Rural plant

Code of Practice

2024

Workplace Health and Safety Queensland
worksafe.qld.gov.au

Queensland Government

This Queensland code of practice has been approved by the Minister for State Development and Infrastructure, Minister for Industrial Relations and Minister for Racing under section 274 of the *Work Health and Safety Act 2011*.

This code commences on 23 September 2024.

It replaces the Rural plant Code of Practice 2004.

PN13052

Contents

1. Foreword

The *Rural plant Code of Practice* is an approved code of practice under section 274 of the *Work Health and Safety Act 2011* (WHS Act).

An approved code of practice is a practical guide to achieving the standards of health, safety and welfare required under the WHS Act and the Work Health and Safety Regulation 2011 (WHS Regulation).

Under section 26A of the WHS Act, a person conducting a business or undertaking (PCBU) must:

- **comply with an approved code of practice; or**
- **manage hazards and risks arising from the work carried out as part of the business or undertaking in a way that is different to the code but provides an equivalent or higher standard of work health and safety than the standard required in this code**.

A code of practice applies to anyone who has a duty of care in the circumstances described in the code. In most cases, following an approved code of practice would achieve compliance with the health and safety duties in the WHS Act, in relation to the subject matter of the code. Like regulations, codes of practice deal with particular issues and do not cover all hazards or risks which may arise. The health and safety duties require duty holders to consider all risks associated with work, not only those for which regulations and codes of practice exist.

Codes of practice are admissible in court proceedings under the WHS Act and the WHS Regulation. Courts may regard a code of practice as evidence of what is known about a hazard, risk or control and may rely on the code in determining what is reasonably practicable in the circumstances to which the code relates.

An inspector may refer to an approved code of practice when issuing an improvement or prohibition notice. This may include issuing an improvement notice for failure to comply with a code of practice where equivalent or higher standards of work health and safety have not been demonstrated.

Code terminology

This code includes references to the legal requirements under the WHS Act and WHS Regulation. These references are not exhaustive and are included for convenience only. They should not be relied on in place of the full text of the WHS Act or the WHS Regulation.

The words **'must'**, **'requires'** or **'mandatory'** indicate that a legal requirement exists that must be complied with.

The word **'should'** is used in this code to identify the standard required in this code. PCBUs can only manage the identified hazard or risk in a different way if doing so provides an equivalent or higher standard of work health and safety.

The word **'may'** is used to identify an optional course of action.

See Appendix 1 for definitions of key terms and Appendix 2 for common acronyms.

Legislation

Legislation that is relevant to rural plant operators includes:

- *Work Health and Safety Act 2011* (WHS Act)
- Work Health and Safety Regulation 2011 (WHS Regulation)
- *Electrical Safety Act 2002* (ES Act)
- Electrical Safety Regulation 2013 (ES Regulation).

Scope and application

This code provides practical guidance on how to manage health and safety risks associated with rural plant. It should be read in conjunction with the WHS Act, WHS Regulation and other relevant codes of practice (see Appendix 3 for examples of other relevant codes of practice).

References to other legislation

This code includes references to the ES Act and ES Regulation. These references are not exhaustive and are included for information only. They should not be relied on in place of the full text of the ES Act or the ES Regulation. While this code includes information about electrical safety, it is not an approved code under the ES Act.

Australian standards

Australian Standards (AS) provide useful information, which may assist duty holders to meet their duties (see Appendix 4 for a list of some of the relevant Australian Standards). All care should be taken when referring to Australian Standards detailed in the document to ensure it is the current standard.

2. Introduction

2.1. What does rural plant cover?

“Rural plant” refers to plant commonly used in the rural industry. “Plant” is a term that covers wide-ranging items such as machinery, equipment, appliances, containers, implements, computers, vehicles, tools, and any components or anything fitted or connected to those things.

The general duty of care under the WHS Act applies to this type of plant. Plant that relies exclusively on manual power for its operation and is designed to be primarily supported by hand, for example a screwdriver, is not covered by the WHS Regulation.

Plant commonly used in the rural industry includes, but is not limited to:

- farm vehicles (e.g. tractors)
- quad bikes
- other mobile plant
- power tools
- forklifts
- planters
- harvesters
- hoppers
- silos
- some aircraft (e.g. drones)

- electric tools such as saws, drills, grinders
- irrigation equipment
- workshop tools and equipment
- augers
- conveyor belts
- roller benches
- earth moving equipment
- implements.

There are significant risks associated with using rural plant, including:
- limbs amputated by unguarded moving parts of machines
- being crushed by mobile plant
- sustaining fractures from falls while accessing, operating or maintaining plant
- being crushed by a quad bike roll-over
- electric shock from plant that is not adequately protected or isolated
- burns or scalds due to contact with hot surfaces, or exposure to flames or hot fluids.

Other risks include hearing loss due to noisy plant and musculoskeletal disorders related to hazardous manual tasks or slips, trips and falls caused by operating poorly designed plant or by poorly designed work areas.

Note: This code does not cover all hazards or risks that may arise with plant used in the rural industry and other relevant codes may be relevant. See Appendix 3 for more Codes of Practice relevant to the rural industry.

2.2. Who has health and safety duties

WHS Act section 19: Primary duty of care
WHS Act section 22–26: Designers, manufacturers, importers and suppliers of plant, substances or structures
WHS Act section 27: Duty of officers
WHS Act section 28: Duties of workers
WHS Act section 29: Duties of other persons at the workplace

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

The business or undertaking can be conducted alone or with others, and can be not-for-profit or for gain. A PCBU can be, but is not limited to:
- a CEO
- an organisation – a company, an unincorporated association or a partnership)
- a sole trader – for example a self-employed person
- a contractor – for example companies providing contracting and consulting services such as harvesting, irrigation maintenance or vine spraying. Further guidance on work health and safety duties for PCBUs who are working as part of a contractual chain can be found in the *Safe Work Australia Fact Sheet: WHS duties in a Contractual Chain*.

The WHS Regulation includes specific duties for PCBUs involving the management or control of plant, which includes rural plant. These include requirements to:
- manage the health and safety risks associated with rural plant

- prevent unauthorised alterations to or interference with rural plant
- use rural plant only for the purpose for which it was designed unless the proposed use does not increase the risk to health or safety.

Designers, manufacturers, importers and suppliers of rural plant, substances or structures must ensure, so far as is reasonably practicable, the plant, substances or structure they design, manufacture, import or supply is without risks to health and safety. This duty includes carrying out testing and analysis as well as seeking or providing specific information about the plant or substance.

The WHS Regulation requires:
- manufacturers to consult with designers of the plant
- importers to consult with designers and manufacturers of plant
- the person who commissions construction work to consult with the designer of the structure.

Designers and manufacturers should comply with relevant Australian Standards or equivalent design criteria. For example, there are specific technical standards relevant to tractors – see Appendix 4.

Officers are generally someone who:
- makes, or participates in making, significant decisions that affect the whole, or a substantial part, of the business, or
- has the capacity to significantly affect the business' financial standing.

Officers, such as company directors, have a duty to exercise due diligence to ensure that the business or undertaking complies with the WHS Act and WHS Regulation. This includes taking reasonable steps to ensure that the business or undertaking has and uses appropriate resources and processes to provide and maintain a safe work environment.

Workers have a duty to take reasonable care for their own health and safety and that they do not adversely affect the health and safety of other persons. Workers must comply with any reasonable instruction and cooperate with any reasonable policy or procedure relating to health and safety at the workplace.

Other persons at the workplace, like visitors, must take reasonable care for their own health and safety and must take care not to adversely affect other people's health and safety. They must comply, so far as they are reasonably able to, with reasonable instructions given by the PCBU to allow that person to comply with the WHS Act.

A person can have multiple duties, and more than one person can have the same duty at the same time. For example, if a PCBU owns and operates plant in their workplace and decides to modify it themselves, the PCBU will have the duties of a designer and manufacturer as well as a person with management or control of plant at the workplace.

3. Obtaining and providing WHS Information about rural plant—duties and responsibilities

WHS Act sections 22(4–5), 23(4–5), 24(4–5) and 25(4–5): Duties of designers, manufacturers, importers, suppliers to seek and/or provide information about plant.

WHS Regulation sections 187, 195, 196 and 198: Duties of designers, manufacturers, importers and suppliers to obtain WHS information and provide that information to applicable duty holders.

Plant designers, manufacturers, installers, importers and suppliers can influence the safety of rural plant before it is used in the workplace. They all have responsibilities to seek and/or provide information to help other people manage plant health and safety risks. Plant designers include design professionals like engineers, industrial designers and designers of plant systems.

Anyone who designs their own plant, or changes the original design of a plant (e.g. making modifications or retrofitting) will have the same duties as a designer and/or manufacturer.

3.1. Duty to seek and provide information

Sections 22–25 of the WHS Act, and s187–198 of WHS Regulation require designers, manufacturers, importers and suppliers to obtain and/or provide information to duty holders in the next phase of a plant lifecycle to help them manage plant health and safety risks. Information should flow from plant designers to manufacturers, manufacturers to importers and suppliers, and from importers and suppliers to end-users.

Seeking information

Manufacturers, importers, suppliers, installers and PBCUs who own and operate rural plant have responsibilities to obtain information to manage plant health and safety risks. They should take all reasonable steps to obtain. WHS information required to be provided by duty holders in the previous phase of the plant lifecycle.

Providing information

Generally, designers, manufacturers, importers and suppliers must give adequate information to those people in the next phase of the rural plant lifecycle concerning, where applicable:

- each purpose for which the plant was designed or manufactured
- the results of any calculations, testing, analysis or examination carried out in accordance with the WHS Act
- any conditions necessary to ensure that the plant is without risks to health and safety of persons at a workplace who:
    - use the plant for a purpose for which it was designed
    - store the plant
    - carry out reasonably foreseeable activities related to the manufacture, assembly, use, storage, decommissioning, dismantling or disposal of the plant (e.g. inspection, operation, cleaning, maintenance or repair).

Where additional hazards are identified as the rural plant is created, duty holders are required to pass information about additional hazards and risks identified, such as hazards identified by the manufacturer through the manufacturing process.

Designers of plant also have additional requirements to provide information to manufacturers, concerning, where applicable, the:

- installation, commissioning, decommissioning, use, handling, storage and dismantling (if the plant is capable of being dismantled)
- hazards and risks that the designer has identified
- testing or inspections to be carried out

- systems of work and competency of operators that are necessary for safe use
- emergency procedures required if there is a malfunction.

3.2. Duty to provide information upon request

End users or those people who undertake relevant foreseeable activities related to a plant (such as the assembly, inspection, operation, cleaning, maintenance or repairs, decommissioning, dismantling and disposal of rural plant), can also request health and safety information from designers, manufacturers, installers, importers and suppliers.

Upon request, sections 22–25 of the WHS Act requires designers, manufacturers, importers and suppliers to, as far as reasonably practicable, give relevant information concerning (where applicable):

- each purpose for which the plant was designed or manufactured
- the results of any calculations, testing, analysis or examination, carried out in accordance with the WHS Act
- any conditions necessary to ensure that the plant is without risks to health and safety of persons at a workplace who:
    - use the plant for a purpose for which it was designed
    - store the plant
    - carry out reasonably foreseeable activities related to the design, manufacture, assembly, use, storage, decommissioning, dismantling or disposal of the plant (e.g. inspection, operation, cleaning, maintenance or repair).

3.3. Duty to provide information about second-hand plant

Where second-hand plant is being supplied, suppliers must give information to the buyer about what the plant was designed or manufactured to do and its safe use. The supplier must also identify any faults in the plant.

Second-hand plant is more likely to have out-dated or missing safety features, for example a missing emergency stop control. In these circumstances, suppliers of second-hand plant for use at a workplace must do what is reasonably practicable to supply safe plant.

Suppliers' duties apply to a PCBU whether the sale is a one-off sale, for example, their own plant, or forms part of a business's day-to-day operations.

Supplies' duties apply to sellers' agents like auctioneers, unless the agent does not take control of the supply and has no authority to make decisions about the supply. For example, agents selling used agricultural plant at farm clearing sales do not take possession of the plant, have little or no control of the supply and are not considered to be suppliers. In these limited circumstances the suppliers' duties will only apply to the seller—not their agent.

Second-hand plant sold for scrap or spare parts is not intended to be used at a workplace so does not need to be made safe or supplied with instructions for use.

However, the supplier must tell prospective buyers in writing or by marking the plant that the plant is being supplied for scrap or spare parts only and that it cannot be used safely in its current form for any other purpose.

For further information, refer to Safe Work Australia's guide for Plant designers, manufacturers, importers and suppliers information sheet available on the Safe Work Australia website.

4. Consultation

4.1. Consulting with workers

WHS Act section 47: Duty to consult workers
WHS Act section 48: Nature of consultation

Consultation involves sharing of information, giving workers a reasonable opportunity to express views and taking those views into account before making decisions on health and safety matters.

PCBUs must consult workers when proposing any changes to the work that could affect their health and safety. This includes rural plant health and safety issues. These workers can assist in the identification of the risks involved in operating rural plant at the workplace.

In a small workplace, consultation can take the form of an informal discussion. For example, consultation could occur between a PCBU and the PCBU's workers over the content of a manufacturer's instructions. In a large workplace with many workers, a PCBU may set up a formal process with a health and safety committee.

Consultation involves the sharing of information and the exchange of views between PCBUs, workers and their representatives. It provides the opportunity to add to the decision-making process in a timely fashion. This may pre-empt or resolve any problems. Additionally, consultation fosters co-operation in the workplace.

PCBUs should ensure consultation with workers occurs during the identification and assessment of risks associated with rural plant for rural workplaces. PCBUs should also consult on the selection and implementation of control measures.

The consultative process should regularly address the following issues:
- planning for the introduction of new plant or a new operation method
- identifying risks associated with the operation, age and condition of plant (whether new, old or modified)
- assessing risks associated with the operation, age and condition of plant (whether new, old or modified)
- deciding what control measures can be taken
- determining training requirements
- developing documented 'safe systems of work'
- developing advice to any workers and other persons who are likely to operate plant.

Further guidance on consultation is available in the *Work health and safety consultation, co-operation and co-ordination Code of Practice.*

4.2. Consulting, cooperating and coordinating activities with other duty holders

WHS Act section 46: Duty to consult with other duty holders

The WHS Act requires a PCBU to consult, cooperate and coordinate activities with all other persons who have a work health or safety duty in relation to the same matter, so far as is reasonably practicable.

There is often more than one business or undertaking involved in managing risks of plant in the workplace, that may each have responsibility for the same health and safety matters, either because they are involved in the same activities or share the same workplace.

In these situations, each duty holder should exchange information to find out who is doing what and work together in a cooperative and coordinated way, so risks are eliminated or minimised so far as is reasonably practicable.

For example, if the owner or manager of a farm contract harvesting business employs workers who carry out work at other workplaces, then the owner or manager should exchange information with the host business to determine:

- if workers could be exposed to hazardous plant or substances
- what each party will do to control associated risks.

Further guidance on WHS duties for labour hire agencies and host employers can be found in the following Workplace Health and Safety Queensland (WHSQ) guides:

- *Labour hire agencies: Managing the safety of on-hired workers*
- *Host employers: Managing the safety of labour hire workers*

If using plant at a workplace shared with other businesses, the plant owner or manager should talk to those businesses about the risks the plant could cause.

A PCBU could share responsibility for a health and safety matter with other business operators who are involved in the same activities or who share the same workplace. In these situations, each duty holder must exchange information to find out who is doing what and work together in a cooperative and coordinated way so that all risks are eliminated or minimised as far as reasonably practicable.

Examples of where a PCBU will have a health and safety duty include where:

- the PCBU engages workers to carry out work – for example, a farm owner hiring an employee to work on a farm
- the PCBU directs or influences workers in carrying out work – for example, a farm owner asks an employee to complete a task
- other persons may be put at risk from work carried out in their business or undertaking – for example, external parties present on a farm business, such as neighbours, stock agents and agronomists
- the PCBU manages or controls a workplace or the fixtures, fittings or plant at a workplace – for example, a business that installs machinery on a farm or does tasks like decommissioning or dismantling
- the PBCU's business or undertaking involves designing, manufacturing, importing or supplying plant, substances or structures for use at a workplace – for example, farm machinery sales and service businesses, farm equipment manufacturing businesses
- the PBCU's business or undertaking involves installing, constructing or commissioning plant or structures at a workplace – for example, on-farm machinery servicing, on-farm silo construction.

Further guidance on consultation is available in the *Work health and safety consultation, co-operation and co-ordination Code of Practice.*

5. How to manage risks from rural plant

WHS Regulation section 34: Duty to identify hazards
WHS Regulation section 35: Managing risks to health and safety

WHS Regulation section 36: Hierarchy of control measures
WHS Regulation section 37: Maintenance of control measures
WHS Regulation section 38: Review of control measures
WHS Regulation section 297: Management of risks to health and safety

The risks from rural plant, like any other risk, are best controlled using a risk management approach. The object of risk management is to enable PCBUs to assess systematically all the factors about an activity involving rural plant. The risk management approach involves:

1. **Identifying** plant hazards that pose a risk.
2. **Assessing** the degree of risk created by the plant, environment and work processes.
3. **Controlling** the risk by implementing the most effective control measure that is reasonably practicable in the circumstances.
4. **Reviewing** the control measure to ensure it is working as planned.

Managing work health and safety risks is an ongoing process that needs attention over time, but particularly when any changes affect work activities. Examples of when PCBUs should work through the steps include:

- purchasing new or used equipment or using new substances (for example, chemicals)
- changes in the operation, age and condition of plant (whether new, old or modified plant); new information about rural plant risks becoming available
- responding to rural plant incidents (even if they have caused no injury)
- responding to concerns raised by workers, health and safety representatives or others at the workplace.

Figure 1 summarises the steps in managing risks of rural plant, which are discussed in the next sections.

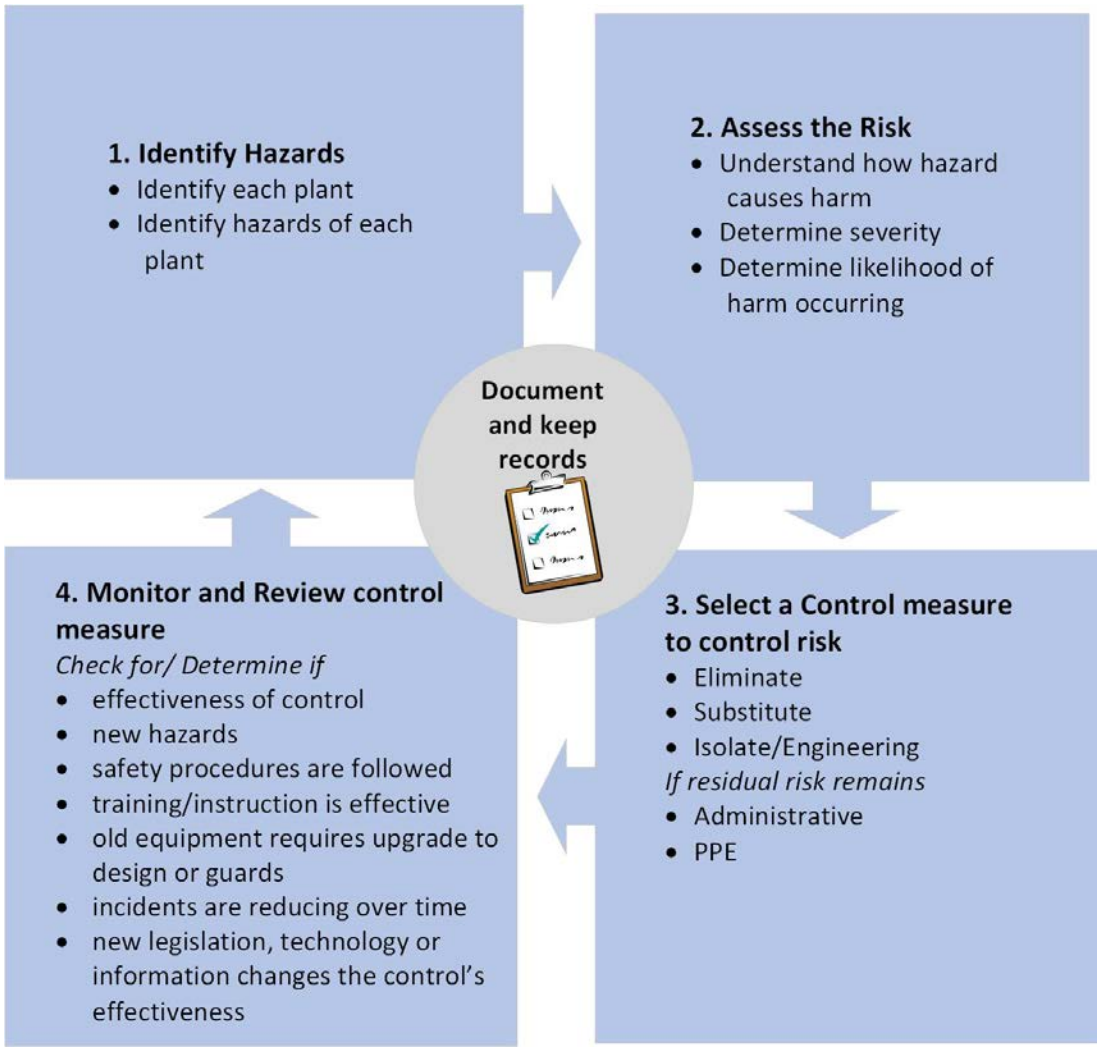


Figure 1: *Managing risks from rural plant*

Further information on risk management is available in the following codes:
- *How to manage work health and safety risks Code of Practice*
- *Managing the risks of plant in the workplace Code of Practice*

5.1. Identifying rural plant hazards

The first step to identifying the risks is to identify all plant. Once all plant is identified, all hazards associated with the plant should be noted. A hazard is something with the potential to cause harm. For example, the hazards of an electric saw are the saw blade and the electricity itself.

Hazards generally arise from the following aspects of work and their interaction:
- physical work environment
- equipment, materials and substances used
- work tasks and how they are performed
- work design (e.g. work organisation, schedules) and management.

Hazards may be identified by:
- looking at how work is carried out at a workplace. For example, identifying farm operations, identifying activities, and recording rural plant used in each activity

- reviewing manufacturer's instructions
- reviewing records, incident reports and other relevant information
- talking to workers, manufacturers, suppliers, health and safety specialists and competent persons (e.g. engineers or qualified tradespersons)
- reviewing relevant information, records and incident reports.

Note: Consult with your workers – they might know about rural plant hazards.
- ✓ Consultation with workers is an effective method of identifying rural plant and hazards.
- ✓ Often workers have the best idea about where hazards exist because they are the people using the plant on a daily basis.

5.2. Assessing the risk

Once all hazards at the workplace have been identified, the risks associated with the hazards must be determined. Risk is the likelihood that death, injury or illness might result because of the hazard. For example if the blade of the saw is unguarded, the likelihood of a person coming into contact with the blade is high.

A risk assessment involves considering what harm could happen if someone is exposed to a hazard and the likelihood of it happening. A risk assessment can help PCBUs determine:
- how severe a risk is
- whether existing control measures are effective
- what action a PCBU should take to control the risk
- how urgently the action needs to be taken.

Risk assessment tools should be specific to the type of risk being assessed. Consider using risk assessment tools which are best suited to the type of risk being assessed. For example, risk matrices which focus on consequences and likelihood are less suited to assessing risks associated with human factors, psychological health or manual tasks.

Some risk aspects may be best assessed by suitably qualified and experienced consultants or professionals.

5.3. Controlling the risks

Controls are those measures that eliminate or reduce the potential for events. When appropriate, the choice of control measures should be made by the PCBU with the worker or operator.

The ways of controlling risks are ranked from the highest level of protection and reliability to the lowest. This ranking is known as **the hierarchy of control measures** (see **Figure 2**). The WHS Regulation makes it mandatory for PCBUs to work through this hierarchy when managing risks.

Controls measures should be considered for all rural plant in the workplace. A PCBU can apply control measures:
- before use, for example when purchasing new rural plant; or
- during use, for example the fitting of a guard to a power take off (PTO) on an existing tractor.

Hierarchy of controls - selecting a control measure

A PCBU must always aim to **eliminate** the risk. If that is not reasonably practicable, the PCBU must minimise the risk by **substitution**, **engineering controls and isolation** (for example, by a fixed and physical barrier). These controls reduce or minimise risk in a reliable manner.

If risk remains, it must be minimised by implementing **administrative controls**, so far as is reasonably practicable.

Any remaining risk must be minimised with suitable personal protective equipment (PPE). Administrative control measures and PPE do not control the hazard at the source. They rely on human behaviour and supervision and, used on their own, tend to be the least effective in minimising risks.

