Guide for tree trimming and removal work – crane access method
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This guide provides information on how to manage the risks of using a crane to access trees for tree trimming and removal work.

The Work Health and Safety (WHS) Regulations use the phrase ‘lopping a tree’. A range of terms are used across industry including lopping, trimming, pruning, thinning, felling and removal. This guide uses the terms tree trimming and removal to cover the range of terms used in industry and the WHS Regulations.

What is the crane access method?
The crane access method involves a worker who is wearing a harness, sometimes called a saddle, being lifted into a tree by a crane. The worker then attaches the harness to the tree and detaches from the mobile crane before tree trimming or removal work begins.

Who should use this guide?
This guide applies to all businesses or undertakings that use cranes to access trees to carry out tree trimming and removal work.

Who has duties under the law?
Everyone in the workplace has a work health and safety duty. The main duties are set out in Table 1.

Table 1 – Duty holders and their obligations

<table>
<thead>
<tr>
<th>Who</th>
<th>Duties</th>
</tr>
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</table>
| A person conducting a business or undertaking            | A **person conducting a business or undertaking** must ensure, so far as is reasonably practicable, that workers and other people are not exposed to health and safety risks arising from the business or undertaking. For the crane access method this includes ensuring, so far as is reasonably practicable the:  
  - provision and maintenance of safe plant  
  - safe use, handling, storage and transport of plant  
  - the provision and maintenance of safe systems of work.  

A **person conducting a business or undertaking who has management or control of a workplace** must ensure, so far as is reasonably practicable, the workplace, the means of entering and exiting the workplace and anything arising from the workplace is without risks to health and safety.

A **person conducting a business or undertaking involving the management or control of plant** at a workplace has a duty to ensure, so far as is reasonably practicable, the plant is without risk to the health and safety of any person. |
| Designers, manufacturers, importers, suppliers, installers | Designers, manufacturers, importers, suppliers and installers of plant likely to be used in tree trimming or removal work must ensure, so far as is reasonably practicable, the plant is designed, manufactured, imported, supplied and installed in a way that eliminates or minimises the risks to health and safety. This duty includes carrying out testing and analysis as well as providing specific information about the plant. |
| Officers                                                 | Officers, such as company directors, have a duty to exercise due diligence to ensure the business or undertaking complies with the WHS Act and Regulations. This includes taking reasonable steps to ensure the business or undertaking has and uses appropriate resources and processes to eliminate or minimise risks from tree trimming and removal work and plant used at the workplace. |
| Workers and others                                       | **Workers and other people at the workplace** must take reasonable care for their own health and safety, co-operate with reasonable policies, procedures and instructions and not adversely affect other people’s health and safety. |
How can risks associated with crane access be managed?
The following steps should be used to decide what is reasonably practicable to ensure workers and other people are not injured when the crane access method is being used:

1. **Find out what could cause harm.** The following can help you identify potential hazards:
   - Observe the workplace to identify how work will be carried out. Consider the physical work environment, the tree to be accessed, equipment, materials and substances used, work tasks and how they are performed and work design and management. Hazards associated with the crane access method can include:
     - the condition and location of the tree to be accessed
     - falls from height
     - contact with energised electric lines
     - biting or stinging hazards including ants, bees, wasps and snakes.
   - Ask your workers about problems they encounter at your workplace.
   - Talk to manufacturers, suppliers and health and safety specialists and review your incident and injury records including any near misses.

   Figure 1 shows potential tree hazards that should be checked before starting work.

   **Figure 1 Tree hazards**

   ![Tree hazards diagram]

   Are branches intruding from other trees nearby?
   Is the crown leaning heavily?
   Is the crown concealing nests or insect colonies?
   Are there vines or creepers in the crown?
   Are there any dead or diseased branches?
   Are nails, wire or spikes embedded in the tree?
   Is the tree stable in the ground?
   What is the tree species? What special consideration must be given to it?

