FIFWA Forestry Safety Code

Consultation Draft | March 2024

CONTENTS

1 INTRODUCTION

1.1 Background

The FIFWA Logging Safety Code was first published in 1997 and most recently updated in 2016. It provided practical advice on how to manage health and safety in logging operations in Western Australia. The forestry industry in Western Australia now has a much greater focus on growing timber in plantations. To recognise these changes, the title of the document has been changed to the FIFWA Forestry Safety Code (the Code). Its scope has been extended to include sections on growing, maintaining, enhancing, and protecting planted and natural forests.

In 2020, Western Australia enacted the *Work Health and Safety Act 2020* (WHS Act). The WHS Act is substantially based on the national model work health and safety laws that were developed to underpin a harmonised WHS framework in Australia. Supporting the primary legislation are the Work Health and Safety (General) Regulations 2022 (WHS Regulations) that suit Western Australia's unique conditions.

The introduction of the WHS Act and Regulations made many of the terms used in the FIFWA Logging Safety Code redundant. The content has been modified to recognise these changes by:

- ensuring that duties and duty holders are consistent with the nationally harmonised legislation
- updating the document to reflect the format of modern codes of practice.
- integrating information associated with new technology
- reflecting and addressing comments received from industry stakeholders.

The document references several relevant Australian/New Zealand Standards **(AS/NZS)**, and other state and Commonwealth legislation and codes of practice. The refencing of these documents seeks to ensure the Code remains current when amendments to referenced legislation and standards occur.

1.2 Application of the Code

Under the WHS Act, the FIFWA Forestry Safety Code applies to people who have responsibilities for **workplace** health and safety in **forestry operations** in Western Australia.

A **person conducting a business or undertaking (PCBU)** has the primary duty under the WHS Act to ensure, 'so far as is reasonably practicable', that **workers** and other people are not exposed to workplace health and safety **risks** arising from the business or undertaking.

PCBUs with responsibility in the forestry industry include landowners, forest managers, **contractors**, and timber business owners who grow, maintain, harvest, and process wood products within a forest.

Other people, such as designers, officers, and workers, also have duties under the WHS Act.

As an industry code, the guidance does not have the evidentiary status of an approved Code of Practice. Nonetheless it represents the state of knowledge about forest **hazards** and ways of controlling risks.

1.3 Scope of the Code

This Code provides practical guidance for duty holders on how to manage workplace health and safety risks associated with forestry operations in Western Australia. It has been developed to support the WHS Act and Regulations and applies to all workplaces where forestry operations are carried out.

The scope remains largely the same as the previous code, but this Code introduces some new hazards (steep slope harvesting and psychosocial hazards) and operations such as silviculture and fire management. It covers all activities necessary for establishing, maintaining, harvesting, and processing forest produce in field within Western Australian forests.

The Code also includes guidance on the hazards associated with loading and unloading timber products for transport and on the general application of WHS Regulations relating to fatigue. However, the safety of transport activities outside a forest is not covered.

The Code seeks to be consistent with specific WHS regulations and approved Codes of Practice on hazards such as noise, hazardous **substances**, manual handling, and plant.

1.4 Structure and approach of the Code

The Code is structured in four parts to provide guidance to all PCBUs involved in forestry. The first sections provide general guidance about meeting key duties in the WHS Act, and later sections focus more on particular activities or hazards. The document is arranged as follows:

Part	Focus
One	• Understanding responsibilities • Consulting, cooperating, and coordinating with others • Understanding the risk management process
Two	• Planning for health and safety including site assessment and hand over, **health and safety management systems** and **site safety plans** • Focusing on the essential critical hazards, risks, and essential **risk controls** that are relevant to any forestry operation including training, induction, emergency procedures, personal protective equipment (PPE), and first aid
Three	Outlining additional activity-specific hazards and risk controls related to specific operations conducted by the forestry industry
Four	Providing supporting resources including risk controls for common hazards present in most forestry operations and technical specifications for equipment, PPE, and operator competencies.

The Code highlights hazards and provides recommended risk controls that reflect the industry's current practices. Where appropriate, it outlines the factors that a risk assessment should consider. This risk management approach underpins the Code's advice.

Section 6 Risk management essentials for all forestry operations sets out the baseline hazards, risk factors, and risk controls. The specific operational sections (i.e. *sections 7 to 13*) then build on this foundation, referencing and reflecting the general principles, so each one can be read as a standalone section alongside *Section 6*.

The Code is underpinned by established and tested risk management processes for many forestry tasks and activities. These should be used or, where necessary, adjusted by a risk assessment that deals with changed conditions (e.g. personnel, sites, equipment, or weather).

Risk assessment remains a basic tool to be used where the circumstances vary from that described in the Code or are not covered.

1.5 Use of the Code

The Code represents practical guidance on workplace health and safety in forestry operations. It can be used as:

- a benchmark for those with responsibilities to check their current systems of work against
- a source of information to use in any risk assessment or in the selection of risk controls
- the foundation to build a health and safety management system and safe operating procedures on
- the template to base any compliance or workplace health and safety audit on
- the standard to test or measure any alternative approaches against.

The risk management approach set out in legislation enables different operations to find solutions relevant to their scale and the level of risk they manage.

However, it should be emphasised that the hazards do not discriminate by size or scale, nor does the applicability of known and tested risk controls.

1.6 Code language, style, and symbols

The word **'must'** is used where risk controls and processes are mandated in the WHS Act or WHS Regulations. Otherwise, the word 'should' is used where the risk controls and processes are appropriate unless it can be demonstrated an alternative achieves the same level of safety.

The exception is where evidence and industry practice show there is only one safe way to manage the risk. In this case, expressions such as 'must', 'do not' and 'never' are used. An example is separation distances. The rule to 'keep two tree lengths away from falling operations' is not mandated in regulation. However, it has long been part of codes of practice and industry standards in WA and other states.

This is an example of what can be described as the 'state of knowledge' about the hazard and the ways of eliminating risk. It is expressed in the WHS Act as part of what is 'reasonably practicable'.

To guide readers, defined terms are bolded on first use.

In *sections 7 to 13*, the following symbols will guide the user to information specific to each operation. In each case, the critical hazards, common risk factors and essential risk controls are **the baseline** to eliminate or minimise risk.

Any additional activity-specific hazards, risk factors or risk controls are highlighted by the plus icons:

In *section 14* information on common hazards (e.g. noise, extreme weather, fatigue) is provided to support the development of a user's health and safety management system. Planning for operations that are likely to expose a worker to a common hazard should consider this information.

Planning for forestry operations in longer term harvest plans, annual plans, and operational plans.

Consultation, cooperation, and coordination between relevant parties, including contractors and workers, to both establish safe systems and encourage the active involvement of all.

General hazards.

Critical hazards, i.e. the hazards that create the most potential for death or injury during forestry operations.

Activity-specific hazards in addition to any critical hazards that may be present (relevant to specific operational sections).

Common hazards, a hazard that is likely to arise when undertaking an operation. The folder icon is a prompt that further information is available in *section 14*.

Risk assessment, particularly relating to planning, operational risks, and situations when operating conditions change.

Common risk factors most often associated with increased likelihood of harm and with more serious consequences; likely to apply to all forestry operations.

Activity-specific risk factors in addition to any common risk factors that may be present (relevant to specific operational sections).

Risk controls, i.e. the measures that will eliminate or reduce assessed risks so far as is reasonably practicable.

Essential risk controls, i.e. the most widely used and effective measures that will individually, or in combination, eliminate or minimise critical hazards and common risks so far as is reasonably practicable.

Activity-specific risk controls in addition to any essential risk controls that may apply (relevant to specific operational sections).

The additional risk controls are highlighted using the following types of essential risk control.

MAIN TYPES OF ESSENTIAL RISK CONTROLS

Equipment designed for the task and operated within specified limitations like slope, weather, or tree size**.** This includes machinery and other equipment such as chainsaws and ladders.

Safe work zones and exclusion zones to separate workers from hazards. These include physical barriers, distance, or time-based means of separation.

Safe work practices achieved through relevant training qualifications, licences, PPE, and policies that cover readiness to work (such as policies on fatigue, drugs, and alcohol).

Communication systems for site access control, for communication between machines operators and other workers, and for emergency and evacuation situations.

PART ONE

WORKPLACE HEALTH AND SAFETY FRAMEWORK

2 WORKPLACE HEALTH AND SAFETY RESPONSIBILITIES

3 CONSULTATION, COOPERATION, AND COORDINATION

4 RISK MANAGEMENT IN OVERVIEW

2 WORKPLACE HEALTH AND SAFETY RESPONSIBILITIES

2.1 Duty holders and duties under the WHS Act

Ensuring health and safety in forestry operations requires everyone to play their part in eliminating or reducing risks so far as is reasonably practicable. These responsibilities or 'duties' (the term used in the WHS Act) are related to each person's role and level of authority.

The WHS Act sets out the different duty holders and prescribes the responsibilities they have. The WHS Regulations provide more detail on what must be done to eliminate or reduce specific hazards and risks.

It is important to understand that two or more people may hold similar duties in some circumstances and that duties are often reciprocal. For example, a business has a duty to protect the health and safety of workers, but workers also owe a duty to the business to follow procedures and not put themselves or others at risk.

Duties cannot be 'contracted out', but each party must discharge their responsibilities to the extent that they have the capacity to influence or control the matter.

A landowner, for example, has a duty to provide a timber harvesting contractor with relevant information about the site and the hazards they know or might reasonably know about. They also have a duty to satisfy themselves that the contractor is capable of safely undertaking the task.

The contractor must then carry out the task by taking this information into account and applying their own safe operating procedures.

2.2 Person conducting a business or undertaking

Under the WHS Act, a person conducting a business or undertaking (PCBU) has one primary duty. This is to ensure, 'so far as is reasonably practicable', that workers and other people are not exposed to workplace health and safety risks arising from the business or undertaking.

An undertaking is the activity conducted by the business, such as building access **roads**, harvesting timber, or planting seedlings.

A PCBU in the forest industry includes:

- landowners who grow or harvest timber on their own property, even if it is for their own use
- landowners and forest managers who engage contractors to harvest or transport forest products
- contractors and business owners who establish or maintain forests, harvest or transport forest products, or process **logs** within a forest.

A PCBU's duty includes managing risks by providing:

- a safe work environment
- safe plant
- safe systems of work
- adequate facilities
- **health monitoring**.

Providing information, training, and instruction or supervision to manage risks is an important part of a PCBU discharging their duty of care.

Another important duty is the duty to consult, cooperate, and coordinate with others where there are overlapping duties. This includes consultation with:

- workers or their representatives (e.g. a health and safety representative)
- other PCBUs
- other landowners.

2.3 Other duty holders

Other duty holders under the WHS Act include:

- **Designers, manufacturers, suppliers, and importers of plant, substances, or structures** – They must ensure, so far as is reasonably practicable, the plant or structure is without risks to health and safety. Harvesters, skidders, and chainsaws are examples of plant. Noise and vibration are common risks that can be addressed at the design stage. These'upstream' duty holders have a responsibility to the equipment's end user that the plant is designed and manufactured to operate safely within its specifications.

- **Officers, such as company directors** – They have a duty to exercise due diligence to ensure the business or undertaking complies with the WHS Act and Regulations.
  Due diligence means taking an active role in resourcing, monitoring, and maintaining the business's systems for eliminating or reducing workplace health and safety risks.
- **Workers and other people at the workplace** – They must:
  - take reasonable care for their own health and safety
  - cooperate with reasonable policies, procedures, and instructions
  - not adversely affect other people's health and safety.

Worker responsibilities include wearing required personal protective equipment (PPE), observing **exclusion zones**, and advising on any matter that may impair their ability to work safely.

Workers have the right to stop or refuse unsafe work (see Section 84 of the WHS Act) as long as they notify the PCBU and remain available for work. The health and safety representative may direct workers to cease work because of unsafe work (see Section 85 of the WHS Act), but this must be done through consultation and issue resolution processes.

The term 'other people' includes **visitors**, volunteers, and unauthorised persons in a prescribed work area.

2.4 Meaning of 'reasonably practicable'

The PCBU's duties are not absolute but are qualified by the term 'so far as is reasonably practicable'. This qualifier is applied to the responsibility to eliminate or reduce risks. To establish what is reasonably practicable, the WHS Act lists five variables the PCBU must consider:

1. *the likelihood of the hazard or the risk concerned occurring*
   Estimating likelihood can be based on what is known about a risk (e.g. how often particular risks result in injury). It must also be based on the actual circumstances of the workplace and the way work is done.
2. *the degree of harm that might result from the hazard or the risk*
   Accounting for the degree of harm means looking at what injuries or incidents could result from the hazard, how many people might be affected, and how widespread the effects could be.
3. *what the person concerned knows, or ought reasonably to know, about the hazard or risk, and about the ways of eliminating or minimising the risk*
   Accounting for what a person knows or ought reasonably to know is sometimes referred to as the state of knowledge about a hazard or risk and ways of controlling it. This Code is an important part of the state of knowledge for forestry work.
4. *the availability and suitability of ways to eliminate or minimise the risk*
   Identifying the availability of ways to eliminate or minimise a risk means finding risk controls that can be bought or applied in the workplace. Risk controls are suitable if they are feasible to apply in the workplace and have been shown to be effective in similar circumstances.
5. *after assessing the extent of the risk and the available ways of eliminating or minimising the risk, the cost associated with available ways of eliminating or minimising the risk, including whether the cost is grossly disproportionate to the risk.*
   Only after all the other factors have been considered does cost get taken into account. Risk controls should be implemented unless the cost is so disproportionate to the benefit (in terms of reducing the level of the risk) that it would be clearly unreasonable to require the expenditure.

For more information on the concept of 'reasonably practicable', refer to the WorkSafe Western Australia *interpretive guideline How to determine what is reasonably practicable to meet a health and safety duty*.

2.5 WHS Regulations

While the WHS Act outlines general duties, the *Work Health and Safety (General) Regulations 2022* provide more details about how to manage hazards and risks.

Responsibilities for identifying hazards, assessing risks, and controlling risks are outlined in the WHS Regulations. The regulations cover specific measures for hazards such as noise, manual handling, isolated workers, **hazardous chemicals**, confined spaces, driving commercial vehicles, falls, construction work, and plant. There are also details for how workplace consultation is to be conducted.

The requirements of the WHS Regulations must be met. What is required is often qualified by 'so far as is reasonably practicable'. But in some cases, a regulation is absolute, like the requirement to report a **notifiable incident** or to provide access to a safety data sheet to a worker using a hazardous chemical.

The WHS Regulations relevant to forestry work are referenced in later sections of the Code.

2.6 Shared or similar duties

Often in forestry operations, several PCBUs are working in a common workplace and thus may hold similar duties at the same time. Where multiple PCBUs (e.g. harvesting contractor, haulage contractor, and forest manager) hold duties at the same time, each PCBU will retain responsibility to minimise risks to the extent to which they have a capacity to influence and control the matter. A PCBU cannot contract out of their workplace health and safety obligations. Once control or influence exists, a PCBU owes an obligation to their contractors.

Control includes both legal and practical control. Practical control exists if a PCBU decides to give a direction to a person and this direction is acted on. The nature of the legal relationship and the control a PCBU can exercise will affect how much they are required to do. Engaging expert contractors and verifying that a contractor manages risks may be viewed as taking reasonably practicable steps to discharge a duty.

An example of a direction is where a landowner requires compliance with their PPE rules as a condition of entering a forest but does not have a direct contract. To discharge their duty, the landowner would need to check that the forest manager or contractor has a way of conveying this policy to visitors, such as through induction records.

To understand these situations, duty holders should refer to Section 16 of the WHS Act, which states that duty holders:

> "… must discharge the person's duty to the extent to which the person has the capacity to influence and control the matter or would have had that capacity but for an agreement or arrangement purporting to limit or remove that capacity."

Where several parties share a duty and legal responsibility needs to be determined (e.g. after an incident), the facts of the situation will be used to make that determination. This would normally include the ability of the parties to control the outcome, along with foreseeability and practicability issues.

For example, a subcontractor who comes on to the site to maintain machinery has direct control of the safety of any specific maintenance task. Actions to meet this duty include:

- carrying out the work in a safe manner (e.g. de-energising electrical equipment)
- following site safety procedures
- remaining in the safe work area and only entering other zones when called in by the person operating in that zone.

The principal contractor has control and influence of where the maintenance takes place and is responsible for safe work areas to protect the people doing the work. Actions to meet this duty include:

- ensuring the subcontractor is familiar with access and communication protocols
- ensuring the subcontractor is aware of and follows separation distances
- providing a safe work area where repairs can take place (e.g. an open area).

The forest manager or landowner does not directly control or influence the safety of the maintenance subcontractor's work but still has duties. The forestry manager or landowner holds the duty of a PCBU who manages or controls a workplace. Section 20(2) of the WHS Act states:

> "The person with management or control of a workplace must ensure, so far as is reasonably practicable, that the workplace, the means of entering and exiting the workplace and anything arising from the workplace are without risks to the health and safety of any person."

A specific duty in this case would be the safety of access roads and associated signage. These elements affect the safety of the subcontractors as they enter and exit the site. Thus, a duty holder's level of control will vary even though they hold the same duty concurrently.

Finally, although a worker does not have the duties of a PCBU, they still have a responsibility to follow safe work procedures and not put others at risk. An example of meeting this responsibility would be operating equipment within the maintenance safe zone.

3 CONSULTATION, COOPERATION, AND COORDINATION

3.1 Duty to consult

Part 5 of the WHS Act outlines the duty to consult with workers and others such as landowners, forest managers, and contractors.

As *Section 2* noted, duty holders may share duties to provide a safe workplace.

This section examines situations where consultation, cooperation, and coordination are essential in achieving safe outcomes.

3.2 Consultation with workers

A business must consult with workers on any matters under the business's control that may have an impact on the workers' health and safety at work. The WHS Act states that a person conducting a business or undertaking (PCBU) must consult (so far as is reasonably practicable) with workers on matters including:

- identification of hazards and assessment of risks
- decisions on risk controls
- decisions on health monitoring
- issue resolution
- decisions on proposed changes that may affect workplace health and safety.

Consultation should take place whenever there is a decision that may affect health and safety in forestry operations. Done at the planning stage, it can minimise problems on the job.

Consultation may be achieved through formal processes such as elected health and safety representatives and committees or through crew meetings at which safety issues are discussed (see *Section 3.6*).

Section 48 of the WHS Act specifies the nature of consultation to ensure:

- relevant workplace health and safety information is shared with workers
- workers are given a reasonable opportunity to express their views, raise issues, and contribute to the decision-making process on a matter
- the views of workers are considered
- workers are advised of the outcome of any consultation in a timely manner
- consultation includes the workers' health and safety representative if they have one.

The Safe Work Australia approved Code of Practice *Work health and safety consultation, cooperation and coordination* provides detailed information about consultation, particularly where workers are represented by health and safety representatives.

3.3 Cooperation and coordination with other duty holders

In forestry operations, several parties (each with WHS duties) may work together, requiring a shared understanding of hazards and risks and how to manage them. *Figure 1* illustrates how different parties may interact on a site managed by one forest manager. Safety depends on each party understanding and undertaking their responsibility.

Figure 1: Coordination with other operators

In *Figure 1*, at the entry to a coupe, the landowner has already assumed responsibilities for safe access through road construction. The forest manager and harvesting contractor establish entry protocols through signage. The log truck driver is made aware of what procedures must be followed on the road and within the coupe.

The harvesting contractor ensures the safety of the access road by implementing relevant separation distances and consults with subcontractors on any changes to initial plans. The forest manager consults with contractors to ensure appropriate onsite communication systems.

Part of the coordination task is ensuring that the chain of information about hazards, risks, and operational controls flows through the various contractors and subcontractors to the workers conducting the operation.

3.4 Coordination with adjoining operations

The importance of coordinating forestry operations applies not only within a work area, such as a **log landing,** but also where there are adjoining operations. The following example illustrates coordination issues.

A landowner engages a company for aerial spraying to control weeds. An adjoining site has silviculture workers planting trees.

The landowner needs to:

- ensure the aerial spraying contractor understands the work and area, including any hazards such as power lines
- ensure the aerial spraying contractor meets all required standards (e.g. they are licensed and qualified)
- outline the conditions for safely doing the work (e.g. wind, weather, and visibility)
- advise and consult with the planting contractor about the nature, timing, and location of spraying.

The planting contractor needs to:

- provide workers with information about the spraying work
- take action to ensure there is no exposure to workers by moving work to another location, or suspending work and moving out of the exposure zone while spraying occurs
- restart work on advice from the landowner that spraying has been completed.

The aerial spraying contractor needs to:

- account for any hazards identified by the landowner
- follow safe work procedures
- do the work according to the agreed schedule
- advise the landowner of any changes that may affect the safety of their spraying work.

This example highlights the need to coordinate activities so new hazards are not created for those working in adjoining areas. Coordination of emergency response (e.g. see *Section 13 Fire management*) is another key area for parties to work together on.

3.5 Consultation and coordination with contractors

The best safety outcome is likely to be the result of a contractor engagement process where:

- the brief is clear and practicable
- the selected contractor can demonstrate the capability and track record to complete the job safely.

A forest manager or landowner should consider the following questions when selecting and engaging contractors:

- Does the contractor understand the forest manager's/landowner's health and safety policy?
- Does the contractor have a safe way of working given the nature of the work and the hazards identified in the work plan (e.g. terrain, type of timber, and slope)?
- Is there evidence of the suitability of their staff and equipment for the work?
- Is there evidence of safe work practices to address key activities?
- Have the contractor's safety system and track record been verified?
- What is their response to workplace health and safety incidents and concerns?
- Do they have an agreed process for consulting with key personnel and for resolving issues?
- What is their capacity to monitor contractor staff health and wellbeing?
- Is the amount of operational monitoring or auditing appropriate to levels of risk and operational control?

A contractor should ensure they have the following when assessing how they can meet job requirements:

- the forest manager's/landowner's risk assessment, including information on any hazards identified
- timelines and details of any contingency arrangements where changed conditions affect those timelines
- the opportunity to inspect the site and consult with the forest manager on hazards and risks
- a clear understanding of respective workplace health and safety responsibilities
- an outline of the methods, equipment, staff, and practices they will use to meet the safety needs of the work and the health and safety policy of their client
- any independent verification of their safety performance through previous audits or relevant certification schemes
- a process to consult on and resolve any issues that affect their ability to meet relevant standards.

Health and safety performance depends on shared expectations, information, and practices. These goals can be achieved through consultation and coordination up and down the contracting chain.

The ability to consult, resolve issues, and then communicate outcomes to all involved is a critical part of a safe contracting process.

3.6 Communication at crew level

Crew meetings (e.g. toolbox talks) provide an opportunity to keep everyone informed about the work, hazards, and risk controls.

On any new work site, an initial meeting should cover issues such as:

- work plans and methods
- safe work instructions
- **safe work areas** and separation distances
- communication protocols
- emergency plans.

The initial meeting should be documented.

After work has started on the site, regular crew communication should resolve any uncertainties, provide new information relevant to the day's work, and reinforce safe work practices. In particular, communication should cover:

- any new hazards identified, such as changes in weather, ground conditions, and visibility
- any concerns about safety or issues that have arisen
- problem-solving for any issues of concern
- information about any new workers, contractors, or visitors
- confirmation of safe work areas
- advice on any change to operations.

Crew communication should also allow workers to speak up about any safety concerns so they can be resolved.

The common hazard files in *Section 14* provide guidance about issues that could be discussed at crew meetings.

4 RISK MANAGEMENT IN OVERVIEW

Risk management is a process to help manage workplace health and safety and comply with the law.

Both the WHS Act and the WHS Regulations require the identification of hazards, assessment of risks, and development of controls to eliminate or reduce risk so far as is reasonably practicable.

The objective of this process is to provide the 'highest level of protection at work so far as is reasonably practicable'. *Figure 2* below shows the risk management process.

Figure 2: Overview of the risk management process

The four-step process includes identifying hazards, assessing risks, controlling risks, and reviewing controls. It is underpinned by consultation, cooperation, and coordination (see *Section 3*). It is the foundation for, and drives, any health and safety management system.

The elements of the process are outlined in the sections that follow. For more detail, refer to the Safe Work Australia approved Code of Practice *How to manage work health and safety risks.*

4.1 Common terms

A **hazard** is something in the work environment that has the potential to harm the health and safety of people. In forestry operations, key hazards include falling branches, irregular ground conditions, and steep slope work.

A **risk** is the chance (or likelihood) that a hazard will cause harm to the health and safety of people. Harm could be the death of a person exposed to the hazard, or an injury, illness, or disease they suffer as a result. In forestry operations, risks include death or injury caused by equipment rollover or falling branches.

A **risk assessment** is a way of estimating the nature and level of risk. Working out what could cause harm and how serious that harm could be provides the basis for deciding what risk controls are required.

A **risk control** is a prevention measure that either eliminates a hazard or risk or reduces it so far as is reasonably practicable. In forestry operations, risk controls include safe work areas, protective structures, and tag out and isolation procedures for plant maintenance.

4.2 Hazard identification

The WHS Regulations state that a person conducting a business or undertaking (PCBU) has a duty to identify hazards, control risks, ensure controls remain effective, and review controls where necessary.

For the first step, hazards can be identified by methods such as:

- walk-through inspections
- hazard checklists
- consultation
- reviews of equipment operating instructions.

In many cases, once a hazard is identified, known and effective controls can be applied immediately. This principle is shown in *Figure 2* as **'known risks and controls'.**

For these well-known hazards, regulations may mandate what must be done (e.g. de-energising equipment before maintenance) or codes of practice may recommend established and effective controls that should be used (e.g. separation distances).

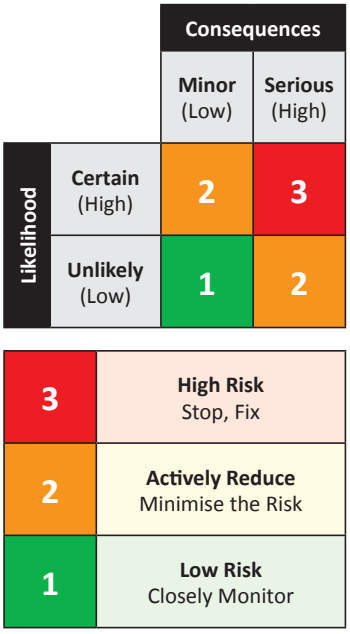
4.3 Risk assessment

Risk assessment is used to develop an understanding of the risks and their importance to work out the best way to eliminate or reduce risks. Many WHS Regulations set out the factors to consider in this step. These are effectively the basis of the risk assessment.

It is common in the assessment of risk to plot the likelihood (probability) and the level of harm (consequence) on a risk matrix.

An example is shown in *Figure 3*, which follows.

Figure 3: Example of a risk matrix



This risk matrix can help with prompt decision-making to find the highest level of protection for each situation. Here are two example scenarios.

If a risk has a high likelihood of occurring and serious injury as an outcome, it would be rated **3** and require immediate action to stop or fix the problem. This would be the case, for example, if hazardous trees are present in the working zone.

If weather and ground conditions are changing and might compromise the operation of certain equipment, the risk could be rated **2** and options to minimise the risk should be considered.

4.4 Risk controls

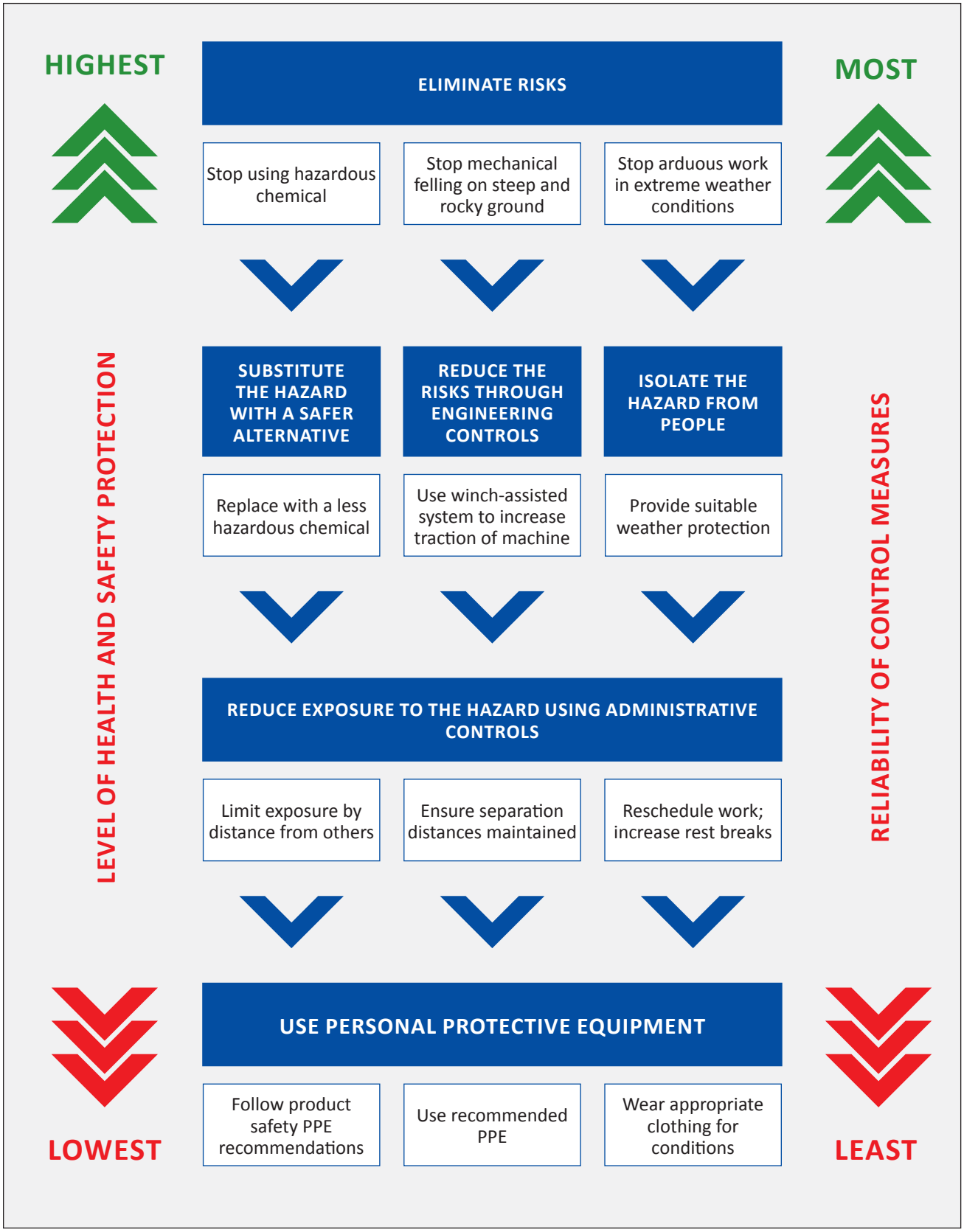
Risk assessments aim to identify risk controls that will achieve the highest level of protection so far as is reasonably practicable. What is meant by the highest level of protection is best described by the 'hierarchy of control'.

