



# HARVESTING TECHNICAL NOTE

HTN08-02  
2015

## International Steep Terrain Training Programmes

### Summary

Successful training programmes are critical to establishing and retaining a safe and efficient workforce. Under New Zealand health and safety law, providing training is also a legal requirement. This report reviews training programmes and training materials relevant to steep terrain harvesting in regions such as the Pacific Northwest and central Europe. A number of western U.S. states have mandatory logger licensing or certification requirements. The training modules are mainly focussed on understanding state legal requirements and environmental compliance. Training itself is typically completed in just a few days. In Europe, Austria is the country with the most advanced steep terrain harvesting training programmes, including 3-year high-school and internship programmes at the well-funded and resourced dedicated logger training schools. The high quality materials used in these programmes may be useful to augment existing training resources used in New Zealand. These include videos and quality illustrated manuals that incorporate operating requirements with best practice guidance.

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### Introduction

Successful training programmes have always been considered critical to establishing and retaining a safe, effective and efficient workforce. A recent United Nations publication on good practice in contract labour in forestry specifically states that workers should have access to both initial and advanced training (UN FAO, 2011).

Training and job knowledge are the two most important factors in an accident prevention programme (Conway, 1982). There are many forms of training for loggers, but worldwide the most common method of training is still informal on-the-job training where an experienced employee works alongside the trainee for a period of time or until the trainee is deemed competent. In many U.S. states training is preceded by Job Safety Analysis (JSA), which is a systematic approach to analysing a job and indicating responsibilities and skills required, hazards present, safe work practices to avoid accidents and experience necessary before the trainee can be considered fully trained (Conway 1982). Ultimately, JSA provides new workers with the job knowledge to identify unsafe conditions and acts to minimise the likelihood of accidents. This knowledge is then reinforced through on-job training.

Sometimes on-the-job training can be administered via an external expert trainer if

sufficient experience does not exist within the harvesting crew. However, there is often no formal acknowledgement of this type of training and if a logger seeks employment with a new crew their evidence of training or experience is often based only on word-of-mouth.

Many countries that have a significant forestry sector provide safety rules and guide books which can also be used in training. Examples are the U.S. Occupational Safety and Health Administration (OSHA) and New Zealand's WorkSafe (previously Department of Labour) safety rules. These countries have laws that require crews to maintain a copy of the relevant safety guidelines and rules on-site, and require documentation of safety training.

Many recent training programmes have been implemented as a means of achieving accreditation, certification or licensing. Accreditation usually refers to the standard of quality of the programme or organisation offering the training or education, according to set criteria related to evidence of success of the programme's outputs. Certification is where a person or firm or product has received some education, training or assessment of specific performance measures which the certifying body deems sufficient to issue a certificate to such effect. The issuance of a licence provides a privilege usually bestowed by a government agency to carry out some function for which a set



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of competencies are required. Forest harvesting certificates or licences are usually issued to logging contractors or foremen who manage logging crews. Certificates or licences are not usually issued to individual crew members.

Motivation for accreditation, certification and licensing has changed over the years and often comes from a variety of sources, including genuine interest in self-improvement; response from associations and organizations to meet requirements such as the Forest Stewardship Council (FSC) or Sustainable Forestry Initiative (SFI) standards; dissatisfaction from interest groups with government control of logging operations; new job challenges and changes in forest work; pressures to reduce safety problems and workers' compensation insurance rates; demands for skilled operators in mechanised harvesting operations; and demographic shifts in the availability of forest workers and the skills these workers bring to the workplace (Garland 1995).

Other formal and informal training mechanisms exist. On-the-job examples include hazard identification and control, and daily safety discussions (commonly known as "tailgate meetings") prior to the start of each working day. Various industry associations may provide access to teaching materials such as presentations, or more commonly video resources.

Under current New Zealand health and safety law, it is a legal requirement for employers to provide training to workers. The system of training standards and certification of logging workers is currently managed through Competenz, a multi-sector Industry Training Organisation (ITO), working with 37 New Zealand industries, and accredited through the NZ Qualification Authority (NZQA). The forest harvesting training programme is built up from a large number of unit standards (previously known as "modules"). Most of the unit standards can be studied and learned on the job under guidance of more senior crew members or a designated trainer. Competency in a unit standard is assessed by a qualified independent assessor,

who is moderated by Competenz to ensure consistency in assessment. Achievement of a given number of unit standards in specific areas of learning leads to achievement of a qualification now called a "New Zealand Certificate in Forest Harvesting Operations", which is achieved based on a worker obtaining a specific group of unit standards depending on the qualification.