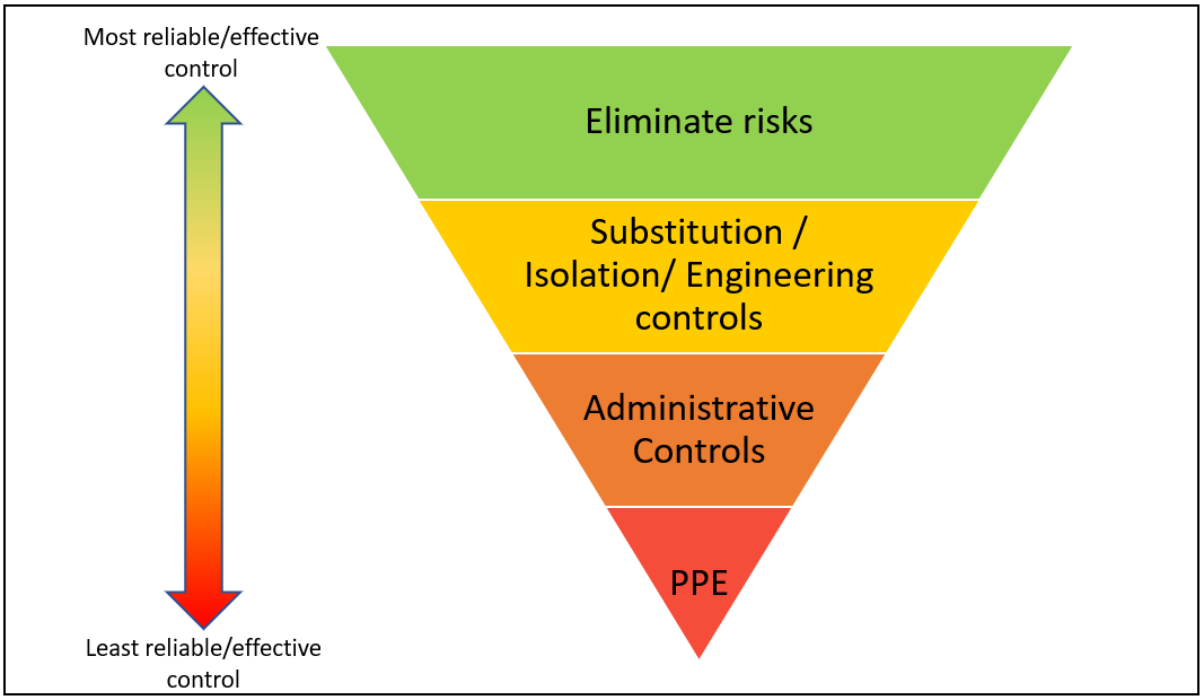


Figure 2: *Hierarchy of controls*

Control measures may be divided into short-term/immediate control measures and long-term control measures. The overall aim should always be to eliminate the hazard at the source. However, short-term measures could be a temporary solution while long-term measures are being implemented.

Some of the ways PCBUs can select a control measure include:

- consulting with workers
- referring to measures in the manufacturer's instructions, where available
- referring to specialist practitioners and representatives of rural industry associations, unions, rural plant suppliers and government bodies.

Elimination

The most effective control measure involves eliminating the hazard and associated risk and must be considered before anything else. The best way to do this is by, firstly, not introducing the hazard into the workplace.

Eliminating hazards is often cheaper and more practical to achieve at the design or planning stage of rural plant. By designing-in or designing-out certain features, hazards may be eliminated. For example, not using a noisy rural plant will be more effective than providing workers with personal hearing protectors.

In these early phases, there is greater scope to design out hazards or incorporate risk control measures that are compatible with the original design and functional requirements.

You can also eliminate risks by removing an existing hazard, for example, by removing trip hazards on the floor, disposing of unwanted chemicals, or not working in an isolated or remote area.

Examples of elimination include:

- stopping the use of plant that causes hazard
- removing an existing hazard, by removing trip hazards on the floor, disposing of unwanted chemicals, or not working in an isolated or remote area
- eliminating the risk of a fall from height by doing the work at ground level
- relocating overhead powerlines
- designing facilities to ensure operating plant is not in the vicinity of overhead powerlines, e.g. redesigning cattle loading facilities so that exclusion zones to overhead powerlines are not breached.

Substitution

Substitution (replacing a material or process associated with plant with a less hazardous one) should not result in a less efficient method of performing a task or an inferior piece of plant.

Examples of substitution include:

- using battery-operated equipment as a substitute for equipment such as corded power tools and extension leads
- using a side-by-side vehicle instead of a quad bike
- pulling a heavy load from the front attachment point of a tractor in reverse, rather than the rear
- using a dedicated forklift or telehandler, rather than a tractor front end loader.

Isolation

Isolation (separation of the process) can be by distance from the rest of the workplace or by a physical barrier between the process and any person.

Examples of isolation include:

- locking all vehicles and storing keys to all rural machines/plant in a central, secure location
- the use of machine guards on mobile plant e.g. the guards covering rotating parts of a harvesting machine.
- arranging for the electricity to be turned off when working near overhead electric lines, before encroaching into an electrical safety exclusion zone
- ensuring any mobile plant that may be able to contact powerlines is located away from overhead powerlines. This includes trucks, harvesters (with harvest arms set in operating and transporting positions), irrigation spray arms and elevating work platforms.

Engineering controls

An engineering control is a control measure that is physical in nature, including a mechanical device or process.

Examples of engineering controls include:

- redesigning the electrical system and installing emergency stop buttons within easy reach of operators, or limit switches where entanglement could occur
- installing a blower/filler pipe to a feed silo to remove the risk of falling from height or entanglement in overhead powerlines if present
- use of limit switches to prevent cranes and plant slewing into exclusion zones
- placing physical barriers to stop entry to exclusion zones
- the use of a tractor cabin designed to lessen the risk of tractor noise, heat and dust
- the use of machine guards on mobile plant e.g. the guards covering rotating parts of a harvesting machine
- roll-over protective structures (ROPS)/fall-over protective structures (FOPS) devices on plant such as tractors, side-by-side vehicles (SSVs) and quad bikes.

Administrative controls

If risk remains, it must be minimised by implementing administrative controls, so far as is reasonably practicable. Administrative controls are 'policy' or behavioural type controls that can be put in place. These controls can include the time of work, hours of work, who does the work and who has access to a work area or plant.

An example of an administrative control is changing a work practice for entry into a confined space by including a requirement for an extra person to be present outside the confined space. Administrative controls also include the 'safe systems of work' and documented policies and procedures that a business may implement in a workplace.

Examples of administrative controls include:

- training workers in the proper procedures and processes for operating plant
- excluding non-essential personnel from access to plant
- limiting the number of hours in a work period a worker is using rural plant
- ensuring that outdoor tasks are done at the most appropriate time of day to overcome problems associated with ultraviolet exposure – for example skin cancer, dehydration, and heat stress
- having processes in place to visually examine electrical equipment such as power points, light fittings, switchboards, wiring are undamaged and in operational condition
- having warning signs, powerline markers and audible warning devices to alert plant operators
- introducing speed limits and out of bounds areas for operating machinery
- implementing time limits on particular tasks, such as not mustering between the hours of 11am and 3pm to reduce heat exposure
- implementing a plant register, which states the location where an employee is going to be using a particular machine and the task they are completing
- induction of contractors to instruct them about farm policies, procedures, and farm specific hazards – for example, location and voltage of overhead lines to contract harvesters, sprayers and crop dusters.

Personal protective equipment (PPE)

Any remaining risk must be minimised with suitable PPE. PPE means clothing, equipment and/or substances which, when worn correctly, protect part or all of the body from risks of injury or disease at work or in the workplace.

Exposure to plant risks should be controlled by one or more measures other than PPE. The use of **PPE is the least effective method of controlling risk**. However, a long-term strategy using other measures may need the short-term use of PPE to attain this aim (for example,

providing hearing protection to workers exposed to noisy rural plant temporarily, until noisy rural plant is replaced with a quiet version).

5.4. Maintain and review of control measures

Control measures must be maintained so they remain fit for purpose, suitable for the nature and duration of work, and are installed, set up and used correctly.

PCBUs must monitor and review control measures regularly to check their effectiveness. A review is also required:

- when a control measure is not effective
- before a change at the workplace that is likely to give rise to a new risk that would make the original control ineffective
- if a new hazard or risk is identified
- if the results of consultation indicate that a review is necessary
- if a health and safety representative (HSR) requests a review, because that person reasonably believes that:
  - a circumstance in any of the above points affects or may affect the health and safety of a member of the work group represented by the HSR
  - the control measure has not been adequately reviewed in response to the circumstance.

A review could determine:

- the effectiveness of the control measures (i.e. whether the risk still reduced by the control measure)
- whether the chosen control measure introduces a new hazard
- if all hazards have been identified
- whether safety procedures use language and/or diagrams that can be easily understood by all workers, accurately reflect how tasks are performed and are followed
- whether training and instruction provided to workers has been successful, suitable and adequate as per legislative requirements
- whether an upgrade to designs of equipment or guards can be purchased to replace old equipment
- if the frequency and severity of incidents is reducing over time
- if the introduction of new legislation, technology or information changes the effectiveness of a control.

If the control measure is not working effectively, it must be revised to ensure it is effective in controlling the risk.

Ways to undertake reviews

One of the ways to undertake this review is to re-do the first two steps of the risk management procedure. This involves identifying the hazards and assessing the risk. Methods that can be used to review control measures to be applied also include:

- consulting with workers
- referring to specialist practitioners and representatives of rural industry associations, unions and government bodies
- managers or supervisors undertaking reviews or inspections for hazards and risks.

A record of when to conduct a review of implemented control measures should be kept.

Maintaining and keeping records

As part of risk assessment, PCBUs should record information about implemented control measures. This information should be readily available at the workplace.

6. Training and licensing

The purpose of training is to ensure that people in workplaces have the appropriate skills and knowledge to operate and maintain rural plant in a manner that is safe and without risk to health. Provision of suitable and adequate training to staff is an essential step towards meeting PCBU's duties under the WHS Act.

6.1. Provision of training

Note: The WHS Regulation requires high risk work (HRW) licences for operators of some plant. This involves completion of formal training provided by a registered training organisation (RTO). See Section 6.8 High risk work licences for further information.

PCBUs must ensure that any person (including the PCBU) who operates and/or maintains rural plant in a rural workplace receives training that enables them to operate and maintain rural plant safely. This includes:

- any person who operates, inspects or maintains plant
- workers who train others to use, inspect, audit or maintain plant
- people required to work in and around, or in close proximity to, rural plant.

6.2. Assessing training needs

PCBUs should consider each person's individual training needs, which may be impacted by the worker's existing level of knowledge, skills, experience and competency. This means that PCBUs may need to have a number of training and assessment methods (including the amount of training to be provided) to ensure individuals are appropriately trained.

6.3. Training methods

Training should be appropriate to the plant to be operated and the type of work to be performed. Training may be carried out by:

- a PCBU
- a qualified person engaged from outside the workplace
- a registered training provider (e.g. Farmsafe Queensland, TAFE Queensland).

Training can be a mix of formal and informal processes. In some cases, formal training will be necessary (for example, for certain high-risk work requires formal qualifications and a licence). In others, on-the-job training may be more appropriate (for example how to safely connect a slasher to the PTO on a tractor would be more appropriately performed through practical on-the-job training).

The special needs of workers should be considered in deciding on the structure, content and delivery of training. This should include literacy levels, work experience and specific skills necessary for the job.

Training should consider emotional maturity of the trainees in attempts to limit inappropriate behaviour when operating rural plant (e.g. age and observed behaviour of young workers).

If the literacy reading level of a trainee is low, spoken methods or highly graphic visual methods should be used. If a worker does not understand or speak English well enough to comprehend and gain competence through the proposed training method, training should be provided in a suitable language and method to suit the trainee.

Training should be practical and include a hands-on experience where relevant. For example, training a worker on the use and fitting of personal hearing protectors where the employee's work involves the use of noisy rural plant.

6.4. Elements of a training program

PCBUs should provide new workers with induction training and consider the need for refresher training (for example, where workers return after a long absence).

The training program should cover:

- how to use and maintain rural plant
- any specific conditions and prohibitions on the use of plant
- specific external factors such as weather or ground conditions
- any known residual risks (e.g. those that cannot be eliminated or sufficiently reduced by design and against which guarding is not totally effective)
- the control measures that should be used to reduce the risks associated with plant and the correct use of the controls (e.g. guards)
- how to access the information on plant for a rural workplace (e.g. manufacturer's instructions)
- instruction in the appropriate work method including the correct use of PPE
- any inspection and maintenance program in place at the workplace
- any requirement for special tools that will be used in the use or maintenance of rural plant
- legislative requirements, such as duties under the WHS Act and relevant codes of practice.

The amount of detail covered in a training program will depend on:

- the hazards associated with the rural plant
- the degree of risk
- the complexity of the work procedures
- any controls, work practices and PPE necessary to minimise risks.

The training program should also specify the frequency of training (for example, induction and refresher training), and how competency will be assessed.

Training programs should be developed following an assessment of likely risks, and in consultation with workers and their representatives.

Note: PCBU's should assess worker's training needs, which can be impacted by their existing level of knowledge, skills, experience and competency. Training programs should be adaptable to meet an individual's specific training needs.

6.5. Assessment of competency

PCBUs should determine a worker's competency before they operate an item of plant. This can be achieved by having the worker operate the plant under supervision and assessing the operator for knowledge and skill. For example, a PCBU can set and observe a specific task which can be assessed in conjunction with the demonstration of knowledge through answering

questions about the plant (e.g. safe working load). The assessment should consider whether a trainee could be reluctant to disclose difficulties in comprehending English.

PCBUs should follow up with competency assessments on a regular basis to determine if workers require more training or refresher training. Newer workers will need closer and more regular supervision than experienced workers.

Documented familiarisation training on a specific make and model of rural plant may be needed where the operation is complex, there is a high level of risk and/or is unusual and would not be classified as a standard type of plant.

As an example, if a worker demonstrates competency in tractor operation and has a good understanding of the risks and safety features, then familiarisation training may not be needed on a similar make and model of tractor. However, the same worker may be required to operate a different type of plant, such as an elevating work platform (EWP), and is unable to demonstrate competency. In this instance it is advisable for the PCBU to provide familiarisation training on the safe operation of the EWP. This training may be in the form of a checklist, or provided by the employer (if they can safely operate the plant).

6.6. Review of a training program

PCBUs should review the training program at least once a year, or:

- each time there is a change in:
  - plant for rural workplaces
  - any hazard information from the manufacturer
  - a work practice
  - a control measure
- each time a worker is assigned to:
  - a new task not previously carried out
  - a work area for which the worker has not received training.

6.7. Training records

A training record is proof that a PCBU has satisfied its duties under the WHS Act to provide training. Training records provide an accurate statement of the training that each person has received at a particular time.

The training program record should include:

- the names of persons receiving training and date of attendance at any training program
- an outline of the course content
- the names of any person providing the training
- where applicable, a person's accreditation certificate number
- the assessment results of the trainee (e.g. pass/fail, competent/not competent).

6.8. High risk work licences

WHS Regulation section 81: Licence required to carry out high risk work (HRW)
WHS Regulation section 85: Evidence of licence—duty of PCBUs
WHS Regulations schedule 3 and schedule 4: list of the HRW licences and classes, and qualifications required for HRW.

Work that has a high risk of injury or death is called high risk work. Any person undertaking high risk work must hold the relevant HRW licence.

A HRW licence is required to operate certain types of plant such as forklift trucks, boom type elevating work platforms and certain cranes. HRW licences are also required to carry out dogging, rigging or certain scaffolding work.

Schedule 3 and Schedule 4 of the WHS Regulation set out the HRW licences and classes, and qualifications required for high risk work.

The addition of attachments to plant can sometimes mean that a HRW licence is required to operate it. For example, a tractor that may have been fitted (either by the manufacturer, or retrofitted) with a mast and a pair of fork arms (also known as tynes), and the tynes are able to be raised 900mm or more above the ground. This apparatus is also known as lifting media made up of a mast and an elevating load carriage to which is attached a pair or fork arms. A HRW licence is not required if the tractor simply has fork arms attached, such as for moving hay bales and this tractor does not have a mast fitted. See **Figure 3** and **Figure 4** for examples.

To obtain a HRW licence, a person must complete formal training provided by a registered training organisation (RTO) and pass the assessment. There are exceptions to this requirement, for example a person who is being trained to obtain a HRW licence and is under supervision by a HRW licence holder. For further information about exceptions, see section 82 of the WHS Regulation.

Further information is available at worksafe.qld.gov.au.

Figure 3: *An example of a tractor requiring a high risk work licence to be operated.*

Figure 4: *An example of a tractor not requiring a high risk work licence to be operated.*

7. Common rural plant risks

The following subsections identify common rural plant areas that should be considered in a risk assessment process.

7.1. Guarding

WHS Regulation section 208: Guarding

One of the many problems of working with rural plant is the risk of contact with moving parts or materials, getting trapped between moving parts or materials or by being hit by material thrown from the plant. These risks should be controlled by measures that the risk assessment has shown to be appropriate to the task being undertaken.

Power Take-Off (PTO)

An example of when guarding needed is in PTOs. A PTO is a device found on some mobile rural plant including tractors. It is used to transfer mechanical energy from an engine to external implements, which include but are not limited to, grain augers, field/haul-out bins, tractor attachments, irrigation pumps, post drivers, mowing equipment, boom spraying equipment and feed grain roller mills.

PTOs should be appropriately guarded because of the risks around death and serious injury if people get caught in the PTO or the connected implements shaft and couplings.

As shown in **Figure 5**, guarding for a PTO includes:

- a fixed power output coupling (POC) guard, which should be permanently attached to the machinery. If it is movable, it must be held securely in place when the machine is in use.
- an implement power input coupling (PIC) guard, which should be permanently attached to the implement. If it is movable, it must be held securely in place when in use. There should be no nip-points where body parts or clothing can be caught.
- a PTO shaft guard, which extends into the POC and PIC areas for the maximum practical distance. The guard can be either rotating or not. A non-rotating guard needs a way to be

restrained. A rotating guard has to turn freely and be able to be stopped by hand without risk of injury or entanglement.

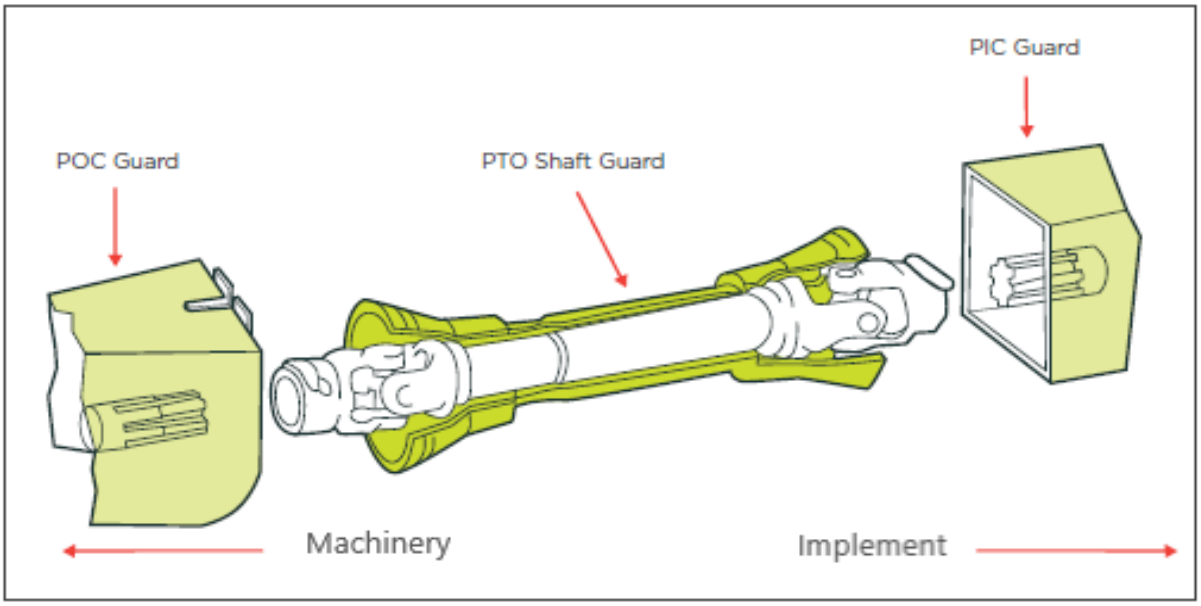


Figure 5[1]:*Power take-off guarding (PTO = power take-off; POC = power output coupling; PIC = power input coupling)*

See Appendix 5 for further guidance on tractor guarding safety.

Other guarding

Generally, guards should be provided where any rural plant part is within reach of persons and could become hazardous during operation, routine maintenance or adjustment. This includes situations where it is necessary to carry out servicing, maintenance or adjustments while:

- the rural plant is operating
- power-driven parts are functioning
- the rural plant is mobile
- power-driven parts are in motion
- electrical parts are energised
- hydraulic system is pressurised
- grain or chemical hoppers are full.

Note: Guarding is an important and effective control measure for safe working with rural plant. Read WHSQ's *Guide to machinery and equipment safety* for more details on guarding.

[1] Adapted from WorkSafe New Zealand, *Safe use of tractors on Farms*, June 2014

7.2. Tractors

WHS Regulation Schedule 19 - Definition of tractor: a motor vehicle, whether wheeled or track mounted, designed to provide power and movement to any attached machine or implement by a transmission shaft, belt or linkage system but does not include earthmoving machinery.

WHS Regulation section 214: Requirement to control risks of tractors (as a powered mobile plant) associated with overturning, things falling on the operator, the operator being ejected, collision, and mechanical failure of pressurised elements that may release fluids.

WHS Regulation section 215: Requirement for specific control measures for tractors (as powered mobile plant): suitable operator protective devices; protection for persons other than the operator riding on the plant; ensuring that the plant does not collide with pedestrians or other powered mobile plant, having a warning device that will warn persons who may be at risk from the movement of the plant.

WHS Regulation section 216: Requirement for Roll-over protection on tractors

Injuries

Tractors can become dangerous if incorrectly used and have caused more deaths or injuries than any other rural plant. Incidents causes include but are not limited to:

- rollovers – either on slopes or where the tractor flips over backwards when pulling stumps, travelling with elevated implements (including buckets) or similar
- contact with overhead powerlines (e.g. involving spray booms)
- entanglement or contact with moving parts (e.g. power take-off shafts, slasher blades, augers and other implements fitted to tractors)
- falls from tractors, hitching equipment, various falling objects and towing
- run-overs linked to:
  - starting a tractor from the ground
  - carrying passengers (e.g. children) on tractors
  - attempting to get on or off a moving tractor
  - falling off the seat and under a slasher
- crush injuries from unexpected movement of tractor and/or attachments (e.g. being crushed from rollover when working on tractor in front of rear wheels, or creeping hydraulics when the bucket or slasher lower onto a worker).

Risk assessment and controls

Common considerations before buying a tractor

Before the purchase of a tractor, consideration should be given to any risks the tractor may introduce at a workplace. After considering these risks PCBUs should ensure that the health and safety design features of the chosen tractor control these risks.

As a guide, buyers should seek a tractor incorporating the following features:

- factory fitted ROPS and/or FOPS
- factory designed and fitted safeguards
- adequate ventilation if a cabin has been fitted

- non-slip surfaces for access and exit
- the positioning of the exhaust outlet to direct gases away from the operator
- adequate for task and terrain for which purchased
- adequate noise control. Where noise cannot be reduced sufficiently at the source, hearing protection equipment should be supplied to the operator
- the location of switches and levers within easy reach of the operator to avoid repetitive injury risks and to reduce the risk of the wrong lever or control being used
- a well-sprung, adjustable seat and seat belt
- control of ultraviolet radiation exposure (e.g. by provision of shade)
- where a front-end loader attachment is fitted, an auto levelling feature on the bucket, that keeps the bucket level as it is raised, to prevent the load falling onto the operator
- where a cabin is fitted, valve bodies and hydraulic hoses fitted outside of the cabin to reduce the risk to operators in the event of hose rupture
- compliance with current technical standards
- an ignition that only permits the tractor to be started with:
  - the operator sitting in the operator's seat (i.e. not standing on the ground)
  - the tractor transmission (e.g. drive gearbox) in neutral and/or the clutch pedal depressed; and
  - all power take-offs (PTOs) disengaged.

Looking after tractors

Section 8 outlines a range of measures that can assist a PCBU to look after and manage the risks associated with tractors, such as pre-start inspections and servicing and maintenance. In addition to those measures, before servicing or maintenance of tractors, the following precautions should be taken:

- ensuring that the operator has exited, the mobile plant cannot move and any movable attachments are lowered to the ground and/or safely blocked
- do not remove or replace belts while the pulleys are under power
- if the tractor has wheel tracks that are adjustable, the wheels should be set as wide apart as practicable.