The hierarchy of control begins with eliminating the risk. If this is not practicable, other options must be considered – from substituting safer alternatives and designing out risks down to adopting administrative procedures and using personal protective equipment (PPE). In practice, a combination of risk controls may be required.

The principle behind the hierarchy of control is that risk controls that depend on individual behaviour are less reliable than risk controls that engineer or design out risks. In some cases, a regulation will prescribe the hierarchy that must be followed.

The hierarchy in *Figure 4* was extracted from the Safe Work Australia approved Code of Practice *How to manage work health and safety risks*. It has been matched with some examples from forestry operations.

Figure 4: The hierarchy of control with forestry operations examples



4.5 Review of risk controls

Once risk controls are in place, effective risk management requires that they be monitored to see if they are operating effectively and that circumstances have not changed. Similar methods to those for hazard identification can be used to check the effectiveness of controls.

Other situations should prompt a review of risk controls, including:

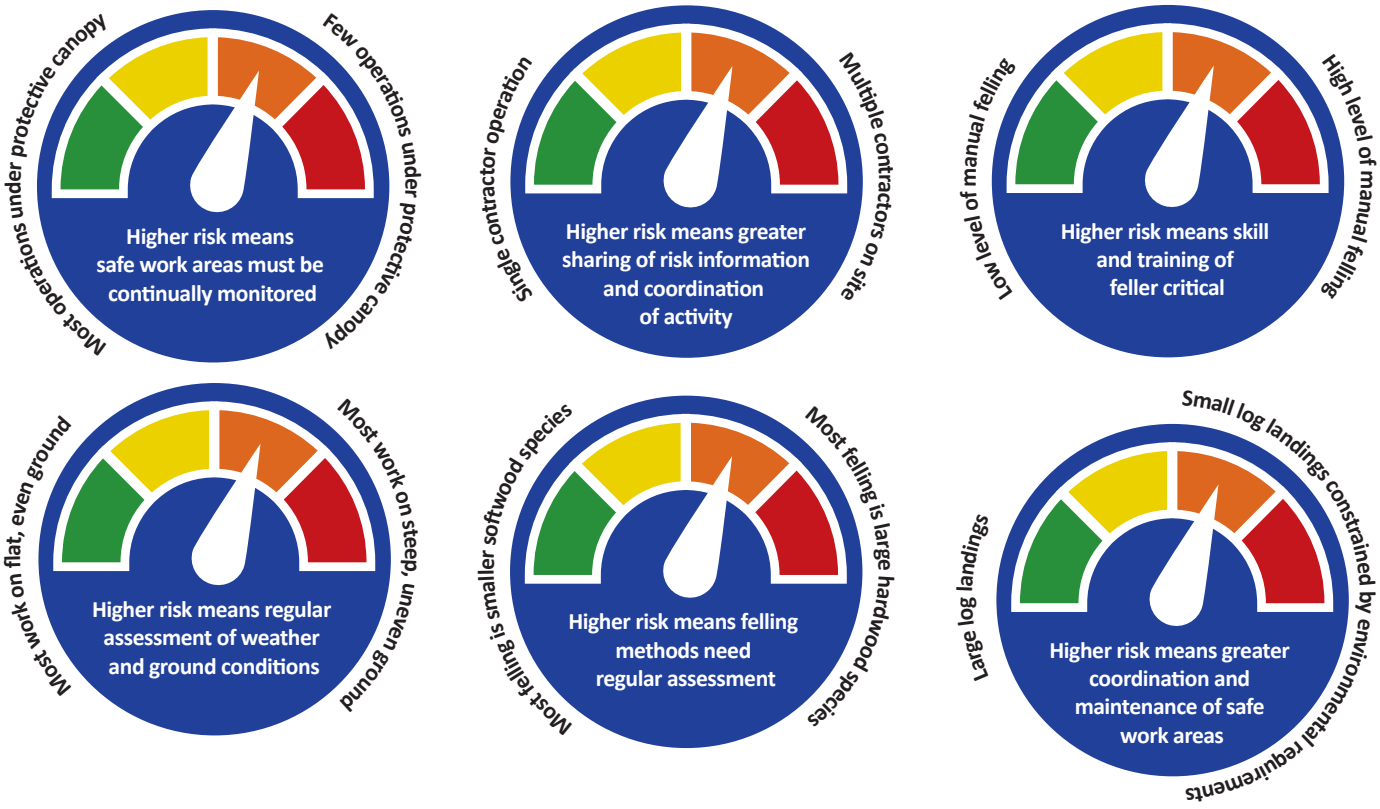
- an unplanned circumstance like a vehicle breaking down or machine getting bogged
- an incident, regardless of injury
- audit findings showing failures or non-compliances
- a notice from the regulator
- workers or others raising concerns about the effectiveness of controls
- changes to competency standards or the ability of current workers to meet them
- new information from manufacturers and suppliers about substances or equipment that could impact the effectiveness of current controls.

4.6 Levels of risk to be managed in forestry operations

It is important to understand what level of risk has to be managed and what the implications for managing that risk are.

The level of risk is illustrated in *Figure 5* with examples found across most forestry operations.

Figure 5: Understanding levels of risk and implications for risk management



Risk management efforts will vary with the level of risk. High levels of risk mean a business will rely more heavily on risk management to determine how the risk can be reduced. This will be reflected in a health and safety management system and influence the nature and detail of documentation required for compliance.

4.7 Use of risk management process

WHS Regulations may require risk management and specific elements such as risk assessments. The process is needed in other situations, such as when:

- developing a health and safety management system and site safety plans
- managing a high-risk situation such as removal of hazardous trees
- assessing a newly identified hazard
- purchasing new equipment
- working with contractors or subcontractors
- doing an activity in a new or changed environment
- responding to incidents
- justifying an alternative to a Code recommendation, such as a purpose-specific exclusion zone
- planning for new methods and technologies.

4.8 Documentation

The results of risk management activity should be documented. In some cases, WHS Regulations will require certain records, such as a register of hazardous chemicals, lists of applicable safety data sheets, or emergency plans.

Documentation is also a basic element of a health and safety management system. It enables:

- a duty holder to demonstrate how decisions were made about what is reasonably practicable
- induction and specific training to be targeted at key hazards
- effective safe work procedures to be prepared
- new staff to understand why risk control decisions have been made
- the approach to managing risk to be demonstrated to others (e.g. a regulator, auditor, or company issuing a tender).

The level of record-keeping will vary according to the size and complexity of the operations and the breadth and nature of the risks managed.

PART TWO

PLANNING AND PREPARATION

5 PLANNING FOR FORESTRY OPERATIONS

6 RISK MANAGEMENT ESSENTIALS

5 PLANNING FOR FORESTRY OPERATIONS

Planning for forestry operations has three levels.

The first and highest level relates to the **plan for the harvesting process**. Here the roles and responsibilities of those in the production cycle should be outlined and understood. Planning is longer term and defines the type of operations to be conducted and the intrinsic safety issues to be encountered.

The second level is the **health and safety management system**, which outlines the policies and procedures operators use in all their work. The system may be codified in a company manual and procedures. The system needs to be commensurate with the risk of the work activities.

Different terms may be used to describe a health and safety management system. The Forest Products Commission, for example, uses 'safety management plan (SMP)'. The terms 'safety system' and 'safety plan' often describe the way a company has organised its measures to manage risk.

The third level relates to the work site where harvesting operations take place and where a **site safety plan (SSP)** is applied. The SSP translates the higher-level planning information and the operation-specific systems and procedures to a particular location and activity.

The best safety outcomes will be achieved where each planning level is coordinated and consistent in its approach to managing risks.

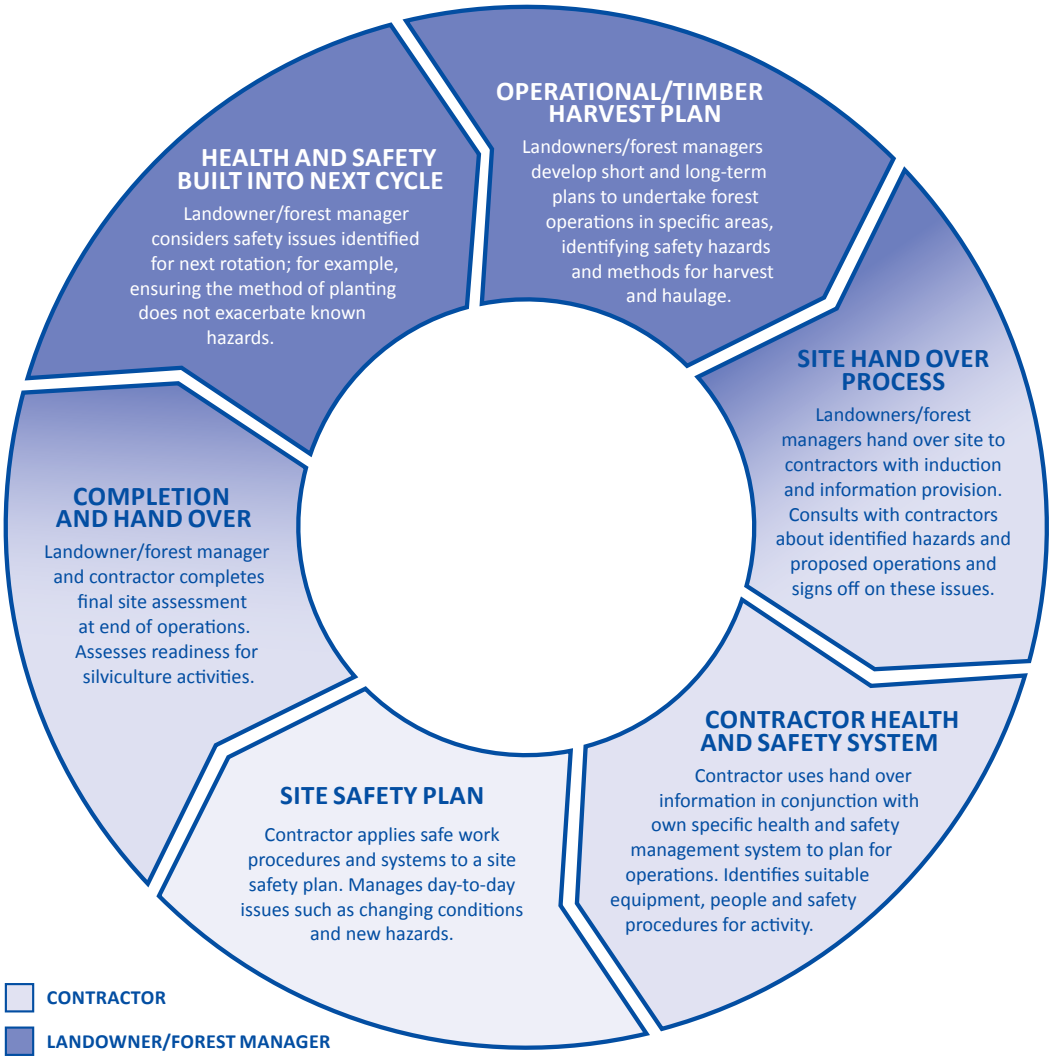
5.1 Planning throughout a forestry operation

Different duty holders have different planning responsibilities throughout a forestry operation – from the planning stage to the operational stage. These include the:

- environmental and other constraints on the operation
- longer-term planning responsibilities of landowners and forest managers
- operational planning responsibilities of landowners and forest managers, including identifying site-specific hazards
- contractor responsibilities, including following site-specific safety procedures and applying their own procedures to manage their activities (e.g. selecting suitable equipment and personnel)
- completion and hand over responsibilities, which bring the cycle back to the planning stage as hazards and issues found are recorded for future operations.

Figure 6 shows the different planning stages throughout the operational cycle of a forestry operation.

Figure 6: Roles in the planning cycle



5.2 Responsibilities for landowners

As a person conducting a business or undertaking (PCBU), the landowner should ensure operations are well planned. This includes considering issues that will affect work tasks, such as:

- location of roads and log landings
- timing of harvesting
- any environmental constraints
- higher risk forest types (e.g. fire damaged trees)
- suitability of methods and equipment.

They should provide information to forest managers or contractors on known hazards such as infrastructure, slope, soil type, and tree hazards.

If the landowner is engaging contractors, the responsibilities in *Section 5.3* also apply.

5.3 Responsibilities for forest managers who engage contractors

As a PCBU, the forest manager should pass on information about hazards and planning issues to contractors and ensure:

- hazards identified by landowner have been risk assessed
- contractors are selected who meet workplace health and safety requirements and are suitable for the type of work
- contractors are fully consulted and given the opportunity to assess how operations can be done safely at hand over stage
- work can be done safely in the allocated time
- organisation-wide emergency procedures have been established
- a site-wide traffic management plan is in place
- the health and safety performance of contractors is monitored.

5.4 Responsibilities for contractors

As a PCBU, the contractor must plan to safely complete the agreed tasks. These might include preparing the site, planting or **felling** trees, and extracting, processing, and transporting product from the **coupe**.

The contractor must address hazards identified during the forest manager's hand over in a site safety plan.

The contractor's health and safety management system should also ensure:

- workers are suitably trained and equipped to do the job safely
- information on hazards such as chemicals is accessible to users
- safe work procedures are applied to the specific risks of their operations
- workers are consulted on risks, safe work practices, and any changes to such practices
- plant is suitable for the task and able to be operated within its safe working limits
- work is actively supervised and monitored
- a safe working environment is maintained
- plant is regularly inspected and maintained
- specific communication and emergency procedures are established and tested
- suitable first aid and amenities are provided
- incidents are reported, investigated and recorded.

5.5 Planning with a health and safety management system

A health and safety management system is a methodical way of managing, documenting, and verifying how the PCBU manages risk.

For a forest manager or contractor, it details how the identified hazards and associated risks of the operation are to be managed. It is a planned and repeatable method that is reflected in allocated roles and responsibilities, safe work procedures, and use of trained staff and suitable equipment. A system can range from a formally documented system (e.g. certifiable system) to a fit-for-purpose contractor manual.

Any system should be commensurate with the risks to be managed (see *Section 4.6*) and focused on the critical hazards of forestry operations (see *Section 6.1*).

All the elements listed here are detailed in *Section 6 Risk management essentials for all forestry operations,* particularly *Section 6.2 Risk control essentials* and *Section 6.3 Risk management supports*.

A health and safety management system should be in an accessible form for its users. For example, safe work procedures must use a format and language that everyone understands. The system should also be reviewed by those who depend on it.

Figure 7 illustrates the elements of a health and safety management system.

Figure 7: Elements of a health and safety management system

A health and safety management system is the foundation for activity or job-specific procedures, rules, and directions. Safe work procedures detail how risks are to be managed and include specific risk controls for workers to apply. These are the basic documents in any health and safety management system. See *Figure 8* for a sample format.

Figure 8: Template for a safe work procedure (worked example)

	SAFE WORK PROCEDURE CONTRACTOR SAMPLE		
	SAFE WORK PROCEDURE – EXCAVATOR OPERATION		
	Version:	Reviewed: ../../..	Page 1 of 3

OPERATION SCOPE	
Set out the tasks to be undertaken, such as: Operator must: ▪ Debark the logs, then stack, segregate, and load them onto log trucks. ▪ Cross-cut logs to maximise the value harvested from the coupe. ▪ Perform daily maintenance including checking fluid levels, refuelling, adding oils, and cleaning tracks and cabin. ▪ Do minor repairs including repairing hydraulic hoses and changing beak attachments.	
GENERAL RULES	
Set out any basic rules, such as: No item of plant or equipment is to be used if: ▪ It is tagged with a 'Do Not Operate' tag. ▪ Its scheduled maintenance date has passed. ▪ It is considered unsafe by the person who is to use it. ▪ The person who is to use it has not been trained in its use.	
COMPETENCIES **No person will do this job, task or activity unless they meet specified competency standards.**	
Include relevant operator competency reference, such as: FWPHAR3225 Operate Excavator with Log Grapple	FWPHAR2209 Trim and Cut Harvested Trees
Environmental Care Certificate	Workplace Health and Safety Certificate
Contractor Induction Manual	
EQUIPMENT REQUIREMENT	
Excavator	Chainsaw, fuel container, axe, wedges, files, and plug spanner
PERSONAL PROTECTIVE EQUIPMENT (PPE) REQUIREMENTS **For additional protection, you must wear the following PPE.**	
Safety helmet while working outside the machine	**Safety footwear**
Safety gloves: ▪ Leather gloves when handling chains and ropes ▪ PVC gloves when handling fuels and oils	**High-visibility clothing**
	Eye protection when using a chainsaw
	Cut-resistant leg protection when using a chainsaw

	SAFE WORK PROCEDURE CONTRACTOR SAMPLE		
	SAFE WORK PROCEDURE – EXCAVATOR OPERATION		
	Version:	Reviewed: ../../..	Page 2 of 3

EXCLUSION ZONES AND SAFE WORK ZONES

You must keep people out of your exclusion zone to ensure that you do not cause a striking or crushing injury to other people and machines. If anyone enters your work zone, you must cease operations immediately.

You must not enter into anyone's exclusion zone without requesting and receiving permission to enter via the UHF radio.

Set out exclusion zones and safe work zones for particular tasks and settings where the use of this equipment interacts with other operations (e.g. log landing).

Example

Log processors, log graders, supervisors and other workers	Ensure no-one enters an area described by the full swing radius, plus the log length in the beak, while the machine is operating. Where practical, ensure there is a physical barrier (e.g. log stack or another machine) between the area where these people work and your work area. If this is not practical, they should be no closer than 30 metres to your point of operation, in case debris or a chain link flies from your cut off saw.

COMMON HAZARDS:
List the hazards most likely to cause injury during this task and what you need to do to protect yourself.

Refer to the Code sections on common hazards and on specific operations (e.g. harvesting or log extraction).

TASK EXAMPLE	HAZARD	CONTROL
Climbing in and out of operating cabin or onto back of machine.	Slips, trips, and falls.	▪ Ensure all handrails and steps are in good condition and report any problems on the pre-operational checklist. ▪ Ensure that all non-slip surfaces are in good condition. ▪ Keep steps and cabin clean and regularly remove any build-up of mud. ▪ Ensure you have 3 points of your body in contact with the machine when you climb in and out. (see Photo)

	SAFE WORK PROCEDURE CONTRACTOR SAMPLE		
	SAFE WORK PROCEDURE – EXCAVATOR OPERATION		
	Version:	Reviewed: ../../..	Page 3 of 3

SUPPORTING DOCUMENTS **All operations must be done in line with the following documents.**		
All decals (stickers) attached to machinery		
Operator's manual for excavator Operator's manual for chainsaw		
FIFWA Forestry Safety Code (2024)		
Safety data sheets for:		
Diesel, hydraulic oil, 2 stroke, and engine oil		
RECORD-KEEPING REQUIREMENTS **Please indicate which records need to be kept.**		
Set out any record-keeping requirements, such as: ▪ *risk assessments for high-risk areas like log landings* ▪ *required equipment checklists like a daily plant checklist or chainsaw checklist.*		
001	First edition	DATE
Authorised by:		Manager's name
This document will be formally reviewed every three years and ad-hoc changes will be made based on audits, incident investigations, or suggestions from toolbox meetings. All changes must be authorised by the named manager.		

At an industry level many forest managers and contractors have adopted the Safe and Skilled Life Saving Commitments, which aim to improve worker compliance and change safety behaviours. These could be adopted and addressed in standard induction procedures.

In *Section 15.5*, each commitment is cross-referenced with supporting parts of this Code.

6 Risk management essentials
6.2.2 Exclusion zones and safe work areas
14.3 Hazardous trees

The '**Never** work near hazardous trees' commitment is shown with the sections of the Code that support this commitment.

Section 6 identifies hazardous trees as a **critical hazard** that must be managed in all forestry work. This is supported through training, communication protocols, felling techniques, and safe work procedures.

Section 6.2.2 Exclusion zones and safe work areas outlines the ways workers can be protected through separation methods and reference to site safety plans.

Section 14.3 Hazardous trees outlines the characteristics of such trees, with associated risk factors and risk controls.

5.6 Site safety plans

A site safety plan (SSP) is a written plan that brings the planning process to a particular location at a particular time.

It covers the specific activities that the contractor will perform at a specific work site. It aims to protect the health and safety of workers, authorised visitors, contractors, and other people on that site.

An SSP's purpose is twofold. First, it should identify potential site hazards. Then, it should specify safe work procedures to mitigate those hazards and prevent accidents and injuries.

It should begin at the harvest plan or operational stage where the landowner and forest manager outline:

- the hazards and risks of the site
- the people, equipment, and processes required to complete the work in a safe and healthy way.

Initial information about site-specific hazards and risks should be passed on to any contractors in the hand over stage. As shown in *Figure 9*, the contractors in turn apply that information to their own SSP. The plan should really act like a passport that outlines conditions of access and operation, and the emergency response.

Figure 9: Information flow through planning and operational stages

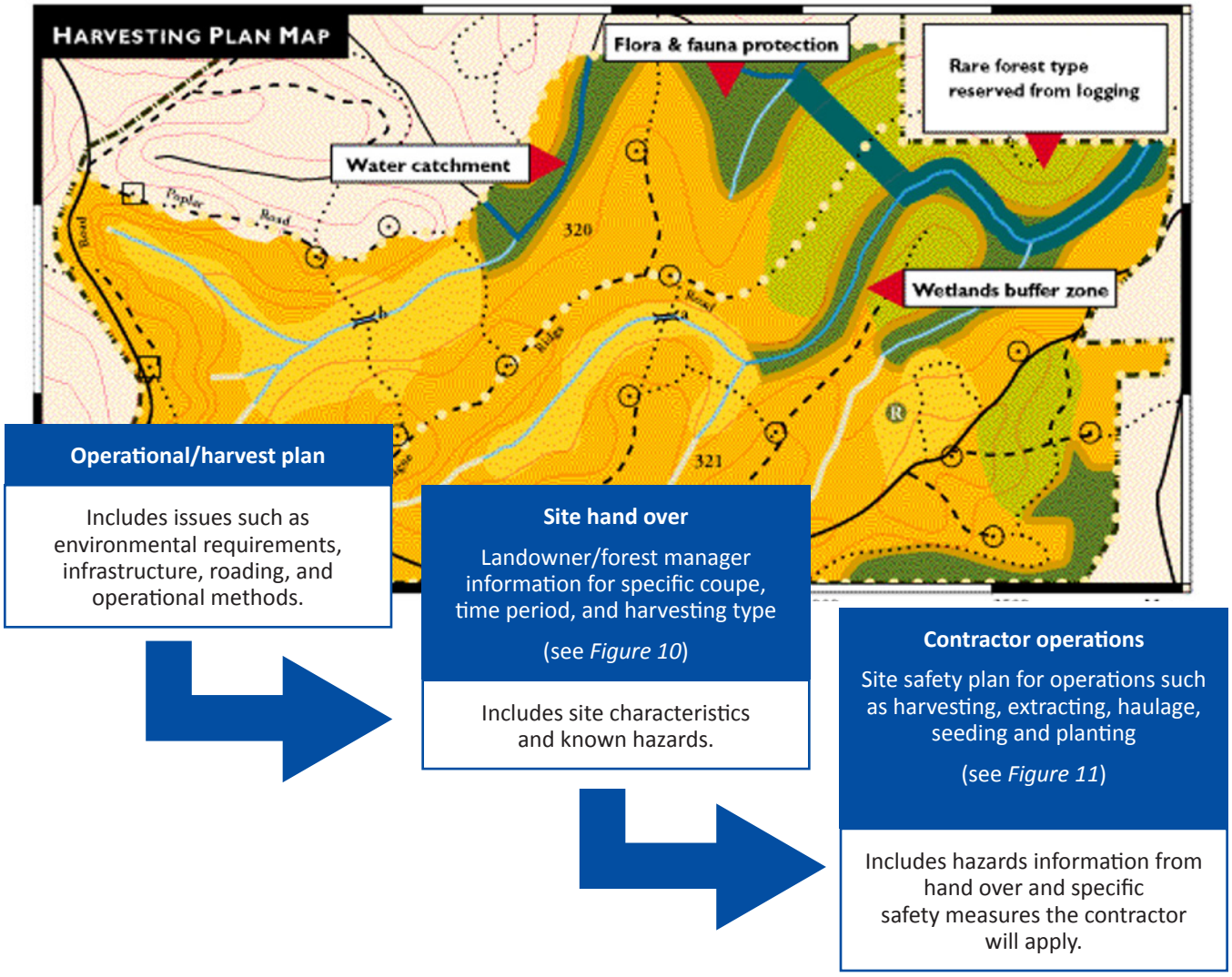


Figure 10 shows a sample of site hand over information. It gives examples of the hazards and risks that a landowner or forest manager should account for before work starts. Critical hazards, common risks, and essential risk controls should be covered in the hand over information.

Figure 10: Template for site handover (worked example)

PROPERTY DESCRIPTION		EMERGENCY MEETING POINT (EMP)	
PROPERTY NAME:		**JUNCTION:**	
LOCATION:		**LATITUDE:**	**LONGITUDE:**
LATITUDE:	**LONGITUDE:**	**MAP REFERENCE:**	
COUNCIL/SHIRE:		**RECEPTION LOCATION:**	

DIRECTIONS TO EMP	

SITE-SPECIFIC HAZARDS		
HAZARD ⚠	**ASSESSMENT AND CONTROLS** ✅	**RESPONSIBILITY/COORDINATION**
Uneven and rocky ground	• Assess the suitability of operations to the ground conditions. • Incorporate this assessment into operational plans (e.g. for harvesting and extraction).	Landowner or forest manager.
Steep slopes	• Assess the suitability of operations to steep slopes , including identifying suitable methods to safely complete the work (e.g. winch-assisted extraction). • Incorporate this assessment into operational plans (e.g. for harvesting and extraction).	Landowner or forest manager.
Overhead power lines	• Ensure operators are aware of the location of power lines, as identified by landowner or forest manager. • Also ensure operations stay clear of these power lines and/or take place within defined safe zones.	• Forest manager to identify and inform contractors. • All to observe safety procedures.
Hazardous trees	• Provide the location of known hazardous trees to operators before work starts. • Identify these locations on coupe maps.	• Forest manager to identify hazardous trees and inform contractors. • Contractors to incorporate in site safety plan.
Underground utilities	• Ensure operators are aware of the location of utilities, as identified by landowner or forest manager and ensure operations do not impact on utilities.	• Forest manager to identify utilities and inform contractors. • Contractors to incorporate in site safety plan.
Boundaries of neighbouring properties	• Ensure operators are aware of the location of boundaries and suitable separation distances are maintained. • Use signage to advise of operations.	• Forest manager to identify and inform contractors. • All to observe safety procedures.
Access points, tracks, roads, and bridges	• Ensure operators are aware of the location of access points to the coupe and any roads and bridges within the coupe. • Use suitable signage and access control.	• Forest manager to identify and inform contractors. • All to observe safety procedures.

Figure 11 shows a sample site safety plan for a contractor. It incorporates contractor-specific issues as well as the information provided by the landowner or forest manager.

Critical hazards, common risks, and essential risk controls should be addressed in the SSP.

Figure 11: Template for a contractor site safety plan (worked example)

PROPERTY DESCRIPTION		EMERGENCY MEETING POINT (EMP)	
PROPERTY NAME:		JUNCTION:	
LOCATION:		LATITUDE:	LONGITUDE:
LATITUDE:	LONGITUDE:	MAP REFERENCE:	
COUNCIL/SHIRE:		RECEPTION LOCATION:	

DIRECTIONS TO EMP	

SITE-SPECIFIC HAZARDS		
HAZARD ⚠	ASSESSMENT AND CONTROLS ✓	RESPONSIBILITY/COORDINATION
Hazardous trees	• Risk assess the removal of hazardous trees and manage these operations with safe work procedures. • Manage operations near hazardous trees with separation distances and signage to protect ground workers.	Contractor to include information from forest manager in site safety plan (SSP) and coordinate with other contractors on site.
Overhead power lines	• Only work near power lines after a risk assessment. • Follow network regulators' 'No Go Zone' requirements and specific operation safe work procedures.	Contractor to include information from forest manager in SSP and apply safe work procedures.
Log measuring and marking	• Risk assess traffic flow in work area, separation distances between operations, and the communication system. • Manage work patterns and traffic flows, establish exclusion zones and safe work areas, and maintain radio communication between ground workers and machine operators.	Contractor to include in SSP and coordinate with other contractors on site.
Falling timber and other debris and objects during seed collecting	• Risk assess the scheduling of seed collection relating to other operations and the separation distances between operations. • Establish exclusion zones and safe work areas, maintain oral and visual communication with other workers, and establish and maintain relevant warning signage.	Contractor to include in SSP and coordinate with other contractors on site.
Slips and trips on debris from previous tree crops or uneven terrain	• Risk assess ground conditions following particular harvesting methods, site preparation and debris from previous rotation (e.g. windrowing or mechanical cultivation). Consider the type and size of planting stock. • Review site for hazards before work starts, use a machine to carry stock to the planting site and use safety footwear.	Contractor to include in SSP and apply safe work procedures.
Hazardous trees near proposed road	• Assess nature of trees and distance to road. • Remove hazardous trees within 2 tree lengths of proposed road using safe method.	Contractor to include in SSP and coordinate with other contractors on site.

