

Safe practice for forestry and harvesting operations

15 November 2024

For reviewers:

We are updating the forestry guidance suite.

This suite will be developed in the following Parts:

Part A: Managing health and safety through the contracting chain (in this document)

Part B: Managing Health (in this document)

Part C: Site Planning, Roding and Access (coming soon)

Part D: Establishment and Silviculture (coming soon)

Part E: Harvesting

- **Mechanised harvesting and tree felling (in this document)**

- **Steep slope harvesting (in this document)**

- **Cable harvesting (in this document)**

- **Manual felling (in this document)**

- Breaking out (coming soon)

- Using mobile plant (coming soon)

Part F: Work on landings, loading and unloading (coming soon)

Part G: Worker facilities, PPE, first aid, emergency plans, training, information, instruction and supervision (coming soon)



What things mean: terms used in this guidance

In this guidance, where we use the term 'you' it is referring to you as a PCBU.

Use of 'must' and 'should'

In these guidelines you will see the words 'must' and 'should'.

They are used very deliberately.

Where you see the word 'must' it means that it is a legal requirement. You have to comply.

Where you see the word 'should' it means that it is a recommended practice or approach but it is not mandatory.

The use of 'should' means that you can look at approaches that are different than recommended good practice and which may in the future be accepted as good practice. It does not allow for approaches that are less robust or provide a lesser level of safety.

Use of 'so far as is reasonably practicable'

You will also see the phrase, 'so far as is reasonably practicable' where certain legal requirements require you to do something.

'Reasonably practicable' is the term used to describe what is reasonably able to be done in your circumstances when deciding how to meet health and safety duties, taking into account:

- the amount of harm that might result from the hazard or risk,
- the likelihood of it happening,
- what the people involved can be expected to know about the hazard or risk and ways they can eliminate or minimise it, and
- are those ways available and suitable?

Then – and only then – can you consider the cost of eliminating or minimising the risk and whether the cost is grossly disproportionate to the risk.

For more information, see WorkSafe's guidance: [Reasonably practicable](#)

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1.0 About these guidelines

Forestry work involves considerable risk. Each year many people are injured, some seriously. And every year there are fatalities. It is the job of every business working in forestry to make sure that workers are not put at risk by the work that they do.

1.1 Who should read these guidelines?

These guidelines are for any person conducting a business or operation (PCBU) involved in forestry operations (from deciding to plant the forest through to the trucks taking the logs from the site) including:

- the owner or owners of the land where the forest is planted
- forest owners and managers and their workers
- roading and earthworks contractors and their workers
- log buyers and their workers
- forest contractors and sub-contractors and their workers
- logging transport contractors and their workers.

In these guidelines, "you" means you, the PCBU.

1.2 What work is covered in these guidelines?

These guidelines provide an overview on how PCBUs in a contracting chain could work together to manage health and safety, and what WorkSafe's expectations are for the different parts of the contracting chain.

These guidelines are in the following Parts:

Part A: Managing health and safety through the contracting chain (in this document)

Part B: Managing Health (in this document)

Part C: Site Planning, Roading and Access (coming soon)

Part D: Establishment and Silviculture (coming soon)

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Part G: Worker facilities, PPE, first aid, emergency plans, training, information, instruction and supervision (coming soon)

PART A: MANAGING HEALTH AND SAFETY THROUGH THE CONTRACTING CHAIN

Part A provides an overview on how PCBUs in a contracting chain could work together to manage health and safety, and what WorkSafe's expectations are for the different parts of the contracting chain.

This Part does not explain all the duties that PCBUs may have under the Health and Safety at Work Act 2015 (HSWA). These duties will be introduced where relevant later in the guidance.

For feedback

2.0 Roles in the contracting chain

2.1 Introduction to the contracting chain

Contracting is when a PCBU (called the contracting PCBU), hires another PCBU (called a contractor) to do work for them.

The forestry industry has traditionally referred to these roles as 'principals' and 'contractors' so we will use those terms in this guidance.

These are the definitions.

Role	Explanation	Examples
Principal	A person or business that engages any other person or business to do work for them, other than as an employee.	Principals could include: <ul style="list-style-type: none"> - the landowner and/or forest owner - forest management company or agent - harvest managers - log buyers - contractors that hire sub-contractors (see below).
Contractor	A person or business who has been engaged to do the work, other than as an employee.	Contractors could include: <ul style="list-style-type: none"> - earthworks contractors - roading contractors - engineering companies - silviculture contractors - harvesting contractors - log transport contractors - suppliers of services (for example, fuel deliveries and mechanical maintenance).
Subcontractor	PCBUs hired by the contractor to work or provide services on their behalf. Sometimes subcontractors are referred to as suppliers.	Subcontractors could include: <ul style="list-style-type: none"> - engineering services - mechanical and maintenance services - fuel supplies - labour hire. <p>They may also include contractors in the list above.</p>
Worker	An individual who carries out work for a PCBU.	Under HSWA a worker includes: <ul style="list-style-type: none"> - an employee - a contractor or sub-contractor - an employee of a contractor or sub-contractor - an employee of a labour hire company - an apprentice or trainee - a person gaining work experience or on work trials.

Table 1: Roles in a contracting chain

3.0 Working with other PCBUs to manage health and safety through the contracting chain

3.1 Introduction

PCBUs must ensure, so far as is reasonably practicable, the health and safety of workers, and that other persons are not put at risk by their work.

PCBUs in contracting chains will share duties in relation for the same health and safety matters. There are called overlapping duties.

Overlapping duties could include duties like managing shared health and safety risks, or notifying WorkSafe when a notifiable event occurs. Overlapping duties are explained next.

If you are new to risk management, see Appendix 1 for guidance.

3.2 Overlapping/shared duties

PCBUs operating in a contracting chain will have shared health and safety duties with other PCBUs in that contracting chain. They all have the duty for keeping workers safe. This joint responsibility is known as overlapping duties.

Where there are overlapping duties, all PCBUs must, so far as is reasonably practicable:

- consult with each other
- cooperate with each other
- coordinate their activities.

That means they have to work together. They should:

- talk about what is going on – and what will be going on in the future – and who is going to be doing it
- discuss the level of control that each PCBU has over the activity
- agree on who will manage what and how it will be managed
- agree on shared facilities, if applicable
- talk about how they are going to monitor and check on things.

Two important principles to be aware of

The more influence a PCBU has over a work site or health and safety matter, the more responsibility they are likely to have.

Each PCBU is responsible for making sure their own duties are met. PCBUs cannot contract out of their health and safety duties or push risk onto others in the contracting chain.

One simple way of understanding overlapping duties

Stand back from what you are doing and look at what is going on around you, and who is doing what.

Then talk to the other people and decide how you are all going to make things as safe as you can for everybody involved.

For more information, see [Overlapping Duties – Quick Guide](#)

Have a look also at [PCBUs working together: advice when contracting](#).

Example

An example of a shared overlapping duty is the duty to notify WorkSafe in the event of:

- a death
- a notifiable injury or illness (see [What events need to be notified](#)) or
- a notifiable incident (for example, a hazardous substance spill, an electric shock, or engineering failure).

After consulting with the PCBUs in the contracting chain, it was decided which PCBU would be best placed to notify WorkSafe if a notifiable event occurs. They agreed that this process will be followed:

- If there is a death at the workplace, WorkSafe will be called immediately on 0800 030 040.
- For other events, WorkSafe will be notified through the [Notify WorkSafe](#) page of the WorkSafe website.
- The notifying PCBU would then tell the other PCBUs that a notification had been made.

For feedback

4.0 What do we expect of landowners?

If you own the land and are putting it into forest or are contracting the harvest of an existing forest on your land, you are a PCBU and a principal (also see Section 5 of these guidelines).

Even if you contract a forest manager to manage all the work for you, you still have influence over the health and safety of people who will work in any forestry operations on the land.

As a PCBU, you have responsibilities under HSWA.

You must:

- make sure, so far as is reasonably practicable, that everybody that works on your land, or other affected people are not put at risk by the work that they do
- consult, cooperate and coordinate with other PCBUs in the contracting chain to manage shared duties
- engage with workers on any matters that might affect their health and safety.

The following sections cover some general expectations we have of landowners. They do not represent all the duties landowners could have as PCBUs.

4.1 Engage a forest manager

A forest manager or forestry consultant will plan and coordinate the whole process from site preparation and planting through to the eventual harvest.

You should make sure that you engage a reputable company with robust health and safety systems.

4.2 Know what hazards and physical constraints there are on your land

It is important that you think about these things even if you engage a forest manager.

Use aerial photos, farm maps, topographic maps or drone footage. Identify constraints and hazards such as:

- tracks, roads and bridges
- overhead power lines
- drains and culverts
- underground utilities
- areas of steep terrain, cliffs, sink holes and drop-offs
- rivers and creeks (particularly with respect to any downstream uses)
- flood prone areas
- erosion-prone or unstable soils.
- areas of public access
- boundaries onto neighbouring properties.

4.3 Talk with your neighbours

It is important to let neighbouring landowners know if you are planning to plant forest or harvest existing forestry.

If the work creates health and safety risks for your neighbours and their workers, you must manage those risks.

4.4 Think twenty years ahead

If you are planting new forest, many of the risks will not happen until harvest occurs which could be in twenty years' time.

If you plan ahead, you can eliminate or, at the least, minimise those risks.

Some examples:

- If steep slope areas could present added risk for harvesters, consider leaving them unplanted
- Think about unstable soils or erosion-prone areas. If harvesting could trigger erosion, again, perhaps they are better unplanted.
- If the area is prone to heavy rains or the rivers are prone to flooding, think about how you manage the risk of slash, debris and soil being carried downstream.

For feedback.

5.0 What do we expect of principals?

Principals engage any other person or business to do work for them, other than as an employee.

Principals could include:

- the landowner and/or forest owner
- forest management company or agent
- harvest managers
- log buyers.
- contractors with subcontractors.

If you are a principal, you must:

- make sure, so far as is reasonably practicable, that everybody that works on your site, or other affected people are not put at risk by the work that they do
- consult, cooperate and coordinate with other PCBUs in the contracting chain to manage shared duties
- engage with workers on any matters that might affect their health and safety.

The following sections cover some general expectations we have of principals. They do not represent all the duties principals could have as PCBUs.

5.1 What we expect of principals

You should:

- engage competent, safe contractors
- coordinate contractors' activities
- give them all the information they need to keep them and their workers healthy and safety while working (this guide on [information and training](#) could be useful).
- monitor the contractors' health and safety performance and
- take the lead in encouraging good health and safety practices throughout the contracting chain.

5.2 Choosing a capable contractor

When choosing a contractor, consider their health and safety record as well as their ability and capacity to do the work.

Consider:

- the contractor's incident and hazard/risk reporting procedures
- an independent assessment of their health and safety performance
- any work injuries or near misses over the last five years, plus any investigation results
- information on any enforcement and prosecution they have undergone, and
- their finances, capacity and equipment to do the work.

Look for positive signs, for example:

- evidence of proactive steps they have taken to improve health and safety
- evidence of ongoing improvement in health and safety
- evidence that they have good worker engagement and relationships.

5.3 Having a documented health and safety system

As the principal, you should make sure the contractors have a documented health and safety system that includes the following at a minimum:

- a health and safety policy
- a drug and alcohol policy, including testing
- training and supervision
- health and safety meetings
- hazard identification and risk assessment and management
- auditing and inspection programmes
- incident reporting and investigation
- emergency procedures
- management of hazardous substances.

5.4 Other considerations for contractors

You should also consider:

- the contractor's ability to provide competent workers and equipment needed for the job
- worker turnover and any issues arising by ensuring that they have written employment agreements which include healthy and safe working conditions for workers
- the availability of effective worker participation and representation, and
- the availability of trained health and safety representatives.

5.5 What should contracts cover?

As a principal, you should make sure that all contracts and agreements clearly define responsibilities and duties such as:

- who liaises with stakeholders and interested parties including:
 - WorkSafe
 - regional councils and territorial authorities
 - power and gas companies if the work is near their assets
 - local Māori
- site security – who is responsible and what it will involve and include
- how to manage emergencies, including incidents, weather emergencies, and fire
- who will notify WorkSafe about notifiable work events
- how the principal will monitor the contractor's activities throughout the contract
- how and when the contractor will report to the principal
- reasonable work schedules, including flexibility around delivery dates if the contractor cannot complete the work because of issues such as weather or worker illness
- minimum site design and roading standards, including skid site infrastructure
- use of vehicles on site
- plant and equipment, and their certification, maintenance, and repair
- informing the principal about WorkSafe assessments and results
- crew size and composition
- responsibilities for ensuring employment law requirements are met
- log transport and compulsory standards
- subcontracting processes, and
- safe work systems, including:
 - identifying and managing risks
 - health and safety training
 - worker engagement, participation and representation
 - worker competence and responsibilities
 - crew training systems
 - competent supervisors
 - fatigue management
 - PPE and how it is provided to workers
 - communication procedures and equipment
 - managing adverse working conditions such as weather, poor visibility and lighting
 - documentation to be held on site

- reporting incidents to the principal and others
- policies about working alone, and
- drug and alcohol policies and standards.

5.6 Planning the work

As the principal, you will be responsible for planning the work and talking with the contractors about the plan.

You must work with the contractors to identify any work or workplace hazards and risks and any other health and safety requirements.

Once the scope of the work has been agreed, the principal should provide a job prescription. This might take the form of a planting or spraying prescription, a job specification, or a harvesting or logging plan.

The information to put in a harvest plan could include:

- recent maps of the worksite (not an aerial photo) showing:
 - locations of site-specific hazards identified by the principal. The contractor can add to them over time as the site is worked
 - emergency location points or references
 - site location and access
 - a preliminary site plan
 - waterways and sites of historical or cultural significance
 - earthquake and fire risks
- site-specific hazard/risk identification form, describing how each risk will be managed and by whom
- how to report incidents
- who will notify WorkSafe of hazardous work ([Particular hazardous work](#) includes commercial logging)
- who will notify WorkSafe about notifiable events
- information about the proposed work, including:
 - mean tree height
 - piece size
 - start and finish dates
 - transport plans, roads and road maintenance
 - agreed standards, systems and processes
 - skills and equipment to do the work
 - plans for working around power lines
 - communicating deadlines and change management
 - who will control the work, and how.

5.7 Eliminate risk at the design and planning stage – how to best use the harvest plan

Developing the harvest plan is a good chance to identify hazards and eliminate risk at the planning stage. This works best when you have all parties involved. Consider including:

- earthworks contractors
- roading contractors
- harvesting contractors
- log transport contractors.

Suggest that the contractors involve their foremen or key workers. Their experience and practical views of how a site and work processes can be managed to operate safely can be invaluable.

Consulting and coordinating with the contractors can help with:

- deciding on the best extraction method
- the design of the roading network
- the position, size and design of the skid sites.

For feedback.

6.0 What do we expect of contractors?

Contractors are responsible for planning and carrying out the work. If you are a contractor, you must make sure, so far as is reasonably practicable, that the health and safety of your workers and other people are not put at risk by the work that they do.

