

Industry Code of Practice for Arboriculture Tree Work at Height



Second Edition

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Arboricultural Association

The Malthouse, Stroud Green
Standish, Stonehouse, Gloucestershire
GL10 3DL, UK

Tel **+44 (0)1242 522152**

Email admin@trees.org.uk

Web www.trees.org.uk

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PART 1: INTRODUCTORY MATERIAL

1.1 Foreword



1.1.1 Arboricultural Association

The publication of the first edition of this document was a seminal moment in the development of the arboricultural industry, which has expanded exponentially over recent years. Through the innovation and creativity of numerous individuals working in the sector both practical techniques and management systems have evolved to support a highly skilled and professional workforce, which continues to grow.

Following recent developments and in order to meet the many challenges we face in managing tree work at height safely and efficiently, we are now at a point where we need to revise our guidance on the principles of managing tree work at height.

This industry code of practice (**ICoP**) provides that guidance, with planning protocols for managing resources, personnel and equipment to ensure safe and efficient working practices. It also provides the basis for the further development of detailed technical guidance on individual tasks and equipment.



1.1.2 Health and Safety Executive

The Health and Safety Executive (HSE) was involved with the Arboricultural Association in producing this guidance. HSE endorses the guidance, as it follows a sensible and proportionate approach to managing health and safety.

1.2 Acknowledgements

The Arboricultural Association wishes to express its gratitude to the following in respect of the preparation of this industry code of practice.

Technical authors: Chris Cooper-Abbs and Matt Brooker.

Contributors: Simon Richmond, Jonathan Capper, Simon Cox, Paul Elcoat and David Robinson.

In addition to the individuals listed above, the Association and the technical authors would like to thank the Arborists' Working Group, the Professional Committee and the numerous individuals whose thoughts and comments have contributed to this publication.

1.3 Introduction

The aim of this ICoP is to identify the principal planning, management and supervisory requirements necessary to establish safe systems of work for tree work operations at height. Correct consideration, and application, of these elements will assist in the creation and maintenance of a safe working environment, thereby increasing productivity and reducing margins of **risk** that may result in accidents and incidents, including near misses, injuries and fatalities.

Many of the guiding principles and considerations outlined within this ICoP may also be used in the planning, management and implementation of other tree work operations, e.g. ground-based chainsaw activities.

1.4 Structure

This ICoP comprises six parts.

Part 1: Introductory Material – The scope and limitations of the ICoP, along with its position within the legislative framework.

Part 2: Terms and Definitions – Terms that are defined specifically in relation to their application to tree work at height.

Part 3: Principles and Guidance – Guiding principles and considerations, along with technical definitions, in relation to tree work at height.

Part 4: Legislation (Local/National) – UK statutory provisions applicable to tree work at height.

Part 5: Bibliography – A list of sources used in the production of this ICoP.

Part 6: Work equipment standards – A summary of fall protection standards.

Within this ICoP, sections are numbered according to the part in which they appear, e.g. in Part 3, section 3.2 covers Planning and Management. Sub-sections are also numbered, e.g. under 3.2 Planning and Management, 3.2.2 covers Planning and Resourcing. If you are accessing this document electronically, you will note certain words and phrases are **highlighted**; these are hyperlinks that will take you to Part 2: Terms and Definitions.

This ICoP may be subject to change over time through a process of revision and update. Version control, including edition number and date published, is set out on page 2.

1.5 Scope and Limitations

This ICoP provides guiding principles and considerations, along with technical definitions, in relation to tree work at height in arboriculture (including the provision of training for tree work at height), to help in designing safe systems of work that are specific to the work required, the location of its delivery and the people required to manage and/or perform the work.

It is intended for use by arborists, **employers**, suppliers, policymakers, awarding organisations, trade bodies, regional, national or international enforcement agencies, safety officers and those who commission arboricultural work. This ICoP is applicable to the planning, management, **supervision** and use of arboricultural techniques, methods and equipment for the completion of tree work at height.

This ICoP reflects principles of general good practice; it is not wholly definitive and there may be circumstances in which it is reasonable to adopt practices not described herein. Any departure from general good practice must be supported by a robust **hazard** and **risk assessment**. Users of the information in this ICoP should be aware of, and consider, any local or regional restrictions that may be in place.

