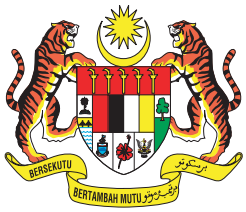

Ministry of Human Resources Malaysia

Department of Occupational Safety and Health

GUIDELINES ON OCCUPATIONAL SAFETY AND HEALTH IN LOGGING OPERATIONS

OCCUPATIONAL SAFETY AND HEALTH INSTITUTIONAL CAPACITY BUILDING

UNITED NATIONS DEVELOPMENT PROGRAMME

UNDP Project MAL/99/006/A/01/NEX

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Foreword

This guideline may be cited as the Guidelines for Safety and Health in Forest (Logging) Operations.

The purpose of this guideline is to provide guidance for safe forest operation, i.e. in logging operations. It recommends on how to comply with the Occupational Safety and Health Act 1994 and includes procedures to take into account when deciding practicable steps for forest worker to do their jobs. The guidelines list down rules on general safety and health as well as rules for protective clothing and equipment. The guidelines laid down rules for every single operation involved in logging activities, from rules for land preparation up to rules for transporting the logs to the sawmills. The guideline also provides equipment specification and design such as for stanchion and load restraint.

This guidelines will be of interest to logging operators and contractors, logging concession holders, employees, personal protective equipment suppliers, safety and health officers, officers of relevant department such as DOSH, Forestry Department, timber associations and logging equipment suppliers. For this entire group of people, the reality is that the agricultural industry is one of the most dangerous workplace in Malaysia with the second highest accident rate of all industrial sectors. The Department of Occupational Safety and Health Malaysia (DOSH) is actively working with her social partners to improve safety and health in logging. The aim of this booklet is to raise awareness of safety and health issues and promotes a “culture of safety” in logging operation. To employees and employers in the industry, your well being is important to us at DOSH and we have strong and effective laws governing safety and health. What is more important is a “culture of safety” where people work in a safe way because that is the way they prefer to work.

This guideline is design to provide practical information about working safely and the legal duties of persons who manage logging operations. From time to time this guideline will be reviewed and we at DOSH would welcome written comment to help make the guideline more comprehensive and informative and up to date with the state of knowledge and technology.

Director General
Department of Occupational Safety and Health
Malaysia

Contents

1. The OSHA 1994 and Regulations

GUIDELINES ON OCCUPATIONAL SAFETY AND HEALTH IN LOGGING OPERATIONS

1. THE OCCUPATIONAL SAFETY AND HEALTH ACT 1994 AND REGULATIONS

1.1 THE ACT: AN OVERVIEW

1.1.1 PRINCIPAL OBJECTIVES OF THE ACT

The Occupational Safety and Health Act 1994 and regulations have the principal objective of providing for the prevention of harm to employees at work. The following mandatory requirements are designed to help with ensuring operations are managed safely.

1.1.2 GUIDELINES

In addition to the mandatory requirements, the Act allows for the development and approval of statements of preferred work practice. These are known as approved guidelines and are the result of consultation between DOSH and affected industry members.

Requirement	Explanation
Active management commitment	A policy statement that reflects commitment to the health and safety of employees, employers and others.
Hazard identification and control	A systematic identification of hazards to employees in the workplace, including appropriate controls.
Information, training and supervision	Systems in place to ensure workers have the training or supervision to do the work safely and efficiently
Accident reporting, and investigation	Investigation and recording documentation of accidents to employees in the workplace.
Emergency procedures	A plan covering procedures during emergencies, which may occur on the job.

The guidelines recommend how to comply with the Act, and may include procedures to take into account when deciding practicable steps workers take to do their job.

Compliance with guidelines is not mandatory. However, a Court may consider that non-compliance with the guidelines in all matters it covers is non-compliance with the Act to which the guideline relates.

1.1.3 HOW TO COMPLY

Compliance with the requirements of the Act (and the recommendations of the guideline) is best achieved by incorporating the elements listed above in a written document, often called a health and safety management plan.

To assist with the operation of this guideline, other documents prepared by the relevant authorities should be used as the basis for safe work practice. Other references should be used when involved in logging operations are:

- Akta Perhutanan Negara 1984 (Pindaan 1993);
- Kaedah-Kaedah Hutan 1986;
- Kod Amalan Pengusahasilan Hutan Darat Asli Semenanjung Malaysia 1997;
- Kod Amalan Pengusahasilan Hutan Paya Laut Semenanjung Malaysia 1997;
- Kriteria, Petunjuk, Aktiviti & Piawaian Perlaksanaan Malaysia bagi Persijilan Pengurusan Hutan Semenanjung Malaysia (MC&I).

1.2 THE ACT: DUTIES

1.2.1 DUTIES OF EVERYONE

The Act places duties on employers, self-employed people and employees to ensure that their work activities do not harm themselves or other people. For forest operations, other people include visitors, people passing the operation, and the general public who may be in the vicinity of an operation.

Any person in control of a place of work (e.g. a principal, contractor or subcontractor) shall attempt to ensure that people there (or close by) are not harmed by any hazard resulting from work activities.

NOTE The best way to safely restrict access to forest operations and inform people about work-related hazards must be decided by the contractor in consultation with the principal.

1.2.2 DUTIES OF SELF-EMPLOYED PERSONS

Self-employed persons shall take all practicable steps to ensure that no action or inaction while at work harms either himself or herself or any other person.

Refer to Section 15, Part IV, OSHA 1994

1.2.3 DUTIES OF EMPLOYEES

While at work, employees shall take all practicable steps (including using safety equipment) to ensure their own safety and that of others.

Refer to Section 24, part IV, OSHA 1994

1.2.4 DUTIES IF YOU EMPLOY CONTRACTORS

Forest owners (or those acting as an agent for a forest owner) who hire contractors or sub-contractors are principals and shall take all practicable steps to ensure no one is harmed while carrying out any work that they are engaged to do.

1.2.5 EMPLOYER'S DUTIES: GENERAL

Under the Act, employers are required to:
- provide and maintain a safe working environment;
- provide and maintain facilities for the safety and health of employees;
- ensure that machinery and equipment are safe for employees;
- ensure that working arrangements are not hazardous to employees; and
- provide procedures to deal with emergencies that may arise while the employees are at work; and
- provide information, instruction, training and supervision as is necessary.

Employers have general duties, that relate to the management of particular hazard, e.g.
- working at heights above three meter;
- activities under raised objects;
- earthworks and excavations;
- harmful noise;
- cleaning, maintenance and repair of machinery;
- protective structures of self-propelled plant;
- employment of young persons.

Refer to Section 15, Part IV, OSHA 1994

1.2.6 EMPLOYER'S DUTY TO PROVIDE FACILITIES

Employers have a duty to maintain, keep clean and provide access to the following facilities, sufficient for the place of work:
- washing facilities;
- toilets;
- drinking water;
- first-aid equipment;
- facilities for employees who become ill at work;
- facilities for changing and storing clothes; facilities for meals.,
- lighting;
- emergency exit plans.

1.2.7 EMPLOYER'S DUTY ON HAZARDS

Employers shall have a three-step system for hazards at work.

Step	Task	Description
1	Identify hazards	A hazard is any activity, situation or substance that can cause harm.
2	Assessment of hazards	**Assess** which hazards are significant. "Significant hazard" means one which could cause: • Serious harm, including death, serious injury and disease. • Harm, which depends on how often/long a person is exposed to the hazard (e.g. exposure to noise over a long period may cause gradual or permanent deafness). • Harm, which cannot be detected for a significant time (e.g. exposure to certain chemicals may cause health problems years later).
3	Manage hazards	Eliminate the hazard if it is practicable to do so. Isolate the hazard if you cannot eliminate it, by putting some kind of barrier or distance between the hazard and the person. Minimise the hazard if you cannot isolate it, e.g. • follow safe and accepted work practices; • provide suitable protective clothing and equipment and ensure it is worn/used correctly; • maintain equipment properly; • train employees in safe work methods; • supervise untrained or inexperienced employees; • monitor employees' exposure to the hazard; • monitor employees' health (only with their consent).

1.2.8 EMPLOYER'S DUTY TO INFORM EMPLOYEES,

Employers shall inform employees of:

- the hazards they are exposed to or create while at work;
- how to minimise hazards to themselves and other people;
- where the necessary safety clothing and equipment are kept;
- what to do if an emergency arises while they are working.

Employers must also give employees the results of any monitoring of their health or the workplace, without identifying individuals.

1.2.9 EMPLOYER'S DUTY TO TRAIN AND SUPERVISE

- Employers shall take all practicable steps to ensure that employees who do any kind of work, or use plant, equipment or deal with any substance:
- have the knowledge and experience to ensure that they and others are not harmed; or
- are supervised by a person with the knowledge and experience to ensure that they and others are not harmed; or
- are adequately trained in the safe use of all:

- plant;
- objects;
- substances;
- protection clothing/equipment provided by the employer; that the employee may use.

1.2.10 EMPLOYER'S DUTY TO INVOLVE EMPLOYEES

Employers shall ensure that employees have an opportunity to be involved in the development of procedures for health and safety.

1.2.11 EMPLOYER'S DUTY WITH REGARD TO ACCIDENTS

Employers shall keep a register of every work-related:

- accident;
- dangerous occurrence;
- occupational poisoning or occupational diseases; and near-miss incident (where someone might have been harmed);
- involving any person in a place of work.

Employers are also required to:

- investigate all accidents, dangerous occurrence, occupational diseases and near-miss incidents;
- determine the cause;
- document remedial action taken;
- notify DOSH of the accident, dangerous occurrence or diseases that occurs at a place of work:
  - by the quickest means as soon as possible;
  - and in writing within seven days.

NOTE The site shall not be disturbed unless authorised by an inspector, except where necessary to aid the injured person or prevent serious damage to or loss of property.

1.2.12 GENERAL DUTIES OF DESIGNERS, MANUFACTURERS AND SUPPLIERS

Designers, manufacturers, and suppliers of plant and protective clothing/equipment have general duties, which relate to the safety of their products.

1.3 THE ACT: DEFINITION OF ACCIDENT, SERIOUS BODILY INJURY AND DANGEROUS OCCURRENCE

1.3.1 DEFINITION

The definition of accidents, serious bodily injury and dangerous occurrence are listed in the Occupational Safety and Health (Notification of Accidents, Dangerous Occurrences, Occupational Poisoning and Occupational Diseases) Regulation 2003 (Draft).

1.3.2 EXAMPLE OF SERIOUS BODILY INJURY CONDITIONS

Serious bodily condition has occurred if any of the following symptoms or conditions results in severe loss of bodily function (permanent or temporary). This table shows conditions that indicate serious harm has occurred.

Condition	Cause
Unconsciousness	• from lack of oxygen; • from absorption, inhalation, or ingestion, of any substance, requiring treatment by a registered medical practitioner.
Hospitalisation	• any need for person to be hospitalised for 24 hours or more.
Temporary severe loss	• pain or health impairment is significantly more than discomfort; and • pain or health impairment prevents use of part of the body: and • condition is likely to be temporary.
Acute illness	• from absorption, inhalation, or ingestion, of any substance, requiring treatment by a registered medical practitioner.
Sickness/illness	• caused by decompression; • from poisoning; • caused by exposure to infected material; • cancer.
Disease	• neurological disease; • dermatological disease; • respiratory disease; • musculoskeletal disease; • communicable disease.

1.3.3 EXAMPLES OF SERIOUS BODILY INJURIES

This table shows injuries that indicate serious harm has occurred.

Body part	Injury
Any part	• Amputation; • Burns requiring referral to a medical specialist or specialist outpatient clinic; • Laceration; • Bone fracture; • crushing
Eyes	• Chemical burn; • hot-metal burn; • penetrating wound; • other vision impairment.
Ears	• noise-induced hearing loss

1.3.4 EXAMPLES OF LOGGING INJURIES AND REQUIRED REPORTING ACTION

Example of Employee's Injury	Severity of Injury	Action Required by the Employer
Serious chainsaw cut requiring visit to doctor.	Serious harm	Notify DOSH as soon as possible; record in accident register.
Small chainsaw cut requiring stopping of task: first aid treatment only.	Temporary severe harm	Notify DOSH as soon as possible; record in accident register.
Strain to back while lifting, requiring visit to doctor.	Serious harm	Notify DOSH as soon as possible; record in accident register.
Strain to shoulder while pruning, requiring stopping of task but no visit to doctor.	Temporary severe harm	Notify DOSH as soon as possible; record in accident register
Minor cut while sharpening saw; requiring first aid but can still perform task.	Minor harm	Do not have to notify DOSH; record in accident register and submit return at the end of the year.
Dirt in eye while planting; requiring first aid but can still perform task.	Minor harm	Do not have to notify DOSH; record in accident register and submit return at the end of the year.
Pain in arm and temporarily cannot perform task.	Temporary severe harm	Notify DOSH as soon as possible; record in accident register.

Refer to Section 32, Part VIII, OSHA 1994

1.4 THE GUIDELINE: DEFINITIONS

1.4.1 APPLICATION

This guideline refers to any logging or tree felling operation undertaken for commercial purposes.

1.4.2 DEFINITION OF LOGGING

Logging is defined as felling trees by manual or mechanical means for the purpose of extracting logs, poles, and posts. It includes extracting logs to an area for processing and loading.

1.4.3 DEFINITION OF TREE FELLING

Tree felling is defined as felling trees by manual or mechanical means for any purpose. It includes:
harvesting firewood commercially;
land clearance;
maintaining shelter belts for horticulture;
maintaining trees in the vicinity of power lines;
managing and caring for trees in the general community;
silviculture;
willow layering and any other work in catchments soil erosion operations.

2. Rules of The Guideline

2. RULES FOR GENERAL SAFETY

2.1 RULES FOR GENERAL SAFETY

These rules are to be observed by every person employed, engaged in, or visiting any logging operation. All logging operations workers shall acquaint themselves with the relevant safety provisions of this guideline for each operation and shall take all necessary precautions to ensure their own safety and the safety of others engaged in each particular operation.

All workers shall have the right to obtain proper information from the employer regarding safety and health issues and step that must be taken. This information shall be presented in a form and language that workers can readily understand.

2.1.1 GUIDELINE ON LOGGING CAMPS

The following are minimum requirement and may be superseded by federal or local government acts or regulations. The objective is to:

(i) Prevent pollution of water resources.
(ii) Prevent the introduction of new health issues to the operation area.
(iii) Maintain a tidy operation.

Moving: Plant,

(i) Plant should be cleaned before being moved to new area.
(ii) The spillage of fuel and oil is to be avoided during transport.

Workshop: Workshop should comply with the same as though it is a factory

(i) Machine guarding
(ii) Extraction of fumes
(iii) Lighting
(iv) Be located well clear from any lake pond or water course
(v) Be provided with waste pits for fuel and all waste and to be constructed above the water table and avoid of water run – off.
(vi) Provide a safe area for solid waste disposal.

Fuel Storage Including Oil

(i) Be located in a well drained area at least a100 meters from any living area and or water course;
(ii) Reasonable precaution to be taken to prevent spillage in the area;

Identified as a hazardous area.

Field Waste Disposal

(i) All waste from fuel securing such as oil, oil filters, fuel drums and other such material must be returned to the base camp workshop for disposal.

End Of Operation

(i) All discarded machinery is to be removed to the base camp or pre-designated area allocated by the appropriate authority (i.e Forestry Department);
(ii) All rubbish as to he buried or removed to a pre-designated area set and by the appropriate authority.

2.1.2 EMERGENCIES

2.1.2.1 There shall be a means of communication or transport available at the work site in the case of injury or illness that requires medical attention.

The employer (or person in charge) shall issue procedures for dealing with emergencies and ensure that persons at the work site fully understand them.

2.1.2.3 There shall be at all times:
- immediate access to work sites; or
- machines available which are capable of clearing the way and enabling immediate access;
- alternative procedures/arrangements.

2.1.3 FIRST AID

2.1.3.1 Every main camp shall have a designated First Aid room; this will be identified by a Red Crescent and be used solely for the purpose of First Aid. The First aid room shall be stocked with basic necessities including a stretcher. Each main camp will have at least one qualified first aid persons on site at all times when logging is in progress. Where crew work is taking place, a holder of a current first aid certificate issued by a recognised organisation (e.g. Persatuan Bulan Sabit Merah, NIOSH or Ministry of Health) shall be present in the crew at all times.

There shall be at least one foreman trained in basic first aid at all times when logging is in progress. There must be a means of obtaining assistance within the shortest period of time possible for every logging crew. Where there is no radio communication or other means of assistance then a vehicle must be available at all times when logging is in progress. No person should be moved if there is a danger of further injury. The person in control of the logging operation shall be responsible for all emergency procedures in his logging operation. The person in control the logging operation shall also be responsible for recording and notification of every accident in his operation.

All vehicles used by logging foreman for the purpose of supervising workers shall have a first aid kit. The first aid kit is only to be used in cases of emergency. When supplies are depleted the operations manager shall restock the kit as soon as possible. Every kit shall be kept fully stocked, and stored so as to ensure contents are protected against contamination by dust, heat, moisture or any other source.

2.1.3.4 A clearly marked first aid kit shall be kept:
- in each work vehicle;
- at each work area.

NOTE Vehicle kits can substitute for those required at a work area, provided the vehicle remains at the work site.

2.1.3.5 Chainsaw operators (except those working on a skid site) shall carry at least two large sterile wound dressings or bandage for protection against contamination by dust, heat, moisture or any other source.

Note: For detail on first-aid box content please refer to Guidelines On First- Aid Facilities In The Workplaces, published by DOSH.

2.1.4 All PERSONS IN THE FOREST

2.1.4.1 No person shall work at or visit a forest operation while under the influence of drugs or alcohol.

No person shall enter an area where work is taking place until they have drawn attention to their presence and been acknowledged.

No person shall work in a manner likely to cause harm to themselves or others.

2.1.4.4 Every person undertaking forestry work shall be either:
- qualified;
- competent; or
- under training.

No person shall work on their own unless all practicable steps are taken to ensure they have a mean of getting help in an emergency.

2.1.4.6 No person shall position themselves where there is danger of materials being dislodged and rolling or falling into the work area.

2.1.4.7 No person shall remain in the bight of an operating rope under tension unless safety precautions have been taken to protect them from being struck by the rope if it breaks or becomes loose.

2.1.4.8 No person shall attempt to guide moving ropes on to drums or through fairleads by using their hands or feet.

2.1.5 PRINCIPALS (LICENCE OR CONCESSION HOLDER)

2.1.5.1 Before commencing operations, the principal shall verify that the employer has in place a safety management plan that complies with the requirements of the OSH Act and Regulations.

2.1.5.2 The principal shall ensure contract agreements clearly incorporate and define responsibilities and duties under the:
- Occupational Safety and Health Act 1994

2.1.5.3 The principal shall periodically audit the effectiveness of the employer's safety and health system to ensure compliance with the requirements of the OSH Act and Regulations.

2.1.5.4 The principal shall provide the employer with the opportunity to have input into the planning phase or such documents as are necessary, so that hazards which may arise from the work can be identified or controlled prior to commencement.

2.1.5.5 The principal shall identify hazards which:
- can arise from any operations over which they have control;
- are specific to the work area;

and then:

- jointly with employer determine measures to control the hazards;
- supply employer with documentation on the hazards in a form that is reasonably can be understood.

NOTE See appendix 2 for examples of hazard information to consider.

2.1.6 EMPLOYERS

2.1.6.1 The employer shall ensure that a competent person is in charge of each operation, and shall ensure that work is supervised and performed in a safe manner.

2.1.6.2 The employer shall ensure that all employees are properly instructed, and are qualified, adequately trained, or under training for the work they are required to perform.

2.1.6.3 Training shall include information on health issues associated with forestry work.

2.1.6.4 The employer shall have in place a system for the management of hazards in each operation. Employers shall provide employees with access to comprehensive information regarding safety and health hazards and their control.

The employer shall ensure close supervision of employees until they visually demonstrate they are competent in the work they may have to perform.

2.1.6.6 Employers shall ensure all new employees are inducted into:

- legislative and regulative requirements;
- the principal's safety and health system, and policies;
- in-house practices;
- hazards;
- codes of practice and guidelines;
- emergency procedures.

Employees required to work at positions where they may fall vertically more than 3 meters shall be provided with suitable mean to prevent them from falling.

The employer or person in charge shall suspend all operations when adverse weather creates hazards that cannot be satisfactorily controlled.

Where night work is required, the employer shall ensure that the level of illumination does not cause a hazard.

2.1.7. EMPLOYEES

2.1.7.1 No employee shall work in a manner likely to cause harm to themselves or others.

2.1.8 VISITORS

2.1.8.1 Visitors to a work site shall have prior approval of the person in charge who shall ensure they are:

- designated a safe area; or
- guided so that they are not harmed in the place of work.

Persons in charge of the place of work shall stipulate the minimum requirements for protective clothing and equipment for visitors.

2.1.8.3 Persons under the age of 16 are not permitted in the vicinity of any forest operation while work is being carried out, unless:

- they have permission from the person in charge; and
- they are under the constant supervision of a responsible person.

2.1.9 VEHICLES TRANSPORTING WORKERS

2.1.9.1 Vehicles used for conveying workers shall comply with the:

- Road Transport Act 1987 (Act 333)
- Commercial Vehicle Licensing Board Act 1987 (Act 334)
- Transport Act 1962;
- Traffic Regulations 1976;
- Passenger Vehicle Construction Regulations 1978;
- Transport (Vehicle Standards) Regulations 1990;
- Rules made under the Land Transport Act 1993, which replace or supersede the above Regulations.

IMPORTANT NOTE The above requirements are in addition to provisions contained in any Act, regulations or other written law.

2.1.9.2 Drivers of vehicles used for transporting workers shall hold a relevant driver's licence.

No loose tools or equipment shall be carried in the passenger compartment of a vehicle conveying workers.

2.1.9.4 Each person travelling in a vehicle shall have a suitable place to sit in a properly fastened seat with shelter.

2.2 RULES FOR HEALTH

2.2.1 GENERAL HEALTH

2.2.1.1 Working hours shall be arranged so as to provide adequate opportunity for rest periods, which shall include:

- short breaks during working hours;
- sufficient breaks for meals;
- daily or nightly rest.

The employer shall ensure that employees are educated about the importance of sufficient nutrition and hydration, and balanced diet, for their health and productivity.

2.2.1.3 The employer shall ensure employees have medical assessments to monitor any effects from exposure to health hazards associated with their work.

2.2.2 CAMP HYGIENE

The following are minimum requirement for a safe and healthy during conditions for camp people these may be superseded by local authority.

Camp Design Construction

(i) Building construction shall give adequate shelters from the weather.
(ii) Provide condition for waste disposal, as far as practically possible.

Water Supply

(i) Camp must be supplied with clean water;
(ii) Rain water should be collected in tanks for cooking and drinking;
(iii) Such tanks must be cleaned to prevent contamination and screened to avoid breeding of mosquitoes.

Water Disposals

(i) Domestics Water
(ii) Direct to a disposal area more than 15 meters from the nearest building.
(iii) All drains should be covered sewage.
(iv) All toilets are not to be located within 100 meters of any water source used for drinking.
(v) Sewage should not be discharged into any catchments of drinking water suppliers or into any stream.
(vi) Including any point that may create a health risk to any person.

Rubbish disposal:

Provide safe rubbish disposal
(i) In pits which are above the water table
(ii) Areas that are free from run-off water
(iii) Be at least 50 meters from and watercourse, or any source of water used for human consumption.
(iv) Rubbish pits should be covered with at least 20-cm depth of soil depth at least once every week.

Vegetation management

(i) Grass and weeds in close proximity to the camp should be kept to a minimum.
(ii) Should be short enough to reduce the risk of fire and reduce the risk of infections disease.

2.3 RULES FOR PROTECTIVE CLOTHING AND EQUIPMENT

2.3.1 GENERAL HEALTH

2.3.1.1 The employer shall provide or make provision for all appropriate clothing, footwear and personal protective equipment to protect employees from harm due to any hazard in the workplace, and ensure it is used correctly.

2.3.1.2 Clothing/equipment shall be comfortable and allow free movement.

NOTE Give consideration to fit, comfort and the protection offered when selecting protective clothing and equipment.

2.3.1.3 Clothing/equipment shall be kept clean and properly maintained.

2.3.1.4 Damaged clothing/equipment shall be properly repaired or discarded.

2.3.1.5 Persons entering/working in harvesting or tree felling operations shall wear high-visibility clothing.

2.3.1.6 During the hours of darkness, high-visibility clothing with reflectors strips (minimum of 150 sq.

cm visible on both the front and rear of the garment) shall be worn.