Apprenticeship programmes are not offered for new industry entrants in the forest growing and harvesting sector but are available in some wood industries (such as pulp and paper, solid wood and furniture). A Competenz apprenticeship is a structured programme that combines practical and technical training and takes 3-4 years to complete.

This report reviews some harvesting training programmes, certification schemes and training materials, with a focus on steep terrain harvesting in the Pacific Northwest and central Europe.

## Training Programmes

### Pacific Northwest

In the US, there are over 45 natural resources and forestry university programmes, but only five have the skills and staff to provide training in logging. One of the most well-known is Oregon State University's student logging training program, which takes place at the school's demonstration forest. The programme's goals include training and teaching, conducting workshops and demonstrations and demonstrating safe work practices. The programme provides many benefits to students including working in a safe training environment, completing internship requirements for undergraduate degrees, earning money while studying and adding practical work skills to their resume (Wimer 2007).

Logger Education to Advance Professionalism (LEAP) was a nationwide logger education programme carried out by extension services of various states. The quality of the programme is enhanced by the accreditation of the parent



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schools and colleges of forestry which house the extension faculty. Originally it started at the request of loggers, and the programme featured over 20 hours of training in the topic areas of forest ecology, silviculture, water quality and safety through presentations, discussions, videos and other learning resources. LEAP still exists in some states but for the most part has been incorporated as standard training and practice by various state logging contractor associations and is now the basis for their certification.

## Austria / Central Europe

Austria is the country in Europe with the most advanced training programmes, including 3-year high school as well as internship programmes at the well-funded and resourced dedicated logger training schools. Graduates of such academies are exceptionally well trained in not only the full range of logging operations, but also in silviculture and wildlife.

However, there are no legal requirements for training of forest workers, and approximately 50% of all harvesting is carried out by contractors who typically recruit workers from eastern European countries. This significantly reduces effective hourly worker wage rates. Interestingly, it is the forest managers looking after estates greater than 500 hectares that are legally required to have formal training, which is two to three years full time at a Polytechnic-type educational institution. To manage forests larger than 3000 hectares the forest manager must have the appropriate forestry degree from a University.

Austria is divided up into regions and each region has a series of forestry professionals who help manage the forest, and, where required, help provide logging services. Most regions still have their own logging teams, but also have access to the crews from the Federal Forest Service that tend to specialise in the more technical work such as cable logging or cable-assisted ground-based operations. High levels of formal training are required for their forest workers through to their forest managers.

In terms of logger training, some other European countries where steep terrain harvesting is common, such as Germany and Italy, have similar (but typically less formal and not as well resourced) programmes in place, but other countries such as France and Spain do not.

## Sustainable Forestry Initiative (SFI) Training

A number of forestry environmental certification schemes require evidence of worker training. While environmental certification schemes such as Forest Stewardship Council (FSC) aim to ensure worker safety and that those engaged are competent for the task, other programmes are more specific. A direct example from the U.S. is the SFI programme where the rules state:

### Objective 16 (training & education)

16.1.4 Shall have contractor education and training sufficient to their roles and responsibilities.

16.1.5 Forestry enterprises shall have a programme for the use of certified logging professionals and qualified logging professionals.

16.2.1 Establish criteria and identify delivery mechanisms for wood producers' training courses that address (among other things):  
e) logging safety  
f) U.S. OSHA compliance

This has driven a number of larger forestry companies to develop in-house training to comply with forest environmental certification requirements, especially those who operate their own logging crews. Additionally, the implementation of SFI led to many of the state contractor certification schemes, as many forest managers will not hire non-certified logging contractors. A fundamental part of most contractor certification schemes is that on-the-job-training has an emphasis on logging safety and compliance with U.S. OSHA.