6 RISK MANAGEMENT ESSENTIALS FOR ALL FORESTRY OPERATIONS

Section 4 outlines the basics of risk management. In this section, the essential elements of risk managements across all forestry operations are defined. Regardless of type of operation – be it harvesting, extraction, weed control, planting or another activity – there is a baseline risk profile for all forest workers.

6.1 Critical hazards, common risks, and essential controls

Landowners, forest managers, and contractors have responsibilities to manage risk at various stages in the planning and production cycle. However, a baseline of hazards, risk factors, and risk controls applies to all aspects of forestry operations. These are listed below.

- The **critical hazards** are based on injury and incident data as well as the knowledge and experience of forest operators. They have the most potential to cause death or injury.
- The **common risk factors** are likely to explain the nature of the risk and influence the likelihood and potential harm of the critical hazards.
- The **essential risk controls** are the general categories of measures that will individually, or in combination, eliminate or minimise risks so far as is reasonably practicable.

These risk management essentials are the baseline in all the guidance on specific forest operations in *sections 7 to 13.*

Hazardous trees and falling objects (e.g. limbs, dry stags, dead and brittle tops, hollow trees, and **widow makers)**

Sloping, rough, uneven, and unstable terrain

Rolling logs, sliding logs, or materials under tension

Breach of exclusion zones and separation distances by ground workers, mobile plant, or falling trees or objects

Objects ejected or released from machinery (e.g. chain shot)

Proposed pattern of work (e.g. felling and extraction method) **or layout of cultivation lines for site preparation**

Steepness of slope, length of slope, soil condition, debris, stumps, and holes

Location of workers and other operations

Current and forecast weather conditions affecting ground conditions, visibility, and worker fatigue

Effectiveness and reliability of communication systems

Safe work practices achieved through relevant training and competencies, licences, PPE, and readiness for work policies (see *Section 6.2.3*)

Equipment designed for the task and operated within specifications (see *Section 6.2.1*)

Exclusion zones and safe work areas to separate workers from operational and forest hazards; physical barriers, distance, or time-based means of separation (see *Section 6.2.3*)

Communication systems for site access, such as signage, for communication between operators in machines and on the ground, and for emergency and evacuation situations (see *Section 6.2.4*)

Each health and safety management system and site safety plan should refer to these risk management essentials. They should also be communicated throughout the production cycle.

Each section on forestry operations (e.g. harvesting, extraction, or planting) outlines activity-specific hazards and risk factors. Risk controls are also customised to the operations and circumstances (e.g. type of competency, separation distances, type of equipment, and work method).

These additional hazards, risks and controls are indicated by the following icons:

Activity-specific hazards

Activity-specific risk factors

Activity-specific risk controls

6.2 Essential risk controls

6.2.1 Equipment designed for the task and operated within specifications

Equipment and tools should be selected with the help of designers, manufacturers, and suppliers. They all have duties to provide plant that is fit for purpose and designed to operate safely.

The purchaser should describe the intended use, operating conditions, and likely site hazards to the supplier. In turn, the supplier should determine suitable equipment for the purchaser to consider.

Common design and operational issues include:

- protective devices and structures to keep operators safe (see *Section 15.1 Protective structures for forestry machines*)
- cabin protection (e.g. reinforced glazing to protect the operator from chain shot)
- compliance with Australian or overseas design standards, including for any attachments for plant or tools
- compatibility of attachments
- suitability for the intended terrain and use
- ergonomic features (e.g. working posture, cabin visibility, noise, and vibration)
- cabin access that minimises the risk of falls when the operator is entering and exiting
- guarding of hazardous machinery components.

Machine operators should hold a **statement of attainment** in relevant **units of competency** (see *Section 15.4*). They must be trained in the working limits of the machinery and in techniques for different tasks and ground conditions.

6.2.2 Exclusion zones and safe work areas

In forestry operations, a failure to separate activities that create risks to others can result in death or serious injury. Risks arise in situations such as:

- ⚠ workers being impacted by adjacent operations
- ⚠ workers being impacted by machinery on a log landing
- ⚠ truck drivers being impacted by log loading.

An **exclusion zone** is a designated area that everyone but the operator is excluded from. Uncontrolled or unplanned entry into the exclusion zone puts each party at risk. On some sites, an exclusion zone is used to separate everyone, including the operator, from hazardous trees or from power lines.

An exclusion zone can be established by:

- defining a **separation distance** – the common separation distance is two lengths of any tree being fallen or snigged
- creating a **physical barrier** – for example, a non-operational machine might be parked between ground workers and other working machines
- scheduling activities at **different times** – risks are reduced by scheduling different parts of the process at different times. For example, a log landing is constructed before other activities start.

An exclusion zone can only be entered when the person is called in by the zone 'owner'. This involves visual recognition and radio communication or other signalling. The activity must stop before the person enters the zone. It can be restarted by radio communication or other signalling.

A **safe work area** is a designated area outside another operator's exclusion zone. Examples include an area on a log landing for maintenance, for the log truck driver during loading, or for log measuring. The same methods of distance, physical barrier, and time are used to define safe work areas.

In the case of separation distances, the common measure is two tree lengths. This may not always be practicable, particularly on landing sites with limited space or where equipment features such as boom size and arc are more relevant. In these situations, a risk assessment should be done to establish an agreed and documented plan that achieves the highest level of protection that is reasonably practicable.

Such plans should demonstrate safety is maximised as follows:

- Work occurs under protective structures where possible, and workers use radio protocols when leaving that protection.
- Reliable radio communications to enable people outside a canopy to advise where they are and when they have moved to a different location.
- A relevant safety factor is used for equipment, such as twice the boom length or boom arc.
- Suitable signage and traffic control is in place.
- Anyone who must follow the plan has been consulted and given it their sign-off.

6.2.3 Safe work practices

Safe work practices are achieved through relevant training and competencies, licences, **PPE**, and readiness for work policies.

The person conducting a business or undertaking (PCBU) must ensure workers who perform hazardous work in forestry operations have the relevant competencies to carry out their job safely.

All workers are expected to hold a **statement of attainment** for a unit of competency or equivalent that provides a general understanding of health and safety in their workplace so they are aware of the general hazards of forestry operations.

All workers should hold a statement of attainment for a relevant unit of competency when undertaking any potentially hazardous activity. In forestry, hazardous activities include tasks that involve:

- using handheld motorised plant (e.g. chainsaw)
- operating heavy machinery (e.g. feller buncher)
- driving log trucks.

Section 15.4 sets out the units of competency that describe relevant performance standards for workers in potentially hazardous forestry operations. These are minimum standards and recognise pre-existing qualifications that are supplemented by relevant experience.

Competency to conduct hazardous activities is best demonstrated or verified through formal assessment by a registered training organisation. If workers do not hold a statement of attainment, they should demonstrate equivalent competency. Where access to training for specific competencies is limited or the worker has just started, there should be evidence to demonstrate in-house training and progress towards becoming competent against the relevant performance standard.

A worker can gain equivalent demonstrated competency through on-the-job training. For machinery-related competencies,

equipment suppliers can provide initial training that is supported with close supervision until the competency is formally assessed. The PCBU should have a process to evaluate the worker's competency. The process should provide detailed documented evidence that shows the development of skills or behaviours relevant to the activity the worker is employed for.

Any workers without the required minimum qualifications should be regarded as 'under training', and receive a suitable level of supervision, identified by a **competent person**.

New workers should be enrolled in relevant accredited training within six months of starting. Their training should be completed within two years. Existing workers should have their current competency reviewed periodically to ensure they are aware of the risks related to new equipment, methods, and technology.

Records of training, statements of attainment, and any related licences should be kept.

The WHS Regulations require a PCBU to provide PPE where it has been established other risk controls are not reasonably practicable.

PPE provided to workers must:

- minimise risk to health and safety
- be suitable for the work and the hazards associated with the work
- be a suitable size and fit, and reasonably comfortable, for the worker who will use it.

Even though equipment can provide protection, PPE should be worn by all forestry workers as all tasks involve some exposure to common hazards. PPE should be used with other methods of reducing risk, rather than being the only level of protection.

The required PPE by activity is summarised in *Section 15.2* and may include:

- high-visibility clothing
- a safety helmet
- safety footwear
- hearing protection
- eye protection
- safety gloves
- leg protection
- respiratory protection.

Information must be provided to workers on the proper use, storage, and maintenance of PPE.

WHS Regulations also require that workers (and others such as visitors) wear provided PPE in line with instructions and training. In addition, workers have a duty to not damage or misuse PPE. If they are aware of damage or ineffectiveness, they must report it to the PCBU. The PPE must then be replaced if damaged or ineffective.

For more information on PPE standards and the types of PPE for forestry operations, refer to *Section 15.2.*

6.2.4 Communication systems

Communication is essential to managing risk in any forest operation. In particular, methods need to cover controlling site access, communicating between operators in machines and on the ground, and managing emergencies and evacuations.

Systems include:

- suitable signage to control traffic on access roads and to mark any harvesting operations that could present a risk to others
- ultra-high frequency (UHF) radio system for access, on site, and emergencies
- a radio protocol that is documented and understood by all workers
- emergency contact numbers
- radio communications to monitor movement onto and within log landings
- protocols to manage entry into a designated work areas and, where necessary, exclusion zones.

The following checklist assesses whether current systems have these basic requirements in place. The checklist may be useful for forest managers, site supervisors and contract managers.

	Essential risk controls checklist	Yes	No	N/A
1.	**Formal training**			
1.1	Do workers have statements of attainment for units of competency relevant to the job?			
1.2	Do all workers and contractors have required licences?			
1.3	Are records of statements of attainment and licences kept on file?			
2.	**On-the-job training**			
2.1	Are workers who are yet to gain skill or equipment competency under the close supervision of a person with relevant competency and experience?			
2.2	Are workers 'in training' assessed against the performance criteria in the competency they are seeking to attain?			
2.3	Are there checks on progress and records kept of skill and experience achievements?			
3.	**PPE and first aid**			
3.1	Has training been provided on the use and serviceability of PPE?			
3.2	Has appropriate and serviceable PPE been provided for particular activities?			
3.3	Has training been provided on first aid and emergency procedures?			
4.	**Selection and use of plant and equipment**			
4.1	Is machinery suitable for the terrain and intended use?			
4.2	Has training been provided on the use and maintenance of plant and equipment?			
4.3	Can selected machinery operate within the manufacturer's specifications on the site?			
4.4	Are operator protective devices and structures fitted to mobile plant? Are they suitable for the work?			
4.5	Have manufacturers supplied information on ergonomic features (e.g. working posture, cabin visibility, noise, and vibration) of mobile plant?			
4.6	Have chainsaws and cutting heads been serviced in line with specifications?			
4.7	Has plant and equipment been regularly serviced and maintained?			
5.	**Exclusion zones and safe work areas**			
5.1	Does the site safety plan indicate exclusion zones around identified hazards (e.g. power lines and hazardous trees)?			
5.2	Has everyone on site been informed of separation distances (e.g. two tree lengths)?			
5.3	What form of barrier is used to create an exclusion zone (e.g. two tree lengths, physical barrier, time separation by scheduling)?			
5.4	Do truck drivers know where the safe work area is during loading and unloading?			
5.5	Are there methods to separate activities on log landings?			
5.6	Are there communication protocols for the zone owner to call others into an exclusion zone (e.g. radio and visual signalling)?			
5.7	Is a risk assessment done when two tree lengths is not practicable to separate activities?			
6.	**Communications**			
6.1	Is appropriate traffic control signage displayed?			
6.2	Is there appropriate signage warning of operations (e.g. tree felling) in the vicinity?			
6.3	Has everyone been informed of the oral, visual, or radio communication used on site to coordinate activities and ensure exclusion zones are maintained?			
6.4	Are UHF radio frequencies operational and channels displayed on signage?			
6.5	Are emergency contact numbers displayed and communicated to all?			
6.6	Can isolated workers maintain effective communication?			

6.3 Supports for risk management essentials

To establish risk management essentials, several supporting elements and processes are required. These should be outlined in the health and safety management system and relevant site safety plans. For example, training underpins operator competencies, induction supports safe work practices, and information provision enables hazard identification.

6.3.1 Training

Providing training is a core duty of all PCBUs as set out in *Section 2*. This responsibility includes:

- selecting workers with relevant competencies for forestry work (see *Section 15.4*)
- providing training to nationally endorsed standards with training and assessment conducted by a registered training organisation
- providing induction training to new workers on and off the job
- providing training in company-specific policies and procedures
- keeping records of training, competencies, and licences.

6.3.2 Induction

Induction is necessary for new workers and should cover:

- hazards they are likely to face
- contractor and forest manager workplace health and safety policies (e.g. drug and alcohol policy)
- safe work procedures
- PPE requirements
- emergency procedures
- incident reporting
- first aid and amenities
- communication protocols
- disciplinary procedures
- consultation and issue resolution.
- All workers are to be inducted before entering a new operation to ensure they are aware of the matters covered in the SSP.

Inductions should be refreshed when any of these matters change.

6.3.3 Information provision

All duty holders must provide information to other parties as part of their responsibilities as shown in *Section 2*. A harvesting contractor, for example, should provide information on hazards and safe work procedures to both directly employed workers and subcontractors. This information should include:

- information required by regulation (e.g. safety data sheets for chemicals)
- risk controls for common workplace hazards (e.g. extreme weather, noise)
- site hazards
- safe work procedures for the work
- hazard and incident reporting
- emergency procedures
- first aid and amenities
- drug and alcohol policies
- communication protocols.

This information mirrors induction topics and should be provided both to new workers and to all workers when work begins at a site.

Information can be in a written or electronic form if it is accessible and uses language that users can understand. Involving all crew members in developing information is the best way of guaranteeing they will understand and follow the business requirements.

6.3.4 Supervision

The PCBU with direct control of the work must supervise the work and maintain a safe and healthy work environment. Forestry operations are often difficult to directly observe and supervise, so supervision is highly dependent on consultation with and cooperation from crew members.

Some typical circumstances that monitoring and supervision may identify include:

- conflict between crew members that compromises safety
- inspection of stumps indicating a manual **feller** has poor technique, which creates risks for the feller and others
- a machine operator using a machine beyond limits.

In these cases, strategies such as counselling, refresher training, disciplinary procedures, or independent auditing may be used to resolve problems.

Compliance with safety policies and procedures will be highest where there is:

- clear understanding of the procedure and its role in achieving safety
- opportunity to discuss and problem-solve issues that affect compliance
- understanding of the impact of poor practices on oneself and others
- acceptance of the legal duty to follow safety procedures and the role of agreed disciplinary procedures.

Regular crew meetings are a way of ensuring matters do not escalate and changes can be made to improve safety outcomes.

6.3.5 First aid

First aid requirements for forestry operations are set out in the WHS Regulations.

The WHS Regulations outline the matters that must be considered to establish first aid arrangements. These matters are:

- the nature of the work being carried out at the workplace
- the nature of the hazards at the workplace
- the size, location, and nature of the workplace
- the number and composition of the workers at the workplace.

An operational coupe should have at least one trained first aider to provide ongoing coverage.

Specific requirements for workplaces should be guided by a risk assessment as set out in the Safe Work Australia approved Code of Practice *First aid in the workplace.*

Section 15.3 First aid kits, which is reproduced from the approved code, outlines the typical contents for first aid kits, including additional items for remote workplaces.

6.3.6 Amenities

Amenity requirements for forestry operations are set out in the WHS Regulations. Specific guidance is provided in the Work Health and Safety Commission's code of practice *Managing the work environment and facilities*.

The same matters as for first aid must be considered in assessing amenities. Consequently, amenities may vary but as a minimum should include:

- clean drinking water
- a hand-washing facility
- suitable sanitation arrangements
- shelter from conditions.

Facilities should be in a safe work area away from identified hazards.

6.3.7 Emergency planning

The WHS Regulations set out the responsibility to prepare, implement, and maintain an emergency plan. The nature of this plan depends on assessing the same factors as in *Section 6.3.5* and *Section 6.3.6* (e.g. nature of work, hazards, location, and number of workers).

Some typical emergency situations based on these factors include:

- treatment and evacuation of injured worker(s)
- motor vehicle and machinery incidents
- chemical spill
- search and rescue
- unauthorised persons entering a work site
- fire.

Each emergency plan will vary but should include as a minimum:

- an emergency meeting point, which is communicated to all
- emergency contact numbers
- set up and testing of communications systems
- first aid that is adequate for possible scenarios
- protocols for working alone, 'no response', and 'no return'
- adequate transport for evacuation if required.

The emergency plan should form part of the SSP. Its information must be made available to all at the workplace and the site induction should run through its procedures. Each emergency plan should be reviewed and tested.

6.3.8 Documentation

Effective management of health and safety will always require some documentation to meet legislative requirements. These records demonstrate to others that safe work procedures are being followed and they support effective induction and training.

Section 4.8 outlines the reasons for keeping basic records for risk management, and these reasons apply to all documentation.

In the WHS Act and Regulations, the record-keeping requirements that apply most to forestry operations include:

- Act s38 – Duty to notify of notifiable incidents
- Regulations s43 – Duty to prepare, maintain and implement emergency plan
- Regulations s50 – Monitoring airborne contaminant levels
- Regulations s58 – Audiometric testing.

While these are explicit and mandatory requirements, many other parts of the legislation imply records must be kept to show compliance. Records relating to equipment maintenance, training, health monitoring, safe work procedures, and risk assessments are just a few examples. The business's risk management system will generate this documentation.

Documented policies, plans, and procedures in health and safety management systems and site safety plans should be up to date. They should also be reviewed when things change (e.g. contractual requirements, legislation, methods, and equipment) and amended accordingly.

6.3.9 Incident reporting

Part 3 of the WHS Act requires the PCBU to notify WorkSafe Western Australia if at a workplace there is:

- a death
- someone suffers a serious injury or illness
- a dangerous incident.

See WorkSafe Western Australia's interpretive guideline *Incident notification.*

Examples of serious injuries and illness include:

- amputation of any part of the body
- a serious head injury
- a serious eye injury
- serious lacerations
- medical treatment within 48 hours of exposure to a substance.

Examples of dangerous incidents include:

- an uncontrolled escape of a pressurised substance
- electric shock
- the fall or release from a height of any plant, substance, or things like a branch or tree that created an immediate serious risk to health and safety.

For any notifiable incident, the site must be preserved until an inspector attends or directs otherwise. The PCBU must keep a record of each notifiable incident for at least five years from the day notice of the incident is given to the regulator.

Apart from statutory reporting requirements, businesses should have an internal process for reporting and investigating non-reportable incidents (e.g. hazard reports, lost time, medical treatment, or near misses).

As with a notifiable incident, all reported incidents should be subject to risk assessment and review. This helps determine future action to mitigate the risk of recurrence.

From a risk management point of view, the reasons for investigating incidents are to:

- prevent similar incidents recurring in the future
- identify any new hazards
- identify and choose suitable controls or strategies and update relevant procedures.

If the results of any investigation show that changes need to be made, corrective action must be taken. The risk management process outlined in the Code should be the basis for identifying the best solutions.

PART THREE
SPECIFIC OPERATIONS

7 SITE ACCESS AND ROADING
8 TIMBER HARVESTING
9 LOG EXTRACTION
10 LOG LANDINGS, LOADING AND UNLOADING
11 IN-FIELD PROCESSING
12 SILVICULTURE
13 FIRE MANAGEMENT

7 SITE ACCESS AND ROADING

Planning

The planning of roads, traffic management, and other requirements to enable safe access and egress from the site is an important responsibility of landowners and forest managers. It is a key part of the hand over process outlined in previous sections. Information about hazards should be passed on to any contractors, and the site safety plan (SSP) should cover roading and site access. The SSP should be understood by all operators working on the site.

For requirements for road and bridge construction, refer to Chapter 6 of the WHS Regulations and the related Safe Work Australia approved Code of Practice *Construction work*.

The risk assessment and safety planning approach in these regulations is closely aligned to the approach in this Code. However, duty holders should ensure construction activities are done in such a way that they comply with their regulatory duties.

The related issue of log landings is covered in *Section 10 Log landings, loading, and unloading*.

Site access and roading work is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.

The following **activity-specific hazards** need to be considered:

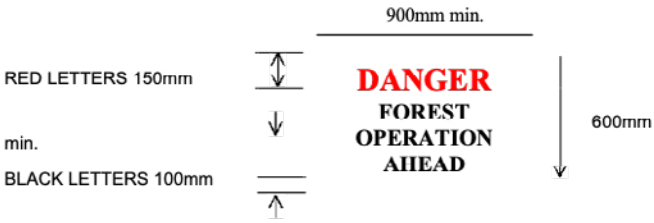
- Traffic flow and traffic levels that create collision risks
- Poor line of sight and blind intersections
- Inadequate visitor controls
- Unclear or inappropriate signage
- Inappropriate speed limits
- Undefined evacuation routes
- Type and specifications of vehicles (e.g. width or axle load) that create vehicle instability and damage to road
- Inadequate passing bays for expected traffic
- Road specifications (width, surface and drainage)
- Poor haul route planning

The **essential risk controls** are all relevant to roading and site access work.

Activity-specific controls are listed below:

Signage and traffic control

- Display clearly legible, suitable signage both to control traffic on access roads and to mark any harvesting operations that could present a risk to others, including signs to:
  - show road closures
  - warn of infrastructure such as power lines
  - advise of personal protective equipment (PPE) requirements and communications protocols
  - give adequate warning to anyone approaching
  - direct visitors to contact points
- Use signs at the entrance to the coupe or site and to areas where high-risk forestry operations are underway (e.g. felling, log landing, or spraying)
- Ensure signage conforms to:
  - *AS 1319-1994 Safety signs for the occupational environment*
  - *AS 1743:2018 Road signs – Specifications*
  - *AS 1742.1-2003 Manual of uniform traffic control devices – Part 1: General introduction and index of signs*
- Use typical signs such as the following:



- For more detail, refer to the Australian Forest Products Association's *Safety signage in forestry operations* guideline
- Manage traffic or close the road when trees are being felled/pushed within two tree lengths of a road

Road construction

- Build roads in line with construction-specific regulations (e.g. with a safe work method statement (SWMS) and white cards)
- Remove hazardous trees or identify them with marking or tape and add them to the SSP
- Ensure each road is capable of carrying the intended vehicles
- Where road lines are not harvested before road construction, pull/push all trees that have been felled or pushed over so they are clear of standing trees and leave them in a safe position
- Fell or push over standing trees that have had their roots disturbed or undermined by roading activity to eliminate the risk of accidental fall
- Adopt traffic control measures, including signage, during construction
- Follow the operator competencies in *Section 15.4*
- Use equipment that conforms to the standards in *Section 15.1*

Visitor control

- Display signs to direct visitors to contact points
- Have a designated person in the crew at the main work site who is responsible for meeting and inducting visitors
- Establish and follow a sign-in process for visitors that informs them of site hazards, site procedures, emergency procedures, and the PPE they must wear
- Ensure visitors remain in safe zones separated from the activity by the designated distance (e.g. two tree lengths or outside chain shot danger zones)
- Ensure visitors are aware of their duty to follow all reasonable instructions (e.g. following agreed safe work practices and wearing required PPE)

Unauthorised persons	● If unauthorised persons enter a work site (e.g. protestors or illegal firewood collectors), follow this process: – Cease activity – Secure the site and equipment – Request people leave if safe to do so – Contact the relevant authorities – Collect any relevant information – Inspect the site and equipment to ensure nobody is at risk before restarting work
Communications	● Use communication systems for access to the coupe and for communication between operators in machines and operators on the ground ● Use an effective ultra-high frequency (UHF) radio system for access, work on site, and emergency purposes ● Follow a radio protocol that is documented and understood by all workers ● Test the radio system to ensure all workers can communicate their intended movements and be confident that messages are heard and understood ● Display the UHF channel used in the coupe on entry signs ● Ensure the radio system allows communication of: – an operator exiting a machine or truck – an operator moving into or out of a safe work area – a worker or visitor entering the site – movement on access roads to warn other drivers ● Ensure that the 'owner' of an exclusion zone directs communication when another worker seeks to enter that zone, and that any request is answered before entry ● Do not allow the use of mobile phones in vehicles or machines while they are operating ● Adopt backup hand or voice signals where the radio system is not operable ● Have a backup emergency contact system, in case the primary system fails (e.g. location of nearest farmhouse and mobile phone transmission point) ● Equip ground workers, such as manual fellers, with radio units, global positioning systems (GPS) or other working alone technologies (e.g. man down alarms) to enable both safe work and emergency communication

8 TIMBER HARVESTING

The type of felling method will be determined during the planning stage of new operations. The options available include:

- **manual felling**
- mechanised felling
- a combination of both methods.

Traction-assisted methods may also need to be considered for sleep slopes.

8.1 Manual felling

Planning

Planning should assess and outline the type or combination of felling methods. This assessment should involve all operators involved in felling and extraction.

The plan should detail issues such as:

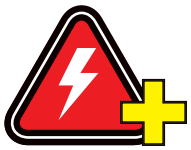
- What felling method will be used first and why?
- How will the system of work maintain safe separation distances?
- How will any manually felled trees be fallen into clear and open areas?
- How will ground hazards be eliminated or minimised for the manual feller?
- How will overhead hazards be eliminated for the manual feller?
- How will any remaining hazards be identified?
- What system of communication will be used between the mechanical felling machines, extraction machines, and manual fellers if they are felling and extracting at the same time?

Consultation, cooperation, and coordination

Specific operational plans and methods should be supplemented by a walk through before operations start. They should then be adjusted when there are significant changes in operating conditions (e.g. weather, wind, visibility, or traction).

Crew meetings should also be held before work starts to ensure all workers and contractors understand the specific felling plans.

Manual felling is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.

	The following **activity-specific hazards** need to be considered: △ Standing vegetation in the intended direction of fall △ Worker being struck by the butt of the tree △ Kickback or recoil from the chainsaw △ Weather conditions including heat, wind, rain, and cold △ Slips, trips, and falls △ Noise △ Fatigue
	These **activity-specific risk factors** also apply: ● Tree species and characteristics ● Tree felling boundaries and information on any adjacent mechanised felling operations ● Environmental restrictions ● Felling direction, and extraction method and direction

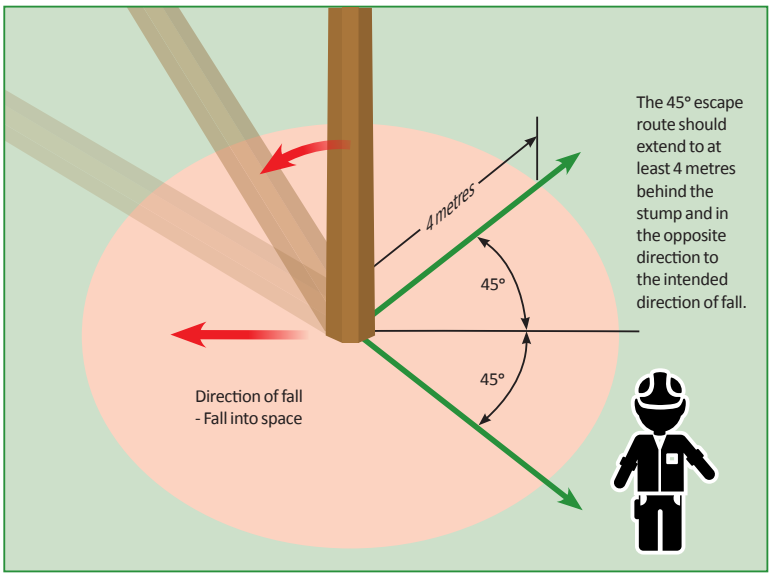
To safely fell a tree manually, specific control measures are necessary and depend on the nature of the work area. The **essential risk controls** are all relevant to manual felling.