2.3.2 LEG PROTECTION

2.3.2.1 All workers required to use a chainsaw shall wear safety leg protection. Such leg protection should be designed to meet local conditions and meets a recognized standard.

2.3.3 SAFETY FOOTWEAR

2.3.3.1 All workers engaged in forest operations shall wear footwear. For forest floor operators (e.g tree feller, skidder operators, hookman etc) the rubber sole shoe snare found to be the best.

2.3.3.2 Laces shall be securely tied at all times.

2.3.3.3 Chainsaw safety footwear shall be of a recognised industry standard.

2.3.4 SAFETY HELMETS

2.3.4.1 Safety helmets shall be worn at all times by persons who are:
- tree felling;
- at a logging operation site.

EXCEPTION Machine operators who are fully protected by an approved canopy need not wear helmets.

2.3.4.2 Safety helmets for chainsaw operators shall be fitted with earmuffs and has provision for visors. Such safety helmets must comply with the Malaysian Standard for safety helmets.

2.3.4.3 Safety helmets shall be of high-visibility colours for daytime work.

2.3.4.4 Helmets shall be inspected regularly and shall be replaced as recommended by the manufacturer or earlier if they have suffered any damage or deterioration.

2.3.4.5 Helmets should not be stored in exposure to direct sunlight. Paints, petrol, oil or solvents should not be applied to them, as they can cause deterioration.

2.3.5 HEARING PROTECTION

2.3.5.1 Hearing protection shall be worn where noise levels are above (or likely to be above) 85dB.

2.3.5.2 Hearing protection shall comply with the requirements as set out in Appendix 3: Exposure to Continuous Sound.

2.3.5.3 Hearing protectors shall comply with either:
- Hearing Protection Devices, Regulation 17, Factories and Machinery (Noise Exposure) Regulations, 1989 or
- any other Standard embodying the same or more stringent criteria.

2.3.5.4 Owners of machinery shall take all practicable steps to minimise at source excessive noise levels which may impair the worker's hearing.

2.3.6 EYE PROTECTION

2.3.6.1 Eye protection shall be used where there is potential for injury from:
excessive dust;
flying particles;
material from vegetation;
Chemicals, welding, and grinding except where the eye protection itself is likely to cause a greater hazard.

NOTE Chainsaw operators may use a forestry-type mesh visor.

2.3.6.2 Eye protection equipment other than forestry-type mesh visors shall comply with any standard setting by the authorities.

2.3.7 GLOVES

2.3.7.1 Gloves shall be used where there is potential for injury from:
- chemicals;
- abrasions/punctures;
- heat.

2.3.7.2 Gloves shall comply with Malaysian Standard or any other standard embodying the same or more stringent criteria.

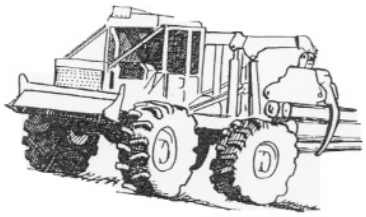
2.3.8 RESPIRATORY PROTECTIVE DEVICES

2.3.8.1 Appropriate protective devices shall be used where there is potential harm to persons exposed to:
- dust;
- gases;
- fumes;
- chemicals.

2.3.8.2 Appropriate protective respiratory devices shall comply with Malaysian Standard or any other standard embodying the same or more stringent criteria.

2.4 RULES FOR MOBILE PLANT AND MACHINERY

2.4.1 STATUTORY REQUIREMENTS



2.4.1.1 Mobile plant used in logging operations shall comply with the:
- Factory and Machinery Act 1967 & Regulations;
- Occupational Safety and Health Act 1994 & Regulations;
- Transport Act 1957;
- Or any other standards embodying the same or more stringent criteria.

2.4.1.2 Mobile plant (except hydraulic excavators), which is not operated on level round, shall be fitted with a rollover protective structure (ROPS) complying with either:
- ISO 8082:1994 Self-propelled machinery for forestry, Rollover protective structures, Laboratory tests and performance requirements; or
- any other Standard embodying the same or more stringent criteria.

Included in this rule	Excluded from this rule
All mobile plant used in forestry work such as: • wheeled tractors • crawler tractors • skidders • graders • loaders	Mobile plant that is designed to be and is operated on level ground and: • machinery weighing less than 700 kgs; • log haulers; • buses, trucks, vans, cars; • telescopic mast forklifts; • power-operated work platforms.

Hydraulic excavators operating on terrain where stability cannot be assured shall be fitted with a Cabin Operator Protective Structure (COPS).

2.4.1.3 Mobile plant fitted with ROPS or COPS cabs shall be fitted with seat belts (or other safety restraint) complying with either:
- MS 75 : 1972 Specification for anchorages for seat belts; or
- any other Standard embodying the same or more stringent criteria.

Where a seat belt or other safety restraint is fitted, operators shall wear the restraint device whenever the machine is being operated.

2.4.1.5 Any alterations to protective structures outside the manufacturer's specifications shall be approved by the manufacturer (or their agent).

2.4.2 SAFETY SPECIFICATIONS

2.4.2.1 Mobile plant working in standing trees or where there is danger from falling material) shall be fitted with a falling object protective structure (FOPS) complying with either:
- ISO 8083:1989 Machinery for forestry, Falling object protective structures, Laboratory tests and performance requirements; or
- any other Standard embodying the same or more stringent criteria.

2.4.2.2 Mobile plant required to work where there is danger of objects entering the cab shall be fitted with an operator protective structure (OPS) complying with either:
- ISO 8084: 1993 Machinery for forestry, Operator protective structures, Laboratory tests and performance requirements; or
- any other Standard embodying the same or more stringent criteria.

2.4.2.3 Mobile plant required to work at night shall be equipped with lights to illuminate the work area.

2.4.2.4 Mobile plant with any structure that may come in contact with overhead power lines shall have an appropriate warning displayed.

Mobile plant shall be equipped with brakes capable of holding the machine and its load on any slope on which it is operated.

2.4.2.6 Any mobile plant used as a stationary winch shall comply with the relevant requirements set out in this guideline.

2.4.2.7 All pulleys, shafts belts and fan belts shall be securely guarded.

2.4.2.8 Where operating noise levels may cause damage to hearing:
- An ear protection warning sign shall be displayed;
- The operator shall wear appropriate hearing protection.

2.4.3 PLANT AND VEHICLES

2.4.3.1 Vehicles/mobile plant used for forest operations shall have a valid Warrant or Certificate of Fitness where applicable.

2.4.3.2 Drivers of vehicles shall hold a relevant valid licence.

2.4.3.3 Operators of mobile plant shall hold a valid licence if applicable.

2.4.4 USING MACHINERY

2.4.4.1 Mobile plant shall be operated, serviced and maintained to the manufacturer's specifications, recommendation and instructions.

2.4.4.2 Where the stability of machines may be compromised by slope, weather or ground conditions, specific hazard control measures shall be put in place.

Equipment shall not be operated on slopes that exceed the maximum specifications by the manufacturer. As a guide, subject to weather and ground conditions:
- Rubber-tyred machines should not operate on slopes that exceed 30% (18°).
- Crawler tractors, feller bunches, excavators, and other similar mobile plant should not operate on slopes that exceed 40% (22°).

2.4.4.3 No person shall:
- Get on or off a moving machine;
- Ride on a machine not provided with proper seating;
- Ride on a load carried or towed by a machine.

2.4.4.4 No loose objects shall be carried in the cab of a machine.

2.4.4.5 When a machine is shut down or left unattended with engine running:
- Brakes shall be applied;
- Blades and accessories shall be resting on the ground.

2.4.4.6 Machines shall be kept away from tree felling by a distance equal to at least twice the height of the tallest tree being felled.

They shall enter the area only when felling has ceased and the fellers have signaled their approval (see Mechanised harvesting, Machine-assisted felling, and Hung-up or Cut-up trees exceptions to this rule).

2.4.4.7 Any machinery that become unsafe, or is suspected to be unsafe shall be shut down. The machine shall be inspected, repaired and tested before returning to service.

2.4.5 MAINTAINING MACHINERY

2.4.5.1 Every employer shall make provision for inspections at least weekly, by a competent person; of each forest operation to ensure it complies with the requirements of this section. The inspections shall cover all plant and equipment directly associated with the forest operation. Details of the inspection shall be recorded.

2.4.5.2 Any person who discovers any defect in any plant or equipment shall immediately report the defect to the person in charge of the forest operation.

2.4.5.3 In forest operations, owners of machinery used shall take all practicable steps to remove, at source, excessive noise levels that are likely to impair workers' hearing.

2.4.5.4 Mobile plant shall be maintained as a safe operating condition according to the manufacturer's requirements.

2.4.5.5 No machine shall be cleaned, lubricated or repaired with the engine running, except where final adjustments are specified by the manufacturer. Repairs or adjustments shall never be made when the machine is in motion.

2.4.5.6 No person shall work under:
- A raised blade,
- A load or accessory; or
- Any machine raised for repairs

Unless strong supports are used to ensure that the object cannot be dropped or lowered.

2.4.6 SHIFTING MACHINERY

2.4.6.1 Loading or unloading a machine onto a transporter or other vehicle shall only be done by a competent person.

2.4.7 USING ALL TERRAIN VEHICLES

2.4.7.1 The manufacturer's recommended instructions shall be followed and recommended loadings shall not be exceeded.

2.4.8 USING POWER-OPERATED WORK PLATFORMS

2.4.8.1 A power-operated elevating work platforms shall have an engineer's certificate stating it can safely:

- elevate, sustain, and lower;
- slew and transport (where applicable) its designated safe working load (SWL).

2.4.8.2 The work platform shall be operated in accordance with the manufacturer's instructions. In particular, operators shall not:

- exceed the safe working load;
- approach within 4 meter of overhead power lines; without written consent of the owner and operator of the power lines.

2.4.9 WORKING AROUND OVERHEAD POWER LINES

2.4.9.1 Persons working with hand tools or ladders, or operators of any machinery working in the proximity of live power lines, shall keep the tools, ladders or any part of the machinery at least 4 meters away.

2.5 RULES FOR HELICOPTER

It is imperative to:	It is prohibited to:
• remain clear of the immediate vicinity of the hovering helicopter (unless unavoidable).	• Approach or leave a helicopter that is starting up or closing down; • Throw any object.

2.5.1 WHEN A HELICOPTER IS IN THE VICINITY

It is imperative to:	It is prohibited to:
• Stand in front of helicopter; • Stay in full view of the pilot; • Keep clear of the rotors; • Crouch; • Approach from the downhill side; • Move as far up to the cabin doors as practicable.	• Go near the rear of the helicopter; • Remain near the outer path of the rotor.

2.5.2 WHEN APPROACHING AN OPERATING HELICOPTER

It is imperative to:	It is prohibited to:
• Wait for a signal from the pilot before entering, leaving or unloading; • Fully secure loose clothing (e.g. unfastened jacket); • Fully secure loose freight (e.g. open containers).	• Take anything into a helicopter unless carried horizontally below waist height.

2.5.3 WHEN ENTERING, LEAVING OR UNLOADING

NOTE Operations involving suspension of persons below the helicopter, including injured persons, shall be conducted in compliance with the The Laws of Malaysia Act 3, Civil Aviation Act 1969.

2.5.4 OPERATIONS

2.5.4.1 Pilots shall hold a current valid licence and appropriate rating for specialised work.

2.5.4.2 A briefing session on safety between the pilot, controllers and workers shall be held before operations commence.

2.5.3.3 Where safety helmets are worn in helicopter operations they shall be provided with a means of preventing them from being blown off such as a chin strap or by wearing ear muffs attached to the helmet.

2.5.3.4 Seat belts shall be fastened until pilot signals for passengers to exit.

2.5.5 RIGGING

Strops or taglines used shall have an ultimate breaking strength three times their safe working load and shall be regularly inspected for wear.

2.5.6 REFUELLING

2.5.6.1 An appropriate area shall be allocated for refueling. The pilot shall be responsible for safety procedures during refueling and ensuring compliance with :

- Occupational Safety and Health Act 1994 (USECHHR 2000)
- MS 683: 1982 Specification for Class Labels for Dangerous Goods.

2.5.7 COMMUNICATION

2.5.7.1 Procedures shall be established to ensure that alternative communication methods are available should radio communication fail or become unclear.

2.5.7.2 Hand signals shall be in conformance with the instructions issued by the pilot.

2.6 RULES FOR CHAINSAWS

2.6.1 GENERAL SPECIFICATION

2.6.1.1 Chainsaws shall comply with Malaysian Standard or any other standard setting by the authorities.

2.6.1.2 Chainsaws held directly by hand shall have at least one of the following securely attached, in place, and in good working order before it is used:

- Where a chain brake is not in place then a safety mitt should be used;
- A chain brake;
- a clearly marked and functional ON-OFF switch;
- a chain catcher;
- a rear hand guard;
- anti-vibration mounts;
- a throttle lockout;
- an effective muffler;
- a spark arrester.

2.6.1.3 All operations relevant to tensioning the saw chain and any other maintenance shall be carried out in a safe manner and to the manufacturer's instructions.

2.6.2 STARTING

2.6.2.1 Only approved starting methods shall be used. These are:

- starting a chainsaw on clear ground (see figure 1);

- step over method for warm starting (see figure 2).

NOTE For starting/using a chainsaw off the ground, see the Training Manual for Safety and Health (OSH) in Logging Operations or "Panduan Penggunaan Gergaji Berantai dan Teknik Tebangan Berarah", Unit Latihan Perhutanan.

Figure 1: Starting a chainsaw on clear ground

1. Place the chainsaw firmly on the ground.
2. Have the left arm straight, with the front handle bar firmly cradled between the thumb and fingers. If a mitt is fitted, the hand must be in the mitt.
3. Place the front of the right foot in the rear handle. Or, alternatively, secure the saw by placing the right knee on the body of the saw.
4. Place the other leg to provide stability.

Figure 2: Step over method for warm starting

1. Place left hand in safety mitt, if fitted. Keep left arm straight.
2. Position saw on left thigh pointing left.
3. Step over rear handle and secure saw behind a bent right knee.
4. Start with short sharp pulls on starter cord.
5. If the saw does not start revert to method shown in figure 2.

OPERATION

2.6.3.1 Operators shall use all protective equipment, appliances or other means provided to afford protection and safeguard health.

2.6.3.2 A chainsaw shall not be used if:
- the saw chain does not remain stationary when the motor is idling;
- the guide bar, handles or controls are loose;
- any parts affecting the safety or operational capacity of the chainsaw.

2.6.3.3 Operators shall ensure that, where practicable:
(i) All obstructions in the path of the chainsaw are removed before cutting operations begin;
(ii) A good footing and safe, comfortable, balanced working position are maintained;
(iii) During operations the chainsaw is held firmly with both hands, with the handles cradled between the thumbs and fingers and safety mitt used;

(iv) Watch what, and where, the chainsaw is cutting; and
(v) Avoid overreaching with the chainsaw.

2.6.3.4 Where necessary, plastic, wooden or soft metal wedges shall be used to keep the cut open, thus reducing the likelihood of binding (pinching or jamming).

2.6.3.5 The chain brake shall be activated by the operator at least every work period to test its effectiveness under operating conditions.

2.6.3.6 Except for short unobstructed distances, the chainsaw motor shall be stopped while being carried by hand, or the chain brake activated, if fitted.

2.6.3.7 The chainsaw shall always be carried in such a manner as to allow it to be thrown clear in case of a fall.

2.6.3.8 To reduce the probability of kickback and vibration, and to ensure smooth cutting, the manufacturer's instructions for sharpening and maintaining the saw chain shall be adhered to.

2.6.3.9 No maintenance shall be carried out while the motor is running except for the fine tuning of the carburetor.

2.6.3.10 No person shall use a chainsaw while on stockpiled, stacked or heaped logs.

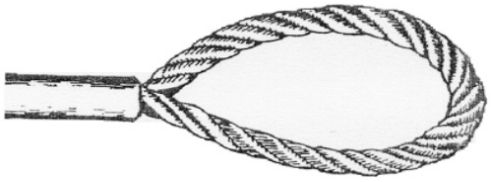
2.6.4 REFILLING

2.6.4.1 The following rules shall be observed when refilling:
- stop the motor;
- place the saw on the clear ground. Fill the fuel tank first to allow the saw to cool down;
- avoid spilling fuel on hot engine components, as excessive heat can cause ignition;
- Do not smoke or have any sparking or open flame near the filling point;
- When completed, wipe excess fuel from the saw;
- move at least 3 meters away from the refilling site before restarting;
- Take special precautions in periods of high fire danger.

2.6.5 REDUCTION OF VIBRATION DISEASE

2.6.5.1 Operators shall check and maintain the security and condition of anti-vibration mountings.

2.6.5.2 The following points should be observed to control the hazard of vibration disease:
- Maintain and check the fastness of all anti-vibration mountings, absorbers, the guide bar and chainsaw body parts;
- Maintain the correct low- and high-speed carburetor adjustments;
- Maintain a firm grip of the chainsaw handles;
- Maintain depth gauge settings and chain sharpening to the manufacturer's recommendations.



2.7 RULE FOR WIRE ROPE

2.7.1 WIRE ROPE

2.7.1.1 No wire rope shall be used in any forestry work unless the manufacturer or vendor has certified its breaking strength.

2.7.1.2 Wire rope used in forestry work shall comply with either:
- MS 550 : 1978 Round steel wire for ropes; or
- MS 754 : 1981 Specification for stranded wire ropes – Technical delivery Requirements; or
- MS 796 : 1982 Specification for small wire ropes; or
- any other Standard embodying the same or more stringent criteria.

2.7.1.3 Eyes in all ropes and strops shall be:
- spliced, with ends tucked in at least three times on one side, and two on the other; or
- held by clamping devices giving at least the same strength.

2.7.1.4 Wire rope shall be cut with either:
- a specialist non-percussion cutting tool; or
- a percussion tool using a softened hammer.

2.7.1.5 Eye-to-eye splices shall not be used in:
- load-bearing or working ropes;
- strops used for lifting purposes.

2.7.1.6 Wire rope shall be replaced if it shows signs of:
- excessive wear;
- corrosion;
- kinking;
- stranded wires;
- being burned.

2.7.1.7 Knots shall not be used in any wire rope.
Exception: Knots may be used to secure strawline hooks in cable logging.

2.7.1.8 "C" type hooks of the type illustrated in figure 1 shall not be used in any logging operation.

Figure 3 "C" hook of prohibited type
Reference: LIRO Wire Rope Splicing Handbook.

2.8 RULES FOR OTHER PORTABLE EQUIPMENT

2.8.1 PORTABLE TOOLS

2.8.1.1 Tools shall be kept in safe working condition and where applicable be properly sharpened.

2.8.1.2 Tools shall be used only for the purpose they were designed for.

2.8.1.3 Point to be noted include:

- Handles shall be securely and correctly attached to tools. All wooden handles shall be of firm straight- grained stock and free from defects.
- Split axe heads, damaged or mushroomed wedges, hammers and similar equipment shall be properly repaired or replaced.
- When cutting wire rope, a suitable cutting tool or a softened hammer shall be used. Eye protection shall be worn. Hardened hammers are not suitable for this operation.
- A maul or other suitable tool shall be provided for the driving of wedges.

2.8.1.4 Workers shall keep 3 meter apart, or twice the height of tallest vegetation being cut (whichever is the greatest) when using hand-cutting tools.

2.8.1.5 Tools shall be properly secured when transporting. Before leaving the site, all visible or known spikes shall be removed from all logs.

2.8.2 LADDERS

2.8.2.1 Ladders shall comply with:

- MS 1009 : 1986 Specification for portable aluminium step-ladders; or
- MS 1069 : 1987 Specification for portable aluminium single and extension ladders; or
- Any other Standard embodying the same or more stringent criteria.

2.8.2.2 Ladders shall be regularly checked and defects repaired before use.
Particular attention shall be given to:
- Junction of stiles and rungs;
- Interlocking joints.

2.9 RULES FOR FLAMMABLE LIQUIDS AND EXPLOSIVES

2.9.1 STORING AND TRANSPORTING FLAMMABLE LIQUIDS

2.9.1.1 Petrol and other flammable liquids shall be conveyed, stored and packed in containers that comply with the requirements prescribed under the Occupational Safety and Health Act 1994 (Use and Exposure to Chemical Hazardous to Health Regulation 2000).

2.9.1.2 At least two hand-held fire extinguishers designed for fighting class "B" fires shall be immediately available. They shall be of suitable capacity in relation to the quantity of flammable liquid being carried on every tank wagon or trailer.

2.9.1.3 When it is necessary to carry flammable liquids in vehicles also used to transport passengers, the containers shall be secured in a properly constructed vented compartment which is:
- separate from the passenger compartment;
- accessible only from the exterior;
- vented to the exterior.

2.9.1.4 Only approved containers shall be used to carry fuel for on-site refilling. Such containers must not be used for storing fuel. Refer to MS 1248: 1991(P) Recommendations on the packaging of dangerous goods.

2.9.2 USE OF EXPLOSIVES

2.9.2.1 Explosives shall be stored, carried and handle under the requirements of The Explosive Regulations 1959.

2.9.2.2 Persons using explosives shall be conversant and carry out operations to the requirement Regulation 74, "Use of Explosives" of The Explosive Regulations 1959.

2.10: RULES FOR ROADS

2.10.1 WORKING ON OR NEAR ROADS

2.10.1.1 Signs warning of work in progress shall be displayed when work is on or near public/private roads. Their purpose is to protect workers, and to guide traffic and pedestrians around the worksite from any hazards.

2.10.1.2 Planning of appropriate warning methods shall be prepared as part of hazard management.

2.10.1.3 Permanent and temporary traffic control signs shall comply with regulations by the relevant authorities (i.e Jabatan Kerja Raya, Majlis Daerah etc). Temporary signs shall be removed or covered when no longer valid or when work has ceased.

2.10.1.4 Where there is a road controlling authority, formal authorisation shall be obtained and compliance made with any conditions set by the authority before any signs warning of operations are placed and work commences.

2.10.2 ROAD CONSTRUCTION AND MAINTENANCE

2.10.2.1 Roads shall be constructed according to 'Spesifikasi Jalan Hutan untuk Semenanjung Malaysia, 1999' by Forestry Departmant Peninsular Malaysia or any other authority.

2.10.2.2 Adequate provision shall be made for passing bays in one-lane roads. These shall be located on level ground where practicable.

2.10.2.3 Roads and tracks used for regular access shall be maintained to ensure the safe passage of the class/ type of vehicle for which its use is intended.

2.10.2.4 The gradient of any road used for transporting logs or wood produce shall not be greater than 25 degrees or 36% on the steepest part.
Exception: Roads used only by off road vehicles may be in excess of the stated gradient limit provided:
- the machines are designed to cope with the steeper gradient; and
- the operation has a written site-specific hazard control procedure.

2.10.2.5 Adequate culverts and drains shall be provided to ensure surface water is carried away. Cutouts for water disposal and soakpits for ponding shall be regularly checked for proper functioning.

2.10.2.6 Sight distances shall be maintained by cutting back impeding vegetation or removing obstructions.

2.10.2.7 Warning of slips, washouts or repair work shall be provided by signs complying with section 2.11.1, "Working on or near roads".

2.10.3 BRIDGES

2.10.3.1 Bridges and their approaches shall be designed and constructed to engineering standards appropriate for the intended use.

2.10.3.2 Approaches to bridges shall be constructed to allow:
- as straight an access way as practicable;
- optimum visibility for all users.

2.10.2.3 Curb rails shall be provided on bridges.

2.10.3.4 The running surfaces of bridges shall be provided with non-slip materials to prevent vehicle slide.

2.10.3.5 The bridge owner shall inspect the bridges regularly by himself or his nominated representative and a record of each inspection kept.

2.10.3.6 Bridges shall be maintained to ensure the safe passage of the class/type of vehicle for which its use is intended.

2.11: RULES FOR TREE FELLING

Tree felling is a hazardous operation, with falling trees, branches and moving logs causing many serious and fatal injuries. Safety therefore depends on the skill, experience, common sense and judgement of the feller. Consequently, every emphasis must be placed on training, clear instructions, and supervision.