2. **Assess the risk.** When you have identified the hazards at your workplace, you need to think about the risks—the likelihood of somebody being harmed by the hazard and how serious the harm could be. You also need to think about how incidents could happen and who might be harmed.

   When carrying out a risk assessment think about:
   - Whether using the crane access method creates a greater risk than using plant specifically designed to lift a person or climbing the tree.
   - The stability and integrity of the tree:
     - Is the tree decayed or dead and unsafe to climb or be attached to?
     - Is the species or the particular tree susceptible to branch failure when under load?
     - Is the tree stable in the ground?
     - Is the crown of the tree leaning heavily in one direction?
Is the tree suitable to be climbed?

- Whether the site is safe to use a crane e.g. the crane is not on sloping, uneven or soft ground and is there a safe and stable route available for plant to enter and exit the site?
- Ensuring that no person, plant or thing will come within an unsafe distance of an energised electric line.
- Access by people and managing traffic.
- Animal and insect management (e.g. Are there insects, bees or other animals in the tree that may be a risk to a worker?)
- Workers being adequately trained including in emergency procedures, working near electric lines, equipment, work tasks and communication.
- Workers holding relevant licences (e.g. a dogging licence and relevant crane licence).
- A safe work method statement being prepared and reviewed before each lift.
- Action plans about hazards and the nature of the work including number of workers, each worker’s role and job process have been discussed with workers.
- The worker accessing the tree is using the correct harness.
- An experienced observer is on the ground monitoring the worker accessing the tree with adequate communication between the worker accessing the tree, the crane operator, the observer and a dogger controlling the load—if this person is different to the observer.
- Exclusion zones are placed around the crane and drop zone to keep the public and other workers at a safe distance—physical barriers as well as signs should be used.
- Weather conditions including heat, humidity and wind speed are suitable to start the job and are monitored to ensure they are suitable to continue working.
- Common hazards like vines, creepers in crown, nails and wire are identified and removed or controlled.
- The crane, all lifting devices and ancillary equipment are fit for purpose and are inspected before starting work.
- Personal protective equipment (PPE) is fit for purpose.

A risk assessment can help you determine what action you should take to control the risk and how urgently the action needs to be taken.

3. **Take action to control the risk.** The work health and safety laws require a business or undertaking do all that is reasonably practicable to eliminate or minimise risks.

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 risk control. You must work through this hierarchy to manage risks.

The first thing to consider is whether hazards can be completely removed from the workplace. For example, carry out the work from the ground as this eliminates the risk of falls, problems with tree integrity and avoids the use of high-risk plant like cranes.

If it is not reasonably practicable to completely eliminate the risk then consider the following options in the order they appear below to minimise risks, so far as is reasonably practicable:

- substitute the hazard for something safer (e.g. using plant specifically designed to lift a person like an elevating work platform (EWP) to gain access to the tree rather than the crane access method)
- isolate the hazard from people
- use engineering controls (e.g. work boxes, fall prevention harnesses and work positioning systems).

If after implementing the above control measures a risk still remains, consider the following controls in the order below to minimise the remaining risk, so far as is reasonably practicable:

- use administrative controls (e.g. rotating jobs and varying tasks to reduce the risks associated with repetitive manual handling tasks)
- use PPE (e.g. safety eyewear, hearing protection, safety helmets, cut-resistant leg protection or reflective, high-visibility clothing).

A combination of the controls set out above may be used if a single control is not enough to minimise the risks.

You need to consider all possible control measures and make a decision about which are reasonably practicable for your workplace. Deciding what is reasonably practicable includes the availability and
suitability of control measures, with a preference for using substitution, isolation or engineering controls to minimise risks before using administrative controls or PPE. Cost may also be relevant, but you can only consider this after all other factors have been taken into account.

4. **Check your control measures** regularly to ensure they are working as planned. Control measures need to be regularly reviewed to make sure they remain effective, taking into consideration any changes, the nature and duration of work and that the system is working as planned.