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## Contractor Certification Schemes

### British Columbia, Canada

Performance-based certification in BC is referred to as “SAFE Company”, and is issued by the British Columbia Forest Safety Council (BCFSC). The entry requirements include a fee plus registration to the BC Forest Safety Council. Occupational health and safety programme training is required for one member of the organisation, based on the size of the organization. The training itself is based around a 3-day, 4-hours-per-day programme. An initial certification audit must be completed and submitted to BCFSC by a certified external auditor, and the audit must achieve a score of >80% with no less than 50% for any subsection. For companies greater than 20 employees, training includes a 3-day internal auditor training course, including preparing for audits, conducting the audits, and processing and reporting audit results. Upon completion of the course trainee auditors must complete an exam and prepare an internal maintenance audit for review. To remain certified they must submit an annual maintenance audit by a certified auditor (internal auditor for large companies) and apply for recertification.

### Washington, U.S.A.

This programme is referred to as the “Washington Master Logger” and requires certification from the issuing body, the Washington Contract Loggers’ Association (WCLA).

There is a fee plus 32 hours (over four days) of training required. The course includes: 8 hours forest silviculture and ecology, 8 hours logging safety and workers compensation loss control, 8 hours Washington Forest Practice Act rules and regulations, 8 hours logging business management.

To become certified you must also have a current first aid certificate, as well as having the state-required programmes such as accident prevention, hazard communication, hearing

conservation and lockout / tag out procedures. To remain certified a logger must pay a fee plus gain 8 hours of continuing education credits annually.

### Oregon, U.S.A.

This programme is referred to as the “Oregon Pro Logger” (OPL) and requires certification with the Association of Oregon Loggers (AOL). As in Washington there is a fee, plus 32 hours of education credits. This includes 6 hours on the Oregon forest practice rules as well as “Sustainable Forestry Training” (SFT) which is based on a series of video modules.

Those certified must follow the OPL handbook which defines standards for forestry, safety, fire, insurance, labour, tax and business practices. They must adhere to the Code of Professional conduct outlined in the OPL Standards handbook and avoid sanctions. To remain certified there is an annual fee plus 10 hours of continuing education credit annually, including 3 hours on Oregon forest practice rules and verification that all employees have completed SFT training.

### California, U.S.A.

California has three levels of formal logger training: namely Licensed Timber Operator (LTO), California Pro Logger, and California Master Logger.

#### a) *Licensed Timber Operator*

The basic licence to operate in California is referred to as a Licenced Timber Operator (LTO), and the issuing body is the California Department of Forestry & Fire (CDF). There are a number of requirements in addition to a fee. These include two days training on California forest practice laws, having 3,000 hours of experience in at least two job tasks in logging, and having a minimum of \$1,000,000 in liability insurance coverage.

In addition, to actually operate they must have:

- an illness & injury prevention programme,
- a hearing conservation programme,



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- a hazardous substance communication plan,
- an emergency response plan, and
- workers compensation insurance.

Continuation is based on an annual fee and proof of operating requirements.

## **b) California Pro Logger**

Whereas the LTO is the licence to operate, there is also certification that is issued by the Associated California Loggers (ACL). To become certified, loggers must be a current LTO, must complete 20 hours of course work including 6 hours on Best Practice Guidelines, 5 hours on business practices, 4 hours first aid & CPR, 2 hours risk management, and 3 hours of approved elective units.

To retain certification loggers must provide proof of operating requirements, as well as taking annual CPR & first aid refresher courses, and 8 hours of approved continuing education credits.

## **c) California Master Logger**

The California Master Logger programme is a performance-based certification issued by the Associated California Loggers (ACL). To attain this certification loggers must be a California Pro Logger, and have third party audit for verification of performance of the following:

- code of practice and rules compliance by a CDF inspector (up to three times throughout course of operation);
- risk & safety management systems by a qualified safety professional; and
- sound business practices by a certified accountant.

Operating requirements are the same as for the LTO and continuation as for the Pro Logger, but the third party audit must be repeated annually.

## **Safety and Training Resources**

In reviewing the various training programmes and requirements the following materials that could complement New Zealand information sources were reviewed, such as Best Practice Guidelines for Cable Logging (FITEC, 2005), LIRA Cable Logging Handbook (Liley 1983) and the Approved Code of Practice for Safety and Health in Forest Operations (MBIE, 2012).