2.11.1 ENTERING TREE FELLING AREAS

Every person approaching a felling area shall:

- Before entering the felling area, notify the supervisor or person in charge of their intention;
- Exercise care when approaching workers engaged in any felling operation;
- Draw the workers' attention to your presence and intention by calling out loudly or by some other effective means; and
- Do not enter the area until acknowledged or signaled to do so.

2.11.2 PREPARATION FOR TREE FELLING

2.11.2.1 The employer (or their representative) with the involvement of the fellers shall identify hazards specific to the site. All felling operations shall be under the direct control of a competent person fully experienced in the kind of work to be undertaken. The person in charge of felling operations shall exercise control and supervision of the work to ensure adequate safety precautions are being observed.

2.11.2.2 All dead or defective trees that could cause danger to persons using roads, skids or tracks shall be felled before operations begin. This includes trees, which have been disturbed during road or skid construction. Special care should be taken when felling dead trees, as parts may fall backwards into the work area as the tree falls.

2.11.2.3 Before felling commences, a careful check shall be made to ensure that there is no danger from dead material, branches or dead tops being dislodged and falling into the work area.

2.11.2.4 Scrub, vines, dead defective or unstable trees, and similar obstacles along the escape route shall be cleared from around every tree to be felled to provide adequate work space and a clear escape route.

2.11.2.5 A clear escape route at 45° (or as close as practicable) to the rear of felling direction shall be made and used. (Figure 4)

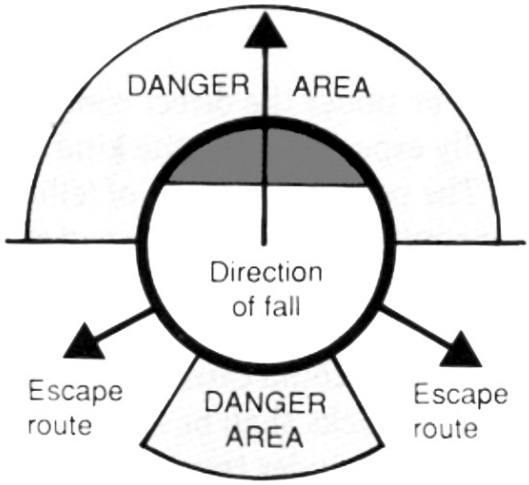


Figure 4: Options for escape routes

2.11.3 FELLING AIDS

2.11.3.1 Where the size of trees being felled has the potential to cause harm, fellers shall carry with them or have available suitable felling aids appropriate for the size of the trees being felled.

- The employer shall ensure that:
- The required wedges (minimum two wedges) and driving tools are readily available to the feller and crosscutter at all times; and
- A suitable maul is provided for the driving of steel wedges.

2.11.4 SAFETY AREAS

2.11.4.1 Fellers shall ensure that no:
- other person;
- machine;
- operating ropes;
- other operations;

are within two tree lengths of the tree being felled.

2.11.4.2 No person shall be closer than two tree lengths to a tree being felled, unless:
- assisting with felling;
- supervising;
- training others;
- being trained.

No person shall operate on the downhill side of the felling operation until all tree felling operations are completed.

2.11.4.3 No tree shall be felled within two tree lengths of any road, railway or public access unless the provisions of Section 2.10.1, "Working on or near roads" have been complied with.

2.11.4.4 Trees should be felled towards a clear open space unless there is no alternative.

2.11.4.5 Fellers and observers shall ensure the safety area is maintained.

2.11.4.6 When it is necessary to "buddy cut" or for another person to be at the tree with the feller, the following rules shall apply:

- only one feller shall make felling cuts at one time;
- only one chainsaw shall be working while felling cuts are being made.

The person not executing the felling cuts must be:

- behind the tree being felled;
- positioned up the escape route in full view of the feller;
- able to see the top of the tree being felled.

2.11.4.7 If overhead power wires gas lines or underground cables of f any kinds are present in the felling area, the appropriate authority shall be consulted and their requirements complied with.

2.11.4.8 Where a public road is involved, there should be a tree felling warning sign so that people are aware of the dangers. A recommended sign is HAZARD "TREE FELLING" sign (see fig. 5). This sign should be placed where it is visible to road users and give plenty of warning.

2.11.4.9 Any conditions laid down by the local road controlling authority shall be complied with.

2.11.4.10 It is strongly recommended that the above also apply to "Private Roads".

2.11.5 FELLING CUTS

2.11.5.1 The scarf, back-cut and hinge wood shall form the basis for felling on trees over 20cm stump diameter.

2.11.5.2 The top cut of the scarf shall be put in first followed by the bottom cut (except with Humbolt scarfs).

2.11.5.3 The scarf and back-cut of the tree being felled shall be completed and the tree felled before starting on the next tree.

2.11.5.4 The back-cut shown in Fig. 6 is a conventional back cut in a conventional tree. Trees that are known to slab are heavy leaners or trees with cantilevered weight distribution. Refer to Figure 11, for the required back-cut method that prevents slabbing, and optimizes the margin of safety for the Tree Feller.

Figure 5: Sign to be used

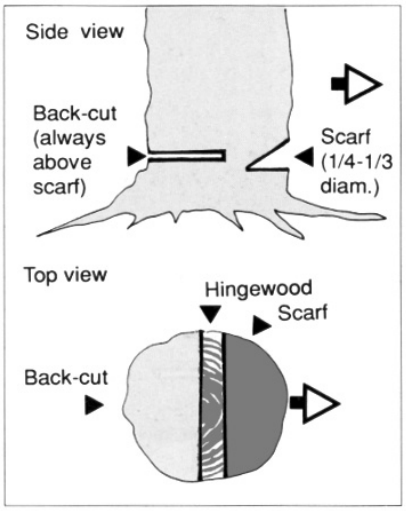


Figure 6: Felling cuts

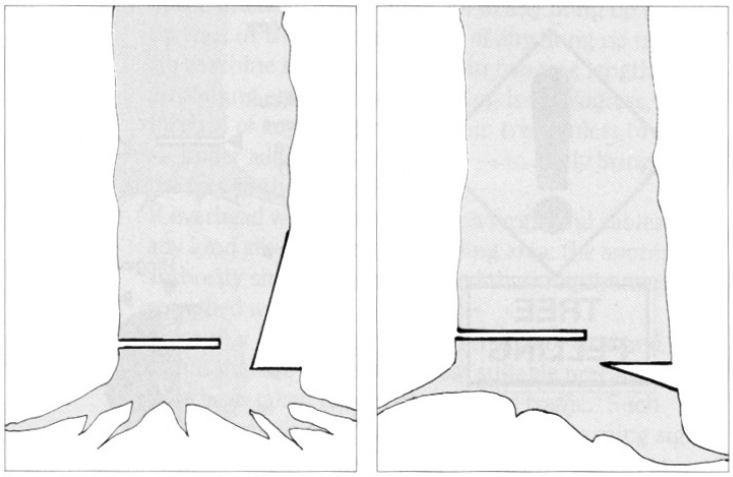
2.11.5.5 The top cut of the scarf shall always be put in first, followed by the bottom cut.

2.11.5.6 There may be occasions when, because of lean etc, the opening of the scarf may have to be reduced or enlarged to suit unusual circumstances. However, careful consideration should be given before using other than the accepted practices.

2.11.5.7 In wind-throw salvage, for example, trees without tops should be scarfed deeper than normal but not more than half the diameter.

2.11.5.8 Figure 7 illustrates the Humbolt scarf, which assists in reducing waste in the butt log and can be used on steep ground.

Figure 7: Humbolt scarf



2.11.5.9 Where side slabbing to buttlogs may occur, wing cuts at each side and beneath the base of the

scarf and at an angle of 60° or greater into the wood of the stump area maybe used, providing the control of the tree is not jeopardised. These cuts shall not exceed the bar width. This is illustrated in Figure 8.

2.11.5.10 Where there is doubt as to the lean of a tree, a wedge or wedges should be inserted in the back cut and driven home as soon as practicable.

2.11.5.11 The direction of fall of a tree can be altered from the natural lean by insertion and driving of wedges in the back-cut and variation of hingewood depth. Figure 9 illustrates the method.

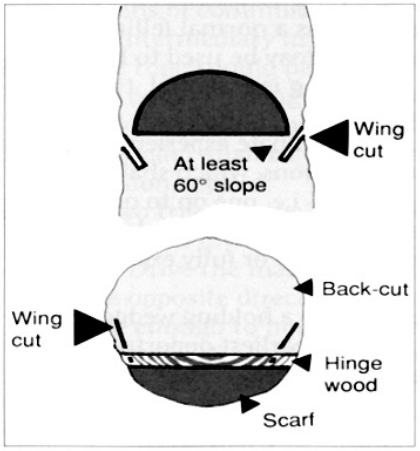


Figure 8: Wing cuts

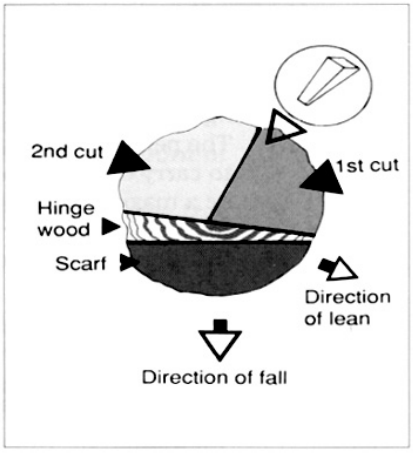


Figure 9 : Felling in variation of natural lean

2.11.5.12 Forward-leaning trees, or those affected by wind require special techniques. The amount of forward lean dictates the distance between the bore and release cuts. The back-cut method for felling heavy leaning trees is the Bore and Release. This was introduced to optimize the margin of safety for tree fellers. These trees normally slabbed or split up the center, with devasting effect, when using a conventional back-cut. An example is illustrated in Figure 10.

2.11.5.13 Some trees with a moderate back lean may be felled away from that lean by using a split level back-cut and wedges. The split-level allows the wedge to be effectively set in smaller trees. Fig. 11 shows the method.

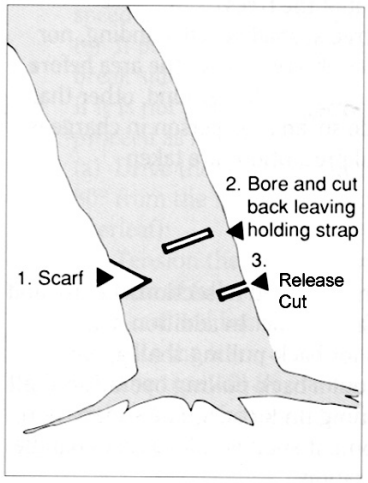


Figure 10: Felling forward-leaning trees

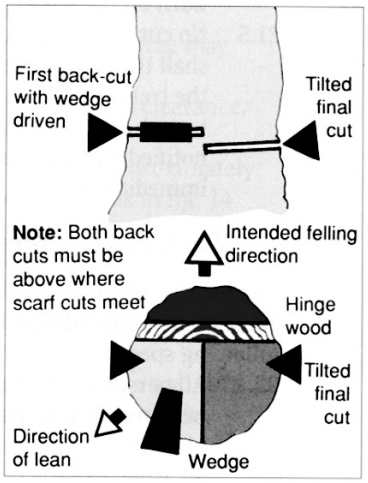


Figure 11: Split level back-cuts

2.11.6 HUNG-UP AND CUT-UP TREES

2.11.6.1 Hung-up and cut-up trees shall be brought to the ground immediately or isolated from the operation. The safe distance is two tree lengths from the tree.

2.111.6.2 A hung-up or cut-up tree shall not be left standing. The feller shall not leave the area before the tree has been brought to the ground, other than to seek assistance to do so.

2.11.6.3 Machine assistance shall be used where practicable for hung-up and cut-up trees.

2.11.6.4 No person shall be within two tree lengths of the intended or likely direction of fall of any hung-up or cut-up tree.
Exception: Machinery may work within two tree lengths to assist in safely bringing the tree to the ground providing the operator does not leave the cab.

2.11.7 MACHINE-ASSISTED FELLING

2.11.7.1 Where machine-assisted felling is required, the machine may work within one tree length of the tree being felled provided that:
- the machine shall be of sufficient size to handle all aspects of the operation;
- the feller and the machine operator shall have an effective means of communication;
- when using rope pulling, the rope shall be secured as high as practicable on the tree;

the machine shall not be in the direct line of the intended direction of fall.

2.11.7.2 If it is not possible to get two tree lengths clearance, proceed as follows:

- Drive the machine out to an angle approximately 800 from the intended direction of fall (as in fig. 12);
- Tension the rope just enough to hold the tree in position of fall;
- Scarf and back-cut, holding more wood on the side opposite the lean;
- The tree will free fall swinging on the rope, thus eliminating the need to pull the tree towards the machine.

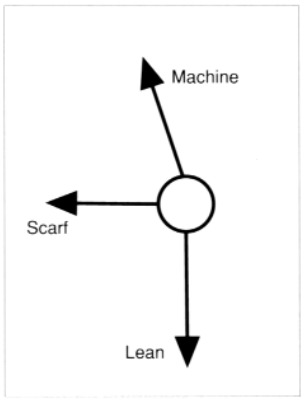


Figure12: Angle for back-pulling trees

2.11.8 FELLING JACKS

2.11.8.1 There shall be two competent persons engaged on operations where tree jacks are used to fell trees against their lean.

2.11.8.2 Trees shall be felled directly against their lean.

2.11.8.3 Only jacks designed for tree felling shall be used.

2.11.9 WINDTHROW

2.11.9.1 Wind-thrown trees are those, which have been blown down or significantly affected by wind. This constitutes a major problem in both the cutting and logging operation. All normal hazards are multiplied and added to by the presence of partial or complete breaks, and by shatter and tension in trees which may be standing but weakened, leaning, or fallen.

2.11.9.2 Machines shall be used if practicable to breakout wind thrown trees to a safe position where tension is leased and the tree may be safely worked on.

2.11.9.3 No person shall work within two tree lengths forward of wind wrenched or damaged trees.

2.11.9.4 Workers shall approach each tree with caution, and then examine each tree to see if it is under tension -whether up or down, or bent sideways - and determine the correct method of work.

2.11.9.5 Generally, machines and loggers should work close together, avoiding preparation too far ahead of the machine, and having the machine handy if assistance is required.

2.11.9.6 In dangerous situations, machinery should be used to extract logs to a clear area for trimming, eliminating the need to walk on top of logs that have limbs under tension.

2.11.9.7 Extreme care is required when dealing with bent or heavy leaning trees. In such cases uprooting with a machine should be used, and where this is not practicable, only experienced fellers shall carry out this work.

2.11.9.8 Head hauling should be avoided unless absolutely necessary as this requires the trimming or butting to be carried out under wind throw.

2.11.9.9 When a tree is resting on its upturned roots the worker shall ensure that the cut is made in such a manner that neither the feller nor other workers are in a position of danger from movement of either the root mat or the log. Fig. 13 illustrates a method to butt off a tree that may spring up and side ways. (2nd angle cut must be at least 45°).

2.11.9.10 Figure 14 shows how to butt off a tree under tension. It is important that cutter bars are of adequate length to complete the butting operation from the safe side of the tree. In general, the greater the tension, the larger the step should be.

2.11.9.11 Workers shall stand sufficiently clear and have a good escape route planned when logs are first broken out.

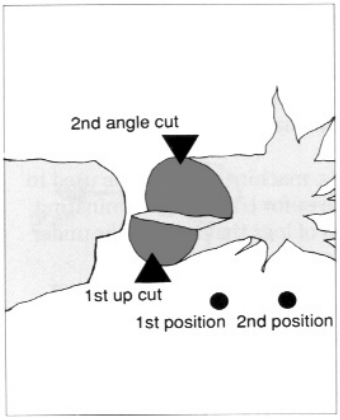


Figure 13: Butting off a tree that mug spring upwards and sideways

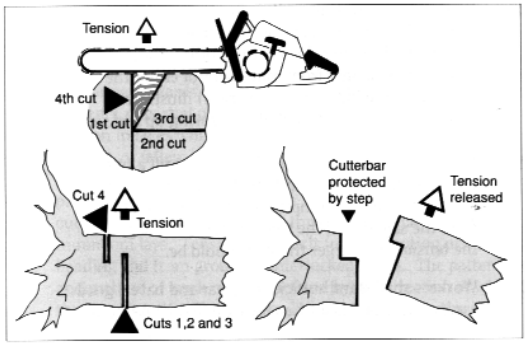


Figure 14: butting a tree under tension

2.11.10 MECHANICAL HARVESTING

2.11.10.1 All machinery shall be operated with the doors closed.

2.11.10.2 Machinery may work within two tree lengths of felling operations (but never closer than one tree length) providing the operator does not leave the cab.

2.11.10.3 All harvester heads shall be locked or supported and the cutting unit deactivated when any maintenance is being carried out.

2.11.11 TRIMMING

2.11.11.1 Trimming should be carried out while walking alongside the tree providing there is no danger of a log rolling and that debris or scrub is not a hindrance. Trimming shall not be done from the downhill side of the log if the log has the potential to roll on the worker.

2.11.11.2 Wherever practical, standing on the log shall be avoided when trimming or heading off. Before commencing to crosscut any felled tree the crosscutter, from a safe position, shall examine it to determine how it or any off-cut may roll, drop or swing when the cut is completed.

2.11.11.3 Trimming or heading off while standing on a tree which is suspended above the ground by more than 1.5 meter (ground level to the underside of the tree) is prohibited.

2.11.11.4 Logs in an overhung situation can be safely cross cut by using the method illustrated in Figure 15.

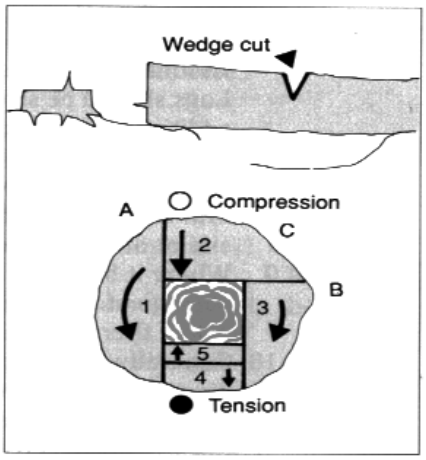


Figure 15: Crosscutting an overhung log

2.11.11.5 Logs under suspension can be safely cut by using the method shown in figure 16.

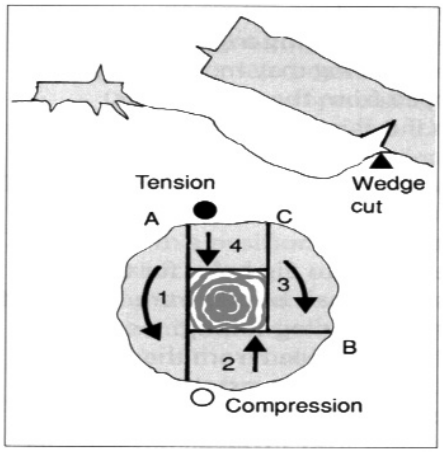
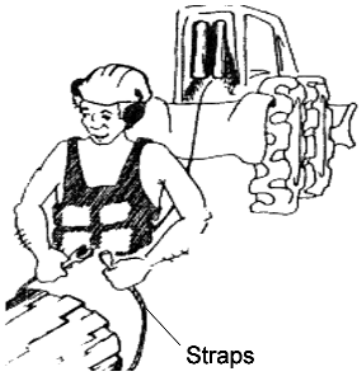


Figure 16: Crosscutting o log under suspension

2.12 RULES FOR BREAKING OUT AND EXTRACTION



2.12.1 GENERAL

2.12.1.1 The person in charge of breaking out shall have a clear, unmistakable system of signaling.

2.12.1.2 Only one person shall give signals at anyone time. Exception: Any person may give an emergency or stop signal.

2.12.1.3 The breaker-out shall move to a safe position:
- where movement will not be restricted;
- behind the uphill side of the drag (if possible);
- out of the rope bight;
- clear of any material likely to be dislodged during the extraction;
- out of reach of any log swinging or upending;

before signaling the machine operator to breakout.

2.12.1.4 Log strops shall not be hooked or unhooked while the machine or winch rope is moving.

2.12.1.5 Workers shall not enter the area below a log unless the log is obviously stable.

2.12.1.6 Machine operators shall take additional precautions when advised by the breaker-out that a log may swing or up-end, and shall ensure all persons/mobile plant near the swinging log are clear when this occurs.

2.12.2 GROUND-BASED

2.12.2.1 Strops shall be attached no more than 1 meter (if practicable) from the end of log/tree.
Note: The breaker-out shall notify the machine operator if it is necessary to have strops more than 1 meter from the end of a log/tree.

2.12.2.2 Winch ropes shall be long enough to ensure machines are not put in hazardous situations at breakout.

2.12.2.3 Winches shall not be operated from outside the canopy or cab.
Exception: Radio-controlled winches equipped with a fail-safe device.

2.12.2.4 Machine operators required to attach strops to logs, shall first:
- angle the machine away from breaking-out area;
- apply the brake;
- lower all hydraulics;
- ensure the winch is in the free spool position.

2.12.2.5 Breaker-outs shall position themselves clear of the machine until it is stationary.

2.12.2.6 The breaker-out shall be in view of the machine operator.

2.13: RULES FOR CABLE LOGGING

2.13.1 GENERAL

2.13.1.1 The security of anchors for hauler towers, spars and working ropes shall be checked daily by a competent person.

2.13.1.2 Cable logging installations shall be rigged in accordance with the manufacturers instructions or industry specified standards or guidelines.

2.13.1.3 The configuration used to anchor any operating rope shall be at least equal in strength to the operating rope.

2.13.1.4 Any rope suspended over a traveled road shall be rigged to clear all traffic. If this is not practicable, then:
- the rope shall be conspicuously marked;
- signs warning of limited clearances shall be posted on the road;
- appropriate traffic control measures carried out.

2.13.1.5 At least two competent persons shall be present when tree topping or rigging operations are taking place.

2.13.2 TAILSPARS

2.13.2.1 Tail spars shall be topped where there is a hazard from the tree top falling.

2.13.3 SKYLINES

2.13.3.1 Extensions to the skylines shall be of at least equal strength to the skyline to which it is attached.
Exception: Unless the extension is being used as a fuse line.

2.13.3.2 Live, running or standing skylines shall be secured to an anchor of sufficient strength to withstand the forces which are imposed on it.

2.13.4 GUYROPES

2.13.4.1 Guyropes shall be at least equal in strength to the strongest working ropes, unless otherwise recommended by the manufacturer.

2.13.4.2 Splicing of guyropes is prohibited except to make eye splices. Splices shall be tucked at least three times.

2.14.4.3 Eye-to-eye joining of guyropes is prohibited.

2.13.5 ANCHORS

2.13.5.1 It is prohibited to use standing trees for guyrope anchors, except in mini-hauler thinning operations.

2.13.5.2 Guyrope anchors should be selected so that the angle of the guyrope at the anchor is 45° (or less) to the horizontal, unless otherwise specified by the manufacturer.

NOTE If this is not possible, an additional guyrope shall be rigged to oppose the haul line.

2.13.5.3 All guyrope stumps shall be notched. Notches shall be:
- at least 11/2 times, but no more than twice the diameter of the guyrope;
- as close to the ground as practicable;
- in lead with the top of the tower.

2.13.5.4 Guyropes shall be fixed to one of the following:
- sound stumps;
- adequately sized and properly buried deadmen;
- an adequately sized and correctly positioned machine anchor capable of restraining the force imposed from the guyline;
- other tested and industry approved anchoring device.

2.13.5.5 Where deadmen are required:
- a separate strop with both ends protruding above the ground shall be used to pass around the buried deadman;
- the strop shall be of equal strength to the rope being attached;
- the rope being attached shall be shackled to both ends of the strop.

2.13.6 RIGGING GEAR

2.13.6.1 Shackles with bodies made of high-tensile steel or alloy steel and fitted with high-tensile steel pins, may be used for any purpose if:
- they are fitted with screw pins when used in butt rigging;
- they have their pins secured from undoing if they cannot be readily checked at any time during operation (e.g. top of the tower).

2.13.6.2 Shackles and rigging screws or turnbuckles used in the rigging or guyropes shall:
- be tested and marked with their safe working load;
- have a breaking strength at least equal to the rope to which they are rigged.

2.13.6.3 Hauler towers shall be fitted with safety equipment which confines the fall of the haul rope and damaged tackle in the event of failure of lead block, blocks or their securing tackle.

2.13.7 SIGNAL

2.13.7.1 All cable operations shall have a clearly understood signaling system, and all workers in the operation shall be familiar with the signals used in their work.

