

VTIO Tree Climbing Guidelines
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Premise

Climbing trees in order to conduct work in them is the current best-practice method of access for a range of professions, such as arborists; tree workers; seed-collectors; forestry workers and animal rescue climbers. Although climbing and working in trees is an activity with potential risks, it is recognised both in Australia and internationally as the most appropriate way of accessing a tree's canopy, when the climber is suitably qualified and equipped. This document provides guidelines for suitable techniques and practices, and for minimum standards that must be adhered to, to safely climb and conduct work in trees.

Whilst this document attempts to provide guidelines which will cover any work conducted in trees, it has primarily been written with the work of a climbing arborist or tree worker in mind. The VTIO asks for input from other professions engaged in tree-climbing, in order to bring this work-in-progress into a more uniformly applicable form.

1 Introduction

The Victorian Tree Industry Organisation (VTIO) recognises that although working in trees is activity with inherent risks, comprehensive prescriptive regulation of best practice is unfeasible as the unique challenges posed by each tree mean that no single universal approach can be successfully prescribed. In addition, the differing skill sets and experience of each individual climber allow for a number of different valid approaches to each tree. The VTIO acknowledges the professional knowledge and judgment necessary to safely conduct climbing work in trees, and recognises the high level of personal responsibility vested in each climber whilst they are conducting tree work operations.

2 Terminology

Throughout this document, the term **must** denotes a requirement which shall be observed unless doing so brings one into conflict with another requirement or is unsafe for a demonstrable reason; the term **should** denotes a strong recommendation.

3 Climbing

All tree climbing work must be done by or under the direct supervision of a **competent climber** (see Appendix 1).

Work must be conducted in a professional manner with due appreciation of inherent risks.

3.1 Climbing crew

A minimum of two persons must be present on every job site. One is the climber, and one is the **rescue climber**, who must be a sufficiently **competent climber** to perform an **aerial rescue** from the particular trees being worked on.

- In remote areas a third person should be present on every job site to assist in the event of a rescue.

Climbers (both the climber and the **rescue climber**) must:

- Be physically and mentally fit
- Exhibit zero blood alcohol and be free from the effects of any illegal drugs. (Climbers using prescription medication should consult a medical professional before climbing)

The **rescue climber** must be able to perform an **aerial rescue**.

3.2 Climbers should wear

- Comfortable, high visibility clothing that is close fitting without restricting movement
- Climbing helmet with chin strap
- Eye protection
- Appropriate protective-toe or climbing-style lace-up boots
- IF USING A CHAINSAW: (In addition to the above) Climber must wear approved cut-resistant trousers, and approved ear and eye protection.

Climbers should understand the dangers of working outside, and wear appropriate UV protection.

Exposed jewellery, including ear rings, rings and necklaces should be removed or covered.

3.3 Prior to climbing

Every tree must be inspected by a **competent climber** before it is climbed to determine if special precautions or techniques are required (see Appendix III: **Tree Inspection**). The climber must establish that the tree is safe to climb.

Climbers must check all **points of attachment** daily prior to use and continually throughout the day.

- The public and traffic must be excluded from the work site and adequate signage that complies with the current Australian Standard (and with VicRoads Standards where applicable) must be clearly visible

3.4 Tree Access

Climbers should use a tree access system appropriate to the task, the tree and the climber's ability and understanding of different access systems used in the tree industry. Regardless of which access method is used the climber must:

- Remain attached to the tree or a suitable belay at all times
- If a prussik cord is being used, test the compatibility of the prussik cord to the rope being used to ensure adequate fall arrest performance. The prussik knot must effectively grab the rope to prevent a fall. An "on rope test" should be performed prior to climbing. Prussik cord must be made from appropriate heat-resistant material.

The VTIO recognizes all of the following as being appropriate methods of tree access:

SPUR CLIMBING – When using climbing spurs as climbing aids, climbers must:

- Use climbing spurs designed to an approved standard for tree climbing
- Maintain spurs in good working order to manufacturer's specifications.

