

**Draft Climbing Guidelines**  
**05<sup>th</sup> June 2010**



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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 inherently dangerous activity, it is recognised both in Australia and internationally as one of the best ways of accessing a tree's canopy, when the climber is suitably qualified and equipped. This document provides guidelines for suitable techniques and practices, and to 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

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The Victorian Tree Industry Organisation (VTIO) recognises that although working in trees is an inherently dangerous activity, 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

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Throughout this text, the term **shall** denotes a requirement which must 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

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All climbing work in trees shall be done by or under the direct supervision of an **able climber** (see Appendix 1).

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

#### 3.1 CLIMBING CREW

A minimum of two persons shall be present on every job site. One is the climber, and one is the **rescue climber**, who shall be an **able climber**.

- In remote areas a third person is required on every job site, to assist in the event of a rescue.

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

- Be physically and mentally fit.
- Exhibit zero blood alcohol and be free from the effects of any drugs. (Any prescribed medication will require a medical certificate.)

Climbers (both the climber and the **rescue climber**) shall be able to perform an **aerial rescue**.

#### 3.2 CLIMBERS TO WEAR

- Comfortable, Hi-Visibility clothing that is close fitting without restricting movement
- Climbing helmet
- Eye Protection
- Appropriate protective-toe **or** climbing-style lace-up boots with ankle support

All jewellery, including ear rings, rings and necklaces should be removed or covered with tape.

- **IF SPUR CLIMBING:** (In addition to the above) Boots require a flat reinforced instep with a well defined heel to locate spur stirrups.
- **IF USING A CHAINSAW:** (In addition to the above) Climber shall wear approved cut-resistant trousers, and approved ear and eye protection.

### 3.3 PRIOR TO CLIMBING

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

Climbers shall check all climbing equipment that is to be used daily prior to use and continually throughout the day.

- The **rescue climber** shall check the climber's **points of attachment** prior to starting work each day.
- The public and traffic shall be excluded from the work site and adequate signage that complies with the current Australian Standard (and with VicRoads Standards where applicable) is clearly visible.
- Climber and crew shall carry out Daily **Job Safety Analysis** and/or Risk Assessment and Hazard Identification Control as per OH&S Policy and Procedures, and discuss work plan.
- Prior to climbing, the nature of all hazards of the site shall be established, and strategies devised to minimize them.
- A complete Three Tier First Aid Kit (or equivalent) shall be positioned on the site.
- On site access to a telephone or two way radio shall be established. The location of the job site shall be noted and the site address made known to all staff.

### 3.4 SAFE CLIMBING TECHNIQUES

Whilst in the tree, climbers shall:

- Wear a **safety 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 carefully considered. Where there is any doubt about its capacity as a safe anchor, then a belay stop should be established at a point where there is absolutely no doubt about the strength of the anchor. A redirect can then be established out on the branch at the desired point.
- Maintain regular visual or verbal communication with the ground crew.
- 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 prussik 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 and never for climbing.
- Keep climbing rope 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 knees.

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).

### 3.5 NUMBER OF CLIMBERS PER TREE

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 safer method of performing the required tasks.

- Two or more climbers should be made to maintain communication.
- Climbers should work at approximately the same height.
- Climbers should 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 both the **climber** and the **rescue climber** are 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

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

- 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 shall 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 safety helmet and HI-VIS tops or reflective safety vest at all times, as well as cut resistant trousers or chaps, helmet, safety glasses and ear muffs if chainsaw is used.
- Minimize ground level noise wherever possible to facilitate communication with climbers.
- 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 climber.
- 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 drugs. (Any prescribed medication will require a medical certificate.)

## 5 WEATHER CONDITIONS

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### 5.1 CONSIDERATION OF 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 temperatures - climber fatigue accelerated.
- Low Temperatures - climber fatigue accelerated
- Humidity - climber fatigue accelerated
- Wet trees provide poor grip, foot and hand holds.
- High winds can cause branch or trunk failure, and unpredictable movement of trees with rope tension varying.
- 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.
- Safety may be severely reduced in adverse weather conditions. In steady rain, work should cease.

## 5.2 TREE CLIMBING IN ADVERSE WEATHER

Climbing may be considered unsafe if the following limits are exceeded. Additional safety precautions shall be initiated should situations necessitate climbing. In adverse weather conditions, shorter working periods should be considered

- Temperatures above 37<sup>o</sup> C or below 5<sup>o</sup> C.
- Wind chill factor reducing temperature to below 5<sup>o</sup> C.
- Humidity above 85%, if temperature is above 35<sup>o</sup> C.
- Wind Speed above 25 Knots (approx. 60 km/h).
- Rain 1mm in a 10 min. period
- Intermittent showers, consideration must be given to bark, foliage type, rope grip and equipment handling before work recommences.
- Steady and continuous rain, climbing should cease.
- Work should cease prior to sunset, and not start before sunrise.