2.13.7.2 When audible signals are used the following signals shall be adopted:
- One long + one short blast = Start main rope
- One short blast = Stop any rope
- Two short blasts = Start tail rope
- One continuous blast = Emergency.

2.13.7.3 An audible signal shall always be sounded before any major rope movement.
Exceptions:
- when no breaker-outs are being used in the f operation;
- when workers on the landing are in an enclosed protective cab.

2.13.7.4 Hauling shall cease if the communication system in use cannot be clearly heard or seen, and understood, until the system is fully restored.

2.13.7.5 Only one worker shall give signals when strops are set.
Exceptions: Stop and emergency signals.

2.13.7.6 Any worker may give the emergency signal.

2.13.8 MOBILE TAILHOLDS

2.13.8.1 The tailhold operator shall have direct communication with the hauler operator during a tailhold shift.

2.13.8.2 No person shall be on a tailhold machine when the hauler is pulling in logs. (A person can only be on tailhold machine when shifting haul lines.)

2.13.8.3 Tailhold machines shall be positioned squarely to hauler, and with brakes on.

Tractors
Tractor blades shall be dug into the ground to a depth greater than 1/2 of the depth of the blade wherever possible.

Excavators
Excavators shall be positioned and the boom lined up to maximise stability.

2.13.8.4 The operator of a tailhold machine shall retreat to a safe position clear of the machine.

2.13.9 HAULER OPERATIONS

2.13.9.1 Modifications and structural repairs shall only be made under the direction of the manufacturer or a registered engineer.

2.13.9.2 The manufacturer or a registered engineer shall sure modifications and structural repairs:
- do not reduce the original safety factor of the equipment;
- are recorded on an identification plate showing:
  - name and address of manufacturer;
  - date of manufacture;
  - any other relevant information as set out in rule 5 below.

2.13.9.3 A safe working load factor of 3:1 shall be used.

2.13.9.4 Any hauler in standing or live skyline operations shall have an efficient skyline brake with the facility to release tension (slip) if overloaded.

2.13.9.5 An integral spar manufactured shall have an identification plate permanently attached to its base. The plate shall include:
(a) name and address of manufacturer;
(b) spar model and serial number (if relevant);
(c) date of manufacture;
(d) maximum and minimum inclination at which the spar is designed to operate;
(e) maximum breaking strength and size of all operating ropes (except strawline) for which the spar is designed;
(f) number, breaking strength and size of guyropes and any other ropes or lines required; and
(g) shall be positioned so that it can be easily read by a person standing on the ground (or on the base platform).

2.14 RULES FOR UNDERWATER LOGGING

(Refer to A Protocol Enforcement of Occupational Safety and Health Act 1994, Under Water Logging Activities)

2.15: RULES FOR SKIDS (MATAU/BETAU/BAGAN)

DEFINITION

Skids means clear area where logs are assembled for preparation, stacking and loading out.

2.15.1 GENERAL

2.15.1.1 Skids shall be constructed, arranged, maintained and operated so that:
- all logs can be landed safely;
- workers may work in the clear of moving logs and equipment;
- hazards are eliminated or minimised.

2.15.1.2 Sufficient area shall be provided for parking of workers' transport and smoke/rest facilities:
- clear of any work activity;
- clear of any road carriageway;
- with an exit open at all times.

2.15.2 CONSTRUCTION

General

2.15.2.1 All dangerous trees within reach of the skid shall be removed before operations begin. Particular attention shall be given to:
- trees leaning towards the skid;
- trees on the prevailing wind side;
- trees disturbed in skid formation.

2.15.2.2 Over-burden, cast material, rocks or stumps shall not be placed where they will create a hazard to operations.

2.15.2.3 Unstable logging debris around the edge of the skid shall be made safe before enter the hazard zone.

2.15.2.4 Waste may be used for corduroy in adverse soil conditions, providing it is kept compacted and does not interfere with safe movement of machines or workers.

For cable logging

2.15.2.5 Landing shutes shall be long and level enough to safely land extracted logs allowing for:
- machine type;
- surrounding terrain;
- extraction direction.

2.15.2.6 For downhill hauling, there shall be adequate flat shute area to land logs without endangering the hauler operator or other workers.

2.15.2.7 The ground foundation for a hauler or spar shall be adequate to ensure it remains stable throughout log harvesting at the site.

2.15.2.8 Provision shall be made for the safe control and disposal of slash.

2.15.3 WORK ON SKIDS

General

2.15.3.1 Work areas shall be organised and spaced so that the actions of one worker will not create a hazard for another worker.

2.15.3.2 A one-metre gap shall be maintained between the counterweights of boom loaders and any obstruction.

2.15.3.3 Workers shall:
- Stay clear of log loaders and extraction machines;
- watch for swinging or suspended logs;
- watch for the radius of swing of boom loaders;
- not pass alongside trucks being loaded;
- try to face operating machines if possible;
- remain in view;
- notify machine operator when leaving/returning to the skid area.

2.15.3.4 All stems shall be assessed for tension before commencing log making, and appropriate steps taken to minimize this hazard.

Ground-based

2.15.3.5 Machine operators shall ensure people are clear before blading or straddling logs.

2.15.3.6 To enable strops to be safely removed from the drag after dropping it on the skid, machine operators should release rope tension, move machine forward and stop.

Cable Logging

2.15.3.7 Workers shall not work under operating ropes unless in an approved protective cab.

Log Loaders

2.15.3.8 No load/log shall be swung above or within reach of any person.

2.15.3.9 Loading and unloading operations shall only be performed by plant with adequate lifting capacity.

2.15.3.10 Forked loaders shall:
- support loads with both forks;
- be fitted with a log clamp to secure logs and round wood.

2.16 RULES FOR TRANSPORTATION

2.16.1 TRANSPORTATION OF LOGS

2.16.1.1 There are two type of vehicles used to carry logs:

(i) 'San-Tai-Wong' used to transfer the logs from the logging area ('betau') to the landing point ('matau').

(ii) Timber lorry used to carry logs from logs point ('matau') to the sawmill.

2.16.1.2 'San-Tai-Wong' is a local made winched lorry that can transfer the logs in the logging area at the low cost. It is not registered with the Road Transport Department but registered under 'Kaedah-kaedah Hutan 1986, Bahagian VIII, Kaedah 25' and it is allowed to operate on the road in the forest only.

2.16.1.3 This type of vehicles are:

- Under Department of Road Transport (JPJ) Regulations, the drivers need to have class 'E' licence.
- The safety of the vehicles is less and driver space is open.
- It is very noisy and the engine is under the driver's seat.
- The operator of this machines need to used safety boot, helmet, earplugs and wear the suitable clothes.

2.16.1.4 The timber lorries are registered with JPJ but not with the Forestry Department.

2.16.1.5 The lorry drivers need to have Class 'E' licence and 'GDL' from JPJ. For San-Tai-Wong operator's need to have 'Sijil Pengendali Jentera Berat' from Forestry Department.

2.16.1.6 The San-Tai-Wong lorry fitted with a 'A Frame' and timber lorry shall be fitted with a cab protection frame between the cab and the forward end of the log load of every truck used for transporting logs. It shall be suitably fastened and stayed so as to protect the cab during loading, and the driver, in event of sudden movement of the logs during an emergency stop and for rollover protection. See below for an example of this:

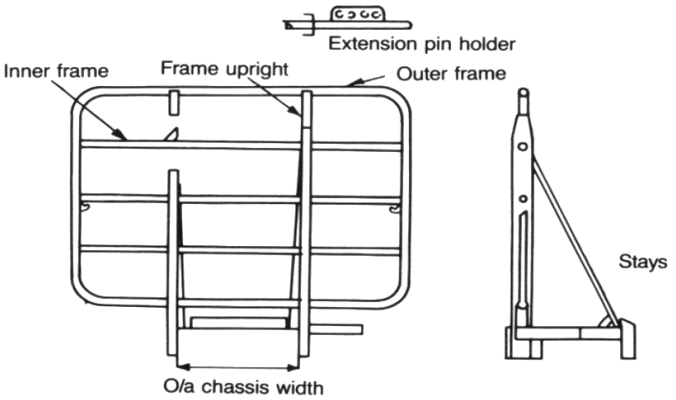


Figure 17: Cab protection

2.16.2 VEHICLES

2.16.2.1 Vehicles transporting forest produce on a public highway:
- Shall be subject to all aspect of the Transport Act 1962 and associated transport legislation;
- Shall have a valid Certificate of Fitness / Licence.

2.16.2.2 Off-highway cartage vehicles not subject to the Transport Act 1962 and associated regulations shall:
- be inspected every six months and issued with a road worthiness certificate;

NOTE Inspection and maintenance records shall be maintained to ensure maintenance is performed properly.

2.16.2.3 Vehicles used to carry logs shall be:
- certified as to the maximum load the unit shall carry (this information shall be available to authorized persons on request);
- where logs are to be measured and scaled on the vehicle, they shall be fitted with suitable non-slip platforms enabling logs to be measured safely;
- operated within the manufacturer's rated gross vehicle mass and gross combination mass;
- operated within the component manufacturer's rating.

2.16.3 CAB GUARDS

2.16.3.1 Vehicles used for the transportation of forest produce shall be fitted with an industry-standard cab protection frame between the cab and forward end of the load.

2.16.3.2 The frame shall be fastened so that it protects the cab and driver during loading, unloading and in the event of a sudden movement of the load.

2.16.3.3 The cab guard shall provide limited protection in the event of a vehicle roll over.

2.16.4 RIGGING AND FITTINGS

2.16.4.1 The following shall be inspected daily or at the end of each shift:
- load restraint equipment;
- load securing equipment;
- load anchorage points;
- load binders.

2.16.4.2 Defective rigging or fittings shall be repaired or replaced before the vehicle continues operating.

2.16.5 SAWDUST, WOODCHIPS AND WASTE PRODUCTS

2.16.5.1 Loose bulk loads shall be tarped/netted as appropriate whenever there is risk of load shedding due to wind actions or movement.

2.16.6 RAILWAY MACHINERY

2.16.6.1 Machinery used for the assembly, loading and unloading of logs at a railway yard shall comply with the relevant section of this code.

2.16.7 DRIVING

2.16.7.1 Drivers shall have a current licence for the class of vehicle they are operating.

2.16.7.2 Drivers shall have thorough knowledge of and abide by the regulations and codes of practice for the class of vehicle they are operating.

2.16.7.3 Machine operators shall have a current licence for the class of machine they are operating when working in an area which comes within the jurisdiction of the Transport Act 1962.

2.17: RULES FOR LOADING

2.17.1 TRUCK DRIVERS

2.17.1.1 Persons may stay in the cab except when:
- Loading/unloading debarked logs;
- Loading/unloading by open sling method;
- There is a risk of short logs falling out when unloading.

2.17.1.2 Truck drivers and persons involved in loading/unloading shall be:
- In sight of the machine operator at all times; or
- At a safe predesignated position.

2.17.1.3 The truck driver shall have final responsibility to ensure the vehicle in their control is loaded:
- To the correct length, weight and height;
- Securely and in accordance with this guideline.

2.17.2 JETTY/PORT OPERATIONS

2.17.2.1 Persons may stay in the cab of a truck while logs are reloaded from a log dump and during unloading at the ship's side, except where an open sling method is used. (All persons shall keep a safe distance while such operations are carried out).

2.17.2.2 Outriggers/stabilizers shall be used unless the stability of the empty truck exceeds the maximum tipping moment the crane can apply.

2.17.2.3 All practicable steps shall be taken to protect the driver of a self-loading truck from log movement, if the truck design does not offer protection from the crane mast or other device.

2.17.2.4 A positive means shall be provided to prevent a free fall of the boom in the event of malfunction.

2.17.2.5 Each set of controls for the operation of a self-loading unit shall be of the deadman (anchor log) operation type.

2.17.3 LOADING

2.17.3.1 Measuring/marking shall not be carried out while loading or unloading.

2.17.3.2 General:

- The outside logs of the load shall not be loaded above the top of the stanchion extensions.
- Logs loaded in the middle of the load shall not have more than one-third of the diameter of the logs above the top of the stanchions or the stanchion extensions where fitted.
- The top of the load shall be rounded so that the load-securing device will contact as many logs as possible.

2.17.3.3 Overhang:

- Logs shall be loaded so that lower and outside logs overhang the bolster and side arm edges by at least 300mm.

Exceptions: the minimum overhang may be reduced to 150mm provided:

- logs are less than 4.6 meter and of uniform length;
- there is a fixed chassis or frame between the bolsters;
- there is a tensioned load restraint of equal strength used in addition to other restraints required by this code.

2.17.3.4 Short logs:

- Logs that are shorter than the distance between the bolsters and side arms shall be nestled between outer rows.

Exception: Short logs may be placed on top of the load, provided the log end not supported by a side arm is secured with a tensioned load restraint of equal strength in addition to other restraint required by this

2.17.3.5 To prevent any logs sliding off a bolster or stanchion, all logs shall be loaded so that the lower layer and the outside logs overhang the bolster and stanchion edge by at least 300 mm.

2.17.3.6 In cases where it becomes necessary to load logs having a length shorter than the distance between the stanchions or bolsters, then such logs shall be nestled between the lower rows, or if placed on top of the load, the end of the log not supported by the stanchion shall be secured by a belly chain/strop.

2.17.3.7 No log shall be swung or lifted over the truck cab, machine or any person during loading or unloading operations. No person should be permitted in or on the truck cab while the truck is being loaded or unloaded.

2.17.3.8 When logs are stockpiled at the skids they shall be correctly placed and chocked where necessary so as not to create a hazard. No person shall stand on or near a stockpile while logs are being stacked or extracted from the pile.

2.17.3.9 Except for chip wood logs, all broken ends shall be trimmed from all logs before being loaded onto any logging truck and/or trailer.

2.17.3.10 A satisfactory system of clear signaling shall be arranged before loading or unloading commences. Only one person shall give the signals, except that any person may give a stop signal in an emergency.

2.17.3.11 When loading material for transportation, the loader driver shall receive instructions from the transport driver, who has the final say as to how his vehicle is to be loaded.

2.17.3.12 Where stanchions are used on logging trucks and/or trailer(s) the top of the load shall be rounded so that the binder chains/strops will contact on as many logs as possible. (See Figure 18)

2.17.4.13 The outside logs of the load shall not be loaded above the top of the stanchions or the stanchion extensions where fitted. (See Figure 19)

2.17.4.14 Log(s) loaded in the middle of the load should not have more than one third of the diameter of the log(s) above the top of the stanchions or the stanchion extensions where fitted. (See Figure 19)

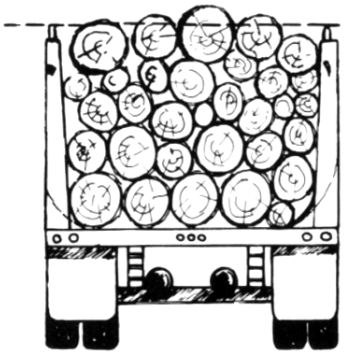


Figure 18

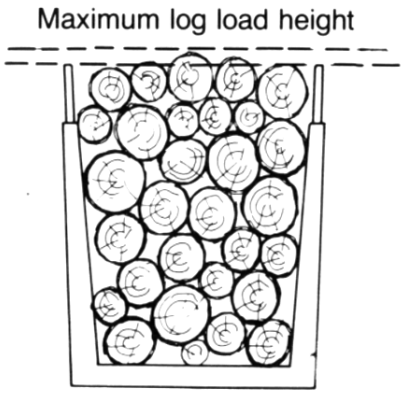


Figure 19

2.17.4 FORK LOADING

2.17.4.1 All loaders shall be equipped with a strong metal canopy so as to provide adequate protection for the operator. It shall be constructed so 'that it will not impair his movements or prevent his escape in the event of an emergency.

2.17.4.2 The strength of a loader canopy and its mounting points is to be such that it will support the full weight of the machine in the event of overturning on flat ground.

2.17.4.3 All fork loaders not fitted with a log clamp shall be provided with means to prevent logs or roundwood rolling backwards towards the operator when the arms are fully extended.

2.17.4.4 Loader forks must be soundly constructed and be of sufficient strength for the work to be performed.

2.17.4.5 When the loader forks are lowered onto flat ground they must be parallel. Should this test show that one fork is bent, then that loader is to be removed from service until repairs are effected.

2.17.5 CRANE AND HYDRAULIC KNUCKLE-BOOM LOADING

2.17.5.1 All cranes subject to the Boilers, Lifts and Cranes Act shall have a current certificate issued by the appropriate legal authority. Such a certificate or a copy is to be displayed in a conspicuous place in the crane's cab.

2.17.5.2 Rubber-tyred and truck-mounted loaders are to be fitted with outriggers and stabilizer as that

will firmly stabilizer the machine while loading and unloading operations are carried out.

2.17.5.3 Logs shall not be dropped out of a grapple, tong, hook or other securing device while the load is suspended in the air.

2.17.5.4 All loaders shall be fitted with a strong metal canopy so as to provide adequate protection for the operator. It shall be constructed so that it will not impair his movements or prevent his escape in the event of an emergency.

2.17.5.6 Such canopies will comply with the relevant ISO Standard as prescribed in this manual.

2.17.5.6 Where loaders are operating adjacent to stockpiles or other objects, there shall be a minimum of a 1 meter gap between the fixed object and the revolving part of the loader.

2.17.6 UNLOADING

General

2.17.6.1 Transport drivers shall wear safety helmets during unloading operations.

2.17.6.2 Stanchion chains and belly chains shall not be released until the load is ready to be removed.

2.17.6.3 Measuring and marking must be completed before the holding chains are released.

2.17.6.4 All persons must keep a safe distance while unloading operations are carried out. The driver must be visible at all times when the vehicle is being unloaded.

2.17.6.5 Extreme care is to be taken when releasing twitches, pulling over or throwing over chains or dropping objects from the top of the load.

2.17.6.6 Where unloading is conducted by winching, the winching rope must be in place before load binding devices and drop-arm stanchions are released.

2.17.6.7 Where drop-arm stanchions are used, extreme care is to be taken that no person is on the off side before the trips are released.

2.17.6.8 Only machinery of adequate lifting capacity shall be used for unloading purposes.

2.17.7 SECURING LOADS ON LOGGING TRANSPORT

2.17.7.1 All loads shall be loaded and secured so that no portion of the load can become dislodged or fall from the vehicle.

2.17.7.2 There shall be a minimum of two sets (two bolsters and stanchions) to contain each load or section of load.

2.17.7.3 Steel wire rope and chain used to secure a load shall have a combined rated strength at least equal to half the weight of the load they contain.

Where this is not practicable, using a belly strop/chain or load-restraining equipment of equal strength shall make up the balance.

Where a belly strop/chain or other load restraint is used, it may be attached from chassis to chassis.

2.17.7.4 Debarked logs and other hard-to-restrain logs shall have a tensioned belly load restraint fitted over each section of the load in addition to any other restraints required by this code.

2.17.7.5 Restraining devices shall not be released until the load is ready to be removed.
Exceptions: Log transport may move slowly (20kph) to the unloading area providing:
- A designated unchaining area has been allocated;
- The distance is no greater than 500 meter;
- There is no access way by members of the public.

2.17.7.6 All chain, wire strop, load binder attachments and anchor points shall be maintained in good condition. No equipment shall be used if it has any defect which will prevent its safe operation until the defective part is replaced or repaired.

2.17.7.7 At logs landings (matau), it shall be permissible to move up to 100 meter to a safe area away from the landing (matau) before securing the load.

2.17.8 LOAD-SECURING REQUIREMENTS

General Functions

Load-securing devices are to reduce risk of injury to other road users, bystanders and the driver of the vehicle. Belly chains/strops and throw-over chains/strops:

2.17.8.1 Reduce risk of logs sliding forward and hitting or sliding over the cab.

2.17.8.2 Reduce risk of logs sliding off the back of the load.

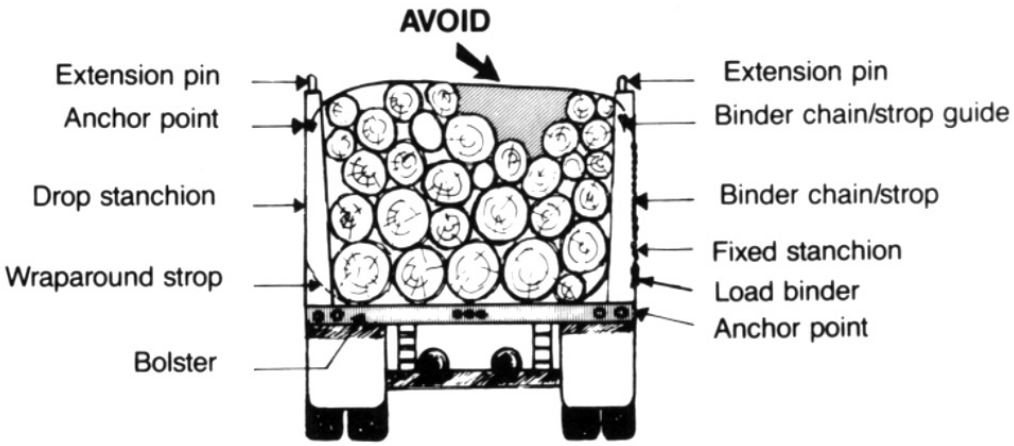
2.17.8.3 Reduce risk of logs jumping over the Stanchions.

2.17.8.4 Restrain the drop stanchion in the event of a wrap- around strop failure.

2.17.8.5 Retain the load on the vehicle in the event of a vehicle upset.

2.17.9 USING STANCHIONS AND BOLSTERS

Figure 20



2.17.9.1 Stanchions:

- Lift-out stanchions shall have the stanchion secured to the bolster (see specification).
- Drop-out type stanchions shall only be used with load restraint equipment capable of retaining the stanchion in an upright position in the event that the wrap-round strop fails.
- Drop-out stanchions shall have the release control pin placed so that it can be released on the side opposite to that from which the load shall be removed.
- When not in use, the extension pins shall be carried long-end down or in a separate rack.

2.17.9.2 Bolsters:

- Bolsters shall be attached to the main chassis. If this is not practicable:
  - The combined rated strength of all chains/strops shall be at least equal to twice the payload weight carried.
  - Section load anchorage points shall be at least equal to a minimum breaking load limit of the chain/strops being used.
  - Convertible units with sliding bolsters shall be used with a locking device which prevents the bolster sliding when long logs are carted.

2.17.9.3 Maintenance: Bolsters/stanchions shall be repaired or replaced if they show signs of significant bending or deformation (damage).

2.17.10 MISCELLANEOUS VEHICLES

2.17.10.1 Flat-decked trucks:

Where logging bolsters and stanchions are not securely attached directly to the chassis:

- The combined rated strength of all chains/strops shall be equal to twice the payload carried;
- Load anchorage points shall be at least equal to the working load limit of the chain/strops being used.

2.17.10.2 Well-sided trucks:

Well-sided trucks used for cartage of bin logs:

- Shall not be loaded above the height of well deck sides or tailgate;
- Shall have a method of containing the logs so no portion of the load may become dislodged or fall from the vehicle at any time.

2.17.10.3 On vehicles loaded across deck with round wood :

- Uprights of sufficient height and strength to retain the load shall be fitted when round wood is loaded above the headboard;
- Uprights/chock blocks of sufficient height and strength to ensure safe releasing of load restraints shall be fitted at the rear of the vehicle.

The load on the vehicle shall be secured with at least two tensioned load restraints complying with other relevant parts of this code.

- If there is doubt about load security, at least two additional load restraints across the load shall be used. These shall be tensioned tight across the load and load restraints, and positioned approximately 1/3 along the road from each end.

2.17.10.4 Over-dimensional log train units:

- Units shall not be operated at a weight exceeding manufacturer's rated gross vehicle mass or gross combination mass.
- Units shall not be loaded in a manner exceeding manufacturer's component rating.
- Units with excessive overhang shall display flashing lights and operate under a specific hazard control procedure to ensure that other road users are warned of the hazards associated with such operations.
- Units shall have any excessive rear overhang identified with warning signs as recommended by the relevant authority.
- All load securing equipment shall comply with the requirements of this code.

2.17.10.5 Boats and Barges:

- Logs shall not be loaded exceeding the side walls.
- The length of the logs should not be longer than the boat or barges.

2.17.11 CHAINS

2.17.11.1 The combined total minimum breaking strength of all chains or strops used to secure a load must be not less than half the weight of the load they contain, e.g. for a 24 tons payload, the combined minimum breaking strengths of the chains or strops shall be not less than 12 tons.