The use of climbing spurs causes damage to trees. Climbers must not use spurs except where the tree is being removed completely; the tree is dead; it is unsafe to climb without spurs; the damage caused by using spurs is considered to be of negligible impact; or in an emergency situation.

BODY-THRUST/HAND-OVER-HAND TECHNIQUE – When alternating anchor points as they climb to the tie in point, climbers must:

- Weight-test each new anchor-point before disconnecting from the last.

FOOTLOCK or SINGLE-ROPE-TECHNIQUE (SRT): Access methods where the climber attaches to a pre-installed (usually static) access line with a prussik or system of approved mechanical devices, and uses either the 'footlock' technique or SRT to advance up the rope. Climbers must:

- Pay particular attention to anchor points when setting the rope high in a tree with a throwline; the use of binoculars may be required. The anchor point should be assessed from a number of angles.
- Check the strength of anchor points before attaching to the rope, using the 'bounce' test or by placing multiple loads on the line

FOOTLOCK OR SINGLE-ROPE-TECHNIQUE (continued):

Climbers must:

- Understand the potential forces placed on an anchor point when a rope is passed over it with one side secured elsewhere and the other side used for climbing. In this case the net force placed on the anchor point can be up to twice that generated by a climber attaching directly to the anchor point.
- Understand the shock loading potential when using super static ropes.

When footlocking, climbers must:

- Keep hands below the prussik until a secondary attachment point is established.

When using mechanical ‘open-face’ ascenders as a primary point of attachment, climbers must:

- Always maintain a minimum of two independent points of attachment to the line.

3.5 Safe climbing techniques

Whilst in the tree, climbers must:

- Wear a **tree climbing harness**
- Be attached to the tree or a safe top belay at all times
- Have access at all times to a **climbing rope**, wherever possible of sufficient length to reach the ground
- Use extreme care when establishing an **anchor point**. Attachment should be around the trunk or main leader and over a suitable branch. If the anchor point is to be set out on a branch away from the main trunk, the size of the branch (diameter of attachment point), its angle of attachment to the main trunk and the distance of the anchor point from the main trunk must all be considered
- Maintain regular visual and verbal communication with the ground crew. This may require radios, or the stopping of machinery
- Signal to the ground crew using an appropriate pre-arranged warning prior to dropping any object from the tree
- Ensure that all **points of attachment** are correctly set and visually inspected prior to placing weight on them. This includes ensuring that knots are correctly tied, dressed and set, that karabiners are closed and locked and that the climbing knot or hitch system (where used) is correctly dressed
- When using a chainsaw in a tree, maintain two **points of attachment** unless it is unsafe to do so
- Never use climbing ropes for any purpose other than climbing; use dedicated lowering ropes for lowering logs or branches and never for climbing
- Keep climbing rope taut or nearly taut at all times (when it is the primary **point of attachment**). At no time should slack in the climbing rope fall below the climber's feet.
- Use only the designated life-support connection points on the harness for connection to the **points of attachment**

Whilst in the tree, climbers should:

- Not climb above the **anchor point** without a second **point of attachment**
- Not branch walk without a second **point of attachment** if there is any risk of a dangerous **pendulum fall**.

Climbers should use only equipment and techniques that are deemed suitable by the industry-wide forum on equipment and equipment-usage that is offered by the International Tree Climbing Competition. (see Appendix IV: Climbing equipment standards).

3.6 Multiple climbers

In most situations one climber per tree provides the safest and most controlled method of conducting the work. However in some situations more than one climber in a tree can provide a safe and efficient method of performing the required tasks.

Where there are two or more climbers in the same tree, climbers should:

- Maintain communication with each other
- Work at approximately the same height
- Be aware of the position of other climbers at all times and never remove any part of the tree that could endanger the other climbers

Note that even in situations where more than one climber is in the tree, there should still be at least one person on the ground in order to control the site and respond in the case of an emergency.

