Draft for Consultation

December 2018

Proposed AA Technical Guide 1: Tree Climbing and Aerial Rescue

Please note this 'Draft for Consultation' document has not been set out in its final design style or format.

It relates to the first of five Technical Guides being developed, due for publication in 2019: 'Tree climbing and aerial rescue'. It is aimed at practicing, trained arborists and their supervisors.

TEXT
The draft is intended to show the proposed text, with indicative images at the appropriate points, and chapters / sections in the order we intend to present them.

IMAGES
Please note that those photos and diagrams included are for indicative purposes only – while some of the images will be presented as normal photos, many will be adapted by electronic design and illustration techniques to remove background 'noise' and focus on the key technical areas. Some photos will be replaced by others (a further photo shoot is planned in the New Year). Where images are proposed but not included, green highlighted text describes the image to be inserted. Diagrams and flow charts will be developed by designers and presented in a consistent style

SUMMARY BOXES
In each section there is a summary box which will be presented in the guide to:

- Summarise key points for the arborist
- Provide a supervisor check sheet for monitoring purposes.

The content of the summary boxes will also be compiled in a separate document that will be made available as 'PDF download' and will effectively replace the current AFAG Safety guides for aerial tree work.

RESPONSE
Please read through the draft and make note of any comments. Please then complete the short 'Survey Monkey' questionnaire, adding any extra information where requested.

If you have a longer or more complex comment or query, please email to paul.m@trees.org.uk with 'Draft for consultation' as the subject title.

Please submit all responses by Tuesday 15 January 2019.

TAKE THE SURVEY

TG1 DRAFT

(Front cover, verso page and contents page to be added.)

1.0 Introduction

1.1 This document provides technical guidance for anyone who is required to carry out tree climbing operations.

1.2 This Technical Guide is not a substitute for adequate training but it does set out current industry good practice relating to tree climbing equipment and techniques.

1.3 Everyone involved in tree climbing operations can use this document:

a. as guidance, enabling the climber and employer to comply with health and safety legislation;
b. to provide direction on the correct use of components in a tree climbing system;
c. to outline suitable techniques for tree climbing operations; and
d. to help reduce risk by making tree climbing safer.

1.4 This Technical Guide can form the basis of a safe system of work and can be used as part of standard operating procedures, setting out how an employer requires operators to carry out work.

1.5 In accordance with the Industry Code of Practice for Arboriculture, the key principles of tree work at height must be adopted when using this Technical Guide.
It is essential that:

a. all work at height is properly planned, organised, supervised and managed;
b. lifting systems are properly designed, including the compatibility and correct configuration of components within each system;
c. any equipment used is suitable for the task and subject to periodic inspection and examination;
d. maintenance of equipment is carried out to confirm all equipment remains safe for use; and
e. everyone engaged in a tree-climbing operation has the appropriate training and experience to be proficient in tasks they are required to undertake.

1.6 NB. When compiling this Technical Guide, the authors have assumed that if you are applying the principles and guidance laid out here then the decision that it is necessary to climb the tree has already been made. For guidance on making that decision reference should be made to the Industry Code of Practice for Arboriculture. Climbing should only be undertaken when it is not reasonably practicable to do the work from ground level or from a platform, in that order.

2.0 Planning and Management

Summary:

- *A suitable and sufficient risk assessment must be undertaken prior to any tree work at height commencing.*
- *Emergency Action Plans are to be in place for all tree work at height operations.*
- *Operators must be fully aware of the safe system of work and control measures to be implemented to ensure safe working.*
- *Where appropriate Risk Assessment Method Statements (RAMS) must be effectively communicated and followed.*
- *Point of work risk assessments must consider all external factor that may affect the tree work operation.*

2.1 Risk Control Systems and Emergency Planning

This section includes information to enable tree work operatives and others involved in planning arboricultural climbing operations to understand the purpose of the risk assessment and the emergency planning process, and their role within them.

2.2 Risk Assessment

2.2.1 For every operation, a suitable and sufficient risk assessment covering the site, task and machinery must be in place to identify the controls necessary to reduce the risk to As Low as Reasonably Practicable (ALARP).

2.2.2 Operators should ensure that they are fully aware of the significant hazards and risks associated with undertaking tree work at height, and that control measures to be implemented by them to ensure safe working are fully carried out.

2.2.3 For every operation, Emergency Action Plans (EAP) must be drawn up at the pre-work planning stage and revised if necessary at the point-of-work stages. An effective rescue plan must be put in place.

2.2.4 **All** site personnel must take part in job planning, raise points of concern and recognize that they must stop work if something is unclear or a safety issue arises.

Insert image of a work site and overlay arrows pointing to a series of potential hazards to be identified.

Insert a cut away image of a generic RA, and site specific validated. Linking to image above.

2.3 Emergency Action Plans

2.3.1 Every work site must have an effective, written Emergency Action Plan which includes what will happen in the event of: Aerial Rescue, First Aid Emergency, Fire Action, Contact with Service Utilities (underground and overhead), Restricted or Remote Access.

2.3.2 As part of this information, all operators on site must understand (through direct briefing, training and guidance) what is expected of them in an emergency and what immediate action to take.

2.3.3 Emergency action protocols (describing what to do) can be part of general work site documentation. However, for every work site, specific detail must be recorded to allow emergency services to find operators and access the site.

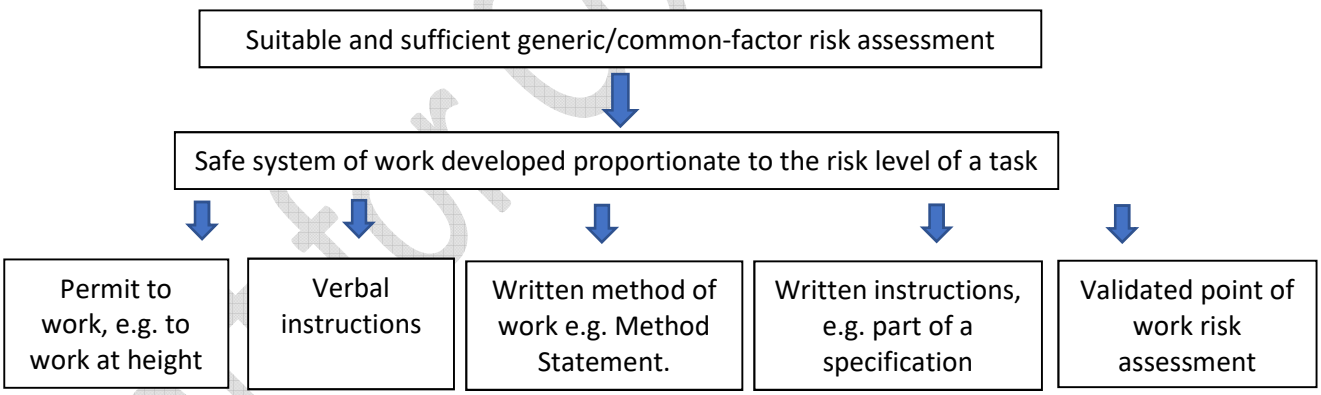
2.3.4 Emergency contact and access information should include the following list as a minimum. However, it should not be limited to this list. If other information is relevant, include it.

a. site/location address, providing a nearest address and postcode (where applicable);
b. work site directions (especially if the address and postcode are inadequate);
c. designated emergency services meeting place (especially if communication methods are restricted or the address is inadequate);
d. nearest emergency services access point and type of access;
e. where applicable, a helicopter-accessible emergency services meeting place;
f. location and contact details of the nearest urgent care facility;
g. work manager's contact details; and
h. site (landline number if possible) and site staff contact details.

Insert a cut away example of a recorded EAP information as part of a SSRA.

2.4 Safe systems of work

All operators, regardless of their position, must be aware of the safe system of work in place for any task. A safe system of work outlines the control measures that need to be in place to avoid or reduce risk in the workplace.



2.5 Method statements

2.5.1 A method statement will contain the following key information:

a. a sequence of procedures necessary for carrying out the task in hand safely;
b. the control measures that are being or have been introduced to ensure the safety of anyone who is affected by the task or process; and
c. provision for emergencies in the form of an emergency action plan.

2.5.2 Method statements must be supported by a risk assessment, e.g. a Risk Assessment Method Statement (RAMS) pack that is specific to the site and job.

2.5.3 A method statement can be used to set out and record the safe system of work and is normally prepared by a competent person in a business.

2.5.4 Everyone affected by any work activity covered by the RAMS must be fully briefed to ensure they have understood the requirements of the procedures it sets out.

2.5.5 The information in the RAMS must be communicated by the competent person to everyone involved in the task before any work starts. Ideally this should be done as an on-site briefing and a site walk to highlight any specific points identified in the RAMS.

2.5.6 Any changes or additions proposed to the planned methodology and method statement should first be approved by the competent person. No works must take place that are not detailed in the method statement.

2.6 Other work site considerations

2.6.1 In producing a point-of-work risk assessment, a competent person should take into account a range of factors that may affect the works. These factors may include, but are not limited to:

a. legal protection of the trees, e.g. Tree Preservation Orders, planning conditions, felling licences;
b. protected species, e.g. bats, birds, European Protected Species;
c. railways, roads and footpaths;
d. immediate infrastructure, e.g. buildings, fences, property targets, utilities;
e. third-party constraints like access arrangements or restrictions on the timing of work;
f. welfare facilities, e.g. nearest toilets, handwashing facilities, rest area, smoking area; and
g. biosecurity considerations.

2.6.2 Weather conditions. If the weather creates a significant hazard and the safety of anyone involved in or affected by the operation could be compromised, an operator must ask for additional guidance from the competent person about the appropriate course of action. For example, if the wind strength could cause the operator to lose stability in the canopy or could pose a risk to the structural integrity of the tree, the work should not be carried out.

2.6.3 An operator is responsible for making sure they know what impact other site considerations (including but not limited to those listed in 2.6.1 and 2.6.2) might have on their work and for taking any necessary actions. Those other site considerations will be included in the point-of-work risk assessment.

The table below includes some of the considerations that may impact on the undertaking of tree works.

Considerations	Impact	Operator Action
Legal protection of trees	• prevents required works taking place • limits scope of work	• Confirm presence/significance of legal protection before beginning work. • Undertake tasks only in accordance with approved schedule of works.
Protected species	• prevents required works taking place • limits scope of work	• Confirm presence/significance of any protected species before beginning work. • Undertake works only when measures are in place to ensure the protection of noted species. Such measures may need to be carried out under the direct

		supervision of a specially qualified individual i.e. an ecologist. • If applicable, do the works outside nesting/breeding seasons.
Railways Roads Footpath Utilities	• prevents required works taking place • limits scope of work	• Contact relevant authority to explain the scope of works and establish any measures which must be in place beforehand. • Undertake tasks only in accordance with approved schedule of works.
Third-party constraints, e.g. noise limits, locality	• limits scope of work	• Contact all parties affected by the works to agree timings and duration to limit potential disruption. • Think about how the work may affect others and do what you can to minimise its impact.

2.7 Resources

Summary:

- *A sufficient number of operators must be available throughout the duration of the task.*
- *Rescue provision is to be immediately available, with proficient operators equipped to deal with a possible range of rescue scenarios.*
- *The use of climbers acting as rescue provision for each other working at height, must be carefully considered and justifiable*

2.7.1 A minimum of two people must be present during all tree-climbing operations. It is expected that there is someone always available on the ground to support operatives working in the tree.

2.7.2 It is of crucial importance that an aerial rescue can be carried out without delay. Therefore, for each climber there must be a rescuer immediately available, competent and equipped to perform an aerial rescue.

2.7.3 In particular circumstances (for example, if two climbers are working in the same tree) it may be more favourable for climbers to act as aerial rescue provision for each other as their response time to the casualty will often be far quicker than an individual starting from a position on the ground.

2.7.4 When considering using two climbers in adjacent trees and tasking them with the role of rescuing one another, a detailed examination must be undertaken to consider whether they would be immediately available to carry out a rescue. Any decision to undertake this as a methodology must be justifiable, giving due consideration to the speed and efficiency of a safe rescue.

2.7.5 The following factors should be considered when deciding whether the person nominated to carry out an aerial rescue could be on the ground, working in the same tree, or an adjacent one:

a. proficiency level of rescuer e.g. Is the rescuer suitably proficient to access the casualty in time to perform an effective rescue?
b. equipment resources e.g. If access from ladder would be the quickest method but that ladder is not available, it may be better to have the rescuer in the tree.

c. proximity of trees to each other e.g. Are the trees close enough to enable the rescuer to traverse directly into the tree where the casualty is located, or will they need to descend prior to accessing? If access is required to be from ground level first are there any obstacles which may hinder rapid access i.e. needing to cross a boundary like a fence, wall or a road.
d. complexity of crown structure e.g. In a dense canopy the route through to the casualty may be difficult to negotiate or in a sparse canopy lateral movement may be challenging due to a lack of limb structure.
e. method, speed and ease of access e.g. It may be worth using SRT as opposed to MRT as it may prove to be a quicker and more efficient mode of access.
f. nature and severity of likely injury e.g. If the climber is using a chainsaw in the tree the severity of the injury is likely to be greater than if using a handsaw.
g. task being undertaken e.g. suitability of two climbers in the same tree during dismantling operations.