You must consult, cooperate and coordinate with other PCBUs in the contracting chain to manage shared duties. And you must engage with your workers over any matters that could affect their health and safety.

If you have subcontractors, you are classed as a principal (also see section 5.0 of these guidelines).

The following sections cover some general expectations we have of contractors. They do not represent all the duties contractors will have as PCBUs.

6.1 What we expect of contractors

If you operate as a self-employed contractor, you must look after your own health safety and the health and safety of others. You will have shared duties with the principal and any other contractors and subcontractors to manage workplace hazards and risks and any other health and safety requirements.

If you are a contractor with employees, you should have a documented Health and Safety Management System (see Section 5.3).

This could include:

- clearly defined roles and responsibilities
- regular work hazard/risk inspections by workers and supervisors
- stress and fatigue management plans
- regular health monitoring
- first aid equipment and training
- plant and equipment inspection and maintenance
- managing sub-contractors
- managing visitors
- worker competency assessment plans
- return-to-work policies and assessments
- dynamic risk management training
- stop-work processes for weather extremes and unusual conditions
- management of work around power lines
- vehicles
- transport and mobile plant
- working at height
- landing size and maximum capacity
- helicopter landings, where necessary.

6.2 Personal protective equipment (PPE)

PPE that is to be used to minimise risks to health and safety (helmets, hearing protection, high-vis, gloves, chainsaw chaps etc) must be provided by the PCBU and must be used.

You must supply PPE appropriate to the task, and check that it fits correctly.

You must regularly check PPE for wear and damage and replace it when too worn or damaged for safe use.

Wet weather gear, sun block, hats and neck cover should be included as PPE.

You should also make sure that any visitors to the site are equipped with appropriate PPE.

PPE is not the first line of defence in minimising risk. You should always look at other forms of risk minimisation as well as using PPE.

For more information, see Part G (to come).

6.3 Site supervision

You should make sure there is always a competent person in charge of the site. This person should be able to effectively supervise and control the work and carry out emergency procedures. They should also be competent at understanding and managing your health and safety system.

6.4 Worker competence

All workers should be competent for the work they are being asked to do. Assessing competence should take into account whether the worker has the training, experience, knowledge and skills to work safely. If a worker is in training or is lacking current experience, they must be supervised at all times.

More information see Part G (to come).

7.0 What do we expect of subcontractors?

Subcontractors are PCBUs hired by the contractor to work or provide services on their behalf. Sometimes subcontractors are referred to as suppliers.

You must make sure, so far as is reasonably practicable, that the health and safety of your workers and other people is not put at risk by the work that they do.

You must consult, cooperate and coordinate with other PCBUs in the contracting chain to manage shared duties and to engage with workers over any matters relating to their health and safety.

You need to make sure that your workers have all the relevant information for working on the site and have the training, experience, knowledge and skills to work safely.

You need to be aware of on-site rules and procedures, inductions, toolbox talks, health and safety plans and reporting procedures.

7.1 Work with other PCBUs in the contracting chain

You must work closely with the contractor to help manage risks. The contractor should:

- be involved, where practicable, on any risk management planning
- share the contact details of other contractors on the job and make sure that everyone knows who the key contacts are
- alert contractors or the principal when control measures are not adequate, or when new risks arise.

8.0 Other PCBUs in the contracting chain

There are other PCBUs that may be involved in providing professional services, materials, plant, or people in and around the contracting chain. For example:

- engineers
- plant hire
- labour hire
- plant servicing and repair.

They all have the same duties as other PCBUs in the contracting chain. Some will have additional [upstream duties](#) (which is where plant and equipment manufacture, construct or supply).

Part B: Managing health risks for forestry workers

Part B provides an overview on how PCBUs could manage health risks.

For feedback.

9.0 Introduction to work-related health

More workers will be affected by work-related health illnesses or injuries than acute injuries.

Work-related health problems are the less visible side of health and safety in forestry operations but that does not mean that they are not important.

As a PCBU you need to be aware of work-related health risks and how to manage them.

This Part looks at:

- some things to consider when managing health risks including using exposure and health monitoring (this section).
- the common health risks to forestry workers, and what you can do to eliminate or minimise these risks (Sections 10-19).

9.1 How can work affects health and health affects work?

A worker's health might be harmed by:

- physical factors such as the repetition of a task, the length of time doing a task, and stresses and strains on the body
- environmental factors such as noise, temperature, and the physical environment
- organisational factors such as rosters and shifts, training and levels of experience, and worksite communication
- individual factors such as fitness, fatigue, and previous injury
- psychological factors such as job demands, stress, workplace relationships, and workplace support.

There is a two-way relationship between work and health. Work can affect a worker's health and a worker's health can affect their work for example:

Effects of work on health

Type of risk	Example of harm
Physical risks	High levels of noise may lead to hearing loss.
Chemical risks	Exposure to hazardous substances may lead to chronic illness.
Biological risks	Exposure to bacteria (for example, giardia or leptospirosis) may lead to sudden and severe illnesses.
Manual task risks	Repeated lifting of heavy or awkward items may lead to back injury.
Mental harm risks	Bullying at work or production pressure may lead to work-related stress.

Table 2: Effects of work on health

Effects of health on work

Type of risk	Example of harm
Sensory risks	Changes in a worker's hearing or eyesight may affect the way their ability to react to risks.
Impairment risks	Tiredness and fatigue may lead to reduced concentration.
Mobility risks	Physical restrictions – for example, strains, sore backs – may affect a worker's ability to move out of the way of danger.
Incapacity risks	High blood pressure or a poorly controlled heart condition, for example, could lead to a worker suddenly losing consciousness.

Table 3: Effects of health on work

Example of how small things can create bigger problems

A worker is part of the breaking-out crew. Their job requires fitness and stamina. The crew needs to be agile and to concentrate on what they are doing.

Usually, the crew take breaks so they do not get fatigued and swap tasks with a co-worker.

But this day:

- the crew is short-handed so workers cannot swap tasks (organisational factor)
- the crew is running behind so workers take shorter breaks (organisational factor).

Because the crew is working faster, workers are less careful (impairment). One worker strains a muscle (physical factor). The head breaker-out does not notice it and the injured worker does not tell them (psychological factor). Instead, the injured worker keeps working because of the pressure to get the job done. But the muscle discomfort gets worse and becomes a distraction (physical factor).

Because the injured worker is not paying full attention to the job, the risk of making a mistake increases considerably.

9.2 What can you do to eliminate the health risks at the early stages?

As with other risks, you must first eliminate health risks so far as is reasonably practicable. It is best to try to eliminate the health risks at the early stages. If risks cannot be eliminated, they must be minimised so far as is reasonably practicable.

If you are new to risk management, see Appendix 1 for guidance.

Think about the potential risks to worker health. Is there anything can you do at the planning and design stage to eliminate the risks? If it is reasonably practicable you should eliminate potential risks at this stage.

For example:

- Think about the production targets. Do they allow for reasonable deadlines?
- Are there machinery and tools that present least risk to workers?
- If chemicals and hazardous substances are being used, are there less harmful alternatives?
- Do you have a good chain of command? Do people know who is meant to do what? If there is an issue can it be resolved early?
- Do you have enough workers on a job so that everybody can have regular breaks and take sick leave without putting pressure on the other workers?

9.3 How can exposure monitoring and health monitoring be used to effectively manage health risks?

Exposure monitoring and health monitoring – along with verifying that control measures are working effectively – can be used to manage health risks (Figure 1).



Figure 1: Role of exposure monitoring and health monitoring in managing health risks

Monitoring is not a control measure. It does not replace the need for control measures to eliminate or minimise worker exposure to harm.

What is exposure monitoring and what can it be used for?

Exposure monitoring measures and evaluates what your workers are being exposed to while they are at work.

Biological exposure monitoring is another type of exposure monitoring. It usually involves taking blood or urine samples to test for a substance (or a metabolite of a substance) workers are working with.

Exposure monitoring can be used to:

- identify, assess and confirm health risks
- identify where new control measures are needed
- monitor how well current control measures are performing, and
- identify when control measures need to be reviewed, updated or removed.

What is health monitoring and what can it be used for?

Health monitoring looks at whether a worker's health is being harmed because of what they are being exposed to while they are at work.

Health monitoring can be used to tell you if workers are experiencing health effects from potential exposures.

Health monitoring can also confirm that control measures are preventing harm.

Where can you find more information?

For more information on selecting external monitoring providers and then on putting in place monitoring programmes including worker consent and privacy requirements: [Health and exposure monitoring | WorkSafe](#)

9.4 What are common hazards that can harm workers' health?

Health hazards that forestry workers could be exposed to include:

- impairment from fatigue
- impairment from drugs and alcohol
- mental health harm
- noise
- vibration
- temperature extremes (hot and cold)
- UV/sun exposure
- harmful substances
- hazardous manual tasks

These may not be the only health hazards workers are exposed to, but they are a good place to start. These topics are addressed next.

10.0 Impairment from fatigue

Forestry work relies on workers being physically and mentally alert. A worker's fitness to work can be impaired by fatigue. This can create a risk to their health and safety and the safety of those around them.

Impairment can be a major risk for forestry workers particularly where fatigue is involved. This section offers guidance on managing the risks of fatigue for forestry workers.

10.1 What is fatigue and how can it happen?

Fatigue is a physiological state where someone is not able to mentally and physically function as they usually would. There are four main factors that can contribute to someone developing fatigue:

- missing out on sleep
- being awake for too long
- working and sleeping in the wrong parts of the body clock cycle
- having a high workload (mental and/or physical).

Fatigue is a major risk for forestry workers. Examples of conditions that can lead to workers experiencing fatigue include:

- long driving times (many workers have to travel considerable distances to get to their sites)
- longer shifts
- the physical nature of most forestry jobs
- personal health or lifestyle factors.

As the level of fatigue experienced by a worker increases, there is a higher likelihood that the worker will experience impairment. This can affect their decision-making abilities, increasing the likelihood of negative safety or health outcomes.

Fatigue could also cause micro-sleeps, where the person briefly falls asleep. Micro-sleeps are potentially deadly if they occur at the wrong time – for example, when the person is in control of a vehicle or mobile plant.

10.2 What are possible control measures?

There are several control measures that can be used to reduce the chances of workers experiencing fatigue, for example by:

- creating work schedules that allow for sufficient rest during work shifts and between shifts (create these in consultation with your workers)
- making sure working hours are not too long. If longer working days are required, consult with your workers before deciding these hours. Consider staggered start and finish times, longer rest breaks, and periods off work
- scheduling tasks suitably throughout a work period. A person's ability to remain alert and focused can be reduced between 3.00am and 5.00am, and between 3.00pm and 5.00pm. If reasonably practicable, avoid critical jobs, such as working at height, manual tasks, or tasks using mobile plant or vehicles, during these times
- monitor and place limits around the number of overtime hours that can be worked. Avoid incentives to work excessive hours
- monitoring and placing limits around shift swapping and on-call duties
- designing rosters that follow natural sleeping rhythms and allow for good sleep opportunity and recovery time

- avoiding work that starts before 6.00am, where possible. If night work is required, limit the number of night shifts in a row that your workers can work
- factoring in travel times to worksites. Long travel times to remote worksites will contribute to fatigue, as will the effects of staying away from home for days at a time
- checking that casual staff or labour hire workers have not recently worked a shift somewhere else (for example, the same day or the previous night). If they had, they might already be tired.

You can also manage the effects of fatigue by managing physical and mental work demands. For example, by:

- limiting periods of excessive mental or physical demands by often rotating those tasks between workers
- making sure plant, machinery, and equipment are fit for purpose
- making sure workloads are manageable. Take into account workflow changes due to factors such as machinery breakdowns, unplanned absences, or resignations
- avoiding unreasonable deadlines.

Consider seeking expert advice from a suitably qualified health and safety professional that specialises in fatigue management. They can assess your workers, schedules, systems, and practices, and provide advice on fatigue risk management.

Managing fatigue across the contracting chain

PCBUs in forestry contracting chains should work together to create a fatigue management policy or agreement for all PCBUs in the contracting chain.

An agreement could include:

- minimum hours of sleep opportunity between shifts and at least two full nights between each week of work
- maximum shift length, considering:
 - time of day
 - type of work
 - maximum travel time before and after a shift
 - maximum hours to be worked in a week
 - maximum hours to be worked in a month
- procedures for detecting, reporting, and addressing fatigue.

As well as the above, PCBUs should:

- provide workers with training and information on fatigue management so they can self-manage outside of work hours
- encourage open communication with workers to discuss mental health pressures. For more information, see Section 15.0: Mental wellbeing
- make sure anyone can report fatigue-related issues to management
- investigate incidents where fatigue may be involved.

Once these strategies are implemented, monitor and review them to make sure fatigue is managed effectively.

PCBUs should not create situations where there is pressure on PCBUs further down the contracting chain to meet requirements that are likely to result in fatigue or unhealthy work pressures for workers. For more information, see Section 3.

Worker responsibilities in managing fatigue

Workers must take reasonable care of their own health and safety, including managing fatigue.

Workers should:

- make sure they are well and ready for work at the beginning of their shift, having done everything possible to get a good sleep and rest. Their work schedule needs to make this possible – workers need enough time between shifts to allow for quality family and recreational time, as well as rest and recovery time
- recognise the signs and symptoms of fatigue and communicate with their manager if they start showing these signs and symptoms
- report fatigue-related incidents.

For more information, see [Practical steps workers can take to manage fatigue](#)

10.3 Where can you find more information on fatigue?

- You can find more information by looking at [Fatigue](#) on the WorkSafe website.

11.0 Impairment from drugs and alcohol

A worker's fitness to work can be impaired by things like medication, drugs, and alcohol. This can create a risk to their health and safety and the safety of those around them.

This section offers guidance on managing the risks of alcohol and drugs for forestry workers.

11.1 What are possible control measures?

Not allowing impaired workers on site

Workers who are impaired or suspected to be impaired by alcohol or illegal drugs should not be allowed to work.

Have a policy for prescription medicine

If workers are impaired, or may become impaired, by prescription medication, they should inform their site manager. Workers may perform work while taking prescription medication if a medical practitioner has cleared them to do so.

Put a drugs and alcohol policy in place

PCBUs should establish a drug and alcohol policy which includes strategies to deal with illegal and prescription drugs, and alcohol use or impairment during work hours. This should be done in consultation with workers and their representatives.

The drug and alcohol policy should contain at least:

- the position on the consumption of alcohol on site
- that workers must not be under the influence of illegal drugs
- what action will be taken if a worker is suspected of being impaired.

If you decide to introduce drug or alcohol testing for workers, you will need to document when and how drug or alcohol tests may be performed. Examples of tests include:

- pre-employment testing
- post-incident testing
- reasonable cause testing.

You should clearly identify safety-sensitive roles where drug testing may be applicable for managing risk.

For more information, see WorkSafe's position on [impairment and testing for drugs at work](#)

Discuss your alcohol and drug policy during induction and training. Make sure all workers understand it. Regularly remind workers of the policy during team meetings.