2.17.11.2 All chains used for transporting logs shall have safe working loads identified on the chain or similar identification.

2.17.11.3 All chains and strops must be well tensioned to prevent load movement and to reduce the risk of chain/strop fatigue failure. Tensioning shall be by means of a load binder. Hand tensioning without a load binder is not acceptable.

2.17.11.4 During the course of a trip, logs will settle and the tension of the chains will reduce. The driver must stop and re-tension until no more movement is detected.

2.17.12 STEEL WIRE ROPE

2.17.12.1 All steel wire rope throw-over strops and belly strops used to secure a load in accordance with this code shall have a total breaking strength of at least equal to half the total weight of the payload.

2.17.12.2 It is recommended that chains and a tension device be used in lieu of tensioned steel wire ropes.

2.17.12.3 Chains, load binder attachments and anchor points shall be maintained in good condition. If any defect is found which will prevent the safe operation of the equipment, all necessary repairs or adjustments shall be made before the equipment is used.

2.17.12.4 Under any of the following conditions, the chain or other components shall be condemned and replaced:

(i) Cracked welds or links in chains or load binder attachments;
(ii) Bent, twisted, stretched or collapsed links;
(iii) Links weakened by gouges or pits reducing the diameter by 10% or more;
(iv) Chains repaired or joined by repair links of a type other than those designed for the purpose;
(v) Links obviously worn or showing other visible evidence of loss of strength (wear 10% or more);
(vi) Knots in any portion of the chain;
(vii) Spread or distorted hooks;
(viii) An anchor point used in the secure part of the load, which is in a weakened condition or shows evidence of loss of strength because of cracks, breaks, distortion or other deterioration;
(ix) Repair of the above items, except for item (vi), by welding is not permitted.

2.17.12.4 Attachments, fittings and tensioning devices shall be not less than the minimum breaking strength of each chain ~ or wire rope used to secure the load.

2.17.13 GRAB HOOKS AND CLEVIS HOOKS (TENSIONING DEVICES)

2.17.13.1 When grab hooks are used with tensioning devices they reduce the chain strength by 25%. Clevis claw hooks do not reduce the chain strength and should be used in preference. Clevis claw hooks must be so designed that they cannot easily become dislodged.

2.17.13.2 Synthetic materials for straps or strops must not be used as load-securing devices.

2.17.13.3 If half the total weight of the payload is such that chains/strops of excessive weight would be required, the size of the stanchion chains/strops can be reduced with the difference made up by use of belly chains/strops.

2.17.13.4 Where chain used is not identifiable, it is to be classed as low-grade chain.

2.17.13.5 When the chain/strop is passed over the load, it shall be secured so that it includes the stanchion. Thus, when tensioned, the stanchion as well as the load is secured against failure.

2.17.14 LOGGING TRUCKS-BOLSTER

2.17.14.1 Each bolster shall be made up of a heavy-duty channel steel with webs facing upwards.

2.17.14.2 Bolster pivot pins are to be secured at the bottom by a pin or other locking device.
2.17.14.3 An adequate safety bolt, pin or other effective stop is to be fitted to the end of the trailer pole.

2.17.14.4 The load is to be secured to each bolster with 2 chock blocks and a binder chain securely tensioned.

2.17.14.5 Where the binder chains do not hold a jockey log, such a log is to be secured to the load by 2 belly chains, which shall be tensioned.

2.17.14.6 Belly chains, throw-over chains and any other chains used to secure the load must have their twitches so placed that they can be released from the opposite side to unloading.

2.17.14.7 The load shall be completed and the chains secured before the truck is started. They shall not be released until the load is ready to be removed, except that, where necessary, they may be

released singly to tighten or relocate.

2.17.14.8 Any branding or measuring shall be completed before binder and belly chains are released.

2.17.15 OTHER PROVISIONS

Transportation of Workers

2.17.15.1 No loose tools, fuel or equipment shall be carried in the passenger compartment of a vehicle conveying workers.

2.17.15.2 All vehicles used for conveying workers shall be provided with a means of communication between the passenger compartment and the driver for use in case of an emergency.

Constructions and Maintenance of Private Roads

2.17.15.3 The gradient of any road used for transporting logs or wood products shall not be greater than 1 in 5 on the steepest part. The exception is when that stretch of road which exceeds the stipulated gradient does not exceed 100 m in length.

2.17.15.4 Roadways shall be of sufficient width and camber to ensure safe passage of vehicles and equipment.

2.17.15.5 Roads shall have suitable culverts and drains to ensure surface water is carried away.

2.17.15.6 Any unstable overhanging, dry or rotten trees shall be removed before the road is used by vehicles.

2.17.15.6 Any slip or unstable overhanging rock face shall be cleared before vehicles use the road.

Log Transportation

All logging trucks that use private roads must be subjected to regular maintenance checks at intervals no longer than 3 months, a copy of that check will be made available to a DOSH inspector on request.

Risks and Hazards and Suggested Control

Health Risks

Risk Identified	Suggested Control Guidelines
Stress	• Get enough sleep (go to bed earlier). • Eat a healthy balanced diet • Drink less caffeine and high sugar drinks. • Try to exercise regularly. • Allow time-out for yourself. • Try to plan as much of the day as possible. • Practice relaxation techniques. • Make sure you talk to workmates or family doesn't bottle things up.
Lack of Rest / sleep	• Be prepared to wait-have a book or magazine to read. • Build short frequent rest breaks into your work routine. • Take at least two evenly spaced 30-minute rest breaks during the working day. • Ensure that you have at least 5 hours, Continuous sleep every day.
Hypothermia /chills	Polypropylene clothing (thermal underwear) is excellent for cold, wet weather • if necessary also wear a warm hat Or balaclava. • Bring spare dry clothing even on fine days. The weather can turn bad very quickly. Put a hat and warm clothes on when you stop for a break. • Have wet weather clothing handy for working on maintenance or repair outside the cab.
Noise	Use hearing protection noise level is above- 85dB. • Reduce noise exposure while in a machine by keeping doors and windows shut while working.
White Finger Lack of circulation to hands and Fingers	Ensure all rubber mounts are in good condition. • Keep saw well maintained. • Wear gloves if required. • Give your hands a rest occasionally. • Keep hands warm. • Ensure chain is sharpened correctly.
Eye Damage Temporary loss of sight or blindness may result	Wear a visor or safety glasses. • Check your eyesight regularly
Weather conditions Cold, Sunburn and melanoma (skin cancer)	Wear the correct clothing for the conditions. • Carry a change of clothes. • Use sun block if required.
Eye Damage Temporary loss of sight or blindness may result	Wear a visor or safety glasses. Check your eyesight regularly.

Risk Identified	Suggested Control Guidelines
Dehydration / heat exhaustion	Regularly drink fluids at a rate of 0.5 liter per hour and up to 1 liter per hour in hot conditions. • Drink before you feel thirsty. • Do not drink fluids like soft drinks and cordials that have more than 8% carbohydrate content. • Drink high-carbohydrate drinks after work to replace energy levels. • Drink plenty of water a night to recharge the body. • Drink a couple of glasses of water before leaving for work.
Fatigue Mental and Physical	Build short frequent rest breaks into your day- Take at least two evenly spaced 30-minute rest breaks during the Working day.
Early Starts	Learn to go to bed earlier to replace the sleep you lose in the morning. Your body needs time to adjust to changes in sleep patterns. When first beginning early starts in spring /summer or after the Christmas holidays, recognize that you may remain tired until your body adjusts. Also, allow time for your body to adjust once you are back to late starts.
Poor Nutrition (food)	Start each day with a high carbohydrate breakfast like rice, cereal, breads, bananas, or pasta. Eat high protein foods like lean meat, chicken, eggs, milk, and cheese at night. Eat at the start of a break and rest to allow digestion. Always eat a high carbohydrate snack straight after work.
Exposure to Sun	Wear sun block or a good sun cream if required. Wear a light shirt rather that a T- shirt on hot days. Install a neck flap on your helmet. Carry out regular health checks of moles, freckles, etc.
Early over exertion / strains and sprains	Start each day with a 10 to 15-minute warm-up and then a few Stretches. • Start the day slowly until muscles are warmed up property. • Do some stretches at the end of the day- Take particular care when starting back at work after the holiday
Lack of Hygiene / infection	Clean and dress any cuts or scratches received on the job as soon as possible and keep them covered. Make sure the first aid kit is kept fully stocked. Carry water and soap on the job to wash hands before eating. Bath or wash every night Eat a balanced diet to keep your body healthy. Wear clean clothes against the skin every day.

TREE FELLING HAZARDS

General Risks	Suggested Control Guidelines
Undergrowth: Impairs vision. Impedes escape route. Inadequate workspace.	• Crushing where possible. • All undergrowth cleared to create a clear workspace and escape route. **BE AWARE!**
Terrain - Steep / Rolling / Broken: Trees may roll or slide toward or onto operator. Butts may bounce-up or back towards operator.	• Safety helmet and other safety equipment • Fell all such trees as soon as practical • Ensure others are made aware of possible hazards • Extra care must be taken when felling dead and/or damaged trees; use your wedges. **BE AWARE as tops can break out of dead trees when wedging**
Wind-Throw: Weakened, leaning or fallen trees. Tension from uprooted or bending tree stems. Standing or damaged trees, spars. Kick-back. Recoil. Slabbing Logs moving and rolling Butts moving and rolling	• Correct protective safety equipment • Assess each tree individually and with caution, determine the safest method of cutting • Use machine for assistance if necessary • Do not attempt to cut if you are unsure or fell unsafe • Ensure chainsaw bars are long enough to cut completely through the tree from the safest side • Ensure adequate work area and escape route is available. **BE AWARE!**
Felling near roads and landings: Danger to others who may be working with you or passing through your work area.	• Trees that are within two tree lengths of a road must not be felled unless any access way or road is closed. A "Road Closed" and "Tree Felling" sign must be displayed, or flagmen are in attendance • Don't forget to remove signs when area is safe again
Felling: Danger to yourself and any others in or around your work area.	• Every feller must be equipped with all safety gear and must ensure gear is functional at all times. • Wherever possible, fall trees toward a clear, open space. • If any other person is in your work area, ensure that they are at least two tree lengths away at all times. • All scarfing and back-cutting techniques must comply with those laid out in this Safety Training Manual or other approved methods.

General Risks	Suggested Control Guidelines
	• When felling a tree, scarf and back-cuts tree. If still standing tree must have two wedges in back-cut. Any tree damaged by a felled tree must be felled before moving forward to trim the felled tree. • When felling Douglas Fir, it is recommended that a wedge be used for every tree.
Tree Driving: Extremely dangerous due to having less control of tree being driven. Not permitted as a normal felling practice, but in the interests of safety it may be used to assists in felling difficult or dangerous trees.	• Provided that the feller is experienced, the trees are to be driven one-to-one only! • Holding wedges must be used; two wedges minimum. • Should the drive not be successful and machine assistance not available, then a third tree may be used providing an observer is present.
Cut-Up or Scarfed Trees/Hangups: Any disturbance by weather or machine may cause trees to fall.	• No cut-up or scarfed trees are to be left standing. • The feller shall not leave the area until the tree has been brought down unless it is to seek assistance.
Trimming/Limbing: Kickback, recoil, traction or falling off logs rolling onto operator; any of these may occur and result in severe injury.	• Wherever possible trimming should be carried out while walking alongside the tree, but be sure the log will not roll toward the operator or that the undergrowth and debris is not a hazard • Do not trim on the log when the tree is suspended more than 1.5 meter off the ground. • Standard safety equipment essential • Wear spiked footwear • Be aware of tree moving when limbs or head is removed
Approaching Tree Feller or Felling Area: You are entering an extreme danger area. Fellers may not be aware of your approach. The result may be severe injury or death.	• Notify the person in charge of your intentions • Be VISIBLE! Draw attention to your presence. • Do not approach until you are sure the feller has seen you and indicated that you should continue • Remain at least 2 tree lengths away until you have been seen
White Finger: Lack of circulation to hands and fingers.	• Ensure all rubber mounts are in good condition • Keep saw well maintained • Wear gloves if required • Give your hands a rest occasionally • Keep hands warm • Ensure chain is sharpened correctly
Weather Conditions: Hypothermia. Sunburn. Melanoma.	• Wear the correct clothing for the conditions • Carry a change of clothes • Use sun block if required
Eye Damage: Temporary loss of sight or blindness may result.	• Wear a visor or safety glasses • Check your eyesight regularly

General Risks	Suggested Control Guidelines
Ear Damage: Temporary or permanent loss of hearing may result	• Wear approved earmuffs at all times • Ensure noise emissions from saws and machines are at an acceptable level • Check your hearing regularly
Trees Around the landing: Trees may fall onto landing if disturbed by machines or wind.	• Be aware of this hazard, ensure any trees that pose a danger to workers are felled before working on the landing
Tree Fellers: May fall trees onto or near the landing.	• Do not work on a landing unless the fellers are at least 2 tree lengths away.
Kickback/Recoil/Traction: The bar tip contacts a solid object and the saw is thrown back toward operator. The saw is forced straight back toward operator. The saw is drawn forward away from the operator causing loss of balance.	• Avoid using the tip of the bar for cutting • Know where the tip of the bar is when cutting • Avoid bore cuts if possible and do not cut more than one log at a time • Ensure the filling of depth gauges is done correctly • Be alert to tension wood and other situations that may pinch saw bar • Where possible use bucking spikes.
Sailers: (Broken limbs or broken heads which are lodged or hanging the crown and branches of the trees) Any disturbance may dislodge and cause them to fall on workers below. Severe injury or death may occur.	• Carefully assess your felling area prior to whilst working in it • Be particularly careful when working in an area that has trees felled into the standing trees • Try to remove hazard by falling into it. • Use an observer • Isolated - use machine to assist
Use of Wedges: When used improperly wedges may break, shatter or spring out of cut causing injury and/or eye damage.	• Wear helmet and visor at all times when using wedges. Use either a nylon/plastic hammer or a maul. Ensure wedges is placed correctly and firmly before hammering • Use wedges that are in good condition only
Carrying Chainsaws Incorrectly: In the event of a fall, the operator can be severely injured or cut.	• Ensure saws are turned off and chain brake activated • Do NOT carry chainsaws over the shoulder • Carry the saw so that it may be thrown clear in case of a fall
Working Apart from Other Workers: That person may require assistance at any time	• Have visual contact with other workers • Ensure checks are made on that worker regularly • Have a vehicle or radio at his/her disposal
Cutting Limbs that are Under Tension: Can cause kickback, recoil or traction. May cause log to move or roll.	• Ensure you are aware of the danger - assess the situation • Have good footing • Protective clothing • If unsure, leave limb uncut.

Operational Risk when working with helicopters

Risks Identified	Control Guidelines
Spinning rotor blades	• Wear approved earmuffs at all times • Approach and leave the helicopter only when instructed by the pilot. • Approach and leave the helicopter from the front or side never from the back. • If on a slope approach or leave from only from the down hill side. • Do not approach the helicopter if the rotors are running down. • Approach or leave in a slight crouched position. • If it is unsafe to walk away from the helicopter remain crouched beside the machine until it has left.
Dust and Loose materials	• Wear appropriate eye protection. If blinded by swirling dust or grit stop, crouch down and wait until conditions have improved. • Wear a hat, it must be fitted with a chin strap. • Do not wear loose or unfastened clothing. • Where possible remove loose items from around the heli-pad. • Get clear of the down wash zone before a hovering helicopter powers up to lift a cargo slung beneath. • Check for overhead hazards.
Static Electricity	• Let the helicopter or hanging strop earth itself by touching the ground before you touch the machine. • The pilot is responsible for refilling the machine and all his instructions must be followed. • Do not smoke in the vicinity of the fuel.
Effective personal protective equipment	• Wear hearing protection to at least grade 4. • Only clean high visible garments may be used if dirty do not use. Replace any soiled, worn, damaged or expired protective equipment, carry out regular checks to ensure that all equipment is in order. • Maintain a good standard of hygiene, drugs and alcohol are not permitted at any helicopter operation.
Drop Zone	• The employer or pilot is to ensure that prior to flying that every person is aware of the flight path of the machine. • No work shall be carried out in the drop zone other than that which is strictly necessary for the operation. • If strops cannot be released they shall be left until a later time. • Logs shall be approached only after they have been completely landed and if necessary stabilized. • Where logging operation or drop zones affect roads or local villages then all villages and person who may be affected by such operations will be informed of the dangers. • If required all roads affected by the logging will be closed for the duration of the flying.
Risks to ground crew	• Always be aware of the arrival of hook or grapple when in the vicinity of the log landing • Always stay in view of the helicopter entering the drop zone • No employee is permitted to be on load supported or suspended from the helicopter. • Be aware of static electricity allow the hook or long line to contact the ground to get rid of any electricity • Remove any vegetation or trees that may be affected by rotor wash of the helicopter.

HAZARDS OF WORKING ON THE SKIDS

Risks Identified	Control Guidelines
Hauling machine/Approaching the landing: Workers may be struck by moving machines	• Machines must reduce speed. They must ensure that workers are aware that they are approaching. • Workers must be sure to face the oncoming machine to watch for any dangers.
Machines Straddling or Striking Logs Already Laid Out on the Landing (some logs may be under tension) The drag may swing around as the tension is released from the rope	• Machine operator must be aware of this and watch the drag as well as the workers whereabouts. • Worker must move well away from the machine.
Dropping the Drag: Ropes or chains may still get caught up in the drag	• Do not stand in the bight of the rope • Allow the machine to move forward and stop before approaching to unstrop the logs.
Moving Away After Drag is Unstropped: Ropes or chain may still get caught up in the drag	• Machine operator should winch mainrope in carefully before moving away. • **Caution!** Chains can sometimes hook themselves up again. **BE AWARE!!**
Trees Jammed Together on the Skids: Logs laid too close on landings can create situation whereby workers need to work on top of logs. Cutting up logs can lead to kickback, recoil, traction, slipping and falling. Injury will result.	• Try wherever possible to leave logs again spread out. • **BE AWARE** of these hazards. If logs are dangerous to cut, wait until loader has spread them. • Know where the tip of your bar is cutting. • Ensure your chain brake is functional. • Hold saw firmly using log mitt. • Avoid working on top of logs if possible.
Butts of Logs Sitting High Off the Ground: Logs may roll onto operator or other workers on the landing causing injury	• Carefully assess the logs before cutting. • Chock the log. • Use the loader to hold the logs or roll them over. • Process the log from the other end first.
People and Machine Interaction: Machines moving, logs moving. Crushing, injury and death may occur	• A machine operator's vision is sometimes limited. • Be visible - wear high visibility clothing. • Do NOT move around behind the machines wherever possible. • Ensure the machine operator has seen you - don't assume it is so. • Stay clear of machines/logging trucks. • Try to work facing the operating machines.
Tree Fellers: May fall trees onto or near the landing	• Do not work on a landing unless the fellers are at least 2 tree lengths away.

OPERATIONAL HAZARDS - EXTRACTION

- Keep at least two tree-lengths away from any felling
- The exception is for a machine giving assistance to a feller in the case of hang-ups or assisted tree felling of edge trees.

Risks Identified	Control Guidelines
Movement of machinery:	• When hooking on, ensure that the parking brake is applied and the blade is lowered. • Do not stand behind a stationery extraction machine that does not have the blade lowered and park brake applied. • Breaker-outs should not stand downhill from any machine positioning for breakout. • Watch for unexpected side-slipping or tipping when a wheeled arch is being manoeuvred
Wire rope:	• Unprotected workers must keep well clear of any ropes when winching. • Do not stand in the bright of any rope unless the tension has been released, and the machine operator is aware of your presence • Avoid hand injuries from sprags by wearing gloves • Remove sprags with side-cutters. • Wear protective eyewear when cutting wire rope.
Stem Movement:	• Make sure that stems are stable before attaching strops • Use the extraction machine to responsible stems
Flying debris, branches at breakout:	• Breaker-outs should stand well clear of the break-out area following hooking-on. • Be aware that branches under tension can whiplash
Underfoot conditions (slash, vines):	• Move slowly to ensure you have stable footing • If possible, walk around piles of heavy slash. • The breaker-out must ensure he/she is standing in a safe position for break-out. Be aware of vines, etc., tangled around stems being extracted.
Machine instability:	• Do not work on slopes beyond the capability of the machine • Move up and down slopes, not across them • Ensure that the angle of break-out is directly behind the machine • Don't plan for, or winch across a side-slope. If stems are caught on a stump or an obstacle, the extra tension on the rope could make the machine unstable • When working on slopes, attach strops from the uphill side if possible • If moving on a track, keep as close as possible to the inside (batter slope) and avoid driving on less stable fill • If turning an articulated machine (skidder) on a slope, turn uphill • Extracting downhill should be carried out with the blade down (to help prevent sliding) in low gear and avoiding stumps (or the machine may become stuck).

Risks Identified	Control Guidelines
Poor Communication	• Ensure that, if hand signals are used, they are well understood. • If breaker-out is required, ensure that he/she talks to the operator beforehand about the sequence of extraction (e.g. gullies first). • The extraction machine operator should talk to the foreman or contractor as well as fellers, about the sequence of extraction, and how contact will be made if fellers need machine assistance.
Material Entering a Machine Cabin:	• Extraction machine shall have certified OPS. • Keep the door of the machine closed while the machine is actively working (if it is not closed there is not full OPS protection)
Personal Protective equipment (PPE) **The approved Code of Practice for Safety and Health in Forest operations requires that people working in logging operations wear the following personal protective equipment.**	• High visible helmet (a machine operator must wear a helmet when outside the machine). • High visible shirt, vest or jacket. • Safety footwear providing ankles support (machine operators should not wear spiked footwear). • Protective eyewear, unless it creates a greater hazard. • Hearing protection if noise levels exceed 85Db.

OPERATIONAL HAZARDS - BREAKING OUT

Risks Identified	Control Guidelines
Location: Breaker-out is in danger of being driven over by the machine and being struck by moving logs.	• Be seen; wear high visibility clothing and helmet. • Be in a position where worker can be seen and/or move out of danger area quickly. • Stay on the uphill side of machine and drag.
Signals: Wrong or no signals could cause machine to drive over breaker-out	• Ensure both operator and breaker-out are familiar with signals and use them.
Tree Fellers: Breaker-out may be struck by falling trees	• Make sure machine and breaker-out are working at least two tree lengths away from felling operation.
Rope Bight: The inside of a turning angling rope under tension. A very dangerous place to be.	• Stay on the outside of the turning rope. • Stay on the uphill side of any extraction.
Logs Swinging or Moving: Logs may swing around or be up-ended striking the breaker-out	• Before machine begins winching, move well away. • Be especially aware of shorter logs. • Stand where you have a clear view of the area. • Have an escape route planned if necessary.
Stropping and Re-Stropping: For your own safety and the safety of others, ensure the strops are fitted correctly.	• Strops should be put on no further than 1m from the butt. If this is no possible, then shift strop forward as soon as possible. Be particularly careful to do this with shorter logs. • Use the machine to lift logs if necessary, or dig holes under logs.
Unstopped logs in the drag: May Slide out of drag or catch on obstacles creating a danger to others on the job site.	• Either drop them or ensure they are re-stopped. • Do not enter landing with an unstopped log in drag.
Riding on Machines: Riders may fall off or be struck off, crushing or death may result.	• Do not permit breaker-outs or others to ride on machines

OPERATIONAL HAZARDS - CABLE LOGGING - GENERAL

Risks Identified	Control Guidelines
Ineffective personal protective equipment (PPE):	• Do not perform any operation if your PPE is ineffective. • Clean dirty high visible garments and oil-soaked protective legwear. • Replace any worn, damaged, or expired PPE. • Routinely check the condition of your PPE.
Incorrect signals:	• Ensure you use accepted audible and hand signals. • Ensure the signaling system is functioning correctly. • Ensure that everyone using these signals is aware of them
Unplanned rope or rigging movement:	• Ensure the rigging has stopped moving before approaching. • When lowering the rigging, signal the cable-logging operator to stop when the strops hit the ground. • Watch for 'bounce' in the ropes that could raise or lower the carriage or rigging.
Rope/rigging wear or failure:	• Avoid shock loading. • Replace worn or damaged ropes and rigging. • Check the condition of the working ropes/rigging each day. • Ensure that ropes and sheaves sizes are matched. • Ensure rope/rigging strengths matched to the task.
Cable Logging General Risk	**Control Guidelines**
Standing in dangerous positions:	• Do not stand within two tree-lengths of a felling operation. • Do not stand within one tree-length of a drag being broken out. • Do not stand downhill of a drag being broken-out. • Do not stand directly downhill of the landing while the drag is being landed or unhooked. • Do not stand in the bight of a rope, unless special precautions have been taken to protect yourself in the event of a block or anchor failer. • Do not stand beneath a loaded or moving rope. • Do not stand on an anchor stump or mobile tailhood when the working ropes are loaded. • Do not stand beneath a load-bearing guyline during break-out and unhook.
Overloading	• Do not hook on drags that will overload the system. • Unhook stems if necessary if the drag is too heavy. • Ensure the skyline band brake is calibrated to slip at the SWL of the skyline. • Alternatively, use a rope tension monitor to ensure that the system is not overloaded. • Intentionally make the band brake slip at the beginning of each day. • Ensure SWL of all rope and rigging equipment is at least the same as the SWL of the working rope. Be aware that different rope constructions may increase or decrease rope strength. • Avoid sudden movements in the ropes, particularly when breaking-out.