Further information on the risk management process is in the Code of Practice: *How to manage work health and safety risks*.

**Who is involved?**

You must consult your workers and their health and safety representatives (if any) when deciding how to manage the risks in the workplace.

This is routinely conducted on site prior to the commencement of work in the form of a toolbox talk, which is documented.

If there is more than one business or undertaking involved at your workplace you must consult them to find out who is doing what and work together so risks are eliminated or minimised, so far as is reasonably practicable. For example, if you own or manage a business involved in tree trimming or removal work and use a contracted mobile crane, you should co-ordinate your work activities with the person you hired the mobile crane from.

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

**Methods of accessing trees**

Methods of accessing trees can include:

- using a temporary work platform
- using a suspended work box
- using an industrial rope access system
- climbing the tree
- using the crane access method.

Before accessing a tree by any method, a thorough inspection of the tree should be carried out by a competent person. The inspection should include an assessment of the tree’s structure, growth habit, stability and growing environment. The inspection should consider hazards, condition, wind loading, structural integrity and location. This information should inform decision-making on whether the tree is safe to access, the method chosen to access the tree and emergency rescue measures.

Further information on accessing trees by using temporary work platforms, suspended work boxes, industrial rope access systems and climbing is in Appendix A.

**Using the crane access method**

Because of the high level of skill needed to carry out this method safely, all other methods of accessing a tree should be considered before using the crane access method.

Before a decision is made to use the crane access method, a risk assessment must be conducted to assess whether using it would create a greater risk to the health or safety of a worker than climbing the tree, or using plant specifically designed to access the tree.

The crane access method may be suitable where:

- a worker could become fatigued from climbing, especially in hot or humid climates
- the physical environment around the tree makes accessing the tree using other methods a higher risk to health and safety (e.g. obstructions like buildings, other trees, adjacent infrastructure or steep ground).
Information, training, instruction and supervision

A high level of competency is required when using the crane access method. Workers should be experienced in tree climbing and trimming and removal work before using this method. Workers accessing trees must also have gained through training, qualification or experience the knowledge and skills to use the harness that is required to be worn while using this method.

The harness must be a work positioning harness, often called a saddle, designed and certified in accordance with AS/NZS 1891.1:2007 *Industrial fall-arrest systems and devices—Harnesses and ancillary equipment*, for the purpose of lifting and suspending a person. Many harnesses used on rope access methods for tree climbing are not suitable for the crane access method.

Further guidance on selecting and maintaining harnesses and ancillary equipment is available in AS/NZS 1891.4: 2009 *Industrial fall-arrest systems and devices—Selection, use and maintenance*.

You must ensure the person operating a crane at a workplace is the holder of a valid high risk work licence to operate the crane.

The crane access method involves the person being lifted by the crane, directing the crane operator in the movement of the load when the load is out of the crane operator’s view. This action is classed as ‘dogging work’. Dogging work is high risk work under the WHS Regulations.

This means the person being lifted by the crane for the purpose of tree trimming and removal work must hold a high risk work dogging licence. If the observer monitoring the person being lifted by the crane also directs the crane operator in the movement of the load, then the observer must also be the holder of a high risk work dogging licence.

The person being lifted by the crane and the observer monitoring the person from the ground should also be experienced at tree trimming and removal work, for example they should both hold the competency-based Certificate III in Horticulture (Arboriculture).

Crane safety mechanisms

The crane used to lift a worker into a tree must have safety mechanisms to prevent the worker from inadvertently falling and should meet the following requirements:

- Have a minimum safe working limit of 1000 kg at the maximum radius for the task.
- Be fitted with:
  - an upper hoist limit that stops the hoist, luff and telescope operating to prevent two-blocking, or be designed so that two-blocking cannot damage part of the crane or lifting gear
  - controls e.g. levers and foot pedals with a constant pressure system that stops the crane’s motions when the operator removes pressure from the controls
  - ‘drive up’ and ‘drive-down’ controls on both the hoisting and luffing motions
  - a safety hook that is fixed so the safety latch cannot inadvertently open.