Common risks and safety considerations when operating a tractor

Appendix 5, Section A provides guidance on some common considerations specifically relating to the operation of a tractor.

Common risks and safety considerations specific to tractor vehicles and tractor attachments

Appendix 5, Section B provides guidance on some of the common risk and safety considerations specifically relating to tractor vehicles and their attachments.

7.3. Rollover protective structures and falling object protective structures

Where there is a risk of injury from a roll-over or a falling objects incident, there are duties under the WHS Act to develop and implement safe systems of work to prevent or minimise the risk of injury to the operator for:

- PCBUs
- persons in control of a workplace
- designers, manufacturers and suppliers of rural mobile plant.

A documented risk assessment should be undertaken in the development and implementation of the safe systems of work. This risk assessment should include information provided from the manufacturer and supplier, and consideration to specific aspects such as:

- operation and environment:
  - the terrain that item of plant may be operated over
  - the speed at which the plant may be operated at
  - any other environmental and operational conditions that could affect the safe use of the plant (including overhead obstructions such as low lying branches of structures)
  - what weight loading may affect the stability of the rural plant, for example:
    - ballast amount and its configuration
    - movement of liquid (e.g. high clearance spray rig)
    - commodity loading (e.g. harvest equipment)
    - implements attached to the three point linkage
  - stability and operational dynamics e.g. width of track, centre of gravity, height of load, distribution of weight.
- design:
  - engineering principles and standards adopted to control the risks of injury from roll-over.
  - testing or analysis undertaken to determine if the engineering controls provide adequate protection to the operator in the event of a roll-over situation
  - testing or analysis conducted by a suitably competent person (e.g. qualified engineer or tradesperson)
  - assessment conducted by a competent person or manufacturer.

Rollover protective structure (ROPS)

Note: Tractors must be fitted with ROPS – it is the law.

- Tractors have specific ROPS requirements under section 216 of the WHS Regulation.
- See Appendix 5 for guidance on tractor safety, including tractor ROPS requirements which PCBUs must comply with.

A ROPS is a structure designed and constructed to prevent or minimise the risk of death or injury to the operator as a result of the tractor or other agricultural mobile plant rolling over in any direction. A ROPS is typically required for a rural mobile plant with a mass of between 560 kilograms and 15,000 kilograms. Some tractors weighing over 15,000 kilograms are now being provided with ROPS.

Many types of rural mobile plant can be at risk of roll-over, including, but not limited to:

- harvesters
- spray rigs
- earth moving equipment
- quad bikes
- banana bagging machines (that might not be defined as an elevating work platforms)
- modified tractors (in addition to tractors captured under the WHS regulation)

The design of the ROPS on rural mobile plant must be sufficient to provide protection for the operator against roll-over during the task being undertaken. Mobile plant overturns commonly involve the following factors[2]:

- unstable ground conditions—soft ground that is unable to support the vehicle's bearing load can cause it to overbalance. This could occur along the edge of a road or when a vehicle is dumping overburden material at a tip head

[2] Sourced from WorkSafe Victoria *Mobile Plant Overturns Guidance* https://www.worksafe.vic.gov.au/safety-alerts/mobile-plant-overturns

- uneven ground—different surface levels can raise the body of a vehicle causing an overbalance. Uneven ground may be common around tip heads
- uneven roads—vehicles can lose control while travelling on roads that are uneven or incorrectly cambered around bends
- loss of vehicle traction on the road surface
- vehicle failure caused by defective, worn out or poorly maintained vehicle components including brakes, steering, tyres or suspension
- excessive speed for the conditions
- overloading
- elevated loads or implements, and
- collision with other vehicles or objects.

Where used, ROPS should be manufactured and maintained according to technical standards for the design and testing of ROPS, or equivalent.

A plate or decal confirming compliance should be attached to the ROPS' frame, or inside the rural mobile plant cabin. The standards that may be applicable are:

- *AS 1636* Tractors – Rollover protective structures – criteria and tests. This standard specifies procedures for the evaluation of rollover protective structures for the protection of operators of tractors. This standard does not apply to high clearance tractors (>600 mm).
- *AS 2294 Earth-moving machinery* – Protective structures. The objective of this standard is to provide designers, manufacturers, suppliers, employers and users of earth-moving machinery with specifications covering technical means to minimise the risk to health and safety of employees.
- *ISO 3463 Tractors for agriculture and forestry* – Roll-over protective structures (ROPS) – Dynamic test method and acceptance conditions.
- *ISO 5700 Tractors for agriculture and forestry* – Roll-over protective structures (ROPS) – Static test method and acceptance conditions.
- *ISO 3471 Earth-moving machinery* – Roll-over protective structures – Laboratory tests and performance requirements.
- *AS 4987 Earth-moving machinery* – Tip-over protection structure (TOPS) for compact excavators – Laboratory tests and performance requirements.
- *ISO 8082 Self-propelled machinery for forestry* – Roll-over protective structures – Laboratory tests and performance requirements.

ROPS should not be modified, because modifications could cause the protective ability could be reduced. Where a ROPS is repaired, PCBUs should have evidence showing compliance with appropriate standards.

Note: Use seat belts – even if rural plant has ROPS.

- ✓ Seat belts should always be worn where a mobile plant has them fitted, to prevent the operator being thrown and crushed in an incident.
- ✓ PCBUs should also consider retrofitting seat belts on mobile plant such as older model tractors, to prevent the risk of crush injury and death when ejected.

Falling object protective structures

FOPS are designed to protect operators from items that could fall on a plant, such as branches, rocks, bales and other falling objects. FOPS on rural mobile plant must be sufficient to provide protection for the operator against falling objects during the task being undertaken.

A FOPS should be fitted to any rural mobile plant, if any activity is undertaken which involves a risk to the operator of being struck and injured by a falling object. This could include, but is not limited to:

- tractors used for tree felling
- using a dozer for tree clearing
- operating rural mobile plant within a eucalypt forest.

An approved FOPS should be tested according to the procedures outlined in *AS 2294 Earth-moving machinery, Protective structures.*

A manufacturer should mark every FOPS legibly and permanently with the following information:

- the name and address of the manufacturer of the FOPS
- FOPS identification number
- make, model or serial number of the tractor(s) the structure is designed to fit
- the relevant Australian Standard or other acceptable standard with which the structure complies
- any other information deemed appropriate by the manufacturer (e.g. installation, repair or replacement information).

FOPS should not be modified, because modifications the protective ability could be reduced. Where a FOPS is repaired, this should be done in accordance with the FOPS manufacturer's instructions and PCBUs should have evidence showing compliance with these instructions and appropriate standards.

7.4. Quad bikes

WHS Regulation section 226A: quad bikes duties for a person with management or control of quad bike at workplace
WHS Regulation section 226B: duty for workers to wear helmets
WHS Regulation section 226C: requirement for approved motorbike helmet, if quad bikes are operated in areas where existing regulation already requires the use of approved motorbike helmets.

A quad bike is a four-wheeled motor vehicle that is ridden in the same way as a two-wheeled motor vehicle. Quad bikes are also sometimes referred to as all-terrain vehicles (ATVs) and are commonly used for farm and other outdoor work activities. These vehicles are a common cause of serious injuries or fatalities in workplaces, especially in rural workplaces. Three-wheeled ATVs are inherently unstable and are no longer manufactured.

Quad bikes complete tasks quickly and efficiently, but they are also a known cause of workplace hazards that should be minimised as far as practicable. Incidents often occur when the quad bike rolls over and pins or crushes the operator, causing crush injuries or asphyxiation.

Note: How to reduce the risks to injury and death on quad bikes:

- ✓ **Wear helmets** – for example, helmets compliant with *UNECE 22.05* and AS/NZS *1698* Standards, or the NZS 8600-02, if speed does not exceed 30km/hr
- ✓ **Get training** – for example, see nationally approved training course *Operate quad bikes (AHCMOM217)* for workers
- ✓ **Consider fitting ROPs on old quad bikes**
- ✓ **No kids riding on adult quad bikes**
- ✓ **No passengers on single seat quad bikes**

Injuries

The most common roll-over injuries are to the head and chest—when operators are crushed between the quad bike and the ground or other surface. Other injuries occur when operators are ejected onto hard surfaces, being struck by objects (e.g. overhanging branch), or the leg of rider is caught in rear tyre, chain or foot rest. Serious injury or death likelihood is increased by:

- not wearing a helmet
- not having rollover controls in place
- excessive speed
- overloading
- carrying passengers, where there is no capacity to do so, or, where more passengers than can be safely carried are carried
- lack of training
- raising the quad bikes' centre of gravity with loads (exacerbated when carrying spray tanks that are partially full as the liquid moves around)
- inexperience or using a quad bike incorrectly, particularly unfamiliarity with sloping and steep terrain, unstable surfaces, speed or weight distribution.

Note: Find out more about the Quad bike safety standard.

All new and imported second-hand quad bikes have to comply with the Consumer Goods (Quad Bikes) Safety Standard 2019.

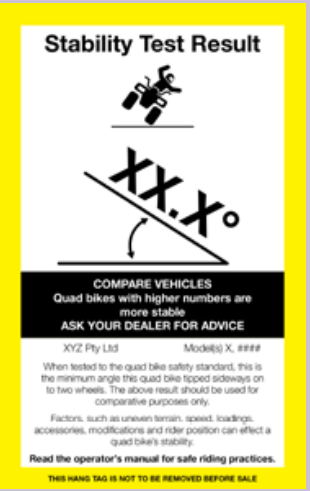
The standard does not apply to second-hand quad bikes, unless they have been imported into Australia as second-hand.

All new and imported second-hand quad bikes have to:

- meet the specified requirements of the US quad bike Standard ANSI/SVIA 1-2017 or the EN 15997:2011 Standard
- have a rollover warning label affixed that is clearly visible and legible when used
- provide information in the owner's manual or information handbook on the risk of rollover
- be tested for lateral static stability, and display the angle at which the quad bike tips on to two wheels on a hang tag
- have a spark arrestor that conforms to the Australian Standard AS 1019-2000 or the United States Standard 5100-1d.

All new general use model quad bikes have to:

- be fitted with, or have integrated into the design, an operator protection device (OPD)
- meet the minimum stability requirement of:
  - lateral stability – a minimum Tilt Table Ratio (TTR) of 0.55
  - front and rear longitudinal pitch stability – a minimum TTR of 0.8.



More information is available at https://www.productsafety.gov.au/products/transport/quad-bikes

Risk assessment

Quad bikes pose an increased risk to the user over and above conventional vehicles as occupants are exposed to direct contact with the ground in the event of the vehicle overturning.

Duty holders should undertake appropriate risk assessment before a quad bike is used in a workplace. For common quad bike risk assessment factors, see Appendix 6.

Quad bike vehicle selection

Quad bikes are not always the most suitable vehicle to use and alternative vehicles should be considered where appropriate. Major considerations include:

- operator needs, safety and capability issues
- comparing vehicle options to workplace needs (e.g. tasks, environment and operator capability)
- seeking safety information from sellers.

For more detail on vehicle selection, see Appendix 6**.**

Risk controls[3]

Rollover protection

Around half of all quad bike fatalities are from asphyxiation or trauma resulting from quad bike rollover. Rollover fatalities can occur at slow speeds and when loading or unloading a quad bike. If a quad bike is still considered to be the most suitable vehicle for the task and there is a risk of rollover, this risk must be managed and controlled. A suitably tested operator protective device (OPD) is an appropriate control.

[3] Adapted from WorkSafe Victoria, *Information about Quad bikes- Reducing the risks, March 2018*

Personal protection

Helmets

Helmets must be used when quad bikes are used.

Helmets that are considered appropriate for quad bikes include those compliant with Australian standards AS/NZS1698 or AS1698, or the United Nations Economic Commission for Europe standard ECE 22.05 or 22.06.

When riding on private land, wearing a *NZS 8600-02* compliant helmet may also be appropriate, but only if the speed of the quad bike does not exceed 30km/hr.

The helmet must be securely fitted and fastened. It should be maintained in good condition (follow the manufacturer's instructions regarding care and maintenance).

Full-face helmets are useful where there is a higher risk of facial injuries – for example, riding through scrub.

Open face helmets offer protection to the head, but little protection to the face.

The 'shorty' style helmet may be suited to some tasks on rural properties (e.g. mustering in open country) as it provides head protection while still enabling good peripheral vision, hearing, and airflow around the head. A shade brim can be fitted to some models.

Other PPE

Other PPE that should also be worn when appropriate includes:
- protective eyewear/goggles
- face shields
- sturdy boots or shoes
- gloves
- appropriate clothing for specific tasks (e.g. spraying), with consideration of solar radiation and dehydration.

In open terrain operation or in continuous low speed operation, less protective or alternate clothing may be chosen after a risk assessment has been conducted.

Safe loads and trailers

- Never carry passengers on trailers or single-person quad bikes.
- Ensure trailers are suited to the task and terrain, and within the quad bike's towing and load limits as per the manufacturer instructions.
- Take extra care when towing, for example:
  - go at a slower speed
  - slow down before cornering
  - make sure there is some weight on the tow coupling, not exceeding the towbar vertical load specification
  - select a safer route without obstacles, hills or tight turns.
- Quad bike payloads can increase the risk of rollover. When the quad bike is carrying a load, take extra precautions, for example:
  - secure the load so it cannot move
  - containers, such as spray tanks, such as pesticide tanks holding liquid, should have baffles

- minimise the weight of loads, and never exceed manufacturer's specifications
- ride at slow speed, especially when turning
- avoid steep terrain and slopes.

Responsible riding

Enforce rules that only competent and physically capable staff and trained staff can use a quad bike. For example:

- no children under 16 on adult-sized quad bikes. Keep children away from quad bikes and their attachments
- no passenger, unless the vehicle is specifically designed to carry passengers, and the passenger is at least 16, or the minimum age recommended by manufacturers
- adopt a 'dynamic' riding style by transferring the weight from side to side and forward and backwards to counterbalance the quad bike directional mass
- ensure all guards are in place, particularly foot plates
- riders should read and implement the operator manual and instructions
- operate the quad bike in appropriate terrain (consider hazards such as long grass obscuring stumps or other hazards, mud, steep terrain)
- operators should be physically capable of riding and controlling a quad bike
- no one should operate if they could be under the influence of alcohol or drugs
- where there are any other vehicles, apply standard road rules (e.g. keep left, right of way)
- operators should take the operation of the quad bike seriously, concentrate and not perform any stunts
- speed to be kept to a safe speed limit appropriate to terrain and track
- remove keys from quad bikes when they are not in use to prevent unauthorised use.

Mechanical and electronic conditions and features

- Regularly check the quad bike's mechanical condition, brakes, throttle, controls and tyres.
- Tyre tread selection, size, orientation, and type are all important for handling and stability. Always follow the manufacturer's recommendations.
- Tyre pressure is critical to handling and stability. Tyres should be regularly checked using a conveniently located and reliable low pressure range gauge. Check the manufacturer's recommended operational range, which is typically between 4–8psi.
- Damage, breakdowns and maintenance requirements should be reported immediately to the person responsible for the quad bike's condition.
- Consider purchasing quad bikes with automatic speed control devices to limit the maximum speed (note – this will require determining what the maximum safe speed is and adjusting accordingly). If a quad bike is being retro fitted with an automatic speed limiting device, it will need to be appropriately designed and implemented by a qualified person such as a professional engineer (i.e. member of the Board of Professional Engineers Queensland).

Information, instruction, training and supervision

- Ensure quad bike operators have received the necessary and appropriate instruction and training. For example, consider training courses such as the nationally approved training course *Operate quad bikes (AHCMOM217)* for workers.
- When instructing, consider emotional maturity of the trainee, such as age and observed behaviour of the young worker (trainee) in attempts to limit inappropriate behaviour.
- Do not allow untrained or inexperienced people to operate the vehicle, particularly in unfamiliar or high-risk terrain or for unfamiliar tasks.

- Make sure the operator has a suitable induction for the vehicle –experience with other vehicles does not mean they know this one.

Communication and emergencies

- Make sure good communication is available – for example, check mobile phone coverage or use personal 2-way radios.
- Develop procedures for checking regularly on people who are working alone.

Note: There are specific rules when using quad bikes on some Queensland roads and road-related areas, state forests or timber reserves, protected areas other than a nature refuge or a special wildlife reserve, and recreation areas:

- Conditional registration is needed and allows some road access for quad bikes.
- There are also other mandatory requirements such as operator licensing, minimum age, passenger minimum age/size, and wearing helmets compliant with specific standards.

These regulations **do not apply** when using quad bikes on private land. For further information, visit tmr.qld.gov.au and parks.des.qld.gov.au

Please note that if you are using quad bikes at a workplace (including on private land), sections 226A and 226B of the WHS Regulation apply.

7.5. Side-by-side vehicles

A side-by-side vehicle (SSV) is a small four-wheel drive vehicle designed mainly for off-road use. It usually has two to six seats, but can sometimes be one-seated. SSVs have bucket seating arrangement, a steering wheel, roll-over protection system (ROPS) and are often fitted with seat belts. SSVs can sometimes be referred to as utility off-road vehicles.

Note: Top tips on reducing the risks to injury and death when using an SSV:

- ✓ Seatbelts can reduce the risk from being thrown off the seat.
- ✓ Check ROPS are not cracked, bent, rusted or damaged.
- ✓ No children under 16 should operate SSVs.
- ✓ Get training – for example, consider training such as the nationally approved training *Operate SSVs (AHCMOM216)* for workers.
- ✓ Make sure SSV is right for the job, well maintained, and loaded to manufacturer limits.
- ✓ Operate SSV within limits of vehicle and skills and experience.
- ✓ Arms and legs inside the SSV while moving.
- ✓ Have a work alone plan – tell someone what you're doing and have a way to alert others if something is wrong.
- ✓ Consider the need for helmets (such as *UNECE 22.05* or AS/NZS *1698* compliant helmets) for certain tasks.

Risk assessment

Duty holders should undertake appropriate risk assessment before an SSV is used in a workplace. For common SSV assessment factors, see Appendix 7.

Risk controls[4]

Rollover protection structures (ROPS), seatbelts, doors and door nets (See **Figure 6**[5])

- Ensure the vehicle is fitted with a ROPS.
- Seatbelts help keep people safely within the ROPS rollover zone. Ensure all seatbelts are in good working condition.
- Do not remove doors and door nets in SSVs—they help keep body parts within the rollover zone. People have received limb injuries (e.g. when an SSV rolls and hands are outside), even while wearing a seatbelt, because a door net has been removed.

Vehicle maintenance

- Check the vehicle before use to ensure it's in a suitable condition. Do not use it if any of the safety features are not working.
- Ensure the vehicle regularly undergoes planned maintenance.

Operators and passenger behaviour and characteristics

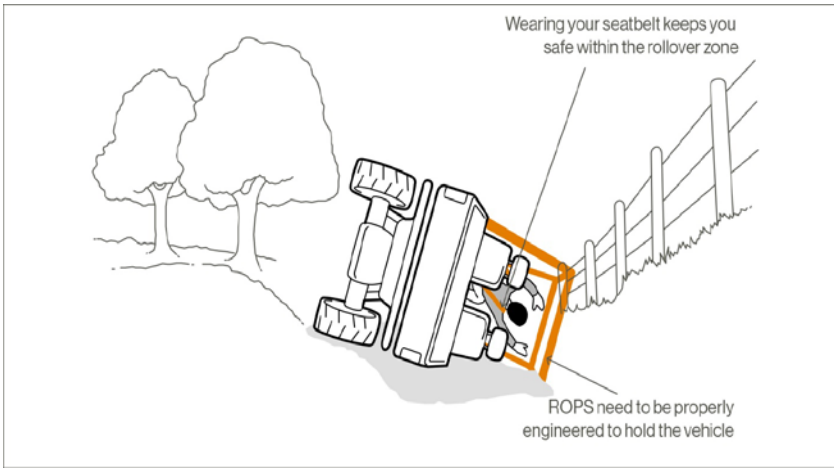


Figure 6: *SSV seatbelts and ROPS*

- Operators should not be operating SSVs at excessive speed.
- SSVs should not be operated under the influence of drugs or alcohol.
- No operators under 16.
- Assess the risk to injury for passengers – the risk is significant to children under eight or those who cannot to sit comfortably with their feet on the floor and they can reach and hold on to the grab bar.

Communication

- Make sure good communication is available (e.g. check mobile phone coverage or use personal 2-way radios).
- Develop procedures for checking regularly on people who are working alone.

Information, instruction, training and supervision

- Ensure SSV operators have received the necessary instruction and appropriate training. For example, consider training such as the nationally approved training *Operate SSVs (AHCMOM216)* for workers.
- Workers should be trained to operate SSVs at a low, safe speed.
- When instructing, consider emotional maturity of the trainee, such as age and observed behaviour of the young worker (trainee) in attempts to limit inappropriate behaviour.

[4] Adapted from WorkSafe Victoria, *Side-by-side vehicle safety, https://www.worksafe.vic.gov.au/safety-alerts/side-side-vehicle-safety, June 2020*
[5] Sourced from WorkSafe Victoria, *Side-by-side vehicle safety, https://www.worksafe.vic.gov.au/safety-alerts/side-side-vehicle-safety, June 2020*

- Do not allow untrained or inexperienced people to operate the vehicle, particularly in unfamiliar or high-risk terrain or for unfamiliar tasks.
- Make sure the operator has a suitable induction for the vehicle – do not assume that because they have experience with other vehicles, they know this one.

Helmets

- Consider wearing helmets for certain tasks, such as helmets compliant with UNECE 22.05 and AS/NZS 1698 standards.

Note: There are strict rules when using SSVs on public roads:
- Conditional registration is needed and allows **some** road access for SSVs.
- There are also other mandatory requirements such as **operator licensing and minimum age, passenger minimum age/size, wearing helmets compliant with specific standards, and seatbelts (where seatbelts are fitted)**.

These regulations do not apply when using quad bikes where there are no public roads.

For further information, visit tmr.qld.gov.au**.**

7.6. Hot or cold parts or materials hazards

Hot or cold parts or materials associated with rural plant for use at a rural workplace can create hazards such as burn injuries or damage to plant.

Risk assessment

The risk assessment should consider the following hazards outlined in **Table 1**:

Table 1: *Hazards from hot or cold materials*

Hazard	Example
Molten material	Oxy cutting and welding
Hot metal shavings	Drilling or grinding metal
Hot gases (e.g. steam)	A radiator overheating
Naked flames	A cane torch
Plant parts at high temperature (e.g. exhaust or bearings)	Combustible materials (e.g. chaff from wheat, oats, barley, combustible dusts) that have gathered in hot parts
Hot fluids	Engine and hydraulic oil
Anhydrous gas	Freeze branding

Risk controls

Hot or cold material risks associated with rural plant should be controlled by the elimination of the hazard. Where this is not possible, a PCBU should:
- substitute the rural plant with less hazardous plant
- modify the design of the rural plant

- isolate the rural plant; and/or
- introduce engineering controls such as guarding.

Where these methods are not practicable or do not adequately minimise the risk, then PCBUs should use administrative controls and/or PPE (see Section 5 How to manage risks from rural plant).

7.7. Electrical risks associated with rural plant

The ES Act places duties for electrical safety on PCBUs, persons in control of electrical equipment and workers where electrical equipment is located.

The ES Regulation identifies specific precautions to take in relation to specified electrical equipment and working around electrical parts (e.g. overhead electric lines) that are applicable to the operation and maintenance of rural plant.

Note: A number of codes of practice also exist that cover electrical risks:

- *The Electrical Safety Code of Practice – Electrical equipment rural industry*
- *The Electrical Safety Code of Practice – Working near overhead and underground electric lines* (see Appendix 8 for a summary of managing overhead and underground electric lines risks)
- *The Electrical Safety Code of Practice – Works*
- *The Electrical Safety Code of Practice – Managing electrical risks in the workplace*
- *Managing risks of plant in the workplace Code of Practice*
- *Excavation work Code of Practice*

These documents and other advice published by the Electrical Safety Office should be consulted to ensure that legal duties in regards to electrical safety are discharged.

7.8. Irrigation and associated equipment

Irrigation systems can be hazardous if they are not installed, moved and maintained properly. Hazards include irrigation pipes contact with overhead or underground electric lines, material handling, transportation and trenching.

Risk assessment

Risks associated with working with irrigation pipes include:
- irrigation pipes contact with overhead and underground electric lines
- trenching/ digging risks
- injuries such as strains, sprains, crushed and pinches sustained when handling pipes
- head injuries when adjusting water pressure systems
- falls when servicing irrigation pivots
- slips and falls when working near irrigation ponds.