	**Activity-specific controls** are listed below:
 **Safe work procedures**	● Identify all hazardous trees (see *Section 14.2*) ● Use mechanical help where possible for trees with excessive natural lean away from the intended direction of fall (see *Section 15.6*) ● Carry out ongoing checks for hazards, especially overhead hazards and changing conditions ● Stop operations in a strong breeze (see *Section 14.16*) ● Limit felling to daylight hours
 **Exclusion zone and safe work areas**	● Maintain a separation distance of two tree lengths ● When a trainee feller is under instruction, ensure the supervising or instructing feller is located at the immediate base of the tree and able to intervene in the procedure ● On steep ground where there is a risk of felled trees sliding or rolling downhill, ensure nobody is working below the tree feller ● Maintain radio communication with other forest workers ● Use signs and manage traffic where the work area is close to roads ● Close roads if needed (e.g. felling within two tree lengths of road)

Escape routes

- Where escape routes are impeded by undergrowth, remove material around the base of the tree using the blade of a machine before felling
- Extend a 45-degree escape route to an area at least 4 metres away from the stump (see *Figure 12*)

Figure 12: Escape route and direction of felling



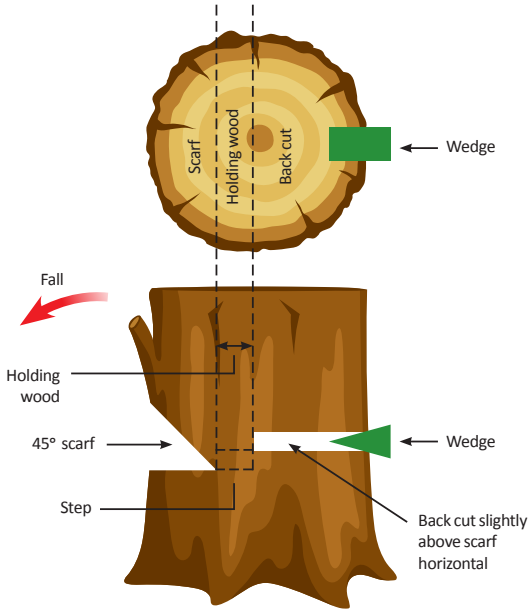
Safe use of chainsaws

- Hold the relevant national competency qualification FWPHAR3221: Harvest Trees Manually (advanced), which is mandated by industry for commercial harvesting operations
- Follow safe work practices, for example as in the *Chainsaw Operators Manual* and *Tree Fallers Manual* (see also *Figure 12* and *Figure 13*).
- Ensure equipment is maintained, including the chainsaw's safety features (e.g. hand guard and chain brake)
- Carry felling equipment, including an axe or suitable size hammer, wedges suitable for the trees to be felled, a two-way communication device, wound dressings, chainsaw fuel and oil in approved containers
- Use personal protective equipment (PPE) suitable for the task (e.g. a safety helmet with hearing protection, eye protection, hand protection, high-visibility clothing, safety footwear, and leg protection)
- Ensure PPE is reasonably comfortable for the wearer and well maintained

Minimising of risks from elevated hazards

- Fell trees into an open area where possible
- Ensure falling trees do not strike brush or other standing trees as they fall
- Avoid using wedges where there is a chance limbs may be dislodged
- Consistently apply suitable felling methods, such as in as in the *Chainsaw Operators Manual* and *Tree Fallers Manual* (see also *Figure 12* and *Figure 13*)

Figure 13: Tree felling



- Except for trees with a clear lean in the intended felling direction, insert a holding wedge into the back cut of each tree manually felled with a chainsaw
- If a tree sits back during felling, the tree feller should follow a safe system of work in line with the accepted procedures (refer to Safe Work Australia's *Forestry: Guide to managing risks of timber harvesting operations*, Appendix A

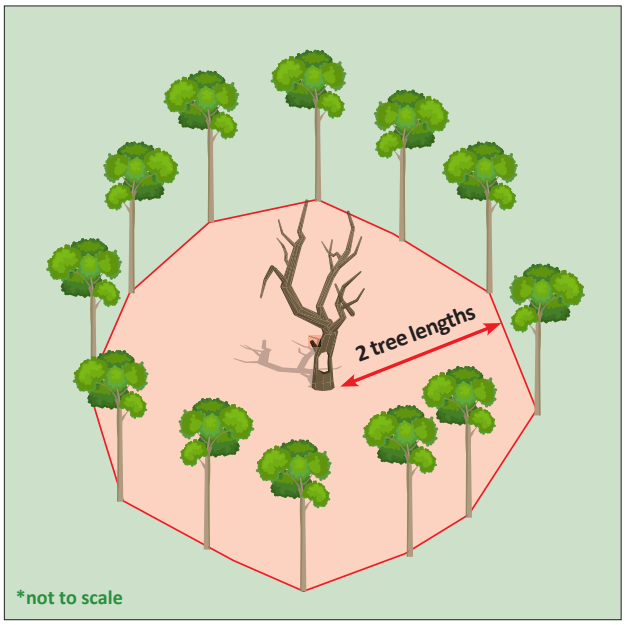
8.2 Felling hazardous trees

Dead or hazardous trees (see *Section 14.2*) are unpredictable – for example, these trees are more likely to fall unexpectedly or have branches break off. Extra care should be taken to identify hazards and put control measures in place to protect the feller.

A qualified advanced feller should only fell a hazardous tree that is within their competency. They should check for the presence of any features shown in *Section 14.2*.

The **essential risk controls** are all relevant to felling hazardous trees.

Activity-specific controls are listed below:

Prohibition of work near hazardous trees	• If the tree is assessed as being too high-risk to fell, clearly identify the tree without placing anyone at risk • Mark the tree with a red and white hazard tape if safe to do so • Clearly mark the hazardous area around the tree with high-visibility tape to a distance of two dominant tree lengths (see *Figure 14*) • Record the tree's location on site documentation with methods such as GPS way point • Do not carry out any work in the hazardous zone until the tree is brought down ***Figure 14: Hazardous tree exclusion zone*** 
Use of mechanical equipment as the first option	• If the hazardous tree is assessed as high risk, first consider using mechanical equipment to fell it • Use a harvester, dozer, excavator, or skidder with a protective structure to remove the tree
Manual felling assessed as manageable	• Where the risk is assessed as manageable by manual felling techniques, ensure the system of work has the following minimum risk control measures in place: – Ensure the feller is assessed as competent against the national unit of competency for the manual harvesting of trees and has current industry experience – nobody else should fell the tree – Maintain a separation distance of two tree lengths from other workers – Use a recognised safe felling method (e.g. as in the *Chainsaw Operators Manual* and *Tree Fallers Manual*) – a hand feller may place preliminary cuts in the tree before using a machine to push the tree – When felling a widow maker or brittle top, work under a protective structure – Ensure the area around the base of the tree is scrub rolled mechanically, where possible, and escape routes are in place – Maintain radio communication between all operators

In addition, there are specific hazards found in manual felling that require assessment and specialist felling techniques. They include:

- delimbing
- machine-assisted tree felling
- tree driving
- wind throw
- **thinning**
- tree jacking.

Information on these techniques can be found in *Section 15.6*.

8.3 Mechanical felling

Many of the hazards for manual felling also apply to mechanical felling. However, some risks are minimised because the machine provides protection for its operator. For more information, refer to the National Institute for Forest Products Innovation (NIFPI) final report on Project NS025, *Development of best practice guidance for protective guarding of mobile plant used in Australian forests*.

Machinery used for mechanical felling includes custom-built feller-bunchers, single grip harvesters, and processors and excavator-type machinery with aftermarket felling heads.

Planning

Before mechanical harvesting starts, a similar planning process to that described in *Section 8.1* should be completed.

Hazards identified in the SSP should also be considered, and confirmed by a site assessment.

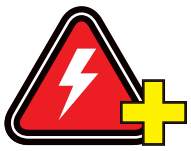
Consultation, cooperation, and coordination

Specific operational plans and assessments should be supplemented by a walk through before operations start. They should then be adjusted when there are significant changes in the operating conditions (e.g. weather, wind, visibility, or traction).

Crew meetings should also be held before work starts to ensure all workers and contractors understand the operational plans. It is then important to:

- use radios or other communication systems to maintain oral and visual communication between workers
- establish and maintain relevant falling and traffic signage.

Mechanical felling is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.



The following **activity-specific hazards** need to be considered:

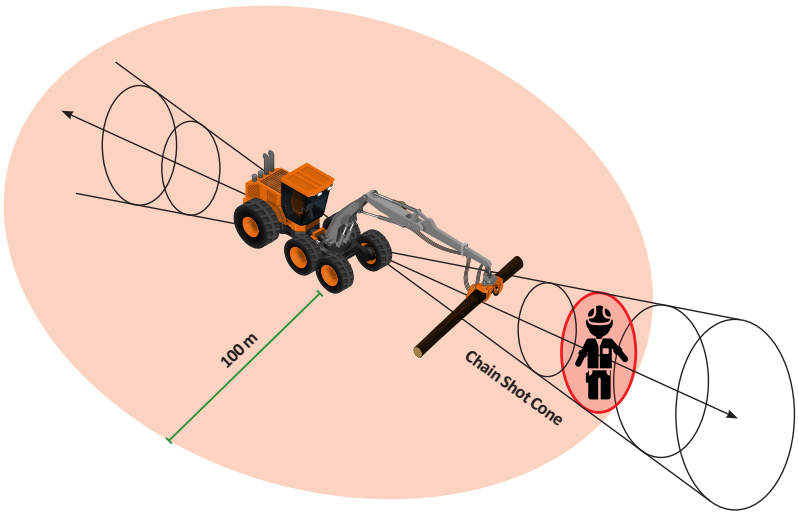
- Unsuitable machine selected to harvest the tree size in the coupe or harvesting site
- High winds affecting the fall direction
- Slips, strains, and falls as workers get on or off the machine for either operation or maintenance
- Loose objects in the operator's compartment
- A machine fire
- Onsite machine maintenance while the machine is energised
- Mechanical failure

The following **activity-specific risk factors** also apply:

- Environmental issues and constraints
- Boundaries
- Condition and lean of timber
- Traffic flow and management in the harvesting area

The **essential risk controls** are all relevant to mechanical felling.

Activity-specific controls are listed below:

Equipment design and operation	• Ensure the weight and power of mechanical harvester is suitable for the site conditions and tree size • Ensure the machine is operated in line with manufacturer's specifications • Ensure the machine is fitted with the following protective structures consistent with the NIFI best practice guide referenced above: – a suitable **rollover protective structure (ROPS)** – a suitable **falling object protective structure (FOPS)** – suitable **operator protective structures (OPS)** to provide front, side, and rear protection using screens and guards • Ensure all protective structures are suitable for the machinery, the conditions, and the size of trees being felled, and they conform to the relevant technical standards (see *Section 15.1*) • Ensure cabin visibility allows the operator to see and check for hazards, especially overhead, and changing conditions • Install a chain shot guard or catcher and, where relevant, a limit switch to prevent the saw operating at angles (e.g. saw bar directly aligned with the cab) where operators are at risk • Keep handrails and steps clean and well maintained • Shut down and isolate machines, and ground attachments, during routine maintenance such as greasing and changing bars and chains
Exclusion zone and safe work areas	• Ensure operation is within a defined exclusion zone with at least two tree lengths separation from others • Keep others at least 100 metres away from harvester and away from the 'shot cone', which is the likely path of chain shot and around 15 degrees either side of the plane of the saw bar (see *Figure 15*) • Work at least two tree lengths away from overhead power lines, fall in parallel or away from lines, or arrange for power to be switched off if necessary ***Figure 15: Chain shot cone*** 
Operator competencies	• Ensure machine operators hold a statement of attainment in relevant competency units, such as the single grip harvester and feller buncher (see *Section 15.4*) • Ensure the operator is trained in the working limits of machine and techniques for different trees and ground conditions • Ensure the operator's seat is maintained, and the seat belt worn • Wear PPE that is suitable for use and correctly maintained (e.g. high-visibility clothing, safety footwear, hearing protection, safety helmet when outside the cabin, and two types of protective gloves for handling fuels or sharpening chains (see *Section 15.2*))

8.4 Steep slope harvesting

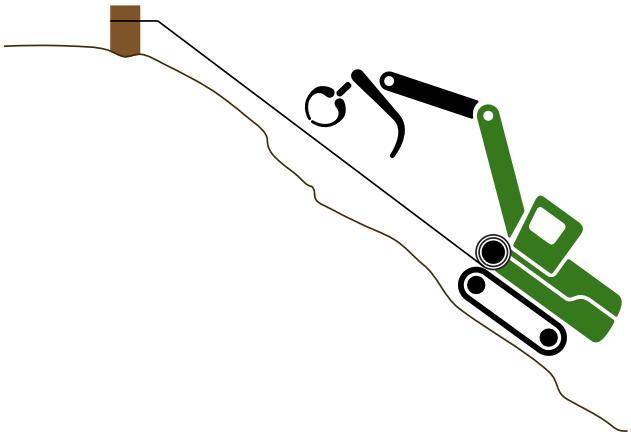
To enable mechanical harvesting on steeper slopes that might otherwise be designated for manual felling, a winch assist system may be used in several configurations.

Winch assist systems consist of a cable winch mounted on a piece of equipment that is either mobile or stationary.

On steep slopes, the mechanical influence of the winch assist system enhances traction and mobility (often called 'traction assist') or safety (preventing machine sliding and overturning).

A winch may be fitted to a harvesting machine such as a feller buncher, harvester, or forwarder either as an integrated part of the machine or as an aftermarket winch attachment. The cable is anchored to another machine or a suitable stump (see *Figure 16*). This is often referred to as a 'tethered' system.

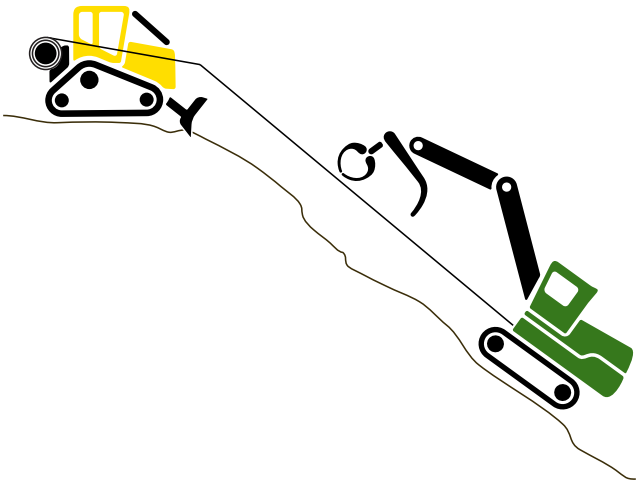
Figure 16: Winch fitted to machine



The machine moves uphill, and the tether provides stability and support. The machine is typically winched up the slope using the tether. This method helps prevent the machine from rolling back down the slope and provides a controlled means of uphill movement.

Another variation is that the machines are anchored by cable to a winch fixed on or attached to another machine that acts as an anchoring point (see *Figure 17*). The winch helps the machine in climbing or descending slopes, providing additional traction and control.

Figure 17: Winch attached to anchor machine



Planning

Decisions to use steep slope machinery should be based on the information prepared by the landowner or forest manager. The contractor should then incorporate this information into the SSP. Traction-related issues require consideration alongside road access, location of landings, roadside stockpiles, tree species, and harvest timing. Relevant issues include the type of soil and erodibility.

The distance that winch assist machines can operate at should also be considered. This distance is based on winch range, load limitations, and the impact on other harvesting and extraction methods. A risk assessment can help determine what methods of harvesting should be used in various parts of the coupe and how they should be managed.

Information should be sought from equipment suppliers on the suitability of winch-assisted operations for the proposed harvesting method.

The slope that wheeled or tracked machines can safely operate on within design limits is particularly important, along with the machine's stability features.

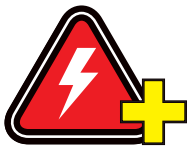
A manufacturer and equipment supplier has a duty to provide information and training to the end user on the equipment's safe operation. For steep slope machinery, this should include:

- the purpose for which the machine or winch attachment was designed and manufactured
- the design limits of the machine relating to:
  - slope
  - traction
  - manoeuvrability
  - load and lifting
  - stability
- any risk assessments or other calculations related to the matters above
- the frequency and type of maintenance required
- information on access to and safe use of the equipment
- information on emergency procedures (e.g. exit or rollover)
- information on the operator qualifications or competencies required to safely operate the machine.

Winches, wires, and attachments such as shackles are also covered by the manufacturer and supplier's duty of care. They should supply similar, relevant information.

The selected machinery should be able to operate safely on the terrain before additional issues related to winch assist are considered. Winch assist systems or tethering machines reduce some risks (e.g. rollover because of loss of traction on steep slopes) but are primarily ways of extending the range of machinery that can be considered for use on slopes.

Winch-assisted steep slope harvesting is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.

	The following **activity-specific hazards** need to be considered: △ Incorrect wire rope tension or overloading △ Poor visibility and traction loss due to slash and downed logs in front of machine △ Wire rope **side wash** by bending around stumps at greater than 45 degrees creating overload or slipping off stump △ Broken or damaged wire, shackles, or connections on felling machine or base machine △ Base machine sitting on soft edge or shoulder of road △ When a stump is used as an anchor, incorrect notching of stump (too shallow, too deep, or too close to top of stump) △ Anchor stump not suitable species or lacking root strength △ Incorrect strap angle when attaching strap to stump
	The following **activity-specific risk factors** also need to be considered: ● Soil condition and erodibility ● Topography ● Space for base machine position ● Suitability of tracked or wheeled machines for all the above factors

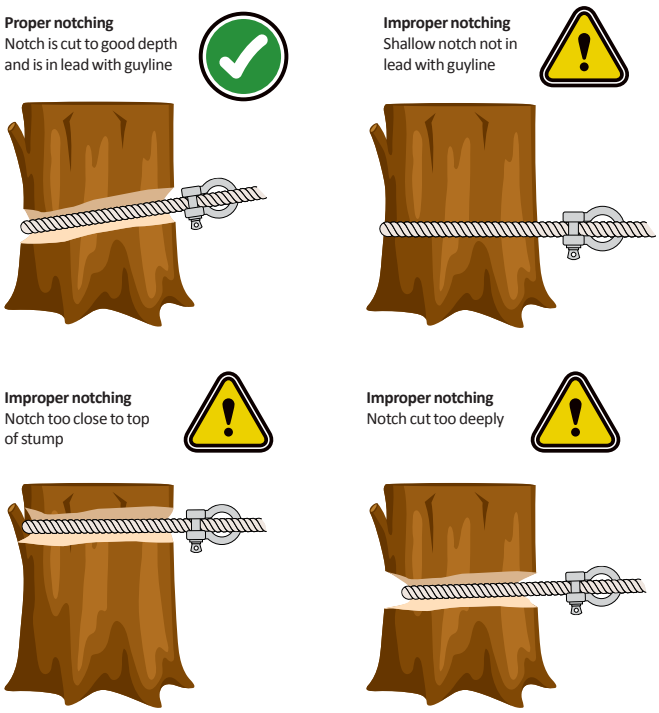
The **essential risk controls** are all relevant to winch-assisted steep slope harvesting.

	**Additional activity-specific controls** are listed below. These should be read with the safe operating specifications of the machines in normal use (e.g. FOPS, ROPS, or OPS requirements).
 **Equipment design and operation**	● Ensure the machine is designed for steep slope work using a winch assist system ● Ensure the machine has an overriding braking system in case it loses power ● Ensure the machine has a system to monitor how much wire rope is left on the winch drum, with an alarm and automatic stop mechanism when the wire is less than five wraps on the drum ● Have a way of monitoring wire tension and the safe working load ● Keep within 33% of breaking load ● Have a way of measuring slope, such as a clinometer ● Have sensors that indicate any stability movement in the base machine ● Ensure all wires, shackles, connectors, and other winch assist attachments conform to relevant technical standards (e.g. shackles meet the specifications of *AS 2741-2002 Shackles*) ● Keep tracks facing downhill and do not operate across a side slope ● Minimise use of stumps to **side wash** wire, and if this directional technique is used, ensure the angle is less than 45 degrees ● Regularly inspect and maintain all wires, shackles, connectors, and other winch assist attachments
 **Attachment to base machine**	● Ensure the base machine is capable of receiving the live wire tension status from the felling machine ● Ensure the base machine has: – an automatic stopping system in case of mechanical failure or excessive machine movement – the same warning devices about wire as the felling machine – buckets and blades dug into the ground to improve stability (e.g. use the anchor machine's blade or bucket to secure the machine by placing the blade or bucket against a stump, or dig it into the ground) – sensors that detect movement in the base machine that are communicated to felling machine ● Regularly inspect and maintain all wires, shackles, connectors, and other tethering attachments

Attachment to stump anchor

- If a stump is used to anchor the felling machine, ensure that the stump:
  - has a high holding capacity indicated by root system and soil density
  - is tied back to distribute load, if necessary, using straps
  - is correctly notched (see *Figure 18*)

Figure 18: Notching of anchor stump



- Ensure all wires, shackles, connectors, and other winch assist attachments:
  - conform to relevant technical standards
  - are regularly inspected and maintained
  - have straps attached to the stump at the correct angle (less than 90 degree angle of strap eyes)

Exclusion zone and safe work areas

- Have a clear plan of the harvesting process, particularly when manual felling is used, so that clear exclusion zones and separation distances are identified
- If manual felling is required for parts of the coupe, do this before the steep slope harvesting process begins
- Create a separation distance around the base machine and on the slope below during operation so that the area is clear of ground workers

Operator requirements

- Have experience operating the machine before using any winch assist system
- Work on lower slopes where the winch effect is minimal and gradually advance to higher slopes where it is safe to do so
- Have a map of the operational area, including hazards and 'No Go Zones'
- Understand the importance of the wire tension and safe working loads
- Have knowledge and experience in using **side wash** techniques
- Understand the procedure for emergencies and breakdowns on steep slopes

9 LOG EXTRACTION

Log extraction includes **forwarding**, **skidding**, and **snigging**.

In this section, extraction on both level ground and steeper slopes is covered. Steep slope work covers common hazards and controls, but where winch-assisted or tethered systems are used, additional measures are required. These largely reflect the controls used with winch-assisted felling.

Planning

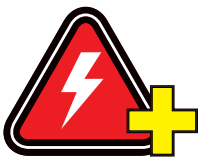
Extraction methods should be included in the information provided by the forest manager and the SSP. Identified hazards should be confirmed by a site assessment before work starts.

Consultation, cooperation, and coordination

All plans and assessments should be supplemented by a walk through before operations start. They should then be adjusted when there are significant changes in operating conditions (e.g. weather, wind, visibility, or traction).

Crew meetings should also be held before work starts to ensure all workers and contractors understand the operational plans.

Extraction is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.

	The following **activity-specific hazards** need to be considered: △ Materials striking trees and spars while being moved, causing them to be pulled over △ Inadequate and unreliable communication systems △ Equipment failure △ Objects penetrating the cabin △ Instability of machinery and risk of rolling over or sliding △ Slips, strains, and falls when workers are getting in and out of machinery
	The following **activity-specific risk factors** also need to be considered: ● The proposed felling and extraction plan and pattern of work ● Communication systems for ground workers and machine operators ● Traffic flow and management in the harvesting area

The **essential risk controls** are all relevant to extraction.

	**Activity-specific controls** are listed below:
Equipment design and operation	● Ensure the weight and power of machines such as a forwarder is suitable for the terrain and tree size ● Ensure the machine is operated in line with the manufacturer's specifications ● Ensure suitable protective structures are fitted consistent with the NIFPI best practice guide referenced in *Section 8.3* ● Ensure cabin visibility allows the operator to see and check for hazards, especially overhead, and changing conditions ● Use handrails and steps ● Ensure extraction **tracks** are clear and suitably located
Operator requirements	● Ensure the operator is trained in the working limits of the machine and techniques for different trees and ground conditions ● Ensure the operator's seat is maintained, and the seat belt worn ● Wear PPE that is suitable for use and correctly maintained (e.g. high visibility clothing, safety footwear, hearing protection, safety helmet when outside the cabin, and two types of protective gloves for handling fuels or sharpening chains (see *Section 15.2*)

Exclusion zone and safe work areas	• Carry out operation within a defined safe work area, with at least two tree lengths' separation from others • Be aware of the chain shot cone around harvesting machines
Communications	• Use radio, GPS, or other communication or location-finding systems to maintain oral and visual communication with other workers

9.1 Steep slope extraction

Where log extraction takes place on steeper slopes using conventional methods, there is a higher risk from the instability of machines and felled logs.

The **essential risk controls** are all relevant to steep slope extraction.

	**Activity-specific controls** are listed below:
Forwarders	
Equipment design and operation	• Never load the loader or carrier over the manufacturer's specifications or above the level of the headboard or stanchions • Do not extend the stanchions without the manufacturer's authorisation
Safe work procedures	• Drag logs closer to the forwarder before lifting • Avoid travelling across side slopes in excess of the manufacturer's specifications • Load the uphill side of the log bunk or truck first • Do not overload the grapple • Do not overload the log bunk • When loading on sloping ground, park straight up or down the slope • Ensure logs being loaded in the loader are fully encircled by the holding jaws when the jaws are closed
Snigging with skidder or dozer with winch or grapple	
Safe use of plant	• Do not extract logs on gradients or side slopes greater than those specified by the equipment designer, manufacturer, importer, or supplier
Safe work procedures	• When snigging heavy logs downhill, hook up 'short' and low to the ground to avoid logs overtaking the skidder or dozer • When snigging heavy logs uphill, raise the log, and if necessary, use a series of 'winch – move forward – winch again' moves • Avoid turning the machine on a slope • Avoid travelling across side slopes in excess of the manufacturer's specifications • When travelling downhill, keep the winch rope taut so the snig does not bump or pass the rear of the machine • Avoid winching logs at a sharp angle to minimise the risk of rolling over

9.2 Winch-assisted log extraction

Winch-assisted systems are likely to be used on steeper slopes that are beyond the normal operating limits of wheeled or tracked machines.

The risk controls for log extraction on steep slopes using winch assistance should again be read with the safe operating specifications of the machines in normal use (e.g. falling object protective structures (FOPS), rollover protective structures

(ROPS), operator protective guards (OPS) requirements).

The **essential risk controls** are all relevant to winch-assisted extraction, as are the risk controls for winch-assisted felling machines. This is because the winch assist systems are similar, but there are some additional controls relevant to extraction.

	**Activity-specific controls** are listed below:
 **Equipment design and operation**	• Use stability-improving options (e.g. wheel spacers and wide 'flotation' tyres) • Consider using tracked machines or purpose-built machines • Ensure tracked machines have tracks that are in good condition and outfitted to provide superior traction
 **Safe work procedures**	• Make smaller turns to avoid overloading or overbalancing the machine • Carry logs as low to the ground as possible without hanging up on stumps and rocks

10 LOG LANDINGS, LOADING AND UNLOADING

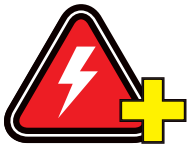
The log landing brings together ground workers and machinery operations, creating risks that should be carefully managed. Planning and construction of the log landing to ensure the safe and efficient handling of logs and workflow will minimise problems.

 **Planning**

The timber harvest plan should detail the location and size of log landings. The design principles for safety include:

- position the log landing on the flattest area as practicable and where the slope of the ground enables good drainage
- make the log landing large enough for activities to be safe and with as little intrusion as possible between tasks
- clear all hazardous trees for a distance of at least two tree lengths
- ensure the log landing is clear of any power lines
- keep it clear of hazardous debris
- have safe pedestrian access and visitor control procedures
- allow space for:
  - the safe passage of other traffic needing to pass the operation
  - the safe storage of logs at the volume to be handled
  - the parking, turning, maintenance, and storage of fuel and chemicals
  - a safe area for ground workers to retreat to for sharpening saws and other tasks
- locate the log landing to allow safe rehabilitation after the forest operation.

Work on log landings is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.

	The following **activity-specific hazards** need to be considered: △ Moving machinery △ Uncontrolled movement of logs △ Chain shot or other material thrown or moved by machinery working on landing △ Slips and trips △ Skin exposure to hazardous chemicals
	The following **activity-specific risk** factors also need to be considered: • Communication systems for ground workers and machine operators • Control of visitors to the landing

Risk controls for all operations on the log landing aim to minimise interaction between operations and protect ground workers.

Those working under a canopy should rely on the risk controls set out for machinery (e.g. operator protective guards (OPSs)) outlined in *Section 6.2.1*.

The **essential risk controls** are all relevant to log landings and loading.

	**Activity-specific controls** are listed below:
 **Exclusion zone and safe work areas**	• Display warning signs at entry to the site • Where practicable, ensure there is a physical barrier (e.g. a log stack or another machine) between machines and ground workers • While a machine is handling logs, ensure nobody enters the area within the full swing radius plus half the log length in the beak (or the manufacturer's specified safe working distance, whichever is greater) • Ensure the intended path of travel for skidders and forwarders is clear of ground workers • Do not swing logs above or within the reach of ground workers • Ensure separation distances to protect ground workers from chain shot injury (see *Figure 15* in *Section 8.3*) *Figure 15* shows a cone-shape danger zone. This zone changes as the cutting head is repositioned. A minimum 100 metre exclusion zone is required for unprotected workers unless effective protective barriers are used.
 **Communication**	• Use radio communications to monitor movement onto and within the landing • Ensure that anyone entering a designated work area has the permission of the area controller • Do not allow snigging machinery to enter the landing until it is safe to do so (e.g. when they are signalled to enter by the authorised person like the landing attendant, processor operator, or loader operator) • Ensure operators of snigging machinery communicate with landing workers, reduce speed when entering the landing, and fully drop logs before unhooking
 **Safe use of mobile plant**	• When using a mechanical processor or cut off saw, ensure the line of the cut is never directed at ground workers to avoid the chain shot zone • Ground the machine's implements when parked, including the log grab or grapple (for forwarders, the safest place for grapples is in the bunk of the machine) • Do not allow workers to walk under an implement supported only by the machine's hydraulics • Only approach logs when they are considered stable • Ensure machinery operators do not carry logs over ground crew • Ensure ground workers on the landing face the operating machines
 **Minimising of slips, trips, and falls**	• Assess the work area for uneven surfaces and high edges • Ensure bark and other debris is regularly removed from the work area of ground workers • On corded landings, do not walk on the corded area while machines are operating • Arrange the work area so the ends of logs can be marked or painted while standing on the ground • Ensure safety footwear is in good condition and does not have worn soles • Use handrails and steps when climbing up onto and stepping down from a machine • Ensure safe ground-based access to the landing area for operators
 **Stability of log stacks**	• Ensure there is enough separation between stacks and machines to minimise the risk of disturbing any stacked logs • Keep log stacks to a safe height on level ground and angled to maximise stability • Make no log stack higher than the capacity of the log-handling equipment • Avoid working at the base of or downhill from a log stack • Chock logs or place them on a notched log to stop rolling when cross cutting or measuring • Use bearer logs under log stacks to avoid rocks or other contamination being loaded onto log trucks and becoming a danger to road users • Work on the topside of a log when manually cross cutting, grading, or measuring • Avoid exposure to hazards from moving logs by not working in front of, climbing onto, or working on logs placed in log stacks or dumps • Do not use chainsaws to cut logs on a log truck or climb on the load for any reason

10.1 Log preparation, measurement, and marking

Where logs are prepared, measured, and marked at the log landing, ground workers are at risk from being hit or crushed. It is important to put in place precautions that minimise this risk to health and safety.

The **essential risk controls** are all relevant to log preparation, measurement, and marking.