Where a crane has declutching allowing free fall it must be locked out or have a prevention plate bolted in place to prevent the activation lever from moving while this access method is being used. If the crane is fitted with a free fall function it must be locked out with a keyed lock-out.

The crane should also be stabilised when using the crane access method.

For specifications relevant to the crane see AS 2550.1 *Cranes, Hoists and Winches—Safe Use—General Requirements*, AS 1418.1-2002 *Cranes, hoists and winches—General requirements*, AS 1418.5-2013 *Cranes, hoists and winches—Mobile Cranes* and AS 1418.17-1996 *Cranes, (including hoists and winches)—Design and construction of work boxes*.

Communication

The person being lifted by the crane must be in visual, audio or radio contact with the crane operator. Communication is important because workers and hazards cannot always be seen.

An effective method of communication should also exist between the crane operator, person being lifted and the observer who is monitoring the person being lifted from the ground. If there is a separate dogger monitoring the load, the dogger must also be included in the communication system.
A secured two way radio and a backup system like a whistle are examples of effective audio and radio communication methods.

**Attaching the harness to the crane**

Attaching the harness to the crane should be done in a way that does not interfere or compromise the function of the crane including any damage-prevention or warning device or any part of the rope access system. The following technique should be used:

1. As illustrated in Figure 2, feed a swivel karabiner onto a length of 11 mm (minimum diameter) braided climbing or prussic line approximately 1 metre in length and tie into a loop with a suitable knot. The karabiner should be triple action self-locking and be rated at a minimum of 25 kn (1 kn = 101.97 kg). This is approximately 2500 kg.

2. Attach the loop to the hook with a double hitch above the curvature of the hook as illustrated in Figure 3 and then fit the lifting chains to the hook. The hook latch should then be taped shut. Leave a section of the loop hanging with the swivel karabiner at the bottom to create a ‘false crotch’ exactly the same as is used to secure a climbing rope in a tree. The false crotch should not be allowed to be pinched by the chain ring. No load should be applied to the lifting chains while the worker in the harness is attached to the crane.

3. Run the climbing line through the karabiner creating a conventional climbing system.

4. Attach a lanyard (pole belt)—preferably wire cored—to the harness.

5. Attach a braided climbing rope (11 mm minimum diameter) to the harness, run it through the swivel karabiner and back to the harness with a friction device, for example a prussic loop which completes the climbing system.

6. Store excess climbing rope in a rope bag attached to the harness to prevent the rope snagging during lifting.

7. Mechanical devices should not be used as a friction device on the climbing line as these can snag as the person is lowered and cause the person to fall. A prussic loop or similar will not be affected even if it is snagged.

8. Lift the worker that is in the harness into the tree using the crane.

**Figure 2** Example of attachment loop

**Figure 3** Example of knot

Note: Lifting chains and chain rings have been omitted from Figures 4 and 5 for clarity.
Attaching the worker to the tree

The crane should remain in place until the worker is attached to the tree by two independent attachment points and the worker clearly instructs the crane operator that they have disengaged all attachments to the crane.

The worker in the harness should not start tree trimming work until they are attached to the tree using climbing spurs and a pole belt and they have removed the climbing line from the crane. The second point of attachment should be secured by re-setting the climbing line to a suitable position on the tree. This also provides an escape route or alternate means of descent.

Two points of attachment should continue to be used while carrying out trimming work including when operating cutting equipment. The worker should also remain attached to the tree when changing positions or attachment points to minimise the risk of falling.

The worker in the harness should attach the lifting chains to the selected part of the tree and either descend via the climbing rope or be lowered by the crane to the position where the cut will be made. They should not descend quickly when using friction knots because heat generated from the descent can damage the prussic loop or make it fail.

Where using the crane to move the worker to another position in the tree the worker should be attached to the crane attachment point before detaching from the tree.

