

This Guide includes information on the potential hazards of plant and equipment used in forestry operations and practical examples of ways you can control the risks associated with them. It is part of a series of forestry industry material and should be read and used together with the *General guide for managing risks in forestry operations* and specific guidance material for:

- [growing and managing forests](#)
- [cable logging](#)
- [coupe and harvesting site access and preparation](#)
- [timber harvesting operations](#)
- [log landings](#)
- [log extraction](#)
- [loading, transporting and unloading logs](#)
- [infield processing of forest products, and](#)
- [general hazards in forestry operations.](#)

These guides are available on the Safe Work Australia website.



Selecting machinery

When selecting machinery it is important to ensure designers, manufacturers, importers and suppliers have met their work health and safety responsibilities for controlling the risks of plant, so far as is reasonably practicable. Suppliers need to take all reasonable steps to obtain and provide information like maintenance and operational documents when the plant is supplied. For example, this can be the operator manual and inspection and maintenance schedule from the manufacturer.

During the planning stage the equipment to be used should be checked to ensure it is suitable for the intended use and it has been inspected and maintained according to the manufacturer's specifications.

All chainsaws used in forestry operations should follow the recommendations of AS 2726-2004 (Series): *Chainsaws – safety requirements*.

Forest machinery like harvesters, skidders and forwarders have common design and operational issues that should be considered. These include:

- operator protective devices and structures e.g. seat belts, roll over protective structures (ROPS) and falling object protective structures (FOPS)
- compliance with Australian or overseas design standards including any attachments
- compatibility and design standard compliance of attachments for plant
- suitability of the machinery for the intended terrain and use
- ergonomic features e.g. cabin access, working posture, cabin visibility, noise and vibration
- operator cabin protection e.g. reinforced cabin glazing to protect the operator from chain shot, and
- guarding of hazardous machinery components.

Selecting the wrong plant can create significant hazards. Plant which is incorrectly chosen for the terrain being worked can be unstable and if the ROPS or FOPS is inadequate the operator could be crushed.

A solution may be to use a purpose-built machine designed for forestry operations with features like increased ground clearance, wider tracks, heavier duty components, improved serviceability which means less downtime and a reinforced operator cabin that meets relevant standards.



Using machinery safely

As well as complying with work health and safety obligations for plant, machinery should be used according to the manufacturers' instructions.

When in the driving position operators should wear a seat belt where fitted.

Tools or equipment carried in the cabin should be secured so they do not create an extra hazard to the operator if there is an incident or the plant moves unexpectedly.

No one should enter the hazardous area next to or underneath raised, loaded or unloaded hydraulic or cable lifting equipment.



Guarding

If guarding is used it must:

- be of solid construction and securely mounted to resist impact or shock
- make bypassing or disabling of the guard, whether deliberate or accidental, as difficult as reasonably practicable
- not create a risk in itself
- be properly maintained
- control any risk from broken or ejected parts and work pieces, and
- be able to be removed when the plant is not in normal operation to allow for maintenance and cleaning.

Hot and moving parts should be guarded against accidental contact and entrapment to minimise the chance of injury. For example, guards can be placed around:

- shafts, pulleys, flywheels, gears, cables, sprockets, belts, chains, clutches, couplings and blades and wings of fans
- keyways, keys and grease nipples protruding from moving parts
- belt, chain or cable run-on points
- ground wheels or tracks adjacent to the operator's position and passenger seat where provided
- exhaust systems or other hot surfaces likely to cause burns, and
- machinery used for removing bark, de-limbing and chipping.



Powered mobile plant

Operator protective structures

Powered mobile plant used for forestry operations must be fitted with operator protective structures like ROPS and FOPS. Operator protective structures should be designed to eliminate or minimise, so far as is reasonably practicable, the risk of operator injury from:

- the plant rolling over and cabin impact damage
- falling objects e.g. trees and branches striking the cabin
- objects penetrating the cabin like chain shot, tree limbs and logs, and
- noise.

Operator protective structures should follow the recommendations in AS 2294-1997: Earth moving machinery—Protective structures and AS 2294.1 Supplement 1-2003: Operator protective structures fitted to plant used in the timber industry (forest operations).

Operator protective structures should be built so they always allow the operator to exit from the cabin during an emergency. Exits should be maintained and cleaned regularly to remove forest debris so the door can always be opened.

If a door is fitted to the machine then the door should be closed while the machine is operating.

Windows and openings should be protected against penetrating objects by wire mesh, steel bars or by using suitable polycarbonate material.

Communication devices

Powered mobile plant used for forestry operations should be fitted with communication devices for communication between the machine operator and other relevant people on site. Suitable devices include two-way radios and mobile telephones.

Warning devices

Warning devices must be fitted to powered mobile plant to minimise the risk of people being hit by moving plant. Reversing or moving the plant in a direction where the driver cannot see where they are driving is hazardous. Warning devices should give a clear and audible warning to workers and people nearby that the plant is moving or is ready to move.