	**Activity-specific controls** are listed below:
For all activities	
 **Exclusion zone and safe work areas**	● Ensure machine operators are aware of where any ground workers are ● When logs will be marked or measured with an excavator, set up the landing so the marker or measurer approaches the operator's door on the excavator, not the boom side, coming from their work area
 **Operator competency**	● Ensure machine operators hold the relevant national operator competency qualification such as FWPHAR2207: Trim and Cut Harvested Trees, which is mandated by industry for commercial harvesting operations
Log preparation	
 **Safe use of plant**	● When using a mechanical processor or cut off saw, ensure the line of the cut is never directed at ground workers ● Where a chainsaw is fitted to a machine and used for preparing logs, limit the risk of chain shot by keeping the shot cone area clear of other workers (see *Figure 15*) ● Remove bark away from the swing path of the loader boom ● Whenever chainsaws are used, follow the techniques in *Chainsaw Operators Manual and Tree Fallers Manual* and secure logs before cutting
Log measurement	
 **Safe work practices**	● Check hazards to workers and equipment before measuring starts ● Use electronic measuring devices ● Put the log in a designated area away from other working operations and in a safe position for measuring (e.g. on a notched log) ● Inspect the log to ensure it is adequately chocked to prevent it rolling or sliding ● Place tape around the centre of the log and do not go below the log at any time ● Measure the length by hooking the tape on the lower end of the log and reading from the raised end ● Ensure there is space to swing the hammer when branding the raised end of the log
Log marking	
 **Exclusion zone and safe work areas**	● Stay in the marking work area and out of the machine's work area until the load or beak is grounded and stable and the operator has given permission to enter ● Give the machine operator permission to restart work after the marker has left the machine's work area

Safe work practices	• Keep the area around the log clear of obstructions that could impede the use of marking or tagging tools • Keep the walkway to where logs are marked or tagged free of obstacles and debris that could become slip and trip hazards • Use log marking paint or grease according to the instructions on the label and the safety data sheet

10.2 Loading

The persons conducting a business or undertaking (PCBUs) who arrange for forest produce to be loaded and transported from the forest should plan this activity to ensure safety.

The PCBUs with this responsibility could include:

- the forest manager
- the harvesting contractor
- the haulage contractor
- the receiver of the forest produce, such as a saw mill or pulp processor.

Planning

The planning should include:

- ensuring that the log form and specification reduces the risk of losing logs during transport
- estimating the likely friction characteristics of logs to be transported
- ensuring vehicles are fitted with the right equipment to transport logs safely
- ensuring loader operators and drivers are trained to construct safe loads.

Loading is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.

	The following **activity-specific hazards** need to be considered: △ Driver injured while tensioning lashings △ Exposure to extreme weather △ Slips and trips while checking load △ Strains from throwing lashings △ Over-centre lever load binders (dogs)
COMMON RISKS	The following **activity-specific risk factors** also need to be considered: ● Communication systems for ground workers and machine operators ● Control of visitors to the landing

The **essential risk controls** are all relevant to loading.

ESSENTIAL CONTROLS	**Activity-specific controls** are listed below. For more detailed advice on loading, especially safe work areas, refer to the Australian Forest Products Association (AFPA) *Log loading guideline* and the *Log Haulage Manual.*

Exclusion zone and safe work areas

- If you are the truck driver, establish communication with the loader operator on arrival at the workplace
- If you are the loader operator, ensure that the area in the immediate vicinity is clear of people during loading operations
- Ensure all people, including the driver, are at least 4 metres away from the front of the truck being loaded, 10 metres from the opposite side to that being loaded, or 10 metres from the rear (see *Figure 19*)
- Maintain contact with the loader operator throughout the loading operation
- In multi-bay configurations, ensure the driver is not in the cabin while the front bay is loaded (once the front bay has been secured, the driver may return to the cabin for the rest of the loading)

Figure 19: Safe viewing area for drivers during loading

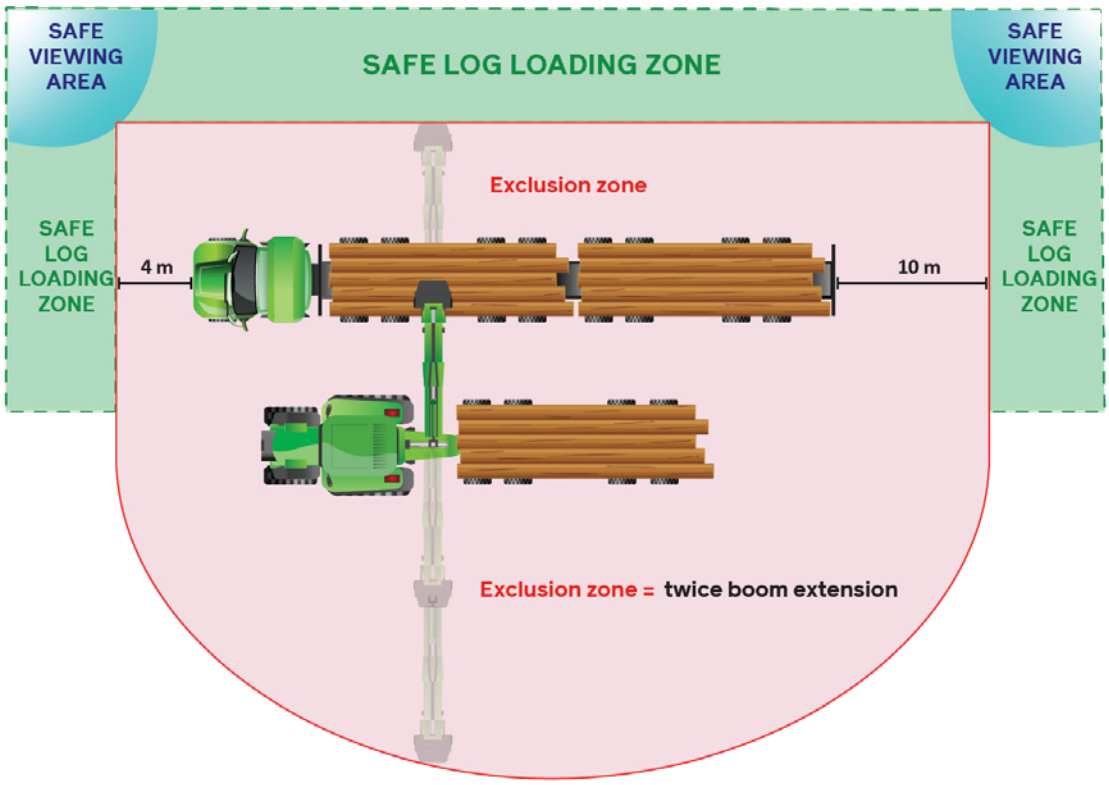


Figure extracted from AFPA's *Log loading guideline.*

- If the driver has to wait during loading, provide adequate shelter and amenities
- Ensure the driver notifies loader operators and receives an acknowledgement before entering an exclusion zone to:
  - check scales, load construction, or the lay of logs
  - secure the load with relevant **lashings**

Self-loading trucks

- Ensure self-loading trucks are fitted with outriggers and stabilisers that firmly stabilise the unit while loading
- Ensure outriggers and stabilisers conform to *AS 1418.5-2013 Cranes, hoists and winches – Part 5: Mobile cranes*.
- Provide a positive means to prevent a free fall of the boom if there is a malfunction
- Provide a safe means of access to the log loading position

Load design	● If you are the driver, ensure the load is constructed so that it meets the requirements of the National Transport Commission (NTC) *Load restraint guide* ● Place the load on the vehicle to ensure the load: – can be restrained effectively – does not destabilise the vehicle – remains stable when applying and removing lashings – is not contaminated with items that can fall from the vehicle in transit ● Ensure no more than 50% of the end diameter of any log is above the top of a cab guard, headboard, tailboard, or stanchion ● Ensure outside logs that are in contact with the stanchion have no part of that log above the height of the stanchion ● Crown all loads of logs to allow proper clamping ● Ensure outer ends of the outside logs extend 300 mm beyond the stanchions ● Secure all logs by at least two load lashings, either directly by contact with the stanchion or restraint, or indirectly if bound by surrounding logs ● If you are the driver, ensure that: – logs are secure before moving the vehicle – lashings are regularly checked to correct the tensions during transit – loose bark is removed – if necessary, the loading configuration is adjusted by suitable log-handling equipment
Correct load restraint	● Ensure load restraint devices are designed to conform to the NTC's *Load restraint guide* ● Apply lashings using a method that minimises the risk of manual strain injuries (e.g. use light weight extension pole) ● Regularly inspect and maintain lashings and tensioners to ensure they are fit for purpose ● Where practical, fit a rear restraint device to prevent logs sliding from the back of the load ● Where stanchion extensions are used, fasten them securely

10.3 Unloading

As with loading, the PCBUs involved in unloading forest produce should plan this activity to ensure safety. These parties could include:

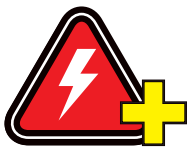
- the forest manager
- the haulage contractor
- the receiver of the forest produce, such as a saw mill or pulp processor.

Planning

The planning should include:

- a risk assessment of the unloading site and the receiver's unloading process
- induction materials for truck drivers, including safe work procedures developed by the receiver on the unloading process, traffic management, and scheduling
- signage and communication protocols to be used in the unloading process.

Unloading is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.



The following **activity-specific hazards** need to be considered:

- △ Being struck by another vehicle
- △ Being struck by a log when releasing lashings
- △ Being struck by straps, chains or shackles when removing lashings
- △ Strains from removing lashings
- △ Slips, strains and falls when workers are getting in and out of machines
- △ Cramped unloading zone
- △ Tripping on uneven or muddy ground

	The following **activity-specific risk factors** also need to be considered: ● Logs that may have moved in transit ● Poor light conditions ● Hours of operation and schedules that may create fatigue ● Variation in practices at different processing facilities ● Debris in unstrapping zone that may lead to slips and trips

The **essential risk controls** are all relevant to unloading.

	**Activity-specific controls** are listed below. For more detailed advice on unloading, especially safe work areas, refer to the AFPA *Log loading guideline*.
Exclusion zone and safe work areas	● Physically separate the unstrapping zone from other trucks and site traffic, including a traffic-free zone at least 5 metres beside the truck so the driver can move clear of the restraint drop zone ● If you are the loader operator, ensure the immediate vicinity is clear of people during unloading operations ● Ensure all people, including the driver, are at least 4 metres to the front or 10 metres to the rear of the vehicle being unloaded ● During machine-assisted unstrapping, if you are the driver, notify the loader operator and receive an acknowledgement before entering an exclusion zone to remove lashings ● If the driver has to wait during unloading, provide adequate shelter and amenities ● Where appropriate, mark safe work zones
Plant used to unload	● Ensure machines used to unload trucks are specifically designed to lift the logs they handle over the top of pins and stanchions ● Use specific-purpose loading bays where available
Safe work procedures	● If you are the driver, inspect the load for signs of possible movement before unstrapping ● Ensure the unloading facility has an arrangement to secure logs on top of the load if the driver suspects movement ● Unload all logs above the height of a stanchion using a machine-assisted unloading procedure ● Use a machine-assisted unstrapping procedure if the load has become unstable or lashings jammed ● Ensure the driver steps back from the load after binders have been released and watches the top of the load for any signs of instability ● Where a dog is used to tension chains, stand clear of the dog handle when releasing the tension
Machine-assisted unstrapping procedure	● Ensure this procedure is followed for machine-assisted unstrapping: – Driver requests a loader operator for assistance – Driver drives truck to the unloading zone – Driver moves to the driver safe area – Loader operator secures load and advises the driver when it is safe to approach – Driver removes the lashings – Driver moves back to the driver safe area and notifies the loader operator that is safe to begin unloading – Driver and loader operator communicate with each other via two-way radio – Loader operator controls this operation
PPE	● Wear a helmet, high-visibility clothing, safety footwear and eye protection while removing lashings ● Wear night-rated high-visibility clothing if working in poor light conditions
Communication	● When the truck arrives at the receiving point, establish communication between the truck driver and loader operator ● Follow the processing facility's communication and unloading rules (e.g. speed limits and signs)

11 IN-FIELD PROCESSING

Planning

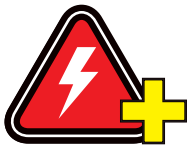
The planning and risk assessment in the site safety plan (SSP) should apply to in-field processing activities such as chipping, portable sawmilling, and firewood collection. The space should always be suitable to complete these activities safely and protect others working in the same area. Refer to *Section 10* on the related issue of log landings.

In-field chipping involves moving large volumes of logs to a dedicated location, removing branches and bark, and processing the logs into chips. Careful planning is important to help ensure:

- the site is big enough
- products are removed from the processing site as they are generated to prevent clutter.

Commercial firewood collection requires a permit or agreement with the landowner or forest manager. It must be done in line with their health and safety policies.

In-field processing operations are carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.



The following **activity-specific hazards** need to be considered:

In-field chipping

- Workers struck by falling metal cowls and guards
- Contact with rotating chipper disc or flails
- Entrapment
- A machine fire
- Falling from height
- Noise

Portable sawmilling

- Material from saw blade flying towards operator
- Operator's fingers or limbs coming into contact with saw blade
- Workers moving and locating logs manually

Product processing

- Kickback or recoil from the chainsaw
- Chain breaks and possible exposure to chain shot
- Contact with other machines

Firewood cutting

- Sudden uncontrolled movement of either the stump or the log where it is resting on roots or under tension
- Workers manually lifting and stacking firewood, boards, posts, or sleepers
- Operator's hand or arm crushed by moving axe, wedge, pressure plate, or wood when using mechanical log splitter

The following **activity-specific risk factors** also need to be considered:

- Potential line of throw of failed equipment parts or cutting line of saw
- Communication systems for ground workers and machine operators
- Traffic flow and management in the work area

The risk controls for in-field processing are highly dependent on the design and selection of machinery. *Section 2.3* outlines the duty of designers, manufacturers, and suppliers to provide equipment that can safely undertake the task and reduce risks to operators.

The **essential risk controls** are all relevant to in-field processing. In particular, all in-field processing should be done by operators with the relevant competencies (see *Section 15.4*).

ESSENTIAL CONTROLS	**Activity-specific controls** are listed below:
In-field chipping	
Exclusion zone and safe work areas	• Create designated safe work areas for truck drivers, record them on the site-specific risk assessments and ensure all truck drivers who visit the site sign the relevant risk assessment • Establish and maintain exclusion zones (two tree lengths from ground workers and further if needed in front of debris chute) for all items of plant and equipment
Safe work procedures	• Ensure the operator is trained in the working limits of the machine • Wear suitable and correctly maintained personal protective equipment (PPE) for the work (e.g. high-visibility clothing, hearing protection, and safety gloves when handling fuels or chipper blades)
Safe use of plant	• Only ever operate plant and equipment within the manufacturer's specifications • Isolate plant and equipment before servicing or repairs • Use interlocks on chipper hoods to ensure they cannot be opened while the chipper disc is running down
Communication	• Establish radio communication or other effective means of contact with other forest workers
Portable sawmilling	
Safe use of plant	• Only ever operate plant and equipment within the manufacturer's specifications • Isolate plant and equipment before servicing or repairs • Guard saw blades using a suitable means • Never operate the machine while hands are still in contact with the material being cut • Ensure any machine that moves or lifts logs is fitted with rollover protective structures (ROPS) and falling object protective structures (FOPS).
Exclusion zone and safe work areas	• Establish and maintain exclusion zones for all items of plant and equipment
Safe work procedures	• Ensure the operator is trained in the working limits of the machine • Stand clear of the cutting line of the saw • Wear suitable and correctly maintained PPE for the work (e.g. eye protection, high visibility clothing, and hearing protection).

Product processing	
 **Safe use of plant**	● When using a mechanical processor or cut off saw, ensure the line of the cut is never directed at ground workers ● Where a chainsaw is fitted to a machine and used for preparing logs, limit the risk of chain shot by keeping the shot cone area clear of other workers (see *Figure 15*) ● Remove bark away from the swing path of the loader boom ● Whenever chainsaws are used, follow the techniques in *Chainsaw Operators Manual and Tree Fallers Manual* and secure logs before cutting
 **Safe work procedures**	● Wear suitable and correctly maintained PPE for the work (e.g. hearing protection, eye protection, and safety gloves) ● Use log marking paint according to the instructions on the label and the safety data sheet
 **Communication**	● Establish radio communication or other effective means of contact with other forest workers
Firewood cutting	
 **Safe use of plant**	● Only ever operate log splitters within the manufacturer's specifications ● Provide suitable guarding of the wedge, axe, and pressure plate on the mechanical splitter ● Use mechanical aid to lift boards, posts, or sleepers
 **Safe work procedures**	● Wear suitable and correctly maintained PPE for the work (e.g. high visibility clothing, hearing protection, eye protection, and safety gloves)

12 SILVICULTURE

In this Code, silviculture refers to the science and practice of managing the establishment, growth, health, and protection of stands of trees or forests. This includes a wide variety of activities to maximise the value of timber production, such as:

- burning operations (refer to *Section 13 Fire management* for relevant safety information)
- harvest residue management
- site and soil preparation
- seed collection
- tree planting
- chemical use for nutrient and weed management
- competition control
- protection of crops from browsing animals
- pruning and thinning.

This section has three subsections:

- generic hazards and risks associated with the machinery and equipment used across silvicultural operations
- specific hazards and risk associated with establishing a new forest
- specific hazards and risk associated with maintaining a plantation or forest.

The use of hand tools is included in the sections that address specific hazards.

12.1 Machinery and equipment used across silvicultural operations

The silvicultural operational cycle involves a range of tasks using manual methods, ground-based mechanical methods, and aerial operations.

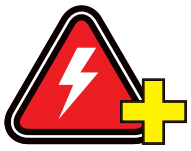
Ground-based mechanical methods use machinery and equipment such as tractors, **all-terrain vehicles (ATVs)**, bulldozers, tractors and excavators, chainsaws, and brush cutters. These each have generic ways of reducing risk to users and other workers that are covered in the section that follows. The generic risk controls focus on equipment use and design, and operator requirements.

Aerial operations can use equipment such as drones, helicopters, and light planes. These operations also have some common risks and controls.

Specific hazards and risks relating to the use of machinery and equipment in individual silvicultural activities are covered in the later sections.

12.1.1 Ground-based machinery and equipment

The use of ground-based machinery and equipment in silvicultural work is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.



The following **activity-specific hazards** need to be considered:

- Vehicle rollover and run over
- Vehicle instability when carrying or pulling loads
- Falls or strains accessing or exiting machine
- Unbalanced loads or overloading
- Loads shifting in transit
- Excessive loads being towed with unbraked equipment
- Entanglement with unguarded drive and power take-off (PTO) shafts
- Fitting and use of custom-built attachments like chopper rollers, ploughs, and spray units
- Onsite machine maintenance
- Interaction with ground-based workers
- Brush cutter and chainsaw hazards such as lacerations, kickback, and one-handed use

The following **activity-specific risk factors** also need to be considered:

- Steep and/or uneven ground
- Ground conditions
- Communication systems for ground workers and machine operators
- Dust
- Noise
- Extreme weather
- Working in isolation

The **essential risk controls** are all relevant to ground-based machinery and equipment use.

Activity-specific risk controls are listed below:

Generic equipment design and operation controls

- Operate the machine and attachments in line with the manufacturer's specifications (e.g. slope, tyre pressure, load, and towing)
- Guard any moving parts and other hazards on tractors and attachments
- Ensure the machine is suitable for slope and work pattern
- Ensure that protective structures (e.g. rollover protective structures (ROPS), falling object protective structures (FOPS), and operator protective structures (OPS)) are suitable for the machinery, conditions, and type of work and conform to the relevant technical standards (see *Section 15.1*)
- Ensure operators wear seatbelts and there are no loose objects inside the machine's cabin
- Ensure the machine has handrails and steps
- Shut down and isolate machinery completely during maintenance

 **Generic operator requirements**	• Ensure the operator either holds a statement of attainment for the unit of competency relevant to the skill or machine required (see *Section 15.4*) or can demonstrate progress to meeting the performance standard on which the competency is based • Ensure the operator is trained in the working limits of the machine and techniques for use (e.g. limits for working on steep slopes) • Ensure the operator is aware of any identified site hazards, such as power lines and underground assets
 **Safe use of chainsaws**	• Follow safe work practices, for example as in as in the *Chainsaw Operators Manual* and *Tree Fallers Manual* • Ensure equipment is maintained, including the chainsaw's safety features (e.g. guards and chain brakes) • Carry felling equipment, including an axe or suitable size hammer, wedges suitable for the trees to be felled, a two-way communication device, wound dressings, chainsaw fuel and oil in approved containers • Use personal protective equipment (PPE) suitable for the task (e.g. a safety helmet with hearing protection, eye protection, high-visibility clothing, safety footwear, and leg protection) • Ensure PPE is reasonably comfortable for the wearer and well maintained
 **Brush cutters**	• Follow *AS 3575-1995 Clearing saws, brush cutters and grass trimmers – Safety requirements* and *AS/NZS 3576-1998 Clearing saws, brush cutters and grass trimmers – Guide to safe work practices* • Ensure equipment is maintained, including any safety features (e.g. guards)

12.1.2 Aerial operations

Aircraft such as helicopters, light planes and unmanned vehicles (drones) can be used for a range of purposes during silviculture. These include mapping, identifying diseases, applying fertiliser, planting, and evaluating forest growth and post-harvesting waste.

The Civil Aviation Safety Authority (CASA) is the regulatory body for aircraft operation.

Helicopters and light planes are covered by the *Civil Aviation Safety Regulations 1998 (CASR)*. These include:

- compliance with airspace rules
- compliance with pilot qualifications
- operating according to manufacturer's specifications.

Part 101 of the CASR – Unmanned aircraft and rockets – outlines requirements relevant to drones.

For more information, see CASA's advisory circulars:

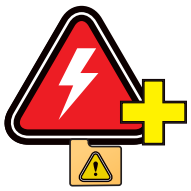
- *Guidelines for helicopters – suitable places to take off and land*, advisory circular AC 91-29 v1.3
- *Remotely piloted aircraft systems – licensing and operations*, advisory circular AC 101-01 v5.1.

Drone safety rules need to be followed and a remotely piloted aircraft operator's certificate (ReOC) is required for the commercial use of drones. A ReOC permits a business to conduct a range of remotely piloted aircraft (RPA) operations – subject to approval – that are not available to other operators.

An exemption exists for use over your own land, but operators still need to be accredited by CASA and registration is likely in the future.

These matters are not covered here and the focus is on interaction with ground-based operations in forestry.

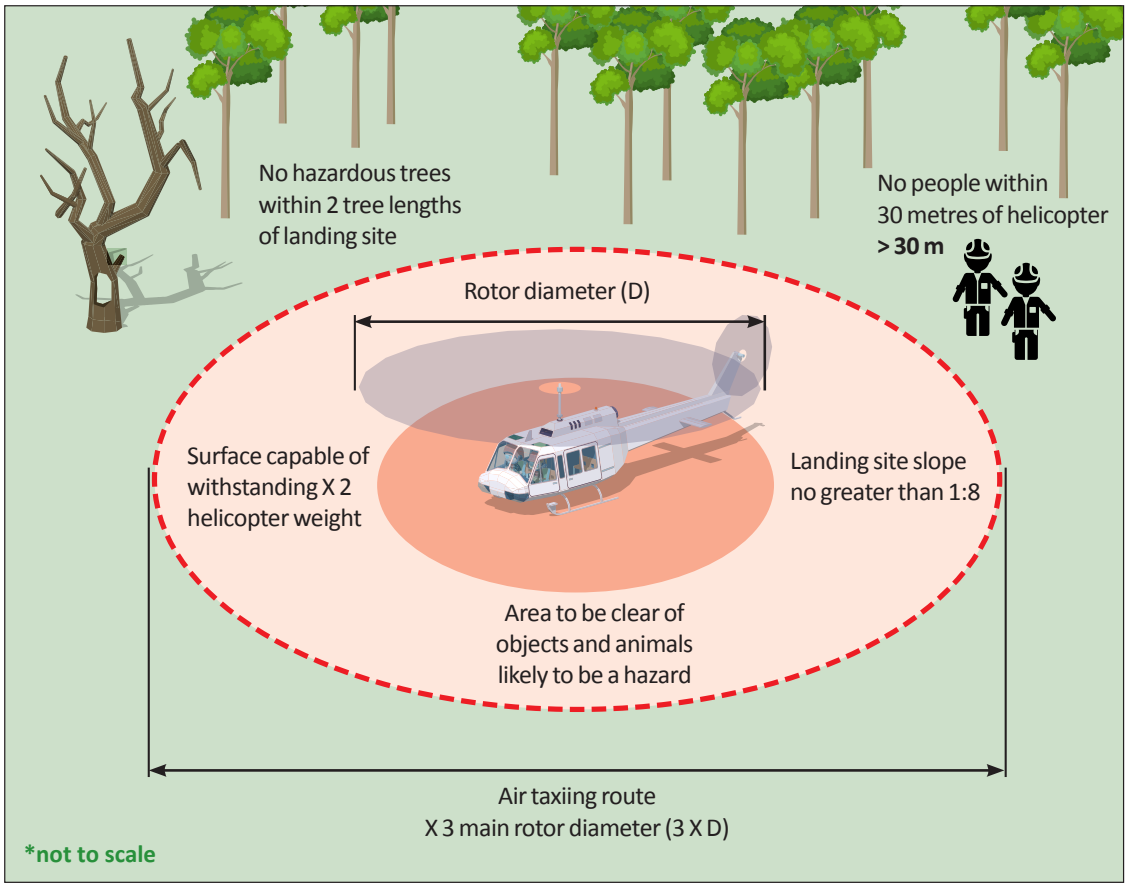
The use of aircraft in silvicultural work is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.

	The following **activity-specific hazards** need to be considered: △ Extreme weather conditions △ State of landing areas △ Impact of adjacent operations △ Poor visibility
	The following **activity-specific risk factors** also need to be considered: ● Change in weather conditions that impact controlled delivery of service (e.g. wind, mist, rain, or smoke) ● Change in line-of-sight capacity

The **essential risk controls** are all relevant to the use aerial operations.

	**Activity-specific controls** are listed below:
Safe work practices for drones	● Engage contractors who comply with CASA requirements ● Use suitable take-off and landing areas that do not impact on other operations ● Communicate flight plans and schedules to adjacent operations ● Assess collision risk (e.g. from power lines or infrastructure) and maintain separation distances ● Establish emergency procedures for collisions, medical emergencies, loss of control, malfunction, and fires (e.g. as a result of battery malfunction or faulty electronic wiring)
Safe work practices for helicopters	● Use a suitable landing site on flat ground, free of loose debris, and separated from hazards (e.g. trees or objects) to achieve a safe landing zone (see *Figure 20*) ● Plan operations so that anyone affected is aware of the scope and timing ● Have a clear line of control between the helicopter and ground staff through a designated ground controller ● Restrict access to the landing zone to authorised persons ● Follow standard safety precautions for entering and exiting helicopter (e.g. remove loose items, approach from front visible to pilot, and follow hand signals to enter rotor zone) ● Ensure emergency plans include helicopter evacuation and relevant information, such as type of helicopter to be called and compatibility with first aid arrangements (e.g. size of stretcher) ● Follow the more detailed guidance on helicopter safety in Section 12 of the Safe Work Australia *Guide to growing and managing forests*
Safe work practices for light aircraft	● Do not approach the aircraft while the engine(s) are starting up, running or running down ● Do not approach the aircraft until directed to do so by the pilot ● Approach the aircraft from the side, preferably in view of the pilot ● Plan operations so that anyone affected is aware of the scope and timing ● Restrict access to the landing zone to authorised persons ● Communicate flight plans and schedules to adjacent operations ● Assess collision risk (e.g. from power lines or infrastructure) and maintain separation distances

Figure 20: Safe work around helicopters



Further information on aerial spraying can be found in *Section 14.6 Hazardous chemicals*.

12.2 Forest establishment

Planning for planting and replanting is an opportunity to:

- design in safety aspects for future operations
- learn from risks evident in the previous rotation or operation.

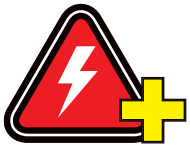
To minimise risk, planting methods should account for future harvesting and reforestation risks, identified site hazards, and the use of existing landings.

Use of machinery and equipment should be appropriate for the area, accounting for hazards identified by the forest manager or landowner. Information on any adjacent operations and their work schedules should be used to minimise the impact on others working on the site.

12.2.1 Mechanical site preparation

Machinery such as bulldozers, excavators, or large tractors may be used to prepare the site. Often they help to manage the residue of the previous tree crop. This process may involve pushing debris into windrows or chopper rolling. Preparing the soil may also involve machinery-dependent processes known as mound ploughing, deep ripping, or mechanised spot cultivation.

Site preparation is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.

	△ The following **activity-specific hazards** need to be considered: △ Hazardous trees within or adjacent to area △ Stumps left from previous rotation △ Unstable ground △ Rocky ground △ Fatigue from physical work for extended periods of time △ Exposure to snake and insect bites and stings △ Exposure to extreme weather conditions
	△ The following activity-specific risk factors also need to be considered: △ Debris from previous rotation (e.g. windrowing or mechanical cultivation) △ Timing and scheduling of work

The **essential risk controls** are all relevant to site preparation.

	**Activity-specific controls** are listed below:
 **Safe work practices**	● Avoid operating machines directly above other machines and ground workers where stumps, rocks, or logs may roll or slide down the slope ● Form windrows and heaps with larger stumps or logs at the base of the windrow/heap and smaller material around them to increase stability ● Park machinery on flat, level ground whenever possible
 **Personal protective equipment**	● Wear personal protective equipment (PPE) that is suitable for use and correctly maintained (e.g. high-visibility clothing, safety footwear, hearing protection, and safety helmet when outside the cabin (see *Section 15.2*)
 **Exclusion zones and safe work areas**	● Ensure separation distances and safe work areas are identified and maintained ● Ensure the machine (and any material it is pushing or pulling) remains more than two tree lengths away from any people on the ground ● Where two tree lengths is not applicable, maintain a safety zone of no less than 100 metres ● Remove any hazardous trees (or create an exclusion zone if the trees cannot be removed, e.g. a habitat tree) that impinge on safe work areas ● Maintain suitable separation distances from overhead power lines and other infrastructure, and comply with any 'No Go Zones'
 **Communication**	● Maintain oral and visual communication with other workers ● Establish and maintain relevant warning signage

12.2.2 Tree planting

This section addresses mechanical and hand planting of trees. These processes can involve lifting and carrying trees, frequent bending, and heavy physical work.

Planning

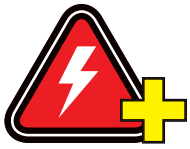
Part 4.2 of the WHS Regulations on hazardous manual handling applies to this activity.