Cable Logging General Risk	Control Guidelines
Unexpected stem movement:	• Do not approach stems that you suspect of being unstable. • Hook on stems that are stable - as these are broken-out they should move remaining unstable stems. • Keep at least one tree-length away from stems that are being broken-out. • Always stand in a position where you can move if necessary, and have an escape route planned should evasive action be required. • Watch for stems that are not part of the drag moving during breakout. • Watch for stems on the landing being moved by incoming drags.
Tower or machine instability:	• Ensure the tower is correctly guyed to resist the applied forces. • Regularly (at least daily) check the condition of the guyline and tailhood anchors. • Ensure that the cable logging is located on stable and level ground. • Ensure that the breaking strength of the ropes, rigging, and anchors is matched to the breaking strength of the working ropes. • Do not overload the cable system. • Regularly check the guylines and rigging for the damage or deterioration - check every time the tower is lowered.
Terrain:	• Move carefully across the cutover to avoid losing your footing. • Take the safest route. • Wear spiked boots for added traction, unless in rocky terrain. • Wear safety protective footwear that provides good ankle support (chainsaw-resistant gumboots are less suitable on steep terrain than lace-up boots.) • Ensure you have secure footing when working on a steep slope. • On rocky sites, avoid dislodging rocks that may fall into the path of co-workers.
Anchor failure:	• Ensure the anchor layout is correct to support the tower and working ropes. • Ensure that one or two anchors behind the cable logging are not taking the entire load, unless it is 2-guyline machine. • If using stump anchors: - Ensure they are correctly notched and rigged. - Use only fresh and sound stumps (less than 6 months old). - Check the condition of the stumps at the beginning of each run, looking for signs of movement. - If in doubt about the strength of asingle stump, rig a multiple stump anchor,or use an alternative anchoring method. • If using deadman anchors: - Use one or two large logs, at least 3.5m long. - Ensure the trench is at least 3m deep, with an intact front wall. - Ensure the deadman is correctly installed. - Paint the strop/strap where it exists the ground. Check the movement of the deadman at the beginning of each run. • If using a mobile tailhold: - Ensure the attachment of the working rope is solid. - Ensure the tailhold is secured from moving forward when loaded (angled towards the load, blade or bucket buried, and stropped to a stump if necessary).

Cable Logging General Risk	Control Guidelines
Unprotected moving machine parts:	• Shut the machine down before carrying out maintenance checks or repairs on moving parts. • Install protective guarding to isolate hazards.
Adverse weather:	• Wind, rain, and snow can adversely affect cable operations. This is particularly so for breaker-outs and fellers - stop work if conditions become hazardous.
Cable Logging Risk	**Control Guidelines**
Injury from machine maintenance:	• Take care when greasing the sheaves and fairleads swivels in the tower. • Avoid skin irritation from contact with fuel and oil. • Use your tools correctly to avoid hand injuries.
General Risk	**Control Guidelines**
Damage to machine	• Do not operate a damaged machine that may be hazardous. • Check for damage to wire rope. • Watch for failure of machine controls (e.g., air or fluid leaks.) • Be aware of block failure. • Avoid tower failure by following manufacturer's rigging instructions. • Be aware of loader movements around the guylines. • Avoid over-spooling (birdnesting) on the drums. • Ensure that the machine access is always clear and in good condition.
Vibration from machine:	• Avoid sudden impacts while operating a machine. • Reduce the time your back is exposed to vibration by getting off the machine at least once every hour. • Work smarter - move larger loads at slower speeds. • Make sure the seat is adjusted properly. • Do exercises while seated to even-out pressure on your spinal discs. • Control breathing and relax muscles. • Keep a good posture. • Keep fit - Strengthen abdominal muscles.
Noise:	• Use hearing protection if noise level is above 85dB. • Reduce noise exposure while in a machine by keeping doors and windows shut while working.
Tower failure. Machine toppling into working area:	• All towers must be rigged and operated in accordance with the manufacturer's recommendations. • Ensure the tower is adequately guyed to resist the applied forces. • Ensure the cable logging is located on stable and level ground. • Ensure that the strength of the ropes, rigging and anchors are matched to the breaking strength of the working ropes. • Do not overload the cable system.
Falling carriage:	• Do not stand beneath a loaded rope.
Maxiport spring brakes on cable logging:	• Do not attempt to repair internal air leaks or mechanical failures to maxipots or maxipot spring brakes as serious injury or death can result. Ensure suitably qualified or competent person carries out repair.

Mobile Tailhold Risk	Control Guidelines
Unexpected rope, shackle, or block movement:	• Do not stand in the bright of a rope. • Stand clear of rigging when loaded or during a lineshift. • Ensure all ropes and rigging have stopped moving before approaching them.
Movement of the tailhold:	• Do not stand direcly in front of, or on the tailhold when loaded. • Watch for the anchored rope suddenly going slack - this may indicate that the tailhold has moved. • Ensure the tailhold is adequately secured to avoid movement.
Loss of control during shifting:	• Mobile tailhold machines should only be operated by experienced operators, or under strict supervision - the weight of the attached rope(s) can make the machine unstable. • Ensure there is no load on the tailhold when manoeuring. • Wear the seat belt while you are operating the machine.
Communication failure:	• If audible (including radio) communication fails, move to a safe position and use hand signals. • Do not act until signaled to. • Use other workers to assist.
Inappropriate footwear:	• If you wear spiked boots, the chance of slipping or losing control of the foot pedals is higher than if the boots are not spiked. • Have non-slip steps and pedals covers fitted.
Binds or bights:	•" Watch for binds when tensioning the ropes. • A rope maybe able to be lifted over an obstruction by hand. Ensure the rope is completely lowered to the ground before attempting. • Watch for sprags - wear gloves. • Only stand on the safe side of the rope - DO NOT stand in the bight. • If attempting to clear an obstacle by tightlining, go ahead on the rope slowly, and constantly assess the situation. • If using a chainsaw to clear the obstruction, ensure you wear the required PPE and are either skilled or under supervision of a competent person.
Unstable soil:	• Only operate the tailhold in a stable position.

OPERATIONAL HAZARDS - MACHINES

A SAFE OPERATION BEGINS WITH A SAFE OPERATOR

- Know your machine
- Know how to operate all equipment on your machine
- Know the purpose of all controls, gauges and indicators
- Know the rated load capacity, speed range, braking and steering, turning radius and operating clearances
- Remember: Changes in the weather conditions/ soil types/ topography also change the capabilities of your machine - BE CAREFUL

General Risks	Control Guidelines
Little or No Experience of the operational Capacities of Machine: Can cause severe injury or death to operator or any other person in or around the machines.	• For the safe operation of any machine you must be qualified / authorized operator; • To be such, you must understand the written instructions supplied by the manufacturer; be trained in actual operation of the machine; know the safety rules and regulations pertaining to the particular job site.
Machine Structure: (To protect you and others around you, the machine should be equipped with safety features securely in place and in operating condition) In the event of a roll-over or impact from falling objects, the operator may be injured or killed. Others around the machines not fitted with safety equipment may be injured or killed as a result.	• Falling Object protection Structure (FOPS) • Roll-Over Protection Structure (ROPS) • Seat Belts • Lights/Horn • Guards/Shields • Back-up Alarm • Mirrors *Use them! Never disconnect any safety device*
Detective Machinery: Mechanical deficiencies can cause injury or death to either operator or others in the work place. Remember damage to a machine can be fixed in a short period of time. BUT injury or death has a lasting effect.	**Check for:** • Broken or missing parts • Tyre pressure, worn or damaged tyres • Brakes for wear • Perform maintenance procedures as outlined by manufacturer • Check machines for fuel and oil leaks • Repair or replace!
Pre-Start Check: (Leaks, fuel/oil levels, tyres, brakes and rigging, fire extinguishers) Ensuring machines is in working condition, any deficiency may cause severe injury or death	**Check for:** • All hoses for leaks • Oil and fuel levels • Brakes • Rigging • Fire extinguisher • Clean oil, grease and rubbish from operator's compartment • Remove loose items from within operator's compartment.
When Starting: Engine operating correctly? Control levers functioning correctly? Brakes working?	• With transmission in neutral, test throttle/brakes, then raise hydraulic attachments. • Be certain you can control speed direction and braking before operating machine • Ensure operator restraint is fastened • Check to see that all people are clear of the machine's path

General Risks	Control Guidelines
The Untrained Person: Handled improperly, a machine could cause severe injury or death	• Never allow an unstrained or unqualified person to operate your machine
The Other Person: Logging machinery are one-man machines. They aren't designed for passengers. Riders may fall or be struck off causing injury or death.	• Never permit riders!
Travelling Around the Job Site: Other people and machines are working in your area	• When approaching other workers, keep their safety and yours in mind • Make sure they seen you. Reduce speed, watch out for people on foot. • Look around, use your mirrors, be sure everyone is in the clear • Maintain a safe distance from other machines. Don't presume they seen you, ensure they have.
Machine shutdown/Stopping: Ensuring the machine is not left as a danger to anyone when it is unattended	• Engage park brake. • Lower attachments. • Controls in neutral. • Stop engine. • Cycle all hydraulic controls to relieve system pressures. • Remove key. • Shut off battery master switch. • DON'T GIVE ANYONE THE KEY TO AN ACCIDENT!
Machine Maintenance: Cuts/crushing/burns could all occur when working on machinery	• Do not perform any work on a machine unless you are qualified - and authorised to do so. • Use the correct tools and equipment to do so. • If the machines should be started, remove the key. • Wear all the protective clothing the job requires.
Solvents:	• Read safety information regarding the solvents use. • Try not to get dangerous substances on your skin. • Make sure that hands are washed before eating food. • Avoid excessive breathing in of solvent fumes, ensure there is plenty of ventilation in the work area
Diesel fuel or hydraulic fluid under pressure: Skin penetration, eye injury.	• Install cylinder rod support struts, or block the cylinders and equipment before working on the hydraulic system • Cycle all hydraulic steering and other controls after shutdown to relieve system pressure, follow manufacturers instructions • When venting or filling the hydraulic system, loosen filler cap slowly and remove it gradually • Use a piece of cardboard or wood when looking for leaks • Wear a face shield or goggles for eye protection
Flammable substance:	• Never fill the fuel tank while engine running smoking, or near a naked flame; • Ground the fuel funnel or nozzle against the filler neck to prevent sparkling;

General Risks	Control Guidelines
	• Do not cut or weld on fuel lines, tanks or conditioners; • Remove rubbish and debris from the cab of the machine; • Make sure that oily rags and other flammable material is removed from the machine; • Check for, and repair fuel, oil, and hydraulic leaks before operating the machine; • Use non-flammable solvents for cleaning parts; • Store all flammable fluids and materials away from the work area; • Check readiness of fire extinguishers or suppression systems.
Other vehicles on roads during relocation: If mobile plant is to be driven or transported on the road	• Make sure all flags, lights and warning signs are in place and visible; • Use hazard-warning lights; • Use an escort vehicle if required; • Secure all necessary equipment or attachments.
Safe mounting and dismounting from cabs:	• Maintain three points of contact while climbing; • Face the machine when climbing or dismounting; • Be aware of the state of the ladder (e.g. ice, mud, water, oil, etc), and clean if necessary; • Don't jump from a machine; • Don't climb off a moving machine; • Don't use either the steering wheel or any control lever when entering or leaving the cab; • The cab should be aligned with the undercarriage centerline when entering or leaving the cab.
Maintenance-related hazards:	• Read the Manufacturers Services Manual and the Operators Manual; • Ensure you have the necessary skill information, correct tools, and equipment; • If the machine should not be started, remove the key; • Check the workshop has adequate clearances, light and ventilation; • Wear protective clothing, overalls, gloves and eye protection; • Keep clear of rotating components (e.g. fan blades and couplings); • Keep pockets free of objects that could fall out into machinery; • Start the engine only from the operator's seat; • Move the machine on to a level surface • For tracked machines, block the tracks before releasing services brakes; • Stop the engine and release all hydraulic pressure; • Don't work on a running engine unless instructed by manual; • Attach cylinder support struts or block hydraulically operated attachments; • Place controls in neutral; • If doing maintenance on a running engine use two people, one to sit in the operator's seat; • Don't leave guards off or access doors open when the machine is unattended • If servicing the air conditioning system, avoid Freon gas contact; • Don't work beneath raised equipment, use jacks, wood block, or jack stands as stable support.

General Risks	Control Guidelines
	• Place controls in neutral; • If doing maintenance on a running engine use two people, one to sit in the operator's seat; • Don't leave guards off or access doors open when the machine is unattended • If servicing the air conditioning system, avoid Freon gas contact; • Don't work beneath raised equipment, use jacks, wood block, or jack stands as stable support.
Asbestos: Some older machines may have components containing asbestos in friction (brake linings) and gasket materials.	• Never use compressed air for cleaning • Avoid brushing or grinding • Use wet methods for cleaning up • Avoid areas where particles may be in the air • Shower after contact • Store food, drink and personal belongings away from the work area • Never eat, drink, or smoke where asbestos is in the area
Exhaust fumes:	• If it is necessary to run the engine or operate the machine in an enclosed area be sure there is enough ventilation
Tracks:	• Wear gloves if handling recently used pins and bushings from a dry joint • Never hit track tension springs (they could shatter explosively if under compression)
Tyres:	• Follow supplier's recommendations • Don't exceed correct tyre pressure • Inspect tyres and wheels daily • Don't operate on low pressures, cuts, bubbles, damaged rims or missing lug bolts or nuts. • When adjusting tyre pressure, use a long hose with a self-adjusting chuck. Always stand behind the tread when doing this. Ensure the area to the side of the tyre is clear of others.
Electrical systems:	• Disconnect the battery before working on the electrical system • Remove the ground cable first. Connect this cable last • When checking coolant, stop the engine and let the system cool first before removing the filler cap (if this is necessary) • Keep car, sparks and naked flames away from lead-acid batteries • Do not charge a battery or jump-start the engine if the battery if frozen
Noise: Typical noise levels: Car 70dB, skidder 85-95dB, Chainsaw 100-105dB and Gunshot 180dB:	• Use hearing protection inside a cab if noise level is above 85dB • Reduce noise exposure by keeping doors and windows shut while working
Vibration from machine:	• Avoid sudden impacts while operating machine • Reduce the time your back is exposed to vibration by getting off the machine at least once every hour • Work smarter-move larger loads at slower speeds • Make sure the seat is adjusted properly • Do exercises while seated to even out pressure on spinal discs • Control breathing and relax muscles • Keep a good posture • Keep fit- strengthen abdominal muscles

OPERATIONAL HAZARDS - LOADER

General Risks	Control Guidelines
People /Machine interaction on Landing: People will be working in close proximity to your machine	• Ensure that you know where they are at all times and that they are visible • Ensure they that know you are present • Use your mirrors • Use back-up alarms • De-phase fleeting operation where possible • If the whereabouts of any worker is unknown, stop the machine until that person is visible
Turning and Lifting Logs on Landing: Log may swing in an arc over workers, or slide from forks. Should they fail or strike anyone, severe injury or death may result.	• Know the turning radius of your machine never lift, move or swing a load over anyone • Be particularly careful with wet or slippery logs
Workers Moving Among Logs on Landing Where Loader is Fleeting: Loader may disturb logs, causing workers to be in a situation whereby they could be crushed, or logs may flick around and strike them.	• Ensure workers are working well away from loader's maximum reach and are working facing the machine • De-phase fleeting operation if possible
Lifting Workers on Hydraulics: Workers may fall off or hydraulics may fail, causing possible injury or death	• No riders • Never use hydraulics as a work platform or personnel carrier
Other machines; Collisions may occur	• Maintain a safe distance from other machines, pass cautiously • Always assume the other machines unaware of your presence. Give away
Obstacle and Debris on the Landing: Can create a roll-over situation, particularly if machine is moving at speed or has a heavy load	• Keep landings swept clear of debris at all times. • Go around rocks and obstacles • Know that your path is clear.
Steep Slopes and Unstable Surfaces: Can cause a roll-over.	• Wear seat belt • Avoid such areas • When operating on a steep slope, keep the load low and proceed with caution. DO NOT drive across a steep slope, drive up and down it • When turning on an incline, make the turn wide and slow with load carried low
Dust, Fog or Smoke: Poor visibility for operator and for nearby workers	• Keep spreed to a minimum • Use lights and other warning devices • Move other workers out of the area
Trees Around Landing Sites: May fall on machine	• Ensure all trees that may endanger workers or machines on landings are fallen prior to work beginning on any landing
Overloading loader: May cause loader to roll or tip end for end, anybody or anything around may be crushed. May cause severe injury to operator. Hydraulics mail, dumping load	• Know the machine's lifting capacity and don't exceed it • Keep landings flat and clean if possible • Wear your seat belt • Lift logs at the centre point of balance

General Risks	Control Guidelines
Obstructed Vision from Load Carried in forks: Danger to others in the area and operator cannot ensure the path of travel is clear	• Carry your load low for both visibility and stability
Travelling on Road Carried in Forks: Machines can become dangerous when travelling at speed, especially downhill	• Do not travel at excessive sprreds • Keep hydraulic attachments low for visibility and stability • Keep machine in gear at all times especially downhill • Maintain engine revs to provide steering and braking functions
Loading Trucks: Injury to driver Damage to truck	• Ensure driver is wearing a hard hat • Ensure you are aware of where the driver is at all times • Do not lift logs over the cab of the truck at any time • Do not permit driver to chain up either truck or trailer while you are still to complete loading. Have him in view at all times
Unloading Trailers: (Cracked or damaged forks/using one fork rather than two for lifting) Trailers may fail and cause injury or death to the operator Forks may break off and trailer will be dropped	• Be sure your machine has the lift capacity to remove the trailer safety • Do not allow the driver to go under the trailer until it is sitting on the ground • Ensure the lifting hook or strop/chain is in good condition " Do not lift the trailer by putting forks under the bolsters " Try to have the truck parked on flat and level ground
Overloading: The load may fall off during transit, a danger to the driver and others using the roads	• Ensure the load does not exceed the height of the extension pins and has a reasonable amount of log overhanging the bolsters at each end
Loading on a landing while Others are Working Thereon: Logs may fall off the truck and strike workers on the landing	• Make sure workers are aware of the situation and stand well clear • Move them to another landing if necessary
Loading on Fleeting wet or Slippery Logs: Logs may slip out of forks and strike the driver or truck. Logs may also strike other people in the area.	• Ensure the logs are held firmly in the log forks to lifting away from the stack • Inform the driver of the situation. Ensure the driver remains a good distance away from the truck and remains visible
Stockpiles Too High: Stacks may fall and cause injury or death to workers on the Landing. Too high and unsafe for the workers to trim and brand	• Keep the stockpiles at a reasonable height and stacked in a tidy fashion
Loading Trucks: Trucks entering landing. Logs falling off trucks. All of these represent dangers to workers on the Landing	• Be aware of other vehicles and trucks arriving and moving around on landing • Do not move or when the driver is chaining up the load.

OPERATIONAL RISKS - TRANSPORTATION

Risks Identified	Control Guidelines
Other road users	• Turn lights on when traveling. • Keep speed to road conditions. • Watch out for other road users who are not experienced in such conditions (village people). • Be aware of corners that have restricted vision.
Loading and Unloading	• The truck driver and the loader operator must agree on a safe place for the driver to stand. • Both must have a clear means of communication. • The truck driver must stand well clear of all stock piled logs. • Remain in view of the loader operator at all times
Truck and Trailer stability	• Do not over load the truck or trailer beyond the vehicles capabilities to control the load. • Ensure that the load is evenly balanced. • The driver must have responsibility for the safe loading of his truck and trailer.
Fog, dust and heavy rain	• Check that the road conditions are safe or look for an alternative route. • Take extra care and drive according to the conditions. • Be aware that other road users may not see or hear the vehicle approaching.
Slippery roads caused by rain or mud	• Be aware that brakes will not be as effective as in dry conditions. • Reduce speed to suit condition especially in the vicinity of villages • Be aware of road subsidence
Slippery or peeled logs	• Avoid loading or unloading on slopes as logs may slide from the truck or trailer. • Use additional securing chains if necessary. • Be aware that logs may slide from the forks of the loading machine.
Unloading or loading trailer	• Always be aware of the position hands in relation to moving parts. • Always stand on the opposite side of the drawer bar to the loader • Stand in clear view of the loader operator. • Do not rush and have clear means of communication.
Being hit by tensioning device	• Ensure that footing is firm and that the body is positioned to the side of the handle. • Take care that the handle does not fly back, use a handle if required.
Throw over chains	• Do not start securing the load until the loading is completed, if necessary move the vehicle to a safe location. Before throwing chains, make certain the other side of the truck is clear of other persons.

APPENDICES

Appendix 1	Glossary
Appendix 2	Examples of hazard information
Appendix 3	Guideline table for exposure to continuous sound
Appendix 4	A Protocol Enforcement Of Occupational Safety And Health Act 1994: UNDER WATER LOGGING ACTIVITIES

Example of checklist

Safety checklist for chainsaw safety

Safety Audit Tree Felling

Safety Audit Logging Trucks

Safety Audit Machinery

APPENDIX 1: GLOSSARY

(DEFINITIONS UNDER THE GUIDELINE)

Arch / Fairlead: A structure with a fairlead at its apex designed to lift one end of a log (or drag) in order to reduce resistance along the ground.

Articulated: Machine pivoted at the center.

Average skidding distance: In ground-based operations, the average distance logs are skidded (inclusive of slope) in a total setting.

Average hauling distance: In cable operations, the average distance logs are hauled (inclusive of slope) in a total setting.

Back-cut: The final saw cut in felling a tree, opposite the scarf and the intended felling direction.

Backpulling: Method of using a rope from a machine or winch to pull a tree to enable it to be felled against its natural lean.

Bar (of chainsaws) - Guide bar: Grooved flat steel bar around which the saw chain travels.

Barber chair: A portion of the stem attached to the stump. A result of a stem splitting vertically (slabbing) owing to the use of a conventional, rather than a bore and release, back cut.
(Explanation: The portion left attached to the stump resembles the back of a barber's chair. (Up to 9 meter). The butt of the tree is propelled back behind the stump some 5 meter or more).

Bark, De- : To knock bark off Trees that have reached the skid area.

Bell logger: A versatile three-wheel logging machine that can fell, bunch, extract, sort and load logs and roundwood. Different accessories can be fitted to perform the functions.

Bight: The included angle of a rope running round a block or obstruction. "In the bight" is a dangerous position.

Block: Metal case enclosing one or more sheaves to facilitate a change of direction of a rope, or to gain mechanical advantage in transmission of power through a rope.

Boom: (a) Projecting pole or metal beam, hinged at one end and capable of lifting a weight at the other. Normally part of a log loader. (b) A raft of logs or a string of logs chained together end to end and used to hold floating logs.

Boring: Using the nose of the guide bar to bore into a tree or log. (Note: The 3 guide bar types are termed: sprocket nosed, solid nosed and roller nosed).

Bottom cut: Lower cut in a scarf.

Breaker-out: Worker at the felling site responsible for connecting trees or logs to a hauling rope, tractor, skidder, etc. for transport to a landing.

Breaking-out: Operation of a breaker-out; or initial movement of tree(s) from the felled position.

Bucking spikes: Spikes attached to the body of a chainsaw, which enables the bar to be levered into a cut, giving more pressure on the saw chain.

Buddy cut: Two workers felling one tree.