2.8 Equipment

Summary:
- *Ensure pre-use checks have been carried out on all work equipment in operation.*
- *Where applicable, ensure that the relevant thorough examinations have been carried out.*
- *Ensure that the correct Personal Protective Equipment (PPE) is always used.*

2.8.1 Operators carrying out tree work at height must be adequately trained and able to carry out pre-use equipment checks. An operator must have practical experience of using the equipment they plan to check, and they must understand the standard to which the equipment should be inspected, as defined by the arboricultural industry and the manufacturer's recommendations. Arboricultural lifting equipment must undergo thorough examination by a Competent Person, at the recommended intervals. The competent person must be sufficiently independent and impartial to allow objective decisions to be made.

2.8.2 It is the individual operators responsibility to ensure they are familiar with any personal fall protection system they use, and anyone nominated to carry out a rescue must understand the function, application and limitations of equipment in use by other operators on site.

2.8.3 All those engaged in tree climbing operations must wear PPE appropriate to the site, the task and the equipment they are using. It is the user's responsibility to carry out pre-use checks on PPE. Only use PPE that is in a suitable condition and not age-expired. Report defective or damaged equipment in accordance with organisation/company procedures.

2.8.4 Operators must receive training that ensures they can select the correct PPE for the circumstances and know how to use, maintain, transport and store it.

2.8.5 The user must make sure that PPE is worn in accordance with manufacturer's guidance. Where applicable, PPE must apply to relevant conformity assessments.

2.8.6 As a minimum, those engaged in tree climbing operations must wear the following:

a. helmet – to relevant standards applicable for aerial work;
b. footwear – providing grip and ankle support;
c. non-snag outer clothing, ensuring items do not obscure harness attachment points;

The following may also be needed: :

d. eye protection, subject to the requirements set out in the task-specific risk assessment;
e. hand protection e.g. gloves, suitable for the intended task and subject to the requirements set out in the task-specific risk assessment.
f. Further PPE may be required for the tasks to be carried out, e.g chainsaw use. See TG2: Use of tools in the tree.

2.8.7 A personal first aid kit must be carried by all climbers. It must include at least a large wound dressing, along with a knife with a retractable blade.

2.8.8 It should be ensured operators can readily access any first aid provision mounted upon their harness, when in a range of work positions.

2.9 Time

2.9.1 As part of the work planning process, the competent and/or the responsible person must allocate enough time for operators to complete the designated tasks. Before beginning work, operators must make sure they are fully aware of any time restrictions on the task. Operators must plan work accordingly with the competent and/or the responsible person to ensure operations can be carried out safely and efficiently.

2.9.2 Where operators feel insufficient time has been allocated to a task, or where the safety of operations is jeopardised because of a shortage of time, operators have a responsibility to stop work and contact the competent person to raise their concerns.

2.10 Roles and Responsibilities: General

Summary:
- *Operators on site must clearly understand their role and responsibilities.*
- *The method of communication between climbers and groundstaff must be demonstrably clear, unambiguous and understood by all.*
- *Suitable supervision undertaken by a competent person with the genuine authority to act in this role, must be in place during all tree work at height operations.*

2.10.1 Clear and correctly defined roles and responsibilities must be established from the outset by the competent person, to ensure a consistent approach to the planning, management and completion of tree work at height.

2.10.2 It is the responsibility of every operator on site to ensure they understand their own role and what is expected of them. In general, every operator must do all of the following:

a. understand the limits of their own skill and experience of work practices. They must not take on tasks or use machinery without being adequately trained or if they do not feel comfortable or confident to do so;
b. carry out their responsibilities as defined by good practice or as determined by an employer or an individual charged with coordinating the work site (e.g., foreman, team leader, chargehand);
c. select the correct equipment for a task, ensuring they always use the equipment in accordance with manufacturer's guidance and within its safe operating parameters, e.g. Safe Working Load;
d. be responsible for inspecting their own equipment to confirm it is undamaged and entirely suitable for the intended use;
e. maintain equipment in accordance with manufacturer's guidance, and correctly store the equipment they use;
f. work safely on their own initiative, ensuring what they do (or don't do) does not jeopardise the safety of others on site or anyone else affected by the work;
g. tell those responsible for coordinating work-site activities if there are safety-critical or other developments that could have a bearing on any of the above.

2.10.3 Tree work is usually a team task. Individual members of a team must remain aware of all other operators on site in addition to their individual responsibilities.

Insert a picture of a climber and ground person with idea statements surrounding them of their role and responsibilities.

2.11 Responsibilities

2.11.1 A climber carrying out tree work at height plays a key role in the way work progresses. If the climber works in close cooperation with ground staff this will improve safety and the overall efficiency of the task. A climber's responsibilities include:

a. planning the job with the ground staff, including agreeing on a sequence of works;
b. agreeing and maintaining an effective method of communication with ground staff;
c. working in accordance with good practice so that no unnecessary risk is introduced to the task;
d. consulting with ground staff where methods of working or the sequence of works deviates from the original plan;
e. providing instructions and receiving verbal confirmation from ground staff to ensure drop zones are clear when required;
f. working at a speed which is consistent with the ability of ground staff to maintain a clear work site.

2.11.2 Ground staff play a vital role in tree climbing operations. An effective ground person will make the climber's job easier and safer and can improve the efficiency of the task by doing the following:
a. planning the job with the climber;
b. maintaining effective communication with the climbers;
c. maintaining concentration, anticipating the climber's needs, passing up tools and other equipment;
d. keeping climbing and work ropes on the ground free of knots, kinks, tangles, debris and branch wood, and clear of machinery (e.g. brushwood chippers), passing traffic and other potential sources of damage;
e. keeping the work site tidy;
f. being aware of the surroundings: Do not enter designated drop zones unless the go-ahead has been given by those working at height, except if there is an emergency;
g. ensuring the precautions taken to keep the public and traffic out of the work area are maintained while work is in progress;
h. controlling working ropes and, when applicable, lowering systems;
i. discussing with the climber any poor work practices they notice or any work technique that may endanger the climber or others – reporting near misses and correcting unsafe acts;
j. being aware of their ability to call a halt to proceedings or raise concerns at any point during the operation; and
k. helping in emergencies and aiding rescue.

2.12 Communication

2.12.1 Communication during an operation can be key to safety and effectiveness. Any system to be used must be agreed between climbers and ground staff before work begins and remain effective throughout.

2.12.2 To ensure clarity the agreed system of communication may be recorded as part of a point of work assessment.

2.12.3 The communication system chosen can be verbal or non-verbal. It must be appropriate to the site and situation, based on:
a. weather conditions – wind;
b. background noise – construction traffic, highways, public spaces;
c. complexity of the task – where misinterpretation of information could have serious consequences; and
d. reliability of the communication system, e.g. risk of radio-signal-based communications suffering interference or losing a link;
e. whether visual contact can be maintained between climber and groundstaff.


2.12.4 All members of the team must agree the key words or signals to be used.

If a climber shouts 'Clear!' it could mean:
'It's clear to walk under the tree'
OR
'Is it clear under the tree?'

2.12.5 A positive reply to an instruction should be brief, always given and easy to understand. A misunderstanding between climber and ground crew in this example could result in an accident.

2.12.6 If there is more than one person on the ground, a 'Lead' or 'Head' ground person should be nominated to avoid the potential for multiple – possibly conflicting – replies to a climber's call.

2.12.7 Where the site has multiple operational areas, a 'contact' can be allocated for each task, to reduce the chance of miscommunication which could lead to an accident. For example, where there are two climbers in two separate trees with a ground person supporting each one, the climber must only act on instructions given by their ground-based 'contact' and not by the individual supporting the climber in the other tree.

2.12.8 The climber must also make it clear when 'free' equipment is being handled in the tree, such as during the installation of friction savers, in case objects are dropped. In such a scenario the climber must ensure the areas directly below are clear and must give a verbal warning before installing the equipment.

2.13 Supervision

2.13.1 The competent person (who is responsible for ensuring operations are managed and carried out safely and the work environment is controlled) may be referred to as chargehand, crew leader, foreman or team leader.

2.13.2 Anyone in the competent person role must ensure they are fully aware of their responsibilities and must understand the expectations others have of them. Principally, a competent person is expected to:

a. lead by example, in work practices and equipment use;
b. treat those involved in or affected by the work respectfully, maintaining effective communication between the workforce and with managers;
c. control the work environment, ensuring that operators with specific responsibilities carry them out effectively;

d. monitor task progression, actively encouraging efficiency within the workforce;
e. provide feedback to individuals on their performance and observed work practices;
f. encourage operators to develop their knowledge and understanding of tree work at height by engaging in proactive continuing professional development (CPD);
g. ensure that individuals allocated specific tasks are capable of carrying them out; and
h. directly supervise operators who lack experience or need to consolidate their skills.

Insert a pre-work checklist that encompasses all of the previous points.

3.0 Work Site Planning

3.1 General

Summary:
- *The Competent Person on site is to ensure the work site is appropriately planned and laid out.*
- *Prior to any tree access taking place, tree condition assessments must be carried out.*
- *Clearly defined drop, working and buffer zones must be established and maintained throughout the duration of the task.*

3.1.1 Before work at height operations begin, any control measures required by the point-of-work risk assessment must be implemented.

3.1.2 The image below provides guidance on the key elements that should be addressed as part of any work site plan.

Insert image of a worksite laid out correctly, highlighted all the points for consideration e.g. Access, fuel storage etc.

Insert functional flow chart that shows a step by step process that goes from arrival on site to completion of works, considering all the factors in-between.

3.2 Tree Condition Assessment

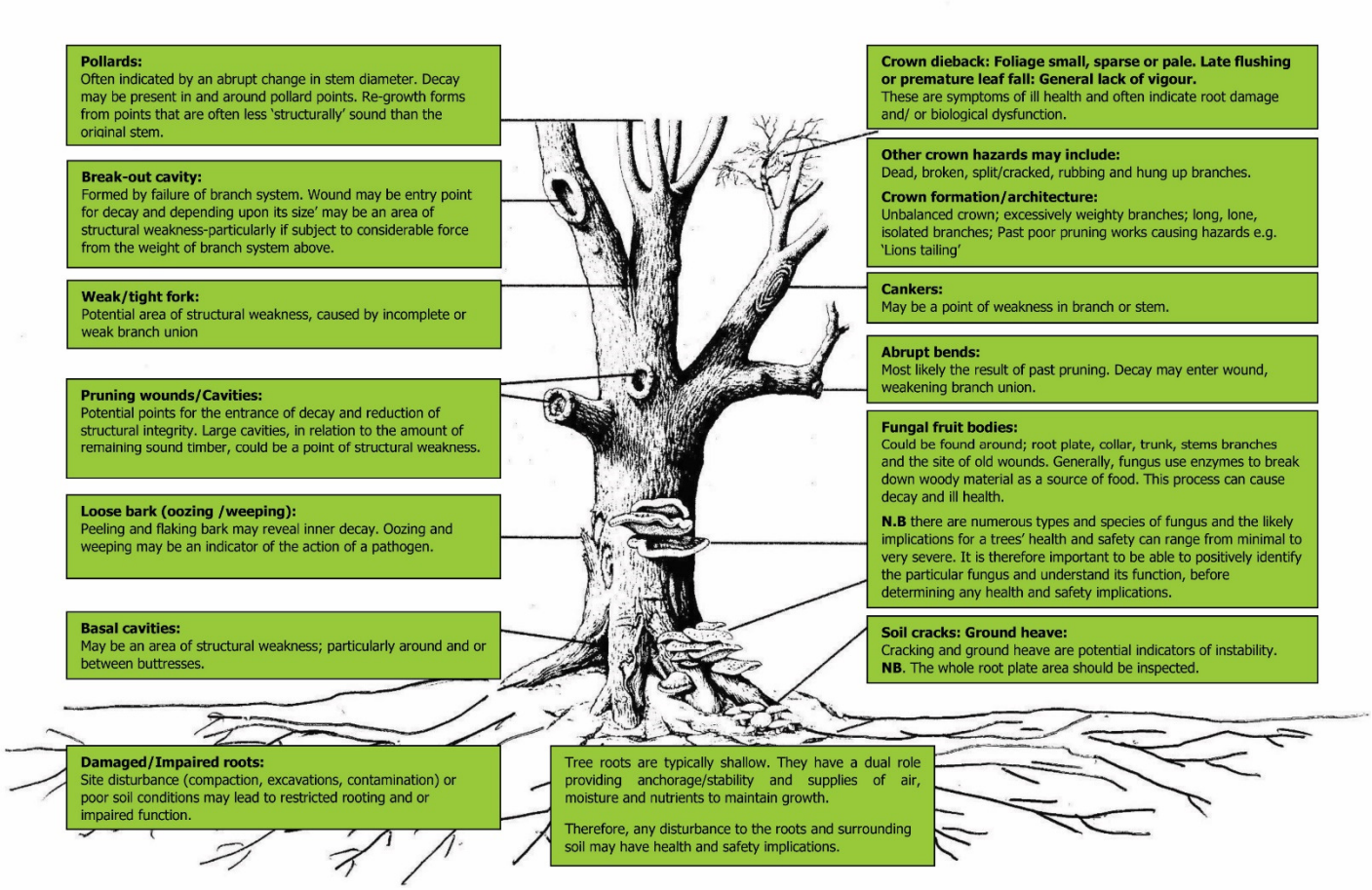
3.2.1 The point-of-work risk assessment should be consulted before any pre-climb tree condition inspection is carried out. In summary this inspection should include: a visual tree condition assessment; an inspection of the rooting area; and an understanding of the species, its timber characteristics and the effects of seasonal variations.