Generally, tree planting activities are repetitive, involve high force, and are carried out in dynamic and unpredictable work environments. Tree planting meets the definition of a hazardous manual task under the WHS Regulations.

A person conducting a business or undertaking (PCBU) must manage health and safety risks relating to musculoskeletal disorders associated with hazardous manual tasks. For more guidance, refer to the Safe Work Australia approved Code of Practice *Hazardous manual tasks.*

Use of machinery should be appropriate to the task and site conditions. It should also meet the generic requirements in *Section 12.1.1*.

Tree planting is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.



The following **activity-specific hazards** need to be considered:

- Body pain or strain from carrying excessive weight, containers, or trees large distances before planting
- Body pain or strain from the repetitive and sustained application of force, awkward posture, or frequent bending or kneeling during planting
- Blisters and dry skin from handling hand tools and soil
- Fatigue from physical work for extended periods of time
- Exposure to snake and insect bites and stings
- Exposure to extreme weather conditions
- Debris flicking up into the face or eyes

The following **activity-specific risk factors** need to be considered:

- Ground conditions following use of particular harvesting methods
- Site preparation and debris from previous rotation (e.g. windrowing or mechanical cultivation)
- Type and size of planting stock
- Carrying distances
- Timing and scheduling of work

The **essential risk controls** are all relevant to tree planting.

Activity-specific controls are listed below:

Mechanical tree planting

- Complete a site assessment to ensure the machine is suitable
- Ensure the operator is protected from stick and logging debris
- Use transfer mechanisms to minimise the handling of seedlings

Manual handling practices

- Use a machine to carry stock to the planting site
- Use planting tools (e.g. purpose-built spades) that minimise or eliminate the need for bending and minimise force
- Ensure carrying frames are adjusted for each individual
- Restock carry frames on the ground or have someone else do it to avoid twisting and lifting while wearing the frame
- Perform warm-up and warm-down exercises before and after planting sessions
- Provide information and training on techniques to reduce risks (e.g. neutral postures and change of hands) and to identify the best ground for planting

Personal protective equipment and first aid

- Make first aid available for specific risks such as stings and bites
- Plan communications for emergency situations
- Wear suitable protective clothing, including non-slip safety footwear with ankle support, high-visibility outer garments, long pants, long sleeves, gators, wet weather gear, and ultraviolet radiation (UVR) protection

Slips, trips, and falls	• Review site for hazards before work starts • Follow a suitable work–rest regime for the conditions (e.g. heat) • Provide access to drinking water • Use safety footwear
Exclusion zone and safe work areas	• Do not work directly above other workers on steep slopes • Stay at least 10 metres away from ATVs and other machinery on site • Comply with all warning signs on site
Communication	• Determine communication methods between planting crew members before starting on a new site • Provide access to a mobile phone or other reliable communication device for emergency calls

12.2.3 Weed control

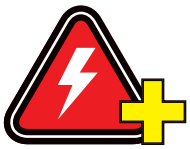
This section covers manual and machine weed control practices. Manual weed control involves frequent bending and heavy physical work using tools like axes, shears, and hand-held motorised plant. Where chemical herbicides are applied – either by workers using spray units or by machines with spray units or booms – different issues arise related to exposure to hazardous chemicals.

Planning

Both manual and mechanical methods are bounded by regulations on hazardous manual handling, hazardous chemicals and agricultural chemicals. The *Code of practice for the use of agricultural and veterinary chemicals in Western Australia* must also be followed.

Initial coupe planning and risk assessment should provide information on soil types and vegetation. This information will inform the most appropriate weed control methods and scheduling. Other site hazards should be identified, and controls established before work starts.

Weed control is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.

	The following **activity-specific hazards** need to be considered: △ Muscular pain or strain from manual weed control work △ Muscular pain or strain from handling and storing chemicals and application methods (e.g. using harnesses) △ Exposure to chemicals △ Exposure of others working near chemicals △ Exposure to snake and insect bites and stings △ Walking or working with machines on steep ground
	The following **activity-specific risk factors** also need to be considered: • Weight and shape of chemical containers • Toxicity of chemicals • Walking distances • Weather conditions that may affect spray drift • Timing and scheduling of work • Ground conditions following use of particular harvesting methods

Eliminating or minimising risk is the starting point for deciding what controls should be used (e.g. using machines rather than manual work or less hazardous chemicals). The **essential risk controls** are all relevant to weed control.

	**Activity-specific controls** are listed below:
Chemical weed control	
 **Aerial spraying**	● Develop a spray plan in line with the *Code of practice for the use of agricultural and veterinary chemicals in Western Australia* ● Take precautions to avoid spray drift
 **Machines with spray units**	● Identify safe routes for vehicles ● Check on weight and load distribution before operation ● Select machines that have enclosed cabins and air conditioning units with appropriate air filters ● Calibrate application equipment ● Use pumps to deliver chemicals and water into spray tanks ● Use chemical-proof PPE when checking and calibrating nozzles
 **Manual application**	● Use manufacturers and suppliers who can provide product in smaller, lighter packaging and provide lifting points or aids to minimise the use of force ● Supply chemicals in smaller containers where they will be physically handled by workers ● Follow a suitable work–rest regime for the conditions (e.g. heat)
 **Exclusion zone for ground-based operations**	● Maintain a distance of more than: – two tree lengths between machine-based chemical spraying (dozer/tractor) and other operations – 5 metres between vehicles or trailers fitted with spray units and other ground workers – 5 metres between ATVs fitted with spray units and other ground workers – 5 metres between individuals using spray units and other ground workers
 **Personal protective equipment and first aid**	● Wear suitable PPE, including a safety helmet, eye protection, and non-slip safety footwear with ankle support, as well as more specific equipment such as: – protective chemical-proof overalls – chemical-proof gloves – a dust-proof filter mask for powders or granules as specified in the safety data sheet – a vapour-proof chemical mask for liquid chemicals as specified in the safety data sheet ● Wear suitable PPE when using an ATV (e.g. a helmet conforming to *AS/NZS 1698:2006 Protective helmets for vehicle users* or an equivalent standard, and eye protection) ● Make first aid available for specific risks such as stings and bites and in line with safety data sheet requirements, including arrangements for emergency eye washing and spill kits after eye washing

Mechanical weed control	
 **Mulchers and slashers**	● Ensure custom attachments are matched to the capacity and design of the base vehicle ● Ensure mulchers or slasher have deflectors, chain curtains, or other suitable guarding, mounted at the intake and discharge areas
 **Personal protective equipment**	● Wear suitable PPE, including a safety helmet, eye protection, and non-slip safety footwear with ankle support

12.2.4 Fertiliser

Fertiliser may be used at several stages when a forest is being established. It may be applied by aerial spraying, machine spreaders or manual methods.

Planning

The type of fertiliser to used, the application rate and timing of application, may have implications for health and safety. Planning how fertiliser will be spread in a safe way should be assessed before work starts.

Fertiliser application is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.

	The following **activity-specific hazards** need to be considered: △ Chemical reaction to extreme conditions (e.g. heat or other chemical contamination) △ Slips, trips, and falls walking around the site △ Sprains and strains restocking fertiliser bags △ Exposure to dust and chemicals △ Burns or skin irritation △ Exposure to solar UVR
COMMON RISKS	The following **activity-specific risk factors** need to be considered: ● Walking distances ● Timing and scheduling of work ● Ground conditions following use of particular harvesting methods

The **essential risk controls** are all relevant to fertilising.

ESSENTIAL CONTROLS	**Activity-specific controls** are listed below:
Aerial spraying	● Develop a spray plan in line with the *Code of practice for the use of agricultural and veterinary chemicals in Western Australia* ● Take precautions to avoid spray drift
Mechanical spreaders	● Ensure suitable guarding of the hopper top and front spinning guards, spinner at the bottom of the fertiliser spreader, and the cultivation blades inside the hopper
Manual application	● Use manufacturers and suppliers who can provide product in smaller, lighter packaging and provide lifting points or aids to minimise the use of force ● Supply fertiliser in smaller containers where it will be physically handled by workers ● Follow a suitable work–rest regime for the conditions (e.g. heat)
Exclusion zone for ground-based operations	● Maintain a distance of more than two tree lengths between a machine-based fertiliser spreader and other operations

Personal protective equipment and first aid	• Wear suitable PPE, including a safety helmet, eye protection, and non-slip safety footwear with ankle support, as well as more specific equipment such as: – gloves – a dust-proof filter mask for powders or granules as specified in the safety data sheet • Make first aid available for specific risks such as stings and bites and in line with safety data sheet requirements, including arrangements for emergency eye washing

12.3 Maintenance

Maintenance operations prevent damage to the tree crop and maximise its growth and value. Other biological organisms including fungal diseases, insects, and animals (e.g. rabbits and deer) may damage crop trees.

Planning should outline what maintenance activities are required. Regularly monitoring forest health enables a timely response to any issues. Forest growth is generally measured via specific inventory programs.

Monitoring and inventory programs require workers to walk under forest canopies – often through heavy undergrowth where most of the **critical hazards** and **common risk factors** are present.

	The following **activity-specific hazards** need to be considered: △ Hazardous trees △ Branches △ Heavy undergrowth that may be spiky △ Snakes and insects △ Slips, trips, and falls walking around the site △ Exposure to solar UVR
COMMON RISKS	The following **activity-specific risk factors** also need to be considered: • Timing and scheduling of work • Working at night

The **essential risk controls** are all relevant to maintenance operations.

ESSENTIAL CONTROLS	**Activity-specific controls** for monitoring and inventory work are listed below:
Safe work procedures	• Review site for hazards before work starts • Plan operations to minimise walking through rough terrain • Pre-assess night operations • Follow a suitable work–rest regime for the conditions (e.g. heat) • Provide access to drinking water • Use safety footwear
Personal protective equipment and first aid	• Make first aid available for specific risks such as stings and bites • Plan communications for emergency situations • Wear suitable protective clothing, including non-slip safety footwear with ankle support, high-visibility outer garments, long pants, long sleeves, gators, wet weather gear, and UVR protection

Exclusion zone and safe work areas	• Comply with all warning signs on site from other operations

12.3.1 Protection from insect or fungal infestation

Insect and fungal disease control is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.

	The following **activity-specific hazards** need to be considered: △ Exposure to chemicals △ Exposure of others working near chemicals △ Exposure to snake and insect bites and stings △ Walking on steep ground
	The following a**ctivity-specific risk factors** also need to be considered: • Toxicity of chemicals • Weather conditions that may affect spray drift • Timing and scheduling of work

Eliminating or minimising risk is the starting point for deciding what controls should be used (e.g. machine rather than manual work or less hazardous chemicals). The **essential risk controls** are all relevant to pest management.

	Activity-specific controls are listed below:
Aerial spraying	• Develop a spray plan in line with the *Code of practice for the use of agricultural and veterinary chemicals in Western Australia* • Take precautions to avoid spray drift
Machines with spray units	• Identify safe routes for vehicles • Check on weight and load distribution before operation • Select machines that have enclosed cabins and air conditioning units with appropriate air filters • Calibrate application equipment • Use electric pumps to deliver chemicals and water into spray tanks • Use chemical-proof PPE when checking and calibrating nozzles
Manual application	• Use manufacturers and suppliers who can provide product in smaller, lighter packaging and provide lifting points or aids to minimise the use of force • Supply chemicals in smaller containers where they will be physically handled by workers • Follow a suitable work–rest regime for the conditions (e.g. heat) • Use well-maintained and calibrated subsoil seedling injectors
Exclusion zone for ground-based operations	• Maintain a distance of more than: – 5 metres between vehicles or trailers fitted with spray units and other ground workers – 5 metres between individuals using seedling injectors and other ground workers

Personal protective equipment and first aid	● Wear suitable PPE, including a safety helmet, eye protection, and steel-toe lace-up footwear with ankle support and non-slip soles, as well as more specific equipment such as: – protective chemical-proof overalls – chemical-proof gloves – a dust-proof filter mask for powders or granules as specified in the safety data sheet – a vapour-proof chemical mask for liquid chemicals as specified in the safety data sheet ● Wear suitable PPE when using an ATV (e.g. a helmet complying with *AS/NZS 1698:2006 Protective helmets for vehicle users* or equivalent standard, and eye protection) ● Make first aid available for specific risks such as stings and bites and in line with safety data sheet requirements, including arrangements for emergency eye washing

12.3.2 Protection from animal browsing

Animal browsing can destroy or damage crop trees in planted forests. Protection operations aim to remove the threat until trees are large enough to withstand damage.

Non-lethal control involves the use of:

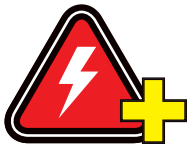
△ repellants – where specific products are applied to the seedlings to discourage browsing
△ tree guards – where fluted plastic tubes encase seedlings
△ fencing – where fence barriers protect high value crops such as seedling stocks.

Lethal control (culling) involves the use of:

△ firearms
△ trapping
△ poisons.

Planning

The type of control used may have implications for health and safety. Planning should assess how pest management will be done safely, before work starts.

	The following **activity-specific hazards** need to be considered: △ Firearm injuries △ Noise △ Off-target poisoning △ Injuries from carrying and handling tree guards or fencing materials
	The following **activity-specific risk factors** also need to be considered: ● Isolation ● Impacts on neighbours ● Working at night ● Slips and trips

The **essential risk controls** are all relevant to protecting crops from animals.

	**Activity-specific controls** are listed below:
Non-lethal control	
 **Safe work procedures**	• Plan operations to reduce risk of strain injuries • Wear a safety helmet and safety footwear • Wear high-visibility clothing • Wear eye protection and leather gloves while fencing • Make first aid available for specific risks such as stings and bites and in line with safety data sheet requirements, including arrangements for emergency eye washing
Lethal control - firearms	
 **Safe work procedures**	• Hold the appropriate firearms licence for any firearms being carried or used • Always have a functional communication system • Wherever possible, be accompanied by another person • Ensure that you have a functional GPS tracking device and spare batteries • Notify all neighbours before starting operations on a site • Ensure that firearms and ammunition are stored in line with the state's firearms regulations • Adhere to all basic firearm safety requirements • Ensure that firearms are secured (restrained) and not loaded while travelling in a vehicle in line with relevant legislation • Know the range of the ammunition being used • Identify the target before shooting
 **Exclusion zones**	• Do not shoot at a target if what is behind the target cannot be seen • Do not shoot over public roads or tracks • Do not shoot over property boundaries
 **Personal protective equipment and first aid**	• Wear well-maintained hearing protection • Ensure that anyone within 5 metres of a shooter (e.g. a passenger) also wears hearing protection • Wear a safety helmet and safety footwear • Wear high-visibility garment(s) • Wear eye protection

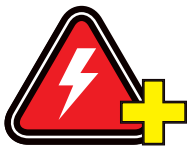
12.3.3 Pruning

Pruning is the removal of branches from the main trunk of a tree to improve the quality and value of the timber produced.

 **Planning**

Many of the hazards and risk controls for tree climbing (see *Section 15.7*) apply to pruning and a limited number of hazards are covered here. The planning and risk assessment issues for tree climbing also apply to pruning.

Tree pruning is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.

	The following **activity-specific hazards** need to be considered: △ Falling from height △ Slipping on ladders when climbing up or down △ Pruning tools coming loose while working △ Chainsaw hazards such as kickback or one-handed use △ Ladder sway when pruning in windy conditions △ Exposure to snake and insect bites and stings △ Cuts and abrasions from mishandling pruning equipment △ Being struck by falling limbs or other debris △ Carrying ladders while walking through thick undergrowth
	The following **activity-specific risk factors** also need to be considered: ● Ground conditions following use of particular harvesting methods ● Individual tree integrity, including: – age and species – health – condition of the crown – decay – proximity of other trees

The **essential risk controls** are all relevant to tree pruning.

	**Activity-specific controls** are listed below:
 **Safe climbing practices**	● Work from ground level where practicable (e.g. use a pole saw) ● Assess each tree, particularly for prune height and access method ● Ensure cutting methods do not cause limbs to fall into the ladder or climber ● Do not carry out pruning operations during extreme weather when the movement and dynamic loading on the tree can be unpredictable ● Establish a clear walking path before moving from one tree to the next ● Use other controls in line with *Section 15.7*
 **Ladders**	● Use a purpose-built ladder attached to the tree trunk at its top and secured at the base ● If working from a ladder at height, use a work-positioning harness and a steel core, rope flip-line attached to the tree to reduce the risk of a fall ● Use other controls in line with *Section 15.7*
 **Pruning equipment**	● Always use a scabbard or holster to carry pruning equipment (e.g. shears, secateurs, loppers, or saws) and always pick up loppers using the handles ● Ensure chainsaw operators follow the safety precautions in as in the *Chainsaw Operators Manual* and *Tree Fallers Manual.* ● Regularly maintain pruning equipment
 **Personal protective equipment and first aid**	● Wear suitable PPE, including a safety helmet, eye protection, cut resistant gloves, and steel-toe lace-up footwear with ankle support and non-slip soles ● Make first aid available for specific risks such as stings and bites ● Plan communications for emergency situations

12.3.4 Thinning

Planning

Thinning is a selective felling operation and may include one or more of the following:

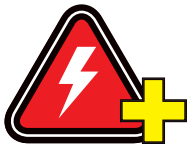
- **Ecological thinning** – thinning to improve the health and vitality of a natural forest
- **Commercial thinning** – thinning to extract small piece size material, and thinning for saw log and small produce
- **Non-commercial thinning** – thinning to waste and thinning for stand improvement.
- **Coppice management** – reducing the number of **coppice** stems on a single stump.

The safety procedures for thinning operations are like those for felling other trees. Refer to and apply requirements of *Section 8*. In particular, the following controls should also be used by everyone involved in thinning operations:

- Identify hazardous trees by referring to the features in *Section 14.2*.
- Ensure fellers keep watch on the falling tree and look out for limbs and branches that may be thrown back.
- Remove dead or defective trees in the intended fall direction before starting thinning operations.
- Bring hung-up trees to the ground as soon as possible.
- Ensure the feller does not leave the area until the tree is grounded, except to seek assistance. Before leaving to seek assistance, the feller should make other people in the immediate area aware of the danger and should mark the hung-up tree as per hazardous tree marking procedures (see *Section 14.2*).
- Whenever a tree cannot be completely felled, do a risk assessment to find an alternative way of bringing it to the ground safely.

Non-commercial thinning and coppice management requires the felling of smaller trees and stems. Where practical, a mechanical system should be used.

Manual non-commercial thinning and coppice management is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.

	The following **activity-specific hazards** need to be considered: △ Being struck by small branches and falling trees △ Lacerations from chainsaws or brush-cutters △ Exposure to snake and insect bites and stings △ Exposure to extreme weather conditions △ Debris flicking up into the face or eyes
	The following **activity-specific risk factors** also need to be considered: ● Chainsaw sharpening and bar maintenance ● Handling of fuels and oils ● Noise and vibration ● Mental and physical fatigue ● Slips, trips, and falls

The **essential risk controls** are all relevant to manual non-commercial thinning and coppice management.

	**Activity-specific controls** are listed below:
 **Safe work practices**	● Scarf trees if the sum of the height in metres and diameter in centimetres exceeds 25 (e.g. height 15 m + diameter 12 cm > 25, so scarf is required) ● If regularly falling coppice that has to be scarfed as above, carry an axe or hammer to drive wedges and at least 2 wedges; keep these items available on site at all other times ● Fell trees to an open area ● Establish a clear walking path before moving from one tree to the next ● Follow other controls as set out in *Section 8*

13 FIRE MANAGEMENT

Uncontrolled fire is a threat to forests that needs to be minimised. Fire is also a tool that can be actively used to:

- reduce the threat of uncontrolled fire
- make sites safer for other operations
- provide ecological benefits.

The following section explains how fire-related operations must be done, to protect the health and safety of workers and to ensure others are not impacted by those operations.

The landowner, forest manager and contractor all have responsibilities – both shared and individual – to eliminate or minimise health and safety risks. This means suitable fire suppression equipment should be installed in machines and vehicles. When the risk of unplanned fire is high equipment to suppress fires and monitor fire weather is expected on site.

General planning

The key documents outlining requirements for fire management are the:

- *Guidelines for plantation fire protection* published by the Fire and Emergency Services Authority of Western Australia
- *Code of practice for timber plantations in Western Australia* published by FIFWA
- *FIFWA Minimum Fire Season Requirements for Working in WA Plantation Forests*.

These documents require a fire management plan and outline what should be included.

Fire management plans more generally should cover:

- features of the forest area pertinent to fire risk
- arrangements to monitor fire season weather
- responsibilities and cooperative arrangements
- communication protocols and emergency plans
- purpose-specific equipment, as well as supplementary fire equipment, for forest machines and vehicles
- adequate staff resources and suitable training.

More specific requirements for different fire management operations are as follows.

Prescribed burns

Prescribed burning may be done for plantation site preparation, fuel reduction, ecological reasons, or forest **regeneration.** As a planned forest operation, it must be done in a way that eliminates or minimises health and safety risks from fire and related risks.

Planning for these activities should include all the general matters with a particular emphasis on:

- all the requirements, such as permits and notifications, of Western Australian law
- written and approved burn plans
- public, neighbour, and stakeholder notification
- specific training in prescribed burning practices.

Response to uncontrolled bushfire

Planning for bushfire response on owned or managed land must be done in a way that eliminates or minimises health and safety risks from fire and related risks. It should include:

- regular assessment of fire fighters' health and fitness
- regular inspection and maintenance of fire-fighting equipment in line with the manufacturer's recommendations.

The workplace health and safety requirements of the agencies governing the control and allocation of resources should be reviewed for adequacy and followed where practical.

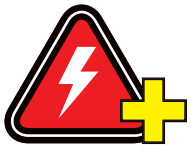
Consultation, cooperation, and coordination

Managing fire risks – whether to prevent fires or when responding to them – requires parties to consult, cooperate, and

coordinate. This includes:

- consultation with workers about risks to health and safety in planned and unplanned fire situations
- consultation and coordination with and between landowners, forest managers, and contractors on applicable fire management standards
- consultation and coordination with adjacent properties, stakeholders, or operations that may be impacted by fire activity
- consultation, cooperation, and coordination with lead fire agencies and any memorandum of understanding or interagency protocols.

Fire management is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.

	The following **activity-specific hazards** need to be considered: △ Exposure to smoke and heat △ Working around aircraft and machinery △ Fatigue △ Entrapment by fire △ Lack of signage about access and egress in road system △ Slips, strains, and falls when workers are getting in and out of machinery △ Manual handling △ Working at night △ Handling combustible materials
	The following **activity-specific risk factors** also need to be considered: ● Weather history and patterns ● Quantity, type, and arrangement of fuels ● Forest operations using equipment such as chainsaws, cables, machinery, vehicles, or tools with potential to create fire hazards ● Coupe accessibility ● Availability of water

The **essential risk controls** are all relevant to fire management.

	**Activity-specific controls** are listed below:
 **Safe work practices**	● Where fire management includes the felling and cutting of trees, follow *Section 8.2 Felling hazardous trees* whenever practicable ● Follow the forest manager's fire weather monitoring requirements and thresholds for suspending or stopping work ● Monitor fire weather in the work area and advise the forest manager if work is suspended or stopped ● Do not work alone, as either a ground worker or a machine operator ● Follow a work–rest regime suitable for the current and forecast conditions ● Ensure there is availability of and opportunity for frequent hydration ● Work from a secure anchor point and avoid being in the unburnt area ahead of, above, or to the flank of the fire ● Pass burning trees on the uphill side or above the lean
 **Exclusion zone and safe work areas**	● Provide information and instruction to ensure everyone knows where the escape routes are ● If cut off by the fire, try to move to an area that has already burnt ● Park vehicles in the direction of the escape route, with doors closed, windows up, and keys in the ignition, and in a position to allow other vehicles to pass ● Close roads and tracks in the area to exclude anyone not involved in fire fighting ● Establish communication between machine operators and ground workers to maintain safe separation distances ● Use communication between an aircraft's pilot or authorised ground personnel and ground workers to maintain safe separation distances in the aircraft's drop zone

 **Competencies and readiness**	● Ensure workers in planned fire management operations have the relevant competencies to complete the task safely ● Ensure workers responding to unplanned fire management events have the relevant competencies to complete the task safely ● Ensure crew leaders have additional fire management competencies including: – understanding of how weather and topography affect fire behaviour – understanding and practical application of fire-fighting strategies and tactics ● Ensure fire-fighting duties are only undertaken by those who have been assessed for their physical capacity to do the anticipated tasks ● Do not carry out fire-fighting duties while affected by alcohol or drug consumption ● Ensure workers meet the requirements of relevant drugs and alcohol policy. ● Workers volunteering as part of an industry fire suppression crew are required to report for duty with a BAC of less than 0.05% unless that worker was rostered on for fire duty in which case the worker is required to report for duty with a BAC of 0.000%.
 **Personal protective equipment (PPE) and first aid**	● Provide PPE to protect workers in fire management operations (see *Section 15.2*) including: – overalls or a long-sleeved shirt/trouser combination of a suitable material to protect against heat radiation and sparks, in a highly visible colour – safety helmets suitable for bush fire fighting – goggles and smoke masks when conditions require – gloves that protect against cuts, punctures, and heat penetration – laced or zipped leather steel-capped boots with non-slip soles and good ankle support
 **Design and operation of plant**	● Ensure fire-fighting equipment is suitable for the relevant fire management operations ● Regularly inspect, test, and maintain the equipment in line with the manufacturer's recommendations ● Keep the equipment close to active operation, so that it is readily available when required ● Equip any machines that operate at night with at least one forward and one rear light to permit safe working ● Calibrate and maintain weather monitoring equipment (e.g. digital wind meter or fire danger meter) in line with the manufacturer's instructions
 **Use of drip torches**	● Ensure that the weather conditions are suitable and compatible with the prescribed burn ● Notify neighbours and use signage to warn of burning operations ● Check the effectiveness of emergency communication equipment before the operation starts ● Keep fire-fighting equipment close to active operation, so that it is readily available when required ● Ensure all fuel is stored in labelled containers and handled in line with the safety data sheet ● Use and maintain equipment in line with the operator's manual ● Ensure drip torches are not leaking ● While refilling torches, wear impervious gloves and have a fire extinguisher readily available ● Ensure that the system of work minimises the risk of the fire getting out of control: – only light manageable areas not the whole area – burn edges into the wind where possible, in strips ● Wear leather gloves when handling lit drip torches

PART FOUR
RESOURCES

14 COMMON HAZARD FILES
15 FURTHER INFORMATION
16 GLOSSARY
17 REFERENCES

14 COMMON HAZARD FILES

14.1 Overview

This section focuses on common hazards found across forestry operations and known and effective ways of controlling risks.

These hazards rarely impact health and safety on their own. It is usually a combination of factors that leads to injury and illness.

For example, fatigue is not just related to the length of time spent working and the time of day but also to accelerants such as noise, weather extremes, and manual handling.

These hazards are referred to throughout the Code. They are presented in a hazard file format so that they can be:

- printed off as a standalone information sheet for toolbox talks or other communications
- used to populate safe work procedures and referred to in site safety plans (SSPs).

HAZARDOUS TREES

In all aspects of forestry operations, hazardous trees may pose a risk of death or serious injury. Trees may be dangerous for a range of reasons, e.g., because of overhead hazards like hung-up trees or **widow makers** as well as their characteristics and locations.

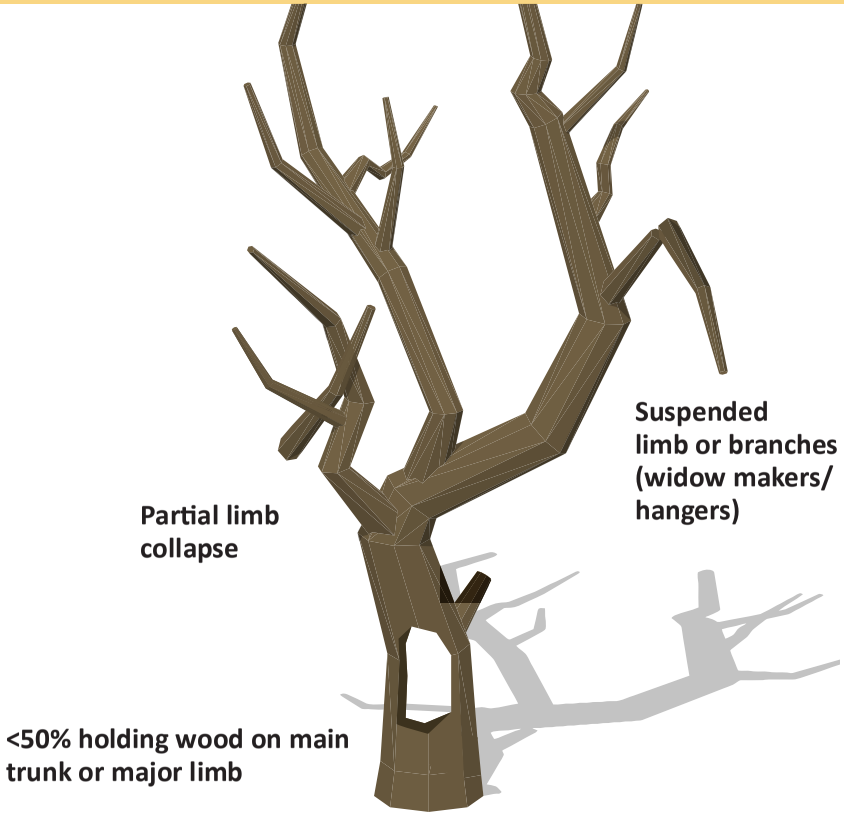
			
▲ Struck by falling limbs ▲ Struck by falling fire damaged tree ▲ Struck by another tree lodged in a hazardous tree ▲ Struck by falling tree or limbs where poor condition of tree affects the ability to control falling direction	● Damage to trees caused by fire, wind, or insects ● High winds ● Periods of drought ● Recent isolation ● Dead limbs drying out	● Mark the tree with a red and white hazard tape if safe to do so ● Clearly mark the hazardous area around the tree with high-visibility tape to a distance of two dominant tree lengths ● Record the tree's location on site documentation with methods such as GPS way point ● If assessed as too risky to remove, use a high-visibility hazard tape to identify the hazardous area around the tree to a distance of two dominant tree lengths ● If assessed as safe to fell, use a suitable manual or mechanical method ● Establish and maintain a separation distance between the hazardous tree and other operations (two tree lengths) ● Maintain communication with all in vicinity of hazardous trees	● Forest Products Commission, *Identifying and marking hazards in native forest coupes*, procedure 70.