## **BC Forestry Safety Council (BCFSC) Resources**

Specific resource packages include:

- [Chain Shot Resource Package](#). This package contains the latest information on chain shot, including two recent safety alerts and links to additional resources on the topic.
- [Joint Health & Safety Committee Resource Package](#). This presentation is used to refresh knowledge of the roles and responsibilities of Joint Occupational Health and Safety Committees.
- [Overexertion Injury Prevention Resource Package](#). Better known as strains and sprains, these injuries are very common in the forest industry. Learn how to prevent these injuries with specific examples from the trucking, tree falling and tree planting operations.
- [Phase Congestion](#). Phase congestion occurs when different logging phases – such as falling, road construction, production and trucking – become bunched up or congested, negatively affecting production and safety. The guide, assessment form, poster and video are used to help manage phase congestion in operations.
- [RADAR Hazard Assessment Resource Package](#). In this resource package you will find resources and information to help improve your workers' skills in identifying and controlling the hazards they face on the worksite.
- [Slips, Trips and Falls Injury Prevention Resource Package](#). This package



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includes tips and techniques to help you educate yourself and your workers, improve your safety management system and inspire practical solutions for preventing slips, trips and falls in your operations.

- [Steep Slope Resource Package](#). Included are the following: Steep Slope Hazard Assessment Tool, Steep Slope Planning and Operational Responsibilities, General and Machine-Specific Best Practices and other support documents.
- [The MANual: A Men's Health Survival Guide](#). Northern Health has developed a men's health and maintenance manual, which provides health information for men of all ages about nutrition, active living, and health screenings at the various life stages.
- [Winter Safety Resource Package](#). The winter safety resource page contains seasonal information for your company to use for crew talks, to post on safety bulletin boards or incorporate into a safety management system.
- [Woodlot Safety Program](#). This programme outlines steps for woodlot owners to follow to develop a successful safety programme. It includes a Safety Plan, forms and safe work procedures.

## WorkSafeBC Resources

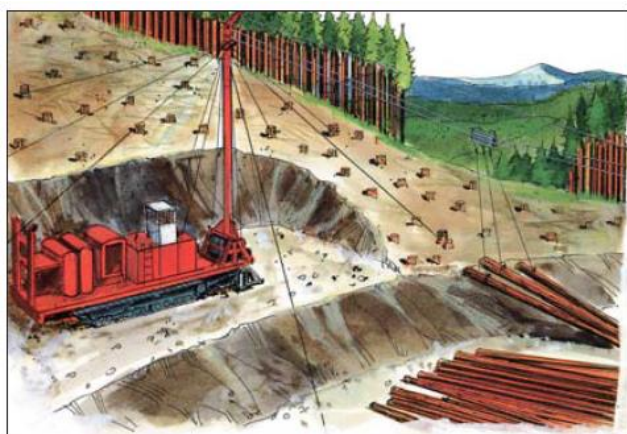


Figure 1: Benefits of a split level landing. (WorkSafeBC resources)

## [Cable Yarding Systems Handbook](#)

Well-illustrated handbook that covers both the British Columbia safety requirements but also gives guidance towards best practice. For example Figure 1 illustrates the benefits of a split level landing.

## Washington State Department of Labor and Industries:

The Logger Safety Initiative (LSI) was started in 2013 to promote a "Safety First" culture for all logging industry employers and workers. Objectives are to reduce the frequency and severity of injuries and prevent deaths, increase proper reporting of worker hours and to explore options to reduce costs in the industry. LSI offers various resources linked to the Washington State Department of Labour and Industries requirements.

### Choker Setter Injured When Struck by Log

Task: Pre-setting chokers Occupation: Choker setter Release Date: October 24, 2014

On March 25, 2014, a 41-year-old choker setter pre-setting chokers was seriously injured when he was struck by a log being yarded. A four-man rigging crew with a rigging slinger and three choker setters were working on a 30% slope about 500 feet from the landing. The choker setters were on one side of the skyline and the rigging slinger was on the other side. After the crew had rigged a three-log turn, the choker setters began pre-setting chokers for the next turn. The rigging slinger gave the go-ahead signal and the yarder operator began moving the turn to the landing. Two of the choker setters were not in the clear of the turn. As the turn moved uphill, one of the logs in the turn upended and swung toward them. One choker setter dived under the moving log; the other choker setter was struck in the hip by the log and was seriously injured.



#### Safety Requirements

During yarding operations:

- Employees must move away from the turn so as to be above or behind the turn in the clear. They must remain on their feet and face the turn before the go-ahead signal is given. See WAC 296-54-577(5).