You should support workers who want to seek help for drug and alcohol problems.

11.2 Where can you find more information on drugs at work?

- WorkSafe's position on [Impairment and testing for drugs at work](#)

12.0 Mental wellbeing

Creating mentally healthy work is the best way to prevent mental wellbeing risks for forestry workers. You have a duty of care for your workers' mental wellbeing as well as their physical health and safety. This section offers guidance on managing the mental health risks.

12.1 How can mental health be harmed?

Mental harm may be immediate or long-term. It can come from a single event or repeated exposure. Mental harm can result in workers' experiencing decreased mental wellbeing (for example, increased stress levels, reduced work performance, self-harm and suicide).

12.2 What are risk factors for mental harm and possible control measures?

Many potential risks to worker mental wellbeing can be eliminated or minimised by PCBUs working together at the planning and design stages of work. Causes of mental harm can be grouped into three main areas. When doing a risk assessment, consider any potential risk factors in the following areas.

Factor	Examples	Possible control measures include:
How the work is designed	<ul style="list-style-type: none"> - job demands – conflicting demands, repetitive tasks - unreasonable deadlines - shift work, night work, working away from home - poor communication, lack of information about the project or job - long periods of remote or isolated work. 	<ul style="list-style-type: none"> - manage job demands by ensuring adequate staffing and limiting repetitive tasks. - set realistic deadlines and renegotiate if necessary. - design shifts to allow for adequate rest and notify workers of changes in advance. - clarify roles to ensure everyone understands their responsibilities. - support remote workers socially and practically.
Social factors at work	<ul style="list-style-type: none"> - bullying, harassment, poor interpersonal relationships at a worksite (this risk can increase when there are multiple PCBUs working at a site) - lack of supervision or support, or conflicting directions (especially when there are multiple PCBUs and it is unclear who controls the worksite). 	<ul style="list-style-type: none"> - create a positive work environment where workers are encouraged and supported - Promote workplace dignity, respect, and the upholding of one's mana - have clear policies in all contracts on stress, bullying and violence, and how issues can be reported - have a clear process for dealing with issues so that workers should know who they can raise concerns with (for example, their manager, Health and Safety Representative, or union representative) - make sure managers are accessible and available to workers - make sure workers are given fair and timely feedback on their performance (both positive and

		constructive feedback) - consider conflict management or de-escalation training, for example for when workers are: - raise issues with other contractors, subcontractors, or co-workers, or responding to issues raised by other contractors, subcontractors, or co-workers. - where possible, be aware of personal circumstances that affect your workers and provide support as appropriate. Allow flexibility or time off where needed - be proactive about providing worker support and normalise asking for help.
The work environment, equipment, and hazardous tasks	- working in extreme environmental conditions - having to use inadequate or faulty plant, equipment, or tools - responding to trauma (such as witnessing injuries and death).	- rotate workers on tasks that have extreme environmental conditions - make sure workers have all the resources they need to do the job properly and safely - provide effective debriefs and support for workers who have witnessed injuries and death. - consult with workers regularly about ways that hazardous tasks can be eliminated or minimised.

Table 4: Risk factors and possible control measures to manage risks to mental health

12.3 What support should you provide to workers who are exposed to traumatic situations?

When incidents happen in forestry work, they are often involving serious injury and death. This means that workers are exposed to traumatic situations that can cause mental harm.

Where reasonably practicable, exposure to these situations should be minimised. Ways this can be done include:

- limiting the number of people who witness the scene. Workers that are not directly involved should be kept away
- identifying the roles and responsibilities of those who will step up if a situation occurs
- developing a trauma response plan that covers these situations and how they will be handled.

Make sure there are practices in place to provide support for these workers, so they do not suffer mental harm as a result. Examples of practices include:

- training managers in mental health first aid. For example, training managers in how to debrief effectively so that workers share how they are feeling and recommend ways of seeking help
- considering the cultural needs of your workers. For example, workers may wish to have the tapu lifted at the site of a fatality before feeling spiritually safe to continue work at that site
- emphasising the importance of workers looking out for each other
- promoting a work environment that encourages workers to seek help by:
 - making sure workers know where they can get extra support
 - emphasising the confidentiality of support services to make sure there is fair and easy access for all workers.
 - educating workers (and their families) about effective coping strategies for workers and ways they can reduce the effects of trauma on family members

- where possible, rotating workers between tasks, so they have a break from responding to these types of jobs.

You should consider including incident response training for all workers. Training should include:

- guidance on what to do in emergency or trauma situations
- how to deal with the emotional aftermath of witnessing traumatic situations
- where and how they can seek help for themselves if needed.

12.4 What worker support services should be made available?

Support services should be available to all workers (such as employee assistance programmes).

You may need to actively facilitate access to these services. If workers are working long shifts or nights (meaning they should be resting during the day), they may find it difficult to access these services without assistance from their employer. They may be reluctant to access them during their limited personal and family time.

Where reasonably practicable, you should allow for workers to access support services during paid work time. Especially if the need for help has been triggered by work factors.

12.5 Where can you find more information on managing risks to worker mental health

- [Bullying prevention toolbox](#)
- WorkSafe's position on [Supporting mentally healthy work](#)
- [Work-related stress](#)

13.0 Noise

Noise is a common hazard on forestry sites. The biggest noise risks come from chainsaws and mobile plant. This section offers guidance on managing the risks to forestry workers of exposure to excessive noise.

13.1 How can noise be harmful?

Noise is considered hazardous when it reaches 85 decibels (dBA) or more. A rule of thumb for noise is, if people have to raise their voices or shout to be heard in a conversation, then the noise level may be too high.

Excessive noise can lead to noise induced hearing loss (NIHL) which is permanent and has a significant impact on a worker's life. Loud noise can also lead to tinnitus – a persistent ringing or buzzing in the ears.

13.2 What are possible control measures?

Eliminate the source of the noise

Consider changing work processes to eliminate hazardous noise (for example, xxxxx).

Minimise exposure to noise

If eliminating the source of the noise is not reasonably practicable, look at how you can minimise the level of noise your workers are exposed to.

Examples of how to minimise noise include:

- replacing noisy plant, equipment, and vehicles with quieter plant, equipment, and vehicles
- fitting silencers (such as mufflers or enclosures) on noisy plant
- enclose engines and heavy equipment workstations to contain the noise
- sound proofing of cabins
- keeping workers that do not need to be there out of the area
- reduce exposure time for workers operating noisy equipment
- making sure plant is well maintained to reduce noise from friction, vibrating surfaces, mechanical impacts, high velocity air flow or liquid flow, and fan blades.

Personal protective equipment (PPE)

You should only rely on hearing protection after you have taken all other reasonably practicable steps to minimise exposure to noise.

When providing hearing protection to your workers, make sure that:

- it is the right fit for the worker
- it is providing the right level of protection for the noise levels they will be exposed to.
- workers are trained in how to correctly wear, clean, and store their hearing protection (for example, earmuffs will not provide proper protection if they are worn over hoodies)
- any new risks are also managed. Hearing protection can restrict both a worker's awareness of what is around them, and their ability to communicate (such as workers not being able to hear approaching mobile plant or while wearing hearing protection).

For more information on PPE requirements, see Part G (link to come).

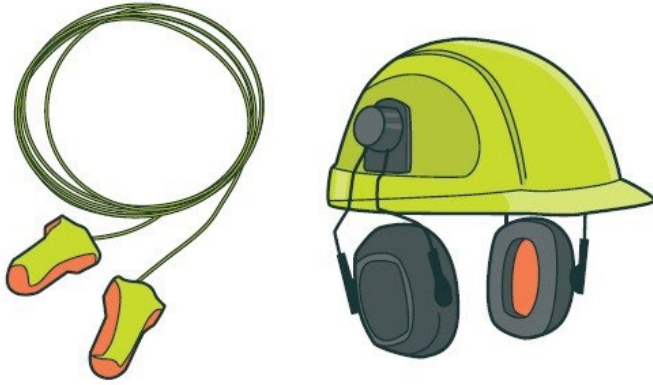


Figure 2: Examples of hearing protection (placeholder)

13.3 When should you carry out exposure monitoring and health monitoring?

Once you have taken all reasonably practicable measures to eliminate or minimise the risks from noise, check if ongoing exposure monitoring and health monitoring is needed.

Exposure monitoring to check the amount of noise your workers are exposed to can help to inform you whether the control measures are being effective at minimising the risk.

It can also help you decide what level of hearing protection is required.

Consider including monitoring workers for noise-related harm into your health monitoring programme. For noise, health monitoring involves carrying out hearing tests to check for hearing loss.

13.4 Where can you find more information on managing the risks from noise and monitoring?

- [Noise toolkit](#)
- [Exposure monitoring and health monitoring- guidance for businesses](#)
- [Personal protective equipment \(PPE\) | WorkSafe](#)

14.0 Vibration

Exposure to excessive vibration can cause permanent and disabling damage to forestry workers. This section offers guidance on managing the risks to forestry workers of exposure to excessive vibration.

14.1 What is excessive vibration and how can it harm?

There are two main types of vibration that can cause harm to workers:

Whole body vibration

Whole-body vibration occurs when vibration is passed through the body from a surface where a worker sits or stands. This occurs most often in workers driving or operating machinery or other vehicles over rough or uneven surface.

Whole body vibration can affect the body in several ways and can contribute to several health disorders.

Hand-arm vibration

Hand-arm vibration occurs when vibration is passed through the hands and arms, usually from hand or power tools.

Workers can develop Hand-Arm Vibration Syndrome (HAVS), Carpal Tunnel Syndrome (CTS), and other musculoskeletal conditions if they regularly and frequently use hand-held power tools and machines, especially for long periods of time.

<placeholder>

Figure 3: Examples of machinery that can cause vibration-related harm (to come)

Forestry workers can be exposed to harmful levels of vibration through various sources. For example, from:

- spending long periods of time sitting on or operating mobile plant, vehicles, or machinery that vibrates
- using tools or machinery that vibrate for long periods of time, such as chainsaws.
- working in cold conditions can increase the harmful effects of vibration on the body.

14.2 What are possible control measures?

Eliminate exposure to vibration

Consider using tools or machines operated by remote or use mobile plant-mounted tools rather than hand tools.

Minimise exposure to vibration

If eliminating the source of the vibration is not reasonably practicable, look at how you can minimise the amount of vibration your workers are exposed to.

Examples of how to minimise vibration include:

- using power tools and plant that produce less noise and vibration
- using methods of work that produce less vibration (for example, use hydraulic rather than compressed air tools)
- isolating vibrating machinery, mobile plant, or vehicles from the operator by providing fully independent seating

- choosing power tools and plant that direct cold air (for example, from the tool's exhaust) away from hands
- training workers on choosing the right tool or plant for the job (one which has the appropriate size, power, and capacity for the task and work conditions)
- making sure workers are trained in how to safely use the plant or tools in a way that minimises the levels of vibration
- maintaining power tools and machines regularly. Repair faults as soon as possible. Make sure suspension systems are well maintained
- maintaining vehicle seats and seat suspension
- limiting the time workers are exposed to vibration, especially while working in cold conditions (for example, job rotation, lots of breaks)
- discussing with workers how exposure to vibration can harm them and training them in how to identify the symptoms of HAVS and CTS. Tell workers how they can report their symptoms
- reducing exposure to working in the cold, providing warm/hot drinks, and having workers take breaks in a warm place.

Personal protective equipment (PPE)

PPE should only be used to manage the risks from vibration after all other reasonably practicable steps have been taken.

Thermal PPE can be used to keep workers warm and dry (for example, thermal, non-slip gloves).

Note: Anti-vibration gloves reduce worker exposure to high frequency vibration but not low frequency vibration. However, in general, gloves can be helpful because they keep your workers' hands warm. When choosing gloves, pick non-slip gloves that are not too thick. Thick gloves mean workers have to grip tighter, increasing the chance of HAVS and CTS and other musculoskeletal conditions.

Use mats or insoles to reduce foot-transmitted vibration.

For more information on PPE requirements, see Part G (to come).

14.3 When should you carry out exposure monitoring and health monitoring?

Once you have taken all reasonably practicable measures to eliminate or minimise the risks from vibration, check if ongoing exposure monitoring and health monitoring is needed.

Exposure monitoring to check the amount of vibration your workers are exposed to can help to inform you whether the control measures are being effective at minimising the risk.

Consider including monitoring for signs and symptoms of vibration-related illness or injury into your health monitoring programme:

- For hand-arm vibration, health monitoring checks for nerve, muscle or circulation damage in hands, wrists and arms.
- For whole body vibration, health monitoring checks for lower back, neck or shoulder pain or other signs of discomfort.

14.4 Where can you find more information on managing the risks from vibration and monitoring?

- [Whole body vibration – information for businesses](#)
- [Hand-arm vibration – information for businesses](#)

- [Exposure monitoring and health monitoring- guidance for businesses](#)
- [Personal protective equipment \(PPE\) | WorkSafe](#)

For feedback.

15.0 Extreme heat

The outdoor nature of forestry means forestry workers are particularly vulnerable to the effects of working in extreme temperatures. Exposure to extreme hot temperatures can cause serious harm to forestry workers. This section offers guidance on managing the risks to forestry workers of working in extreme heat.

15.1 How can working in extreme heat harm workers and when can it happen?

Working in extremely hot environments can put workers' bodies under stress.

If their bodies have to work too hard to stay cool, it can cause heat-related illness and injuries. These can be fatal if ignored.

Heat-related illness and injuries are a risk, especially when working outdoors in summer or in high humidity, or when exposed to radiant heat.

High body temperatures that can cause harm to workers can occur:

- in the summer months
- in humid environments
- during highly physical activities when warm or heavy clothing is being worn, including personal protective equipment (PPE)
- when working near a source of radiant heat such as machinery or generators.

15.2 What are possible control measures?

While it may not be possible to eliminate extreme heat in the outdoor environment, there are steps that can be taken to minimise the effects of working in extreme heat. For example, by:

- replacing heat-producing plant with plant that produces less heat
- insulating heat-producing plant or use heat screens to reduce radiant heat
- using mechanical aids to reduce worker effort
- making sure vehicle and mobile plant cabs have air conditioning
- providing protection from the sun while working
- scheduling work for cooler times of the day or year
- frequently rotating workers on tasks
- allowing extra rest breaks and providing climate-controlled rest facilities away from the heat and sun
- educating workers on the importance of staying hydrated, making cool drinks available at all times, and encouraging them to drink water at the beginning and end of the day
- encouraging self-paced work where possible
- making sure workers are acclimatised to the conditions
- avoiding putting workers with pre-existing medical conditions that may make them susceptible to heat stress in jobs where they will be exposed to extreme heat
- making sure PPE is as light as possible and breathable (without compromising its protective function)
- training workers on how to identify signs and symptoms of heat-related illness in themselves and their workmates.

Provide PPE for working in extreme heat

PPE can help protect workers against the effects of extreme heat by shielding workers from a hot environment. Examples of PPE include:

- heat-reflective clothing

- face shields
- sunhats
- heat-resistant footwear.