4 The ground crew

Whilst there is a climber in the tree, the ground crew must:

- Consist of at least one **able climber**, (except where there are two **able climbers** and both are climbing) who shall be designated the **rescue climber**. Remaining ground crew must meet the standards given in Appendix II: Ground crew
- Maintain a clear and safe **work site** and a calm and controlled working environment
- Ensure that any person or other worker within the **work site** is fully aware of the nature of the work and is aware of what is taking place
- Wear a brightly-coloured safety helmet and high visibility top or safety vest at all times
- Wear appropriate protective equipment in addition to the above whenever operating plant or machinery. For example, ground crew should wear cut resistant trousers or chaps, safety glasses or visor and ear muffs if a chainsaw is being used
- Maintain communication with the climbers at all times
- Consider and anticipate the climber's needs and actions at all times. Be aware of all hazards on the site and be prepared to warn the climber if necessary
- Remain on the **work site** and remain attentive until the climber has exited the tree
- Consider a **rescue plan** for each individual situation as it is encountered. Be prepared to rescue an injured climber if necessary. Be prepared to administer first aid as required
- Be physically and mentally fit
- Exhibit zero blood alcohol and be free from the effects of any illegal drugs. (Workers using prescription medication should consult a medical professional before attending site)

5 Weather conditions

Adverse weather conditions can introduce a considerable range of hazards to the activity of tree climbing. Additional safety precautions must be initiated should climbing be undertaken in adverse weather conditions. The climbing crew will need to consider the following when determining safe weather conditions for tree climbing:

- Ability, training and experience of climbing crews
- Species of trees to be climbed, for example smooth barked as opposed to rough barked
- Nature of work to be performed. Minor pruning conducted close to the trunk is easier in wet conditions than the removal of long, heavy, slippery branches
- High or low temperatures or high humidity will accelerate climber fatigue
- Wet trees provide poor grip, foot and hand holds
- High winds can cause branch or trunk failure, and unpredictable movement of trees. This may cause the tension in the climbing rope to vary suddenly and erratically.
- Wind may limit verbal communication and climber ground crew visibility
- Erratic gusting winds are more unpredictable than strong steady winds
- Fog and mist may limit climber visibility
- Working after dark entails limited visibility and reduced ability to communicate.

In adverse weather conditions, shorter working periods should be considered.

6 Work site safety

6.1 Before work commences:

Before work commences all staff must carry out Daily **Safe Work Method Statements** and/or Risk Assessment and Hazard Identification Control documentation as per OH&S Policy and Procedures.

Every tree must be inspected by a **competent climber** before it is climbed, to determine if precautions or special techniques are required for the climb (see **Appendix III: Tree Inspection**). The climber must establish that the tree is safe to climb.

Before work commences:

- All staff on site must discuss work plan and emergency plan
- Prior to commencing work the nature of all hazards particular to the job site must be established and strategies devised to minimize them
- A complete and appropriate first aid kit must be positioned on the site
- On site access to a telephone or other appropriate means of communication must be established. The location of the job site must be noted and the site address made known to all staff.

In addition, before work commences all possible hazards should be identified:

- Electrical conductors - number, voltage, height, and distance from work site
- Bees, wasps, snakes or other stinging biting hazards
- Other trees, dead limbs, intertwining branches
- Other site works, tree falling, building, landscaping etc.
- Traffic – vehicular and pedestrian
- Underground pipes gas, power and water
- Star pickets, garden stakes removed or covered if within the work site

Note that every work site is different and has its own particular hazards. This list is not intended to be exhaustive, nor to be a 'checklist' for hazard identification.

6.2 Working hours

Physical or mental fatigue can erode a worker's ability to undertake tasks in a safe manner, increasing risks to health and safety. In amenity tree work, where many jobs are physically demanding, the 'heaviest' jobs are often left until the end of the day. Workers who have climbed and cleared branches throughout the day may find that the trunk of a tree requires cutting up using large chainsaws and sections may then have to be lifted onto a truck or trailer.

The term 'last cut syndrome' refers to the practice of pressing on to finish a job in spite of fatigue. The job would be more safely completed the following day when workers are rested.