#### Resources\*

- Free workplace safety and health consultations are available from L&I at: [www.SafetyConsultants.Lni.wa.gov](http://www.SafetyConsultants.Lni.wa.gov)

Figure 2: Example accident report (LSI resources)

LSI in collaboration with Washington Fatality Assessment & Control Evaluation (FACE) and Washington State Logging Contractors Association release weekly updates on logging injuries and provide incident overview materials and forms for safety meetings required by logging crews: [Logging Safety Alerts \(Weekly Messages\)](#)



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## Oregon OSHA Division 7 Forest Activities Resources

[Yarding and Loading Handbook](#). This is a well-illustrated handbook describing different logging tasks and is often used as a foundation for on-the-job training in many states and countries (e.g. how to set chokers to overcome obstacles).

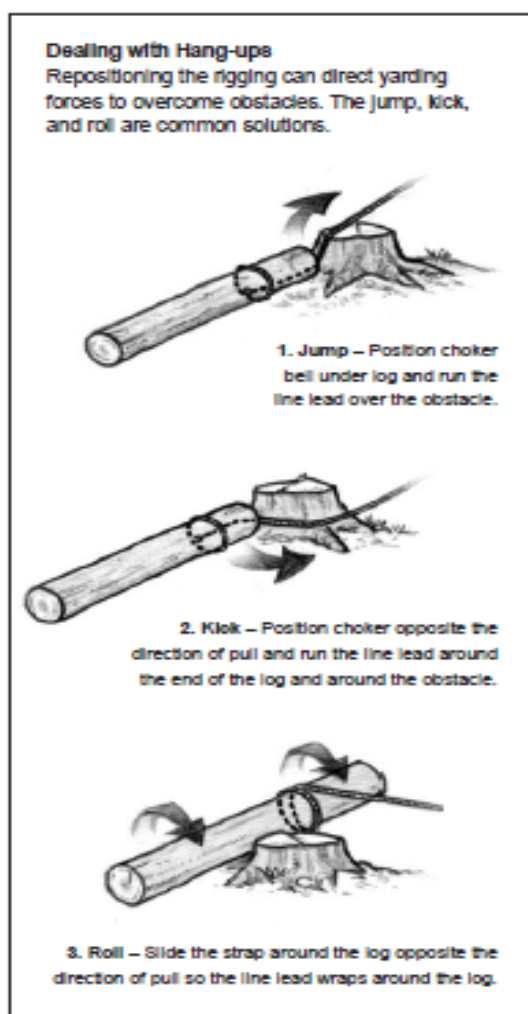


Figure 3: Example guidance on breaking out (Oregon OSHA resources).

## Austrian Logger Manuals

The forest worker training centres in Austria have, together with the Austrian forest industry, developed a series of manuals that have a high level of detail. They include not just safety and

best practices, but also cover productivity and cost of the various logging options. They are updated and added to at regular intervals. For example, with synthetic ropes now in common use for many logging applications, a fully illustrated section has been added that shows how to splice synthetic rope (Figure 4).



Figure 4: Example guidance on rope splicing (Ossiach Forest Training Centre resources).

## Videos

### BC Forestry Safety Council:

- [Falling Videos](#)
- [Overexertion Webinar](#)
- [Reynold Hert 2013 COFI Speech](#)
- [Safety Videos Archive](#)
  - Worker Survives Excavator Rollover
  - The Supervisor
  - Truck driver almost killed by H2S



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- Logging safety awareness
- Log Hauling Safety
- U-bolt: A video guide to checking u-bolts on log trucks
- Lockout - A guide to safe work procedures
- Deaf to the Danger: Sawmills Scenario
- Broken chain link almost kills worker
- Workers killed while servicing tires
- Finding a safe position: cable yarding in forestry
- Setting the standard: helicopter logging
- Setting standards for safety: mechanical harvesting
- Supervisor Training
  - [Business & Safety](#)
  - [Characteristics of a Good Supervisor](#)
  - [Due Diligence](#)
  - [Emergency Response Plans](#)
  - [Introductions & Advice](#)
  - [Planning](#)
  - [Regulations](#)
  - [Responsibility](#)
  - [Worker Assessments](#)
- [WorkSafeBC 2013 Rates Presentation](#)
- [YouTube - BCFSC Safety Videos](#)