Sweating is the body's main way of keeping cool. Make sure that, where possible, PPE and uniforms are made from light, breathable materials so workers can sweat freely.

For more information on PPE requirements, see Part G (to come).

15.3 When should you carry out exposure monitoring and health monitoring?

If your workers are being exposed to extreme heat while working, you may need to get an assessment done to determine if they are at an elevated risk of developing heat-related illness or injury.

Once you have taken all reasonably practicable measures to eliminate or minimise the risks from extreme heat, check if ongoing exposure monitoring and health monitoring is needed.

Exposure monitoring to check the thermal conditions in the work environment can help to inform you whether the control measures are being effective at minimising the risk.

Consider including monitoring for signs and symptoms of heat-related illness or injury into your health monitoring programme.

15.4 Where can you find more information on managing the risks from extreme heat and monitoring?

- [Temperature at work](#)
- [Working safely in extreme temperatures](#)
- [Exposure monitoring and health monitoring- guidance for businesses](#)
- [Personal protective equipment \(PPE\) | WorkSafe](#)

16.0 Extreme cold

Exposure to extreme cold temperatures can cause serious harm to forestry workers. This section offers guidance on managing the risks of working in extreme cold.

16.1 How can working in extreme cold harm workers and when can it happen?

Working in extremely cold environments can put workers' bodies under stress.

If their bodies have to work too hard to stay warm, this can cause cold-related illness and injuries which can lead to permanent tissue damage and death.

Low temperatures can occur:

- in wet conditions (being damp or wet can significantly increase the rate a body cools)
- winter conditions (frost or snow)
- at night (outside temperatures drop even further at night)
- in windy conditions (high winds can amplify the effects of cold)
- in alpine regions
- in open vehicles.

16.2 What are possible control measures?

While it may not be possible to eliminate extreme cold in the outdoor environment, you can take steps to minimise the effects of working in extreme cold conditions. For example:

- replacing existing plant with plant that is designed with built-in protection against cold injuries (such as thermally-insulated handles and heated operator cabs)
- where possible, scheduling work for warmer times of the day or year
- allowing extra breaks for warming up or rotating workers more often when they are exposed to cold conditions
- encouraging self-paced work where possible
- making sure workers are acclimatised to the conditions
- avoiding putting workers with pre-existing medical conditions that may make them susceptible to cold stress in jobs where they will be exposed to extreme cold
- providing climate-controlled shelter away from wind and rain during breaks
- providing specialised protective clothing that protects from cold, wind, and water
- providing drying facilities so wet or damp clothing and PPE can be dried during breaks and between shifts
- training workers on how to identify signs and symptoms of cold-related illness in themselves and their workmates.

Provide PPE for working in extreme cold

You must provide specialised PPE, such as thermal and weather-proof clothing, that protects workers from cold, wind, and water.

Workers should wear layered clothing to maximise insulation and allow them to add or remove layers to keep comfortable when changing environments.

Clothing should be made of materials that provide good insulation and waterproofing (where required) but are still breathable.

For more information on PPE requirements, see Part G (to come).

16.3 When should you carry out exposure monitoring and health monitoring?

If your workers are being exposed to extreme temperatures while working, you may need to get an assessment done to determine if they are at an elevated risk of developing cold-related illness or injury.

Exposure monitoring to check the thermal conditions in the work environment can help to inform you whether the control measures are being effective at minimising the risk.

Consider including monitoring for signs and symptoms of cold-related illness or injury into your health monitoring programme.

16.4 Where can you find more information on managing the risks from extreme cold and monitoring?

- [Temperature at work](#)
- [Working safely in extreme temperatures](#)
- [Exposure monitoring and health monitoring- guidance for businesses](#)
- [Personal protective equipment \(PPE\) | WorkSafe](#)

17.0 UV/sun exposure

Exposure to ultraviolet (UV) radiation from the sun can increase the chance of workers developing serious health conditions, such as skin cancer. This section offers guidance on managing the risks of ultraviolet (UV) radiation exposure for forestry workers.

17.1 How can UV/sun exposure harm workers?

UV radiation is a type of radiation that is given off by the sun and some artificial sources (such as UVB work lights). This radiation can damage the genetic material (DNA) of skin cells, causing harm to a person.

UV radiation cannot be seen or felt, so workers may be exposed to harmful UV radiation without knowing.

UV radiation can harm a worker in several ways, including:

- skin cancer
- sunburn
- eye damage (such as cataracts).

The total amount of UV radiation that a worker may be exposed to when working outside depends on the factors described below.

Factors affecting UV exposure	Things to consider
The time of day and the time of year	UV levels are highest when the sun is high and during summertime when the sun is in the sky for longer
The weather conditions	UV levels are generally higher on a cloudless day. However, UV radiation can pass through cloud cover and reach harmful levels even on a cloudy day.
Work surfaces	Workers can be exposed to UV radiation as it reflects off lighter colour surfaces. The lighter the colour of the surface, the more UV radiation will be reflected.
Medical and chemical exposure	Certain medication and chemical exposures can increase the chance of UV damage because they cause photosensitivity, which makes a person more sensitive to UV radiation.

Table 5: Factors that can affect UV exposure

All skin types can be damaged by UV rays.

17.2 What are possible control measures?

Minimise exposure to UV radiation

As the risk of sun exposure cannot be fully eliminated, minimising exposure to UV radiation is important. Examples of how UV exposure can be minimised include:

- providing shelter where possible
- providing shade during breaks
- rotating workers on jobs where there is the most UV exposure
- avoiding uncovered outside work between the hours of 10am to 4pm, wherever practicable
- educating workers on the risks of UV exposure, for example:

- how they can keep themselves protected
- what warning signs of UV damage to look out for
- what to do if they suspect sun damage.

Personal protective equipment (PPE)

As well as minimising the time workers spend exposed to UV radiation, PPE must also be provided.

PPE for UV radiation includes:

- sunscreen and lip protection
- breathable protective clothing
- protective hats
- protective eyewear or sunglasses.

When considering what PPE options are appropriate, check that the proposed PPE is not going to introduce new risks. Examples of risks include:

- workers overheating if the material is too heavy or not breathable
- PPE equipment or clothing getting caught in machinery if it is too loose
- wide brimmed hats or dark glasses limiting vision.

For more information on PPE requirements, see Part G (to come).



Figure 4: Example of sun protection that can be fitted to hard hats and helmets (placeholder)

17.3 When should you carry out health monitoring?

The skin and eye health of workers should be monitored. This is a practical way to check if control measures are working.

A system that checks workers for the risks from sun exposure can include:

- encouraging workers to regularly check their own skin
- providing annual skin checks by a doctor or nurse trained in skin cancer detection.
- offering yearly vision checks
- encouraging workers to get an abnormal mole, freckle or spot checked by their doctor (you should consider funding this expense)

- reporting incidents of sun exposure and sunburn to a Health and Safety Representative or management.

17.4 Where can you find more information on managing the risks from UV/sun exposure and monitoring?

- [Protecting workers from solar UV radiation](#)
- [Exposure monitoring and health monitoring- guidance for businesses](#)
- [Personal protective equipment \(PPE\) | WorkSafe](#)

For feedback.

18.0 Harmful substances

Exposure to harmful substances can cause serious harm to forestry workers. This section offers guidance on managing the risks to forestry workers when working with harmful substances. What

18.1 What kinds of harmful substances could workers be exposed to?

Harmful substances include:

- substances classed as “hazardous substances” (for example, flammable, explosive and toxic substances such as fuels, oils and hydraulic fluid, weed spraying chemicals, explosives)
- other substances such as wood dust, the lithium inside batteries or diesel exhaust.

For those harmful substances that are classed as hazardous substances, the Hazardous Substances Regulations set out the rules for hazardous substances, such as requirements for:

- when certified handlers are required
- safety data sheets (which have information on the properties of the chemical or substance, and how to use the product correctly and safely)
- labelling
- storage (including temporary storage and storage limits)
- emergency response plans
- information and supervision and training for workers.

For more information and specific guidance, see [Hazardous substances](#)

18.2 What are possible control measures?

You must eliminate any harmful substances you do not need. If you cannot eliminate, you must minimise risks from the harmful substances so far as is reasonably practicable.

Minimise potential exposure to harmful substances

If you cannot eliminate a harmful substance, consider:

- substituting the substance for one that poses less risk (for example, using less-toxic chemicals)
- automating processes so workers do not have to get near the substance, where possible, for example, mechanical spraying
- installing barriers between workers and the substance
- making sure the substance is handled or prepared in an area with good ventilation
- rotating workers on jobs involving substances to reduce the time they are exposed to the substance.

Personal protective equipment (PPE)

PPE must also be provided to protect from accidental exposure. Examples of PPE include:

- long pants and long-sleeved shirts (made from breathable or waterproof fabric – depending on the substance the workers will be exposed to)
- protective eyewear
- gloves
- face shields.

Make sure the PPE is appropriate for the type of substances workers are exposed to.

For more information on PPE requirements, see Part G (to come).

18.3 When should you carry out exposure monitoring and health monitoring?

Once you have taken all reasonably practicable measures to eliminate or minimise the risks from harmful substances, check if ongoing exposure monitoring and health monitoring is needed.

Exposure monitoring to check the amounts of harmful substances in the work environment can help to inform you whether the control measures are being effective at minimising the risk.

Any exposure monitoring and health monitoring recommended will depend upon the harmful substance workers are being exposed to.

For example:

- For airborne particulates (for example, wood dust, welding fume), exposure monitoring could involve measuring the amount of the substance in the air. Health monitoring could involve checking for loss of lung function.
- For substances that can irritate the skin (for example, wood dust), exposure monitoring could involve measuring the amount of substance on the skin. Health monitoring could involve checking for skin inflammation/dermatitis.

18.4 Where can you find more information on managing the risks of harmful substances?

- [Hazardous substances](#)
- [Dust | WorkSafe](#)
- [Personal protective equipment \(PPE\) | WorkSafe](#)
- [Exposure monitoring and health monitoring- guidance for businesses](#)

19.0 Hazardous manual tasks

Some manual tasks are hazardous and may cause musculoskeletal disorders for forestry workers. This section offers guidance on managing the risks to forestry workers of hazardous manual tasks.

19.1 What are manual task risks and what harm can occur?

Manual tasks are any activity requiring a person to lift, lower, push, pull, carry, or otherwise move, restrain, or hold any person, animal, or thing. It is sometimes also referred to as manual handling.

Examples of manual tasks include:

- lifting gear in or out the back of a truck
- carrying weighty loads
- dragging gear, chains, wires or vegetation
- operating machinery.

Workers can be harmed carrying out manual tasks, including:

- sprains and strains of muscles, ligaments, and tendons
- back injuries, including damage to the muscles, tendons, ligaments, spinal discs, nerves, joints, and bones
- joint and bone injuries or degeneration, including injuries to the shoulder, elbow, wrist, hip, knee, ankle, hands, and feet
- nerve injuries or compression, for example carpal tunnel syndrome (CTS)
- cuts or lacerations from using sharp tools or exposure to sharp tools and objects
- hernias
- chronic pain
- muscular and vascular disorders from vibration. For more information on vibration, see Section 14.

Manual tasks can be a major factor in the development of musculoskeletal disorders.

Musculoskeletal disorders may start as a mild ache or pain and develop into a serious condition. They can happen over time or occur suddenly from a specific event. Multiple factors usually combine to cause musculoskeletal disorders. For more information, see Section 19.

You should pay early attention to discomfort, so you can control the risk before serious harm occurs.

19.2 What are possible control measures?

Eliminate manual tasks

Consider using alternative work methods that do not require manual tasks. For example (example to come).

Minimise exposure to manual tasks

If eliminating manual tasks is not reasonably practicable, look at how you can minimise the risks associated with manual tasks.

Examples of how to minimise manual task risks include:

Control measure	Examples
Buy equipment that meets ergonomic standards	Consider things such as: <ul style="list-style-type: none"> - cab access - cab visibility - the ergonomics of the operator's seat - working posture.
Climb in or out of machine or mobile plant carefully	<ul style="list-style-type: none"> - keep handrails, steps and non-slip surfaces maintained - keep steps and the cabin clean and free of mud and debris - make sure you have three points of contact when climbing in or out of the machine.
Care when hooking and unhooking logs	<ul style="list-style-type: none"> - where possible use a grapple - when the breaker-out is pulling out chokers from a motorised carriage, face the carriage directly to minimise twisting
Choose tools and machinery with built-in controls to reduce physical impacts on the operator	<ul style="list-style-type: none"> - select equipment that is easy to handle - make sure that the right tool is available and is used for the right job - make sure tools and machinery are regularly maintained.
Limit the amount of heavy lifting required by workers	<ul style="list-style-type: none"> - use mechanical lifters where possible - replace heavy items with lighter or smaller items - deliver goods and materials directly to the point-of-use so that they do not need to be carried to the work site manually.
Move workers between tasks to vary the physical demands	<ul style="list-style-type: none"> - moving between tasks that involve sedentary work (for example, machine operators) and movement - planning tasks that involve walking - planning light work after repetitive physical work.

Table 6: Control measures for manual risks

You must provide appropriate information, training, instruction, and supervision for workers so they know how to protect themselves from risks to their health and safety when working. This includes how to use equipment.

Manageable job demands and a healthy work culture that supports good communication will also reduce the risks of musculoskeletal injury caused by manual tasks.

Personal protective equipment (PPE)

PPE should only be used to manage the risks from manual tasks after all other reasonably practicable steps have been taken to reduce these risks.

Gloves and safety boots should be worn to protect against cuts and crushed toes.

For more information on PPE requirements, see Part G (to come).

19.3 When should you carry out health monitoring?

Once you have taken all reasonably practicable measures to eliminate or minimise the risks from hazardous manual tasks, check if ongoing health monitoring is needed.

Health monitoring involves checking workers for signs of discomfort, pain, or injury to muscles, ligaments, bones, tendons, blood vessels, and nerves, associated with manual tasks.

19.4 Where can you find more information on managing the risks from manual tasks and monitoring?

- [Manual handling](#)
- [Exposure monitoring and health monitoring- guidance for businesses](#)
- [Personal protective equipment \(PPE\) | WorkSafe](#)

For feedback.

PART E: HARVESTING

Part E provides good practice guidance on mechanised harvesting and tree felling, steep slope harvesting, cable harvesting and manual felling.

For feedback.

20.0 What does this Part cover?

This guidance looks at managing the risks around harvesting and tree felling.

It includes sections on:

- mechanised harvesting
- steep slope harvesting
- cable harvesting
- manual felling
- manual breaking out (coming soon)
- using mobile plant (coming soon).

20.1 What are the common risks faced by workers?

Some of the greatest risks in forestry are in the tree felling and harvesting areas. These include:

- being struck by trees or dislodged branches during felling
- workers being struck by mobile plant
- mobile plant tipping, rolling or losing control
- being struck by ropes, chains or cables.

All have the potential to cause serious injury or death.