This ICoP is not intended to apply to the application of arboricultural techniques for the purposes of sport/competition or recreation, nor is it a substitute for adequate training.

The diagram below provides a UK-specific model demonstrating where this ICoP may fit within the legislative framework.

Figure 1: The relationship of an ICoP to the legislative framework.



This ICoP is not intended to provide guidance on how tasks and specific techniques should be performed. It identifies and considers the underpinning principles, informing technical guidance (TG) that relates to specific arboricultural operations.

Technical Guide 1: *Tree climbing and aerial rescue*

Technical Guide 2: *Use of tools in the tree*

Technical Guide 3: *Rigging and dismantling*

Technical Guide 4: *Use of mobile cranes in tree work*

Technical Guide 5: *Use of Mobile Elevating Work Platforms in tree work*

PART 2: TERMS AND DEFINITIONS

ACoP: approved code of practice:

Approved codes of practice offer practical advice on how to comply with the law in Great Britain and have a special legal status.

ALARP: as low as reasonably practicable. The core concept of ALARP is 'reasonably practicable'; this involves weighing a risk against the trouble, time and money needed to control it.

anchor: (*noun*) a structural place, fixing or fixture to which a safety line or anchorage device is attached; (*verb*) the act of attaching to an anchor point; **anchored** (*adjective*) being attached to an anchor.

anchor device: a component or assembly of components that allows connection to an anchor or anchor point.

anchor point: a point of attachment for personal fall protection systems or anchor devices, providing a means of support or suspension.

appointed person: a person with training, practical and theoretical knowledge and experience of lifting operations.

ascender: a mechanical device used for ascending a rope which slides when advanced up a rope but grips when loaded in the opposite direction.

assembly: a unit consisting of two or more connected components.

assessment: a judgement based on physical, verbal or observed evidence and/or fact (in isolation or combination). An examination or test containing elements of practical demonstration, verbal questioning or recorded answers.

assessor: an individual with the necessary knowledge, ability, training and experience to make visual and cognitive judgements and decide upon an appropriate course of action.

backup: a device, safety line or system used to provide protection and/or support in the event of structural or

primary system failure, including main line, components or anchor.

certification: the action or process of providing someone or something with an official document attesting to a status or level of achievement.

collective protection: equipment which can protect more than one person and, once properly installed or erected, does not require any action by them to make sure it will work (i.e. passive).

compatibility: the ability of components to function together, without detriment to any element.

competent: having the knowledge, ability, training, skills and experience (theoretical and practical) necessary to perform the required tasks to a safe and efficient standard.

competent person: individual(s) responsible for ensuring operations are managed and undertaken safely and that the work environment is controlled.

component: an element of a system.

configuration: a collection of parts where the relative organisation of components is defined.

configured strength: the minimum breaking strength of a component, assembly or system when in use. A **safety factor** should be applied to configured strength to determine a safe working load for use.

connector: a component that can be opened and/or closed in a secure or locked position.

crane supervisor: a person who controls the lifting operation and ensures that it is carried out in accordance with the appointed person's safe system of work.

descending devices: a mechanism used for descending a rope, often incorporating a smooth cam, a roller or other friction system to regulate the

speed of descent. Some descending devices incorporate auto-locking functions and **fail-to-safe** mechanisms.

dismantling: the process by which trees or parts of trees are taken down in sections. This can be done using free-fall techniques or with the aid of ropes, pulleys and/or friction devices or mechanised systems such as cranes.

dynamic load: forces created by a moving load.

element: a component part of a system.

employer: a legal entity that controls and directs a worker under an express or implied contract of employment and pays (or is obligated to pay) him or her salary or wages in compensation.

experience: the accumulation of knowledge and/or skills that results from the observation of or participation in an activity or task.

fail-to-safe: returning to a point of safety in the event of a failure. Often used to describe components or systems used as backups.

fall prevention: preventing the operator/user of fall protection equipment from going into a free fall.

harness: an assembly of elements designed to be worn by a user and to provide points for connection to systems. It can be adjusted to fit and used to support an operator in suspension or support by means of a ventral, sternal or dorsal attachment.

hazard: something with the potential to cause harm, injury or damage to people, property or the environment.

hitch (friction): the term used to describe a variety of different knots and hitches that can be used to control ascent, descent or to maintain position on the rope, but will self lock when released.