3.2.2 The visual tree condition assessment undertaken pre-climb is vital to:

a. validate work at height decisions made as part of the point-of-work risk assessment process;
b. assess whether the tree is safe to climb;
c. select the most appropriate system for safe working;
d. choose the most appropriate method of access;
e. identify suitable and safe anchor points.

3.2.3 An inspection of the rooting area for signs that might lead to instability of the tree should include looking for:

a. evidence of fungal activity;
b. evidence of movement or heave of the root plate, e.g. soil cracking or lifting;
c. evidence of root pruning/severance, e.g. recent trenching or excavation work in the proximity of the main stem; and
d. any other visible defects.



3.2.4 Pre-climb inspection of the stem and crown should assess it for signs of decay or weakness, for example:

a. fungal fruiting bodies, cavities, cankers and poor health;
b. major deadwood and hanging branches;
c. asymmetry of the lower main stem;
d. open wounds;
e. potential structural weaknesses that may be indicated by included bark in forks, weak branch union, abrupt bends and epicormic growth;
f. damaged stems and/or branches with cracks or splits;
g. evidence of previous work, for example, 'topping' and 'lopping', or branch regrowth from a stub which may have a weak branch union because of decay; and

h. any other visible defects.

3.2.5 Tree species, timber characteristics and seasonal variations must be considered as these will affect the structural integrity of the tree, which in turn will have a bearing on the work specification and the access technique used.

3.3 Site Zoning

3.3.1 During any work at height task, operators – particularly those working on the ground – can be injured by falling tools and equipment. All those on site have a duty to ensure that everyone is kept as far as possible from risks. When planning the layout of a work site, the risk associated with falling objects must be considered, and appropriate working and exclusion zones must be set up. Such zones must be established, communicated and maintained by everyone involved in the work as part of the risk control system for the site.

3.3.2 The size of each zone should be assessed and determined individually. Changes to the dimensions of any zone must only be made following a reassessment of the factors that determined the original zone size and only after carefully considering why a change is to be made.

3.3.3 If a zone size or location is to be changed, the details of the alteration must be made clear to everyone involved in the operation.

Insert a plan view of the work site, tree in the centre with three zones radiating from the centre red, amber, green.

3.3.4 Any operator entering a drop or work zone must wear PPE in accordance with current good practice. This requirement must be strictly enforced by the competent person on site e.g. foreman.

3.3.5 Drop Zone (Red): This is the area where it is anticipated materials may fall and therefore people or property would be at significant risk from falling objects..

Specific controls must be in place to manage entry to this zone. As a minimum these must include confirmation from the climber to ground staff that it is safe to proceed, and demarcation, for example physical barriers, signs, floor indicators, physical features (e.g. canopy dripline).

The individual with the primary responsibility for designating the drop zone must make sure it is agreed by all parties, and if the zone changes during work, the changes must be confirmed to all.

3.3.6 Work Zone (Amber): an area where hazards could be encountered or created. Consideration must be given to the risks associated with items from the drop zone entering the work zone, and therefore control measures such as extended drop zones and work practices to minimise the chance of falling objects may need to be introduced e.g. branch lowering techniques.

Anyone who is not authorised to enter the work site must stay outside it. Signs and guards must be established and maintained.

3.3.7 Buffer Zone (Green): an area that anyone – work team or the public – may enter. This area is not exposed to an immediate hazard. However, it may be necessary to put up warnings (tree work signs) or to introduce a control (close footpath).

4.0 Occupational health

Summary:

- *The wellbeing of everyone in the team should be established before work operations begin and must be maintained throughout.*

4.1 All operators involved in arboriculture have a responsibility to promote good occupational health in the workplace. Employers should encourage self-awareness in their staff in order to reduce the chances of long-term sickness and ill-health.

4.2 Operators should be provided with guidance about how to manage their own health and how to introduce control measures as they see fit, e.g. to stop smoking, improve diet, increase water consumption.

4.3 Periodic health surveillance may be required by an employer to demonstrate compliance with the law, a process each operator should actively participate in. Employers should assess whether an employee's exposure to physical agents such as noise and vibration is significant enough to require health surveillance.

4.4 The development of a positive culture in the workplace, where each individual feels valued and has the opportunity to discuss health-related issues, should be encouraged.

4.5 Some specific occupational health factors may affect arboriculture and can have a day-to-day effect on staff. They include:

a. Exposure to the sun, potentially resulting in poor hydration levels, sun stroke and heat exhaustion. Avoid exposure and seek shade. Try to sequence work to allow operators to stay in the shade for as long as possible. Sunscreen, long-sleeved tops, hats and trousers are relevant controls to protect against the UV in sunlight.
b. Warming up and stretching. Climbers should make sure that they are warmed up before climbing to reduce the risk of muscular strain. Climbers should be able to use a range of techniques to improve their efficiency and reduce the risk of injury.
c. Workplace-related immunisations. The decision to have immunisations must be based on a risk assessment of the working environment and the operators who are doing the work. Particular environmental factors can present significant hazards, e.g. watercourses, animals, needles. Some individuals are at greater risk, e.g. people with low immunity because of ongoing medical conditions or treatment and new or expectant mothers.

Other health factors:

a. Mental wellbeing. Be aware of and engaged with those around you. Mental wellbeing does not mean the absence of times of stress and sadness; it is more about an individual's general outlook and ability to cope with such times.
d. Substance abuse. This is the harmful or hazardous use of psychoactive substances, including caffeine, alcohol, and illegal or prescription drugs. These substances affect the way that the brain and nervous system work and can therefore directly impact on an operator's ability to function.

4.6 All operators must report any signs of ill-health – their own or a colleague's. Ill-health should be reported to the competent and/or the responsible person as soon as possible. Ill-health can impair judgement and physical capability and can therefore affect the safety and wellbeing of both the individual concerned and the team.

5.0 Access Methods

Summary:

- *Access methods and techniques selected should reflect the outcome of any tree condition assessment undertaken.*
- *Methods should consider operators abilities, surrounding features and tree structure.*
- *Any work equipment selected to assist in access must be used in accordance with manufacturers guidance.*
- *Access methods should be selected to be as ergonomic and efficient as possible for the operator.*

5.1 General

5.1.1 After the decision has been made to climb the tree, it is necessary to choose the specific technique, methodology and equipment to be used.

Insert a decision tree which shows the selection of appropriate methods and techniques for climbing a tree.

5.1.2 It is the responsibility of all personnel to consider physical constraints (of people, surroundings or both) when selecting work techniques.

5.2 Rope Installation

5.2.1 The chosen method of installing the rope will often depend upon:

a. the method of access to be used;
b. the desired position of the rope within the canopy of the tree; and
c. the physical capabilities of the operator.

For example, if body thrusting is the chosen method, a rope positioned in the lower part of the canopy against the stem would be adequate. However, this would not be preferable if the access technique was to use secured footlocking, where a rope positioned free hanging from the main stem would be advantageous.

5.3 Rope throwing

5.3.1 Rope throwing may be chosen to install a rope when significant height and/or distance are either not necessary or not desired.



5.4 Throw-lines and Associated Equipment

5.4.1 A throwline can be a very effective method of installing a climbing line high in the tree.


5.4.2 Tree form and surrounding hazards may limit the use of throwlines. For example, the bag can get stuck in a tree covered in ivy or epicormic growth.

5.4.3 Additional risks may arise from mis directed throws, powerlines or the recoil of a snapped line when it is stretched.

5.4.4 Different weights of bag and line are available:

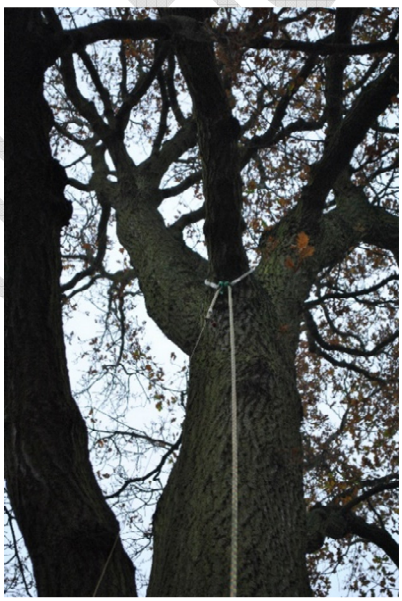
a. Lighter bags and lines can be thrown further and are better suited to smooth-barked trees.
b. Heavier bags pull the line over the branch and return to the ground more easily, particularly on rough-barked trees. However, the potential maximum height of a heavier bag may be less.
c. Stronger lines can also be used to pull small hanging branches or deadwood out of the tree.

5.4.5 An initial throw may send the line over several branches. By using a bag on either end of the throwline, an operator can manipulate it so that the line is installed over a single isolated branch.

5.4.6 In certain circumstances, the line may be installed through the canopy and routed over multiple anchors, for example, when the operator is employing a Stationary Rope Technique. This type of rope installation can work well where it is difficult to isolate a single branch because of a complex canopy or physical limitations.

NB Be cautious when installing a rope over multiple anchors as it can exert eccentric forces on the canopy of the tree and cause branch failure.

5.4.6 Once the line is installed, it can be attached to the climbing rope by using a karabiner or tied on, for example using a clove hitch and a series of half hitches. The use of half hitches can help keep the rope in a straight line and allow the rope to be pulled over a narrow fork or through the rings of a friction saver. The bag may not need to be removed unless the rope is being pulled through a narrow fork or the rings of a friction saver. The climbing rope is then pulled into the tree.

5.4.8 Specific equipment, such as a catapult, can be used to send a throwline a long distance. Before using this equipment, carry out a risk assessment to identify hazards (e.g. buildings, people, roads and overhead powerlines), the risks they pose and the control measures required.


5.5 Use of Extendable Poles

5.5.1 Extendable poles can, in some circumstances, provide a climber with a means to install part of their rope system. This may be from the ground to position an initial anchor in the canopy, or from within the canopy. Because of the risk associated with using pole-saw heads and the potential for damage to textiles when pole-saws are used to install or retrieve rope, this equipment must be used only with a secured bar cover/scabbard in place.

5.5.2 Whenever extendable poles could be used, consider the following:

a. distance to anchor – number of poles required, safe use and retrieval;
b. density of canopy – ease of movement through it, potential for entanglement, obscured vision; and
c. site-specific hazards, e.g. overhead lines, greenhouses.

5.6 Ladders and Steps

5.6.1 Ladders or steps must only be used for low-risk, short-duration tasks, such as accessing the lower canopy to begin a staged ascent or as limited-duration access for hedge trimming. If ladders are to be used for a 'hands free' task, the operator should also be correctly anchored into the tree. If the task requires working from a ladder for extended periods of time, another work method must be considered.

5.6.2 Where ladders are to be used, the following points can help reduce the risks:

a. Ladders must be of a type rated for industrial or heavy-duty use, be subject to recorded periodic checks by a competent person and be inspected prior to use.
b. The set-up (safe operational angles, footing, correct overlap etc.) and transport of ladders must be in accordance with manufacturer's instructions.
c. A rope can be installed (by throwline, for example) to safeguard the climber's ascent of the ladder. Ground staff can tend a climber's system during ascent so that the climber can keep both hands in contact with the ladder.

d. The climber must be secured to a proven load-bearing anchor point in the tree before leaving the ladder or when installing a higher anchor point from the top of a ladder.

e. Ladders are normally only used as a means of accessing the crown of the tree. Once the climber is secured to the tree, the ladder should always be removed and stored safely to prevent damage to it.
f. The climber should avoid working from the ladder where higher, easily accessible anchor points are available. The ladder can then be removed before work starts.

5.6.3 Where a ladder is used as a means of providing a temporary platform for work, the climber must be anchored into the tree, and preferably the ladder will be secured to stop it moving.

5.7 Lowerable Systems

5.7.1 The use of a lowerable system when uninstalling a ladder is preferable when a risk assessment has determined that the ladder's removal poses significant risks to operators or surrounding structures. It will also help prevent damage to equipment. A lowerable system could be required because of the height and weight of the ladder when extended, the number of people available to carry out the operation or the specific conditions, e.g. wet and slippery.

5.7.2 Where a single user has to control descent as part of a lowerable system, as a minimum the system should contain an element of friction management.