Risk controls

Table 2 includes some control measures to reduce the risks of incidents associated with irrigation systems. PCBUs should also provide training for workers on how to handle irrigation pipes safely.

Table 2: *Examples of risks and controls associated with irrigation pipes*

Risk	Control
Overhead and underground electric lines	• Always remaining aware of the location and height of overhead electric lines in the work area, including the installation field, equipment storage, and transport areas. • Not lifting pipes vertically, especially near overhead electric lines. • Moving pipes in a horizontal position and tilting them to remove leaves or pests. • Storing irrigation lines and equipment away from overhead electric lines. • Always remaining aware of the location and height of overhead electrical lines in the work area, including the installation field, equipment storage, and transport areas. • Using the same precautions whether installing new pipe, moving pipe, or lifting and clearing existing systems. • Ensuring water discharge is a safe distance from overhead electric lines as electricity can be conducted through water and high-pressure water can cause damage to the overhead electric line (including loss of electricity supply). See Section 7.7 Electrical risks associated with rural plant for further guidance on managing overhead and underground electric lines risks.
Digging irrigation lines	• Accessing Before You Dig Australia (BYGA) for details on underground electric lines and ensuring location is known and safety risks are addressed. • Using proper trenching and shoring techniques to safeguard against collapse and engulfment. • Marking trench areas clearly. • Not parking vehicles near the trench sides where they could cause a collapse. • Not trenching more than what can be completed and backfill in a day.
Handling pipes	• Clearing excess water and vines that may have grown over the pipes to reduce weight and force required. • Using appropriate mechanical aids, taking rest breaks and rotating tasks to reduce the risk of musculoskeletal disorders. • Wearing appropriate PPE such as gloves and protective footwear.
Water Pressure	• Keeping the face as far away as possible from the valve when adjusting any pressurised system. • Knowing where the pressure is, especially if the system requires opening the riser valve while the main line is fully charged.
Pivots	• Fall protection may be needed when servicing pivots. • Using pivots which can be turned on/off remotely and following the correct procedures for lockout/tagout controls. • Using the right ladders and stable lift devices when inspecting the system and ensuring ladders are properly anchored. • Being aware of wheel paths in the field when using vehicles to access pivots.

Irrigation ponds	• Awareness of possible slip and fall hazards when working around edges of bodies of water. • Minimise carrying loads around edges of bodies of water. • Allow sufficient time to undertake activities. • Use and maintain footwear with wide tread. • Life jackets and/or rescue rings if workers access waterways.

7.9. Plant that lifts or moves persons, equipment or material

WHS Regulation section 219: A person with management or control of a plant that lifts or suspends loads at a workplace must ensure that the plant used is specifically designed to lift or suspend the load, or, if that is not reasonably practicable, that the plant does not cause a greater risk to health and safety than if specifically designed plant were used.

WHS Regulation section 220: Where a plant not specifically designed to lift or suspend a person is used, a person with management or control of plant at a workplace must ensure that:

- persons are lifted or suspended in a work box that is securely attached to the plant
- the persons within the work box remain substantially within the work box
- if there is a risk of a fall from a height, that a safety harness is worn
- a means of safe exit is provided in the event of a failure in its normal operation.

Risk assessment

When assessing the risks associated with plant designed to lift or move people, equipment or materials, PCBUs should consider:

- the nature of the load and weight being lifted
- the frequency of use
- the systems of work
- movement of the lifting mechanism
- supporting areas and structures
- factors affecting stability (e.g. terrain slope and undulations)
- obstacles
- communication systems
- protective equipment and safety gear
- periodic structural checks.

Risk controls

When controlling a risk from plant designed to lift or move material, equipment or persons, a PCBU should ensure that:

- an **industrial lift truck (fork-lift)** is operated and maintained in accordance with *AS 2359.1 Powered industrial trucks – Part 1: General requirements*, and the manufacturer's instructions
- **mobile cranes, Vehicle Loading Cranes and other mobile plant** used as mobile cranes (e.g. backhoe, excavator, front-end loader and telescopic handler) are operated and maintained in accordance with manufacturer's instructions and the *Mobile Crane Code of Practice* for more information
- a **crane, hoist or building maintenance unit** is operated and maintained in accordance with *AS 2550 Cranes, hoists and winches – Safe use set* (AS 2550), and *AS 1418.1*

Cranes, hoists and winches – Part 1: General requirements (AS 1418.1), and the manufacturer's instructions

- an **elevating work platform (EWP)** is operated and maintained in accordance with *AS 2550.10 Cranes, hoists and winches – Safe use – Part 10: Mobile elevating work,* and the manufacturer's instructions. For more EPW safety information, see Appendix 9
- pre-operational and start up checks are performed when operating plant
- a clearly legible notice is fixed in a conspicuous place on the plant or any lifting gear which specifies the appropriate safe working load, in metric units or maximum number of people
- safe working load limits of plant are not exceeded
- a person at work is not lifted or suspended by any plant or its attachment, other than plant specifically designed for lifting or suspending persons, unless:
  - the use of another method of access or movement to the place is impracticable
  - a suitable and adequate personnel box or carrier, designed for that purpose, is used
  - the plant is fitted with a means by which the personnel box or carrier can be safely lowered in the event of an emergency or the failure of the power supply (as approved by an Australian Standard)
  - the plant is suitably stabilised at all times while the personnel box or carrier is in use
- no plant other than a crane should be used to suspend a load at the workplace, unless:
  - the use of a crane is impracticable
  - the load is only travelled with the lifting arm of the plant fully retracted
  - stabilisers are provided wherever necessary in order to achieve stability of the plant
  - no person is allowed under the hook or suspended load or in the trench adjacent to the plant while it is in operation
  - in the case of earth moving machinery, the lifting point consists of a load rated lifting eye (not a hook) and the lifting point is preferably provided above the quick hitch on the dipper arm
  - an appropriate load chart is provided
  - loads are only lifted using a specifically provided lifting attachment.

7.10. In-field traffic management

PCBUs have a requirement to manage the risk of powered mobile plant colliding with persons or other plant. Many machines such as harvesters, and module trucks used to transport produce like cane, cotton and bail during harvesting or during in-field operations are potentially hazardous. For example, when large machines are operated close to each other and to people on the ground.

PCBUs can refer to the following material for guidance on transportation:

- the *Mobile crane Code of Practice* provides guidance on machinery, such as handlers used to lift materials
- the *Cane rail safety supplement to the Sugar industry Code of Practice* part 4 provides guidance about siding and delivery points for cane harvesting
- the *Safety guidelines for Harvesting and In-Field Transport of Sugar Cane* developed by CANEGROWERS provides guidance for in-field harvesting and haulout operations and at shared workplaces of cane railway and road delivery sidings
- the *Telehandler Safety Book* developed by the Queensland Farmers Federation provides guidance for farmers utilising telehandlers on their properties
- the *General guide to workplace traffic management* published by Safe Work Australia provides guidance on how to manage traffic risks in a workplace.
- Section 8.4 Transporting rural plant provides guidance on transporting rural plant.
- the *Electrical safety Code of Practice – Working near overhead and underground electric lines* (see Appendix 8 for a summary of managing overhead and underground electric lines risks).

7.11. Confined spaces

Note: The *Confined spaces Code of Practice* provides practical guidance for PCBUs on how to manage risks associated with confined spaces. This document should be consulted to ensure that legal duties that apply to work in confined spaces are met.

WHS Regulation section 5: Definitions
WHS Regulation sections 62-77: Specific obligations relating to confined spaces

Confined spaces pose dangers because they are usually not designed to be areas where people work. Confined spaces often have poor ventilation which allows hazardous atmospheres to quickly develop, especially if the space is small. The hazards are not always obvious and may change from one entry into the confined space to the next.

Examples of confined spaces include:

- storage tanks, process vessels, pressure vessels, boilers, silos, field bins, enclosed truck bodies and other tank-like compartments
- pits and degreasers
- pipes, sewers, sewer pump stations including wet and dry wells, shafts, and ducts;
- effluent pits and wells
- silage pits.

However, many other types of structures can also meet the definition of a confined space. A person whose upper body or head is within a confined space is considered to have entered the confined space.

Duty holders must manage health and safety risks associated with work carried out in a confined space. For common confined spaces risk assessment and control associated with rural plant, see Appendix 10**.**

7.12. Systems for storing and handling hazardous chemicals

Note: This section provides guidance on the **systems for storing and handling** of hazardous chemicals.

For guidance on managing other workplace risks associated with hazardous chemicals, including usage, safety data sheets, impact protection, placards and training requirements, PCBUs should refer to the *Managing risks of hazardous chemicals in the workplace Code of Practice*.

This document should be consulted to ensure that legal duties in regards to hazardous chemicals are discharged.

WHS Regulation section 363: Control of risks from storage or handling systems
WHS Regulation section 366: Stopping use of underground storage and handling systems
WHS Regulation section 379: Duty to provide supervision
WHS Regulation section 367: Notification of abandoned tank
WHS Regulation section 37: Maintenance of control measures

PCBUs must manage the risks to health and safety associated with the systems for using, handling, generating and storing hazardous chemicals at a workplace. Examples of these systems include, but are not limited to:

- storing petrol or diesel fuel in aboveground tanks and dispensing fuel for mobile plant and equipment
- storing and handling Liquefied Petroleum (LP) Gas in aboveground tanks for warming/heating/drying processes
- fit-for-purpose storage areas for pesticides and herbicides, including hazardous chemical cabinets and package stores
- chemicals dispensing systems such as sprayers, associated pumps and pipe work
- chemical transfer lines
- pumps
- fertiliser/gas rigs
- spill containment systems (e.g. bunds and compounds).

A PCBU must ensure that the implemented control measures remain effective. This includes checking that the control measures are: fit for purpose, suitable for the nature and duration of the work, and are installed and used correctly.

Storage and handling

A PCBU must ensure, so far as is reasonably practicable, that a system used at the workplace for the use, handling or storage of hazardous chemicals is:

- used only for the purpose for which it was designed, manufactured, modified, supplied or installed
- operated, tested, maintained, installed, repaired and decommissioned having regard to the safety of workers and other persons at the workplace, and
- the implemented risk control measures remain effective (such as maintaining plant integrity).

Maintenance of control measures

Systems for the storage and handling of hazardous chemicals need ongoing maintenance and testing to ensure that they continue to be safe for the intended use and that they maintain their operational integrity. This includes performing maintenance in accordance with manufacturer instructions.

To ensure that the integrity of chemical handling systems is preserved, planned maintenance programs should be designed and carried out at regular intervals, consistent with the manufacturer’s instructions or advice provided by other competent persons. If this is not reasonably practicable, inspections and maintenance should be carried out annually.

This could include:

- checking spill bunding walls for cracks or other signs of wear to ensure that, in the event of a spill, the bunding will not leak or fail
- checking for signs of corrosion or degradation on tanks, pipe work and compressed gas fittings.

Information, training and instruction

PCBUs must provide information, training and instruction regarding storage and handling systems for hazardous chemicals.

Discontinued use of underground storage and handling systems

When an underground hazardous chemical handling system (e.g. tank) is no longer to be used, a PCBU must remove the system. If it is not reasonably practicable to remove the system, the person must ensure, so far as is reasonably practicable, that the system is without risks to health and safety.

Where an abandoned tank was used to store fuels like petrol, diesel or gas, WHSQ must be notified. Further information is available at worksafe.qld.gov.au.

Conducting hot work on plant that contained flammable and/or combustible liquids

A number of serious injuries and fatalities have occurred where workers have performed hot work on or near plant (e.g. tanks and steel drums) that have contained flammable or combustible liquids. Hot work includes hot-cutting, welding, grinding and related high-energy heat-producing activities which can ignite flammable and combustible substances.

Empty containers, even those emptied long ago, can still harbour flammable residues or vapours, posing serious ignition and explosion risks. Rinsing with water doesn't guarantee removal of these residues or flammable vapours.

The PCBU must always ensure hazards of any product that has been contained in a piece of plant have been identified and the associated risks assessed and controlled. Flammable substances are hazardous chemicals under work health and safety laws. This means containers must be correctly labelled and have a safety data sheet (SDS) in a hazardous chemical register readily available to the workers. The SDS provides health and safety information including relevant fire and explosion hazards. The PCBU must ensure proper training and supervision is provided to workers before they conduct any hot work. Understanding the associated hazards and risks is crucial for safety.

7.13. Working at heights

When operating and maintaining rural plant, workers could be exposed to working at heights. The WHS Regulation has provisions about managing the risks of a fall. These must be followed in relation to any work at height.

Risk assessment

Falls from height can occur when repairing, maintaining or gaining access to plant and buildings at the workplace. Silos, windmills, towers, sheds/barns, mezzanine floors and other structures can all be a hazard to PCBUs, workers and others, if work is being performed at a height where a fall can result in injury or death.

Some of the hazards that should be assessed for risk are:

- height of work
- ground hazards (e.g. rocks)
- lack of guard rails or other edge protection
- pitch of roof
- surface material and condition (e.g. brittle asbestos-cement sheeting, leaf build up or mould)
- contaminants (e.g. mud, water, oil on steps used for access/egress)
- poor lighting
- weather conditions (e.g. high wind, rain or dew)
- complexity of task (e.g. use of power tools or tree lopping)

- supporting plant (e.g. tractor, fork truck, EPW, ladder).

Note: Further guidance on how to manage the risks of falls at work can be found in the *Managing the risks of falls at workplaces Code of Practice*.

Risk controls

PCBUs and other duty holders have a duty to identify, manage and control hazards that can result in a fall and could cause death or injury if a person were to fall.

To prevent the person falling, the following controls should be considered:
- edge protection
- a fall protection cover placed over an opening
- a travel restraint system
- rope access work is properly supervised—supervisors of rope access work should have the necessary experience and competence to supervise the rope access work and any potential rescue for each rope access project under their supervision.

If prevention is not practicable, a worker's fall should be arrested by a method that minimises the risk of injury when the fall is arrested. Examples of control measures to arrest a person's fall are:
- a fall-arrest harness system
- a fall restraint harness system
- an industrial safety net.

The use of fall arrest harnesses and associated equipment is a type of PPE. Even when used correctly, it does not guarantee than an injury will not occur, however it can reduce the likelihood of injury.

Ladders

When using a ladder at a height where a fall can result in injury or death, the person using the ladder should have at least two hands and one foot, or two feet and one hand, on the ladder. The type of work that can be safely performed on a ladder is limited. Other methods of access such as scaffolding or an elevating work platform should be considered for involved tasks.

Rural plant access/egress

Height risks should be considered for mobile rural plant such as harvesters or tractors, where a risk of falling can result in injury or death of an operator. Safety considerations when accessing or egressing from rural plant include:
- designing ladders and access points around the plant with:
  - adequate hand and foot hold depth, and dimensions plus ladder width (refer to *Australian Standards AS 1657 Fixed platforms, walkways, stairways and ladders - Design, construction and installation*) so operators can comfortably and securely grip the rung and their foot can securely rest on the rung
  - consistent spacing and uniformity in design of steps and handles
  - proper positioning of ladder and handles
  - comfortable step up and down height of the first step, so that operators do not need to overstretch or jump down off the plant
  - provide and position sufficient lighting so the operator can clearly see where they are stepping and any possible hazards or contamination
  - handholds and footholds that do not trap expected contaminants and remain non-slip in all weather conditions

  - high contrast colour and non-slip handles and steps
  - maintenance points and storage that can be accessed at ground level.
- minimise work performed on ladders or steps, ensuring that when these tasks are performed, operators should:
  - avoid carrying loads to allow them to maintain at least three points of contact with the access points (with hands and feet)
  - only undertake short duration and low risk tasks from a ladder, to maintain the centre of their body between the sides of the ladder or steps, and both feet on the same rung or step.

7.14. Slips, trips and falls

WHS Regulation section 40: requirements for a PCBU at a workplace to ensure that the workplace layout and maintenance allows persons to enter, exit and move about without risk to health and safety in normal working conditions and in an emergency. Similar requirements are set out in relation to space for work to occur, floors and other surfaces, lighting, ventilation, work undertaken in extremes of heat or cold, and work on or near essential services.

Slips, trips and falls are common when entering, exiting or moving around rural plant. Injuries are more serious if they involve falls from raised levels or contact with sharp and/or hard surfaces. Rural plant is usually accessed outdoors which can often be on rough or uneven ground. Adverse weather can make walking surfaces slippery or muddy, create potholes and pools of water, which increases the risk.

Good housekeeping practices such as keeping all work areas clear of obstructions, providing adequate storage space, removing any temporary obstacles such as debris, electrical cords and air hoses, can reduce the risk of slip, trip or fall injuries.

Other methods for controlling the risk of slips, trips and falls at level include:
- providing, and regularly maintaining, level accessways and work areas including on and around the rural plant
- managing risks of contaminants on rural plant floor surfaces (e.g. rain, mud, or oil that may increase risk of slips and falls)
- providing floor and standing surfaces on rural plant with adequate grip for expected weather conditions
- providing and maintaining adequate handrails and steps on rural plant that are non-slip and have a contrasting front edge on each step (For further information, see *AS1657 Fixed platforms, walkways, stairways and ladders – Design, construction and installation)*
- providing adequate lighting on rural plant
- providing boot cleaning stations to reduce build up on soles of work boots, particularly for workers who operate rural plant
- early reporting of and addressing of slip or trip hazards
- having a system of regular cleaning and spot cleaning on and around the rural plant.

7.15. Hazardous manual tasks

WHS Regulation section 60: A PCBU must manage the risk of a musculoskeletal disorder associated with a hazardous manual task. The PCBU must have regard to all relevant matters that may contribute to a musculoskeletal disorder when determining what control measures must be implemented, including:
- postures, movements, forces and vibration relating to the hazardous manual task
- duration and frequency of the hazardous manual task

- workplace environmental conditions affecting the task for worker
- design of the work area
- layout of the workplace
- system of work used
- the nature, size, height or number of persons, animals or things involved in carrying out the hazardous manual task.

WHS Regulation, schedule 19, definition of 'hazardous manual task': a task that requires a person to lift, lower, push, pull, carry or otherwise move, hold or restrain any person, animal or thing that involves one or more of the following:

- repetitive or sustained force
- high or sudden force
- repetitive movement
- sustained or awkward posture
- exposure to vibration.

When operating and maintaining rural plant, workers could be exposed to hazardous manual tasks that can lead to musculoskeletal disorders (MSDs). Work that may be a hazardous manual task includes:

- lifting and moving rural plant components (e.g. moving and installing irrigation pipes, handling drums of fluid for vehicle maintenance, handling tyres). This can include risk factors of repetitive or sustained force, high and sudden force, awkward posture and repetitive movements.
- operating chainsaws, drills or grinders which may have risk factors of awkward and sustained postures and forces, repetitive movements and vibration.

A task could involve more than one risk factor that can contribute to MSDs. Where several risk factors are present, the risk of MSD increases significantly.

When conducting a manual task risk assessment, consider sources that are causing the risk factors. Examples include:

- the systems of work and the way the work is organised that can contribute to fatigue
- shift arrangements
- duration of the task or deadlines
- environmental factors such as gusty winds, or rough ground conditions
- the design and layout of the work area
- the nature, size, weight or number of things to be handled (e.g. components, fluids, tools).

A PCBU should carry out a risk assessment for any manual tasks that have been identified as being hazardous, unless the risk is well-known and appropriate control measures are known. Workers must be consulted as part of this process as they can provide valuable information about work that results in discomfort and muscular aches and pains.

Examples of control measures for hazardous manual tasks include:

- designing the work in a manner that minimises exposure to hazardous manual tasks
- having components, tools and items delivered and suitably located to minimise the amount of carrying over long distances
- using mechanical equipment to eliminate or reduce the need for workers to lift, carry or support materials and equipment. For example, wherever practical, using forklifts, cranes, vehicle loading cranes, lifting hoists and trolleys (but ensuring that an additional risk is not introduced when working with these aids)
- selecting tools that are suitable for the task and are well maintained.

Further information on managing the risk of hazardous manual tasks can be found in the *Hazardous manual tasks Code of Practice.*

7.16. Agricultural aviation activities

Agricultural aviation activities include using aircraft for dispensing chemicals for crop management or to control pests, feeding or transferring livestock, and farm supply delivery. Agricultural aviation aircraft activities should be managed using the health and safety risk management approach applicable to all hazards (see Section 5 How to manage risks from rural plant).

Hazards common in agricultural aviation activities include, but are not limited to:

- poor situational awareness leading to collisions – for example, collision between aircraft and on-ground workers, objects, or wire strikes. During low-level spraying, on-ground workers and agricultural pilots should work together to stay safe. All duty holders (e.g. pilots, contract pilots, aviation companies or farm owners) are required to consult with other duty holders to about the risks in the workplace and how to manage these risks. A safety risk management program can help identify and manage hazards, and put mitigations in place to ensure safe aerial operations (see Section 4.2 Consulting, cooperating and coordinating activities with other duty holders).
- chemicals handling – hazards, such as spray drift can happen when aircraft is used to transport, and apply fertiliser or other chemicals (see Section 7.12 Systems for storing and handling hazardous chemicals and the *Managing risks of hazardous chemicals in the workplace Code of Practice*).
- farm airstrip hazards and aircraft loading risks – helicopters and fixed wing have different Civil Aviation Safety Authority (CASA) loading site requirements and loading processes that should be followed. Refer to CASA for further information. Only authorised persons should be on loading sites/areas and be in such a position that they are visible to the loading crew where practical.

Note: In addition to WHS legislative requirements, agricultural aviation is subject to several additional regulatory, accreditation, licensing and reporting requirements.
These include, but are not limited to:

- CASA safety rules and regulations e.g. traffic management and control collisions risks mitigation
- pilot licensing e.g. CASA pilot licences and chemical rating pilot licences
- Australian Transport and Safety Bureau (ATSB) accident or incident notification requirements
- chemical spray accreditations.

PCBUs should refer to the appropriate State and Commonwealth agencies, such as the Department of Agriculture and Fisheries, CASA and the ATSB, to understand their respective requirements.

Unmanned aerial vehicles (UAVs, commonly referred to as drones)

Unmanned aerial vehicles (UAVs), commonly referred to as drones, are being used in the rural industry for a range of functions including water and asset management, stock management and maintaining crops and fields.

The presence of a drone flying in close proximity to workers could cause collisions or other accidents. Common risk factors of drones include:

- unstable flying conditions
- unintended actions
- faulty equipment[6].

Risk controls[13]

It is important to develop hazard identification, risk characterisation and mitigation approaches to ensure the safe operation of drones. Examples of effective safety design concepts include:

- lightweight aerial manipulators
- passive compliant systems
- safe actuators
- passive robotic systems
- navigation and collision avoidance systems.

Operating drones

Drone operators should be appropriately trained to operate these devices safely. CASA has licensing, accreditation and other operational requirements for drones. This includes:

- only flying one drone at a time
- always flying a drone in visual line-of-sight; this means:
  - flying only during the day
  - avoid flying through cloud, fog or smoke
  - the operator can always see the drone with their own eyes
  - not flying behind obstacles that stop the operator from always seeing the drone. For example, trees, buildings or other structures.

Further information is available at www.casa.gov.au/drones/drone-rules/drone-safety-rules.

Note: Know about Civil Aviation Safety Authority (CASA) and drones:

- ✓ CASA drone safety rules and regulations apply, including traffic management and control collisions risks mitigation for operators.
- ✓ CASA has specific licensing, accreditation and operational requirements for drones.

PCBUs should refer to CASA regulations when drones are used in workplaces.

Note: Risk in relation to new technology must be controlled using the same risk management approach applicable to all plant. PCBUs have the same duties and responsibilities about obtaining and providing information, consultation with workers, training and managing risks.

See:

- Section 3: Obtaining and providing WHS information about rural plant – duties and responsibilities
- Section 4: Consultation
- Section 5. How to manage risks from rural plant
- Section 6: Training and licensing

[6] Adapted from Howard J, Murashov V, Branche CM. *Unmanned aerial vehicles in construction and worker safety*. American Journal of Industrial Medicine. 2018;61:3–10. *https://doi.org/10.1002/ajim.22782*

7.17. New technology

The agriculture sector and other rural businesses have adopted a wide range of technological advancements, which could create workplace health and safety risks and hazards that must be managed by a PCBU. New technology includes many types of plant – autonomous mobile machinery and robotics and are two examples.

Autonomous agricultural mobile machinery[7]

Autonomous agricultural mobile machinery can be used in many different mobile machinery farming operations. Examples include:

- scouting vehicles
- tractors
- sprayers
- haymaking equipment
- harvesting equipment.