When passing branch junctions or changing attachment point locations, the existing attachment system should not be disconnected until the next system is checked and the climber’s body weight is transferred to that system. The new attachment system should be preloaded before removing the existing attachment system.

When a climbing rope forms part of the work positioning system:

- It should be kept taut to minimise the fall distance. The fall distance should never exceed 600 mm.
- A stopper knot should be maintained in the tail of the rope.

Knots and hitches used for harness based work positioning systems should:

- form a secure load bearing knot suitable for life support
- not require a second knot to make them secure
- not creep, roll or walk loose when repeatedly loaded and unloaded.

The bowline and the clove hitch are examples of knots and hitches which should not be used.

While the worker is attached to the crane, the worker in the harness should be in constant communication with the crane operator, for example a secure radio channel with a back-up whistle in case of radio failure.

The observer should only use the radio in an emergency, for example where the crane operator cannot see that the person accessing the tree is in trouble.

Where the crane is used for lifting or assisting in the trimming or removal of a tree or its branches:

- the lifting equipment used e.g. chains or sling should not compromise any part of the attachment system
- the crane should not take up or support another load while the worker is attached to the crane
- the risk of the crane breaking branches when a worker is in the tree should be minimised, so far as is reasonably practicable
- the worker should not carry out trimming work while they are attached to the crane.

Working near electric lines

Electric lines pose significant risks for tree trimming and operating cranes. When assessing the risks of working near electric lines consider:

- electric lines hidden in trees
- de-energising electric lines running through tree branches before using crane access method
- contacting the relevant electricity supply authority for information on specific requirements when working near electric lines including qualifications required for people working near electric lines.
Most risks can be addressed by observing safe working distances for people and plant working near electric lines. The distances will depend on the type of work being carried out and the voltage of the electric lines.

**Emergency and rescue procedures**

There are many situations in tree trimming and removal work that may require emergency action. It is important to develop emergency procedures and ensure workers are adequately trained in these procedures. All crew members must be familiar with these procedures.

Rescue and first aid training must be an integral part of an induction program for workers. Workers must know these procedures and any changes to these procedures that are specific to a new site before starting work.

Further information about developing emergency plans is available in the *Emergency Plans Fact Sheet*.

All types of emergency and rescue scenarios should be considered when developing emergency and rescue procedures. Information from the risk assessment will help with this task. Some questions to consider when establishing these procedures are in Table 2.

**Table 2** Considerations when developing emergency procedures

<table>
<thead>
<tr>
<th>Relevant considerations</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location of the work area</strong></td>
<td>Is the work at height being carried out in a remote or isolated place? How accessible is it in an emergency and how far away is it from medical facilities? Can a person be recovered immediately after an arrested fall without relying on emergency services?</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>How can workers working at height communicate in an emergency? A minimum of two people should be present during tree-climbing operations. One of the ground team should be available, competent and equipped to carry out an aerial tree recovery without delay.</td>
</tr>
<tr>
<td><strong>Rescue/recovery equipment</strong></td>
<td>What kinds of emergencies may arise? The equipment depends on the nature of the work and control measures used and should include equipment necessary to carry out the planned emergency procedures. Equipment should be kept close to the work area for immediate use.</td>
</tr>
<tr>
<td><strong>Capabilities of rescuers</strong></td>
<td>Are rescuers properly trained and sufficiently fit to carry out their task and capable of using equipment provided for rescue, for example access equipment? Have emergency procedures been tested to show they are effective?</td>
</tr>
<tr>
<td><strong>First aid</strong></td>
<td>Is first aid available for injuries associated with falls, crush and cut injuries, for example from chainsaws? Are trained first aiders available to use the necessary first aid equipment? Workers may be exposed to insects and animals, like wasps, bees, spiders, possums, birds, snakes, rats and cats whilst working in and around trees. A single wasp or bee sting could be fatal if the worker has an allergic reaction. Contact with some plants can also cause allergic reactions. Identifying workers’ sensitivities and allergies should be considered as part of the emergency planning process.</td>
</tr>
<tr>
<td><strong>Local emergency services</strong></td>
<td>Should you rely on local emergency services for rescue? You should make other arrangements if they cannot respond quickly. How will the local emergency services, for example ambulance be notified of an incident? Are there ways to ensure information is given about the location of the site and access problems, personal details about the casualty including names and relevant medical history as well as the approximate time of the incident, treatment given and any chemicals involved?</td>
</tr>
</tbody>
</table>