HAZARDOUS TREES

Additional information

Trees are hazardous if they have any of the features shown below.

- Widow makers / broken limbs
- Rot
- Fire damage to trunk or limbs
- Storm damage
- Insect damage
- Mechanical damage
- Exposed root systems
- Dead wood
- Symptoms of internal damage including swelling, bark cracks, and wounds
- Hung up trees and stags



NOISE

Exposure to noise above the prescribed level of 85 dB (A) over an 8-hour weighted average or a peak level of 140 dB (C) may be experienced in forestry operations. Chainsaws and chippers are most likely to reach high levels over shorter periods. Audiometric testing is required where exposure above the limits requires frequent wearing of hearing protection to control the risk.

△ Noise above exposure limit during chainsaw and chipper use △ Longer time exposure to machine noise in cabin △ Noise exposure of ground workers △ Conditions in which a normal conversation is difficult	● Length of exposure ● Poor sound proofing ● Inadequate hearing protection ● Use of machines that reach peak noise levels	● Ensure the manufacturer or supplier provides noise assessment information ● Assess noise when purchasing, sound proofing of cabin, minimise time with cabin open ● Regularly maintain machinery to reduce noise emission ● Take suitable breaks and rotate tasks to reduce exposure ● Use damping and use of acoustic absorbent measures on machines, separate workers from the noise source if practicable, coordinate noisy activities ● Use highest rated hearing protection

- WHS Regulations Part 4.1 – Noise
- Safe Work Australia approved Code of Practice *Managing noise and preventing hearing loss at work*
- Regulation 58 Audiometric testing

HAZARDOUS MANUAL TASKS

Some manual tasks are hazardous and may cause musculoskeletal disorders. Whole body and hand-arm vibration also contributes to hazardous manual handling.

△ Poor cab set-up △ Getting in and out of machines △ Tree planting △ Vibration △ Using chainsaw △ Tasks such as manual fencing △ Walking in the forest △ Slips and trips	● Awkward postures ● Repetitive movements ● Repetitive and sustained forces ● Duration and frequency of the task ● Environmental conditions including heat, cold, and vibration	● Assess ergonomics when purchasing (access, posture, visibility, seat, controls) ● Ensure three points of body are in contact with the machine and all points clean and non-slip ● Use planting tools that minimise or eliminate the need for bending and minimise force ● Support weight with harness when using equipment like brush cutters ● Purchase equipment with lowest hand-arm vibration emission level ● Ensure machine cab suspended with special damping or another solution for minimising vibrations

- WHS Regulations Part 4.2 – Hazardous manual tasks
- Safe Work Australia approved Code of Practice *Hazardous manual tasks*

IN-FIELD PLANT MAINTENANCE

The WHS Act requires persons conducting a business or operation (PCBUs) to provide and maintain safe plant. This general duty is reinforced by WHS Regulations. In-field inspection, maintenance, and adjustment of forestry machinery like harvesters and excavators create a higher risk than regular preventative maintenance activities carried out off site.

		
△ Being hit, crushed, or lacerated when energy sources are not isolated △ Touching hot hydraulic oil or other hazardous chemicals △ Falls from height during repairs and maintenance △ Slips, strains, and falls getting in and out of machine △ Being hit by falling metal cowls, unsupported booms, and guards △ Touching moving machine parts when changing chain or bar △ Infrequently serviced chainsaws and cutting heads △ Lack of service schedule for equipment △ Working in hot conditions	● Proximity to exclusion zones ● Poor weather conditions ● Rough terrain ● Muddy or slippery surfaces ● Overhead hazards ● Nearby plant ● Other workers	● Carry out maintenance in safe zone, separated from other workers and on flat ground ● Prevent interference with safety features like isolating switches and guards ● Carry out maintenance in line with manufacturer's specifications, instructions, and information ● Isolate all equipment (i.e. turned off and locked out) as recommended by manufacturer ● Ground and secure any machine attachments (e.g. cutting head, blade, grapple) ● Regularly clear debris such as leaves, sticks, and needles from machines to minimise fire risk ● Regularly inspect plant before use ● Comply with 'Do Not Operate' tags or other warning notices ● Wear protective gloves when replacing chipper blades, chains, and bars ● Reinstate guards after maintenance work ● Maintain three points of contact when accessing machine for maintenance

IN-FIELD PLANT MAINTENANCE

Additional information

Regular and preventative maintenance is important for not only assuring the plant's safe operation but also to limit the exposure of other workers to hazards. Risks that regular maintenance should consider include:

- noise emissions
- exposure to high pressure fluids
- failure of safety features like braking systems
- integrity of guards and protective structures (e.g. margard)
- operator visibility through windscreens and protective structures
- suitability of emergency exits
- possibility of material being thrown at high speeds, like chain shot.

Forest machinery requires daily inspection and maintenance including checking fluid levels, refuelling, adding oils, cleaning the tracks and cabin, and replacing chipper blades on discs. Minor repairs may also be needed including repairing hydraulic hoses and replacing chains and bars.

Plant must be inspected and maintained in accordance with the manufacturer's specifications and instructions. If these are not known, inspections and maintenance must be done according to the recommendations of a **competent person**.

Items of plant that are tagged 'Do Not Operate' or have exceeded a scheduled maintenance date should not be used. These issues should be identified when checking equipment before starting work.

Plant should be de-energised and checked before any maintenance or repairs in the field start.

- WHS Regulations Div. 7
- s213. Maintenance and inspection of plant
- s214. Powered mobile plant – General control of risk
- Safe Work Australia approved Code of Practice *Managing the risks of plant in the workplace*

HAZARDOUS CHEMICALS

Hazardous chemicals may be used in pest control, weed control, and fertilising operations. Also, some substances used to operate and maintain mobile plant and powered handheld equipment are hazardous. Exposure needs to be controlled.

		
⚠ Spills and splashes when handling or mixing chemicals ⚠ Spray drift that exposes operator or others ⚠ Storage and mixing near ignition sources or incompatible chemicals ⚠ Premature re-entry into spray zones	● Number of ways chemicals may enter a worker's body ● Frequency and duration of exposure ● Level of concentration of ingredients ● Quantities of fuel stored and potential ignition sources	● Use non-chemical methods of weed control such as slashing, mulching, grazing, or heat kill methods where effective in the longer term ● Only store the lowest practical quantity of flammable substances ● Use precise dosing methods and technologies to minimise exposure ● Use less hazardous chemicals or minimum necessary application rates ● Have procedures and signage for workers re-entering an area that has been sprayed ● Use enclosed canopies in vehicles to deliver chemicals ● Maintain suitable separation distances to prevent exposure to other workers ● Use defined areas for storing chemicals ● Use personal protective equipment (PPE) as prescribed in safety data sheets ● Operate when weather conditions help manage spray drift ● Ensure chemicals are correctly labelled

HAZARDOUS CHEMICALS

Additional information

Hazardous chemicals are regulated in Chapter 7 of the WHS Regulations. Specific duties apply to a PCBU to manage the risks to health and safety associated with using, handling, generating, and storing hazardous chemicals at a workplace. These duties include:

- providing workers with information, training, instruction, and supervision
- maintaining a register of hazardous chemicals
- obtaining the current safety data sheet of each hazardous chemical (usually from the supplier) and making it readily available to workers
- ensuring containers are correctly labelled, and safety signs are displayed
- identifying the risks of chemicals being used and controlling those risks in the most appropriate manner
- providing health monitoring to workers, where relevant (e.g. after exposure to organophosphate pesticides)
- preparing an emergency plan and providing safety and emergency equipment
- storing and dispensing hazardous chemicals safely.

Flammable or combustible substances must be kept at the lowest practicable quantity for the workplace.

In line with the hierarchy of control, identification of alternatives that eliminate hazardous chemicals should be the starting point in managing exposure.

- WHS Regulations Chapter 7 – Hazardous chemicals
- Safe Work Australia approved Code of Practice *Managing risks of hazardous chemicals in the workplace*
- Australian Pesticides and Veterinary Medicines Authority (APVMA) guidelines and codes of practice

FATIGUE

Fatigue is a state of tiredness or exhaustion that results in a degree of impairment. This impairment may be physical and/or mental and can result in an increased risk of workplace errors or incidents.

		
△ Physically and mentally demanding work △ Lack of opportunity for quality sleep △ Working long days (>14 hrs) and long weeks (>55 hrs) △ Working at night or into the 12am to 6am period △ Inadequate breaks within and between workdays △ Sleep disorders △ Impact of out- of -work demands on sleep opportunity and quality	● Mental and physical demands of the job (e.g. heavy physical demands, high concentration levels on demanding tasks such as rough terrain, slopes) ● Environmental conditions (e.g. weather extremes, noisy workplaces, whole body vibration) ● Work schedules (e.g. regularly working or travelling through the night, having limited opportunity for quality sleep, needing to travel long distance to work, having no regular breaks from work) ● Working time (e.g. regular shifts longer than 12 hours, inadequate breaks between and within shifts, or intrusion on time to get regular night sleep) ● Individual (e.g. nutrition and hydration, sleep disorders, non-work impacts on sleep, mental health status)	● Follow work–rest schedules that reflect task and operating conditions (e.g. slope, visibility) ● Include contingencies for delays and disruptions ● Ensure contractual arrangements do not provide incentives to work excessive hours ● Work schedules that maximise opportunities for sleep at normal sleep times ● Minimise night working and working into night hours ● Provide training and information on fatigue and sleep disorders and countermeasures (e.g. nutrition and hydration) ● Provide training in the use of any self-reporting or fatigue risk scales and the process to use results to then reduce risk

FATIGUE

Additional information

Fatigue can be assessed using objective working time, time of day, and rest break indicators but these can be supplemented by experience-based measures such as self-reported sleep time and indicators of alertness.

Use of experience-based measures requires appropriate training, policy transparency, and high levels of worker engagement for effective risk reduction.

- WHS Regulations Part 4.10 — Driving commercial vehicles
- WorkSafe Victoria *Fatigue management guidelines for the forestry industry*
- LITA Fatigue Working Group *Guidelines for developing and implementing a fatigue management policy in forestry*

WORKING AT NIGHT

Forestry operations may be conducted in failing light or at night. Where practicable organise work schedules to minimise time spent working at night. Where night shifts are part of regular operations fatigue management measures set out in Section 14.7 should be referenced. Additional measures to improve lighting should also be considered.

		
△ Poor visibility to conduct operations △ Being struck by machines △ Unable to see instability in log stacks △ Inability to estimate separation distances and maintain safe work areas	● Regular night shifts ● Extreme weather ● Working in proximity to others	● Use suitable illumination of work area including log stacks, projected path of booms, tops of pins on trucks being loaded ● Use suitably placed lighting on mobile equipment ● Illuminate and mark safety zones ● Follow fatigue management practices ● Use of luminous high-visibility clothing ● Use regular call ins to check in on workers

- Safe Work Australia approved Code of Practice *Managing the work environment and facilities*

WORKING NEAR POWER LINES

Contact with energised power lines by forestry operations equipment or materials can cause death, electric shock, and other direct or indirect injuries. An electric shock can also occur without contact with overhead power lines. A close approach to line conductors may allow a 'flashover' to occur. The risk of flashover increases as the line voltage increases.

- Felling trees near power lines
- Using machinery that at full extension could touch overhead power lines
- Extreme weather conditions that could bring down lines

- Location, height, arrangement, and visibility of overhead power lines and supporting structures (e.g. poles, towers, and stay wires)
- Voltage of power lines and exposed energised parts and whether they are insulated or bare
- Working position and arc of machines
- Weather and ground conditions

- Incorporate location of power lines in coupe planning and harvest plans
- Ensure separation distance of two tree lengths for tree felling maintained near power lines
- Comply with 'No Go Zone' requirements
- Use zone limiting devices on machinery
- Fit proximity sensors to equipment
- Use procedures to ensure work is not conducted near or under energised power lines
- Use felling machines with precise directional falling capability
- Use PPE with electrical insulation properties
- Use flags or other markers to warn of overhead power lines
- Use procedures to identify and manage the risk of trees falling on adjacent power lines

- WHS Regulations s166A. - Duty of person conducting a business or undertaking: overhead electric lines
- Safe Work Australia general guide *Working in the vicinity of overhead and underground electric lines*
- Safe Work Australia information sheet *Agricultural work near overhead electric lines*
- *ENA NENS 04-2006 National guidelines for safe approach distances to electrical and mechanical apparatus*

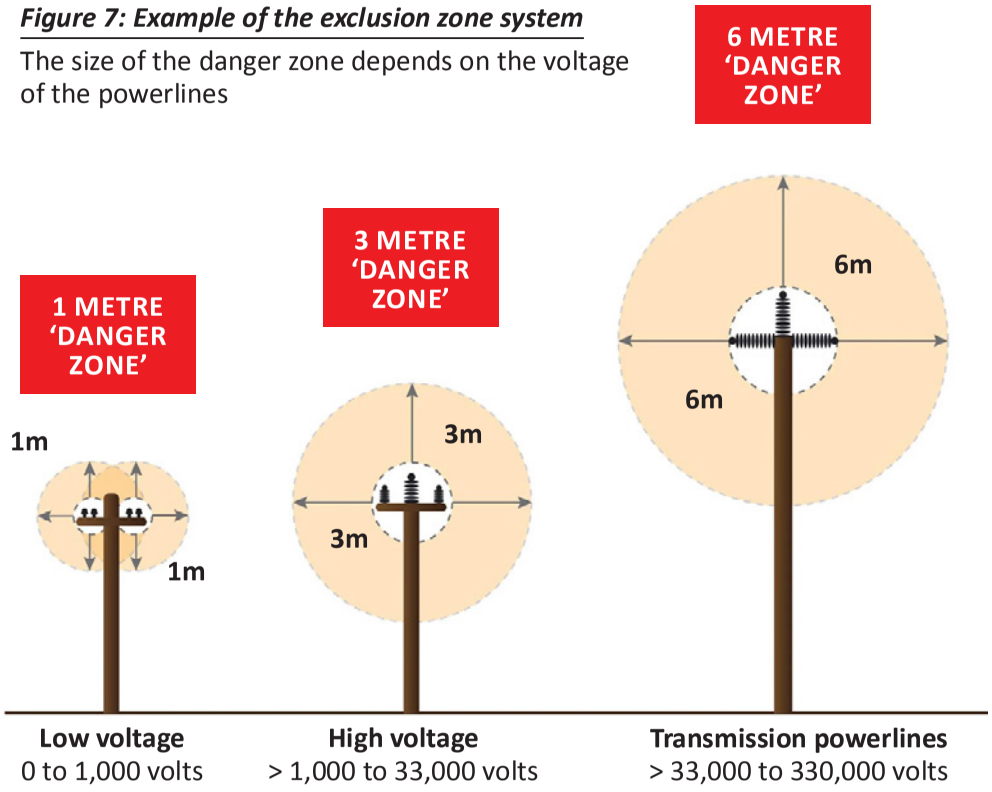
WORKING NEAR POWER LINES

Additional information

There is also the hazard created by falling trees too close to power lines. The energy regulator defines exclusion zones for different voltage levels (see *Figure 7*). Specified clearance distances, permits, and training requirements are part of the exclusion zone system.

Figure 7: Example of the exclusion zone system

The size of the danger zone depends on the voltage of the powerlines



BIOLOGICAL HAZARDS

Biological hazards in forestry operations include fungi, spores, and sawdust. Exposure may result in skin infections such as contact dermatitis or allergic reactions to plants or wood products. Biohazards also include viruses, poisonous snakes, spiders, insects, and parasitic diseases.

		
△ Irritants in plants and wood products △ Bites, stings, and infections from animals and insects △ Bacteria in soil △ Community transmitted viruses △ Cleaning products such as solvents	● Seasonal conditions ● Weather conditions ● Geographic location ● Level of virulence, toxicity, and ability to cause disease	● Provide Safety Data Sheet for substance such as solvents ● Provide hand cleaning facilities and hand hygiene practices ● Provide induction and training on viruses such as COVID-19 ● Provide suitable first aid ● Wear specific PPE, particularly where requirement increases risk (e.g. sweating)

PSYCHOSOCIAL HAZARDS

Psychosocial hazards or factors are anything in the design or management of work that increases the risk of work-related stress. Stress responses are the physical, mental, and emotional reactions that occur when a person perceives the demands of their work exceed their ability or resources to cope. Work-related stress if prolonged, and/or severe, can cause both psychological and physical injury.

⚠ Tolerance of inconsistent safety practices ⚠ Inflexible work schedules and workloads ⚠ No clear processes to resolve issues ⚠ Lack of regular communication on work issues ⚠ Little commitment from managers to address stress and bullying issues ⚠ Lack of consultation on processes to manage psychological hazards ⚠ Lack of training and information on psychological hazards	● Work delays that reduce time to compete work ● High physical and mental work demands ● Remote work ● Extreme weather conditions ● High levels of risk in tasks ● Health issues ● Out–of-work stressors	● Provide regular opportunities to address issues and resolve problems (e.g. crew meetings) ● Allow a flexible response to work schedules and workloads during planning ● Clearly communicate what is acceptable behaviour and processes to deal with non-compliance ● Provide access to support services ● Provide training and information on psychological hazards ● Establish issue resolution and anonymous reporting processes

- Work Health and Safety (General) Regulations 2022, Part 3.2 General workplace management Division 11 Psychosocial risks
- Work Health and Safety Commission code of practice *Psychosocial hazards in the workplace*
- Safe Work Australia national guidance material *Work-related psychological health and safety: A systematic approach to meeting your duties*

PSYCHOSOCIAL HAZARDS

Additional information

Psychosocial factors are tied to the system and nature of work and can include:

- high job demands (e.g. long hours or high workloads in demanding conditions)
- lack of resources to meet demands (e.g. poor equipment or lack of time to complete job)
- lack of reward/recognition
- lack of support at work
- poor work relationships including bullying
- inadequate problem-solving processes to address work relationships promptly and fairly.

These factors are not easily accommodated by a traditional risk management approach. The hazard is not easily identifiable, the likelihood and consequence of the risk is difficult to reliably calibrate, and controls are organisational and interrelated.

The hazards, risk assessment, and risk controls for forestry operations set out in this Code are inevitably underpinned by the work culture of the business.

A positive safety culture minimises many of the psychological hazards by:

- intervening early because of open communication throughout the business
- responding appropriately because of good support systems and active managers and supervisors
- encouraging open discussion of issues without fear of reprisal or stigmatisation
- using agreed and fair processes to resolve interpersonal issues
- maintaining integrity in all health and safety procedures by addressing breaches and failures openly
- training and informing workers so that there is a clear understanding of the individual and shared responsibility to manage risks.

The role of a positive safety culture should be considered alongside the psychological hazards and controls on the preceding page.

DRUGS AND ALCOHOL

Drug and alcohol use (including legitimate over-the-counter or prescribed medications) can affect a person's ability to work safely. Even if someone drinks alcohol or uses drugs outside working hours, it can impair their judgement, coordination, concentration, and alertness while on the job.

- Operation of machines, vehicles, and equipment in an impaired state
- Work culture that accepts drug and alcohol use on the job
- Lack of regular and open communication on drug and alcohol issues
- Punitive approach to drug and alcohol use without an agreed process to manage issues
- Impact of prescription medications on ability to perform role

- Work-related contributors such as workload, isolation, schedules
- Inadequate supervision and poor communication practices
- Schedules that encourage drug use (e.g. long shifts where a worker takes drugs to stay awake)
- Availability and culture of acceptance of workplace use
- Out-of-work contributors such as grief, relationship breakdowns or health concerns

- Adopt an agreed policy based on extensive consultation
- Eliminate or minimise any schedules or work patterns that provide an incentive to use drugs or alcohol
- Establish a positive work culture that encourages self-reporting, monitors and responds in a non-punitive way, and provides access to assistance
- Make others apart from direct employees (e.g. other contractors or visitors) aware of the policy
- Provide training and information on drugs and alcohol

- Commission for Occupational Safety and Health guidance note *Alcohol and other Drugs at the Workplace*
- Australian Forest Products Association guideline *Drug and alcohol policy and testing program*

DRUGS AND ALCOHOL

Additional information

Typical activities in forestry operations where impaired performance would affect the health and safety of the individual or other workers include:

- operation of machinery
- work-related driving
- tasks that rely on concentration or motor coordination
- use of hazardous chemicals.

Managing alcohol and drug issues is part of a PCBU's responsibility to provide a safe and heathy workplace and every workers' responsibility not to put themselves or others at risk.

A drugs and alcohol policy should be based on the nature and extent of the problem and developed through a consultative process.

While the WHS Act and Regulations do not mandate, require, or prohibit testing, some workplaces may choose to include testing as part of their drugs and alcohol management plan.

Testing should be commensurate with the size and nature of the problem and should be introduced with consultation, training, and information to ensure agreement and acceptance of the approach.

A testing program should be clear on:

- the purpose, type, and integrity of tests
- when testing takes place
- who administers tests
- what happens if a positive test is recorded
- the nature of support and assistance post testing.

Managing risk associated with alcohol and drug use requires high levels of engagement with the workforce (including other contractors), agreed processes to manage impairment issues, and suitable and confidential assistance programs to help recovery.

DRIVING TO AND FROM WORK SITE

Work-related driving has been shown to carry a higher risk than travel in non-fleet vehicles. Vehicle and driver safety is covered by both workplace health and safety legislation and road traffic laws. The focus here is on the PCBU's obligations but workers also have a duty to take reasonable care and to follow the PCBUs procedures.

⚠ Inadequate journey planning ⚠ Inappropriate vehicles ⚠ Poorly maintained vehicles ⚠ Untrained drivers ⚠ Speed ⚠ Driver distractions ⚠ Fatigue	● Length of trips ● Time of day ● Road conditions ● Adverse weather conditions	● Choose vehicles against criteria covering active and passive safety features ● Implement a safe driving and vehicle selection policy signed off by employees ● Ensure drivers are competent and fit to drive ● Do pre-start vehicle checks ● Use daylight running lights ● Adopt driver monitoring systems (e.g. lane assist and alertness warnings) ● Provide defensive and specialist vehicle skill training ● Ensure vehicles are maintained to both the manufacturer's service requirements and the broader vehicle safety standards ● Apply fatigue management measures such as planning longer trips to allow for regular breaks, encouraging drivers to take power naps if sleepy, and minimising night driving ● Ensure all vehicles have first aid kits, fire extinguishers and emergency contact numbers

- WHS Regulations Part 4.10 — Driving commercial vehicles
- WorkSafe WA fact sheet *Driving commercial vehicles*
- Department of Transport *Drive Safe A handbook for Western Australian road users*
- NSW Government *Road Safety and Your Work A Guide for Employers*

WORKING ALONE

If a worker is working alone, they cannot be seen or heard by others. Due to the location, time, or nature of the work, they do not have easy access to help if they are injured, ill or there is an emergency.

		
△ All the common hazards described in the Code △ Unreliable or poor communication systems △ Remote locations where emergency response is slow	● Hazards that expose a lone worker to greater risk (e.g. machinery that one person cannot operate safely, objects too heavy for one person, chemicals that pose a particular risk for lone worker) ● Ability to communicate with worker onsite ● Ability to execute emergency and rescue plans ● Likelihood of rapidly changing environmental conditions	● For tasks assessed as suitable for working alone adopt an agreed procedure that covers location, movement, and times to complete work, and report back ● Establish an effective communication system with a fail to safety back up ● Adopt check in and report back procedures ● Provide suitable first aid arrangements ● Establish ability to maintain effective communication

- WHS Regulations
- s48 – Remote or isolated work
- Commission for Occupational Safety and Health guidance note *Working Alone*
- Safe Work Australia approved Code of Practice *Managing the work environment and facilities*

SOLAR UV RADIATION

Exposure to ultraviolet radiation (UVR) can damage the skin and eyes. The most serious health effect of exposure to solar UVR is skin cancer. Forest workers may be exposed to the sun for long periods, so their risk of developing skin cancer or other solar UVR-related illness is increased unless control measures are used.

		
△ Working at time of year and time of day when UVR exposure highest △ Extended periods working outdoors	● Extended shifts ● Work with no forest canopy or other canopy protection	● Equip forest machines to limit exposure through canopies, tinting, and non-reflective surfaces ● Work in shade where practicable ● Rotate workers to reduce individual exposure ● Reschedule work to early morning or late afternoon if possible ● Use PPE including sun protective clothing and hats, sunscreen, sunglasses, long pants and long sleeves

- Safe Work Australia *Guide on exposure to solar ultraviolet radiation (UVR)*
- Safe Work Australia approved Code of Practice *Managing the work environment and facilities*

EXTREME WEATHER

Extreme weather in forestry operations includes extreme heat, low temperatures, snow, ice, fog, and high winds. These extremes both affect the body and create hazards for all workers.

⚠ Extreme heat ⚠ Extreme cold ⚠ Heavy rain, snow, and ice reducing traction ⚠ High winds creating falling object hazards ⚠ Fog creating poor visibility	● Air temperature – how hot or cold the surrounding air is ● Humidity – the moisture content in the air – higher humidity will increase the effects of high air temperature ● Radiant heat – from the sun or from the plant or a work process ● Rain – a combination of weather conditions may contribute to reduced core body temperature causing hypothermia ● Air movement – air or wind speed and air circulation can reduce the effect of high air temperature ● Wind – strength and effect on trees (e.g. breaking branches) ● Ice – impact on traction for both ground workers and machines and access to and from the forest ● Fog – impact on visibility and the ability to maintain separation distances and safe access to and from the forest ● Time – how long workers will be exposed to extreme conditions	● Adopt agreed procedures for stopping work because of extreme weather ● Adopt agreed procedures for restarting work, including risk assessment ● Establish communication protocols for poor visibility ● Adjust of machinery and methods where traction and slippage are an issue ● Provide climate control in machines ● Follow work–rest regimes to manage heat and cold extremes ● Schedule high exertion tasks at times of the day when weather is less extreme ● Provide of suitable clothing for conditions ● Make cold and hot liquids available, relevant to conditions ● Provide suitable weather protection in breaks ● Use PPE to protect from weather, aid visibility, and reduce slipping

EXTREME WEATHER

Additonal information

Guidelines for working under and around trees in windy conditions				
Observed wind effects	**Wind category**	**Beaufort Wind Force (scale)**	**Wind speed (km/h)**	**Response**
Dust is raised from the ground. Paper is blowing about. Small branches are moving.	Moderate breeze	**4**	20 to 28	In most situations, wind will not pose a hazard to forestry operations, including manual felling.
Small trees begin to sway.	Fresh breeze	**5**	29 to 38	Stop manual felling of small trees (coppice thinning). Review the work against the conditions and if necessary, move to an alternative location.
Large branches are moving. Signs are hard to put up and they blow over.	Strong breeze	**6**	39 to 49	Stop all manual felling. Move to an alternative task at least two tree lengths from standing trees.
Whole trees (the trunk of larger trees) are moving. The wind makes walking difficult.	Constant breeze	**7**	50 to 61	Stop all forestry work. Seek shelter at least two tree lengths from standing trees.
Twigs are falling from the trees. The wind hinders progress when walking.	Fresh gale	**8**	62 to74	Leave the forest immediately. Do not enter the forest until gale conditions subside.

- Safe Work Australia approved Code of Practice *Managing the work environment and facilities*
- Safe Work Australia *Managing the risks of working in heat guidance material*

15 FURTHER INFORMATION

15.1 Protective structures for forestry machines

Forestry machines require the following protective structures. See also the NIFPI Best Practice Guide.

Machine	Type	ROPS	FOPS	OPS
Dozers	Enclosed cabin	✓	✓	✓
	Open – canopy with attachments	✓	✓	✓
Hydraulic excavators	Landing unit – log grab & cut off saw	✓	✓	✓
	Landing unit – log grab only	✓	✓	
	Off-landing shovel logging	✓	✓	✓
	Feller buncher – processing head	✓	✓	✓
	Construction excavator – hydro hitch, buckets, rock drill, and rock grab	✓	✓	✓
Purpose-built forestry units	Tracked or wheeled feller buncher	✓	✓	✓
	Tracked or wheeled harvester	✓	✓	✓
	Grapple skidder	✓	✓	✓
	Cable skidder	✓	✓	✓
	All forwarders	✓	✓	✓
Wheel loaders	Wheeled loader fitted with a falling or bunching head	✓	✓	✓
	Articulated, enclosed cabin, quick coupler, and attachments	✓	✓	
	Articulated, enclosed cabin, pin or multi-purpose bucket	✓	✓	
	Articulated, enclosed cabin, pin or general-purpose bucket	✓	✓	
Skid steer loaders	Enclosed cabin, multi-purpose bucket	✓	✓	
	Open canopy, multi-purpose bucket	✓	✓	
Compact truck loaders	Enclosed cabin, multi-purpose bucket	✓	✓	
	Open canopy, multi-purpose bucket	✓	✓	
Backhoe loaders	Enclosed cabin, multi-purpose bucket, 4x4 extendable dipper, quick hitch, and buckets	✓	✓	
Bobcat and attachments		✓	✓	✓
Motor graders	Enclosed cabin	✓	✓	
Agricultural tractors		✓		
All-terrain vehicles (ATVs), including quad bikes		Crush protection		

The most recent editions of the following standards (including any amendments) apply for protective structures, depending on the type of machinery.