These types of autonomous plant can introduce hazardous situations not normally encountered on plant operated by people. Examples include:

- access into an autonomous mobile machinery's operating zone by unauthorised personnel, animals or other plant
- unintended actions leading to plant going into unauthorised areas or performing tasks that cause safety risks (e.g. human intervention, overriding an alarm condition, failure to update information such as survey plans)
- communications failure leading to lost, degraded, delayed, misdirected or hacked communications
- loss of control movement functions (e.g. sliding, skidding)
- machinery deviating from its programmed area into the path of another vehicle (manned or autonomous), or leading to a fall to another level
- inadvertent switching between autonomous mode and other operating modes leading to loss of control
- interactions with farm visitors and the general public
- interactions with walls, windrows or other infrastructure
- passengers, observers and technicians aboard an operating autonomous agricultural mobile machinery
- remote control of the machine from a position without appropriate situational awareness.

Robotics

The use of robotics is becoming increasingly common in the workplace. While this development has resulted in improvements to safety and health, robotics have their own risks and hazards, including[8]:

- mechanical hazards such as those arising from unintended and unexpected movements or release of tools or human-machine interaction
- electrical hazards such as contacts with live parts or connections or exposure to arc flash
- thermal hazards such as those associated with hot surfaces or exposure to extreme temperatures

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[7] Adapted from Grain Producers Australia: *Code of Practice: Agricultural mobile field machinery with autonomous functions in Australia*, https://www.grainproducers.com.au/_files/ugd/cce1a6_7291560d4c624980bb5ebf119560342b.pdf

[8] Adapted from *Working Safely with Robot Workers: Recommendations for the New Workplace*, Article by Vladimir Murashov, Frank Hearl, and John Howard https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4779796/

- software errors
- operations in unstructured and unpredictable environments
- unauthorized access to robotic work area
- system deficiencies related to maintenance, programming, or operation beyond the robot's safe parameters
- incidents that can result from lack of understanding, knowledge, increased or changed cognitive demands or control of robotic work processes
- noise hazards
- other hazards such as vibration, radiation, electromagnetic fields, lasers and chemicals.

Safety considerations for autonomous agricultural mobile machinery and robotics[9]

Below are some examples of safety considerations. These examples are not exhaustive and PCBUs need to apply the same risk management approach outlined in Section 5 How to manage risks from rural plant.

For the purposes of this section, autonomous agricultural mobile machinery and robotics are collectively referred to as "plant".

Design and operation

Design and operation considerations include:
- clear decision-making aids to assist with emergencies (e.g. diagrams which show the correct sequence to shut down the plant, and accurately reflect the current layout of the operating controls)
- operators should never be in reach of the plant while it is operating
- programmers, operators, and maintenance workers should operate the plant at appropriate speeds consistent with adequate worker response to avoid hazards during programming
- programmers, operators, and maintenance workers should be aware of all conceivable pinch points in a plant's operational area
- barriers or defined operational boundaries (e.g. fences, rolls, and chains) between the work area of the plant, and workers or other freestanding objects such as electrical interlocks
- interlock access gates to a robot's work area which automatically shut down the robot system if a gate is opened
- automatic illuminated warning signs which turn on when a robot is operating
- emergency stop buttons in easily accessible locations
- pressure-sensitive pads placed on the floor around a robot that can turn the robot off when stepped on
- adequate clearance distances around all moving components
- remote diagnostic functionality, so that the maximum amount of troubleshooting can be done outside the operating range
- additional supervision whenever it is necessary for a worker to be within the operating range of plant
- adequate lights in the control and operational areas of the robotic system so that written instructions, and buttons are clearly visible
- clearly visible marks that indicate the movement zones of the robotic system (this is applicable in a building).

[9] Adapted from *Robot Safety – Guidelines to avoid Robotic hazards and incidents, https://roboticsbiz.com/robot-safety-guidelines-to-avoid-robotic-hazards-and-incidents* and the National Institute for Occupational Safety and Health, USA, *Preventing the Injury of Workers by Robots, https://www.cdc.gov/niosh/docs/85-103/*

- implementing on-farm traffic management processes to minimise risks of interaction with other equipment or people
- placing support infrastructure (e.g. fuel facilities, storage of pesticides and water) in areas that are not increasing the risk hazard of people interacting with these machines.

The design, layout and placement of controls should be easy for operators to understand and allow for appropriate controls to be identified quickly and accurately. Further information may be sought from *AS 4024.1901– Safety of machinery Displays, controls actuators and signals – Ergonomic requirements for the design of displays and control actuators – General principles for human interactions with displays and control actuators*.

Training

Training and refresher courses specific to the particular plant should be provided to workers, who will be programming, operating, or maintaining the plant.

Workers should be familiar with all working aspects of the plant before operating or performing maintenance at plant work stations, including:
- full range of motion
- known hazards
- how the plant is programmed
- emergency stop buttons, including which parts of the plant are affected by the emergency stop controls, and in what circumstances they are to use it
- safety barriers.

Supervision

Effective supervision includes assessing operator's ability to operate the plant safely and ensuring that people do not enter the operational area of a plant unless first putting it on "hold", "power down", or at a reduced operating speed mode.

8. Looking after rural plant

There are a range of measures that can assist a PCBU to look after and manage the risks associated with rural plant. These are outlined below.

8.1. Preventative activities

A PCBU should consider the risks associated with plant, such as risks caused by:
- ongoing wear and tear
- damage
- aging and ongoing use
- corrosion
- loose or worn rural plant parts that overload the plant and result in a dangerous failure
- rural plant parts damaged because of break down, rollover or misuse
- modifications
- electrical insulation breakdown
- erosion.

Some methods to identify and minimise these risks are identified in the sections below.

Pre-start inspections

PCBUs should ensure that visual and pre-start inspections of rural plant are carried out before the plant is put to use.

Inspection is one of the best tools available to identify hazards and assess any associated risks before accidents occur. Inspection can accomplish the following:

- identify potential problems of operation not referred to in the manufacturer's instructions
- identify deficiencies in the rural plant or the equipment associated with the use of the plant. Among the basic causes of problems are normal wear and tear, corrosion, modifications, and damaged rural plant parts
- identify worker actions associated with the use of rural plant (this will identify where further training is needed)
- identify effects of changes in processes or materials associated with rural plant (changes may gradually occur that produce a different outcome than originally assessed)
- identify inadequacies in implemented control measures
- identify changing hazards during transport activities.

A PCBU should consistently identify:

- the manufacturer's instructions against which rural plant should be inspected
- impact of weather and temperature throughout the day
- the frequency of inspections
- critical safety instructions, such as the isolation procedure, to be applied during inspection
- the procedures to be followed when:
    - carrying out periodic inspections
    - carrying out specific tests
    - inspecting repaired rural plant
    - inspecting modified rural plant
    - inspecting re-rated rural plant
- the procedures to be followed when investigating and reporting to PCBUs any variations from normal operation or dangerous occurrences.

Servicing and maintenance (periodic inspections)

Rural plant should be serviced and maintained in accordance with the manufacturer's requirements and specified periods, or as advised by the competent person (e.g. engineer, trades person, manufacturer representative). A record of all relevant servicing and/or maintenance should be kept.

Through effective servicing and maintenance, a PCBU can prevent rural plant from deteriorating to a point where it becomes unsafe. This will help prevent rural plant becoming a risk to health and safety.

The servicing of rural plant while in use should only be carried out if this can be done without risk to health and safety. Adequate safeguards should be provided to ensure health and safety where servicing is carried out during use. The maintenance work area should be clean and tidy.

Note: Rural plant should be isolated from energy sources and de-energised before maintenance starts (see Section 8.2 Isolating energy sources).

When rural plant is isolated from energy sources, and plant shutdown results, the shutdown should not create additional risk. For example, hot work such as welding in the middle of a grain paddock would create additional risk of fire.

All control measures (e.g. guards) removed during maintenance should be replaced before start-up of plant. Taking short cuts can lead to exposure to risks.

When servicing and maintaining plant, it should be secured and stable so that it does not fall or topple over and trap workers. This could mean adding secondary support to secure and stabilise the plant. For example:

- when harvesters or planters are serviced or maintained in field, secondary support in addition to de-energised hydraulics or chain drives should be considered to minimise risk of plant lowering and trapping workers. This could include supporting blocks, stands, or hydraulic ram props.
- when changing blades, tines, points or rippers of implements, secondary support such as load rated vehicle stands should be used as a back up safety device to support the plant, instead of relying on the plant's hydraulics (this includes a three point linkage on a tractor
- in the case of tractor slashers where the rear of the slasher is supported by chains the use of two vehicle stands along is unsafe as the stands can be ejected as the slasher lowers. Instead the slasher manufacturer's propping system should be used (see Appendix 5, Section B).

Repairs

Rural plant should be isolated before repair begins and repaired as recommended by the manufacturer or documented procedures.

Cleaning

Rural plant should be isolated before cleaning starts, and where appropriate, physically made immobile. Rural plant should be safeguarded while cleaning, especially where it is necessary to clean rural plant while it is being used. Where safeguards have been removed during cleaning, then:

- the rural plant should be in a non-operational state, or
- means of preventing accidental operation, or unexpected movement of plant or parts, should be implemented.

PCBUs should refer to manufacturer recommendations about cleaning. Using the wrong cleaning materials could lead to hazardous chemical reactions. For example, new cable insulation materials can breakdown faster when exposed to some chemicals. Further information on hazardous chemicals is available in the *Managing risks of hazardous chemicals in the workplace Code of Practice.*

8.2. Isolating energy sources

Note: Isolation, in the context of energy sources (e.g. shut down of machinery or equipment), is different to the hierarchy of controls' isolation control (e.g. physical barriers such as fences between a plant and a person).

Note: A number of codes of practice and guidance material exist that cover isolating energy sources risks in detail:

- *The Electrical Safety Code of Practice – Electrical Equipment Rural Industry 2020*
- *Managing risks of plant in the workplace Code of Practice*
- *WHSQ Guide to Machinery and Equipment Safety*

It is recommended that these documents be consulted to ensure that legal duties in regards to isolating energy sources are met.

An isolation procedure in the context of energy sources is a set of predetermined steps that should be followed when workers have to perform tasks, for example maintenance, repair, installation and cleaning of plant.

Isolation procedures involve isolating potentially hazardous energy, so the plant does not move or start up accidentally. Isolating plant also ensures entry to a restricted area is controlled while the specific task is being carried out. Designer or manufacturer procedures should be considered when isolating energy sources.

The lock-out process is the most effective isolation procedure. The process is as follows:

- shut down the machinery and equipment
- identify all energy sources and other hazards
- identify all isolation points
- isolate all energy sources
- control or de-energise all stored energy
- "lock out, tag out, test out" (LOTOTO):
  - *lock out* all isolation points
  - *tag out* machinery controls, energy sources and other hazards
  - *test out* by 'trying' to reactivate the plant without exposing the tester or others to risk.

Failure to reactivate the plant may mean the main power has been isolated. However, it does not guarantee all stored energies have dissipated. Further measures to safely release these energies, for example hydraulic or pneumatic pressure, suspended weight or compressed springs, may be necessary.

In order for the isolation procedure to be effective, a PCBU should identify all energy sources likely to activate the plant or part of it, and isolate or de-energise these to avoid the plant being inadvertently powered. Energy sources include:

- electricity (mains)
- wind energy
- hydraulic energy
- battery or capacitor banks
- solar panels
- fertilizers
- fuels, grease and other chemicals
- heat
- steam
- fluids or gases under pressure (e.g. water, air, steam or hydraulic oil)
- stored energy (e.g. compressed springs)
- gravity
- radiation.

In order to isolate plant, a PCBU should use a device that effectively locks out the isolation points. These devices include switches with built-in locks and lock-out circuit breakers, fuses and valves. Other devices include chains, safety lock-out jaws (also known as hasps) and safety padlocks.

When isolating an energy source, a PCBU should, where possible, use a lock that allows one or more padlocks to be fitted. If more than one person is working on the plant at the same time, a PCBU should ensure each worker is able to attach a padlock to the device (see **Figure 7**). This will prevent access to the energy sources while the work is being carried out.

Figure 7: *Example of lock-out with a tag and the padlocks of two workers*

Another way to allow multiple locks to be used is to have one padlock on the isolation point, with the keys locked in a box that has been locked separately by each worker.

Each worker involved in the maintenance, cleaning or repair of the plant should have a lock, tag and key for each isolation point. There should be no duplicate key for any lock, except a master key that is kept in a secure location and which should only be used in an emergency.

If more than one energy source needs to be isolated to enable safe shut-down of the plant, the single key to each lock-out device should be held by the same person.

Tags should only be used as a means of providing information to others at the workplace. A tag should not be used on its own as an isolation device; only a lock is effective in isolating the energy source.

Tags and locks should only be removed by the person who applied them or by the supervisor after consultation with the signatory of the tag.

In the event that the person who applied the tag is unavailable, their tag or lock may only be removed in accordance with a management approved procedure.

8.3. Disengaged/stored rural plant

Rural plant should be disengaged/stored:

- so as not to hinder or interfere with the operation of any other plant
- with safeguards in place if operational, as a precaution against unintentional activation - for example, by a person leaning on the controls
- so access is not obstructed
- to prevent deterioration to the extent that rural plant becomes unsafe.

Plant not in use should be stored appropriately, so it does not create a risk to workers or other people in the workplace. Where plant is placed in storage, PCBUs should:

- ensure relevant health and safety information supplied by the designer or manufacturer is provided to the person who is to dismantle or store the plant
- implement control measures to eliminate, or if that is not reasonably practicable, minimise the risk to health and safety to people during storage. For example:
  - releasing stored energy, lowering moving parts that lower under gravity, or providing support to prevent toppling

  - implements should be stored in a stable and safe manner, away from long grass or sloping ground
  - when storing implements, adding secondary support, such as hardwood sleepers, could prevent the equipment falling when there is reliance on a chain, rope or hydraulics.
- implement control measures to eliminate or, if that is not reasonably practicable, minimise the risks of damage to plant during storage. For example, risks may arise from corrosion as a result of exposure to residues of hazardous substances and deteriorating consumables.

8.4. Transporting rural plant

Transportation of rural plant can expose workers to a range of risks to health and safety. Vehicles such as flatbed trucks and trailers used to move rural plant can pose risks to operators or others nearby, including:

- traumatic injuries and musculoskeletal disorders associated with unsafe loading/unloading of a vehicle
- failure to immobilise vehicles and trailers effectively, causing crushing or trapping of a person
- the vehicle colliding or contacting people or other vehicles, plant, energised powerlines, or objects
- the vehicle moving in an uncontrolled or unexpected manner
- the vehicle overturning
- objects falling on the operator
- the operator being ejected from the vehicle.

Operators of mobile vehicles can often have restricted visibility of ground workers or nearby pedestrians, particularly those close to the vehicle.

On-farm/private property transport safety

Safety considerations when transporting rural plant include:

- vehicles and trailers are immobilised in a safe way. Search for the Safely immobilising heavy vehicles and trailers campaign on worksafe.qld.gov.au for additional information
- inspecting the load prior to unloading to identify any potential movement of the rural plant
- ensuring the vehicle used for transporting rural plant has suitable safety features (e.g. rear-view mirrors and reversing warning device)
- managing workplace traffic risks (e.g. implementing traffic management plans, and exclusions zones). Refer to the *General guide to workplace traffic management* published by Safe Work Australia
- a spotter is used where necessary, including suitable means of communication between the spotter and operator (e.g. two-way radio) to assist with the safe movement – e.g. blind spots or other workers in the vicinity
- weather and ground conditions and the intended travel pathway have been inspected and assessed to identify any problem e.g. sloping ground, reduced visibility, need for adequate lighting
- the risk of coming within an unsafe distance or contact with overhead electric lines is managed. See Section 7.7 Electrical risks associated with rural plant or the *Electrical safety Code of Practice – Working near overhead and underground electric lines* for more information
- the vehicle used for transport is fitted with and has a working audible reverse warning device
- operator protective devices are used

- the manufacturer's operating instructions have been read and are followed. For older items of mobile plant where operating instructions are not available, operational procedures and instructions for use should be developed by a competent person
- untrained or inexperienced workers should not operate the vehicle (see Section 6 Training and licensing).

On-road safety

When rural plant is transported on public roads, PCBUs have additional responsibilities to the above-mentioned on-farm/ on private property considerations, including ensuring that specific requirements from the National Heavy Vehicle Regulator (NHVR) and the Queensland Department of Transport and Roads are met.

This includes heavy vehicle licensing, permits and procedures (e.g. training, tests and loading requirements).

Refer to the NHVR's *National load restraint guide* or WorkSafe's *Safe handling when securing loads on trucks guide* for additional information.

8.5. Modification of plant

Note: When a PCBU modifies rural plant, the PCBU has the same duty as a manufacturer under the WHS Act.

For further information, see section 23 of the WHS Act, Section 2.2 Who has health and safety duties, and Section 3 Obtaining and providing WHS information about rural plant – duties and responsibilities.

Modification to rural plant includes a variety of changes from minor to substantial. Any modification can alter the design characteristics of the original rural plant. This could cause a change in the operation of the plant. For example, a modification could alter the stability of the rural plant or the strength of its supporting parts.

If rural plant needs to be modified, PCBUs have several options, including:
- sending rural plant to the manufacturer/supplier for modification
- sending the rural plant to an engineering workshop
- engaging a competent person to modify the plant on site
- undertaking the work yourself.

When a PCBU undertakes modifications, the PCBU should take the following action:
- include appropriate safety controls when undertaking a modification. Gather sufficient rural plant information from the manufacturer, a competent person (e.g. engineer or qualified tradesman), or a relevant Australian Standard can assist with this
- comply with the relevant Australian Standards or equivalent design criteria (for example, see Appendix 4 for technical standards for tractors)
- assess the modification to ensure the safety control measures mitigate risk. The assessment should use all the information gathered. The PCBU should implement further control measures for any risks highlighted in the assessment. The risk assessment should confirm the control of all risks resulting from the modification.

If unsure of the assessment, a PCBU should get independent advice from the manufacturer or a competent person (for example, an engineer or a qualified tradesman). A PCBU should only modify rural plant as recommended by the manufacturer or other documented procedures.

Modification of safety equipment should not be undertaken. For example, ROPS or FOPS modifications such as the welding of brackets onto a rollover protective structure or the drilling of holes could affect structural integrity, which will reduce its protective ability.

A PCBU should include information on all rural plant modifications and the implemented control measures when training workers or other persons who will use the plant.

9. Isolated work and fatigue – common psychosocial hazards when operating rural plant

Managing psychosocial hazards and risks at work is just as important as managing physical risks. Psychosocial hazards such as isolated work and fatigue are common in the rural industry and can increase the risk of incidents when operating rural plant.

Note: Further guidance on how to prevent harm from psychosocial hazards at work can be found in the *Managing the risk of psychosocial hazards at work Code of Practice*.

See Appendix 11 for further guidance on remote or isolated work and fatigue management**.**

Appendix 1: Dictionary

‘Appropriate information’ – information which states:
- the use for which the plant has been designed and tested
- the conditions (if any) that need to be followed if the plant is to be used safely and without risk to health.

‘Abandoned tank’ - a tank is taken to be abandoned if:
(a) the tank has not been used to store flammable gases or flammable liquids for two years; or
(b) the person does not intend to use the tank to store flammable gases or flammable liquids again.

‘Competent person’ – a person with suitable qualifications who is able to provide advice or services relating to rural plant. For example, a qualified engineer, qualified tradesperson, manufacturer, or a qualified training provider.

‘Grower’ – a person conducting a business or undertaking in the rural industry, whether as a PCBU or otherwise grows something.

‘Hazardous chemical’ – a substance, mixture or article that satisfies the criteria for any one or more hazard classes in the GHS (*Globally Harmonized System of Classification and Labelling of Chemicals*, 7th Revised Edition, published by the United Nations as modified by Schedule 6 to the WHS Regulation) (including a classification referred to in Schedule 6 of the WHS Regulation), unless the only hazard class or classes for which the substance, mixture or article satisfies the criteria are any one or more of the following:
- acute toxicity—oral—category 5;
- acute toxicity—dermal—category 5;
- acute toxicity—inhalation—category 5;
- skin corrosion/irritation—category 3;
- aspiration hazard—category 2;
- flammable gas—category 2;
- acute hazard to the aquatic environment—category 1, 2 or 3;
- chronic hazard to the aquatic environment—category 1, 2, 3 or 4;
- hazardous to the ozone layer.

Note: The WHS Regulation Schedule 6 tables replace some tables in the GHS.

‘Normal operation’ – operation of the machine within its recognisable limits, in accordance with the manufacturer’s instructions by persons familiar with its operations and controls. This definition includes the acts of inspecting the machine and entering and leaving the operator’s work area.

‘Person conducting a business or undertaking’ (PCBU) –
- For the WHS Act, a person conducts a business or undertaking—
    - (a) whether the person conducts the business or undertaking alone or with others; and
    - (b) whether or not the business or undertaking is conducted for profit or gain.
- A business or undertaking conducted by a person includes a business or undertaking conducted by a partnership or an unincorporated association.
- If a business or undertaking is conducted by a partnership (other than an incorporated partnership), a reference in the WHS Act to a person conducting the business or undertaking is to be read as a reference to each partner in the partnership.

- A person does not conduct a business or undertaking to the extent that the person is engaged solely as a worker in, or as an officer of, that business or undertaking.
- An elected member of a local government does not in that capacity conduct a business or undertaking.
- A regulation may specify the circumstances in which a person may be taken not to be a person who conducts a business or undertaking for the purposes of the WHS Act or any provision of the WHS Act.
- A volunteer association does not conduct a business or undertaking for the purposes of the WHS Act.
- In this section, volunteer association means a group of volunteers working together for 1 or more community purposes where none of the volunteers, whether alone or jointly with any other volunteers, employs any person to carry out work for the volunteer association.

'Producer' – a person conducting a business or undertaking in the rural industry, whether as a PCBU or otherwise produces something.

'Routine maintenance' includes adjustment of functional settings, routine lubrication, machine cleaning, performance of minor repairs in the field and renewing consumable items.

'Rural industry' – an industry in which persons are engaged primarily in work:
- in the cultivation of any agricultural crop or product whether grown for food or not
- in the rearing and management of livestock
- in the classing, scouring, sorting, or pressing of wool
- aquaculture
- in flower or vegetable market gardens
- at clearing, fencing, trenching, draining or otherwise preparing land or plant for any purpose stated in paragraphs (a), (b) and (d) to (f).

'Rural plant' – rural plant includes machinery, equipment, appliances, containers, implements and tools and any components or anything fitted or connected to those things, when used for the performance of work at a rural workplace. It includes, but is not limited to:
- planters
- harvesters
- hoppers
- silos
- farm vehicles (e.g. tractors and quad bikes)
- electric tools such as saws, drills, grinders
- irrigation equipment
- workshop tools and equipment
- implements.

'Rural workplace' – a workplace in rural industry

'Supply' –
- A supply of a thing includes a supply and a resupply of the thing by way of sale, exchange, lease, hire or hire-purchase, whether as principal or agent.
- A supply of a thing occurs on the passing of possession of the thing to the person or an agent of the person to be supplied.
- A supply of a thing does not include:
    - the return of possession of a thing to the owner of the thing at the end of a lease or other agreement; or
    - a prescribed supply.

- A financier is taken not to supply plant, a substance or a structure for the purposes of the WHS Act if:
    - the financier has, in the course of the financier's business as a financier, acquired ownership of, or another right in, the plant, substance or structure on behalf of a customer of the financier; and
    - the action by the financier, that would be a supply but for this subsection, is taken by the financier for, or on behalf of, that customer.
- If subsection (4) applies, the person (other than the financier) who had possession of the plant, substance or structure immediately before the financier's customer obtained possession of the plant, substance or structure is taken for the purposes of the WHS Act to have supplied the plant, substance or structure to the financier's customer.

'Worker' –

- A person is a worker if the person carries out work in any capacity for a person conducting a business or undertaking, including work as—
    - an employee; or
    - a contractor or subcontractor; or
    - an employee of a contractor or subcontractor; or
    - an employee of a labour hire company who has been assigned to work in the person's business or undertaking; or
    - an outworker; or
    - an apprentice or trainee; or
    - a student gaining work experience; or
    - a volunteer; or
    - a person of a prescribed class.
- The person conducting the business or undertaking is also a worker if the person is an individual who carries out work in that business or undertaking.

'Workplace' –

- A workplace is a place where work is carried out for a business or undertaking and includes any place where a worker goes, or is likely to be, while at work.
- In this section, place includes—
    - a vehicle, vessel, aircraft or other mobile structure; and
    - any waters and any installation on land, on the bed of any waters or floating on any waters.