## Washington State Department of Labor and Industries

- [Be Safe in the Woods](#) The newest and most comprehensive video produced covering all aspects of logging and harvesting timber. In five parts: Driving & Transportation; Personal Protective Equipment; Cutting; Rigging; and Landing activities.
- [Carpal Tunnel Syndrome & Other Upper Extremity Disorders In the Logging Industry](#). This describes how to prevent musculoskeletal disorders while performing typical logging activities. Gives examples of early symptoms and

- suggestions for correcting problems before a severe injury develops.
- [Fatality and Serious Injury Investigation Stories](#). A compilation on DVD of 23 narrated presentations which depict real events in Washington State. The Department of Labor & Industries investigating safety and health inspectors describe briefly what happened, how the worker was injured or killed, and how the incidents could have been prevented. The stories, mostly 2-3 minutes in duration, include these topics: bulldozer fatality, electrocution, logging chain shot fatality and a tractor rollover.
- [Logging Safety Awareness](#). This video features the day-to-day elements of on-the-job safety. The three areas covered are: safe work procedures, communications, and emergencies.

## Oregon OSHA

- [D0044](#) Dozer Safety. Bark & Chip Pile Management
- [V1144](#) Faller Safety
- [V1288](#) Large Capacity Forklift Operation - Lumber Yard
- [V0844](#) Log Hauling Safety
- [V0810](#) Log Landing And Log Yard Operations
- [V0843](#) Logging Safety Awareness
- [V1018](#) Logging Safety For New Employees
- [V0670](#) Safe Logging Near Overhead Power Lines
- [V0784](#) Safe Operation Of Chainsaws
- [V0780](#) Setting The Standard: An Overview Of Heli-Logging
- [V1064](#) Suicide Missions: Timber!
- [V0331](#) Tackling Productivity In Mechanized Logging
- [V1253](#) Training Materials. Division 7. Forest Activities
- [V0170](#) Working With Windthrown Trees (1985)





## Conclusion

Training programmes for harvesting on steep terrain have been introduced around the world initially for accident prevention and loss control, but have evolved to include environmental performance and compliance with certification schemes. There are some common elements such as basic job knowledge, hazard recognition and on-the-job training. Both the implementation and the need for specific qualifications vary widely. This review of the training schemes has identified content that covers a wide variety of topics that are relevant to the New Zealand logging industry. Most of this international material is readily available, with links provided in this report to the sources provided.

## References

BCFSC: General safety resources available from the BC Forestry Safety Council. Download from <http://bcforestsafes.org/node/109>

Conway, S. 1982. Logging Practices: principles of timber harvesting systems (Revised edition). Miller Freeman Publications, San Francisco. 432 p.

FITEC, 2005. Best Practice Guidelines for Cable Logging, Revised Edition January 2005. Forest Industry Training and Education Council (FITEC), 2005.

Garland, J. 1995. Accreditation Certification and Licensing of the Forestry Workforce. *in* 18th Annual Meeting of the Council on Forest Engineering, Cashiers, North Carolina.

Liley, W. B. 1983. Cable Logging Handbook. New Zealand Logging Industry Research Association, Rotorua, New Zealand, 1983.

MBIE, 2012. Approved Code of Practice for Safety and Health in Forest Operations. Ministry for Business Innovation and Employment, Wellington, New Zealand. December 2012.

OROSHA: General safety resources available from the Oregon Occupational Safety and Health Administration (Division 7 Forest Activities).

[http://www.orosha.org/subjects/forest\\_activities.html](http://www.orosha.org/subjects/forest_activities.html)

Reisinger, T.W. 1995. Evaluating A Chain Saw Safety Training Program In Southwestern Virginia: Preliminary Results. *in* 18th Annual Meeting of the Council on Forest Engineering, Cashiers, North Carolina.

UN FAO. 2011. Guide to Good Practice in Contract Labour in Forestry. United Nations Food and Agriculture Organization. ISBN 978-92-5-106877-9

Wimer, J. 2007. The Student Logging Training Program At The Oregon State University College of Forestry. *in* International Mountain Logging and 13th Pacific Northwest Skyline Symposium, Corvallis, OR.

WorkSafeBC (2006): Cable Yarding Systems Handbook. Workers' Compensation Board of British Columbia, Canada.