5.7.3 Where the climber is working with ground staff to control the lowering system from within the tree, the ground staff must not be directly beneath the climber or the ladder within the drop zone.

6.0 Personal Fall Protection Systems

Summary:

- *A number of Personal Fall Protection Systems are available for work at height. However, because of the nature of tree climbing operations and tree climbing systems, it is assumed here that only Work Positioning Systems are in use.*
- *The use of a second load bearing anchor point when moving within the tree should be based on what is reasonably practical, to ensure the operator is not exposed to greater risk.*
- *Fall protection systems should be configured to minimise the distance and consequences of a fall.*
- *Slack within a system must never exceed 500mm.*

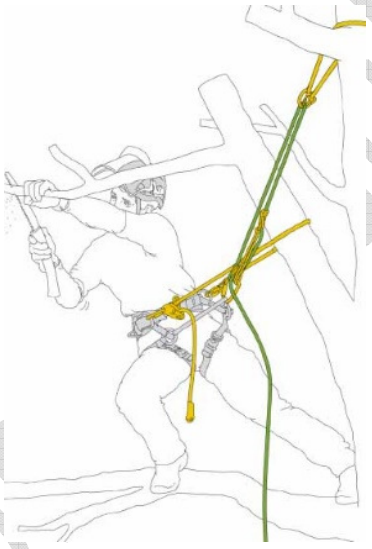
6.1 Defining Personal Fall Protection Systems

6.1.1 It is important operators understand the terms used to describe different Personal Fall Protection Systems (PFPS) and the limits on their safe use.

a. **Work Restraint:** A technique where someone working at height is prevented by PPE from reaching areas where there is a risk of a fall, e.g. a work restraint lanyard used in the basket of a mobile elevating work platform (MEWP).

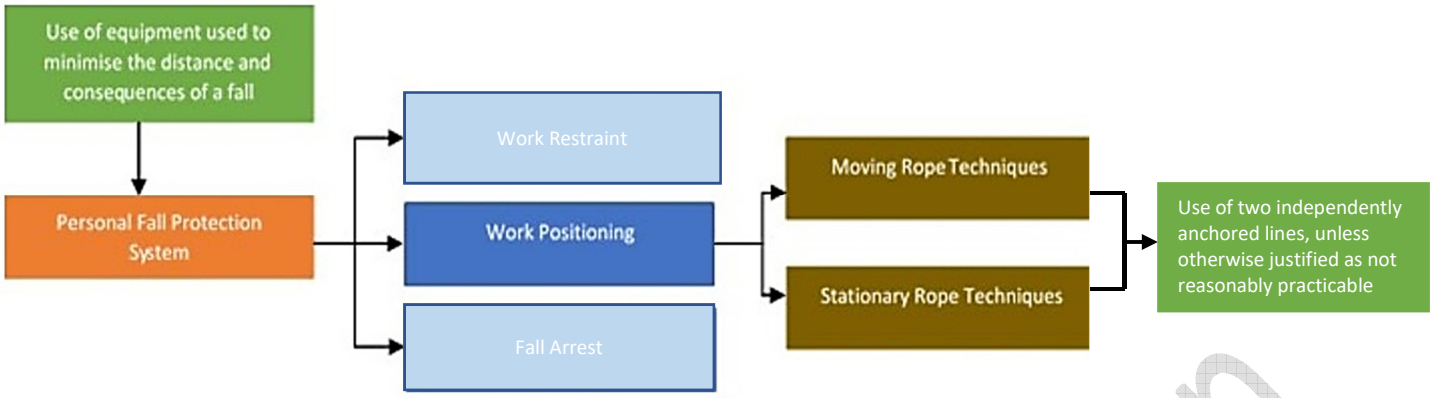
b. **Work Positioning:** A technique that allows someone working at height to be supported in tension or suspension by means of PPE configured to prevent or reduce falls, e.g. moving or stationary rope techniques, or spiking.

   In work positioning techniques, slack must not exceed 500mm. This restriction is intended to limit injury from contact with objects during a fall or from the forces associated with arresting the fall. Supplementary anchors should be used to prevent a pendulum swing.



c. **Fall Arrest:** A technique using PPE to prevent a falling person from hitting the ground or other obstructions. It is designed to reduce the impact forces of the arrested fall. Fall arrest systems may be required when arborists have to work above their anchor point, e.g. when the potential fall distance will exceed 500mm and no other anchor points are available to adequately support the operator.

6.1.2 The following flow diagram illustrates how a hierarchy of PFPS relates to the Work at Height Regulations.



6.1.3 Work positioning techniques can be divided into two categories:

a. Moving Rope Techniques (MRT): where the rope is passed over or through an anchor and runs in opposite directions during ascent and descent.
b. Stationary Rope Techniques (SRT): where the rope is passed over, through or attached to an anchor and remains stationary during ascent/descent.

6.1.4 Work positioning techniques used in the canopy can be defined as all movement in and around the tree not directly associated with ascent or descent from the tree.

6.1.5 Operators should be familiar with a range of techniques which help movement within the canopy. Operators should select a technique only if they have a thorough understanding of how to use it correctly and of any forces the technique could exert on the tree.

6.1.6 For both MRT and SRT, systems should comprise of two independently anchored lines, unless otherwise justified as not reasonably practicable. The operator's decision should take all of the following into consideration:

- the equipment available;
- the nature of the hazards presented and the duration of exposure to them;
- the complexity of the canopy and the availability of suitable anchor points;
- the effects of an additional rope on access and movement throughout the canopy; and
- the overall net gain in safety based upon an evaluation of all the above.

6.2 Moving Rope Techniques (MRT)

6.2.1 Body thrusting

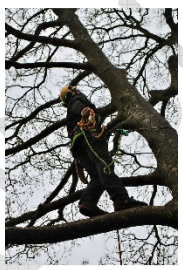
This technique can be used where ascent distances are short and several change-overs are needed to get to the final anchor point.

Throw the climbing rope over a branch and ‘body thrust’ to ascend, i.e. pull the moveable part of the climbing rope and slide the friction hitch/mechanical device to take up the slack.

Plan the climb so that (if possible) the climber can stand or sit during change-overs.

The climber can roll over a branch to sit and then throw the rope higher into the tree. Ensure the system remains correctly configured during branch rolling.

From sitting or standing, attach the adjustable lanyard or other climbing system around the stem or branch, and/or the other climbing system can be thrown over a higher anchor point.



Additional equipment can be incorporated into the system to provide ergonomic assistance, e.g. a foot ascender, micro-pulleys for slack/hitch tending.

6.3 Stationary Rope Techniques

These techniques may be employed where the ascent distances are longer and fewer change-overs are needed to get to the final anchor point.

Insert picture adjacent to each of the stages to illustrate the text

The rope may be installed using a throwline and secured by using either a basal anchor or a canopy anchor.

When installing the rope it may be advantageous to set it hanging way from the stem, depending upon the technique to be used.

Components are then attached to the rope and connected to the operator to aid ascent.

Depending on the components and the type of system being used, it may be necessary for operators to incorporate back-up devices.

When using SRT and for the purposes of being rigged for rescue, an operator should ensure that they can change from ascent to descent whilst remaining securely connected to and suspended by the rope.

The operator should not ascend a line without first having the equipment and knowledge to safely descend on that line if required.

6.4 Spiking

6.4.1 Spikes should only be used as a method of access when a tree is to be removed. Spikes are often the most effective method of access in such circumstances, particularly on stems with few or no load-bearing lateral branches.

6.4.2 A system may be configured during ascent or descent that incorporates elements of moving or stationary rope techniques.

6.4.3 When the tree is not being removed, use of spikes could be considered in exceptional circumstances for aerial rescue if they present a safe, effective and efficient method of access.

6.4.4 When spiking, the operator must be secured to the tree with two systems unless they are undertaking a change-over or descending.

Photo of lanyard and rope chokered

Photo of a changeover with only one attachment point

6.4.5 Where reasonably practical, any system configured for spiking must ensure the potential distance and consequences of any fall, whether during ascent, descent or changeover, are minimized.

Ascent – chokered lifeline, use of an adjustable friction saver

Changeover – double wrap lanyard, figure eight lanyard

Descent – overhead anchor using doubled rope, tied off SRT line with rope wrench, SRT with friction hitch and additional friction behind

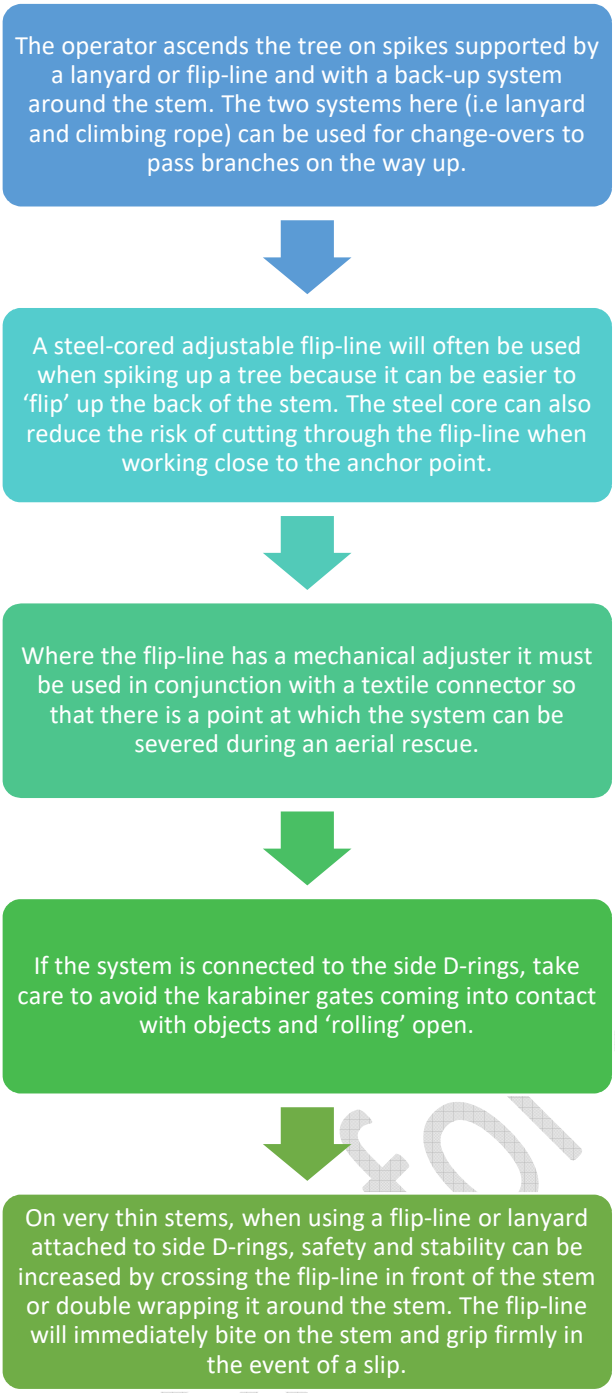
6.4.6 Where not practical such as access on larger diameter systems:

a. Install an overhead anchor
b. Use the friction that the bark or stem structure may provide

6.4.7 It should always be possible for an operator to descend without having to spike back down the stem.

Overhead anchor with pulleysaver

Single line with rope wrench



Insert picture adjacent to each of the stages to illustrate the text

6.5 Motorised Access

6.5.1 Motorised access is often used in long ascents where there are few or no obstacles for the operator to navigate. Devices can be powered by a small internal combustion engine or an electric motor.

6.5.2 When incorporating a motorised ascender into a system, an operator must ensure the following:

a. The motorised ascender is compatible with the rope type and diameter being used and any components used to connect the device to the harness and/or rope.
b. If the motorised ascender is required to be used with a back-up device that device is used and is compatible with the rope type and diameter being used and any components used to connect the back-up device;
c. Where fitted, any back-up system integral to the device is fully functional.

d. Any operator-protection features are fully functional.
e. The use of the motorised ascender is considered as part of rescue planning.
f. Any increase in loading on the anchor point is accounted for.

Image to show motorised ascender in use

6.6 Descent

Before descending, it is the climber's responsibility to ensure:

a. The climbing system is long enough to complete the planned descent.
b. The climbing system is terminated so that the adjuster cannot run off the end of the rope, e.g. using a stopper knot, or by having a long enough rope.
c. The planned route for descent takes into account the positions of tools and equipment and how equipment will be retrieved once climbers are on the ground.
d. The descent is carried out in a controlled manner to avoid the excessive build-up of heat that could damage PPE components.
e. Anchor devices are lowered in a controlled manner to avoid damaging the equipment, infrastructure or anyone affected by the work.

7.0 Anchors and Anchor Point Selection

Summary:

- *Anchor points must always be capable of supporting any foreseeable loading.*
- *Anchors should always be fully load tested prior to being committed to, particularly when that anchor forms a sole point of attachment to the structure.*
- *Operators must be trained in anchor point selection.*
- *Equipment used to create temporary anchors, must be done so in accordance with manufacturers' guidance and suitable for its intended application.*
- *Operators must always be attached to at least one load bearing anchor point.*

7.1 Whatever method of access is used, anchor points must be carefully selected, inspected for suitability and load tested before use. It is essential to select an appropriate anchor point in order to ensure the structural integrity of the climbing system; a poorly selected anchor point could fail, resulting in a fall from height. When selecting an anchor point, make sure it could be used in an aerial rescue and will bear the additional loads that might be placed on it during such an operation. As a minimum, the anchor may have to bear twice the normal loading during rescue.