Physical fatigue can be managed by:

- Adopting work practices that reduce effort and strain
- Job rotation of climber and grounds person throughout the working day
- Ensuring that there are enough workers to do the job safely
- Utilising well designed equipment to reduce physical fatigue
- Taking breaks to avoid build-up of fatigue
- Fluid replacement and nutritious food.

Factors which may affect worker fatigue include:

- Species, size and condition of tree
- Nature of work being undertaken
- Weather conditions
- Size and weight of any branches or logs
- Site constraints.

6.3 Emergency rescue

Each job site should have:

- Access to a mobile phone or other reliable means of communication
- A copy of the job sheet or **Safe Work Method Statement** including the precise location of the job
- A plan for **aerial rescue** - at each job site, the **Rescue Climber's** kit must be within easy access, appropriate to the work being undertaken and in good condition

It is essential that a rope of adequate length is on hand and ideally, if appropriate to the work being undertaken, pre-set as an **access line** in the tree prior to entering the tree to perform the required works. This will provide rapid access for the rescue climber in the case of an emergency.

7 Climbing in close proximity to power lines

Climbers and the grounds person/s working in close proximity to power lines must:

- Be suitably trained and authorised in “Safe Approach Distances for Non-Electrical Personnel” (NUE 260)
- Have permission from the relevant power authority before accessing trees in the vicinity of power lines
- Locate power lines and identify voltages
- Treat power lines with respect at all times regardless of power disconnections
- Estimate distances from the lines and take appropriate action depending on the voltage and the nature of the required works. This may involve power disconnections or other strategies
- When accessing trees in inclement weather or trees with wet foliage, climbers must only work in trees where all parts of the tree are outside the “Safe to Approach Distances”
- Set climbing ropes with extreme caution; any possibility of **pendulum swings** which would break body clearance regulations must be avoided
- Never break body clearance regulations
- Use only non conductive materials for pole saw handles
- Not use steel cable pole belts within the safe approach distance of powerlines
- Not use conductive ladders in the vicinity of power lines
- Set lowering ropes within the tree so that cut limbs are directed away from the power lines.

A trained and authorised “Safety Observer” must oversee the climbing operation and must have a NUE 260. The observer’s main duty is to ensure that the operation is conducted safely at all times.

The observer should be alert, organized and prepared to respond to the climber’s needs and any safety problem or emergency.

The telephone number of the relevant power company must be available to the observer should any problem or emergency occur.

Appendix I: Competent climber

The VTIO recognises that there are many possible avenues of development in the tree-climbing community, and respects the professional knowledge and skill demonstrated by many climbers who lack formal knowledge and training. However, the possibility of climbers who are isolated from the broader community practicing and disseminating risky or unsafe techniques means that recognition as a **competent climber** cannot be based on experience alone.

An **able climber** must be familiar with best-practice guidelines and techniques, understand and be able to use modern safety equipment, and be conversant with developments in the industry at large.

The VTIO recognises the following as criteria for qualifying the individual in question as an **able climber**:

- (a) Formal Qualification (See below)
- (b) Experience (**See above: not to be considered as a full criterion in isolation**)
- (c) Demonstration of ability (EG, ITCC-format competition, industry recognition)
- (d) Mentorship (The supervising individual must qualify as an **able climber**)

FORMAL QUALIFICATION

To be considered an **able climber** on the basis of formal qualification alone, an individual must have Certificate III in Horticulture (Arboriculture) RT30203 or equivalent, **or at a minimum** have demonstrated competency in the following skill sets (Nationally Accredited Units of Competency):

- A current First Aid Certificate, (Level Two or equivalent) and maintain their CPR currency on an annual basis.
- RTF1002A Support Arboricultural Work, RTF2027A Undertake Standard Climbing Techniques & RTF3702A Undertake Aerial Rescue – covering Tree Hazard & Risk Assessment, Rope and Harness Climbing Techniques, Use of Spurs, Aerial Tree Rescue
- RTF3019A Remove Trees in Confined Spaces (including chainsaw use above ground and rigging tree parts with ropes) – where the climber will be using a chainsaw
- RTF3031A Undertake Complex Tree Climbing
- RTC2304A Operate & Maintain Chainsaws, RTC2005A Fell Small Trees and RTF3007A Fell Large Trees – where the climber will be using a chainsaw
- Also any other necessary training and experience to carry out the specific work required. i.e. Worksite Traffic Management, OH & S Card, NUE 260, etc.