Workers' health may also be affected by aspects of felling and harvesting work such as:

- fatigue (Section 10)
- noise (Section 13)
- vibration (Section 14)
- hazardous manual tasks (Section 19).

20.2 Approach to managing risk

The approach to managing risk is covered elsewhere in the guidance (see Appendix 1 – link to be included). You must eliminate risks so far as is reasonably practicable. If you cannot eliminate the risk, you must minimise it so far as is reasonably practicable.

The following guidance on harvesting and tree felling considers how you can manage risks for specific activities by looking at:

- what makes a safe operator
- what makes a safe machine
- what makes a safe site
- what make safe practice.

There are certain requirements to be aware of for managing the risks of falling objects and for remote or isolated work. These are described next.

20.3 Requirements for managing the risks of falling objects

This is a requirement under the Regulations which you should be aware of. Most of this guidance and your day-to-day practice on a forestry site is about stopping things falling on people. But if you would like to know more, you can find more information at:

- [General risk and workplace management Part 2 \(Section 3.1: Falling objects\)](#)

20.4 Requirements for managing remote or isolated work

Work can be remote or isolated from the assistance of other persons because of location, time, or the nature of the work. Work can be isolated without being remote, and be remote without being isolated.

Remote or isolated work includes:

- working alone or separated from colleagues
- working in a geographically isolated or inaccessible area –where the nearest emergency help (for example, fire service or hospital) is some distance away
- working outside normal business hours or shift/night work
- working in locations where communication is difficult.

This applies particularly with manual felling and some other operations, and we will discuss how manage the risks in those sections.

For more information

- [General risk and workplace management Part 2 \(Section 3.1: Remote or isolated work\)](#)

21.0 Managing the risks – mechanised felling

(For detailed information on safe working practices, look at industry guidance, for example, from Safetree)

21.1 What is mechanised harvesting and processing?

Mechanised harvesting and processing are where machines are used for felling, delimiting and/or processing plantation trees. Some machines may do only one of these. Others may do more than one task, or all of them.

[Illustrations of different types of mechanised harvesters/processors – to come]

Figure 5: Different types of mechanised harvesters and processors (to come)

21.2 Safe operator

Machine operators working in forestry operations need to be physically fit, alert and mentally capable if they are to do their job safely.

If you are an operator, you should make sure that you:

- get good sleep
- keep physically fit
- take good rest breaks
- drink lots of fluids and eat well
- do not let drugs or alcohol impair your judgement.

Making sure workers have the right training and supervision

The training requirements are explained in Part G (to come).

Operating mechanised harvesters is a skilled job. As a PCBU, you must ensure, so far as is reasonably practicable, all operators have adequate knowledge and experience, and are adequately trained in the safe operation of their machine.

If operators are still gaining experience, they must be adequately supervised by a competent person.

No worker should be allowed to operate a machine unsupervised until they have demonstrated their competence.

Making sure workers are involved in managing risks

You must engage with workers when identifying hazards, assessing risks, and deciding what control measures to use to eliminate or minimise those risks. It is good practice for all hazards/risks and control measures to be documented and accessible to workers.

All operators should know and understand the hazards/risks they will face while on the job and the control measures to manage those risks.

Before starting any new block, involve all crew members in identifying significant hazards/risks on the ground and in the operational process. They should know what the control measures are for those risks and how to apply them.

For each working day, all operators should be involved in daily tailgate meetings and daily work planning.

All operators should know who is on site or might be coming on site.

Managing health risks

Operators should also be aware of health hazards that can arise from operating their machines.

Part B explains common health risks that workers may face. However, there are two health hazards that are common among mechanised harvester operators that are highlighted below: work-related musculoskeletal disorders (you probably know them as OOS or RSI), and dehydration.

Work-related musculoskeletal disorders (WRMD)

These are the strains, sprains, aches and discomfort that you can get in your muscles or joints when working continuously and often with repetitive movement. Basically, your muscles become fatigued.

The most common WRMD injuries in machine operators occur in the wrists, hands, shoulders, neck and back.

Many machines have their cab layout and fittings designed to help minimise the risk of injury with ergonomic joystick controls and seats. But the operator is still in the cab for what can be many hours.

Although sitting still, operators still use many muscles to brace and counter the movement of the machine. This is where musculoskeletal problems can arise.

To manage the risk of these problems, the following actions could be taken:

- All mechanised felling machines should, so far as is reasonably practicable, have ergonomically designed control measures and seating to minimise risk to the operator.
- Before a new operator starts work on a machine, the seating and controls should be adjusted to suit the operator.
- Operators should rest muscles frequently with micro-pauses while working the machine.
- Operators should also take regular breaks and stretch their muscles and joints outside of the machine.

For more information on musculoskeletal disorders, see Section 19.

Dehydration

Dehydration occurs by either not drinking enough fluid or by drinking the wrong types of fluid.

When it happens, it can cause premature fatigue and difficulty in concentrating. Operating a machine requires a lot of concentration and it is important that machine operators drink regularly and drink well during the day.

If you are a machine operator it is recommended that you:

- carry enough drink in the cab to drink regularly throughout the day
- drink enough that you have to urinate regularly during the workday
- avoid drinking energy drinks or soft drinks and cordials during the workday
- save drinking energy drinks, soft drinks etc until after work to replace energy
- drink plenty of water at night to recharge the body for the next day
- make sure the air conditioning (if it is fitted) in the cab is working effectively. (If it is not working, let the foreman know so it can be fixed.)

Personal protective equipment (PPE)

All machine operators must wear the appropriate PPE.

The PPE for machine operators should include:

- high-vis shirt, vest or jacket with night glow for increased visibility
- high-vis helmet, particularly when working outside a protected cab
- hearing protection
- safety footwear
- other useful equipment can include:
 - gloves – leather or thick cotton
 - protective eyewear
 - small personal first aid kit.

For specific requirements for providing PPE, see Part G (to come).

Communications

For remote or isolated work (Section 20.4), PCBU's must provide a system of work that includes effective communication with the worker.

Equip workers with a good and reliable communications system, usually RT. Relying on a worker's mobile phone is **not** acceptable or considered good practice.

Operators should always have their RT on them.

You should have a communications protocol for operators (and all workers) to check-in regularly, for example, every 30 minutes.

Operators should always radio in when leaving their machine, and again when coming back.

21.3 Safe machine

Use the right machine for the job

Pre-start checks

All machines should have a pre-start check in accordance with manufacturer's recommendations as well as worksite procedures. This is both for the mechanical safety of the machine but also for the safety of the operator.

Pre-start checks should include checking:

- the fluid levels and cooling system
- the hydraulic hose condition
- the tyre and track condition
- the condition and security of machine guarding, access ladders and handrails
- the operator protection structures

- the fire suppression system
- for debris in the engine compartment
- the equipment in operator cab – Is it there (i.e. First Aid kit)? Does it work (RT comms)?.

Safety and protective structures

All mechanised harvesters and processors should have protective structures and equipment that meet their planned use. For example:

Machine, location and task	Should have the following protective structures and equipment:
Machines working in standing trees	- falling object protective structures (FOPS)
Machines working where there is risk of objects entering the cab	- operator protective structures (OPS) - approved chainsaw guards and 12.5 mm polycarbonate protective windshields as required.
Machines (not including hydraulic excavators) working on sloping or rough terrain that may cause instability	- rollover protective structures (ROPS) - an approved seatbelt system or other safety restraint
Hydraulic excavators working on sloping or rough terrain that may cause instability	- cabin operator protective structures (COPS) or tip-over protective structure (TOPS) - an approved seatbelt system or other safety restraint
Machines working at night	- lights capable of illuminating the area being worked
Machines with structures that may come into contact with overhead power lines	- appropriate warning displayed in the cab - consider use of proximity alarms or warning devices
Machines with exposed drumlines and rotating flywheels	- guarding in place and secure.

Table 7: Examples of safety and protective structures under different circumstances

Note: In some cases, and particularly with more modern machines, these different protective structures could be the same structure.

Seating, seat belts and restraints

All mechanised felling machines should, so far as is reasonably practicable, have ergonomically designed seating to and controls to minimise risk to the operator.

The seating and controls should be adjustable to suit the operator.

All machines should have seat belts that meet the relevant industry standard.

All machines using winch-assisted slope systems should be fitted with multi-point harnesses that meet the relevant industry standard.

Seatbelts and harnesses should be worn at all times when the machine is in operation

For more information: [Seatbelts at work | WorkSafe](#)

Noise insulation

Working in mechanical harvesters exposes the operator to continual noise. If the noise levels are too high, or prolonged, they can lead to hearing loss.

Modern cabs are generally well insulated from engine noise, but you should still be aware of the risk. To avoid noise-induced hearing loss:

- noise levels should be below 85dB(A) on average and 140 dB(A) at peak. If possible, replace machinery that creates noise above these levels
- if you cannot replace the machinery, consider if there are ways to reduce noise exposure, such as engine insulation and keeping doors and windows closed while working.
- if noise levels are still too high, operators should wear hearing protection.

For more information, see Section 13.

Emergency exits

All mechanical harvesting machines and processors should have emergency exits that can be activated internally and externally.

Where the machine operates on slopes of 20 degrees or greater, it should have three (3) emergency exits in the event of a rollover or tip over.

No emergency exits should be blocked or hindered by protective structures.

All emergency exits should be accessible and usable by the operator. The operator should ensure that they are able to exit quickly in the event of an emergency.

Where the machine has doors with latches, the latches should function properly, and the doors should be closed and latched when the machine is in use.

First aid

All workers must have access to first aid facilities, equipment and first aiders.

For more information see Part G (to come). First aid kits kept in a machine should be:

- easily identified
- easily found and accessed
- kept up to date
- regularly checked and replenished and replaced as required.

Objects secured in cab

All mobile plant should have all loose objects in the cab secured so that they do not interfere with the operator or the safe operation of the machine.

Communications

For remote or isolated work (Section 20.4), PCBUs must provide a system of work that includes effective communication with the worker.

Equip operators with a good and reliable communications system, usually RT. Relying on a worker's mobile phone is not acceptable or considered good practice.

Operators should always have their RT on them.

PCBUs should have a communications protocol for operators (and all workers) to check-in regularly, for example every 30 minutes.

Operators should always radio in when leaving their machine, and again when coming back.

Maintenance and repairs

All machines should be serviced and maintained in keeping with the manufacturer's recommendations. This includes daily pre-start checks and regular audits.

All machine faults should be noted and repaired.

If a machine fault is critical to the safety of the machine and operator, the machine should be removed from use until it is repaired.

All operators should be familiar with:

- where the operator's manuals are kept
- the daily pre-start checklist
- what safety devices are fitted, how they operate and how they should be maintained
- the lock out procedures for the machine.

For more information on plant repair and lock out procedures, or rigging, Guylines, anchors, rope checks and standards, see Section on Managing the risks: mobile plant use (to come)

Braking standards

All machines should have a braking mechanism capable of holding itself and its load on any slope on which it is operating.

Where winch-assisted harvesting is being used, the winch braking system should be to hold the machine if traction or stability is lost.

For more information, see the section on Winch-assisted harvesting on steep slopes (Section 22).

Fire extinguishers and fire suppression systems

All machines should have fire extinguishers appropriate to the size of the machine.

The fire extinguishers should be secured, easily identified, and easily accessible.

All felling plant and plant operating on steep slopes should have a fire suppression system in the engine bay, so far as is reasonably practicable.

21.4 Safe site

Managing worker/machine separation

Before planning any mechanised felling operation, you need to think about where the operation is taking place, what other activities are happening nearby, and who else may be in the area. Once you have this information, you can define hazard zones.

No workers should enter within two tree-lengths of a working felling machine. This is designed to isolate them from the hazards of falls or breakage from the felled or nearby trees.
(Figure/illustration to come)

The hazard zone should also take into account the risk of chain shot from the chain breaking. Workers should be at least 70 metres distant in the cutting direction of the saw chain.
(Figure/illustration to come)

Another hazard zone to consider is the likelihood of stem movement after felling, particularly if felling downslope of the machine. Workers should stay out of this zone. (Figure/illustration to come)

Other machines should also maintain a safe distance. These machines (fitted with approved OPS and FOPS structures) should never approach closer than one tree-length of the tree being felled.

Workers should never approach a machine without first radioing the machine operator and let them know their intentions. They should only approach when they have permission. They must be wearing appropriate PPE.

Machine operators should cease the task they are doing before anyone is allowed to approach. The operators should lower any raised implements, lock the hydraulic activation control lever and apply the brakes before getting out of the cab or allowing anyone to approach.

Managing terrain

The safety and performance of a mechanical harvester may be affected by a number of factors in the terrain. These include:

- the ground slope and roughness
- the length of the slope
- the soil type and the soil conditions including the moisture content.

Operators should remember that:

- the machine's stability and climbing ability decrease as the slope increases
- the best and safest performance is when working uphill with the weight over the tracks or wheels
- as the slope increases the machine becomes less stable when working out to the side of the machine
- when this happens, the width of the felling strip should be reduced to prevent tipping and maintain tree handling ability.

The machines are limited in the slope on which they can operate.

Machines should not operate on slopes greater than that specified by the manufacturer.

In addition, manufacturer limits (for example, 22° for tracked machines) may overestimate safe working conditions.

Actual safe working limits may be reduced by:

- weather conditions (rain, wind, snow)
- light conditions

- tree size, and
- operator skill.

Harvesters typically do not work downhill, but if they do the slope limits will be considerably less than when working uphill (for example, 12° downhill versus 21° uphill).

Each machine make has its own unique features that will determine the exact slope limits for the machine. Factors to take into consideration when working out these limits include:

- self-levelling bases provide more efficient slope operation
- slash presence affects climbing ability
- growser bars can improve climbing but require careful consideration:
 - they should not exceed 50mm
 - too much grip and there is the risk of climbing dangerously steep slopes
 - too little grip and there is the risk of uncontrolled descent
 - they can affect manoeuvrability and damage roads.

21.5 Safe practice

While mechanised felling presents fewer risks than manual felling, there are still risks that need to be managed.

Table 8 shows sources of harm from mechanised felling and control measures that could be considered to manage risk.