## 6 WORK SITE SAFETY

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### 6.1 BEFORE WORK COMMENCES:

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

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.
- Cranes
- Earth Moving Equipment

## 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 better 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.
- Pruning operation or a tree removal operation.
- Hand held branches.
- Size and weight of any branches or logs.
- Site constraints.

### 6.3 EMERGENCY RESCUE

Each job site shall have:

- Access to a mobile phone or other reliable means of communication.
- A copy of the job sheet outlining the precise location of the job with the mobile phone and emergency telephone number, **000** in Victoria.
- Risk assessment - Prior to commencement of work, a **J. S. A.** must be discussed and documented.
- Plan for **aerial rescue** - at each job site, rescue kit must be within easy access, appropriate to the work being undertaken and in serviceable condition.
- The Daily **Job Safety Analysis** Sheet for each specific job will have noted on it the exact location of the site. This will be appropriate for directing emergency services to the rescue location in the case of an emergency.
- It is essential a rope of adequate length is on hand and ideally pre-set as an **access line** in the tree prior to accessing the tree to perform the required works. This will provide rapid access in the case of an emergency.

## 7 CLIMBING IN CLOSE PROXIMITY TO POWER LINES

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

- Be suitably trained and authorised in “Safe Approach Distances for non-electrical Personnel” for their relevant state or territory, as necessary.
- Notify the relevant power authority that climbing is occurring in the vicinity of power lines.
- Locate power lines and identify voltages.
- Treat power lines as live at all times regardless of shut downs.
- Estimate distances from the lines and take appropriate action depending on the voltage and the nature of the required works. This may involve shut downs or other strategies.
- When accessing trees in inclement weather or trees with wet foliage, climbers **MUST** only work in trees with vegetation outside the “Safe to Approach Distances” relevant to the state or territory.
- Set climbing ropes with extreme caution; any possibility of **pendulum swings** which would break body clearance regulations must be avoided.
- Climbers or their equipment must 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 relevant to state or territory regulations.
- 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 Limits of Approach Certificate. The observer’s main duty is to ensure that the operation is conducted safely at all times.

The observer should be organized and prepared to respond to 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: ABLE 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 an **able 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 criterion 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, ISA-format competition)
- (d) Mentorship

### FORMAL QUALIFICATION

To be considered an **able climber** on the basis of formal qualification alone, an individual must have Certificate III in Horticulture (Arboriculture) **or as 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)
- RTF3031A Undertake Complex Tree Climbing
- Arboricultural Chainsaw Operators Certificates Level 1, 2 & 3 (RTC2304A Operate & Maintain Chainsaws, RTC2005A Fell Small Trees and RTF3007A Fell Large Trees).
- Also any other necessary training and experience to carry out the specific work required. i.e. Worksite Traffic Management, OH & S Card, Limits of Approach, etc.



## Appendix II: GROUND CREW

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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 there is no formal requirement for qualification 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.

Ground crew shall have:

- Appropriate training in and induction into the use of Arboricultural machinery e.g. wood-chippers, stump-grinders, if these are 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
- Arboricultural Chainsaw Operators Certificates Level 1 & 2 (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**

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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?
- The crown has to be checked 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.
- Do not swing from one tree to another unless tree integrity has been checked.

## 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 Australian Standards 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 an independent person who is competent to perform inspections of climbing equipment (this independent person must be an **able 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. Every such inspection must be appropriately documented, and the records of each inspection kept on file.
- (c) Any equipment deemed faulty or unsafe during the above inspections 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 shall be carried out in conjunction with manufacturers' specifications

### Climbing Equipment:

#### 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 shall 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 as a climbing attachment.
- 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 than 8 mm.
  - (ii) If tied with a fisherman knot, each end must protrude at least 3 times the rope diameter
- Any rope used as part of a climbing system shall 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 shall be self-closing and double auto-locking and shall require a minimum of two separate operations to prepare the gate to open. The length adjuster may be attached using a **mallion** which has been tightened using a spanner (as per manufacturers torque settings, or specifications).

Climbing Spikes/Spurs:

- Climbing Spikes shall be from a recognised manufacturer.

Climbing Aids:

- All climbing aids (eg. spreader bars, bridges, strops, pulleys, ascenders, figure 8's, etc) shall be rated to 22kn.
- Chainsaws or other heavy equipment when in use by a climber shall be attached to the climber by a triple locking karabiner or equivalent.
- Climbing equipment shall never be used as rigging for branch lowering or controlled falling.