Appendix II: Ground crew

As the focus of this document is primarily on climbing operations, no stipulation will be given here on requirements or qualifications necessary for general tree-work other than climbing. As such this document holds no formal requirement for particular qualifications or experience on the part of the ground crew. However, it is vital for ground crew assisting in tree care operations to be alert and able to fully co-operate with the climber. In most cases, this requires knowledge and experience of tree care operations. According to the OHS Act 2004, Part 3 21 (e) employers have a duty to “*provide such information, instruction, training, or supervision to employees of the employer as is necessary to enable those persons to perform their work in a way that is safe and without risks to health.*”

Ground crew must have:

- Appropriate training in and induction into the use of machinery that is to be used on-site
- Any other necessary and relevant training and experience to carry out the specific work required, i.e. Worksite Traffic Management, OH & S Card, Safety Observer/Spotter, etc.
- A current First Aid Certificate, (Level Two or equivalent). Ideally ground crew should maintain their CPR currency on an annual basis
- RTC2304A Operate & Maintain Chainsaws and RTC2005A Fell Small Trees or equivalent (If individual will be using chainsaw).
- Competent use of ropes and ground rigging.

Appendix III – Tree inspection

A pre-climb tree inspection should aim to identify any hazards present in the tree, to allow for adjustments to the climb plan in order to reduce the risks associated with such hazards.

Accurate Visual Tree Assessment (VTA) is an essential part of any pre-climb tree inspection. An ability to recognise the many indicators of internal decay is an important skill for anyone working in the tree industry, in particular for climbers.

Any pre-climb inspection should include a systematic inspection of the following:

- What species of tree is it and what is its approximate age?
- Are there any species specific problems or hazards associated with the tree?
- Any allergies or other factors that may be detrimental to health associated with the species?
- Is the tree alive? If dead, do any specific hazards exist?
- Is the tree stable in the ground? Does it need to be braced? Consider using a rope to test for stability.
- Check for dead wood that may fall whilst the tree is being climbed.
- Is the trunk sound, is it decayed or damaged?
- Is it strong enough to be climbed?
- Check for branches that have developed from epicormic shoots.
- Are the major branches well attached?
- Checking of the crown for suspended broken branches, poorly attached branches, split forks, fungal fruiting bodies, ant nests, or any other crown defect.
- Are there any foreign objects, nails, spikes, wire, bricks, concrete etc. in the tree?

If the tree is deemed to be unsafe to climb then alternative means of accessing the tree must be implemented eg. erection of scaffolding, use of elevated work platforms, felling the tree etc.

Climbers should not swing from one tree to another before establishing the integrity of the tree they are entering.

Appendix IV: Climbing equipment standards

The continually evolving nature of the industry, and the ingenuity applied by many advanced climbers in their response to the challenges posed by particular trees, make prescriptive regulation of climbing equipment extremely difficult. The VTIO recognizes the importance of the industry-wide forum on equipment and equipment-usage that is offered by the International Tree-Climbing Championships (ITCC), and formally recognizes the decisions made in that forum as representing an agreed standard set by the industry as a whole.

Where equipment meets an international standard and bears an industry standard mark, but is not considered safe for use in the ITCC, the VTIO strongly recommends that its use in tree climbing operations be discontinued.

Equipment designed specifically for the arboriculture industry should be used wherever available and practicable.