7.2 Anchor Point Selection

7.2.1 Anchor points can be broadly classified in three categories:

- Primary: an anchor point that takes the majority of the operator's load during the operation.
- Load-bearing supplementary: an anchor point that is used in addition to the primary to provide back-up in the event of primary anchor or system failure.
- Non-load-bearing supplementary: an anchor point that provides positional aid and support.

Include images of both SRT and MRT examples to illustrate the above.

7.2.2 Anyone selecting anchor points must be able demonstrate an understanding of:

a. the timber characteristics of the tree species involved;
b. tree health and the potential effects of any decay, damage or defect present on the tree; and
c. branch form: diameter, length and angle of attachment to the stem.

7.2.3 Operators installing any anchor should consider the following points:

a. equipment to be used, its suitability and how it will be attached to the anchor;
b. when installed, the anchor and any component used to create it will not allow the rope to slip down the stem;
c. the position of the anchor point(s) in relation to the work to be done and the features present in, on, around or beneath the tree;
d. the weather (in particular the wind) expected during the work and how this may increase loading on an anchor.

NB. Whilst the operator must have the knowledge and experience necessary to select anchor points correctly, a system of accountability must be in place where others, regardless of their knowledge and experience, can question the selection, in order to approve the decision-making process.

7.3 Loads on Anchors

7.3.1 Where the suitability of an anchor point cannot be visually ensured, e.g. because of its distance from the ground or because it is behind foliage, it must be tested with **at least ×2** the anticipated load.

e.g. A climber weighing 100kg using a moving rope technique will place a load of approximately 100kg on the anchor. Therefore, by putting twice that load on the anchor (and establishing that the anchor can withstand the load), it is anticipated that this would represent a suitable margin of safety.

7.3.2 When pre-loading a remotely set anchor to establish its suitability, operators should listen for cracking, creaking or any other sound that could indicate fibres are breaking in or around the selected anchor.

7.3.3 When pre-loading an anchor during change-overs/rope advance, the climber should be securely attached to the previously established anchor to provide a suitable margin of safety. The climber should only commit to the new anchor when they have fully established its integrity.

7.3.4 In systems where a basal anchor is used, the rope should be secured to the basal anchor before the load is applied. This is because the load on the canopy anchor will potentially be ×2 the load applied to one side of the system. E.g.

©

7.4 Directional Load on Anchors

7.4.1 Consider all the directions from which the load could be exerted on the anchor. It is the responsibility of the operator to fully consider the effect their position in the canopy could have on their anchor point. This is important in terms of the load direction on the anchor and because of the increased risk of pendulum swings.

7.4.2 Anchor points loaded at 90° (lateral load) to the direction of the branch/stem growth will be more prone to failure. A load direction of 0°–45° is optimal, whereas 45°–90° will significantly increase the load on the anchor as the angle approaches 90°.

Insert picture to show green/amber/red zone…on a protractor where 0°/ 180° is the line between climber and anchor.

7.4.3 If possible, always place anchor points close to the main stem. Anchor points installed away from the main stem will increase the load on the branch union and could lead to catastrophic failure.

7.4.4 When using multi-anchor and/or equalising systems, take the following into account:

- the additional forces and vectors exerted on the canopy when connecting to multiple anchors;
- the additional friction within the system and its effect on movement around the canopy and access and egress; and
- how the system could affect a potential rescue.

7.4.5 NB. If anchor points are to be made high up on slender featureless stems, consider the lateral loading on the entire stem and its effects on the attachment. In such circumstances, significant lever forces can be placed on the stem which may lead to stem or attachment failure.

7.4.6 NB. If in doubt about the suitability of the anchor point, remove the line and start again.

7.4.7 NB. Operators must always be securely attached to the structure by at least one load-bearing anchor point.

7.5 Supplementary Anchors – Load-bearing and Non-load-bearing

7.5.1 Supplementary anchors should be used where possible. A supplementary anchor may be load-bearing or non-load-bearing. The selection of either is the responsibility of the operator and the decision should be made based on the tasks to be performed and hazards and risks present.

7.5.2 A supplementary anchor can serve a number of purposes including but not limited to those in the table below:

Load-bearing:	Non-load-bearing
A means of connecting the operator to the structure while they are changing primary anchor points or making change-overs during ascent	A means of support during work positioning
A back-up for the primary anchor in the event of structural or system failure	To prevent a slip and/or pendulum swing
To distribute the load of the climber between two separate anchors	To aid a horizontal traverse through the canopy

7.5.3 It may be necessary or preferable to have more than one supplementary anchor. In these circumstances the operator should evaluate the available anchor points carefully and consider how they will move around the tree or get out of it quickly if there is a problem and the effect that multiple anchor point attachments might have on their ability to do so.

7.6 Changing Anchor Points: Change-Overs

7.6.1 The need to change anchor points (change-over) is a significant hazard during climbing operations. Change-overs happen either during the ascent in order to pass branches and establish higher anchor points or to achieve a better working position. The following can help reduce the risks associated with change-overs.

At the change-over, ensure there are always two proven load-bearing anchor points (i.e. the previous one and the new one) before committing to any single one of those.

The climber's weight must be fully transferred to the newly established rope system and anchor point before the previous set-up is released.

When changing anchor points, check physically and visually that the newly established rope system is correctly connected to the harness.

As an additional safeguard, a climber should (where practicable) ensure two systems are retained whilst they change anchor points, i.e. they should be connected to the previous system for as long as is reasonably practicable whilst ascending or descending on the newly established system.

Canopy Anchors



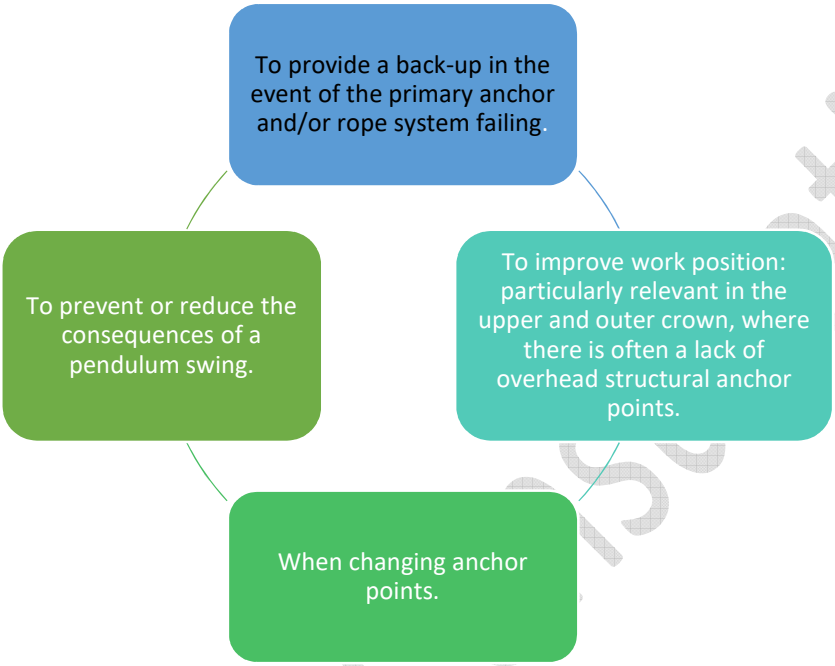

Base Anchors


7.7 Adjustable Lanyards/Additional Climbing Systems

7.7.1 Whilst climbing, operators must carry either an adjustable lanyard or an additional climbing system to aid safe access, egress and movement around the canopy.

7.7.2 Lanyards and additional climbing systems must be adjustable to provide sufficient support and make it possible to remove slack. Adjustment could be by a friction hitch or a mechanical adjuster.

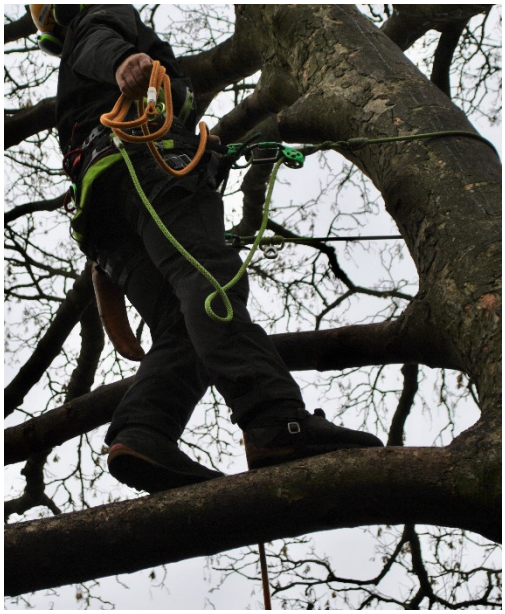
7.7.3 Adjustable lanyards and/or additional climbing systems must be used in the following applications:



7.7.4 When using an adjustable lanyard or additional climbing system, operators must ensure that:

a. If it is used in a single line configuration, the mechanism for adjustment (either a friction hitch or mechanical adjuster) should grab reliably. Insert image to illustrate

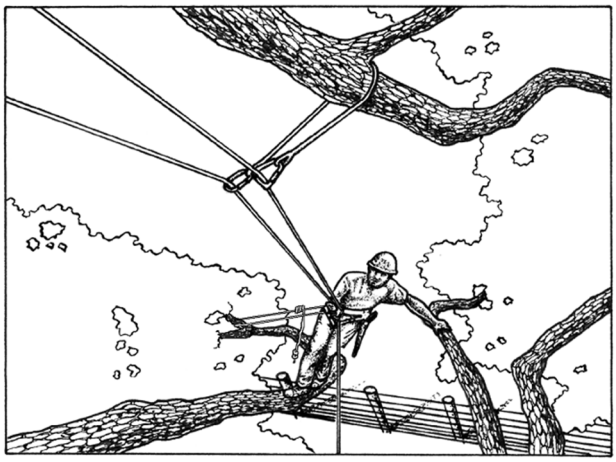
b. When the mechanism for adjustment is connected to attachments on the harness designed for support and not suspension, i.e. side D to side D, the operator's weight must be borne in their feet.



c. The system is not attached to one side of the harness alone. Insert image to illustrate
d. A stopper knot is tied in the end of the rope to prevent accidental release when on full extension. Insert image to illustrate

7.8 Redirects

7.8.1 Redirects are principally used to create a deviation in the direction of the climbing rope. Redirects can be set up using the natural features of the tree or by installing components. If they are made by installing components, redirects can be fixed, adjustable, static or retrievable or a combination of these.



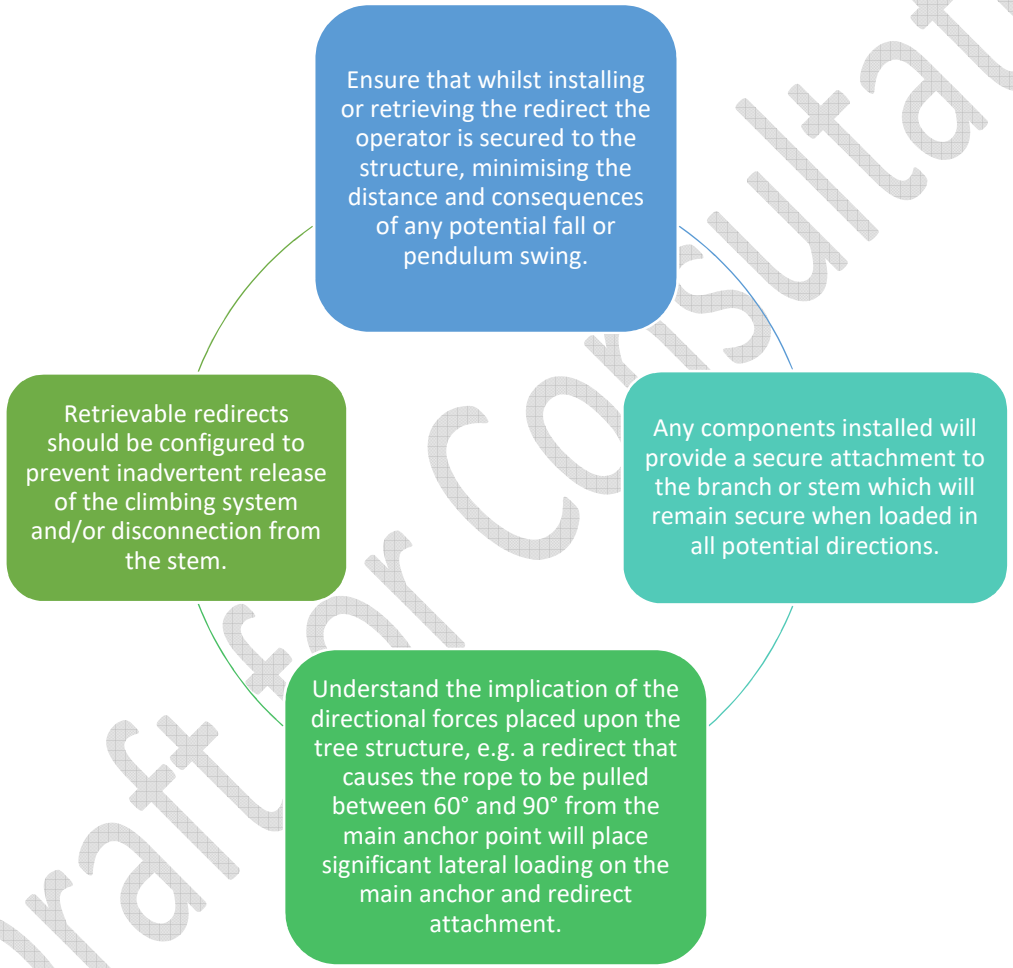
7.8.2 Any deviation in the direction of the climbing line will create directional forces which must be taken into account. This is particularly important when the redirect is installed on a slender limb and the load being exerted is 90° to the direction of growth and is acting in addition to gravity.