Operator controls

Operator controls must be:

- clearly marked to identify what they do and their direction of operation
- located so each person using the plant can easily reach and operate them
- located or guarded to prevent unintentional operation, and
- able to be locked in the “off” position.

Poorly designed operator controls can lead to plant moving unexpectedly or not able to be operated safely.

When shutting down machinery it should be parked on level ground with the transmission placed in the park position or as specified by the manufacturer. Where possible all raised equipment should be lowered to the ground to maximise stability.



Further guidance on guarding, operator controls, emergency stops, warning devices and isolation procedures is in the *Code of Practice: Managing risks of plant in the workplace*.



Modifying plant

Before altering plant you should consult with the designer and manufacturer to ensure all relevant safety issues have been considered. Alterations you make to the plant will result in you assuming the obligations of a designer or manufacturer. If the original designer or manufacturer of, for example older or imported plant cannot be contacted, the alterations should only be carried out by a competent person according to relevant technical standards.

People who modify the original manufacturer’s plant design to use at a workplace must, so far as is reasonably practicable:

- ensure the design and construction of the plant does not expose people who use the plant properly to risks to their health and safety, and
- ensure information is supplied about dangers associated with the plant and about conditions necessary to ensure people using the plant properly are not exposed to risk to their health and safety.

Modifications to a ROPS or FOPS, for example drilling holes or welding, may reduce or destroy the integrity of the structure. Changes must not be carried out unless they have been specified by and will be done by a competent person, for example a mechanical engineer.



Further information on modifying plant and machinery is in the [guides for the safe design, manufacture, import and supply of plant](#).



Inspecting and maintaining plant and equipment

Using plant and equipment safely in forestry operations relies on regular inspection and maintenance. Plant and tools should be inspected before use and unsafe conditions reported. Heads of shock or impact-driving tools and accessories should be dressed or ground to remove mushrooming. If tools show a tendency to chip they should not be used. Wooden handles should be sound, straight-grained and tight-fitting.

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

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

Infield inspection, maintenance and adjustment of forestry machinery like harvesters and excavators create a higher risk than regular preventative maintenance activities carried out off-site. This is because of exposure to in-field hazards like poor weather conditions, rough terrain, overhead hazards, nearby plant and other workers. Other hazards and risks are in Table 1.

High risk forestry activity	Infield inspection and maintenance of forest machinery
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Table 1 Common hazards and risks with infield inspection and maintenance of forest machinery

Hazards and risks
<ul style="list-style-type: none"> ■ falls from height during repairs and maintenance ■ slips, strains and falls getting in and out of machine ■ being hit by falling metal cowls, unsupported booms and guards ■ touching hot hydraulic oil or other hazardous chemicals ■ being hit, crushed or lacerated when energy sources are not isolated, and ■ touching moving machine parts when changing chain or bar.

Forest machinery requires daily maintenance including checking fluid levels, refuelling, adding oils, cleaning the tracks and cabin and replacing chipper blades on discs. Minor repairs may also be needed including repairing hydraulic hoses and replacing chains and bars. The hazards associated with forestry operations should be taken into consideration while maintenance work is being done.

Table 2 Control measures - Infield inspection and maintenance of forest machinery

Control measures
<p>1. Ensure work is done in a safe area.</p> <ul style="list-style-type: none"> ■ Work in an open area if possible. ■ Maintain separation distances from other activities. ■ Park machinery on level ground.
<p>2. Check vehicle fluid and fuel levels.</p> <ul style="list-style-type: none"> ■ Before accessing the area under the engine cover, stop the engine and securely fasten open engine covers.
<p>3. Changing disc blades, chain and bar.</p> <ul style="list-style-type: none"> ■ Never work under a raised object when it is supported only by hydraulics—the arm or object should be securely supported. ■ Equipment should be turned off and locked out. ■ The head should be grounded before doing maintenance. ■ The chipper disc, chain and bar should be physically isolated during maintenance. ■ Wear protective gloves when replacing chipper blades, chains and bars.
<p>4. Repairing and maintaining machinery.</p> <ul style="list-style-type: none"> ■ The engine should be shut down. ■ Control levers should be moved through all positions to neutralise stored pressure in the hydraulic lines before repairing or maintaining them. ■ The engine should be stopped when opening the hydraulic tank and the stored pressure released via a bleed valve or, if there is no other way, by slowly undoing the filler cap. When air starts to bleed off, close the valve or stop undoing the cap until the air flow stops, then restart the process. These steps may need to be repeated several times to completely bleed stored pressure from the hydraulic tank.



Further information

Codes of practice, guidance material and other resources are available on the [Safe Work Australia](http://www.swa.gov.au) website (www.swa.gov.au).