Source of harm	Possible control measures
Unexpected tree movement	<ul style="list-style-type: none"> - Assess tree characteristics and fall direction. - Use proper felling cuts. - Ensure machine has appropriate protective structures. - Keep cab door closed. - Put the machine in a stable position, opposite fall direction. - Fell uphill, making sure the swath width is matched to the slope. - Do not exceed machine/operator capabilities.
Proximity to other workers	<ul style="list-style-type: none"> - Keep workers beyond two tree-lengths. - Keep other machines beyond one tree-length. - Stop felling if distances are breached.
Unplanned machine or component movement	<ul style="list-style-type: none"> - Position machine stably. - Stay within machine/slope capabilities. - Control slew speed to suit load size.
Other machines	<ul style="list-style-type: none"> - Maintain one tree-length minimum from FOPS/OPS machines. - Keep all other machines beyond two tree-lengths. - Plan work to avoid close proximity to other machines. - Maintain operator communication.
Machine instability	<ul style="list-style-type: none"> - Stay within slope capabilities for the ground conditions. - Keep weight of machine and boom over front of machine on slopes. - Choose travel paths that avoid side slopes, slumps and soft ground. - Wear a seatbelt when operating the machine. - Use caution when slewing downhill.
Broken saw chain	<ul style="list-style-type: none"> - Keep unprotected workers 70m away. - Keep doors/windows shut when operating the machine.
Terrain (particularly the	<ul style="list-style-type: none"> - Identify hazards beforehand. - Stay within machine capabilities. - Choose safe travel paths.

risk of rollover)	<ul style="list-style-type: none"> - Fell uphill when possible. - Reverse down steep slopes with the boom low and skewed slightly for better vision. - Wear a seatbelt when operating the machine
Overhead hazards (power lines, trees, sailers, broken heads)	<ul style="list-style-type: none"> - Check harvest plan for known hazards/risks. - Follow power line safety codes. - Check for overhead hazards before exiting cab. - Wear PPE (helmet and high-vis) outside cab. - Check for ropes/Guylines in cable logging operations.
Exiting the main cab	<ul style="list-style-type: none"> - Check surroundings before exit. - Climb off machine – do not jump. - Wear the correct PPE. - Maintain 3-point contact when descending steps.
Ineffective safety equipment and structures	<ul style="list-style-type: none"> - Maintain protective structures to required standards. - Do not operate defective equipment until the problem has been fixed. - Have qualified engineers assess any damage.
Hydraulic equipment	<ul style="list-style-type: none"> - Never work under raised equipment. Make sure equipment is lowered to the ground and chocked and stable before entering danger zone. - Wear full PPE (gloves, protective clothing, approved eye protection) for work on live or pressurised systems. - Turn off machine and reduce hydraulic pressure to zero before work.
Maintenance of the felling head	<ul style="list-style-type: none"> - Lower all equipment to level ground. - Do not move, modify or remove any safety devices. - Use locking pin to secure the head. - Follow proper lifting procedures when removing any heavy components. - Wrap sharp items for protection. - Use hydraulic lock-out to immobilise the machine. - Turn off computer.

Table 8: Sources of harm from mechanised felling and possible control measures

22.0 Managing the risks of winch-assisted harvesting on steep slopes

(For detailed information on safe working practices, look at industry guidance, for example, from Safetree)

Winch-assisted harvesting has changed the way commercial harvesting is carried out. It is significantly safer than harvesting by manual felling, but there remains a risk to operators using winch-assisted machines on steep slopes. These risks could end up with serious injury or death if they are not managed properly.

22.1 Winch-assisted harvesting systems

Winch-assisted harvesting is a system that uses wire rope(s) attached to a harvester that are safely anchored uphill that allows harvesters and other machines to operate on steep slopes

The two distinct winch-assisted steep slope harvesting systems currently in use are:

- systems with one rope, where the winch is attached to the harvesting machine (integral)
- systems with one or more winches fitted to a machine positioned at the top of an incline (independent).

These machines are used to provide winch assistance to:

- harvesters felling and bunching trees for extraction
- knuckle boom loaders/excavators engaged in shovel-logging trees.

Machine operators working in forestry operations need to be physically fit, alert and mentally capable if they are to do their job safely.

If you are an operator, you should make sure that you:

- get good sleep
- keep physically fit
- take good rest breaks
- drink lots of fluids and eat well
- do not let drugs or alcohol impair your judgement.

22.2 Safe operator

Training and supervision

Operating winch-assist harvesters is a skilled job that is an advance on normal mechanical felling.

The competencies and training requirements for winch-assist are available from industry guidance such as that provided by Safetree.

The training requirements are explained in Part G (to come).

Operating winch-assist harvesters is a skilled job. As a PCBU, you must ensure, so far as is reasonably practicable, all operators have adequate knowledge and experience, and are adequately trained in the safe operation of their machine.

If operators are still gaining experience, they must be adequately supervised by a competent person.

No worker should be allowed to operate a machine unsupervised until they have demonstrated their competence.

Making sure workers are involved in managing risks

You must engage with workers when identifying hazards, assessing risks, and deciding what control measures to use to eliminate or minimise those risks. It is good practice for all hazards/risks and control measures to be documented and accessible to workers.

All operators should know and understand the hazards/risks they will face while on the job and the control measures to manage those risks.

Before starting any new block, involve all crew members in identifying significant hazards/risks on the ground and in the operational process. They should know what the control measures are for those risks and how to apply them.

For each working day, all operators should be involved in daily tailgate meetings and daily work planning.

All operators should know who is on site or might be coming on site.

Managing health risks

Operators should also be aware of health hazards that can arise from operating their machines.

Part B explains common health risks that workers may face. However, there are three health hazards that are common among operators that are highlighted below: work-related musculoskeletal disorders (you probably know them as OOS or RSI), dehydration and fatigue.

Work-related musculoskeletal disorders (WRMD)

These are the strains, sprains, aches and discomfort that you can get in your muscles or joints when working continuously and often with repetitive movement. Basically, your muscles become fatigued.

The most common WRMD injuries in machine operators occur in the wrists, hands, shoulders, neck and back.

Many machines have their cab layout and fittings designed to help minimise the risk of injury with ergonomic joystick controls and seats. But the operator is still in the cab for what can be many hours.

Although sitting still, operators still use many muscles to brace and counter the movement of the machine. This is where musculoskeletal problems can arise.

To manage the risk of these problems, the following actions could be taken:

- All machines should, so far as is reasonably practicable, have ergonomically designed control measures and seating to minimise risk to the operator.
- Before a new operator starts work on a machine, the seating and controls should be adjusted to suit the operator.
- Operators should rest muscles frequently with micro-pauses while working the machine.
- Operators should also take regular breaks and stretch their muscles and joints outside of the machine.

For more information on musculoskeletal disorders, see [Section 19](#).

Dehydration

Dehydration occurs by either not drinking enough fluid or by drinking the wrong types of fluid.

When it happens, it can cause premature fatigue and difficulty in concentrating. Operating a machine requires a lot of concentration and it is important that machine operators drink regularly and drink well during the day.

If you are a machine operator it is recommended that you:

- carry enough drink in the cab to drink regularly throughout the day
- drink enough that you have to urinate regularly during the workday
- avoid drinking energy drinks or soft drinks and cordials during the workday
- save drinking energy drinks, soft drinks etc until after work to replace energy
- drink plenty of water at night to recharge the body for the next day
- make sure the air conditioning (if it is fitted) in the cab is working effectively. (If it is not working, let the foreman know so it can be fixed.)
-

Fatigue

Winch-assisted harvesting is a demanding job, especially on steep ground and in tough conditions. Fatigue is common risk which should be planned for. A fatigue management plan helps the operator manage their work health. It does help if operators eat and drink well (see above), have a good night's sleep, and take work breaks.

The following actions could be used in a fatigue management plan:

- Build in a minimum 15-minute break every 3 hours, or two 30-minute breaks per day.
- Take micro breaks. A break of 5 minutes per hour can make a big difference.
- Limit work hours. Industry recommends no more than:
 - 13 hours per day, including travel but not counting rest breaks
 - 65 hours in seven days, including travel time
 - 6 successive days.
- Keep a log of hours worked.
- Take breaks and stop operating if operators have lost concentration.
- Do not allow operators to operate the machine if fatigued.
- Do not do unsafe work, and do not let production pressure affect decisions.

For more information on managing fatigue, see Section 10.

Personal protective equipment (PPE)

All machine operators must wear the appropriate PPE. For specific requirements for providing PPE, see Part G (to come)

The PPE for machine operators should include:

- high-vis shirt, vest or jacket with night glow for increased visibility
- high-vis helmet, particularly when working outside a protected cab
- hearing protection
- safety footwear
- other useful equipment can include:
 - gloves – leather or thick cotton
 - protective eyewear
 - small personal first aid kit.

For specific requirements for providing PPE, see Part G (to come).

Communications

For remote or isolated work (Section 20.4), PCBUs must provide a system of work that includes effective communication with the worker.

Equip workers with a good and reliable communications system, usually RT. Relying on a worker's mobile phone is **not** acceptable or considered good practice.

Operators should always have their RT on them.

You should have a communications protocol for operators (and all workers) to check-in regularly, for example, every 30 minutes.

Operators should always radio in when leaving their machine, and again when coming back.

22.3 Safe anchoring systems

On a steep slope, anchoring systems go a long way towards managing the risk. However, there is always a chance of a system failure, and the machine slipping or rolling.

All mobile plant using the assistance of a wire rope and/or winch must be specifically designed, tested, demonstrated to be safe, and certified by a Chartered Professional Engineer to be safe when operated on steep slopes.

The PCBU operating the plant should ensure that:

- the winch is designed and tested to ensure sufficient power to provide traction assistance on the slope the machine is operating on
- the winch braking system is designed and tested to ensure the machine holds if traction or stability is lost on the slope the machine is operating on
- a Chartered Professional Engineer (CPEng) has certified the winch-assisted steep slope harvesting system as designed, tested and demonstrated to be safe. This should include an assessment of:
 - fail to safe design features
 - safe operating procedures
 - maintenance schedules and
 - a list of all rigging components and their breaking loads
- if a machine is significantly modified after the manufacturer's original certification (for example, an excavator being re-purposed by attaching a winch for steep slopes) then it will need a CPEng to certify the modification is safe.
- The tension on the wire rope should not be more than 33 percent of its breaking load at all times.
- The maximum operating weight of the mobile plant must not exceed the rated breaking load of the wire rope. This applies to all rigging components. The maximum operating weight is the weight when fully loaded.
- An emergency back-up system should be incorporated into the operation to ensure the stability of the mobile plant should the winch, wire rope or anchor fail. Emergency back-up systems could include:
 - a second winch rope
 - a blade or other hydraulic attachment, which can be lowered in an emergency to stop the machine from sliding or rolling.
 - All winch-assist operations should include a movement alarm to warn if the anchor moves and immediately alert the winch-assist machine operator.

22.4 Safe practices

All winch-assist systems need to be supported by good training and safe operating procedures. Systems will also require ongoing monitoring and review to ensure risks are effectively managed.

Regular reviews will make sure that new risks are identified and that existing control measures are working effectively.

The documented safe work practice should include, as a minimum:

- hazard identification and risk management
- machine and wire rope inspection and maintenance routines, carried out by a competent person
- operator fatigue plans
- work alone procedures
- an emergency plan.

It should also include:

- an operating plan including a map indicating slope and terrain features
- slope/soil condition operating guidance
- safe operating procedures
- training requirements
- daily prestart checks
- competency standards for operators and those responsible for safety checks and maintenance.

22.5 Safe machines

Safety and protective structures

All winch-assisted machines should have protective structures and equipment that meet their planned use.

Machine, location and task	Should have the following protective structures and equipment:
Machines working in standing trees	- falling object protective structures (FOPS)
Machines working where there is risk of objects entering the cab	- operator protective structures (OPS) - approved chainshot guards and 12.5 mm polycarbonate protective windshields as required.
Machines (not including hydraulic excavators) working on sloping or rough terrain that may cause instability	- rollover protective structures (ROPS) - an approved seatbelt system or other safety restraint
Hydraulic excavators working on sloping or rough terrain that may cause instability	- cabin operator protective structures (COPS) or tip over protective structure (TOPS) - an approved seatbelt system or other safety restraint
Machines working at night	- lights capable of illuminating the area being worked
Machines with structures that may come into contact with overhead power lines	- appropriate warning displayed in the cab - consider use of proximity alarms or warning devices
Machines with exposed drumlines and rotating	- guarding in place and secured

flywheels	
-----------	--

Table 9: Examples of safety and protective structures under different circumstances

Emergency exits

All winch-assisted machines and processors should have emergency exits that can be activated internally and externally.

Where the machine operates on slopes of 20 degrees or greater, it should have three (3) emergency exits in the event of a roll over or tip over

No emergency exits should be blocked or hindered by protective structures.

All emergency exits should be accessible and usable by the operator. The operator should ensure that they are able to exit quickly in the event of an emergency.

Where the machine has doors with latches, the latches should function properly, and the doors should be closed and latched when the machine is in use.

Braking standards

All machines should have a braking mechanism capable of holding itself and its load on any slope on which it is operating.

Where winch-assisted harvesting is being used, the winch braking system should be able to hold the machine if traction or stability is lost.

Fire extinguishers and fire suppression systems

All machines should have fire extinguishers appropriate to the size of the machine.

The fire extinguishers should be secured, easily identified, and easily accessible.

All felling plant and plant operating on steep slopes should have a fire suppression system in the engine bay, so far as is reasonably practicable.

Seat restraints

All mobile plant operated on steep slopes should be fitted with a multipoint seat belt which provides shoulder restraint.

Emergency stop

All mobile plant operated on steep slopes should have an emergency stop button that immediately brakes the winch or machine.

Checking by a competent person

All mobile plant and winch systems used for steep slope harvesting should have an annual engineering and mechanical inspection by a competent person

Anchors should be selected and constructed by a competent person and checked daily.

Independent winch systems should be positioned and anchored securely by a competent person.

Wire ropes

Joining splices should not be used to join broken or damaged winch ropes.

Wire ropes used for winch-assisted harvesting on steep slopes should not be used for log extraction or hauling. They should only ever be used in the winch system.

For feedback.

23.0 Managing the risks of machine-assisted felling using a grapple

Machine-assisted felling using a grapple is where a grapple machine (usually tracked) works with a tree feller to harvest trees.

23.1 Safe machine

Making sure the machine is suitable

Before committing to a machine-assisted felling plan, it is important to check that it is appropriate for the area to be felled. Some slopes are too steep for machine-assisted felling unless the machine is specifically designed for that terrain and anchored safely.

Other factors to consider in whether machine-assist is appropriate include:

- the size, lean and type of trees in the stand
- the environmental conditions
- the work method that best ensures the safety of the workers.

Machines with a grapple used to assist felling should be:

- of adequate size; they should be a minimum of 20 tonnes in weight
- appropriate to the terrain
- fitted with hose burst protection where a worker will be working close by
- fitted with certified protective structures; OPS, ROPS, FOPS, COPS, and side intrusion guarding.

23.2 Safe system

Before starting machine-assisted felling, a system must be developed to manage the risks associated with this type of felling. The risks must be identified and assessed, and effective control measures implemented to ensure the safety of all workers.

The system should be documented, and involve the forest owner, forest management, crew manager, machine operators, and tree fallers. If the operation is close to roads or powerlines, the powerline owners and road owners should also be involved.

The system should include:

- plant management, including regular checking and maintenance by competent persons
- worker competency, including training and assessment
- communication systems to be used
- standard operating procedures, including detailed descriptions of the machines and safe work methods used
- assessment of the area to be felled, including:
 - proximity to powerlines, roads, rail, and walking tracks
 - slope and soil conditions, and how they affect the ability of the machine to move and apply force to the trees requiring machine assistance
 - stand characteristics, including wind or snow damage, overhead hazards, vines, and undergrowth
 - environmental conditions, including prevailing and expected weather like wind and rain.