7.8.3 The type of redirect chosen will depend on the technique being used, the equipment available and the purpose for which the redirect is being installed.

Consideration should be given to:

a. The friction the redirect will add to the system: In a moving rope system, this may affect the performance of a hitch and/or the climber's ability to ascend and descend. For example, if a natural fork is used as a redirect, the rope in the system will gain extra friction as it comes into contact with the branch but also as the legs of the rope contact one another whilst travelling in opposite directions.
b. The bend placed on rope: When the rope is redirected through a component, the tighter the bend exerted on the rope, coupled with the load being applied, the greater the strength loss in the rope.
c. The use of components such as pulleys or connectors incorporating some sort of roller will help to reduce friction at redirects in addition to potentially making a bend less tight, which will in turn help to reduce potential strength losses.

7.8.4 When installing, using or retrieving redirects, operators must follow the guidance set out in the diagram below:



Insert image to show some of the configurations mentioned above.

8.0 Equipment Selection and Use

Summary:

- *Equipment should only be used in accordance with manufacturers guidance.*
- *Selected equipment is to conform to relevant conformity assessments.*
- *Equipment should not be modified or altered without manufacturers consent.*
- *Operators should be able to identify the equipment they wish to use and the standards against which that product has been tested.*
- *Equipment should be correctly configured in conjunction with all parts of the fall protection system.*
- *Operators should have received adequate training relating to equipment in use, its maintenance and correct storage.*

8.1 General

8.1.1 Climbing equipment should only be used for its recommended purpose, in accordance with manufacturers instructions. If an operator wants to use equipment for a purpose other than that recommended by the manufacturer, consent should be obtained initially from the manufacturer, and the operator – in consultation with a competent person – must ensure the equipment is entirely suitable for its intended application.

8.1.2 All tree climbing equipment used as PPE should be compliant with applicable test standards that lead to independently verified certification.

8.1.3 No equipment should be modified or altered in any way, without the consent of the manufacturer.

8.2 Certification and Conformity

8.2.1 All new climbing equipment should be sold with evidence of conformity and carry a mark to identify that the product has been through a process of independent verification by a notified body.

8.2.2 Operators should have the knowledge and ability to identify each piece of equipment in use and be able to determine the standard against which the product has been tested.

8.2.3 Operators should select items for use that are fit for purpose, as defined by a competent person based on the technical information available.

8.3 Compatibility: Equipment Configuration

Personal fall protection systems should be put together by the operator in consultation with a competent person, to ensure that the system and each component in it are appropriate for the task and correctly configured. Each component must be compatible with neighbouring ones.

Insert images of good cop v bad cop of equipment configurations.

8.4 Loading Parameters

When equipment is selected and/or configured in a system, the operator must be able to ensure with confidence that all reasonably foreseeable loading scenarios can be accounted for and that the system and any component within it can withstand the loads with an appropriate margin of safety.

Include a diagram of a basic system showing the load distribution stating the weight of the climber and the kind of loads the equipment might be subject to.

8.5 Manufacturer's/Supplier's Information

8.5.1 All climbing equipment must be maintained in accordance with the manufacturer's instructions

8.5.2 The operator should understand and comply with any information or instructions supplied with the equipment. This could be the user instructions or guidance information supplied by the manufacturer.

8.5.3 All equipment must be accompanied by information that identifies the manufacturer or relates to its correct use and any relevant test standards.

8.6 User Knowledge

8.6.1 Anyone using any equipment must know how to do so appropriately and safely. It is the user's responsibility to decide whether they have enough knowledge before they go ahead. This knowledge could come from reading the user instructions or an operator might need to ask for training.

8.6.2 Operators must also understand the data on a product, its relevance and its meaning in relation to the other items in their system.

Insert an image of a karabiner with magnifying glass labels indicting what the data means – MBS, ID etc.

8.7 Organisation of Equipment

8.7.1 Equipment on a climber's harness should be stowed in a logical order so the climber can retrieve it and the risk of dropping it is minimal. It should be stowed so that components will not be damaged by interacting with each other.

8.7.2 All of the following should be considered and acted upon:

a. Textile components should be positioned to prevent material catching on cutting components, e.g. lanyard stowed on the opposite side of the harness to handsaws.
b. Personal first aid must be readily accessible.
c. Where an operator can adjust the position of gear loops, these should be set at accessible locations to reduce the need for twisting the upper body.
d. If possible, choose tool and equipment connectors that have a locking gate mechanism or weaker gate components to reduce the risk of an operator becoming snagged in the tree.
e. Stow equipment higher on the harness, to prevent loops forming which may become a snag or entanglement hazard – daisy chaining of rope, storage bags or recoil reels.

9.0 Tree Access and Rescue Equipment

Summary:

- *All equipment should be used in accordance with manufacturers guidance.*
- *Components should be carefully selected to ensure their computability with each other.*
- *Systems should be correctly configured to prevent misalignment or poor orientation during use.*

9.1 Friction hitch and mechanical device

9.1.1 A friction hitch or mechanical device is generally used by climbers to move up and down the rope. It must provide regulated control of ascent and descent during both work positioning and rescue, and it must be reliably self-locking.

9.1.2 Climbers must have adequate training before using friction hitches or mechanical devices.

9.1.3 Climbers must understand the characteristics and use of any knot, hitch and/or friction system. They should also be aware of how any knot, hitch and/or friction system performs in combination with other aids, e.g. a micro-pulley.

9.1.4 Friction hitch cords (often referred to as Prussic cords) should be 8mm or more in diameter and be constructed of materials which have superior abrasion- and heat-resistance relative to other textiles which could be used in the construction of hitch cord.

9.1.5 Friction hitch cords used as a fixed mid-line attachment on a lanyard should be 6mm or more in diameter.

Insert image of how this loading pattern occurs

9.1.6 Any friction hitch cord used in a personal fall protection system should meet the following criteria:

a. clearly identifiable, carrying sufficient information to allow traceability back to manufacturer, product name and construction properties;
b. manufactured against validated performance criteria;
c. subject to independent verification by a notified body; and
d. suitable for its intended use, based on its diameter and construction from materials suitably resistant to the abrasion and temperatures experienced during work and rescues.

9.2 Mechanical Adjusters

9.2.1 Any mechanical adjuster within a system must grab and lock reliably on the diameter of the approved climbing rope in use.

9.2.2 Adjusters can enable easy one-handed take-up of slack in the climbing lanyard. However, different lanyard configurations may affect their performance, including their control and reliability. Operators should carefully consider these factors when selecting and using adjusters for work at height.

9.2.3 Adding friction behind a device in certain scenarios may significantly improve the function and predictability of the device.

Insert image of lanyard used in a straight line, RAD with additional friction added.

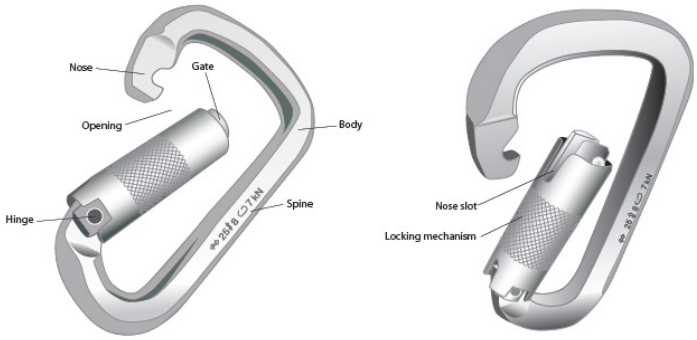
9.2.4 If a steel-cored flip-line is used in conjunction with a mechanical adjuster, some form of ‘soft link’ must be used between the harness connector and the adjuster. This is essential in case the climber needs to self-rescue or be rescued and the ‘soft link’ needs to be cut. Without this the strop will not be easy to release when under tension because some devices are difficult to release under load.

9.3 Connectors

9.3.1 Broadly divided into ‘open’ and ‘closed’ connectors. It is vital that for each specific application the most appropriate type is used.

Open Connectors	Closed Connectors
• Multiple profiles available that can be used for specific applications • Suited to climbing systems where there might be a need to attach and detach systems frequently • Allow for quick connections to be made without the need to create terminations	• Provide a uniform breaking strain • Potential wear pattern evenly spread across entire surface area • Suited to remote anchor locations • Provide greater protection from inadvertent opening • Can be loaded in multiple directions • Can be dual interface, allowing connection of textile and/or hardware components

9.3.2 Karabiners used to connect the harness to a lifeline must have a spring-loaded self-locking gate that requires at least three distinct movements to open it.



9.3.3 There are a number of generic karabiner styles and many different designs, each engineered to be loaded along the major axis. They must not be:

a. exposed to external pressure against the gate;
b. subject to torsional loading – the kind of loading caused when they are chain-linked;
c. cross-loaded against the frame, i.e. not choked.

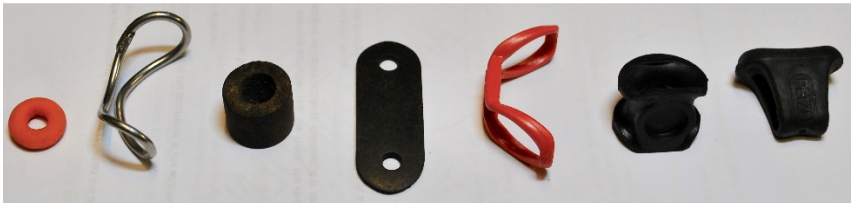
Oval	HMS	D-Shape	Off-set D-Shape
Used to facilitate centrally aligned systems where the load on the karabiner is shared equally between the major axis and the gated side.	Used where a larger internal volume is required and where a wider gate clearance is advantageous.	Used to transfer much of their load close to and parallel with the spine, orientating the load along the strongest axis.	A greater asymmetry than the D-Shape, allowing for a wider gate opening whilst still conducting much of the load through the spine.

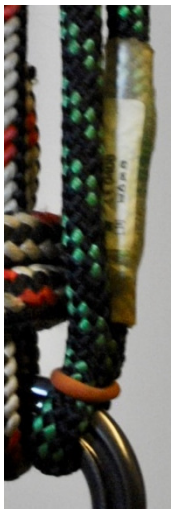
9.3.4 A karabiner's ability to carry a load is reduced as the width of loading is increased, i.e. as the loading axis is moved away from the major axis. Therefore, as part of an appropriately configured system an operator should load a karabiner as close to the major axis as possible.

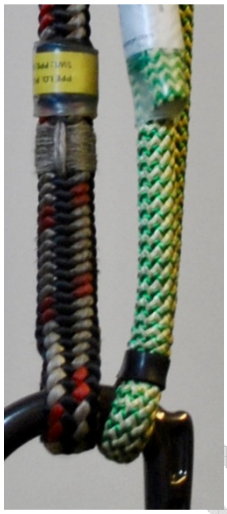
Insert images of karabiner shapes and their correct use in context e.g. as part of a system set up.

9.3.5 The operator must ensure that any connector is loaded correctly. It is essential that connectors are kept in correct alignment during use. The correct configuration and alignment of connectors may include:

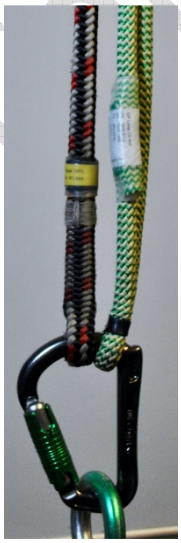
a. use of clips, bands or rubber fixings that hold the karabiner or components captive;



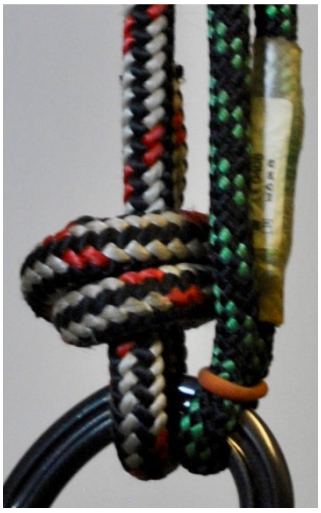




b. use of a small captive eye in the end of the rope;



c. use of knot designed to constrict around the object it is tied to.