When an injured worker needs rescuing all possible precautions should be taken to protect other members of the work team and others entering or approaching the worksite.
First aid
Workers must have access to first aid equipment and facilities to administer first aid. Workers must also be trained to administer first aid or have access to people who are trained in first aid.

Further information about first aid is in the Code of Practice: First aid in the workplace.

Suspension intolerance
Suspension intolerance can occur where a person is suspended in an upright, vertical position. Workers and emergency response workers must be trained to recover or rescue workers in these situations, be able to recognise the risks of suspension intolerance and act quickly in effecting the recovery or rescue of a suspended person.

Further information on suspension intolerance is in the Code of Practice: Managing the risks of falls at workplaces.

Electrical emergencies
The risk of electrical emergencies should be eliminated by ensuring electric lines are de-energised before any work is carried out near them.

Workers who may be working in the vicinity of electric lines should be trained in procedures specific to electrical emergencies. If an emergency involving electric lines happens, do not approach the work area. Stop work, assess the situation and contact the relevant Electricity Supply Authority.
Appendix A – other methods of accessing trees

Temporary work platforms
Temporary work platforms, for example scaffolds and elevating work platforms specifically designed to lift people should be used to access a tree, where reasonably practicable. These reduce hazards like dehydration and fatigue from climbing trees and are designed as a working platform to prevent the worker falling.

If a temporary work platform is being considered to trim or remove a tree consider:
- If it is safer to trim or remove the tree from the ground?
- Are there obstacles, structures like buildings and other trees present at the site posing a risk to health and safety or make access impossible by plant?
- Are there underground services present e.g. water, gas, phone, electricity that may restrict access or locations to set up temporary platforms?
- Do overhead electric lines create a risk for a worker given the position of the temporary work platform?
- Is the ground level, uneven, sloping, firm or loose and could this lead to the temporary work platform overturning? Unless designed for rough terrain, temporary work platforms should only be used on a solid, firm and level surface where there are no obstacles that may cause uncontrolled movement.
- Can the platform safely reach the height necessary to trim or remove the tree?
- Does the worker need to lean outside the structure of the temporary work platform?
- Will the cutting or lowering of the limb, branch or section of the tree be impeded by the use of the temporary work platform?

Boom-type EWP include cherry pickers, boom lifts and travel towers as shown in Figures 4 and 5. They can be battery powered or have internal combustion engines. Some are only designed for hard flat surfaces while others are designed to be operated on rough terrain.

A scissor lift-type EWP has a greater risk from being struck and knocked over by falling timber than a boom-type EWP because their supporting structure is directly under the platform. Scissor lift-type EWP should not be used unless the risk of falling timber striking the unit can be eliminated.

Temporary work platforms may not be reasonably practicable to use where:
- a worker cannot get close enough to the tree to trim the tree safely
- the tree is too large
- the work platform may impede the cutting or lowering of the limb, branch or section of tree
- the ground is sloping or unstable
- there are buildings or other infrastructure in the way.

Figure 4 A boom-type elevating work platform
Figure 5 A truck mounted boom-type elevating work platform
**Suspended work boxes**
Apart from the crane-access method, when plant is used to lift or suspend people, the people must be in a work box securely attached to the plant and remain within the work box during lifting or suspending. A safety harness must be worn if there is a risk of falling from a height. There must be a safe means of exit if there is failure of the plant.