Appendix 2: Common acronyms

ATV:	All-terrain vehicle
CASA	Civil Aviation Safety Authority
COP	Code of Practice
ES Act:	*Electrical Safety Act 2002* (Queensland)
ES Regulation:	Electrical Safety Regulation 2013 (Queensland)
ESO	Electrical Safety Office
EWP:	Elevating work platform
FEL:	Front end loader
FOPS:	Fall-over protective structure
HSR:	Health and Safety Representative
MSD:	Musculoskeletal disorder
OPD:	Operator protective device
PCBU:	A person conducting a business or undertaking, as defined by the WHS Act.
PPE:	Personal protective equipment
PTO:	Power take off
ROL:	Rated operating load
ROPS:	Roll-over protective structure
SSV:	Side-by-side vehicle
SWA:	Safe Work Australia
WHS Act:	*Work Health and Safety Act 2011* (Queensland)
WHS Regulation:	Work Health and Safety Regulation 2011 (Queensland)
WHSQ:	Workplace Health and Safety Queensland

Appendix 3: Codes of Practice relevant to the rural industry

Codes of Practice that are relevant to the rural industry include, but are not limited to:

- *Confined spaces Code of Practice*
- *Electrical safety Code of Practice – Electrical equipment rural industry*
- *Electrical safety Code of Practice – Working near overhead and underground electric lines*
- *Electrical safety Code of Practice – Works*
- *Electrical safety Code of Practice – Managing electrical risks in the workplace*
- *Excavation work Code of Practice*
- *Forest harvesting Code of Practice*
- *First aid in the workplace Code of Practice*
- *Hazardous manual tasks Code of Practice*
- *How to manage and control asbestos in the workplace Code of Practice*
- *How to manage work health and safety risks Code of Practice*
- *How to safely remove asbestos Code of Practice*
- *Labelling of workplace hazardous chemicals Code of Practice*
- *Managing noise and preventing hearing loss at work Code of Practice*
- *Managing the risks of falls at workplaces Code of Practice*
- *Managing the risks of hazardous chemicals in the workplace Code of Practice*
- *Managing the risks of plant in the workplace Code of Practice*
- *Managing the risks of psychosocial hazards at work Code of Practice*
- *Managing the work environment and facilities Code of Practice*
- *Mobile crane Code of Practice*
- *Preparation of safety data sheets for hazardous chemicals Code of Practice*
- *Safe design and operation of tractors Code of Practice*
- *Safe design of structures Code of Practice*
- *Scaffolding Code of Practice*
- *Spray painting and powder coating Code of Practice*
- *Sugar industry Code of Practice and relevant supplements*
- *Welding processes Code of Practice*
- *Work health and safety consultation, co-operation and co-ordination Code of Practice*

For more information and a complete list of Queensland's Codes of Practice, see https://www.worksafe.qld.gov.au/laws-and-compliance/codes-of-practice.

Appendix 4: Technical standards

The following standards are relevant to the design and operation of rural plant.

Section A: Rural plant common technical standards

- **AS 1019** Internal combustion engines – Spark emission control devices
- **AS 1121.1*** Agricultural tractor power take-offs – Rear-mounted power take-off types 1, 2 and 3 – General specifications, safety requirements, dimensions for master shield and clearance zone
- **AS 1121.2*** Agricultural tractor power take-offs – Rear-mounted power take-off types 1, 2 and 3 – Narrow-track tractors, dimensions for master shield and clearance zone
- **AS 1121.3*** Agricultural tractor power take-offs – Rear-mounted power take-off types 1, 2 and 3 – Main PTO dimensions and spline dimensions, location of PTO
- **AS 1121.4*** Agricultural tractor power take-offs – Guards for power take-off (PTO) drive-shafts – Strength and wear tests and acceptance criteria
- **AS 1319** Safety signs for the occupational environment
- **AS 1418.1** Cranes, hoists and winches – Part 1: General requirements
- **AS 1418.10** Cranes, hoists and winches – Part 10: Mobile elevating work platforms
- **AS/NZS 1698** Protective helmets for vehicle users
- **AS 2294** Earth-moving machinery – Protective structures, or
- **AS 2550** Cranes, hoists and winches – Safe use set
- **AS 2550.10** Cranes, hoists and winches – Safe use – Part 10: Mobile elevating work, and the manufacturer's instructions
- **AS 1636** Tractors Roll-over protective structures, criteria and tests
- **AS 1636.1** Tractors – Rollover protective structures – Criteria and tests Conventional tractors
- **AS 1636.2** Tractors – Rollover protective structures – Criteria and tests Rear-mounted for narrow track tractors
- **AS 1636.3** Tractors – Rollover protective structures – Criteria and tests Mid-mounted for narrow track tractors
- **AS 1657** Fixed Platforms, walkways, stairways and ladders – Design, construction and installation
- **AS/NZS 2080** Safety glass for land vehicles
- **AS 2359.1** Powered industrial trucks – Part 1: General requirements, and the manufacturer's instructions
- **AS 4024.1901** Safety of machinery – Displays, controls actuators and signals – Ergonomic requirements for the design of displays and control actuators – General principles for human interactions with displays and control actuators.
- **AS ISO 6393** Earth-moving machinery – Determination of sound power level - Stationary test conditions
- **AS/NZS ISO 6394** Earth-moving machinery – Determination of emission sound pressure level at operator's position – Stationary test
- **AS/NZS 2153** Tractors and machinery for agriculture and forestry – Technical means for ensuring safety
- **AS/NZS 2153.1*** Tractors and machinery for agriculture and forestry – Technical means for ensuring safety – General
- **AS/NZS 2153.3*** Tractors and machinery for agriculture and forestry – Technical means for ensuring safety – Tractors
- **AS/NZS 2153.4*** Tractors and machinery for agriculture and forestry – Technical means for ensuring safety – Forestry winches
- **AS/NZS 2153.5*** Tractors and machinery for agriculture and forestry – Technical

means for ensuring safety – Power-driven soil-working equipment
- **AS/NZS 2153.6*** Tractors and machinery for agriculture and forestry – Technical means for ensuring safety – Equipment for crop protection
- **AS/NZS 2153.7*** Tractors and machinery for agriculture and forestry – Technical means for ensuring safety – Combine harvesters, forage and cotton harvesters
- **AS/NZS 2153.9*** Tractors and machinery for agriculture and forestry – Technical means for ensuring safety – Equipment for sowing, planting and distributing fertilizers
- **AS/NZS 2596** Seat belt assemblies for motor vehicles
- **NZS 8600-02 All**-terrain vehicle helmets
- **ANSI/SVIA 1-2017** Amendment to Standard for All-Terrain Vehicles; Notice of Proposed Rulemaking
- **ISO 3463** Tractors for agriculture and forestry—Roll-over protective structures (ROPS)—Dynamic test method and acceptance conditions
- **AS ISO 3471** Earth-moving machinery—Roll-over protective structures—Laboratory tests and performance requirements)
- **ISO 3471.1** Earth-moving machinery—Roll-over protective structures—Laboratory tests and performance requirements
- **ISO 3767-1** Tractors, Machinery for Agriculture and Forestry, Powered Lawn and Garden Equipment—Symbols for Operator Controls and Other Displays, Part 1: Common Symbols
- **ISO 3767/2** Tractors, Machinery for Agriculture and Forestry, Powered Lawn and Garden Equipment—Symbols for Operator Controls and Other Displays, Part 2: Symbols for Agricultural Tractors and Machinery
- **ISO 5700** (Tractors for agriculture and forestry—Roll-over protective structures (ROPS)— Static test method and acceptance conditions)
- **ISO 6683** Earthmoving Machinery—Seat Belts and Seat Belt Anchorages
- **OECD Code 3** (Standard code for the official testing of protective structures on agricultural and forestry tractors (dynamic test)
- **OECD Code 4** (Standard code for the official testing of protective structures on agricultural and forestry tractors (static test)
- **OECD Code 6** (Standard code for the official testing of front mounted roll-over protective structures on narrow-track wheeled agricultural and forestry tractors)
- **OECD Code 7** (Standard code for the official testing of rear mounted roll-over protective structures on narrow-track wheeled agricultural and forestry tractors)
- **OECD Code 8** (Standard code for the official testing of protective structures on agricultural and forestry tracklaying tractors)
- **SAE J 386** Opera tor restraint system for off- road work machines.
- **SAE J 1040** (Performance Criteria for Rollover Protective Structures (ROPS) for Construction, Earthmoving, Forestry, and Mining Machines)
- **SAE J 1194** (Rollover Protective Structures (ROPS) for Wheeled Agricultural Tractors)
- **SAE J 2194** (Roll-Over Protective Structures (ROPS) for Wheeled Agricultural Tractors)
- **UNECE 22.05 and 22.06** Motorcycle Helmets
- **USS 5100-1d** Standard for Spark Arresters for Internal Combustion Engines
- **EN 15997:2011** All Terrain Vehicles

*Note: * indicates that standard was withdrawn by Standards Australia at the time of publication of the Rural plant Code of Practice 2024. Reference is included for completeness, however compliance with this standard is not mandatory.*

Section B: Tractor-specific technical standards

- **AS 1019** Internal combustion engines – Spark emission control devices
- **AS 1121.1*** Agricultural tractor power take-offs – Rear-mounted power take-off types 1, 2 and 3 – General specifications, safety requirements, dimensions for master shield and clearance zone
- **AS 1121.2*** Agricultural tractor power take-offs – Rear-mounted power take-off types 1, 2 and 3 – Narrow-track tractors, dimensions for master shield and clearance zone
- **AS 1121.3*** Agricultural tractor power take-offs – Rear-mounted power take-off types 1, 2 and 3 – Main PTO dimensions and spline dimensions, location of PTO
- **AS 1121.4*** Agricultural tractor power take-offs – Guards for power take-off (PTO) drive-shafts – Strength and wear tests and acceptance criteria
- **AS 1319** Safety signs for the occupational environment
- **AS 1636.1** Tractors – Rollover protective structures – Criteria and tests Conventional tractors
- **AS 1636.2** Tractors – Rollover protective structures – Criteria and tests Rear-mounted for narrow track tractors
- **AS 1636.3** Tractors – Rollover protective structures – Criteria and tests Mid-mounted for narrow track tractors
- **AS 1657** Fixed Platforms, walkways, stairways and ladders – Design, construction and installation
- **AS ISO 6393** Earth-moving machinery – Determination of sound power level - Stationary test conditions
- **AS/NZS ISO 6394** Earth-moving machinery – Determination of emission sound pressure level at operator's position – Stationary test
- **AS/NZS 2153.1*** Tractors and machinery for agriculture and forestry – Technical means for ensuring safety – General
- **AS/NZS 2153.3*** Tractors and machinery for agriculture and forestry – Technical means for ensuring safety – Tractors
- **AS/NZS 2153.4*** Tractors and machinery for agriculture and forestry – Technical means for ensuring safety – Forestry winches
- **AS/NZS 2153.5*** Tractors and machinery for agriculture and forestry – Technical means for ensuring safety – Power-driven soil-working equipment
- **AS/NZS 2153.6*** Tractors and machinery for agriculture and forestry – Technical means for ensuring safety – Equipment for crop protection
- **AS/NZS 2153.7*** Tractors and machinery for agriculture and forestry – Technical means for ensuring safety – Combine harvesters, forage and cotton harvesters
- **AS/NZS 2153.9*** Tractors and machinery for agriculture and forestry – Technical means for ensuring safety – Equipment for sowing, planting and distributing fertilizers
- **AS/NZS 2596** Seat belt assemblies for motor vehicles
- **ISO 3463** Tractors for agriculture and forestry—Roll-over protective structures (ROPS)—Dynamic test method and acceptance conditions
- **AS ISO 3471** Earth-moving machinery—Roll-over protective structures—Laboratory tests and performance requirements)
- **ISO 3767-1** Tractors, Machinery for Agriculture and Forestry, Powered Lawn and Garden Equipment—Symbols for Operator Controls and Other Displays, Part 1: Common Symbols
- **ISO 3767/2** Tractors, Machinery for Agriculture and Forestry, Powered Lawn and Garden Equipment—Symbols for Operator Controls and Other Displays, Part 2: Symbols for Agricultural Tractors and Machinery
- **ISO 5700** (Tractors for agriculture and forestry—Roll-over protective structures

(ROPS)—Static test method and acceptance conditions)

- **ISO 6683** Earthmoving Machinery—Seat Belts and Seat Belt Anchorages
- **OECD Code 3** (Standard code for the official testing of protective structures on agricultural and forestry tractors (dynamic test)
- **OECD Code 4** (Standard code for the official testing of protective structures on agricultural and forestry tractors (static test))
- **OECD Code 6** (Standard code for the official testing of front mounted roll-over protective structures on narrow-track wheeled agricultural and forestry tractors)
- **OECD Code 7** (Standard code for the official testing of rear mounted roll-over protective structures on narrow-track wheeled agricultural and forestry tractors)
- **OECD Code 8** (Standard code for the official testing of protective structures on agricultural and forestry tracklaying tractors)
- **SAE J 1040** (Performance Criteria for Rollover Protective Structures (ROPS) for Construction, Earthmoving, Forestry, and Mining Machines)
- **SAE J 1194** (Rollover Protective Structures (ROPS) for Wheeled Agricultural Tractors)
- **SAE J 2194** (Roll-Over Protective Structures (ROPS) for Wheeled Agricultural Tractors)

*Note: * indicates that standard was withdrawn by Standards Australia at the time of publication of the Rural Plant Code 2024. Reference is included for completeness, however compliance with this standard is not mandatory.*

Appendix 5: Tractor safety

Section A: Operation of tractor – common safety considerations

Note: Operating a tractor on roads or road related areas:

There are specific rules for tractors operated on roads and road related areas. For example:

- conditional vehicle registration is required. There are certain conditions, including maximum dimension, mass, travel distance, road visibility, speed limits, and vehicle standards (such as having horns, breaks, reflectors, rear view mirrors and signal lights)
- mandatory licensing and operator minimum age requirements
- all general road rules apply, such as speed limits, giving way, indicating, obeying signage, seatbelt and mobile phone rules.

Further information can be found on:

- tmr.qld.gov.au
- Department of Transport and Main Roads (DTMR) Safe Movement Guideline for Conditionally registering a vehicle in Queensland
- DTMR's Safe Movement Guideline for Light Agricultural Vehicles, Light Agricultural Combinations and Drawn Plant.

Table 1 provides guidance on some of the common considerations specifically relating to the operation of a tractor.

Table 1: *Common safety considerations when a tractor is operated*

Training	Operators should be appropriately trained. The training should cover: • tractor controls and instruments, brakes, clutch and gears • tractor safety features (e.g. guards, seat belts) • comfort controls (e.g. adjusting the seat to be in reach of all controls) • operating instructions including starting, moving off and how to stop the tractor • regular service procedures required • proper attachment of implements • possible hazards, and how to reduce the risk of accidents, and in particular where: o there is a risk of the tractor overturning and ROPS and seatbelts have not been fitted (i.e. a tractor with a mass of less than 560 kg). o the tractor is to be operated in an area where it is not practicable to totally separate the tractor operation from other workers or non-workers (e.g. children). • For more guidance on training, see **Section 6 Training and licensing**.

Before starting a tractor	• Read and follow the manufacturer's operating instructions. They contain a wealth of information and are specifically written about your tractor. • Operators should familiarise themselves with the layout of the land before they start working and watch for ditches, embankments and depressions, especially when the ground is unstable or slippery conditions prevail. • Tractor owners should maintain tractors in a safe operating condition by making regular inspections and following the manufacturer's recommended servicing and maintenance procedures. • Logbooks should be maintained and records made of scheduled maintenance and repairs performed.
Operating with passengers	• Passengers should not be allowed to ride on tractors unless the tractor is manufactured to include passengers.
Starting a tractor, including jump-starts	• Only start and use the tractor according to the manufacturer's instructions. • Operate the self-starter only from the driving position and do not start the machine while standing on the ground. • Before starting a tractor engine, ensure all bystanders are clear and away from the tractor. Check that all levers are in their neutral position, the handbrake is engaged and the PTO is disengaged. • Engage the appropriate gear for the work being undertaken. • When jump-starting a tractor, ensure both vehicles are in park (automatic gearbox) or neutral (manual gearbox) with park brakes applied. Connect the jumper leads as specified by the manufacturer, to avoid damage to the electrical system and the possibility of a battery explosion.
Using appropriate speed	• Drive tractors at speeds slow enough to keep control over unexpected hazards.
Tractor Stability	• Seek expert technical advice before fixing counterweights or wheel weights (front or rear) to increase tractor stability.
Awareness of weather and location conditions	• Be cautious in wet conditions – the risk of a tractor overturning can be much higher on wet slopes as the tractor can slide. • Be aware of location of overhead powerlines – see Section 7.7 Electrical Risks associated with rural plant, for guidance on overhead powerlines safety. • Use appropriate warning lights when operating on a declared road reserve on which the tractor may create a hazard. • Exercise extreme caution when operating a tractor or any attached equipment when children or animals are in the area.
Turning or applying turning brakes	• Reducing speed before turning or applying turning brakes. • Where a differential lock and turning brakes are fitted, ensure that the differential lock is disengaged and the turning brakes are locked together before travelling.

Power take-off or belt work	• When using the tractor as a source for stationary power take-off or belt work, apply and lock the parking brake and chock the wheels. • Bond the tractor frame to earth according to manufacturer's instructions. This will remove the risk posed by static electricity when using belts.
Operating on slopes or hillsides	• Descending slopes cautiously with the tractor in low gear. For example, on downward slopes it is possible, in extreme circumstances, for one wheel to reverse, causing the tractor to roll over. Extra care needs to be taken if towing trailers or implements down slopes, as often the trailers will not have brakes. • Ascending steep slopes can cause a tractor to back flip in extreme circumstances or the front wheels to lift thus reducing or losing control of steering. • To increase stability when working on hillsides, set tractor wheels to the widest possible setting.
Operating in confined or enclosed areas	• Where a tractor is operating in a confined area and other persons cannot be excluded, it should be fitted with reversing beepers. • If using a tractor in an enclosed area like a shed, make sure the area is well ventilated to avoid build-up of exhaust gases.
Hitching implements	• Only attach implements to the drawbar, three-point linkage or other specified hitch points specifically designed for that purpose. • Never hitch to points forward of, or higher than the drawbar as this could be extremely dangerous. • Ensure that the weight applied to the three-point linkage by lifting jibs or other attached equipment does not exceed the manufacturer's specifications or adversely affect stability or steering. In addition, seek expert technical advice before fixing counterweights or wheel weights (front or rear) to increase tractor stability. • Seek advice from the operating manual or supplier about the recommended weight of a trailer or implement that the tractor can safely tow before towing it.
Clearing blocked attachments	• When an attachment becomes blocked, the tractor should be stopped, the drive to the attachment disconnected and the moving parts of the implement stopped before the obstruction is cleared. • See Section C of this Appendix for information on slasher attachments
Bogged tractors	• When a tractor is bogged in mud or in a ditch, drive out in reverse gear. • Logs and planks should only be used behind the rear wheels to increase traction, as using logs and planks in front of the rear wheels increases the chance of back flipping.
Changing tyres	• It is recommended that tyres are changed by qualified professionals. • Where this is not reasonably practicable: o when removing and refitting tractor tyres, first remove the

	valve core for air to escape and make the tyres flexible. Maintain a good grip on tyre levers and stand to the side of tyres when removing the tubes from the rims. o while inflating a tyre, continually check to ensure the locking ring is properly seated and locked. The tyre should be inflated to its correct pressure, according to the tyre manufacturer's load/inflation specifications. Always stand to the side when inflating a tyre. An inflation cage should be used when inflating tyres. o the ballasting of tractor tyres should be done in accordance with manufacturer's recommendations.
Refueling	• Turn off the engine. Keep open flames, open lights, lighted cigarettes etc. away from the refuelling operation. • During refuelling, maintain some form of contact between the metal outlet of the refuelling hose and the fuel tank opening to reduce the risk of an explosion or fire due to a discharge of static electricity. • Always refuel in a well-ventilated area.
Stopping and climbing off a tractor safely	• Park on even ground • Shift the gear selector to neutral or park position • Disconnect power sources and secure implements • Lower blades, buckets or any other attachments to the ground and/or securely block these attachments • Lock the parking brake • Stop the engine and remove the keys • Only climb on or off a tractor that is stopped and stable • Do not dismount from a tractor while the engine is running unless the transmission is in the neutral, or park position and the parking brake is effectively engaged.

Section B: Tractor vehicle and attachments – common safety considerations

Table 2 provides guidance on some of the common risk and safety considerations specifically relating to tractor vehicles and their attachments.

If any of the information in this section is in conflict with manufacturer's guidelines, the manufacturer's instructions should be followed.

Table 2: *Risks and safety considerations common for tractor vehicle and attachments*

Tractor roll-over protective structures (ROPS)	• There are specific WHS requirements for ROPS on certain tractors. See **Section C** of this Appendix for more guidance.
Falling object protective structure (FOPS)	• If a tractor is capable of being used in situations which create a risk to the operator of falling objects (e.g. tree felling), then it should be designed for a FOPS to be fitted. • FOPS is a system of structural members and mesh sheeting attached to a tractor to provide the operator with protection from falling objects (e.g. branches, rocks and bales). • Refer to Section 7.3 Rollover protective structures and falling object protective structures, for more guidance on FOPS.
Front end loader attachments (FELs)	• FELs mounted to tractors are widely used and include: o single or multi-purpose buckets o pallet forks o bale and silage spikes o bale and silage clamps and grapples o blades and scrapers o lifting jibs o post hole augers. • See Section C of this Appendix for guidance on FELs.
Rear attachments – e.g. slashers	• See Section C of this Appendix for guidance on slasher attachments.
Service brakes	• Service brakes should be able to stop a fully laden tractor fitted with the heaviest recommended implement. • The service brake efficiency should be not less than 40 per cent as measured on a 'Tapley' brake meter. The parking brake or the service brake should hold the tractor with the heaviest recommended implement on a slope of 15 degrees.

Guards	• Guards should protect the operator or any other person from parts of the tractor which are potentially hazardous either when the tractor is in normal operation or undergoing routine maintenance. • Designers should ensure that the need for guarding is minimised in the design of the tractor. • An owner of a tractor who modifies or alters guards has the same duties as a designer and manufacturer. • Manufacturers should manufacture guards to the designer's specifications. • Suppliers should ensure that a tractor is sold fitted with the guards that were designed for it so that the designer's and manufacturer's requirements are met at the point of sale. • The guarding design requirements of *AS/NZS 2153: Tractors and machinery for agriculture and forestry – Technical means for ensuring safety* or other equivalent standard should be applied by a designer and manufacturer of the tractor.
Noise and ultraviolet radiation	• A tractor should be designed to minimise noise from engines, exhausts and vibrating tractor parts. • Sound should be deflected upwards and away from the operator. PCBUs must ensure that they, their workers and other persons at the workplace, are not exposed to noise that exceeds the exposure standard for noise. The WHS Regulation prescribes requirements for the control of excessive noise. • The use of canopies with ROPS and/or FOPS should be considered to minimise the operator's exposure to direct sunlight and ultraviolet radiation exposure.
Switches and levers	• Switches and levers should be designed to be within easy reach of the majority of potential operators and placed to reduce the risk of the wrong switch or lever being used. • Switches should be easy to identify and clearly labeled with their operations.
Engine features	• Tractors should have self-starting equipment. • Starting the engine should be by operation of a rotary or pullout switch, which is preferably key-operated to lessen the risk of accidental starting. • To prevent the engine starting when left in gear, the engine starting mechanism should be fitted with an interlock in the transmission or clutch. • Allow the engine to cool before removing the radiator cap, and be careful of escaping steam.
Screening	• Windscreens and glass fitted should be safety glass complying with *AS/NZS 2080 – Safety glass for land vehicles*. Alternatively, where any glazing material other than glass is fitted, it should be a clear material of a kind that does not shatter.

Seatbelts and seats	• Where the tractor is fitted with a seatbelt and a ROPS is present, the seatbelt should be worn by the operator if the tractor is moving. This will provide protection in the event of a tractor rolling over by keeping the driver within the protective zone offered by the ROPS. • A seat belt should be fitted to all seating positions on new tractors in accordance with ISO 6683 – *Earthmoving machinery – Seat belts and seat belt anchorages* or *AS 2664 – Earthmoving machinery – Seat belts and seat belt anchorages*. Seat belts should comply with *AS/NZS 2596 – Seat belt assemblies for motor vehicles* or with *SAE J 386 Operator restraint system for off- road work machines*. • The operator's seat should be fully adjustable, well sprung and well maintained to reduce vibration. The backrest should support the lower part of the back to minimize the risk of musculoskeletal disorders.
Ventilation	• Exhaust pipes and cab ventilation systems should be designed and constructed to ensure the operator does not inhale exhaust fumes. • Where a cabin is fitted, adequate ventilation facilities should be provided for the operator. • Filtration systems are required when spraying hazardous chemicals, and should be cleaned and maintained regularly.
Tractor entry and exit	• Operator access to and exit from a tractor should be designed to allow a person to get on and off the tractor easily. • All access surfaces should be non-slip and designed to prevent the build-up of dirt and mud.
Warning signs	• Warning signs should be attached to the tractor. They should include information about the normal operating speed of the power take-off. • Where a conversion assembly is available for changing tractor or implement speeds, an instruction placard specifying power take-off speed and corresponding draw bar adjustments should also be provided. • The warning signs should conform to *AS 1319 – Safety signs for the occupational environment*, be written in English and permanently attached to a conspicuous part of the tractor.

