trees affects target accuracy in felling.

The third session covers more specific steps in harvesting a tree, including height measuring; delimbing and bucking, which is critical to maintaining the highest value for the logs; and segment calculation. The final session gives loggers practice in felling difficult trees and recaps the skills learned during training.

Intense Training Pays Off

Game of Logging participants learn not only from their instructors, but from each other. Throughout the training, they test their newly acquired knowledge in the field and critique each other's work with guidance from the instructors. For example, during a recent session near Galesburg, Illinois, participants discussed ways to improve the felling hinge on their cuts. They studied the hinge width on their cut stumps to see how closely they had adhered to their original plans for logging the tree.

Safety is a cornerstone of the Game of Logging training; techniques to prevent accidents, injuries, and other hazards are repeated regularly. Participants become familiar with all of the precautions and remind each other of them.

When one considers the potential for accidents in the woods, training is a worthwhile investment. It results in accident reduction, increased productivity, and, sometimes, reduced workers' compensation rates. Mead Corporation, for example, requires all those who log its 120,000 acres to complete Game of Logging training. Skilled chainsaw operators make the best use of the trees because they know how to fell timber to maximize its value. The proven methods they employ also result in greater protection of residual stands. But most importantly, Mead says it requires the training because it keeps people safe.

A Collegiate Harvesting Program

Game of Logging founder Eriksson hopes training programs will do more than increase safety and productivity in the short term. He wants to see sound timber harvesting principles and practices become the norm in the United States. To that end, he is helping the faculty at Hocking College in Nelsonville, Ohio, develop a comprehensive, skills-focused timber harvesting program. Its mission will be to train practitioners to establish and maintain profitable ventures using sustainable resource management principles that incorporate concern for the environment.

The two-year program is slated to begin in September 1996 with about 30 students. They will learn about sustainable forestry, including basic silviculture and forest ecology; timber harvesting plan development, including basic forest mensuration and ecosystem plant identification; map development; and economic analysis. Internships and field exercises will allow them to apply what they learn in the classroom. The program will help students learn, for example, how to move logging equipment on a 209-acre site with varying kinds of terrain.

Other training will take place on 1,500 acres of college-owned forest. Hocking College has also built cooperative partnerships that permit students to work with Mead Corporation, the Ohio Department of Natural Resources, and the USDA Forest Service on miniature logging operations.

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Table 1. Examples of safety legislation, standards, and policy affecting forest management.

Legislation	Date	Description
Federal Workers' Compensation	1908	Federal law providing compensation for federal workers injured on the job.
State Workers' Compensation	1911	Wisconsin and Maryland pass laws similar to federal workers' compensation law.
Walsh-Healy Act	1933	Specified working conditions for employees working for private companies under contract to the US government.
Fair Labor Standards Act	1938	Prohibited children under 18 years old from working in hazardous occupations (including logging).
Occupational Safety and Health Act	1970	Created regulatory and research agencies and a process for development and enforcement of OSH standards.
Safety Requirements for Pulpwood Logging	1971	American National Standards Institute (ANSI) national consensus standard.
OSHA Pulpwood Logging Standard 1910.266	1971	OSHA adopted ANSI consensus standard.
NIOSH Criteria Document on Logging	1976	Recommendation for an occupational standard on logging from felling to first haul.
Safety Requirements in Logging	1978	ANSI consensus standard extending prior pulpwood requirements to all logging.
ANSI withdraws Safety Requirements in Logging	1984	ANSI committee fails to renew standard.
OSHA Logging Standard	1994	Proposed in 1989, OSHA promulgated a single standard for the logging industry on October 12, 1994.

Sources: DeReamer 1980; Hammer 1989; Kavianian and Wentz 1990; Public Law 91-596; Reader's Digest 1975; US Department of Labor 1989, 1994.

Table 2. Organizations influential in the establishment of safety policy affecting forest management.

Organization	Description
American National Standards Institute	Develops national consensus standards.
American Pulpwood Association	Produces logging safety materials; facilitates safety training of woods workers.
American Society of Agricultural Engineers	Forest Operations Safety Committee provides a forum for harvesting safety research.
American Society of Safety Engineers	Establishes an independent board to certify safety professionals.
International Labor Organization	Established as part of League of Nations to improve working conditions around the world; major contributor to woods worker training and international recommendations.
National Fire Protection Association	Develops national consensus fire protection standards.
National Institute for Occupational Safety and Health	Conducts occupational safety and health research; trains safety and health professionals.
National Safety Council	Private, nonprofit organization working in traffic, home, recreational, and occupational safety.
Occupational Safety and Health Administration	Administers the OSH Act, promulgates and enforces regulations, and provides state training grants.

Sources: DeReamer 1980; Hammer 1989; Kavianian and Wentz 1990; Reader's Digest 1975.

forestry (see *tables 1 and 2*). Additional topics that could be incorporated into forest policy courses include the regulatory process (including the OSH Act's provision for public comment during standards development), owner liability, third party tort, and specific Occupational Safety and Health Administration (OSHA) and national consensus standards related to forestry operations.

In addition to these forest policy examples, other safety topics can be integrated into the existing curricula. Introductory forestry courses should cover sources of injury and illness information, injury statistics specific to forest industries and occupations, and the importance of safety. Timber harvesting courses should describe specific hazards associated with logging and recommended ways of minimizing such hazards—especially machine guarding, rollover protection, and the identification and safe felling of hazardous trees. Forest management courses should emphasize the role of managers in ensuring safe and healthful working conditions. Other topics specifically for forest management include safety language in logging contracts, hazard communication, recordkeeping, accident investigation, and safety management programs.

Silviculture courses should explain the effects of cutting method, leave-tree selection, and cutting cycle on logging safety. Forest economics courses should include discussion of workers' compensation costs. For example, compensation insurance could be included in machine-cost calculations (Fosbroke and Myers 1995). Still other examples of incorporating safety issues into an existing curriculum are described by Taylor et al. (1994).

Conclusions

Logging is well known as a hazardous industry, in terms of both fatal and nonfatal outcomes. And recent statistics indicate that the industry's injury record has not dramatically improved for over 30 years (Myers and Fosbroke 1994). These facts led OSHA to promulgate a new standard for logging operations (US Department of Labor 1994), which has direct

implications on the way logging is conducted and indirect implications on how forest management decisions are implemented. Therefore, foresters increasingly will need to be aware of occupational safety and health concepts.

Integrating important safety and health issues into existing foresty school curricula can be done, but it will take a concerted effort on the part of faculty to expand existing courses into new subject areas. This paper demonstrates a few examples of how safety topics can be covered in forestry courses. The authors hope that faculty will consider these examples, look at their existing courses, and ask, "Are there important safety issues that I should incorporate into my courses?" JOF

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