Butt: (a) Base of standing tree; (b) Bottom (stump) end of a felled tree.

Butt log: The first or bottom log severed from a felled tree.

Butt pulling: Hauling or skidding with strops attached to the. Large end of a log.
Chain brake: A safety device on a chainsaw designed to stop the chain in the event of kickback.

Chainsaw: A powered saw where the cutting action is performed by a series of linked teeth, which travel around a guide bar.

Cold deck: Logging in which logs are accumulated and stacked to await later transportation.

Combination safety helmet: Helmet with, integral earmuffs and mesh visor, for the protection of head, hearing and eyes. Must comply with the Malaysian standards.

Compartment: Numbered subdivision of a forest (mainly for record or reference purposes).

Contour tracking: Skidding tracks which roughly parallel the contour of the land.

Crawler tractor: A machine mounted on, and travelling on tracks.

Crosscut or Buck: To cut wood across the grain.

Crosscutter: One who cuts felled trees into logs.

Cutover: Clear felled area of forest.

Cut up: Describes a tree which has been scarfed and back-cut but which has not fallen.

Delimb: To remove limbs or branches from a tree or log.

Depth gauge: Metal projection incorporated in front of a cutter (cutting tooth) gauge it's cutting depth. (Explanation: Named a depth gauge because it gauges the depth the cutter chisels into wood. It is the size of the chip from cutting into timber i.e the distance between the bumper and the cutter).

Directional felling: Felling trees according to a predetermined pattern to reduce breakage and to facilitate breaking out and delimbing.

Drag or turn: One or more logs skidded or hauled from stump to landing at any one time.

Draw-wood: Slivers of wood pulled from the butt of a failing tree and remaining attached to the stump.

DOSH: Department of Occupational Safety and Health

DOSH Officer: Means an officer appointed under Sub-section 5(2) of the Occupational safety and health Act 1994.

Drive: Felling a driving tree so that it brushes past another cut-up tree in order to fell it. (Explanation: Only on very rare occasions should a driving tree be aimed directly against a cut-tree. This sets one tree on top of the other. Heading off and/or delimbing of the bottom tree is then an imposition. If the felling cuts in the first tree are precise, and wedges are inserted tightly in the back-cut, brushing the driving tree past it is all that is required. Both trees will fall parallel).

Drop starts (unsafe and illegal): Method of starting a chainsaw by holding the start cord and dropping the saw.

Escape route: A predetermined or prepared track by which a tree feller moves away from a tree or log during felling or crosscutting to avoid danger.

Extraction: General term for removing trees and logs from a felling area to a landing.

Fairlead: A device containing sheaves or rollers used to guide rope on to a drum.

Feller: One who fells trees.

Fell: To sever a standing tree from its stump and bring it to the ground.

Felling: Act of cutting down trees.

Felling face: The edge of a stand of trees where felling is taking place.

Felling lever: Manually operated steel lever inserted in a back-cut to provide lifting force as an aid to felling small trees.

Felling wedge: A wedge hammered into the back-cut, to force it against its natural lean to a point just beyond its center of gravity. (Explanation: From this point on, it is not the wedge but gravity, the scarf, and hinge-wood which contribute to the tree falling in the desired direction).

Hung up: A cut, wind-thrown or pushed-up tree caught in or against another, thus preventing it from falling to the ground.
Head: Top of tree severed from merchantable stem.

Head off. Or top: Cut off top of tree.

Head pull: Extracting a tree or log by the small end.

Hinge-wood: The wood left between the scarf and the back-cut to control with felling direction.

Holding wedge: A wedge inserted tightly into the back-cut, before it is fully completed. This 'holds' the tree in its original position should it sit back and as well, enables the completion of the back-cut.

Humboldt scarf: Scarf where the bottom cut is angled and the top cut is horizontal.

Kerf: The width of a saw cut.

Kickback: (a) The action of a tree in springing back off its stump as it falls; (b) A sudden arcing of the guide bar nose, towards the operator. This can be at any angle and is caused by the chain striking an obstruction, or being pinched, at the guide bar nose. Should striking an obstruction or pinching occur anywhere along the out-running edge of the guide bar, kickback can be sequential to the initial reaction of recoil.

Landing: A selected or prepared area to which logs are extracted and where they may be sorted, processed, loaded or stockpiled.

Lean: (a) of tree, the inclination of a tree from the perpendicular; (b) of stand, the predominant direction

of lean.

Leg protection: Trousers or chaps, designed to prevent or reduce the severity of injuries.

Lifting arms: Main load carrying members for buckets, log forks or felling heads on mobile machinery.

Loader: Machine designed to load, stack and sort logs or tree lengths.

Log: (a) Stem, or length of stem, of a tree after felling and crosscutting; (b) to harvest (extract) trees or logs from a forest.

Logging: Harvesting timber from a forest.

Logging arch: (See also arch) Normally refers to a trailed arch, supported by wheels or tracks.

Marking: Selecting and indicating trees to be retained in a thinning operation.

Maul: Heavy wooden mallet used to drive wedges.

Motor manual: Refers to work carried out by hand-held power tools.

Processor : A person who works on the landing processing or de-barking logs.

Road: A formed roadway used for transporting logs on wheeled vehicles. In forests it is often used with adjectives such as arterial, secondary, spur.

Root wad: Mass of roots and soil, which is exposed when a tree is wind-thrown or pushed over.

Rope: Almost invariably used in logging in the sense of wire rope.

Rope cutter: Tool designed specifically for cutting wire rope.

ROPS: Roll over protective structure. A canopy to protect the operator in the event of a machine roll over.

Rotation: Second entry into jungle, the number of years from planting to final felling of a tree or stand.

Safety footwear: Boots or shoes fitted with steel toecaps.

Safety factor: The ratio of the breaking strength of a rope or piece of material to the maximum permissible working load.

Sailor: A broken limb or tree crown hanging precariously, which could fall on workers below it.

Salvage: (a) Recovery of logs left during a previous logging. (b) Recovery of windthrown timber after heavy winds.

Scaling: The measurement and assessment of logs to ascertain volume or tonnage by species, and other specified categories.

Scaling yard: A landing, place, site or transfer yard, where logs are assessed and measured to ascertain volumes or tonnage within specified categories.

Scarf: Notch cut in a tree stem near the base to establish its felling direction.

Selective logging: Extracting selected trees from a stand managed under a selection system.

Setting: Portion of a stand to be logged to one skid.

Shackle: A U-shaped metal connector, having a removable pin or threaded bolt through its end-used on rigging, blocks, strops, etc.

Sighting: Aligning the felling sight of the chainsaw, with the pre-determined felling direction, prior to effecting the top-cut of the scarf. This may be offset, one way or the other, to allow for side lean.

Sit back: Refers to a tree, which settles back on its stump, closing the back-cut.

Skidder: A self-propelled extraction machine with wheels designed, with an integral fairlead, to partly support logs during skidding. (Note: Wheeled skidders are designed with customized elevated fairleads to lift the front end of a drag or turn off the ground. Tracked machines are not. They either have to get them fitted or tow independent logging arches, which do the same thing).

Skidding or snigging: The process of dragging logs from stump to skid.

Slabbing: Undesirable splitting in logs occurring during felling or crosscutting.

Slash: Branches, bark, tops, chunks, culled logs, uprooted stumps and broken trees left on the ground after logging.

Sloven: Remains of hinge wood and/or scarf left on a butt after felling.

Snag: (a) Any dead or dying standing tree or part of a tree; (b) A hidden, unknown or unexpected difficulty or obstacle.

Sound dead: Merchantable dead wood.

Splice: Section of rope woven into another piece of rope to form a join or back into itself to form an eye.

Stem: Main trunk of a tree from stump to tip.

Stockpile: Stacked logs.

Strop: Short length of wire rope, chain, or synthetic fiber rope, furnished with hooks or other connecting devices, which forms a noose round the end of the log and which is used for connecting logs to the main extraction rope.

Stump: The base of a tree, and its roots, left in the ground after felling.

Stump height: The height of the felling cut of a tree above the ground.

Sweep: Curvature or deviation of a tree's or logs longitudinal axis from a straight line.

Top cut: The upper cut, usually angled, of a scarf.

Tracks: The bands of linked steel cleats running round the sprockets and idlers of a track-laying machine.

Transfer yard: In logging, a permanent or semi-permanent area in which loads of logs are re-assembled or re-loaded from one form of transport to another.

Under cut: (a) A back-cut lower than the horizontal scarf cut (a dangerous practice); (b) in crosscutting, the

cut made from the underside of a log.

Undergrowth: Lower under growth of vegetation in a forest.

Uproot: Tree blown or pushed over with the root wad attached.

Wedge: Tapered plastic or metal tool which is driven into the back-cut to hold a tree in its natural position, or to force it against its natural lean to a point just beyond its center of gravity.

Open up: Initial felling in a setting, or to clear for a landing or roadway.

Overcut: In felling, where one cut of a scarf is extended beyond the other. (Consequences can be potentially dangerous). Note : An overcut is not hazardous in itself. The potential hazard, of splitting or slabbing, may only occur when the back-cut is effected.

Over run: Where rope being spooled off a drum is allowed to go slack; often results in a birdsnest.

Piece size: Average size of logs from a setting.

Pitch: (a) In chainsaw sprocket, the distance between the tips of the sprocket teeth; (b) In chain, the distance between three consecutive rivets divided by two. (If chain pitch is not equivalent to the sprocket pitch, damage will result.)

Pre-fell: Area felled ahead of normal logging operation; usually associated with cable logging.

Pre-stropping: Where strops are attached to logs for the next drags while the previous drags is being extracted.

Protective trousers: Safety trousers with ankle to groin protective padding for chainsaw operators.

Windfall: An individual tree blown down by the wind.

Windthrow: Area of trees blown down or significantly affected by wind.

GLOSSARY OF TERMS - CABLE LOGGING

Aerial Logging: Extraction system using aerial means such as a helicopter.

Anchor cable/s : Wire rope/s attached to a stump or deadman to anchor a hauler or yarder, with an independent spar, when it is under load.

Audio signaling: Standard audio signals, which can be heard by anyone in the vicinity of a cable operation. Activated by the head breaker-out or assistant, and the hauler operator.

Back corner: The site of the corner tail block.

Back Guy: The guyline attached to the spar, and anchored directly opposite the lead of the main rope or skyline, to counter applied forces when logs are being hauled.

Backline: Further most boundary of a setting from the landing.

Barrel swivel: A swiveling device used in butt rigging.

Bight: The included angle of a rope running round a block or obstruction. "In a bight" is a dangerous position.

Bind: Term used to describe an operating rope held out of line by an obstruction such as a log, stump or standing tree.

Blind Lead: A haul path where the line of sight from the tail block to the spar is obstructed by an intermediate ridge or convex slope.

Block: Metal case enclosing one or more sheaves to facilitate a change of direction of a rope or to gain mechanical advantage in transmission of power through a rope.

Breaker-out: Worker at the felling site responsible for connecting trees or logs to a hauling rope for transport to the landing.

Breaking-out: The process of choker setting and breaking-out individual logs from their initial settings and accumulating them as a drag or turn to the edge of the haul lane or skid trail.

Breaking Strength: The greatest load that a rope will withstand without breaking.

Bridling: Varied methods used to laterally displace the fall block and rigging, to increase the skyline haul lane width or, to log gullies or areas lateral to the skyline.

Butt: (a) Base of standing tree; (b) Bottom(stump) end of a felled tree.

Butt rigging: A system of swivels, shackles and chain, to which strops are attached. It is set between the tail rope and the main rope (highlead) or between the fall block and tail rope (North bend).

Cable logging: A complete harvesting system, from felling to loading, where the prime mover of felled trees is a hauler or yarder which uses various cable configurations to haul or yard produce to a landing.

Carriage: A load carrying wheeled device, which rides back and forth on a skyline.

Choke: To pass a strop or choker around a log or other object and to pull it tight.

Choker: wire or chain strop used to choke or strop logs.

Chord: A straight line between the supporting points of a skyline.

Clearance: The minimum vertical distance between the front of a drag or turn and the ground.

Clinometer: A hand instrument to measure slope angle.

Contour line: A line on a map representing constant elevation.

Corner: The point at which the tailrope is turned.

Carriage: A load carrying device, which travels freely on a skyline.

Corner blocks: The tailrope blocks at the backs end of the setting, which allow changes in direction of the tailrope. Sufficient distance between, prevents wrapping of the cables.

Deadman: Log/s buried in the ground as an anchor for a guyline, hauler tieback, or block. Used if stump are unsuitable or non-existent.

Deflection: The vertical distances between the chord the skyline at mid-span.

Directional felling: In cable logging it is the directional felling of trees as close as practicable to the contour. The purpose of this practice is to facilitate and expedite breaking-out.

Drum: The barrel of a winch, on to which rope is spooled.

Elastic limit: The tensioned limit which, when released, yields to the reversion of steel (including wire rope) to its original length.

Extension: A rope joined to another rope to increase it length.

Ferrule: A metal socket in which the end of a wire rope is secured. Attaches to choker hooks and winch drums.

Fixed Skyline: A skyline, which is fixed at both ends, and tensioned to give the correct-deflection.

Fleet angle: The angle between a perpendicular line, from the center of a sheave, to the center of a drum, and a line from the center of the same sheave to the flange of the drum.

Gravity Return: Any cable system which depends on the force of gravity for the downhill travel of the carriage.

Grommet: A strand of wire rolled around itself 6 times, forming a circle. The ends of the strands are tucked, substituting the core.

Ground Haul or ground lead: A system where the tractive force of the main rope is parallel to the ground, and does not provide lift.

Guylines: Anchored wire ropes, attached to the top of a spar to support it from applied and reactive forces.

Hauler: A machine equipped with winch or winches, which operates from a set position to haul, logs or drags from the stump to landing.

Haul Path: The route along which logs will travel from stump to landing.

Headspar: The rigged spar at or near the landing.

Highlead Logging: A hauler logging system in which a lead block is hung on a spar or tower to provide lift to the front of the logs being hauled.

Hot deck: Where logs are loaded out soon after processing.

Interlock: A hydraulic or mechanical means of coupling the main and tailrope drums to maintain running line tension.

Landing: A prepared area to which logs are extracted, sorted, processed, stockpiled or loaded.

Lane changing: Changing the rigging from a completed haul lane to the next.

Lang's lay: Refers to the construction of wire rope where the lay of the wires in the strands, coincide with the lay of the strands in the rope.

Lateral hauling: Hauling of logs from either side of the main hauling lane.

Lateral hauling distance: The distance perpendicular to the side of a skyline within which logs are extracted. The maximum distance is governed by 2 factors: The length of the main rope and the distance the lateral lane is from the spar.

Lay:
(a) The direction in which the strands are laid in the rope. – Right Hand Lay or Left Hand Lay.
(b) The manner in which the wires in the strands and the strands in the rope are laid together to form the finished article.

Lay length: The distance along the rope in which a strand makes one complete turn.

Lead: The direction in which the cables run out from the spar.

lead, Square: A layout where the mainrope makes a 90? angle with the hauler at the spar.

lead, Straight: A layout where the mainrope is in line with the hauler at the spar.

LHOL: Left Hand Ordinary Lay. States the left hand, or anti-clockwise, lay of the strands in a rope. (The wires in the strands are laid, to the right or, clockwise).

Line Pull: The pulling force exerted on a rope drum, usually measured when the drum expressed in kilograms or tonnes.

Live skyline: A skyline that can be readily loered and raised to facilitate extraction.

Load: The stress placed on a cable or other equipment.

Loaded defletion: The vertical distance between chord and skyline, measured at midspan, when the skyline is supporting a load.

Long corner: The furthermost haul distance in a setting.

Long splice: An end-to-end splice, which may be up to 20m lo longer.

Mainrope: The cable used to haul the load.

Marlinspike: A steel spike-shaped tool that tapers to a point or flattened end. Used to separate the strands of a wire rope, in order to allow the insertion of another, when splicing.

MSPC: Mechanical Slack Pulling Carriage. Used in describing carriages, which power out the mainrope, drop line, or skidding line.

Mobile tailhold: Normally a tractor, to which the tailrope blocks are attached.

North bend: A skyline system where the mainrope runs through a fall block and is then connected to the skyline carriage. The buttrigging is attached between the fall block and the tailrope.

Notch: A 'v' cut, in a stump, to prevent wire rope lifting off. The lead of the notch, on the sides of the stump, should be angled appropriate to the circumstances.

Ordinary Lay: Refers to the construction of wire rope where, wires in the strands are laid in the opposite direction to the lay of the strands.

Pass chain: A chain, uniquely knotted to a cable and, used for holding or tractive purposes.

Portable tower: A collapsible hauler spar, being and integral part of a self propelled unit or, set up on a trailer.

Prebunch: To assemble logs together, to form a drag or turn, before attaching strops.

Prestopping: Setting chokers for the next drag before the buttrigging arrives back to the breakout site. Not at all cable systems are suited to prestopping: No one is to take up a position under working ropes, loaded or otherwise.

Purchase: An amount of pulling, pushing or lifting, power exerted.

Purchase block: A block used in conjunction with a cable to obtain increased purchase.

Reeve: To thread a cable through a block or carriage.

Regenerative brake: An integral device of an interlock system which induces a retarding force on an outgoing cable drum, and transfers a portin of the power absorbed to an incoming cable drum.

Reverse bending; When a cable passing through one sheave, deviates sharply to pass through another.

Rigging: Components of a cable system other than the hauler, tower or spar, e.g. wire rope, blocks, shackles, carriage and other fittings.

Rigging block: A light block hung at the top of the spar, and used to haul up rigging gear.

RHOL: Right Hand Ordinary Lay. States the right hand, or clockwise, lay of the strands in a rope. (The wires in the strands are laid to the left or anticlockwise).

Riparian strip: Vegetation or trees providing protection to banks of a river or stream.

Rolled splice: A temporary splice where the strands are rolledin, rather than tucked.

Rope Shift: (Synonym: Line Change) Act of shifting from one haul path to another.

Running Ropes: Moving ropes which are reeled in or out.

Running line: Any moving cable in logging operations.

Running Skyline: A cable logging system where a carriage rides on the tailrope, which, when tensioned against the mainrope, provides lift for the carriage.

Running (scab) skyline: A cable system where a carriage rides on a tailrope. The amount of tension applied to the tail rope through braking determines the extent of lift to the load.

Safe Working Load (SWL): Calculated refers to wire rope.

Saddle:
(a) The support that a cylindrical spar sits in, when lowered.
(b) The base of a bulldog grip which fits over the threaded ends of the U shaped clasp.

Scab Skyline: Synonym: Running Skyline to the main rope.

Scarf: the result of a 45? top-cut and a level bottom-cut at the base of a tree, the horizontal depth being ¼ to 1/3 the tree's diameter. The v shape subscribes to the unrestrained momentum of the tree, and it establishes the felling direction of the tree.

Setting: An area where the logs are extracted to one hauler location, notwithstanding rotation of the hauler on that location.

Shackle: U shaped metal connector with a threaded pin or bolt and nut.

Sheave: A grooved wheel or pulley in a block.

Shell: The outer framework of a block.

Skidding (Drop) line: Cable, which is paid or pulled out from a skyline carriage, with strops attached.

Skyline: the suspended cable upon which a carriage travels back and forth.

Skyline slope: The inclination of the skyline chord, expressed as a percentage; i.e. the difference in elevation of the supports, divided by the horizontal span.

Skyline span: The horizontal span between supports.

Slackline system: A live skyline system employing a carriage to which the main rope, tail rope and chokers are directly attached. The skyline is lowered to allow chokers to be set, then raised for hauling to the landing.

Slack paying carriage: A skyline carriage where the skidding line can be, pulled or powered out.

Slack pulling line: A cable used to mechanically pay out the skidding line of a carriage.

Snap guys: Guylines rigged on the same side of the tower as the lead cables. Should the lead cables break inadvertently, the snap guys counter the reactive forces.

Snatch block: A block that can be opened on one side to facilitate the placement of a wire rope.

Soft eye splices: Eye splices formed without thimbles.

Span: The distance between two supports.

Spar: The pole or mast to which rigging is hung. This can be wood or steel.

Splice: To join wire rope in various ways by marrying, interweaving and tucking strands.

Split level landing: A site formed with 2 levels in lead with the working cables. The hauler is sited on the higher level and the logs are landed on the lower level.

Spool: The fleet, or wind wire rope on to a drum.

Sprag: Short broken wires that stick out of a wire rope.

Spreader: Part of the buttrigging equipment. The short length of chain between the barrel swivels.

Standing skyline: A skyline fixed at both ends. It does not move during haul in and haul out.

Strop: Also call choker. It is a wire rope or chain which provides the noose to secure or choke the log.

Strop, Block: A short length of cable with an eye at each end. Used principally to attach blocks to stump, anchors or spars.

Strawline: A light cable (8 or 10 mm) used in rigging, or moving other cables.

Strawline drum: A small drum on haulers to operate the strawline.

Stump: Used as an anchor in conjunction with guys, block strops, anchor cables, to secure the position of a machine, spar, tower etc. it has to be large enough and in the appropriate position.

Swaged rope: A wire rope, which has been forced through dies to reduce its cross section. The surface of each strand is flattened. Has a higher breaking load than normal wire rope of the same size.

Swivel: A fastening device that allows the parts attached to it, to rotate freely.

Tag: Part of the buttrigging equipment. A short chain linl, with a swivel and butt hook. This is attached to a barrel swivel. More than one can be employed.

Tailblocks: Normally 2 blocks used to guide the tailrope along the backline.

Tailhold:
(a) The skyline anchor at the backline.
(b) Stump to which a tailrope block is attached.

Tailrope: The haul out cable, used to pull the buttrigging or carriage out to the breaking-out area.

Tailtree or tailspar: A spar to elevate and support the skyline, at the backline.

Tensile grade: Refers to the grade or strength of the wires used in wire rope.

Thimble: An oval shaped metal support with a groove. It is placed inside an eye prior to the pressing of a

ferrule. Thimbled eyes are normally used on permanent stationary installations.

Thread: To reeve a line through a block or a carriage.

Tieback: A wire rope, attached from the anchor stump to a second stump, in lead with the hauling cables, to distribute the load.

Tightlining:
(a) In highlead logging, a method of lifting logs or buttrigging over obstacles by applying the tailrope brake while hauling on the mainrope.
(b) Moving cables and rigging from a completed haul lane to the next. This is achieved after re-setting the tailblocks and tightening the working cables.

Topographical map: A map representing constant elevations by means of contour lines.

Tower: Normally an integral portable steel mast or framework to which rigging is hung.

Two-stage conveyance: Where logs are hauled to one landing and relocated by skidder or loader to a processing landing.

Unloaded deflection: The vertical distance between the chord and the unloaded skyline measured at midspan.

Winch: Drums on which to spool wire rope for hauling or hoisting.

Working drum: A drum that can be readily reeled in or out during a haul cycle.

Wrap: A turn of a cable around a drum or stump, etc.

Wrapping: The wrapping together of contiguous cables. There is considerable potential for wear and damage through twisting and rasping.

Yarder: An American term for hauler.

Yarding: A n American term for conveying logs to a landing.

Yoke: The heavy U-shaped part of a block, by which it is attached to an anchor point.

Glossary of Terms - Transport

Ancillary Equipment

Belly strop/chain: The wire ropes or chains which is p around the load at any position(s) in a complete and is attached on to itself and tensioned using a binder".

Bolster Bed: The frame member, which is mounted to the sub-frame and supports the bolster assembly. - Bunk: The frame member mounted directly to the sub-frame, around the other hinge pin. (See fig. 12, item that supports the log load.

Bolster: The frame member, which is swivel, mounted onto the bolster bed and which supports the log load.

Chock block: A wedge-shaped section sliding in the bolster or bunk channel and held in position by a "chock block chain", which constrains the log load within the width limits of the vehicle. Previously used commonly with large native logs.

Extension pin: The uppermost section of the- stanchion upright. It is good practice to remove the pins during a return trip to comply with vehicle height regulations and to keep the pins from falling out. The pins are usually then stored in a carrier on the rear of the cab. (Also called "stanchion extension".)

Load Binder: The device for maintaining tension on a securing chain or belly chain around a load of logs Binder Chain any chain that is used for binding or holding a load of logs on a truck or trailer.

Longitudinal strop/chain: The wire rope or chain runs length-wise along the truck or trailer and over the load. It is fastened at the front and the re each unit and tensioned by a "load binder". It is used to secure cross-loaded shortwood.