Section C: Tractor safety – roll-over protective structures and attachments

WHS Regulation section 216: Roll-over protection on tractors:

- The person with management or control of a tractor at a workplace must ensure that the tractor is not used unless it is securely fitted with a roll-over protective structure.
- If a tractor is used in a place that is too low for the tractor to work while it is fitted with a roll-over protective structure, the structure may be lowered or removed for the period during which the tractor is used in such a situation (but only if other measures to minimise the risk of roll-over are in place).
- This section does not apply if the tractor is—
    - installed in a fixed position, and in a manner which would no longer permit it to be used as powered mobile plant; or
    - a tractor with a mass of less than 560kg or a mass of 15,000kg or more; or
    - being used for a historical purpose or activity.
- In this section—
    - historical purpose or activity, in relation to the use of a tractor, includes an activity ancillary to a historical activity.
        Example of a historical activity - a historical display, parade, demonstration or re-enactment.
        Example of an activity ancillary to a historical activity— restoring, maintaining, modifying or housing a tractor used, or to be used, for a historical activity.
    - roll-over protective structure means a structure designed to protect a tractor operator from injury if the tractor rolls over in any direction.

1. Tractor roll-over protective structures (ROPS)

Note: It is recommended that a ROPS is installed on all tractors, regardless of their mass.

A roll-over protective structure is a structure designed and constructed to prevent or minimise the risk of death or injury to the operator of a tractor as a result of the tractor rolling over in any direction.

Approved ROPS may be available for early model tractors, even as far back as 1945. If these are unavailable from the manufacturer, a ROPS testing centre may supply an approved frame, or test a home designed frame.

An approved fold-down ROPS with a locking device may be more practical to use where a tractor is operating inside or close to buildings, or near trees.

Circumstances where tractors have overturned include:

- level ground
- uneven ground
- slight and steep slopes
- edges of depressions
- contour banks or water courses
- towing/pulling of light, heavy, stable and unstable loads.

ROPS fitted to tractors should comply with the standards outlined in:

- **AS 1636** Tractors – Roll-over protective structures, criteria and tests, or
- **AS 2294** Earth-moving machinery – Protective structures, or
- Any of the following international standards:
  - **ISO 3463** Tractors for agriculture and forestry—Roll-over protective structures (ROPS)— Dynamic test method and acceptance conditions
  - **ISO 3471-1** Earth-moving machinery—Roll-over protective structures—Laboratory tests and performance requirements
  - **ISO 5700** Tractors for agriculture and forestry—Roll-over protective structures (ROPS)— Static test method and acceptance conditions
  - **OECD Code 3** Standard code for the official testing of protective structures on agricultural and forestry tractors (dynamic test)
  - **OECD Code 4** Standard code for the official testing of protective structures on agricultural and forestry tractors (static test)
  - **OECD Code 6** Standard code for the official testing of front mounted roll-over protective structures on narrow-track wheeled agricultural and forestry tractors
  - **OECD Code 7** Standard code for the official testing of rear mounted roll-over protective structures on narrow-track wheeled agricultural and forestry tractors
  - **OECD Code 8** Standard code for the official testing of protective structures on agricultural and forestry tracklaying tractors
  - **SAE J 1040** Performance Criteria for Rollover Protective Structures (ROPS) for Construction, Earthmoving, Forestry, and Mining Machines
  - **SAE J 1194** Rollover Protective Structures (ROPS) for Wheeled Agricultural Tractors
  - **SAE J 2194** Roll-Over Protective Structures (ROPS) for Wheeled Agricultural Tractors
  - Other appropriate international standards.

An approved ROPS in service has an indefinite lifespan. Any sign of physical deterioration (e.g. dents, rust or cracks) may indicate problems. Cracks and fatigue often affect the mountings or brackets and these should be regularly inspected for any signs of deterioration. A damaged ROPS, whose structural integrity may have been adversely affected, indicated for example by deformation or cracking of the structure, should be replaced.

ROPS requirements for designers and manufacturers of tractors

Designers and manufacturers of tractors should ensure that tractors capable of rollover are either designed for a ROPS to be fitted or are fitted with a ROPS.

The design and construction of a ROPS is a skilled operation. The safety of a ROPS is dependent upon the frame yielding and absorbing energy to reduce the load transmitted to the mounting bolts and tractor body.

This type of design reduces the likelihood of continuous rollover while at the same time protecting the operator. A rigid frame, while being strong enough to withstand the rollover, may break the mounting bolts on the tractor or may suddenly fracture rather than yield. The performance of a ROPS under stress can only be determined by conducting a test to the relevant Australian Standard or equivalent overseas standard.

A rollover protective structure is usually tested by a ROPS testing centre. To be approved, a structure should be tested according to the procedures outlined in the standards listed for fitment of ROPS in this Appendix.

A manufacturer should ensure that every ROPS approved under AS 1636 or AS 2294 is legibly and permanently marked with the following information:

- the name and address of the manufacturer of the ROPS

- ROPS identification number
- make, model or serial number of the tractor(s) the structure is designed to fit
- the relevant Australian Standard or other acceptable standard with which the structure complies.

2. Front end loader attachments

Front end loader attachments (FEL) mounted to tractors are widely used and include:
- single or multi-purpose buckets
- pallet forks
- bale and silage spikes
- bale and silage clamps and grapples
- blades and scrapers
- lifting jibs.

A FEL is normally attached to a tractor via a sub-frame that is attached to the tractor. Positive engagement and secure retention of the FEL under different operating conditions can be provided by a quick detach and locking system from the sub-frame.

FELs should be supplied with a support stand which places the arms at the correct height to allow the tractor to be driven in or out when connecting or disconnecting the arms. The support stand should be located on a firm level surface capable of supporting the weight of the unhitched FEL.

Risk assessment

Before using a tractor and FEL, always do a risk assessment that considers the operator, machine, intended load and environment in which it will operate.

When assessing the risks involved with the use of a FEL consider:
- whether the operator has the appropriate level of skill and knowledge
- the potential for carried objects or loads to roll back or fall on the operator
- the capability of the front axle, wheels, steering and tyres of the tractor to accommodate the weight imposed by the FEL when it is fully loaded
- lift capacity of the tractor's hydraulic system
- if there is adequate clearance between tractor front tyres and FEL frame to eliminate contact during turns
- stability of the tractor operating a fully loaded FEL
- appropriateness of the selected FEL to lift the load
- operating conditions related to:
  - density of material to be handled (e.g. nature of material and whether it is wet or dry)
  - dimensions of the load to be lifted
  - speed of travel which affects stability on bumps or turns
  - load height during travel
  - terrain surface (direction of slope, undulations, and hardness of surface)
- whether the rated operating load (ROL) of the FEL will be exceeded.

The ROL is the load that can be safely lifted without reducing rear axle weight of the tractor by more than 50 per cent through weight transfer. If exceeded, the rear wheels will start to lift and lose traction increasing instability. Both lateral (sideways) and longitudinal (lengthwise) operating stability can be affected while lifting and moving a load in the raised position because of the equipment, terrain or nature of the operation undertaken.

Risk controls

A FEL should not be installed on a tractor unless it is fitted with a ROPS or a cabin incorporating ROPS which complies with *AS 1636 Tractors – Roll-over protective structures – Criteria and tests*.

The ROPS should preferably be a four post ROPS or a ROPS forward of the operator to provide a level of protection in the event of an object rolling back from the bucket or lifting mechanism.

Rollback of loads may also be prevented by using:

- specialised lifting attachments (e.g. bale spike)
- a level lift system
- a rollback guard
- lift height limiting device.

Figure 1 and **Figure 2** illustrate how rollback of loads could occur and how to minimise the risk.

Figure 1: *The angle of the earthmoving bucket attachment, relative to the ground, is greatly increased as the FEL is raised, which allows the load to rollback on the tractor or operator.*

Figure 2: *With self-leveling anti-rollback device incorporated into the FEL and its attachments, the angle remains the same and ensures the risk of rollback is eliminated when operated correctly.*[10]

Where there is a risk of objects or material falling onto the operator, the ROPS should be fitted with a falling object protective structure (FOPS) that complies with *AS 2294.1: Earth-moving machinery – Protective structures – Part 1: General.*

The FEL should be matched to the tractor. The hydraulic system needs to be able to provide the pressure and flow rate necessary to lift operating loads of the FEL. Each FEL should have a decal or plate specifying its ROL for the tractor model. Tractor manufacturer guidance can provide guidance on engine capacity, its hydraulic system and a satisfactory operating performance from the FEL.

Rear weights or ballast added to tractors fitted with FELs move the centre of gravity rearwards. This reduces the load on the front axle and improves stability. Ballast can occur as: rear wheel weights; water added to rear tyres; and counterweights or a weight box added to the three point linkage. The amount of ballast added depends on the load capacity of the tractor axel and tyres. The recommendations in the operator's manual provided by the tractor manufacturer should be followed.

Rear ballast also improves lateral stability. By lowering the centre of gravity and moving its position rearward away from the tipping axis, a greater tilt angle (critical tilt angle) would need to be exceeded before lateral roll-over would occur.

Widening the rear wheel track also improves lateral stability by further increasing critical tilt angle. However, traversing a slope or running with one wheel over an obstacle or in a depression decreases stability. It is important to scan the operating environment to identify visible hazards such as slopes, rocks, stumps, depressions or unstable ground.

Quick release hydraulic couplings enable easy attachment and detachment of hydraulic hoses. These should be clearly marked to avoid incorrect connection. All hydraulic pressure should be released before disconnection.

[10] Sourced from WorkSafe Western Australian *Safe use of tractors with attachments – A handbook for workplaces https://www.commerce.wa.gov.au/publications/safe-use-tractors-attachments-handbook-workplaces*

3. Slasher attachments

Slasher attachments are another commonly used tractor attachment. Before conducting maintenance or repair on a slasher attachment, the following should be considered:

- turning the engine off and remove the key
- applying the park brake
- doing the work with the tractor on flat level ground and chocking the wheels
- making sure safety prop(s) used to hold up the slasher will stay in place before getting underneath the slasher attachment.

Further information about safe work procedures when using equipment with hydraulics can be found in Workplace Health and Safety Queensland's *Hydraulics safety* guidance document.

Case study – Effective propping of slashers

There have been a number of incidents resulting in death or serious injury when a slasher attachment has dropped while a person was working underneath it during maintenance and repair – for example, when removing fencing wire that has wound around the vertical drive shaft, or replacing cutting blades.

This can occur when no props have been placed under the slasher and there is a complete reliance on the hydraulics to hold the slasher up.

However, there have been incidents where an attachment has dropped even though a pair of axle stands were positioned under the slasher skids, due to hydraulic creep on the three-point linkage and the design of the slasher itself.

The design of the slashers in question includes rear support chains, where the rear of the slasher is able to float – this is sometimes known as a collapsible headstock (see **Image 1**).

This design reduces the likelihood of damage when the tractor is being driven across uneven ground. Instead of damaging the slasher support frame or three-point linkage, the chain allows the rear of the slasher to "kick up" when it hits the ground.

Image 1: *Slasher with rear support chains*

The difficulty with slashers with collapsible headstocks, is that a side load, in addition to a vertical load, will be applied to the props.

There may be assumptions that only one prop, under the rear of the slasher, or two props under the slasher skids, will be adequate to ensure the slasher does not suddenly drop. However, this is not the case. As the slasher deck starts to creep downwards, the side load becomes greater until the force on the props causes them to pivot on the outside edge of their base plates (see **Image 2**). The force increases until the props are suddenly ejected and the slasher drops, sometimes crushing the props (see **Image 3**). This can happen so quickly that person(s) under the slasher would have no time to get out and the full weight slasher can suddenly come down on them.

Image 2: *Prop pivoting on its edge just before failure*

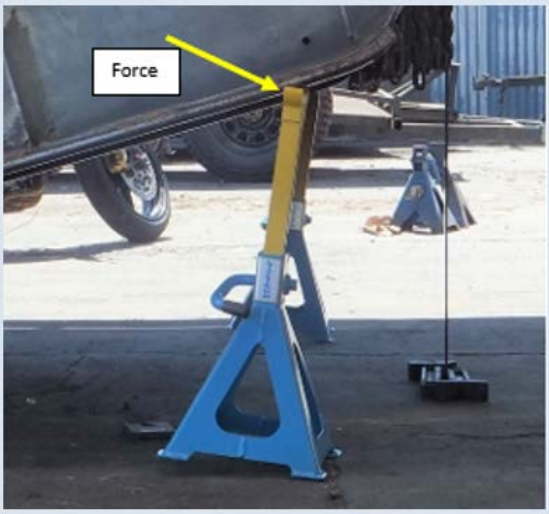

Image 3: *Prop base crushed due to force of slasher dropping*

Assuming that two props would not be ejected because there is not much creep on a tractor hydraulics is a false sense of security and should never be relied on as a safe system of work. To adequately control the risk of the slasher dropping, the propping systems need to be designed so that the props can withstand side loading and cannot be knocked out of position.

One example of an effective propping system is that shown in **Image 4**. In this system, designed by the slasher manufacturer, the props are in the shape of an “L”. The props are pinned between two steel plates that have been welded the top of the slasher deck (see **Image 5**). Once the props are pinned in position, they can withstand side loading and cannot become dislodged. The slasher will not drop, no matter how severe the hydraulic creep on the three-point linkage.

Image 4: *Manufacturer-provided props pinned in place*

Image 5: *Steel plates welded to slasher deck for pinning props*

Appendix 6: Quad bikes safety

Table 1 outlines some common risk assessment factors for quad bikes.

Table 1: *Common risk factors of quad bikes*[11]

Work activities with increased risk	• Spraying for pest and weed control • Mustering/herding/drafting stock • Moving materials • Operating at high speed • Hunting/pest control • Towing loads • Work that reduces the ability to focus on terrain ahead • Operating near other vehicles
Rollover	The roll-over risk is increased if the quad bike: • is traversing slopes • is travelling on slippery or shifting surfaces and in changing weather conditions • is in areas with hidden obstacles, such as paddocks • strikes an object • is travelling at high speed • is towing an implement • is carrying a high, heavy or unstable load (like chemicals for spraying) • has incorrectly fitted attachments or loads • is being used to muster stock • has tyres that are under, over or unevenly inflated.
Incorrect loading	Incorrect loading features that decrease stability and increase the risk of incidents include: • centre of gravity (usually high) • track width (usually narrow) • wheelbase (usually short) • length of travel suspension (usually long) • tyre pressure (usually low) • weight of attachments and load movement (e.g. fluid spray tanks) • loads being too heavy, unequally distributed or not secured properly.
Equipment and attachments hazards	• No rollover protection or OPD on the quadbike where there is a known risk of rollover • Loading hazards, including: o overloading o liquid loads, such as pesticide spray tanks o unstable, unbalanced or unsecured loads o over-sized trailers o exceeding tow capacity • Poor maintenance of both mechanical and safety items like brakes and suspensions • Incorrect tyre type and tread for conditions • Incorrect tyre pressure

[11] Sourced from WorkSafe Victoria: *Quad bikes on farms – A handbook for workplaces, March 2018*

	• Inadequate guarding to protect hands and feet
Operator characteristics	• Age: riders under 16 and over 60 are at increased risk of incidents. Riders under 16 must not operate adult quad bikes. • Strength/fitness: poor physical and mental health and drugs or alcohol in an operator's system • Lack of competency for the type of activity (e.g. lack of experience with mustering or spraying while operating a quad bike) • Unfamiliarity with terrain: this can increase incident risks
Operator behaviour	• Controlling the vehicle with one hand • Carrying working dogs on quad bikes • Use of quad bike when it is not the most suitable or safest vehicle for the job • Failure to observe manufacturer's safety warnings or recommendations • Failure to wear adequate PPE such as helmets, sturdy footwear or eye and hearing protection • Excessive speed • Single seat quad bikes used to carry passengers
Environment risk factors	• Any environment factors that negatively affect vision – e.g. bright sunlight, night time, fog. • Fences that are hard to see • Obstacles – overhead, ground level or hidden in long grass (e.g. stumps and animal burrows) • Terrain variations, including: o mud o sand o uneven, broken ground o floods or frost o sloping and steep terrain • Unpredictable surface changes • Concrete or bitumen surfaces • Chemical exposure
Private use activities	• A significant number of on-farm deaths are associated with outside work activities. These incidents often involve children, including farm visitors, riding adult-sized quad bikes.

Table 2: *Quad bike vehicle selection common considerations*[12]

Identifying the operator needs, safety and capability issues	• **Tasks**: What tasks will the vehicle be used for? What is the size of the property? • **Conditions**: What terrain and conditions will it be used in (e.g. rocky or hilly country, mud, sand)? Will the environment change (e.g. seasonal weather patterns)? • **Safety**: Which type of vehicle is safest for each task? Will safety improvements be needed (e.g. an operator protective device)? Are the quad bike breaks and suspension operating effectively? • **Passengers**: Does the vehicle need to carry passengers? What is the seat carrying capacity? • **Operator**: Who will be operating the vehicle? What experience do they have? Do they have the physical capacity to ride and control the vehicle? What training will they need? What size and age are they? Who has the skills and expertise to train the operators? • **Protective equipment**: Are there helmets for the operator? What other protective gear is needed? • **Potential road use**: Will the vehicle be used on the road? • **Loads**: What will be carried and how much will it weigh? What is the load carrying capacity? • **Attachments**: What vehicle attachments are available and suitable? Will they be easy to attach or will they need modification? • **Towing**: Will the vehicle be used to tow trailers or other attachments? What is the maximum weight and height the vehicle will need to tow? • **Condition**: What is the gear ratio, suspension, drive mechanism and reverse gear functionality?
Comparing vehicle options to workplace needs	• Quad bikes may not be the most suitable choice when more power is needed. Choose a vehicle that is suitable for work use, not a powerful sports recreational model. • Larger and more powerful bikes may not be as safe for tasks like mustering – consider aggressiveness of the throttle action and changing gears on the move, especially for inexperienced operators.
Seeking information	• Questioning and seeking information from dealers and others with relevant knowledge.

[12] Sourced from Department of Mines, Industry Regulation and Safety, Western Australia *Quad Bikes in Workplaces Guide, 2021*

Table 3: *Quad bike task risks and examples of alternative vehicle considerations*[13]

Task	Risks	Alternatives
Checking parts of the farm Quad bikes are invaluable for inspecting and accessing remote parts of the farm, when used without attachments and on level surfaces.	Rollover Collision Unpredictable surface changes	Farm ute, four-wheel drive (4WD) Two-wheel agricultural motorbike Horse SUV (sometimes called a multi-purpose vehicle) Side-by-side vehicle (SSV)
Transporting Quad bikes are often used for transporting the operator and small loads around the farm.	Rollover Collision	Farm ute, 4WD SUV SSV Small tractors (that also function well in wet conditions) Two-wheel agricultural motorbike
Moving produce on the farm When used within their load and towing capacities, quad bikes are useful for carting boxes of fruit, vegetables, hay and small animals.	Rollover Collision Loss of traction on downhill slopes Overload	SUV SSV Farm ute, 4WD Tractor with trailer
Spraying weeds Quad bikes may have fitted or towable spray tanks.	Unstable load may change centre of gravity and make vehicle less stable Loss of traction on downhill slopes Rollover Collision Overload Chemical exposure	SUV SSV Farm ute, 4WD Small tractor Knapsack spray
Mustering Quad bikes have proved very useful for mustering and moving sheep and cattle.	Rollover Collision Hidden obstacles	Two-wheel agricultural motorbike Farm ute, 4WD Horse Helicopter

[13] Adapted from Worksafe Victoria, *Quad Bikes on farms* and Australian Centre for Agricultural Health and Safety, *Safety of quads and side-by-side vehicles on Australian farms – a practical management guide*, 2016

Table 4: *Quad bikes assessment tool*[14]

Assess your risk		**Terrain**					
Use this table to cross reference common quad bike tasks against typical farm terrain. If you identify you're at risk or rollover, it's your duty to reduce that risk – cosider eliminating the task, using an alternative vehicle or fitting an OPD		Road or track	Farm track, path or driveway	Slippery or shifting surface, changing conditions due to weather	Sloped ground	Paddock or area with obstacles	Loading ramp
		Good surface, no bumps, pot holdes, wheel nuts, centre raise, or imperfections	May include wheel nuts, pot holes, centre section raised or other imperfections	Sandy or muddy terrain (with or without track)	Hill, rise, gully, creek embankment	Potential for obstacles such as rocks, timber, rabbit warren, stock clumped grass, foliage, low hanging branches	Driven via a rated and sufficiently long ramp onto transport such as a ute or trailer
Task							
Personal transport	Transport only (light tools or equipment)	Low risk	Medium risk	Medium risk	High risk	High risk	High risk
Moving materials or equipment	Extra weight added to racks changes handling and causes the quad to be less stable	Medium risk	Medium risk	High risk	High risk	High risk	High risk
Travelling at speed	Speed decreases stability and increases harm if there is an incident	Medium risk	High risk	High risk	High risk	High risk	High risk
Mustering stock	Sudden movements, distraction from terrain	Medium risk	High risk	High risk	High risk	High risk	High risk
Towing trailer	Trailers can affect quad bike handling, and increase the stopping distance	Medium risk	High risk	High risk	High risk	High risk	High risk
Spraying	One hand on spray tool, distraction from terrain, shifting load (liquid)	High risk	High risk	High risk	High risk	High risk	High risk

14 Adapted from Western Australia, Department of Mines, Industry Regulation and Safety, *Quad Bikes in Workplaces Guide, 2021*

Appendix 7: Side-by-side vehicle (SSV) safety

Table 1 outlines some common the risk assessment factors for SSVs.

Table 1: *Common risk factors of SSVs*[15]

Work and vehicle suitability	Before deciding how the job will be done, PCBUs need to consider the nature of the task and environmental conditions such as weather, ground conditions and terrain. Sometimes these conditions need to be reassessed daily, or even hourly, depending on the weather and drying times for the ground surface. Things to consider include: • What is the most suitable type of vehicle for the task? For example, a ute, a tractor, or walking may be safer options in some situations. • What is the main task? For example, mustering stock, spraying, moving tools and equipment? • What other jobs need to be done? • Does a load need to be carried or towed? • What is the type of ground that will be driven over? • What condition is the ground in? • How much experience and training does the operator have with an SSV? • What's the weather forecast?
Risk of overturn, being thrown around, hit by objects	Risk of overturn, being thrown around, or being hit by object is increased if the SSV: • is traversing slopes • has no seatbelts fitted, or seatbelts are not used • is travelling on slippery or shifting surfaces and in changing weather conditions • is in areas with hidden obstacles, such as paddocks • strikes an object • is travelling at high speed • is towing an implement • is carrying a high, heavy or unstable load (like chemicals for spraying) • has incorrectly fitted attachments or loads • has tyres that are under, over or unevenly inflated.
Incorrect weight distribution	• The correct distribution of weight on-board is important, particularly when carrying a load or on uneven surfaces. • Risk increases if loads carried on the cargo bed exceed the recommended weight or are not secured against movement.
Equipment and attachments	Common equipment and attachment hazards include: • tyres are not the correct pressure and do not have enough tread • wheel nuts are not firmly secure • poor brakes maintenance • damaged seatbelts

[15] Adapted from WorkSafe New Zealand, *Using your side-by-side safely – The right way every time, June 2019,* Health and Safety Executive, United Kingdom, *Safe use of all-terrain vehicles (ATVs) in agriculture and forestry,* and WorkSafe Victoria, *Side-by-side vehicle safety, https://www.worksafe.vic.gov.au/safety-alerts/side-side-vehicle-safety, June 2020*

	• active safety system, such as traction control, does not work as intended • poor maintenance of ROPS, such as rust on the frame • the engine or other heat-producing components of the machine are covered in dirt, oil, grass, insects or other debris • the lights do not work or are dirty • the steering is loose • inadequate guarding to protect hands and feet.
Operator and passenger age	• Riders of all ages are at risk of serious injury or death, but particularly those under 16. • Passengers and bystanders are also at risk. • Young people, particularly those under 16, do not have the skills, abilities or judgement to operate a SSV safely. They: o may not be able to react fast enough to stop an accident happening o may not be a good judge of speed and distance o may not have enough experience handling vehicles in challenging environments o may take more risks. • The risk to injury is significant to passengers under eight or children who cannot to sit comfortably with their feet on the floor and they can reach and hold on to the grab bar.
Operator behaviour	Behaviour that can increase the risk of SSV misuse includes: • use of SSV when it is not the most suitable or safest vehicle for the job • failure to observe manufacturer's safety warnings or recommendations for use • failure to wear adequate PPE such as helmets, sturdy footwear or eye and hearing protection • excessive speed • failure to install or use seatbelts.
Environment	• Rain, heavy winds, extreme heat and other weather events can affect ground conditions very quickly. • Tracks can become slippery or bumpy. • A storm could bring down trees that block a route and make it off-limits. • If an operator cannot see what the ground conditions are like, then the operator should get off the SSV and walk the area before they drive on it. • Look out for holes, rocks or other obstacles, grooves and uneven ground. Vegetation (e.g. plants) can cover up unsafe surfaces that could make a side-by-side vehicle unstable.