Protective structure	Relevant standard	Hydraulic excavator	Purpose-built forestry equipment	Earth-moving machinery	Yarder
ROPS	*ISO 8082 (series) Self-propelled machinery for forestry* OR *AS 2294.1 Earth-moving machinery – Protective structures – Part 1: General* and *AS 4100 Steel structures*	✓	✓	✓	
	J1194 Rollover protective structures (ROPS) for wheeled agricultural tractors		✓		
	AS 1636.1 Tractors – Roll-over protective structures – Criteria and tests – Part 1: Conventional tractors		✓		
FOPS	*ISO 8083 Machinery for forestry – Falling-object protective structures (FOPS) – Laboratory tests and performance requirements*	✓	✓	✓	✓
OPS	*ISO 8084 Machinery for forestry – Operator protective structures – Laboratory tests and performance requirements* OR *AS 2294.1 Earth-moving machinery – Protective structures – Part 1: General*	✓	✓	✓	✓
	ISO 10262 Earth-moving machinery – hydraulic excavators – Laboratory tests and performance requirements for operator protective guards	✓			
	AS 4988 Earth-moving machinery – Hydraulic excavators – Laboratory tests and performance requirements for operator protective guards (superseded by ISO 10262)	✓			

15.2 Personal protective equipment (PPE) for forestry operations

The most recent editions of the following standards (including any amendments) apply for PPE in forestry operations, depending on the worker's role.

Type of PPE	Relevant PPE standards	Everyone	Chainsaw operator	Machine operator	Herbicide applicator	Fire fighter
High visibility clothing	*AS/NZS 4602.1 High visibility safety garments – Part 1: Garments for high risk applications*	✓	✓	✓	✓	✓
Protective clothing for firefighting	*AS/NZS 4824 Protective clothing for firefighters – Laboratory test methods and performance requirements for wildland firefighting clothing*					✓
Safety helmet	*AS/NZS 1800 Occupational protective helmets – Selection, care and use* *AS/NZS 1801 (series) Occupational protective helmets* (DIN 7948/EN 12492 is a suitable alternative to helmets complying with AS 1801 (series) for pruning operations.)	✓	✓	✓	✓	✓

Type of PPE	Relevant PPE standards	Everyone	Chainsaw operator	Machine operator	Herbicide applicator	Fire fighter
Safety footwear	*AS/NZS 2210 (series)* Footwear should be of a standard that provides ankle support.	✓	✓	✓	✓	
Firefighting boots	*AS/NZS 4821 Protective footwear for firefighters – Requirements and test methods*					✓
Hearing protection	*AS/NZS 1269 (series) Occupational noise management* *AS/NZS 1270 Acoustics – Hearing protectors*	✓	✓	✓	✓	
Eye protection	*AS/NZS 1336 Eye and face protection – Guidelines* *AS/NZS 1337 (series) Personal eye protection*		✓	✓	✓	✓
Safety gloves	*AS/NZS 2161 (series) Occupational protective gloves*		✓	✓	✓	✓
Leg protection	*AS/NZS 4453.3 Occupational protective gloves – Part 3: Protective legwear*		✓			
Respiratory protection	*AS/NZS 1715 Selection, use and maintenance of respiratory protective devices* *AS/NZS 1716 Respiratory protective devices*				✓	✓
Sun protective clothing	*AS/NZS 4399 Sun protective clothing – Evaluation and classification*	✓	✓	✓	✓	✓

15.3 First aid kits

(This section has been reproduced from the Work Health and Safety Commission code of practice *First aid in the workplace*, which is licensed under Creative Commons 4.0.)

For most workplaces, a first aid kit should include the following items.

Item	Quantity
Instructions for providing first aid – including cardiopulmonary resuscitation (CPR) flow chart	1
Notebook and pen	1
Resuscitation face mask or face shield	1
Disposable nitrile examination gloves (nitrile is a latex-free rubber suitable for people with latex allergies)	5 pairs
Gauze pieces 7.5 x 7.5 cm, sterile 3 per pack	5 packs
Saline, 15 ml	8
Wound cleaning wipe, single 1% Cetrimide BP	10
Adhesive dressing strips—plastic or fabric, packet of 50	1
Splinter probes, single use, disposable	10
Tweezers/forceps	1
Antiseptic liquid/spray 50 ml	1
Non-adherent wound dressing/pad 5 x 5 cm (small)	6
Non-adherent wound dressing/pad 7.5 x 10 cm (medium)	3
Non-adherent wound dressing/pad 10 x 10 cm (large)	1
Conforming cotton bandage, 5 cm width	3
Conforming cotton bandage, 7.5 cm width	3
Crepe bandage, 10 cm, for serious bleeding and pressure application	1
Scissors	1
Non-stretch, hypoallergenic adhesive tape—2.5 cm wide roll	1
Safety pins, packet of 6	1
BPC wound dressings No. 14, medium	1
BPC wound dressings No. 15, large	1
Dressing—Combine Pad 9 x 20 cm	1
Plastic bags—clip seal	1
Triangular bandage, calico or cotton minimum width 90 cm	2
Emergency rescue blanket for shock or hypothermia	1
Eye pad, single use	4
Access to 20 minutes of clean running water or, if this is not available, hydrogel 3.5 gm sachets	5 sachets
Instant ice pack for treatment of soft tissue injuries and some stings	1

Medication including analgesics like paracetamol and aspirin should not be included in first aid kits because of their potential to cause adverse health effects in some people, including pregnant women and people with medical conditions like asthma. The supply of these medications may also be controlled by drugs and poisons laws. Workers requiring prescribed and over-the-counter medications should carry their own medication for their personal use as necessary.

However, workplaces may consider including an asthma-relieving inhaler and a spacer to treat asthma attacks and epinephrine auto-injector for the treatment of anaphylaxis or severe allergies. These should be stored according to the manufacturers' instructions and first aiders should be provided with appropriate training.

Some types of workplaces may require extra items to treat specific types of injuries or illnesses. These may also require your first aiders to have additional training.

Outdoor module

If work is performed outside and there is a risk of insect or plant stings or snake bites, assess whether a first aid kit should include:

- a heavy duty 10 cm crepe bandage for snake bites
- sting relief cream, gel, or spray.

Remote module

Where people work in remote locations, a first aid kit should include:

- a heavy duty 10 cm crepe bandage for snake bites
- large clean sheeting, for covering burns
- thermal blanket, for treating shock
- whistle, for attracting attention, and
- torch/flashlight.

The appropriate contents will vary according to the nature of the work and its associated risks.

Burn module

If workers are at risk of receiving burns, a first aid kit should include:

- burn treatment instructions on two waterproof instruction cards: one for the first aid kit and the other to be located on the wall next to the emergency shower or water supply
- hydrogel, 8 x 3.5 gram sachets
- hydrogel dressings
- clean polythene sheets, small, medium, and large, and
- 7.5 cm cotton conforming bandage.

15.4 'Safe and Skilled' units of competency for hazardous activities

Safe and Skilled forestry organisations have agreed all workers must hold a statement of attainment for approved, nationally recognised units of competency when undertaking any hazardous activity. In forestry, hazardous activities are tasks that involve:

- driving heavy plant or trucks
- using handheld motorised equipment
- working on the ground near heavy plant or tree felling operations.

To ensure they are generally aware of hazards in forest operations, all workers involved in these tasks are expected to hold the following units of competency:

Workplace health and safety	Follow WHS policies and procedures in forest and wood products operations	FWPCOR2210
OR		
Alternative competencies in workplace health and safety for workers who have obtained or are pursuing a Certificate III in Forest Operations or higher qualification.		

As well as this general requirement, workers are expected to hold a statement of attainment for a unit of competency related to the activity they are conducting. For guidance, the current national units are listed below.

For further details on predecessor units and updated national units, refer to the Training.gov.au site (https://training.gov.au/Training/Details/FWP) or ForestWorks (www.forestworks.com.au).

SITE ACCESS AND ROADING		
Dozer	Operate Crawler Tractor	FWPHAR3224
Wheeled loader	Operate Loader	FWPHAR3228
TIMBER HARVESTING		
Single grip harvester	Operate Single Grip Harvester	FWPHAR3229
Processor	Conduct Mechanical Processor Operations	FWPHAR3234
Feller buncher	Operate Feller Buncher	FWPHAR3226
Commercial manual felling or felling hazardous trees	Harvest Trees Manually (advanced)	FWPHAR3209
Trim and cut fallen trees	Trim and Cut Harvested Trees	FWPHAR2209
LOG EXTRACTION AND LOADING		
Forwarder	Operate Forwarder	FWPHAR3227
Skidder	Operate Skidder	FWPHAR3230
Dozer	Operate Crawler Tractor	FWPHAR3224
Excavator – for shovelling logs and loading	Operate Excavator with Log Grapple	FWPHAR3225
Truck-mounted loaders	Licence to Operate a Vehicle Loading Crane (capacity 10 metre tonnes and above)	TLILIC0024
IN-FIELD PROCESSING AND TRANSPORT		
Static mobile chipper based on workplace equipment	Operate Integrated or Split Flail and Wood Chipper with Crane	FWPHAR3203 or
	Operate Split Flail and Wood Chipper Fed by Mobile Machine	FWPHAR3204
Log truck	Transport Forestry Logs Using Trucks	FWPCOT3315
Chip truck	Transport Forestry Produce Using Trucks	FWPCOT3316
SILVICULTURE		
Manual felling associated with plantation silviculture or road and firebreak maintenance operations	Fell Trees Manually (basic)	FWPCOT2274
	Harvest Trees Manually (intermediate)	FWPHAR3205
Tractor	Conduct Tractor Operations	RIIMPO315E

15.5 Cross-referencing Safe and Skilled Life Saving Commitments

Forestry organisations have endorsed a set of 12 behaviours to increase worker awareness and improve compliance with basic safety rules. This is part of the broader agenda of developing and attaining essential training standards across the industry.

The Code aims to improve the management of risk not only by raising worker awareness but also by emphasising the building blocks of a health and safety management system. The commitments have been cross-referenced to the structure and content of the Code in *Figure 21*.

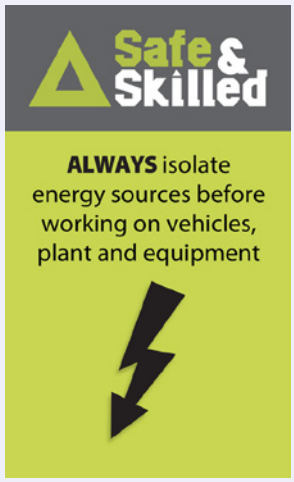
Figure 21 – Health and safety management system references in Code

3.2 Consultation with workers
3.6 Communication at crew level
6.3.2 Induction
6.3.4 Supervision

4 Risk management in overview
6 Risk management essentials

6 Risk management essentials
6.2 Essential risk controls

12.2.1 Mechanical site preparation
8.3 Mechanical felling



8.3 Mechanical felling
11 In-field processing

10.2 Loading

Figure 21 (cont) – Health and safety management system references in Code

15.6 Specialist felling techniques

15.6.1 Delimbing

Delimbing involves removing limbs and branches from a tree. This work can be done manually or mechanically.

Where done manually, the risk controls for manual felling in *Section 8.1* apply. Further measures include the following:

- Do not carry out delimbing or cross cutting from the downhill side of the log if the log has the potential to roll.
- Wherever practical, avoid standing on the log when delimbing or crosscutting.
- Approach all branches with caution, examine the branch to see if it is under tension, up or down, or bent sideways, and determine the correct method of work. Request machine assistance if in doubt.
- Cut overhung or suspended logs only using recommended methods (e.g. *Chainsaw Operators Manual and Tree Fallers Manual*).
- Do not crosscut logs suspended above shoulder height.
- In steep or undulating terrain, do not crosscut immediately above or below operations or people.

15.6.2 Machine-assisted manual tree felling

This task is considered high risk and should only be done by appropriately trained and experienced machine operators and fellers (see FWPHAR3213: Conduct Mechanically Assisted Tree Falling Operations, commonly referred to as 'machine assisted falling' or MAF). The machine operator and feller should be competent in this unit.

Before work starts, everyone involved must be consulted about the operation and agree to the sequence of events. The consultation must include an assessment of the tree to be pushed and surrounding trees for any visible hazards.

Machinery used in felling operations must:

- have the capacity to push or back-pull the tree safely
- be able to clear the under-storey around the tree and create a safe footing for the manual feller to work on
- have an operator protective structure (OPS) and falling object protective structure (FOPS) suitable for forestry operations
- have sufficient height reach and be able to safely control the felling direction of the tree.

Hazardous trees should be cleared from within two tree lengths of the tree to be felled.

The feller should always have control of the felling operation and be in radio and visual contact with the machine operator. There needs to be a degree of trust between the feller and operator.

15.6.3 Pushing

Where a machine will push the tree in a direction other than its natural lean, the machine should be placed in position before the feller approaches the tree.

The machine attachment to push the tree should be:

- in contact with the trunk of the tree with only enough push force applied to prevent the tree sitting back during the felling operation
- high enough above the ground that the machine can provide enough force to push the tree after the felling cuts are made.

When the machine is in position, the controls should be isolated to stop the machine or attachments from moving unexpectedly. Once the controls have been isolated, the tree feller may approach the tree and place the scarf cuts. The depth of the scarf should be approximately one-third of the tree's diameter and not exceed one-half.

After the scarf is removed, the feller should place a back cut in the tree but leave sufficient even holding wood to stop the tree moving backwards.

At no time while the back cut is being made should the machine operator apply extra force to the trunk of the tree, unless told to by the feller, as the tree may split or cap up.

Once the scarf cuts and the back cuts are done, the tree feller should leave the area by the safest route to a safe zone. This zone should be agreed between the feller and the machine operator before starting work.

The machine operator may then push the tree steadily and in a controlled way until it is committed to fall. If the tree will not fall, the machine operator should isolate the controls with the attachment still in contact with the tree trunk and ask the feller by radio to return to the tree and remove more hinge wood.

Once the tree feller removes more hinge wood, the tree feller should go back to the safe zone before the machine operator starts to push the tree again.

The feller should ensure the width of the hinge wood is not reduced below 5% of the diameter of the tree. If the hinge wood has been progressively reduced to 5% and the tree will still not fall, the feller should stop the operation and assess the risk of continuing.

15.6.4 Tree driving

This method involves felling a tree into one or more trees to bring those trees down. This is not a recommended method and should only be considered in very limited circumstances. These include:

- Tree is weakly lodged – i.e. lodged on one side of another tree or between two crowns held only by small limbs and the tree supporting the hang-up is not under great strain
- no suitable machine available to bring the hung-up tree to the ground.
- It is not reasonable to create an exclusion zone until a machine can be bought on site.
- Two accredited advanced fallers are available, one to do the work and the other to work as a spotter while the work is being done.

Further information can be found at this New Zealand Worksafe link

https://www.worksafe.govt.nz/topic-and-industry/tree-work/tree-felling-one-onto-two-tree-driving-operational-guidance/

More technical information on all these techniques can be found in the Tree Fallers Manual: Techniques for Standard and Complex Tree-Felling Operations published by ForestWorks.

15.6.5 Wind throw

Wind-thrown trees have been brought down by strong winds.

All the common risk controls of manual felling in *Section 8.1* apply (e.g. chainsaw safety). However, further measures are required because of the presence of partial or complete breaks, and of shatter and tension in trees that may be standing but weakened, leaning, or fallen.

The pattern and method of work may be dictated by the direction of wind throw rather than the topography, and this adds to the difficulty and dangers.

The following additional risk controls are recommended:

- Use mechanical methods of salvaging wind-thrown trees where practicable.
- Approach all trees with caution, and then examine the tree to see if it is under tension, up or down, or bent sideways, and determine the correct method of work.
- When a tree is resting on its roots, ensure the cut is such that nobody is in danger from movement of the stump or log.
- Uproot bent or heavy leaning trees with a machine. Where this is not practicable, use other safe systems of felling.

15.7 Tree climbing

When growing and managing forests, tree climbing may be necessary for tree measurement and seed collection activities. It is a specialist skill and the main risk is the potential to fall from height.

Planning

Part 4.4 of the WHS Regulations in sets out obligations to manage risks of falling from one level to another where there is the likelihood of injury. For more information, refer to the Safe Work Australia approved Code of Practice *Managing the risk of falls at workplaces*.

The regulation states that if it is not practicable to eliminate the risk of falling, a hierarchy of controls must be followed. A fall prevention device (e.g. elevating work platform) is preferred, then a work positioning system (e.g. rope access system), and finally a fall-arrest system (e.g. individual fall-arrest system).

Before a climber begins a climbing activity, a written climber rescue plan should be developed and communicated to everyone involved.

If a fall-arrest system is used, emergency and rescue procedures must be maintained. In line with the WHS Regulations the practicability of an alternative to climbing should be examined in the risk assessment stage.

Tree climbing is carried out in an environment in which most of the **critical hazards** and **common risk factors** are present.

	The following **activity-specific hazards** need to be considered: △ Falls from height △ Ants, bees, wasps, snakes, and other biting or stinging hazards △ Adjacent trees, dead limbs, and intertwining branches △ Working near power lines
	The following **activity-specific factors** also need to be considered: ● Individual tree integrity, including: – age and species – health – condition of the crown – decay – proximity of other trees ● Nature of adjacent operations ● Expected weather conditions

Risk controls for tree climbing are outlined below. They apply if an assessment shows that eliminating the risk is not reasonably practicable.

For example, a risk assessment might show that elevating work platforms cannot be used safely in the terrain or remote sensing technologies (e.g. laser scanning and photogrammetry) for tree measurement are impracticable because of the nature of the species and forest.

These options should be considered in other circumstances.

The **essential risk controls** are all relevant to tree climbing.

	**Activity-specific controls** are listed below:
Safe climbing practices	● Assess the tree to determine whether it is suitable for climbing and whether extra precautions or special techniques are required ● Assess the weather conditions to determine if it is safe to climb ● Ensure tree climbing is only done by workers who hold a statement of attainment for the relevant unit of competency (see *Section 15.4*) – in particular: – AHCARB319: Use Arborist Climbing Techniques – AHCARB318: Undertake Aerial Rescue ● Ensure a minimum of two people are present: – one climber – one ground worker who is also assessed as competent to the above units and able to climb if the first climber is injured and unable to descend the tree ● If a climber must disconnect the climbing rope or strap to move by an obstacle, use a second climbing rope or strap to ensure continuous protection while passing the obstacle ● Ensure no more than one climber is working in a tree (in most situations, this is the safest method)

 **Climbing equipment**	• Use an approved tree climbing harness conforming to AS/NZS *1891.1:2020 Personal equipment for work at height – Part 1: Manufacturing requirements for full body combination and lower body harnesses* and *AS/NZS 1891.4:2009: Industrial fall-arrest systems and devices – Part 4: Selection, use and maintenance* • Check all climbing equipment for safety and ensure it is in good condition before use and throughout the day • Ensure the climber uses: – a safety belt – a climbing rope or strap – climbing spurs • If a climbing rope or strap could be severed in the conditions at a climbing work site, ensure: – the rope or strap is made of material that cannot be severed – the climber uses a second climbing rope or strap • Correctly set and visually inspect all points of attachment before placing weight on them (e.g. knots correctly tied and checked, and carabiners are closed and locked) • Ensure anchor points are healthy, sound, and suitably strong • Position anchor points in such way that a slip or fall would swing the worker away from power lines or other potential hazards • Make a duplicate set of climbing equipment available for immediate use at the climbing work site for emergency rescues
 **Exclusion zones and safe work areas**	• Maintain a separation distance of more than two tree lengths between the climbing activity and other operations such as tree felling or road construction • Establish a safe zone underneath the climber • Ensure safety observers confirm safe separation distances from overhead power lines.
 **Communication**	• Establish communication methods between the two workers before work starts • Provide access to a mobile phone or other reliable communication device for any emergency calls

16 GLOSSARY

All-terrain vehicle (ATV) – vehicle, usually with four wheels, designed to handle a wider range of terrains than most vehicles. The term includes side-by-side ATVs (also known as light utility vehicles) and quad bikes (four-wheeled motorbikes).

AS/NZS – Australian/New Zealand Standard, described by numerals and a title, published by Standards Australia and Standards New Zealand, including any replacement or amended editions.

Competent person – person with sufficient knowledge and skills acquired through qualification, training, or experience to perform the task to which the term relates.

Contractor – person engaged by a PCBU to perform specific work usually described in a written agreement. A contractor has the duties of a worker but may also hold PCBU responsibilities to any workers they engage.

Coppice – regrowth of new stems from an existing root system following harvest.

Coupe – area of forest of variable size, shape, and orientation, on which harvesting takes place, usually to be harvested and regenerated over one or two years.

Driving trees – felling a tree into one or more trees to bring those trees down.

Exclusion zone – designated area from which everyone except the operator is excluded, established by using separation distances (usually two tree lengths), setting up physical barriers, or scheduling activities at different times.

Falling object protective structure (FOPS) – structure attached to, or forming part of, mobile equipment to reduce the possibility that an operator seated in the driving position will be harmed if an object falls onto the equipment.

Feller (faller) – person who cuts or chops a standing tree or part of a standing tree to bring down that tree.

Felling – cutting, chopping, pushing, or pulling down a standing tree or part of a standing tree, or bringing down a tree using explosives.

Forestry operations – all activities necessary for establishing, maintaining, harvesting, and processing wood products within WA forests.

Forwarding – extracting logs from the logging area using mobile plant that carries the logs clear off the ground.

Hazard – something in the work environment that has the potential to cause harm to the health and safety of people.

Hazardous chemical – any substance, mixture or article that satisfies the criteria of one or more hazard classes in the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), as modified by Schedule 6 of the WHS Regulations.

Health – physical and psychological health.

Health and safety management system – methodical way of managing, documenting, and verifying how risk is managed by a PCBU.

Note that different terms – such as safety management plan, safety system, and safety plan – may be used to describe a health and safety management system.

Health monitoring (of a person) – monitoring a person to identify changes in their health status because of exposure to certain substances.

Lashing – load fastening device that restrains loads, such as a chain, cable, rope, or webbing.

Log – tree segment suitable for subsequent processing into sawn timber, pulpwood, chip wood, or other wood products.

Log landing – area such as a log dump, skidway, or log yard used for the cutting up, debarking, measuring, or sawing logs.

Manual felling – felling of a tree by a method that requires the feller to stand at the base of the tree.

Must – modal verb that denotes a mandatory requirement of the WHS Act or the *Workplace Health and Safety Regulations 2022*, giving no other option than to do what the clause requires.

Notifiable incident – incident involving the death, serious injury or illness of a person, or a dangerous incident that is notifiable under Part 3 of the Act.

Operator protective structure (OPS) – structure attached to equipment to protect the operator from flying objects intruding into the machine.

Person conducting a business or undertaking (PCBU) – person or entity, usually the employer, who has the primary duty of care under the WHS Act to ensure the health and safety of workers and others at the workplace, so far as is reasonably practicable (PCBUs can include sole traders, corporations, associations, and partnerships).

Plant – any machinery, equipment, appliance, container, implement, or tool, including:

- any component of any of those things
- anything fitted or connected to any of those things.

PPE – the abbreviation for personal protective equipment. Refer to *Section 15.2* for details.

Risk – chance (or likelihood) that a hazard will cause harm to the health and safety of people.

Risk assessment – way of estimating the nature and level of risk.

Risk control – prevention measure that eliminates a workplace health and safety hazard or risk, or if this is not reasonably practicable, reduces the risk so far as reasonably practicable.

Road – path or way with specially prepared surface, used by vehicles or pedestrians.

Rollover protective structure (ROPS) – system of structural members on mobile equipment that reduces the possibility of a seat-belted operator being crushed if the equipment rolls over.

Safe work area – designated area outside another operator's exclusion zone, established using distance, physical barriers, or time. For example, a safe work area might be an area on a log landing where maintenance happens, where a log truck driver is located during loading, where a choker setter stands before signalling the turn to be hauled, or where logs are measured.

Side Wash – the use of trees,stumps, ground or other objects to change the direction of the steep slope machine's tether line

Site safety plan (SSP) – written plan developed to protect the health and safety of workers, visitors, contractors, and other individuals at a specific forestry operation work site.

Skidding – pulling a log to a landing by wheeled skidders, bulldozers or tracked loaders.

Snigging – pulling a log by wire, rope chain or grapple.

Statement of attainment – formal certification in the vocational education and training sector by a registered training organisation that a person has achieved:

- part of an Australian Qualifications Framework (AQF) qualification, or
- one or more units of competency from a nationally endorsed training package, or
- all the units of competency or modules in an accredited short course.

Substance – any natural or artificial substance, whether a solid, liquid, gas, or vapour.

Thinning – felling and removal of part of the forest crop.

Unit of competency – nationally agreed and recognised statement of the skills and knowledge required for effective performance in a particular job or job function. Units identify the skills and knowledge as outcomes that contribute to the whole job function. They are an endorsed component of training packages.

Visitor – person who is not directly employed or engaged at the workplace and enters the workplace.

Widow maker – limb or branch of a tree that may unexpectedly dislodge from a tree and presents a high risk of injuring a person.

Worker – person who carries out work in any capacity for a person conducting a business or undertaking, including work as:

- an employee
- a contractor or subcontractor
- an employee of a contractor or subcontractor
- an employee of a labour hire company who has been assigned to work in the business or undertaking
- an outworker
- an apprentice or trainee
- a student gaining work experience
- a volunteer
- a person of a prescribed class.

The person conducting the business or undertaking is also a worker if they are an individual who carries out work in that business or undertaking.

Workplace – place where work is carried out for a business or undertaking and includes any place where a worker goes, or is likely to be, while at work. A workplace could be a vehicle, vessel, aircraft, or other mobile structure on land or water.

17 REFERENCES

Australian Forest Products Association (AFPA), *Drug and alcohol policy and testing program*, industry guideline G23-02 (2023).

AFPA, *Log loading guideline*, industry guideline G23-01 (2023).

AFPA, *Safety signage in forestry operations*, industry guideline G22-06 (2022).

Civil Aviation Safety Authority (CASA), *Guidelines for helicopters – suitable places to take off and land*, advisory circular AC 91-29 v1.3 (2023).

CASA, *Remotely piloted aircraft systems – licensing and operations*, advisory circular AC 101-01 v5.1 (2023).

Commission for Occupational Safety and Health, *Alcohol and other drugs at the workplace*, guidance note (2008).

Commission for Occupational Safety and Health, *Working alone*, guidance note (2009).

Department of Transport WA, *Drive safe: A handbook for Western Australian road users* (2023).

Energy Networks Association, *ENA NENS 04-2006 National guidelines for safe approach distances to electrical and mechanical apparatus* (2006).

Fire and Emergency Services Authority of Western Australia (FESA), *Guidelines for plantation fire protection* (2022).

FIFWA Minimum Fire Season Requirements for Working in WA Plantation Forests

Forest Industries Federation (WA) Inc (FIFWA), *Code of practice for timber plantations in Western Australia* (2014).

Forest Products Commission, *Identifying and marking hazards in native forest coupes*, procedure 70, (2021).

ForestWorks, *Chainsaw Operator's Manual: Chainsaw safety, maintenance and cross-cutting techniques* (2009).

ForestWorks, *Log haulage manual: Techniques for loading, driving and unloading trucks that carry logs and other forest procedure* (2014).

ForestWorks, *Tree fallers manual: Techniques for standard and complex tree-felling operations* (2011).

National Institute for Forest Products Innovation (NIFPI), *Development of best practice guidance for protective guarding of mobile plant used in Australian forests*, final report on Project NS025 (2022).

National Transport Commission (NTC), *Load restraint guide* (2018).

NSW Government, *Road safety and your work: A guide for employers* (2019).

LITA Fatigue Working Group, *Guidelines for developing and implementing a fatigue management policy in forestry* (2019).

Rutherford, P. (2005), *Code of practice for the use of agricultural and veterinary chemicals in Western Australia*. Department of Primary Industries and Regional Development, Western Australia, Perth. Bulletin 4648.

Safe Work Australia approved Codes of Practice adopted by Work Health and Safety Commission in Western Australia in 2022:

- *Construction work.*
- *First aid in the workplace.*
- *Hazardous manual tasks.*
- *How to manage work health and safety risks.*
- *Managing noise and preventing hearing loss at work.*
- *Managing risks of hazardous chemicals in the workplace.*
- *Managing risks of plant in the workplace.*
- *Managing the risk of falls at workplaces.*
- *Managing the work environment and facilities.*
- *Work health and safety consultation, cooperation and coordination.*

Safe Work Australia, *Agricultural work near overhead electric lines*, information sheet (2014).

Safe Work Australia, *Forestry: Guide to managing risks of timber harvesting operations* (2014).

Safe Work Australia, *General guide for working in the vicinity of overhead and underground electric lines*, guidance material (2020).

Safe Work Australia, *Guide on exposure to solar ultraviolet radiation (UVR)* (2013).

Safe Work Australia, *Guide to growing and managing forests* (2013).

Safe Work Australia, *Managing the risks of working in heat*, guidance material (2021).

Safe Work Australia, *Work-related psychological health and safety: A systematic approach to meeting your duties*, national guidance material (2019).

Worksafe Western Australia, *Interpretive Guideline How to determine what is reasonably practicable to meet a health and safety duty* (2021).

Worksafe Western Australia, *Interpretive Guideline, Incident Notification* (2023).

18 ACKNOWLEDGMENTS

Steering committee members

Contractors

Bernie Dawson, Dawson Contracting (Chair)
Shawn Smeathers, Southwest Haulage
Jeff Loton, Plantation Logging
Brett Waugh, Southern Forests Services
Damien Benson, Total Harvesting

Forest Owners / Managers

Murray Anning, Australian Bluegum Plantations
Justine West, Forest Products Commission
Alan Seymour, Forest Products Commission
Stewart Tutton, PF Olsen
Kees Visser, Simcoa
Matt Giles, WAPRES

Processors

Brad Barr, Wespine
Chaz Newman, WAPRES

Others

Dan McCaig, AWU
Bill Towie, Towie Timber Training
WorkSafe WA, as observers

Project Manager

Adele Farina, Chief Executive Officer of FIFWA and Beth Johnston of FIFWA's Communication Officer

Photographs:

details to be included

Thanks to the consultants PF Olsen (Aus) Pty Ltd .

Thanks also to Craig Poore for graphic design and document layout and Justine Dixon Cooper of Goldfinch Editing for final editing and proofreading.