The system's effectiveness should be reviewed daily for as long as machine-assisted tree felling is used.

23.3 Safe processes

Each tree should be assessed individually as to how it is going to be felled.

The machine operator and tree faller should assess each tree to be felled and plan their approach accordingly. This means assessing tree's characteristics, including:

- size
- lean
- double or multi leaders
- overhead hazard
- undergrowth.

The machine operator and tree faller should discuss these factors and agree on:

- the appropriate felling method and direction
- how to position the machine
- the escape route to be used.

The escape route should extend at least five metres when felling with machine-assist.

Communication system

Clear and effective communication is essential when workers are engaged in machine-assisted tree felling operations.

Radio communication is strongly recommended. Using hand signals is often unclear and is less precise.

If the communication system in use is not effective, machine-assisted tree felling operations should not be conducted.

23.4 Safe work practice

While the felling approach for each tree should be decided together, the tree faller controls the operation. Machine operators are responsible for machine stability and control.

The tree feller should:

- check that all equipment is fit for use, including personal protective equipment (PPE), first aid kit, chainsaw, wedges, and hammer
- use the five-step tree felling procedure (Section x)
- retreat to a safe position clear of the tree while the grapple is being positioned
- complete the back cut
- direct where, when and how much force is applied to the tree
- retreat to the end of the escape route before signalling the machine operator to push the tree over
- direct the machine operator to apply force to fell the tree.

Once the scarf is cut, the tree faller can move between the tree and the machine to complete the back cutting. However, the tree faller should never work directly under the raised boom. Back cut or cuts can be made from the side of the tree with the grapple positioned around the tree.

The machine operator should:

- conduct prestart checks to ensure the machine is suitable and in a safe condition for use
- follow safe operating practices and procedures
- ensure the safety and stability of the machine
- advise the tree faller on the best machine position
- ensure effective communication is maintained
- ensure the tree faller is not positioned directly under the raised boom
- follow direction from the tree faller
- apply force to the tree when directed.

Machine operators should never apply force to a tree until directed by the tree faller.

For feedback.

24.0 Managing the risks – manual tree felling

24.1 Introduction

Manual tree felling is a skilled and critical part of commercial forestry. Today, most harvesting is carried out using mechanised felling methods but there are still times where manual felling may be the only viable option.

This section of the guidance looks at how to best manage the risks of manual felling.

24.2 Safe system

Before any manual felling is carried out, the contractor should do the following actions:

- Establish and document the reason for using manual felling. This may include carrying out manual felling in a specified area to maintain a faller's competency.
- Work with the felling crew to identify and assess significant hazards/risks and develop a management plan for each risk (you must engage with workers when identifying hazards, assessing risks, and deciding what control measures to use to eliminate or minimise those risks).
- Check that the manual felling plan meets the requirements of the documented health and safety system. This includes including making sure that:
 - the tree faller holds the appropriate unit standard and has been deemed competent (See the definition of 'competent' in Appendix (number) – to come)
 - where the faller does not hold that unit standard, that they are working towards achieving it and, in the interim, have been deemed competent to do the work or are under close supervision
 - there is a system to audit competence on a regular basis
 - there is a designated, competent observer for complex felling situations
 - there is a documented process to deal with a hung-up tree
 - there is a documented process to deal with tree driving
 - there is a process to deal with an unsuccessful tree drive, including stopping the work until an observer is available
 - there is a documented process to stop tree felling due to high winds or other extremes of weather
 - there is a documented process to establish the two-tree length zone and communicate the boundaries of the zone to all affected parties.
 - these processes are known to and followed by the tree faller and observer including that the faller is always accompanied by an observer
 - the falling crew has the high level of fitness required for the job.

24.3 Safe faller and observer

Training and supervision

As discussed in Part G (to come), all fallers and observers must have adequate knowledge or experience, so they are not likely to cause harm to themselves or other people. If not, they must be supervised by a competent person (for example, where a faller is in training, working towards a standard, or keeping their competency current).

Fallers and observers must also have adequate training in the equipment they use.

Fallers and observers should have the appropriate standard and be current with their qualifications. (See Recognised Standards in the Appendix – to come)

Making sure the whole felling crew is involved

You must engage with workers when identifying hazards, assessing risks, and deciding what control measures to use to eliminate or minimise those risks.

All members of the felling crew should be involved in daily tailgate meetings and daily work planning. They should know who is on site or is coming on site.

The felling crew should know of any changes in conditions or people that may affect work that day (for example, starting a new block, changing weather, a key person being away or a piece of equipment being out of action).

Personal protective equipment (PPE)

All manual fellers must wear the appropriate PPE. For specific requirements for providing PPE, see the section: Personal Protective Equipment (link to come).

The PPE for manual fellers should include:

- high-vis shirt, vest or coat with night glow for added visibility
- high-vis helmet that meets recognised industry standards
- Class 5 hearing protection with RT capability
- protective legwear, chainsaw chaps or trousers
- eye protection
- safety footwear that provides ankle support and good grip.

For more information about PPE requirements, see Part G (to come).

Communications

For remote or isolated work (Section 20.4), PCBUs must provide a system of work that includes effective communication with the worker.

It is industry best practice that all fallers and observers carry RT radio.

The fallers and observers' hearing protection should be RT-enabled or able to fit earpieces for immediate and direct communication.

Equipment essentials

Figure 6 shows what every tree faller should carry or be equipped with.

(Large illustration of a faller wearing PPE and fully equipped with RT, RT enabled hearing protection etc. Laid out on the ground are the essentials of the chainsaw, tools, spares, wedges, fire extinguisher and first aid kit. These are all numbered with a key detailing what they are.)

Figure 6: Faller wearing equipment (to come)

24.4 Safe site

Tree fallers must maintain a safe work area to avoid any activity that might harm themselves or any other person in the workplace.

There are seven key causes of harm in manual tree felling that need to be planned for are:

- fallers working too close to other people or plant

- incorrect or poor felling technique
- broken tree limbs or top hitting the faller
- hung-up trees left standing, or not felled using correct methods
- stem movement/rebound and butt swing
- felling dead trees
- faller being struck from behind by an object or tree.

Managing the risks from these are discussed next.

Managing the risks of fallers working too close to other people or plant

The danger zone of a felled tree is a circle from the stump that stretches out twice the height of the felled tree (see Figure 7). This rule allows for the chance that the falling tree may bring down another standing tree.

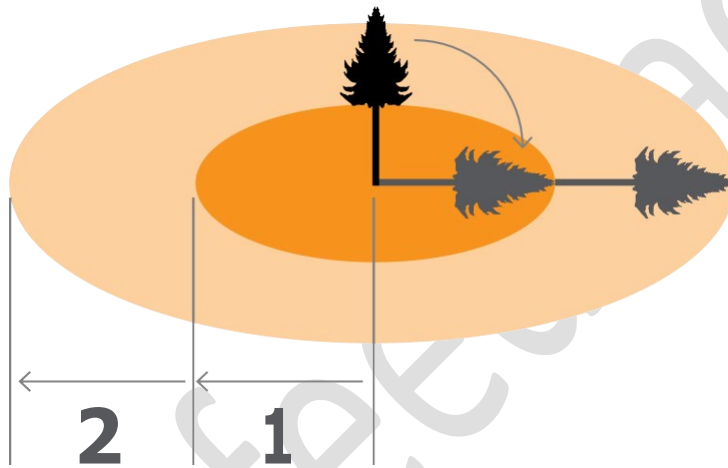


Figure 7: The two tree length rule (placeholder)

The only people that should ever be within those two tree lengths are:

- the faller and the observer assisting the faller
- anybody being trained and the person supervising them
- an auditor or supervisor.

Anyone who is within two tree lengths of a tree being felled is under the direct control of the faller.

They should be:

- able to communicate with the tree faller, using clear, prearranged procedures, techniques, and signals via radio transmitter (RT), earpiece, or other established method
- using that communication system to advise when they are coming and when they arrive
- positioned up the escape route in full view of the faller
- able to see the top of the tree being felled from a safe position.

Managing the risks of incorrect or poor felling technique

The danger zone in the case of incorrect or poor tree felling practice is shown in Figure 7 - a circle from the stump that stretches out twice the height of the felled tree.

Basic tree felling practice should follow the five-step tree felling plan:

1. Site assessment
2. Individual tree assessment
3. Preparation of the work area and escape route
4. Fell the tree using safe felling techniques
5. Retreat and observe

This plan is explained in Section 24.5.

At the very first step, you should consider if you can fell the tree safely. Check for hazards like dead or broken branches, rot, branch weight, and lean, as well as the surrounding trees. If any of these are present you may need assistance to fell the tree.

Always talk with your observer when you are planning and managing hazardous situations.

Managing the risks of broken limbs or top hitting the faller

Assessing a tree and its surroundings should be the first step in felling, and at this time you may be able to identify broken limbs or top.

If the limbs or top fall while the faller is working at the base, the danger zone is basically the width of the crown of the tree being felled.

If a felled tree falls into or brushes past another, the danger zone extends some distance behind the felled tree, as the top or limb could rebound backwards. You should remember that the recommended escape route could be in the danger zone.

If you cannot see the top of the tree, get an observer. If you are concerned about felling the tree safely, you could consider:

- using a felling assistant/observer
- using a machine to fell the tree or
- driving the tree (only where necessary).

Managing the risks of hung-up trees left standing, or not felled using correct methods

A hung-up tree is a cut-up, wind-thrown, or pushed tree that is caught up or lodged against another tree, which prevents it from falling. (A cut-up tree is one where felling cuts have been made but the tree remains standing.)

Attempting to bring down a hung-up tree is the leading cause of fatal injuries in tree felling. Figure 8 shows the danger area when felling a hung-up tree.

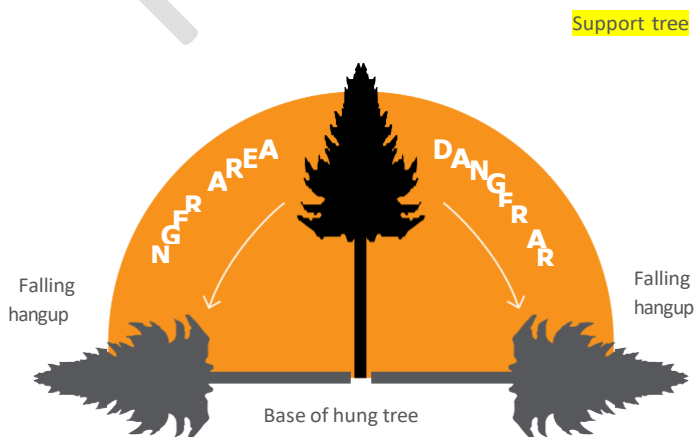


Figure 8: Danger area when felling a hung-up tree (placeholder)

If a tree faller creates or identifies a hang-up, they should alert other crew members immediately. No one should work or be within two tree lengths of the likely direction of fall:

- never work under a hang-up
- never leave hung-up trees unattended
- bring down hung-up trees immediately or isolate the area from other activities and workers
- use a machine to pull down the hang-up if possible.

Where tree driving must be employed to bring down a hang-up, there are specific rules to ensure it is planned and executed safely.

Managing the risks from stem movement/rebound and butt swing

Stem movement back into the work area after felling can be caused by a number of factors. These include:

- uphill felling
- falling into standing trees
- the tree striking an obstacle as it falls (for example, a rock, another stem, other terrain features).

If a felled tree falls into or brushes against another, the butt of the tree can rebound and strike the tree faller. Spars are most likely to rebound.

A tree that is felled uphill may also slide back down the hill and strike the tree faller, so it is important to move further along your escape route.

Tree-to-tree contact can also snap off branches or tops of trees, which ricochet backwards.

Any of these situations may compromise the escape route. Where a hung-up tree kicks back off the stump, the danger zone extends back behind it (Figure 9).

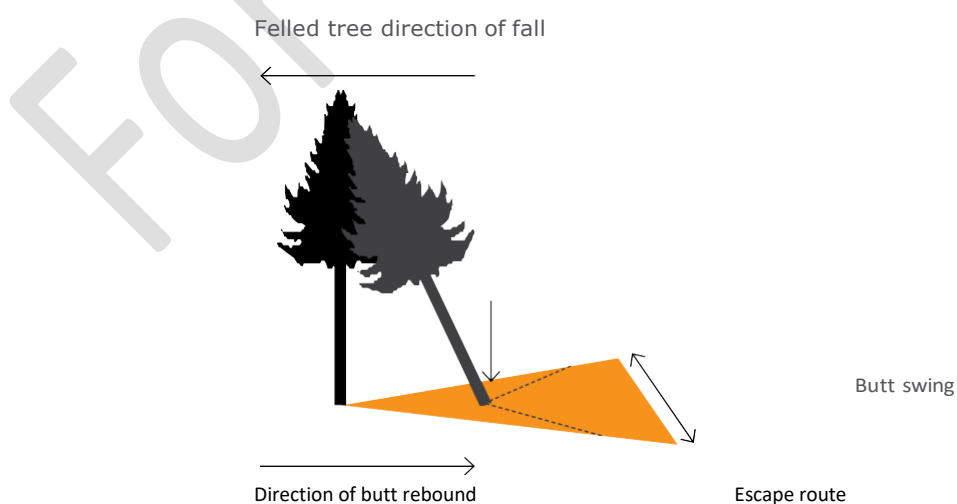


Figure 9: Danger zone extending back into the escape route where a felled tree hits another and causes a rebound (placeholder)

To minimise the risk of stem rebound:

- always have an escape route cleared at a 45-degree angle opposite the felling direction, and finish the felling cut on that safest side of the tree
- always keep your eyes on the tree as it falls
- move away from the stump as the tree falls
- avoid felling trees uphill.

Assuming the five-step felling plan has been followed and the faller is well along the escape route, this risk should be minimised.

Managing the risks of felling dead trees

Dead, broken or rotted trees are particularly hazardous, and need to be felled or removed before the tree faller begins working in the area.

If that is not possible, they should be felled as soon as possible.

Do not leave a tree like this standing as you work around it as it may fall at any time. Until a dead tree is removed, no work should be done in the danger zones except for the purpose of making it safe (for example, clearing an access way to the dead tree).

Machine felling is the best way to fell a dead tree.

Driving dead trees can also pose dangers as the dead tree may break, with the upper stem falling backwards towards the faller.

Again, where possible, machine-fell dead trees. The faller should notify the person in charge of a dead tree before and after felling it.

Always remember that a dead tree can fall in any direction at any time without warning.

The danger zone associated with a dead tree consists of a circle with the centre at the base of the dead tree and with a radius of two tree lengths. (See Figure 3)

Managing the risks of faller being struck from behind by an object or tree

Sometimes a tree or limb can fall from a tree behind the faller and the tree they are felling.

One cause can be intertwined branches or vines connecting the crowns of two trees. Occasionally the vibration from a large tree hitting the ground is enough to fell a dead or unstable tree.