Appendix 8: Working near overhead and underground electric lines

A summary of managing overhead and underground electric lines risks is outlined below. It is recommended that the *Electrical safety Code of Practice – Working near overhead and underground electric lines* is used for further guidance.

ES Regulation section 68 : Duty of a PCBU to ensure, so far as is reasonably practicable, that no person, plant or thing at the workplace comes within **an unsafe distance** of an overhead or underground electric line.

ES Regulation section 69: An exclusion zone, for a person, operating plant or vehicle for an overhead electric line means the distance from the line stated for the person, plant or vehicle in **Schedule 2 of the ES Regulation.**

Any operating plant, or a vehicle, comes within an unsafe distance of an overhead electric line if the operating plant or vehicle is within the exclusion zone for the operating plant or vehicle for the line.

Note: Know the exclusion zones.

- ✓ Exclusion zones are the safety envelope around overhead electric lines. No part of a worker, operating plant or vehicle should enter an exclusion zone while the overhead electric line is energised (live).
- ✓ The exclusion zone distances are contained in ES Regulation *Schedule 2.*
- ✓ PCBUs must keep themselves and anything associated with the work activity out of the exclusion zone (i.e. a safe distance) unless: it is not reasonably practicable to do so; and the PCBUs complies with the requirements of section 68(2) of the ES Regulation to ensure:
  - that a risk assessment is conducted
  - control measures implemented are consistent with:
    - the risk assessment
    - requirements of electricity entities (if an electricity entity is responsible for the electric line).

Identifying hazards

Potential electrical hazards may be identified in a number of different ways including:

- talking to workers and observing where overhead electric lines (including private electric lines) are located
- accessing **Before You Dig Australia (BYDA)** at **byda.com.au** for a free enquiry on **underground electric lines**
- accessing **lookupandlive.com** for **overhead and underground electric line** information
- contacting relevant authorities about the location of any underground electric lines that may be near the excavation. Authorities may include:
  - electricity entities such as Energex or Ergon
  - communication companies such as Optus and Telstra
  - local government authorities
  - water authorities.

Risk assessment

For work near overhead or underground electric lines, risk assessment involves:
- injury to a worker
- damage to property, plant or equipment
- coming within an unsafe distance of an electric line.

This step will help to determine the level of associated risk for each task and in selecting control measures based on that risk level. A copy of the assessment should be kept for future reference.

See the *Electrical safety Code of Practice – Working near overhead and underground electric lines* for more guidance on risk assessment for work near overhead or underground electric lines.

Risk controls

Note: This section should be read in conjunction with the hierarchy of controls guidance in Section 5 How to manage risks from rural plant.

Elimination

The best way of eliminating these hazards is to prevent people, plant, equipment and materials from coming close enough to energised overhead electric lines for direct contact or flash over to occur.

This may include:
- no planting of crops where there is a risk of contact with overhead electric lines
- de-energising the electric line during work
- isolating and earthing the line (or equivalent for low voltage or rail) so it is not live during work
- no fencing or driving star pickets into the ground where there is a risk of contact with underground electric lines
- re-routing the electric line away from the work area
- replacing existing overhead electric lines with underground electric lines.

Note: de-energising or moving electric lines should be arranged with the electricity entity as soon as possible because, depending on the circumstances, it may take some time to arrange.

Substitution

Minimise the risk by substituting or replacing a hazard or hazardous work practice with a safer one.

This may include performing the work another way, for example:
- using alternative plant which cannot enter an exclusion zone
- using non-conductive tools designed to reduce the possibility of direct contact with the overhead electric line
- using ultrasonic measuring devices, instead of the mechanical types, for measuring heights of overhead lines.

Isolation

Minimise the risk by isolating or separating the hazard or hazardous work practice from people. For example, erecting a physical barrier to prevent any part of the plant or equipment from entering an unsafe distance, or, similarly, to prevent a person, anything held by a person, or anything attached to a person from entering an unsafe distance. A physical barrier should consist of non-conductive material like wood or plastic. The barrier should be erected safely which may entail isolating the electricity supply while the barrier is installed.

Engineering controls

Engineering controls are physical control measures to minimise risk, for example:

- limiting movement of plant with mechanical stops
- fitting plant with programmable zone limiting devices
- mechanically limiting slew speed of a crane to slow
- using electrically insulated plant and equipment.

Administrative controls

Administrative controls are work methods or procedures designed to minimise exposure to a hazard, for example:

- fitting sensors and a warning device to plant to alert operators when they are about to enter an unsafe distance
- making hazards more visible by:
  - using warning signs to indicate the location of overhead electric lines and defined work areas
  - arranging for the electricity entity to identify exposed energised low voltage conductors, up to and including 1000 volts and fitting them with approved visual indicators like sheeting or sleeves (e.g. tiger tails). Noting:
    - a competent person should inspect visual indicators each day before starting plant operations
    - if visual indicators have moved or been damaged, the electricity entity should be contacted so they are replaced or located in the correct position.
- managing and supervising the work to ensure:
  - safe work practices and procedures are followed
  - safe work method statements (SWMS) are developed where necessary
  - appropriately trained and qualified people are authorised to carry out the work
  - emergency equipment is provided and readily accessible on site, including first aid kits and fire-fighting equipment suitable for electrical fire, and workers are trained in the correct usage and application in the event off an emergency
  - emergency plan and rescue procedures are followed if there is contact with overhead electric lines, and workers are trained in the correct usage and application in the event off an emergency
  - an emergency plan including contact with energised electric lines is developed and documented with input from workers performing specific tasks
  - work is done very carefully and in an un-hurried, considered manner, as haste can be dangerous
  - a safety observer is used to warn people and plant operators when they are likely to come closer within an unsafe distance of an electric line. A safety observer should be employed when an operating plant is operating within a safety observer zone, as illustrated in **Figure 1**.
  - exclusion zone distances are strictly maintained.

Personal protective equipment (PPE)

PPE for electrical risks is the lowest order control measure in the hierarchy of controls. Examples of PPE include:

- insulating gloves that offer personal hand protection for workers against electrical shocks
- rubber soled boots
- safety helmets
- standing on a rubber insulating mat
- standing on an equipotential conductive mat
- appropriate non-flammable clothing.

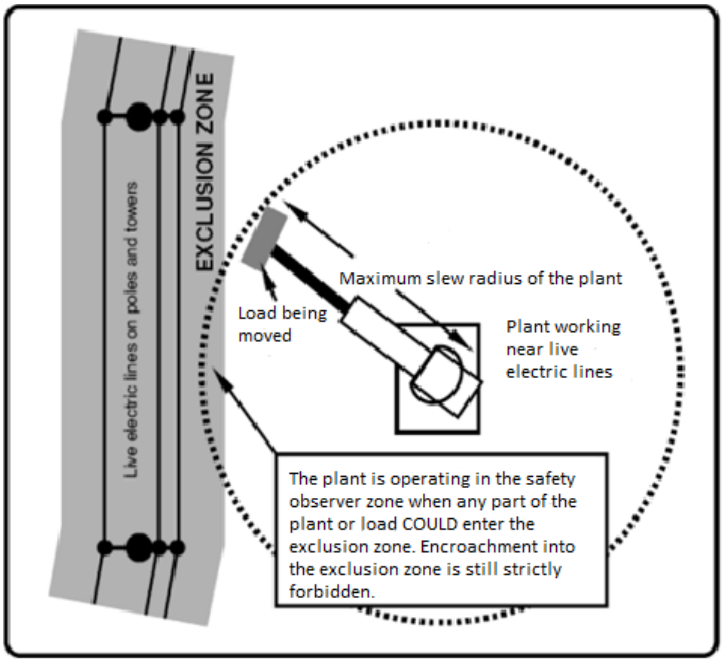

Figure 1: *Overhead electric lines and safety observer zones.*

See the *Electrical safety Code of Practice – Working near overhead and underground electric lines* for more guidance on risk assessment for work near overhead or underground electric lines.

Appendix 9: Set up and safe use of elevating work platforms (EWPs)

To reduce the risk of injury to people who operate EWPs, ensure the following occur:

- operators are fully trained in safe work procedures
- EWPs are regularly inspected and maintained
- EWPs purchased are designed and manufactured to AS1418 Parts 1 and 10
- EWPs are used in accordance with AS2550 Parts 1 and 10.

The risk of injury to people can also be reduced through examining tasks and work locations. Identify and assess safety risks by:

- ensuring operations are planned and safe e.g. check for soft or uneven ground
- not using an EWP on sloping ground beyond its stated design capability
- keeping safe clearances when working near overhead electric lines, which includes handheld harvesting and pruning equipment
- not exceeding the safe working load (SWL) of the EWP
- ensuring a clean work area around the EWP
- staying within the platform when the EWP is elevated
- using a lookout when the view from the platform is obstructed
- undertaking a risk assessment to mitigate a fall from height, such as assessment whether the operator should wear a fall restraint system or a fall arrest system.

The risk assessment to mitigate a fall should consider:

- height of trees to be harvested or pruned
- EWP stability including ground surface firmness and configuration issues that could arise from past agricultural practice e.g. tree stump removal, animal activity, melon holes and cultivated or natural slopes
- presence of any ground obstacles that could contribute to injury if a person were to fall or jump from the platform
- likelihood of the need for a rapid exit or descent because of swarming or biting insects
- the presence of obstacles or obstructions and overhead electric lines
- any other site-specific risks identified.

Appendix 10: Confined spaces

A '**confined space'** means an enclosed or partially enclosed space that:

- is not designed or intended primarily to be occupied by a person; and
- is, or is designed or intended to be, at normal atmospheric pressure while any person is in the space; and
- is or is likely to be a risk to health and safety from one or more of the following:
  - an atmosphere that does not have a safe oxygen level
  - contaminants, including fluids, airborne gases, vapours and dusts, that may cause injury from fire or explosion
  - harmful concentrations of any airborne contaminants
  - engulfment (e.g. wall or structural collapse)
- but does not include a mine shaft or the workings of a mine.

Injuries

Fatalities or severe injuries from confined spaces can occur from the following:

- oxygen deficiency in the confined space which could be caused by:
  - slow oxidation reactions of either organic or inorganic substances (e.g. internal rust)
  - rapid oxidation (combustion)
  - the dilution of air with an inert gas
  - absorption by grains, chemicals or soils
  - physical activity
  - chemicals, including fumigant residue such as phosphine.
- oxygen excess in the confined space which could be caused by a leaking oxygen supply fitting such as in gas cutting or heating equipment
- the presence of contaminants on surfaces or in the atmosphere. Contaminants could be in the form of solids, liquids, sludges, gases, vapours, fumes or particulates. The sources of atmospheric contaminants encountered could result from:
  - the manufacturing process
  - the substance stored, or its by-products – for example, disturbing decomposed organic material in a tank can liberate toxic substances such as hydrogen sulphide
  - biological hazards such as bacteria, viruses or fungi that are present
  - the operation performed in the confined space – for example, painting with coatings containing toxic or flammable substances, and welding or brazing with metals; capable of producing toxic fumes.
- operation of moving equipment – for example, being trapped by augers, crushed by rotating parts such as conveyor belts or accidental operation of equipment such as sweep augers (thereby causing suffocation)
- uncontrolled introduction of steam, water or other gas or liquid (e.g. asphyxiation from exhaust gasses from pumps or generators in pits)
- suffocation by solids (e.g. grain, sand, flour, or fertilizer)
- electrocution
- explosion or fire.

Risk assessment

Undertaking work in confined spaces can greatly increase the risk of injury from hazards, such as:

- noise which could be caused by hammering or the use of equipment within the confined space
- temperature (either high or low) which can result from the work process or the weather conditions, or where appropriate ventilation or appropriate clothing is not supplied or worn

- manual tasks that involve high or sudden forces while working in sustained or awkward postures
- smooth or contaminated surfaces underfoot that can result in a slip, trip or fall.

Confined spaces requirements exist under the WHS Regulation. For this reason, when carrying out an assessment of the risks associated with a confined space, a PCBU should consider:

- alternate work methods that do not require a person to enter the confined space
- all proposed operations and work procedures, particularly those that could cause a change in the conditions in the confined space
- the soundness and security of the overall structure and the need for illumination and visibility
- the identity and nature of the substances last contained in the confined space
- the steps needed to bring the confined space to atmospheric pressure
- all hazards which could be encountered (e.g. entrapment)
- the status of fitness and training of people involved in confined space work
- adequate instruction of people in any work procedure required, particularly those which are unusual or non-typical, including the use and limitations of any PPE and mechanical or other equipment to be used
- the availability and adequacy of appropriate PPE, protective clothing and rescue equipment for all persons likely to enter the confined space
- whether signs comply with *AS 1319 Safety signs for the occupational environment*, and indicate that entry is permitted only after signing the entry permit in a manner appropriate to the persons at the workplace
- the need for additional protective measures, for example:
  - prohibition of hot work in adjacent areas
  - prohibition of smoking and naked flames within the confined space and, where appropriate, the adjacent areas
  - avoidance of contamination of breathing atmosphere from operations or sources outside the confined space, such as from the exhaust of an internal combustion engine
  - prohibition of movement of equipment such as fork-lifts in adjacent areas
  - prohibition of spark generating equipment, clothing and footwear
- whether cleaning in the confined space is necessary
- whether hot work, such as welding, heating or cutting is necessary.

Risk controls

When controlling the risks associated with confined spaces, PCBUs should ensure:

- atmospheric monitoring is conducted prior to and during the entry to the confined space
- a stand-by person is present outside the confined space and is able to communicate with those inside the confined space
- appropriate signs and protective barriers are erected to prevent entry of persons not involved in the work
- the provision of suitable equipment for workers entering confined spaces should include, where necessary, the following:
  - PPE
  - rescue equipment
  - first-aid equipment
  - fire suppression equipment
- suitable supplied-air respiratory protective device is worn where:
  - the results of the assessment or monitoring indicate that a safe atmosphere cannot be established or might not be maintained, or

    - the nature of the work procedure within the confined space is likely to degrade or contaminate the atmosphere in the confined space, for example hot work, painting or removal of sludge
- suitable safety harnesses and safety lines or rescue lines are worn where:
    - there is a hazard of falling during ascent or descent; or
    - rescue by a direct route, either vertical or horizontal is practicable
- precautions are taken to eliminate all sources of ignition where a flammable atmosphere is likely to exist
- no cylinder of compressed gas, other than those for self-contained breathing apparatus, is taken into the confined space
- any portable ladder used is firmly secured to prevent movement.

Appendix 11: Remote or isolated work and fatigue management

1. Remote or isolated work

Remote or isolated work is work that separates someone from other people and can make it harder to get help such as rescue, medical assistance, and emergency services. This can be due to location, time, or the nature of the work being done. In some situations, a worker may be alone for a short time. In other situations, the worker may be on their own for days or weeks in remote locations, for example on sheep and cattle stations.

Examples of remote and isolated workers are farm workers completing tasks alone, such as ploughing and sowing, changing irrigation, and bore running.

Risks of remote or isolated work

The risks of remote and isolated work are that workers:

- may not have access to telecommunications
- will not be able to get help in an emergency
- are more vulnerable
- may be at a higher risk of experiencing work-related violence and aggression
- might not receive important information, training, or instructions, or the necessary supervision
- are more likely to suffer psychological distress (such as anxiety, stress, fear, and depression) because of their work, which could lead to an increased risk of serious injury, or suicide. They could, for example, be psychologically affected by:
  - the negative impact working away from home can have on family relationships
  - feeling excluded and disconnected because of the lack of social, emotional, and practical support from colleagues
  - environmental issues, such as drought in the agricultural industry.

The PCBU may also not be familiar with the remote-working environment and its potential hazards, which could increase the risk to workers.

Risk assessment

Some of the factors that should be considered when assessing the risks are outlined in **Table 1**.

Table 1: *Common risk factors for remote or isolated work*

Time	• The length of time the person needs to be alone to finish the job. • The time of day when a person may be working alone (e.g. work with rural plant during the night may increase the hazards).
Communication	• What forms of communication does the worker have access to? • Are there procedures for regular contact with the worker? • Will the emergency communication system work properly in all situations? • If communication systems are vehicle-based, what arrangements are there to cover the worker when he or she is away from the vehicle?

Location	• Is the work in a remote location that makes immediate rescue or attendance of emergency services difficult? • What is likely to happen if there is a vehicle breakdown?
Nature of the work	• What machinery, tools and equipment may be used? • Are high risk activities involved? For example, work at heights, work with electricity, hazardous substances or hazardous plant. • Is fatigue likely to increase risk? For example, with long hours driving a vehicle or operating machinery. • Is there an increased risk of violence or aggression when workers have to deal with other persons by themselves? • Can environmental factors affect the safety of the worker? For example, exposure to extreme hot or cold environments. • Is there risk of attack by an animal, including reptiles, insects and sea animals?
Skills and capabilities	• What is the worker's level of work experience and training? Is the worker able to make sound judgements about his or her own safety? • Is the PCBU aware of pre-existing medical conditions that may increase risk?

Risk controls

PCBUs and workers can work together to reduce the risks of remote and isolated work. PCBUs have a duty to, as far as it's reasonably practicable:

- put measures in place to protect remote and isolated workers from risk
- make sure workers can communicate effectively and get help if needed
- ensure no other persons' health or safety is put at risk through the PCBU's business or undertaking.

Measures to reduce the risks of remote work include:

- **communication systems**—the type of system chosen depends on the distance from the base and the environment in which the worker will be located or through which they will be travelling. Expert advice and local knowledge may be needed to assist with the selection of an effective communication system.
- **movement records**—knowing where workers are expected to be can assist in controlling the risks, for example call-in systems with supervisors or colleagues. Satellite tracking systems or devices may also have the capability of sending messages as part of a scheduled call-in system, and have distress or alert functions.
- **worker/employee check-in apps**—PCBUs may consider apps that have features such as GPS location and last known location, scheduled check-ins, emergency check-ins, automatic worker down detection and a panic button.
- **training, information and instruction**—a PCBU has a duty to provide information, training and instruction suitable for the nature and risks of the work and the controls being put in place to manage the risks. Workers need training to prepare them for working alone and, where relevant, in remote locations. For example, training in using communications systems, administering first aid, obtaining emergency assistance, driving off-road vehicles or bush survival.
- **first aid**—a PCBU has specific obligations under the WHS Regulation in relation to first aid requirements in the workplace. Further guidance regarding first aid and supplying first aid kits is located in the *First aid in the workplace Code of Practice.*
- **buddy system**—some jobs present such a high level of risk that workers should not work alone, for example jobs where there is a risk of violence.

- **workplace layout and design**—workplaces and their surrounds can be designed to reduce the likelihood of violence, for example by installing physical barriers, monitored CCTV and enhancing visibility.

Workers need to consider the risks of remote or isolated work and make sure they can communicate and get help if necessary. Steps workers can take to stay safe include:
- telling someone where they are going and when they will return
- communication equipment to stay in touch, for example, a mobile phone, 2-way radio, or satellite phone
- taking enough water and food
- have a call-in system (e.g. if workers are on a farm, arranging to call in via 2-way radio at specific times, or when they move to another location)
- available first-aid equipment and knowing how to use it
- access to an emergency position-indicating radio beacon (EPIRB) or GPS tracking system
- including a list of emergency numbers and property GPS coordinates on a card nearby
- not working alone.

Note: Further guidance on managing remote or isolated work is available in:
- *Managing the risk of psychosocial hazards at work Code of Practice*
- *Managing the work environment and facilities Code of Practice*
- *How to manage work health and safety risks Code of Practice.*

2. Fatigue[16]

Fatigue is more than feeling tired and drowsy. At work, it is a state of mental and/or physical exhaustion that reduces the ability to work safely and effectively. Fatigue can be caused by factors that may be work related, non-work related or a combination of both and can build up over time.

Farmers can be at increased risk from the effects of fatigue because they work with rural plant and animals and therefore need to be highly alert all the time. Fatigue impacts alertness, which may lead to mistakes and an increase in incidents and injuries, particularly when:
- operating fixed or mobile plant, including driving vehicles
- doing critical tasks that need a lot of concentration
- doing night or shift work when a person would be normally sleeping.

Risk assessment

The effects of fatigue can be short or long term. In the short term, a person may show signs or report symptoms like:
- constant yawning or falling asleep at work
- short-term memory problems and a hard time concentrating
- finding it hard to join in conversations
- bad decision-making and judgment
- reduced hand-eye coordination or slow reflexes
- changes in behaviour (e.g. repeatedly arriving late for work)
- increase in unplanned absence.

The major factors that can contribute to and increase the risk of fatigue include:
- work schedules (e.g. shift work, night work, hours of work and breaks)

[16] Adapted from Safe Work Australia, *Guide for Managing the Risk of Fatigue at Work, November 2013*

- job demands (e.g. the amount of work being done)
- environmental conditions (e.g. working in cold or hot conditions)
- sleep (e.g. length of sleep time, quality of sleep and time in between sleeping)
- non-related work factors.

To identify if any of these factors are contributing to fatigue in workers, PCBUs can:
- consult with workers, including managers, supervisors and health and safety representatives about workloads and schedules (see Section 4 Consultation)
- look into work practices and systems of work (e.g. the amount of choice workers have over their work hours)
- look into worker records (e.g. sign-out sheets)
- look for advice and information on fatigue from relevant experts and studies
- check over incident data including incidents travelling to and from work
- look into human resource data (e.g. unplanned absenteeism).

When assessing the risks associated with fatigue in the workplace and the severity of harm that could result, the following questions can assist:
- How likely it is that fatigue may arise?
- What is the nature of work being performed?
- How severe would the impact of this be?
- Could the hazard cause death, serious injuries, illness or minor injuries?
- How many people are exposed to the hazard and how many could be harmed in and outside the workplace?
- Could a small error escalate to a much larger error with more serious consequences?
- Is there any information regarding previous fatigue-related incidents in the workplace?
- Do control measures exist and are they adequate?
- Is there data from fatigue management audits or walk throughs?

A risk assessment can help PCBUs figure out:
- where, which and how many workers (including contractors and subcontractors) are; likely to be at risk of becoming fatigued
- how often fatigue is likely to happen
- the degree of harm that may result from fatigue
- whether any effective control measures are in place and if they are effective
- what actions to take to control the risk of fatigue
- how quickly to act.

Risk controls

The best way to control the health and safety risks arising from fatigue is to eliminate the factors causing fatigue at the source. If elimination is not reasonably practicable, the risks must be minimised.

What is reasonably practicable to do to manage the risk of fatigue will vary depending on the type of industry, the structure of an organisation as well as the person carrying out the work.

Factors contributing to the risk of fatigue are often inter-related. Incorporating a combination of control measures into general workplace systems, as well as control measures specific to the work, can help to minimise more than one contributor to fatigue. For example, increasing the amount of time between shifts and adjusting shift starting times may improve the opportunity for sleep.

Control measures that can be considered include, but are not limited to:
- **work scheduling** (e.g. making sure workers take regular breaks)

- **shift work and rosters** (e.g. consideration of whether it is feasible to set shift rosters ahead of time to allow workers to plan leisure time)
- **job demands** (e.g. consideration of whether it is feasible to introduce job rotation to limit a build-up of mental and physical fatigue)
- **environmental conditions** (e.g. providing a cool area where workers can take a rest break and rehydrate in hot work environments)
- **non-work-related conditions** (e.g. developing a fatigue policy for all workers including managers and supervisors).

A **fatigue policy** may be an effective way to communicate a PCBU's procedures to workers. If PCBUs do use a policy, they may consider including information like descriptions on roles and responsibilities of supervisors and workers and the maximum shift length.

Additionally, providing information and training to workers about fatigue and the associated risks can assist with minimising the risk of fatigue at work.

Note: Further guidance on fatigue management is available in:
- *Preventing and managing fatigue-related risk in the workplace* guide published by WHSQ
- *Managing the risk of psychosocial hazards at work Code of Practice*
- *Guide for managing the risk of fatigue at work* published by Safe Work Australia.