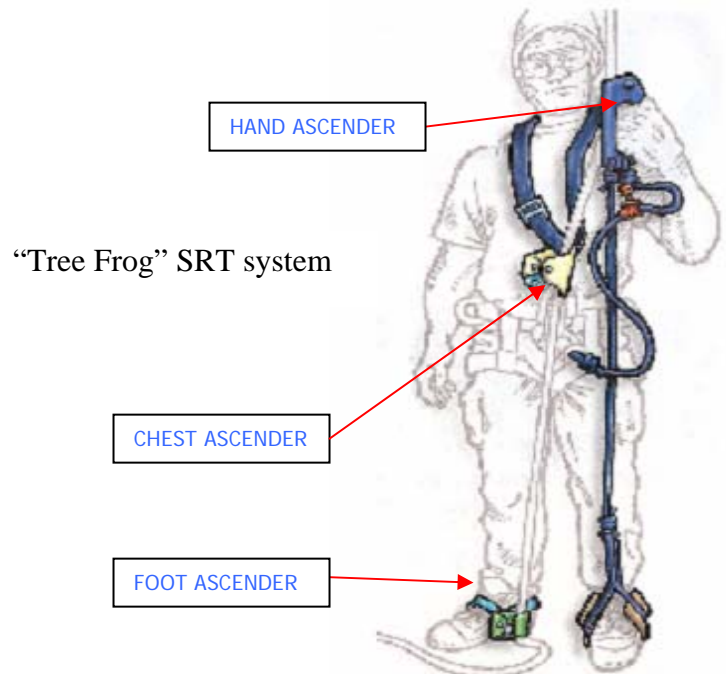
## Appendix V: Single Rope Technique

The Single Rope Technique (SRT) system is a way of ascending a pre-installed access line. It is one of the most energy efficient ways of accessing tall trees and is recognised world wide as a suitable tree access method.

Firstly an access line is set in a suitable fork high in the tree. The suitable fork should be healthy, have no signs of decay, be no less than 100mm in diameter and preferably be close to the main trunk of the tree. The access line is then tied off in a manner such that one side is suitable for climbing. The rope used for the access line should be between 10mm and 13mm in diameter and may be a super-static kern-mantle type construction containing a High Molecular or Amarid fibre core. The access line is normally left in the tree whilst the climber is aloft thus giving direct access to the tree should the climber require assistance at any time throughout the climb.

The climber attaches himself or herself to the rope using one of a number of different possible SRT systems. The variety of such systems, and the personal nature of each system, makes description particularly difficult. However it is essential to ensure that the climber maintains at least two **attachment points** to the line at all times, and that each element of the system is rated to a minimum breaking strain of 22Kn when new.

Once at the desired height the climber may decide to work directly from the access line or change over to a conventional double rope tree climbing technique. The secure side of the access line may also be used to descend out of the tree using a suitable descending device. It is not normally considered acceptable to conduct any cutting work whilst still on an SRT system.



## Glossary

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<b>Able Climber:</b>	See Appendix I: Able Climber
<b>Aerial Rescue:</b>	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.
<b>Anchor Point:</b>	A strong, safe branch or trunk crotch that can be used for the setting of a climbing rope or lowering rope.
<b>Ascender:</b>	An approved length of rope or mechanical device used to ascend a climbing rope.
<b>Belay:</b>	A fall arrest system of protection for a climber by a second person using an approved friction device.
<b>Ground Crew:</b>	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.
<b>False Crotch:</b>	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.
<b>JSA:</b>	Job Safety Analysis: a process of documenting the identification of all relevant site hazards, prior to starting any tree climbing operation.
<b>Point of Attachment:</b>	A complete and independent system connecting the climber to the tree.
<b>Rescue Climber:</b>	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.
<b>Safety Harness:</b>	An approved tree climbing harness conforming to A.S 1891 or equivalent with leg straps fitted.
<b>Spurs:</b>	Tree climbing spikes, manufactured to an approved standard, which are attached by straps to the climbers legs. To be used in tree removals or emergencies only.
<b>Tree:</b>	Woody plant over two metres including palms, either alive or dead. Manufactured or constructed poles or "trees" are excluded.
<b>Tree Climber:</b>	Person using standard tree climbing equipment to safely ascend, descend, move freely around the tree and competently carry out various tasks in trees.
<b>Tree Inspection:</b>	The process of visual tree assessment and hazard identification that must be completed prior to climbing any tree.