Climbing equipment inspection:

- (a) All climbing equipment must be inspected at least once every six months by a competent person other than the regular user of the equipment (this person must be a **competent climber**). Every such inspection must be appropriately documented, and the records of each inspection kept on file
- (b) All climbing equipment must be inspected monthly by individual qualified and competent climbers, that is, each climber is responsible for inspecting their own climbing equipment. That such inspection took place must be appropriately documented, and the records of each inspection kept on file
- (c) Any equipment found to be faulty or unsafe at any time must be appropriately recorded as such and subsequently decommissioned
- (d) Climbing equipment inspection and the decision to either carry out appropriate maintenance or to decommission a piece of equipment must be carried out in conjunction with manufacturers' specifications.

Climbing Equipment:

Tree climbing harness:

- Tree climbing harness must conform to A.S 1891 or equivalent and must have leg straps fitted.

Karabiner:

- Any Karabiner used as a **point of attachment** must be self-closing and double auto-locking and must require a minimum of two separate operations to prepare the gate to open.

Karabiner (continued):

- Karabiners with a screw gate locking device must not be used for life support
- All Karabiners used for life support must be rated to a minimum 22 Kn.

Climbing rope:

- Climbing lines must have a minimum nominal breaking strain of 22 Kn when new.
- Prussic loops must be:
 - (i) No smaller in diameter than 8 mm
 - (ii) If tied with a fisherman knot, each end (tail) must protrude from the knot at least 3 times the rope diameter
- Any rope used as part of a climbing system must be approved by the manufacturers for this purpose and be retired from service as per manufacturers' recommendations.

Note: Natural fibre rope is **not** to be used as a climbing rope.

Steel cable flip line or pole belt:

- Any karabiner used as part of a fall-protection attachment to the harness must be self-closing and double auto-locking and must require a minimum of two separate operations to prepare the gate to open. The pole-belt length adjuster may be attached using a rated **mallion** which has been tightened using a spanner.

Climbing spurs:

- Tree climbing spurs must be built to a recognized standard.

Climbing aids:

- All climbing aids used for life support which are not specifically designed for use in this industry must be rated to 22kn
- Chainsaws or other heavy equipment when in use by a climber should be attached to the climber by a double auto-locking karabiner or equivalent
- Climbing equipment must never be used as rigging for branch lowering or controlled falling

Glossary

aerial rescue:	the technique of climbing a tree in order to safely bring to the ground an injured or incapacitated climber who is unable to return to ground without assistance.
access line:	climbing line installed in a tree to gain access to, but not used to work in, the tree
anchor point:	a strong, safe branch or trunk crotch that can be used for the setting of a climbing rope or lowering rope.
ascender:	an mechanical device used to ascend a climbing rope.
belay:	a fall arrest system of protection for a climber by a second person using an approved friction device.
competent climber:	see Appendix I: Competent Climber
ground crew:	person who is responsible for and supervises a tree-care operation on the ground and who is required to maintain a safe working environment. The person should have appropriate training and experience for the task involved.
false crotch:	an anchor point established where a natural crotch is not suitable. It is often a sling, with a running loop around the trunk and two karabiners forming the bearing surface for the rope.
JSA:	Job Safety Analysis: a process of documenting the identification of all relevant site hazards, prior to starting any tree climbing operation.
point of attachment:	a complete and independent system connecting the climber to the tree.
rescue climber:	the additional climber who must be present on site during any climbing operation, in order to rescue the main climber in the event of accident or injury. This climber must be able to access the tree which is being worked on, in order to affect rescue if it is required.
safety harness:	an approved tree climbing harness conforming to A.S 1891 or equivalent with leg straps fitted.
spurs:	tree climbing spikes, manufactured to an approved standard, which are attached by straps to the climbers legs.
tree:	woody plant over two metres including palms, either alive or dead. Manufactured or constructed poles or "trees" are excluded.
tree climber:	person using standard tree climbing equipment to safely ascend, descend, move freely around the tree and competently carry out various tasks in trees.
tree inspection:	the process of visual tree assessment and hazard identification that must be completed prior to climbing any tree.