Insert images of the above a-c in use.

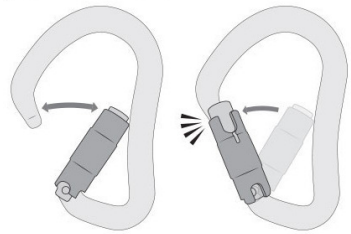
9.3.6 As part of pre-use equipment checks, the operator is responsible for inspecting karabiners. The operator is also responsible for their maintenance before, during and after use.

9.3.7 Inspection of the gate mechanism must include looking for signs of abrasion, cuts, deformity and sharp edges.

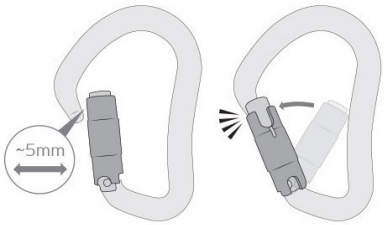
9.3.8 The nose and hinge rivet must also be inspected for condition and correct alignment.

9.3.9 Gate action tests must be carried out without applying bias or influence to any of the actions and as a minimum must include:

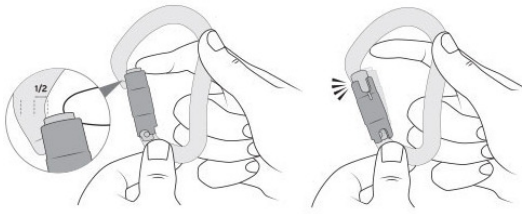
a. a fully open gate test;



b. a test that is carried out close to the nose; and



c. a test carried out over the nose.



The gate action must close positively and reliably in order to be safe for use. Cleaning and lubrication must be done in accordance with specific manufacturer's guidance.

9.3.11 Any time a connector is opened during climbing, the climber must check it fully closes and locks properly. This should be both a visual and physical check on the locking mechanism.

9.3.12 Where a specific connector may require manual locking, such as Maillon Rapides, the operator must ensure it is fully closed and, where applicable, tightened to the manufacturer's specification.

9.4 Rope

9.4.1 When selecting a rope, the operator must carefully consider the compatibility of any friction hitches or mechanical devices used.

9.4.2 Low-stretch braided ropes designed for arborists' use are recommended. Climbing lines for work positioning systems should have a minimum diameter of 10mm, when new a breaking strength of at least 18kn without terminations, and 12kn with terminations.

9.4.3 Make sure the rope is of an appropriate length, taking into consideration:

a. the size of the tree;
b. any lateral movement which will happen during the task; and
c. type of technique used.

For example, if a system with a basal anchor is being used and it is set to enable the climber to be lowered, then the rope will need to be more than three times longer than the distance from the ground to the top anchor. If the climber is not being lowered directly parallel to the lead of the line, then an even longer rope will be required.

9.4.4 If join two ropes are joined to create the length needed, the climber must make sure that appropriate knots and/or closed connections are used and must take into account the loads applied, the relative diameters of the ropes, and whether the rope will need to pass over obstacles or through devices.

9.5 Friction/Cambium Savers

9.5.1 Anchor devices such as 'friction savers', 'pulley savers' or 'false anchors' can be used to protect the bark, cambium and climbing rope from friction. This reduces damage to the equipment and to the tree. The reduced friction in the system can also make climbing easier.

9.5.2 Friction savers may also be used to reduce the spread in a rope as it approaches an anchor.

9.5.3 Friction savers may in some circumstances be installed and retrieved from the ground, using a throwline. To aid efficient removal, prevent damage to equipment and avoid snagging in the tree, it is advisable to use of a throwline for retrieval.

9.5.4 It may be possible that an item can be double wrapped or 'cinched' around the stem where no suitable branch fork exists. In such circumstances make sure that they cannot slip and create an unacceptable fall distance.

9.5.5 Anchor devices that have greater adjustment in their length, along with an ability to cinch against a stem, may provide an operator with more options and flexibility in a range of situations.

9.5.6 Components are available that make it possible to create systems where multiple anchor points can be selected and used simultaneously and, in some cases, to share the load between two separate anchor points.

9.6 Harnesses

9.6.1 Harnesses for tree climbing are generally described as work positioning (a harness comprising a work positioning belt and sit harness with leg loops). Some models are also fitted with or can be modified to include shoulder straps.

9.6.2 Any harness must only be used in accordance with the manufacturer's design and in line with applicable testing criteria, i.e. a work positioning harness used for fall arrest purposes.

9.6.3 If possible, select a harness that has dual or multiple front attachments as these can provide more options for dealing with different techniques or situations. Fixed or sliding pelvic attachments may also provide an operator with a broader range of movement.

9.6.4 If possible, incorporate components at the bridge that can help improve the alignment and orientation of equipment, and can improve the operator's work position.

9.6.5 It is the operator's responsibility to ensure they are aware of the correct loading configurations for the harness attachment points and to apply these limits correctly during use.

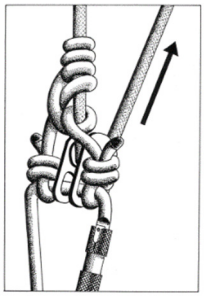
9.7 Pulleys

9.7.1 A pulley offers several benefits as part of the climbers' system, when it is aligned correctly:

a. It can be used to lift a friction hitch, making it self-tending.

Insert image of autolift and/or O rig.

b. It can act as a 'fair lead' to keep the running end of the climbing rope in line with the friction hitch.



c. It can act as a ‘slack tender’, allowing the pulley to be advanced with one hand when the climber is returning from branch extremities.

Insert image of pulley acting as a slack tender.

d. It can be incorporated in a system to help create a ‘V’ or ‘M’ rig, helping to potentially spread load between anchor points or triangulate an operator’s position for greater balance.

e. When used in conjunction with a friction hitch, it can provide an efficient means of hauling equipment into the tree. By lowering a loop to the ground, ground staff can clip the equipment in and pull on the tail end of the rope to send it up to the climber.

Insert image of hauling.

f. A pulley at the climber’s anchor point or strategically set within the tree allows for mechanical advantage returns, particularly suited to longer branch walks or longer ascents, eliminating the potential for slack to accumulate within the system.

Insert images of MA returns in use.

g. A pulley may be used as an aid for the control of a casualty’s friction hitch during aerial rescue, or to help establish a system to help with hauling of a casualty during rescue. (NB. Certain multicender devices will not allow for this mode of operation – ensure the component being used and the method of use are compatible with the manufacturer’s guidance.)

Insert image of controlling a friction hitch and hauling.

9.7.2 For a micro-pulley to act as efficiently as a pulley in scenarios 9.7.1a–g, an anchor with friction-reducing properties should be installed at the main anchor point.

9.8 Slings and Strops

9.8.1 Stitched tape slings are widely used as an aid in a number of situations. They are available in different lengths and fibre types.

9.8.2 Depending on its construction and fibre properties, the residual strength of a sling may change in different configurations. It is the operator's responsibility to ensure they are aware of an item's limitations when it is used in different circumstances, and avoid applying generic principles across all sling types.

9.8.4 Sling applications may include:

a. By larks-footing it round a stem or branch, it can create a foothold where none exists.
b. It can be used as part of a redirect.
c. It can be used to extend the length of a work positioning lanyard.
d. It can be used as a direct attachment from rescuer to casualty during rescue.
e. It can create a soft link when using items such as steel core lanyards and mechanical adjusters.
f. It can be used as an improvised 'chest' harness to maintain an unconscious casualty in an upright position.

Insert images for some of the applications as listed a-f.

9.8.5 The competent person must ensure that slings are uniquely identifiable. There must be clear distinction between equipment that may be used for PPE and equipment used for rigging applications.

9.9 Knots and splices

9.9.1 Where a loop is needed in the end of the rope, it may be created by a spliced eye, a stitched eye or a knot.

9.9.2 Where knots are used, the climber must ensure that they are tied, dressed and set correctly. Knots that will tighten up against components and help keep them in correct alignment should always be chosen in preference to knots that form large open loops where components could become misaligned or poorly orientated.

Image to show knots that form a cinch on components.

9.9.3 All open knots or hitches used within a system must include an appropriate stopper knot.

Image to show knots with appropriate stopper knots included.

10.0 Equipment Inspection, Care, Storage and Maintenance

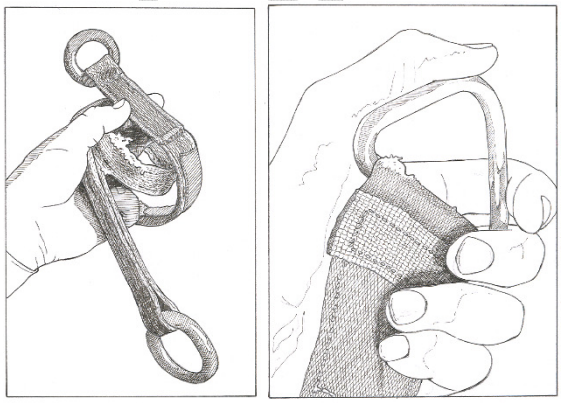
Summary:

- *All equipment must be subject to a visual and tactile pre-use check to confirm its suitability for use including condition and function.*
- *Operators should have received training in equipment inspection, maintenance and record keeping*
- *Manufacturers recommendations relating to lifespan, maintenance, storage and use should always be followed.*
- *Adequate records of equipment issue, inspection, withdrawal and disposal should be maintained.*

10.1 General Procedures

10.1.1 All in-service climbing equipment must be subject to a pre-use check. Equipment must be given a close visual and tactile (touch) inspection to look for:

a. cuts;
b. trays;
c. glazing;
d. condition of rope terminations;
e. functionality of moving parts;
f. contamination; and
g. any other defects.



10.1.2 Other key elements that must be inspected include:

a. harnesses for damaged stitching, correct buckle function, cuts or fraying, and the condition of the anchor points and tool attachment points;
b. the condition of and stitching on friction savers and tape slings;
c. the condition of friction hitch cord, particularly the splices or knots and areas that are subject to high levels of wear; and
d. connector condition and function.

Insert an equipment inspection protocol flow chart that builds in 'LOLER' check, inspection and TE intervals – the competent person, end user etc.

10.2 Equipment Lifespan

The lifespan of an item is almost impossible to quantify because of the many factors involved. However, some information for guidance only is included here.

10.2.1 Metal lifespan

a) Most items age naturally, even under perfect storage conditions. For metal items, ageing results in slight, if any, strength loss. This is insignificant compared with the wear incurred during normal use.

b) In general, metal items can be used until they exceed acceptable levels of wear or are otherwise damaged. Refer to individual manufacturer's guidance relating to maximum lifespan since date of manufacture.

10.2.2 Textile lifespan

a) Textiles deteriorate with age. The fibres degrade naturally even under perfect storage conditions. This gives textile items a finite 'shelf life'.

b) All textile equipment is subject to wear and tear with use. Ropes and rope tools are particularly subject to high levels of wear and tear.

c) Individual manufacturer's guidance should be followed to help determine the point of retirement, paying particular attention to guidance about lifespan from date of manufacture or from date into service.

If the operator is at any point unsure about a component, it should be removed from service and thoroughly examined by a competent person.

10.4 Maintenance

10.4.1 Repairs, alterations or modifications should normally only be carried out by the manufacturer. However, some products have components that can be replaced by the end-user such as the bridge on sliding D harnesses and the cam on some rope adjusters. The manufacturer's instructions must be followed in respect of maintenance and replacement parts.

10.4.3 Maintenance is often limited to the following points, which are included as guidance only.

10.4.4 Textiles

a. Wash in warm water, with a mild soap or detergent (in accordance with manufacturer's instructions).
b. Do not use fabric softeners or conditioners.
c. Air dry at normal room temperature with a free air flow (do not subject to direct heat or UV radiation).
d. Fluffy ends of ropes should be cut and resealed to stabilise the material.
e. Damaged or absent protection sleeves should be replaced with protection approved by the manufacturer.
f. Rope with damaged or absent structural whipping should be quarantined until a competent person has replaced the whipping.
g. Picks can be manipulated back into the braid of a rope to prevent further disruption to the construction.

h. Cut and fluffy strands may be trimmed to maintain the function of rope or webbing and limit further damage. Care should be taken to avoid causing damage to undamaged fibres. When damaged fibres are removed, it is important to quantify and record the degree of fibre removal.

10.4.5 Metal

a. Burrs and other sharp edges should be removed by filing or polishing. Consideration should be given to the loss of cross-sectional profile of the material.
b. Rough abrasion damage may require polishing, especially where the metal equipment makes contact with textile items.
c. The early stages of some corrosion may be removed. The item should then be reassessed for the extent of damage and loss of strength. Manufacturer's guidance may be necessary.