Removable cradle: An assembly onto which wood may be preloaded and subsequently attached to a truck for cartage.

Stanchion: The upright(s) attached to the bolster or bunk, which constrain the load within the width limits of the vehicle. (Also called "side arm").

Throw-over strop/chain: The wire ropes or chains that across the top of the load, through guides, and is attached to the bolster or stanchion end on both sides.

Wrap-around strop: The section of wire rope used to keep stanchion in an upright position. The wrap-around is released from the opposite side of the truck.

APRIL 1998

APPENDIX 2: EXAMPLES OF HAZARD INFORMATION

Documentation that the principal might supply includes a detailed map identifying likely site hazards and related information, e.g.

Item	Description
1	Prescription area boundaries.
2	Routes and tracks: • Access routes; • Existing and possible tracks and skids; • Emergency evacuation routes; • Public access areas, rivers/streams used by fishermen, etc.
3	Terrain factors: • Slope ranges for different extraction equipment; • Ground roughness; • Vegetation hindrance; • Rock outcrops; • Tomos and other significant terrain; hazards
4	Tree factors: • Species; • Average piece size and range; • Presence of windthrow on site; • General direction of lean.
5	Location of services: • Power; • Telephone; • Gas; sewerage; • Water; • Communication lines.
6	Environmental consent requirements: • Streams/rivers; • Wildlife sanctuaries; • Native vegetation; • Historic sites; • Debris removal.

APPENDIX 3: EXPOSURE TO CONTINUOUS SOUND AND REQUIRED HEARING PROTECTION

Source	Decibels	Decibel exposure level for a working day	Hearing protection required
Jackhammer	120	Over 115	Seek expert advice
Sandblasting	112	110 - 115	Grade 5 earmuffs
Chainsaws Brushcutter Disco	106 - 109 104 - 106 100 - 110	104 - 109	Grade 4 earmuffs
Petrol-driven tools Pneumatic drill Boiler shop	100 100 100	93 - 103	Grade 3 earmuffs
Older machinery	90 - 95	92 - 97	Grade 2 earmuffs or ear plugs
Modern machinery Average factory	85 - 90 80 - 90	86 - 91	Grade 1 earmuffs or ear plugs
Busy traffic Ordinary speech Average home	75 66 50	85 and below	No protection required

APPENDIX 4

A PROTOCOL
ENFORCEMENT OF OCCUPATIONAL SAFETY AND HEALTH ACT 1994
UNDER WATER LOGGING ACTIVITIES

INDUSTRIAL HEALTH DIVISION
DEPARTMENT OF OCCUPATIONAL SAFETY AND HEALTH
MALAYSIA

CONTENTS

1. INTRODUCTION

A number of accidents and occupational diseases have been reported to the Department related to under water logging. Accidents common with under water logging are drowning, decompression sickness and struck by fallen tree. Under water logging activities are at present being carried out at Tasik Kenyir in Terengganu, Pergau Dam in Kelantan and Temenggor Dam in Perak.

2. OBJECTIVES OF THE PROTOCOL

This protocol have the following objectives:-

i) to provide guidance to enforcement officers on the procedures and matters to be considered during auditing/inspection activities;

ii) to provide a systematic checklist for usage by enforcement officers during auditing and inspection of place of work; and

iii) to streamline enforcement activities for under water logging operations.

3. ENFORCEMENT PROCEDURES

3.1. GENERAL

The enforcement activities is carried out to measure the level of compliance of OSHA 1994 by the logging concessionaires. The enforcement officers need a high degree of competency and judgment when carrying out the compliance audit/inspection. The officer may need to seek an assistance of a colleague or other person of other discipline, when necessary, to evaluate certain elements of the compliance audits/inspections. For example, an occupational safety and health officer may need the assistance of an occupational health doctor to assist him in the audit or inspection.

3.2. STAGE 1: PRE PLACE OF WORK INSPECTION/VISIT

The following have to be carried out:-

i) Identify the logging concessionaire holders, the main contractors and all the sub-contractors(get the address, contact person and the relevant telephone numbers). This information may be available from the State Secretary Office or the State Forestry Office;

ii) Inform all the relevant parties (other agencies such as the State Forestry Department, concessionaire holder, main contractors and sub-contractors) of the intended audit and inspection and ensure that all information in items 2.1 to items 2.14 of the checklist in Appendix 1 is prepared and ready for inspection by the concession holder;

iii) Check that all necessary equipment/machinery/checklist for the audit/inspection are available and in good condition; The following may be needed for the inspection/audit:-

a) PPE, e.g. suitable shoes, helmet
b) torch light (if staying overnight at the kongsi house)
c) mosquito nets/insect repellent
d) food supply and sleeping equipment (if staying over night at kongsi house)
e) suitable clothing
f) equipment for monitoring of hazards and physical stress such as heat, noise, lighting, etc.
g) life jackets

iv) Ensure that one is well verse with the SOP for conducting an inspection and SOP for carrying out monitoring.

3.3. STAGE 2: OSH MANAGEMENT AUDIT

This audit may be carried out at the concessionaire office, JKKP office or at any other suitable location/premise.

i) Ensure that the responsible person (managers, safety managers, etc.) of the concession holder, main contractors and all the sub-contractors are present during the audit;

ii) Opening conference must be held to inform every one present of the purpose and objectives of the audit;

iii) Go through the item one by one starting from item 2.1 to item 2.14 of the checklist in Appendix 1;

iv) Record all non-compliance and shortcomings in the column provided;

v) Record the intended action or directive to be given to the appropriate persons in the column provided.

3.4. STAGE 3: PLACE OF WORK INSPECTION

i) Ensure that all the necessary equipment/supplies for the inspection team are in order and carried along;

ii) During the journey from the jetty to the logging site and during the entire inspection period ensure that all safety precautions are observed, life jackets are put-on;

iii) Use the checklist in Appendix 1, and check item 3.1 to item 3.4; and

iv) Record all non-compliance or defects observed and action/directive to be taken in the appropriate column provided.

3.5. STAGE 4: POST PLACE OF WORK INSPECTION/VISIT/AUDITS

i) Held a closing conference to summarise all findings of the inspection/audit;

ii) Brief and informed the concession holder, main contractor or the sub-ontractors of the defects and non-compliance and the remedial measures that have to be taken by respective parties verbally; and

iii) Issue a formal directive as soon as practicable (NOP/NOI if necessary)

3.6. STAGE 5: FOLLOW-UP ACTION

i) After a specified period (not longer than 2 months from the date of the inspection/audit) review the progress of the remedial measures that are supposed to be carried out;

ii) If necessary conduct another inspection/audit and repeat STAGE 2 and STAGE 3;

iii) If there is no material improvement of the situation or on the directive given, issued NOP/NOI as appropriate; and

iv) Initiate court proceeding if NOP/NOI is blatantly ignored.

4. CLOSING REMARKS

A well prepared and a thorough place of work inspection and audits will ensure that the inspection and audits comprehensively covered all aspects of occupational safety and health. This will enhance the quality of inspection and audit and indirectly reflect the competency and expertise of the officer conducting the inspection or audit. Competent and quality services provided to the clients are the ultimate aim of the Department and every officer must strive to achieve this goal.

Appendix 1

CHECKLIST FOR THE ENFORCEMENT OF OSHA 1994 UNDER WATER LOGGING ACTIVITIES

CONTENTS OF THE CHECKLIST

1. Detail of the concession holder.

2. Management of OSH.
   - 2.1. OSH policy.
   - 2.2. OSH organisation.
   - 2.3. Safety and health committee.
   - 2.4. Safe operating procedure/work practices.
   - 2.5. Training.
   - 2.6. Personal protective equipment.
   - 2.7. Accident reporting and investigation.
   - 2.8. Emergency planning.
   - 2.9. In-house safety inspection.
   - 2.10. Welfare arrangements.
   - 2.11. Workers selection/pre-employment medical examinations/medical surveillance.
   - 2.12. Diver's certification.
   - 2.13. Compression/decompression chamber.
   - 2.14. Record keeping.

3. Place of work inspection.
   - 3.1. Transportation to the logging site.
   - 3.2. Kongsi house.
   - 3.3. Tree felling operations.
   - 3.4. Transportation of logs.

1. DETAIL OF CONCESSIONAIRE HOLDER

		Registration no. if appropriate (factory/place of work registration number)				
Name of company:						
Address :						
Contact person :						
Job title:						
Telephone no:		Fax no:				
Concession acreage:		No. of employees	M		F	
		Citizen	M		F	
		Non-citizen	M		F	

	(1)	(2)	(3)
Name of subcontractor:			
Address:			
Contact person :			
Telephone no.:			

Name of Inspector/ OSH Officer conducting the audit/inspection:	
Date of inspection:	

	Activity standards/requirements	Compliance			Enforcement/directive or action to be taken
		Yes	No	NR*	
2	**MANAGEMENT OF OSH**				
2.1	**OSH POLICY**				
a)	OSH policy available?				
b)	OSH policy signed by CEO and dated?				
c)	OSH policy reviewed and if necessary revised annually?				
2.2	**SAFETY AND HEALTH COMMITTEE**				
a)	There is a specific organisation for OSH?				
b)	Responsibilities and authority clearly defined and assigned				
2.3	**SAFETY AND HEALTH COMMITTEE**				
a)	SH committee exist and the formation complied with the requirement of the Regulations?				
b)	Meeting held monthly?				
c)	Committee have clear defined objectives?				
d)	Minutes accurately describe each meeting's activities and proceedings?				
e)	Minutes incorporate an action and time allocation to remove/reduce hazards?				
f)	Members been trained in safety and health practices?				
2.4	**SAFE OPERATING PROCEDURES/WORK PRACTICES**				
a)	A risk assessment of all jobs/tasks have been conducted?				
b)	All hazardous jobs/tasks in which a SOP/SWP is required have been identified?				
c)	The SOPs/SWPs required have been prepared, documented and kept?				
d)	Do supervisors and workers have SOP/SWP?				
e)	Do procedures cover tools, equipment and P.P.E?				
f)	Are all SOPs/SWPs reviewed as necessary?				

	Activity standards/requirements	Compliance			Enforcement/directive or action to be taken
		Yes	No	NR*	
2 .5	**TRAINING**				
a)	Is there induction training to new or transferred employees?				
b)	Staffs are train when they are exposed to new or increased risks?				
c)	Does the training incorporate the following? a) fire safety, housekeeping, access rule and regulations b) accident reporting c) PPE uses, limitation and maintenance d) hygiene, chemicals and manual handling e) safe work practices and safe operating procedures which include diving procedures and tree felling for divers f) information on hazards associated with diving works and precautions to be taken g) rescue and resuscitation procedure h) emergency response and evacuation procedure i) company safety policy, responsibilities and accountability				
d)	Records of training are kept?				
2.6	**PERSONAL PROTECTIVE EQUIPMENT**				
a)	Is PPE needed? If so has a survey been conducted to determine the type of PPE required?				
b)	Do you consult your employees on the type of PPE?				
c)	Does the PPE of the approved type by DOSH or complied with other standards such as ANSI, BSI or CSA design and manufacture provisions?				
d)	5) Have you fully instructed your employees how to correctly use and maintain the PPE?				
e)	There is a system to inspect and ensure the PPE is kept clean and in working order ?				
f)	Are all PPE issued to employees fit tested?				
g)	Are there clear signs indicating what PPE is required?				
h)	Do written safe work procedures incorporate what PPE is required?				

	Activity standards/requirements	Compliance			Enforcement/directive or action to be taken
		Yes	No	NR*	
2.7	**ACCIDENT REPORTING AND INVESTIGATING**				
a)	All accidents and diseases are reported to the competent authority?				
b)	There is a comprehensive Investigation Procedure?				
c)	Are your investigators fully trained? (At least I day course?)				
d)	Does the safety and health committee conduct and review investigations?				
2.8	**EMERGENCY PLANNING**				
a)	Do you have written emergency and evacuation plans?				
b)	Does the plan cover procedure of seeking medical treatment for employees suffering from compression sickness?				
c)	Are responsibilities clearly defined?				
d)	Have you conducted at least 2 drills in the past year?				
e)	Are all plans reviewed twice per year?				
2.9	**IN-HOUSE SAFETY INSPECTIONS**				
a)	Do you have a formal inspection procedure?				
b)	Do inspections involve management and workers?				
c)	Are all areas of the place of work inspected?				
d)	Are inspection reports evaluated at the safety and health committees?				
e)	Is there a follow up procedure?				
f)	Is there feedback to the work force of inspection results?				
g)	Are all employees conducting inspections trained how to do them?				
2.10	**WELFARE ARRANGEMENTS**				
a)	Are workers paid monthly or daily?				
b)	What is the working hours for employees?				
c)	First aid facilities provided?				
d)	Trained first-aider available?				
e)	Are the following provided? • Changing room? • Eating room?				

	Activity standards/requirements	Compliance			Enforcement/directive or action to be taken
		Yes	No	NR*	
2.11	**WORKERS SELECTION/PRE-EMPLOYMENT MEDICAL EXAMINATION/MEDICAL SURVEILLANCE**				
a)	What is the minimum and maximum age of workers employed?				
b)	All workers are medically examined before employment?				
c)	What is the frequency of medical examination/surveillance for divers?				
d)	Record of medical examination in order and complete as per format in Appendix 2?				
e)	Does the concession holder employed a medical practitioner trained in occupational health/medicine to supervise all medical matters in connection with the logging activities?				
2.12	**DIVER'S CERTIFICATION**				
a)	Are all divers have an international SCUBA certification?				
b)	What is the minimum and maximum qualification for each diver?				
2.13	**COMPRESSION /DECOMPRESSION CHAMBER**				
a)	A suitably constructed chamber is available at site?				
b)	The chamber satisfies the following:- • have clear head room > 1.8m • have 2 compartment • have efficient means of verbal and signal communications • have at least 1 window • adequately ventilated • protected form the weather and the sun • have adequate lighting				
c)	The chamber is provided with suitable equipment including: • pressure recording gauge • a recording chart • a couch				
d)	The chamber is always ready for use?				
e)	There is no spark or arc creating devices used within the chamber				
f)	The chamber is under the charge of qualified attendant				

	Activity standards/requirements	Compliance			Enforcement/directive or action to be taken
		Yes	No	NR*	
g)	There is a procedure requiring the attendant to be in attendance at all time when diving activities are carried out?				
h)	Employee operating the air supply plant is experience and skillful?				
i)	Maintenance of air supply plant is carried out regularly?				
j)	Air supply plant have back up power?				
k)	Air supplied is check for purity?				
2.14	**RECORD KEEPING**				
a)	Does your company keep the following records? • medical records • employees particulars • dives log book • accident records • compression/ decompression log book • maintenance of plant records				
3	**PLACE OF WORK INSPECTION**				
3.1	**TRANSPORTATION**				
a)	Is the jetty belong to the company, and if so how is the condition?				
b)	Conditions of the boat used?				
c)	Max. loading for the boat is observed?				
d)	Life jackets provided for tevery passenger and boatman?				
3.2	**KONGSI HOUSE**				
a)	The kongsi house is of suitable and safe construction and safe for accommodation?				
b)	Adequate supply of clean drinking water?				
c)	Adequate suitable sanitary facilities?				
d)	Suitable arrangement provided to repel insect and mosquito?				
e)	First aid box (with all the medicine) available?				
f)	The kongsi house are kept clean?				

	Activity standards/requirements	Compliance			Enforcement/directive or action to be taken
		Yes	No	NR*	
3.3	**TREE FELLING OPERATION**				
3.3.1	**SOP FOR TREE FELLING**				
a)	There is A SOP for tree felling?				
b)	What is the safety precautionary measures taken before and during diving activities?				
c)	No of divers?				
d)	Max. depth of dives?				
e)	Maximum time taken to fell one tree?				
f)	Is there a standby oxygen tank?				
g)	What is the precautionary safety measures/procedures if oxygen supply is depleted?				
h)	Is there a 'free ascend/descend' drill for all divers?				
i)	What is the intervals between each dives for a diver?				
j)	Type of stoppages used to normalise diver?				
k)	Which standard is used for wet-stoppages?				
l)	How is the communication between the divers and other employees on the pontoon?				
3.3.2	**PLANTS/MACHINERY/EQUIPMENT USED FOR TREE FELLING**				
a)	The pontoon is of a suitable and safe construction and in good conditions?				
b)	Type of SCUBA provided?				
c)	Safety apparatus of the SCUBA?				
d)	Condition of the chainsaw? (well maintained?)				
e)	Depth gauge provided to all divers?				
f)	Is hooka used? If so what is the safety measures and procedures taken if air supply hose break/leaks?				
g)	All certificated machinery have valid CF? • air receivers • Hauling winch				
h)	Exposed/dangerous parts of a machine adequately guarded?				
i)	All operators of machinery are trained?				
j)	Record of maintenance of all machinery available?				

	Activity standards/requirements	Compliance			Enforcement/directive or action to be taken
		Yes	No	NR*	
3.3.3	**PPE REQUIRED/ PROVIDED**				
a)	All divers and other employees involved in tree felling operations are provided with adequate and suitable PPE:- • helmet/hard hat • suitable gloves • suitable shoes • ear protectors • life jackets • others (specify)				
b)	PPE are of the approved type?				
3.4	**TRANSPORTATION OF LOGS**				
a)	SOP for log transportation is available?				
b)	Condition of tug boat used?				
c)	Max no. of logs that can be towed?				
d)	No. of employees involved in these operation per tug boat?				
e)	Employees are provided with life jackets?				
f)	Operators of tug boat are trained?				
g)	At log collection point/jetty, how are the logs loaded onto lorries?				
h)	If crane is used, crane have valid CF?				
i)	Crane operator are competent and registered with DOSH?				

Appendix 2

1. SCOPE FOR PREEMPLOYMENT MEDICAL EXAMINATIONS FOR DIVING ACTIVITIES

Pre-employment medical examinations should cover but not limited to the following area:-

a) PARTICULAR OF EMPLOYEES:-
- name and address
- age
- sex
- I.C. no./passport no./work permit no.
- nationality

b) PREVIOUS OCCUPATIONS AND NAME AND ADDRESS OF PREVIOUS EMPLOYERS.

c) PERSONAL/FAMILY HISTORY
- smoker/non smoker
- medication history
- alcohol ingestion

d) PREVIOUS MEDICAL HISTORY
- history of compressed air illness
- history of fit, headache, dizziness, migraine, mental illness, drug addiction, backache, accidents

e) MEDICAL EXAMINATION

i) Physical examination
- height, weight, mass body index, blood pressure, urine, albumin sugar, blood chemistry
- eye vision
- ENT, respiratory, cardiovascular, neurological, psychiatric
- gastrointestinal, genitourinary, musculoskeletal

ii) Investigations
- audiometery
- X-rays (CXR)
- stress electrocardiogram

2. SCOPE FOR MEDICAL SURVEILLANCE FOR DIVING ACTIVITIES

Medical surveillance for diving activities should cover but not limited to the following:-

a) Reviewing record of medical examinations (either locally done or examination in foreign country)

b) No. of employees with complaints suggestive of compression illness referred to hospital

c) No. of workers with perforated ear drum

d) No. of cases of bone necrosis

e) No. of cases with hemiplegia

f) No. of death due to compression sickness

g) Frequency of medical examinations
- for pre-employment examinations, should be carried out not greater than 3 days prior to diving;
- not less than once in every 3 months thereafter for working under water not exceeding a depth of 10 meter (1 bar pressure);
- not less than once in every 4 weeks for working under water exceeding a depth of 10 meter (pressure exceeding 1 bar);
- Not greater than 3 days prior to reemployment in diving activities;
- After a worker has not been employed in diving activities for more than 14 consecutive days;
- after an employee has suffered from a cold, chest infections or throat or earache;
- after an employee has suffered from any illness or injury necessitating absence from work for more than 3 consecutive days.

h) Follow-up action
- suspected cases of compression illness should be followed up annually with skeletal X rays (shoulders, hips and knee).
- treatment, even cases with minor symptoms of compression illness should under go therapeutic recompression.

Safety Checklist for Chainsaw Safety

Location Date

Employees Name		Training		Experience	Certification
1					
2					
3					
Observation Indicators	**Good**	**Average**	**Poor**	**Unacceptable**	
Personal protection	**1**	**2**	**3**	**Comments (condition)**	
Safety Helmet / hearing protection					
Safety Footwear					
Leg Protection/ Safety Leg wear					
Eye Protection/ Visor /glasses					
Suitable Clothing for conditions					
Personal protection	**1**	**2**	**3**	**Comments (condition)**	
Start Procedures / Obstructions					
Saw Performance ;/Idle/Cutting					
Carried by hand/ Bar facing rear					
Correct Refueling/ points of ignition					
Delimbing Technique/ Feet					
Cross cutting Technique					
Guide Bar Position/no obstructions					
Kick back awareness/ Bar tip					
Power Controls / Operational					
Saw condition / Broken handles etc					
Chain and Bar condition					
Key points	**1**	**2**	**3**	**Comments (condition)**	
Correct chain tension					
Saw chain correctly sharpened					
Good body position when operating					
Saw held Firmly in both hands					
Correct Position of front hand					
Bend Legs Not Back					
Working to close (2 Meters) apart					
Designated maintenance area					
Designated maintenance area					
Machine Interaction /crosscutting					
Comments					

Safety Audit Tree Felling

Location Date

Employee				Experience	
Training				Has first aid	
Understands rules				Work location	
Personal safety understood				Induction procedures	
	Good	**Average**	**Poor**	**Unacceptable**	
Personal equipment					
Helmet					
Ear Muffs					
Chainsaw Chaos					
Boots					
Felling aids					
Chainsaw Equipment					
Safety Mitt					
Chain brake					
Throttle Lock					
Chain Peg					
Stop Switch					
Idle Correctly					
Side/top cover					
Muffler					
Bar/ chain ccondition					
Fuel Container					
Other					
Task Assessment					
Work method		**Tree assessment**		**Felling Cuts**	
Signs Used		Lean weight wind		Scarf direction	
Two tree length		Ground hazards		Clean scarf	
Refueling		Overhead hazards		Backcut level	
Saw starts		Clear work areaards		Backcut Step	
Use of Wedges		Escape Path		Hinge wood	
Tree Driving rules		Moves clear		Wing cuts	
Aware of Others		Correct side final cut		Trimming techniques	
Comments					

Safety Audit Logging Trucks

Location Date

Company Name	Company address	Driver name	Registration

Type of Unit High	Highway	Truck /trailer	Off Highway Full Stem	Off highway Short stem / or Pole unit

Compliance	**Yes**	**No**	**Comments**
Driver Licence			
Certificate of fitness			
Safety Helmet			
Hi-Viz Clothing			
Safety Rules available			

Log Truck Condition	**Good**	**Average**	**Poor**	**Unacceptable/**	**Comments**
Stems not dragging on ground					
Out side logs over hang bolsters & stanchions					
Logs loaded to local standards					
Load height below Stanchion Pins					
Extension pin Maximum Length 450mm					
Bolsters to have raised edge					
Drop stanchions To be secured					
Release pin on non operating side					
Cradle Strops adequate size (19mm) Certified					

Operation considerations	**Yes**	**No**	**Comments**
Stems not dragging on ground			
Out side logs over hang bolsters & stanchions			
Logs loaded to local standards			
Load height below Stanchion Pins			
Extension pin Maximum Length 450mm			
Bolsters to have raised edge			
Drop stanchions To be secured			
Release pin on non operating side			
Cradle Strops adequate size (19mm) Certified			

Comments

Safety Audit Machinery

Location Date

Machine Type	Operator Name			Experience Years Months	Age
1					
2					
3					
Observation Indicators	**Good**	**Average**	**Poor**	**Unacceptable**	
Machine Items	**1**	**2**	**3**	**Comments**	
Guards in Place					
Brakes					
Steering					
Battery secure					
Loose equipment in cab					
Operator Items	**1**	**2**	**3**	**Comments**	
Operators cab Hazards					
Operator Seat Condition					
Seat Position					
Seat Belts provided and worn					
Access and Egress					
Operator cab Cert ROPS , OPS & FOPS					
Condition of wire rope					
Grapple condition					
Grapple pins					
Work Method					
Training Provided					
Machine Operation	**1**	**2**	**3**	**Comments**	
Machine matches Operation type					
Slope guidelines Observed					
Only one person riding on machine					
Machines not operating off formed tracks					
Care taken when working near banks					
Correct alignment when braking out					
Clearly understood signals					
Comments					

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Notes

Notes