Assessing the tree you plan to fell should include assessing the surrounding trees for damage and structural weakness. Look for branches interlocking with vines or branches of other trees. Clear vegetation around the tree, and make sure the escape route is clear.

The danger zone in this hazard extends from the felled tree to the tree behind with width equal to the width of the tree behind. Note that this hazard is relative to the direction of fall, a factor that emphasises the importance of directional felling techniques and proper use of scarf and back cuts. (Figure/illustration to come)

24.5 Safe practice

All tree fallers, and observers, should follow the five-step tree felling plan. It is an essential part of felling every single tree.

1. Site assessment

- Assess the stand for hazards relating to the trees, terrain, other operations, and power lines. Assess the strength and direction of the wind and whether it will affect safety.

2. Individual tree assessment

- Look for tree defects, decay, heavy lean, or any other characteristics of the tree that may affect the felling plan.
- Note the ground condition and soil moisture.
- Check the surrounding trees for interlocked branches, dead tops or branches that may fall into the work area.
- Determine if you can fell it safely and plan the felling cuts.
- Decide on the felling direction. This will help determine which side of the tree will be the safest for the escape route.

3. Preparation of the work area and escape route

- Clear vegetation and obstacles from around the base of the tree.
- Always think about your escape route before you begin any felling cuts. Where possible, the escape route should be at a 45-degree angle opposite the felling direction (see Figure 10).

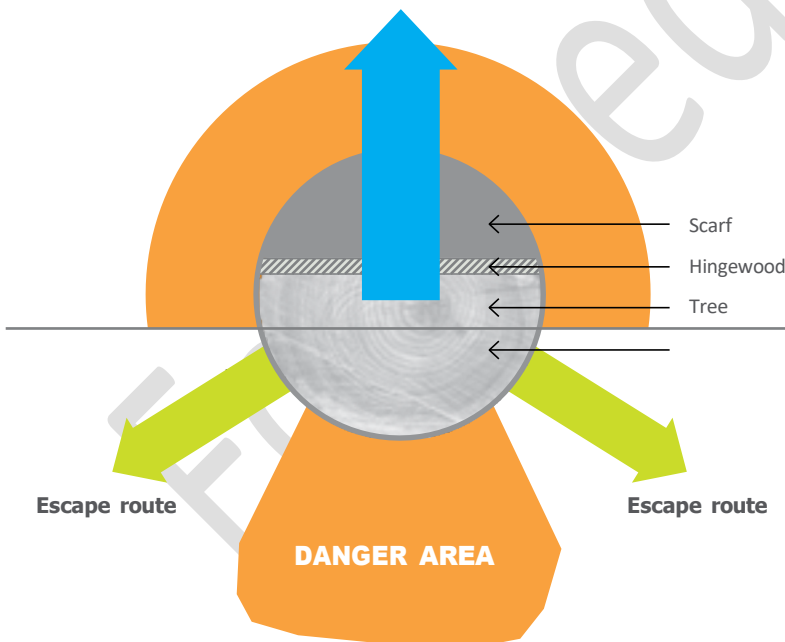


Figure 10: Escape route positioning (placeholder)

Be sure your escape route is clear of obstacles or hazards before beginning.

4. Fell the tree using safe felling techniques

- Good felling technique is critical to safe, accurate, consistent results.
- All trees over 200mm at the stump should be felled using a scarf and back cut.
- The degree of forward or back lean will determine how many wedges and/or whether a pull rope will be necessary and how much power may be required to pull the tree over.

5. Retreat and observe

- Remember to finish the felling cut on the safe side of the tree and use your escape route as soon as the tree begins to fall.
- Watch for falling material and be far enough from the base of the tree to avoid a kick back, butt swing, or bounce.
- Avoid walking directly behind the tree.

For feedback.

Appendix 1: Approach to managing risk

Managing risk across a system

If you are new to managing risk, read this Appendix.

The following section looks at the principles of risk management. Most of them will be familiar to you but they are worthwhile repeating.

Think about how you will manage risk across the whole system. This applies equally if you are a principal or a contractor.

If you are a forest manager, for example, think about the whole project, from establishment and planting, through roading and landings, to harvesting, and replanting.

If you are a harvesting contractor, think about all the parts and processes and actions that go into the job over the whole time of the contract.

Think about the risks and the control measures that you might apply but also think about what those control measures could do further down the line. If they create potential risks, then you need to weigh those up and look for a solution that provides the least total risk for all parties.

Forestry operations involve different businesses working on the same site operating at different times in a forestry cycle that is measured in years.

It is complex.

All PCBUs involved in the forestry and harvesting contracting chain have health and safety responsibilities.

Approach to managing risk

STEP 1: IDENTIFYING THE HAZARDS

The first step is to consider all the things in your work and workplace that could cause injury or harm. These could be physical objects, foreseeable actions or particular situations; or less tangible things such as fatigue, weather events, and 'wild-cards' like unexpected worker actions.

There is a number of ways that you can do this.

- Talk with your workers. Get them to think about what they do and what hazards they see.
- Follow a worker through a task. Look for where things might go wrong.
- Think about the step-by-step process of a particular activity. What actually happens when a task is done?
- Walk around the workplace. Look for hazards. Think about what could go wrong and how you might prevent that.
- Talk with other forestry operators and the industry body about any incidents, accidents or near misses that you could learn from.
- Search online for any incidents that have happened internationally and show what could happen in a similar situation for your business.

- Always ask yourself, 'What could go wrong?'

Why you should talk with your workers about health and safety

- It is good practice. Your workers know about things that you may not. They know how they do their jobs, and they know when things can be done better. They also know the short-cuts and workarounds. This is work as it is in real life rather than work as you might think it should be.
- It is good manners. It is the workers who are at risk of being hurt or being killed. They have a very real interest in making sure that they are not hurt or killed.
- It is also compulsory. Under HSWA (the Health and Safety at Work Act) you must consult with your workers and their representatives at all stages of the risk management process.
- For more information, see [Worker engagement, participation and representation](#)

Examples of things that could go wrong

The table below gives examples of common hazards for forestry workers and operations. They are by no means a complete list. Use them as a starting point for developing your own list of hazards.

Something to think about. When you are identifying hazards, think about the length of a contract and, also, the lifespan of a forest. Think about risks that might come up in the future or things that might increase risk such as severe weather and storms.

Hazard area	Examples
Landscape and terrain	<ul style="list-style-type: none"> - steep slopes and drop-offs - rough terrain - rivers, creeks and water channels - existing forest - unstumped land
Poor weather conditions	<ul style="list-style-type: none"> - hot or cold temperature extremes - heavy rain, flooding - strong winds - UV exposure
Mobile plant, power tools, logging trucks and worksite vehicles	<ul style="list-style-type: none"> - machinery operating near people or other machinery - plant that produces excessive fumes, vibration or noise - cutting tools – chainsaws and brushcutters - plant that is reliant on cables or rigging systems
Tracks and forestry roads	<ul style="list-style-type: none"> - narrow tracks and drop offs - poor visibility - two-way traffic
Vehicles	<ul style="list-style-type: none"> - operating/using 4x4s and side-by-sides

Landing layout	<ul style="list-style-type: none"> - limited working space - log storage - people working near machinery and mobile plant - slash management and disposal
Hazardous substances	<ul style="list-style-type: none"> - hazardous substances being used such as herbicides, petrol and diesel - hazardous substances being stored on site or transported to and from site - chemical and fuel spills - battery storage and recharging - burst hydraulic hoses
Overhead power lines and services	<ul style="list-style-type: none"> - working near overhead lines - damaged lines resulting from a crash or weather event
Harmful airborne substances	<ul style="list-style-type: none"> - vehicle and plant emissions (carbon monoxide and diesel particulate matter) - dust disturbed during digging, excavation or mobile plant movement - wood dust
Working at height	<ul style="list-style-type: none"> - on ladders and height-access equipment - on mobile plant and machinery
Falling objects	<ul style="list-style-type: none"> - broken branches sitting in the canopy - dead trees - windthrow
Hours of work/shift work	<ul style="list-style-type: none"> - long travel times to site - working at night - excessive overtime and long working hours
Manual tasks/vibration	<ul style="list-style-type: none"> - operating machinery that creates vibration - lifting or handling heavy objects - repetitive tasks
Remote work	<ul style="list-style-type: none"> - lone workers - ability to respond in an emergency - limited access to facilities
People near the worksite	<ul style="list-style-type: none"> - residents on forest access public roads - public entering forest sites without permission
Personal factors	<ul style="list-style-type: none"> - impairment of workers through drugs, medication, alcohol, stress or fatigue - worker distractions such as cell-phones, work pressures, home pressures
People getting on with people	<ul style="list-style-type: none"> - bullying, harassment, violence - poor communication between workers and contractors, and contractors and principals

STEP 2: ASSESSING THE RISKS

Once you have identified the hazards, you will need to work out what risks they present. You should involve your workers in this process.

With every hazard that you have identified, think about:

- What is the likelihood of the risk? (Is it reasonable to expect that it will eventually happen if the task/activity is repeated numbers of times?)
- What harm could happen? How serious is the harm and what is the worst-case scenario?
- How many people are likely to be exposed to the risk? Do their skill or experience levels influence the likelihood of the harm occurring?

All risks need to be managed. Risks that have the potential for causing serious injury or death, or chronic ill-health should have priority. Just because a risk has lower likelihood of occurring or lower potential for harm does not mean that it can be ignored.

An example. The likelihood of someone being struck by falling branches during manual felling is high. The potential consequences are likely to be severe – in the worst case, death. Every worker involved in manual felling is exposed to that risk. Manual felling is high risk/high consequence, so you would give priority to managing it.

STEP 3: MANAGING THE RISK

The essential rules of risk management are:

1. You must take all reasonably practicable measures to eliminate the risks.
2. If you cannot eliminate the risk, you must minimise it so far as is reasonably practicable.

Use the hierarchy of control measures. These operate from the highest level of protection and reliability to the lowest.

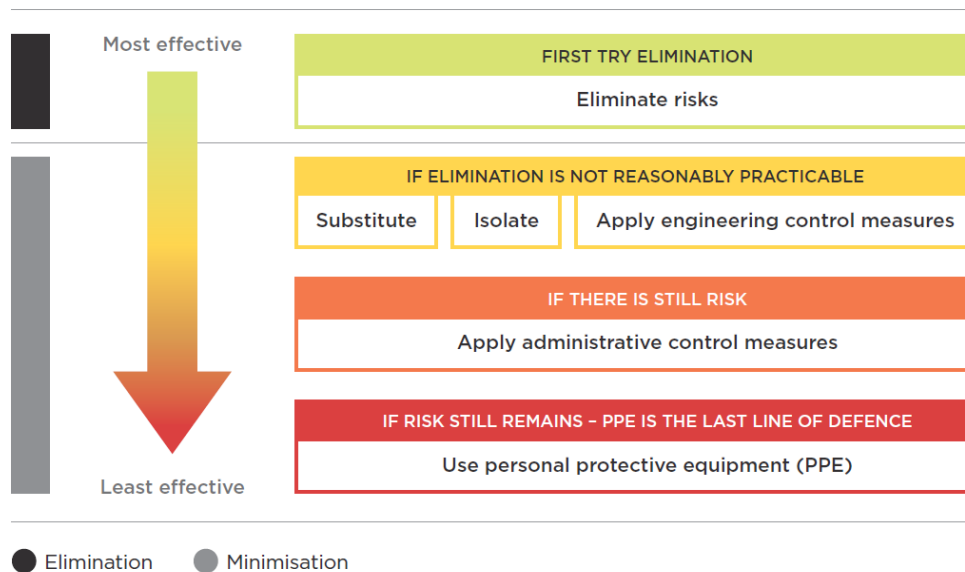


Figure 1. Hierarchy of controls

Think about it like this

Get rid of the hazard (elimination)

Change or redesign the way you do a job so that the hazard is removed or eliminated. For example, the risk of felling on steep slopes can be eliminated at the establishment stage by not planting those slopes.

Replace (substitute)

Replace a process or a material with a less hazardous one. For example, replacing manual felling with mechanised felling or using mechanised grapples for breaking out.

Prevent access (isolate)

Use physical control measures or equipment to keep people away from the hazard. This could include such things such as enclosing or guarding dangerous items of machinery and equipment. Another example of an engineering control would be using chain catchers and chain shot guards on harvesting heads and installing thick polycarbonate windshields on harvesters.

Organise (administrative controls)

Put in place procedures to make sure that the work can be done safely.

Examples are:

- using job rotation to reduce the time workers are exposed to hazards
- prohibiting the use of mobile phones when involved in hazardous work
- having daily toolbox talks.

Standard Operating Procedures (SOPs) are an administrative control. They do not eliminate or minimise risks but once risks have been eliminated or minimised, they can be used to manage the remaining risk.

PPE

Personal protective equipment (PPE) is the last line of defence. You should always look for other forms of risk minimisation first and only use PPE if the risks cannot be effectively managed to a reasonably practicable level.

Putting the control measures in place

Once you have worked out what the most effective control measures are, put them in place as soon as possible.

Engage with your workers. Make sure that they understand:

- the risks that you have identified together
- the control measures that have been chosen and put in place
- how to apply the control measures (what they have to do)
- why it is important to use the control measures.

Monitoring the control measures

Control measures are not 'set and forget'. Situations change, as will your business and processes. It is important that you monitor how your control measures are working, to make sure that they remain fit-for-purpose, they are suitable for the work, and that workers are using them correctly.

- Engage with your workers and their representatives to see if the control measures are eliminating or minimising work risks.
- Check incident reports and near miss reports (and encourage your workers to report incidents and near misses).
- Carry out inspections of the work and the site(s), paying particular attention to known risks and risk control measures.
- Monitor regularly. All policies, processes and systems should have a scheduled date for a review or audit to check that they're being followed and are still fit-for-purpose.

Acting on lessons learnt

If you find that your control measures are not working effectively, or if your workers have suggestions for improving them, take action.

If there is an incident or near-miss, investigate. Find out what caused it and what needs to change to make sure it does not happen again. If need be, go through the risk management steps again and look at how and where you might adapt or improve control measures.

Look outside your own business. Observe what is happening in the industry from the industry association and other forestry operations. Look internationally, too. There are always things that you can learn and improve to make for better health and safety.

A quick summary of risk assessment.

You should:

- identify what could go wrong
- identify who might be affected and how they might be harmed
- identify controls that are needed to stop it going wrong

- show that any remaining risk after all reasonable controls are in place is low enough to be acceptable
- record all of your findings and keep it
- tell everyone what they need to know and do
- make sure it all gets done
- ensure that if anything changes, you check you have got the right things in place. If not, stop the activity and review what's needed

Managing risk in dynamic environments

Things change and sometimes they can change fast.

Workers should be trained to recognise unanticipated risks and what control measures to use.

What do they do if they are manual felling and the wind comes up, or it changes direction?

What do they do if there is an electrical storm?

These are just examples.

Workers need to be able to recognise when a situation has become unsafe.

And they also need to have the authority to stop work if they decide they are unable to properly manage the risks that arise.