10.4.6 Karabiners with autolock mechanisms

a. Flush with warm, soapy water and manipulate the locking mechanism whilst brushing the hinge area, nose, nose slot and as much of the locking mechanism as possible.
b. Rinse in warm water.
c. Dry thoroughly.
d. Assess locking mechanism for full function.
e. If necessary, apply lubricants approved by the manufacturer selectively to contact areas in the locking mechanism and at the nose.

10.5 Storage and Transport

10.5.1 Check, maintain and store all tree-climbing equipment in accordance with the manufacturer's instructions.

10.5.2 Dry wet equipment thoroughly before storage, e.g. in a well-ventilated environment away from any direct heat source.

10.6 Marking and Traceability

10.6.1 For traceability, individual products must carry a unique mark. Marking must ensure any item can be traced back to its records. Marking must, therefore, remain legible and form part of the operator's pre-use checking process for equipment.

10.6.2 For all product groups, it may be necessary to contact the manufacturer to ensure that items are marked correctly, or where remarking of an item is required manufacturers may stipulate certain criteria to prevent compromising the structural integrity. Always follow manufacturer's recommendations regarding modification or alteration of a product, which may include the ID marking of an item.

10.7 Records

10.7.1 Equipment must be used and maintained within a controlled system. The system should start with a purchase record, enabling traceability ultimately to the manufacturer and a production batch.

10.7.2 Additional records for any item of equipment should also be maintained, including:
   a. manufacturer's instructions;
   b. any evidence of conformity (which should be filed and retained for as long as the equipment is in use).

10.7.3 In addition to pre-use checks, recorded interim inspections on items subject to high wear and tear are required.

10.7.4 Climbing equipment should be thoroughly examined by a competent person at least every six months. It is essential that interim inspections are taken seriously and carried out by someone who has the necessary experience and authority.

Insert a flow chart highlighting the process of record keeping for an individual product – what records and who's responsibility.

10.8 Equipment Withdrawal

10.8.1 All equipment must be regularly inspected, and any defective equipment must be withdrawn from use and the details recorded.

10.8.2 Operators should know the quarantine processes in place. Such processes may include the removal from service, repair and/or maintenance of equipment, then its return to service or destruction.

11.0 Aerial Rescue

Summary:
- *Aerial rescue provision must be thoroughly planned.*
- *Operators must be trained and undertake regular skills updating in aerial rescue techniques.*
- *Suitable and sufficient resources – personnel and equipment must be available to facilitate effective rescue.*
- *All operators must understand their role during an aerial rescue event.*

11.1 General

11.1.1 The consequences of poorly planned and managed tree climbing operations are potentially life threatening. It is essential that climbers receive thorough training in climbing techniques and aerial tree rescue methods.

11.1.2 Climbers may be at danger of serious injury from several risks such as:
   a. falls;
   b. becoming unconscious;
   c. becoming stuck/frightened, e.g. inexperienced climbers;
   d. cutting themselves;
   e. electrocution.

11.1.3 During aerial tree rescue, members of the rescue team must not be put at risk. Therefore, before recovering the casualty, the rescue team must undertake a risk assessment to select a procedure which avoids endangering themselves. All climbers should be trained in first aid and all team members should be able to promptly call for assistance from appropriate specialists.

11.1.4 Under no circumstances should anyone attempt to perform an aerial rescue of a climber who is in contact with or is located within the proximity zone of live electrical apparatus. The electrical apparatus must be proven to be de-energised before a rescue is attempted.

11.1.5 Operators should always consider the potential for self-rescue and as such need to ensure that they maintain good work positioning and that ropes are routed appropriately where practicable to allow for safe, effective and efficient descent if the need arises.

11.1.6 Aerial rescue (scheduled and impromptu) must be practised regularly (at least once every 6 months), so that all members of the team, including ground-based operators, are familiar with the techniques.

11.1.7 Aerial rescue practice scenarios should always seek to simulate authentic situations to make any practice relevant.

11.1.8 When practising aerial rescue, consider:

a. The position of the casualty in the tree – a rescue from the end of a limb or working on spikes may be more difficult to undertake and is therefore worth practising.
b. The increased loads being exerted on the tree, anchors and systems.
c. Any tools in use – where is the chainsaw and what will happen to it during the rescue?
d. The need to administer first aid – where are the first aid kits and can a personal first aid kit on a harness be deployed easily whilst hanging in the harness?
e. Role-playing the handover to the emergency services – the nature and level of information that will be required.
f. Depending on the nature of the rescue practice, it may be necessary for the equipment used to be inspected by a competent person before being put back into service.

11.2 Rescue Plans

11.2.1 An effective rescue plan must be created by the climber and those designated to carry out rescue.

11.2.2 The aerial rescue plan must consider any changes required as a job progresses, e.g. during a dismantle as the outer crown, inner structural crown and stems/trunk are removed.

11.2.3 As part of rescue planning those designated with the responsibility for rescue should consider all safety aspects and potential hazards associated with the rescue, the availability of equipment to be used for a rescue and how the tree could be accessed.

11.2.4 The following factors should be in the rescue plan:

a. emergency procedures as part of a point-of-work risk assessment have been comprehensively and accurately completed;
b. equipment required for rescue is available and individuals are available competent in its use;
c. competent and designated aerial rescuer and/or EAP coordinator have been identified and nominated in that role;

d. first aid equipment is available including tourniquet and haemostatic gauze/cloth;
e. access route into the tree has been determined;
f. method of access has been agreed upon;
g. anchor points have been identified and where practical pre-installed; and
h. the type of rescue to be used and connections to the casualty during the rescue have been identified.

11.2.5 The installation of a separate access line or pre-installed throwline which can be left in the tree while the work is carried out to provide rapid access in an emergency should be a primary consideration in effective rescue planning. Operators must be able to justify why such an option has not been included as part of a rescue plan.

11.3 Communication

11.3.1 The location of the nearest telephone must be known to all staff on site and noted down. Mobile phones are now widespread, but reception levels vary. Make sure the mobile phone has a signal and functions on the work site and that all staff can use it and know its number in case you have to be called back.

11.3.2 Operators should ensure that they can quote their location accurately – i.e. a grid reference, GPS co-ordinates or street name/postcode – so they can give the emergency services adequate details of site access points.

11.3.3 When necessary, a rendezvous point should be agreed, together with details of how to navigate emergency services to the site.

11.3.4 Emergency communication details should be recorded on the site-specific risk assessment.

11.4 Safety Issues and Considerations (for all rescue types)

11.4.1 It is the operator's responsibility to be fully aware of the risks associated with undertaking any form of rescue and the potential limitations of equipment during the task.

11.4.2 If equipment might be subjected to exceptional circumstances – such as a rescue – check the manufacturer's instructions. Where two-person loading may occur, make sure the equipment is suitable for the task. Is the equipment capable of supporting the intended loads? If it is subject to specific manufacturer's instructions under such conditions, these instructions must be followed to the letter.

11.4.3 All operators should be aware of the following general principles and apply them to the specific requirements of rescue scenarios they may face:
a. equipment used as part of tree climbing operations may not be suitable as rescue equipment under manufacturer's instructions;
b. friction hitch systems subject to the loading of two people should incorporate an element of additional friction to ensure the hitch maintains its functionality;
c. where additional equipment such as a pulley is used to control a casualty's friction device, this must be strictly in accordance with the manufacturer's guidance;

d. where a rescue system incorporates a basal lowering system, the ground staff must know how to lower the casualty using an appropriate method;
e. the use of false anchors during any rescue should show preference where possible for closed connectors or components, to reduce the risk associated with inadvertent opening as rescue is carried out;
f. all equipment in use during rescue should be subject to the requirements of this Technical Guide in terms of selection, compatibility, configuration, inspection and examination;
g. equipment used in a rescue may need to be quarantined and inspected by a competent person before being returned to service.

Insert images to highlight some of the key points a-f

11.5 Rescue Types/Methods

11.5.1 Rescue Method A

Where the casualty's rope is undamaged and long enough to descend on.

a. Climb to the nearest suitable anchor point above the casualty which can support the weight of both the climber and the casualty.
b. Descend to the casualty, assess and make safe any hazards that threaten the casualty or would impede the rescue, e.g. chainsaw, other equipment/tools, tree debris.
c. Attach the casualty to the main attachment point of the rescuer's harness to protect and aid descent and prevent separation of casualty and rescuer.

d. Assess the casualty's condition and administer first aid if appropriate.
e. The rescuer operates their own and the casualty's friction hitch to give a controlled descent whilst guiding the casualty through branches.

If the casualty is conscious then the rescuer should be aware that the casualty may be able to help during the rescue. This keeps the casualty occupied and aids rescue.

Insert images to help support text above

11.5.2 Rescue Method B

Where the casualty's rope is damaged, trapped or too short to descend on without re-tying into a lower anchor point. This means the entire weight of the casualty must bear upon the rescuer's system.

a. Climb to the nearest suitable anchor point above the casualty which can support the weight of both the climber and the casualty.
b. Descend to the casualty; assess and make safe any hazards that threaten the casualty or would impede the rescue, e.g. chainsaw, other equipment/tools, tree debris.
c. Attach the casualty to the main attachment point of the rescuer's harness.
d. Assess the casualty's condition and administer first aid if appropriate.
e. Connect the casualty to the rescuer's rope and transfer the casualty's weight to the new connection, taking up any slack to prevent the casualty falling any distance when their rope is cut/disconnected.
f. An additional friction hitch, tied to the static side of the rescuer's rope and connected to the main attachment point on the casualty's harness, can make lowering a casualty on a single line easier for the rescuer.

g. Slacken the casualty's friction hitch to test the rescue system and then disconnect the casualty's original climbing system.
h. The rescuer descends with the casualty attached to their own harness and climbing system.

If the casualty is conscious then the rescuer should be aware that the casualty may be able to help during the rescue. This keeps the casualty occupied and aids rescue.

Insert images to help support text above

11.5.3 Counterbalance

In certain circumstances using a counterbalance a pick-off rescue technique can assist in the movement of the casualty by off-setting the rescuer's weight against the casualty.

11.5.4 Lifting/Hauling

In some situations, a casualty will need to be lifted. Lifting or hauling systems can be used. Typically, such systems will consist of a series of components assembled to create mechanical advantage, allowing a casualty to be lifted with relative ease.

Insert image of a lift haul taking place within the tree, and at ground level.

11.5.5 Belay rescue

11.5.5.1 The rescuer can climb to a suitable anchor point above the casualty taking the belay rope up with them (or an access line can be used as the belay line).

11.5.5.2 The belay rope is passed over a suitable anchor point, attached to the casualty and then belayed from the ground to lower the casualty. (If the casualty is not being accompanied to the ground by the rescuer.)

11.5.5.3 The ground staff can use a suitable mechanical belay device or friction hitch attached to a suitable anchorage (tree, vehicle, etc.). This must have sufficient friction to control the descent. The belay system must always fail-to-safe.

Insert image of a lift haul taking place within the tree, and at ground level.

11.6 Casualty support and control

Anyone undertaking aerial rescue should promote the recovery and maintain control of the casualty throughout. The rescuer's own equipment or the casualty's equipment can be used to achieve two principal aims:

a. a direct harness-to-harness attachment from rescuer to casualty;
b. support of the casualty in an upright position to help maintain an airway and provide additional control of the casualty.

Insert images of equipment being used to provide harness to harness attachment, and ways to create support for the casualty.

11.7 First Aid

11.7.1 Climbers using a chainsaw should hold a valid arboricultural specific first aid certificate.

11.7.2 First aid: all climbers must carry a personal first aid kit comprising at least a large wound dressing and a knife with a retractable blade.

11.8 Suspected Spinal/Neck Injuries

Climbers with suspected spinal/neck injuries will still need to be lowered carefully by several rescuers (if possible). Where applicable such extraction of a casualty should be carried out under the guidance of emergency personnel. During any rescue, maintaining a casualty's airway and breathing must always be a priority.

11.9 Handover

When a casualty is seriously injured, effective handover from an on-site first aider to the emergency services have a significant impact on casualty care and recovery. First aiders should be able to handover the following information as a minimum:

a. patient's name and age;
b. time of accident;
c. how the injury happened;
d. injuries top to toe;
e. vital signs (first set and significant changes);
f. treatment provided so far; and
g. medical information, e.g. blood type, insulin dependency, allergic reactions to medication.

11.10 Actions after the Event

11.10.1 Following any accident on site, the preservation of evidence for collection and analysis can form a key part in any accident investigation process.

11.10.2 Operators will be expected to:

a. preserve the scene where possible;
b. notify management of the incident and record the occurrence in line with the organisation's requirements;
c. note the contact details of any witnesses.

11.10.3 As part of further investigation operators may be asked to:

a. take photographs and make drawings;
b. provide a witness statement.

11.10.4 Operators must cooperate with enforcing authorities (e.g. the Police, the Health and Safety Executive) in their duties to investigate workplace accidents. However, it is expected that an operator will not:

a. publicise a workplace accident on social media;
b. provide details to third parties not directly involved with the accident, unless with the consent of the employer.