Suspended work boxes are designed to be supported by a crane to provide an elevated work area for people working from inside the work box. A person must not climb out of the work box into the tree to trim or remove the tree. A suspended work box should not be used where the person would be lowered through the tree canopy or electric lines. Consideration should be given to whether the cutting or lowering of limbs, branches or sections of the tree may be impeded by the use of a suspended work box. Similar considerations should be given to the integrity of the tree, site conditions and nature of work to be conducted using the temporary work platforms.

Where reasonably practicable, other working platforms like a EWP, should be used before using a work box.

Further information on work boxes is in the Information Sheet: Crane-lifted work boxes.

**Industrial rope access systems**
Industrial rope access systems can also be used to access some trees, usually by vertically suspended ropes.

Where the integrity of the tree may make it unsafe for a worker to work in the tree or where there are doubts the tree can hold the load, other methods of access should be considered before using this method, for example temporary work platforms or suspended workboxes. The potential for contact with electric lines should also be considered when using this method.

Further guidance on industrial rope access systems is available in the AS/NZS 4488 *Industrial rope access systems* series and the Australian Rope Access Association (ARAA) ‘*Industry Code for the Industrial Rope Access Method*’ and the ARAA Code ‘*Permanent Anchors for Rope Access Use*’.

**Climbing a tree**
Other methods of access, for example temporary work platforms and suspended work boxes should be considered before attempting to climb a tree.

Tree climbing should only be done by people who are trained and assessed to a minimum relevant Australian Qualification Framework (AQF) or equivalent unit.

Tree climbing should only be done by people who are physically fit and not suffering from disorders or affected by alcohol or drugs including prescribed medication, which may affect or impair their working at heights.

Climbing equipment should be suitable for its intended use. It should be inspected and assessed by the climber before each use. A competent person who is not the regular user of the equipment should also check the equipment regularly, for example every six months.

Tools carried and used by the climber should be safely secured when not in use. If the climber is using a chainsaw the climber should be secured to the tree using steel-core rope flip-lines that provide two points of attachment at all times.

The chainsaw should be secured to the climber in a way that allows the chainsaw to hang in a position that will not hinder the climber’s free movement or create a hazard for the climber or other workers. When climbing large trees in hot or humid climates, the climber can suffer dehydration and fatigue from humidity and heat. Electric lines running through trees may also expose a climber to the risk of electrocution.
Australian and industry standards related to the crane access method

The following list of published technical standards is provided for guidance. Compliance with them does not guarantee compliance with the WHS Act and Regulations in all instances. This list is not exhaustive.

**Australian Standards and Australian/New Zealand Standards**

- AS 1418.1 - 2002 Cranes, hoists and winches—General requirements
- AS 1418.5 - 2013 Cranes hoists and winches—Mobile cranes
- AS 1418.17 - 1996 Cranes (including hoists and winches)—Design and construction of work boxes
- AS/NZS 1891.1:2007 Industrial fall-arrest systems and devices—Harnesses and ancillary equipment
- AS/NZS 1891.4:2009 Industrial fall-arrest systems and devices—Selection, use and maintenance
- AS/NZS 2153 (Series) Tractors and machinery for agriculture and forestry
- AS 2550 (Series) Cranes, hoists and winches—safe use
- AS 4024.2601-2008 (Series) Safety of machinery
- AS 4373 - 2007 Pruning of amenity trees
- AS/NZS 4488.1:1997 Industrial rope access systems series
- AS/NZS 4488.2:1997 Industrial rope access systems—Selection, use and maintenance

**Industry Standards**

- The Australian Rope Access Association Industry Code for the Industrial Rope Access Method

**International Standards**

- I.S. EN 12277:2007 Mountaineering Equipment - Harnesses - Safety Requirements and Test Methods
- UIAA (Union Internationale des Associations d'Alpinisme) - International Federation of Mountaineering Associations series of training and guide book standards.