ICoP: industry code of practice. A document providing recommendations

PART 2: TERMS AND DEFINITIONS

and guidance pertaining to the planning, management and undertaking of tasks and operations within a specific industry.

inspection: to inspect closely or scrutinise a process, system or equipment.

interim inspection: an inspection which is undertaken periodically, often by the operator, and where the interval between inspections is based upon the frequency of equipment use. The nature of this inspection will be largely the same as the pre-use check; however, the results will need to be recorded. Interim inspections will commonly happen on a weekly or fortnightly basis.

karabiner: an opening connector which closes when the gate is released.

kilonewton (kN): 1000 newtons.

lanyard: a short, adjustable system used to provide a means of connection to an anchor.

lifespan: the period for which an item of equipment remains safe for use within the tolerances specified by the manufacturer.

lifting equipment: items of equipment used to lift, lower, raise or suspend a load.

load: the mass to be lifted, lowered, raised or suspended. A person is considered to be a load.

method statement: a written document detailing how a task or operation will proceed in order to ensure a safe system of work: used particularly where tasks and/or sites are safety-critical or complex.

minimum breaking strength (MBS): the load above which an item of equipment might fail when it is new, as determined by the manufacturer.

moving rope technique (MRT): a technique where the rope moves in relation to the user/harness when the system is in use i.e. the rope travels

through or over the anchor as a result of the operator's actions.

peak force: the maximum force experienced during the cycle of a fall. Often measured in kilonewtons (kN) or decanewtons (daN).

personal fall protection (systems): a collection of components which, when used correctly, combine to prevent a fall, limit the potential for a fall or minimise the distance and consequences of a fall. Personal fall protection systems include: moving rope techniques and stationary rope techniques.

personal measures: measures that are generally active (i.e. measures that require the user to do something in order to work effectively, e.g. knot tied and karabiner attached; friction hitch advanced manually) and will only protect one user at a time.

personal protective equipment (PPE): all equipment (including clothing affording protection against the weather) which is intended to be worn or held by a person at work and which protects against one or more risks to health and safety, and any addition or accessory designed to meet that objective.

proficiency: the combination and application of different skills, knowledge and experience, both trained and latent, to achieve a desired outcome consistently. Proficiency may be assessed by the efficiency, quality and effectiveness of the outcome.

proficient operator: a skilled, knowledgeable and experienced operator able to perform specific tasks.

reasonably practicable: a calculation made where the amount of risk is placed on one side of the scales and the measures necessary to reduce or eliminate it are placed on the other. The measures to reduce or eliminate the risk may be considered in terms of money, time or trouble. It is important to remember that the outcome of the

risk(s) may be major injury or death,* in which case any measures taken to reduce or eliminate are unlikely to be grossly disproportionate. (*These outcomes are context specific to arboricultural work at height and used for illustrative purposes.)

responsible person: an individual who is ultimately legally responsible for all activities under their control.

rigging: the process by which trees or parts of trees are removed in sections, controlled using ropes, pulleys and friction devices.

risk: the potential or likelihood combined with the severity of outcome that a hazard will cause harm, injury, loss or damage to people, property or the environment.

risk assessment: an assessment of the hazards and risks pertaining to a particular task, operation, site or machine.

safe working load (SWL): the load that an item of equipment can safely lift, lower, raise or suspend based on particular working conditions as specified by a competent person. The safe working load may be lower than the **working load limit**.

safety factor: the relationship between the minimum breaking strength and the safe working load, often expressed as a ratio.

signaller: a person responsible for directing a crane operator to ensure safe movement of the crane and load.

slinger: a person responsible for supervising the attachment and detachment of crane loads.

stationary rope technique (SRT): a technique where the rope remains stationary in relation to the user/harness when the system is in use.

PART 2: TERMS AND DEFINITIONS

supervision: to watch over, direct or check.

supplier: manufacturer or appointed representative, distributor, retailer or employer.

termination: the end of a piece of rope. The termination can be a knot, a splice, a stitched eye or a combination of these.

thorough examination: an examination that is carried out in sufficient depth

to ensure safety, detect defects or weaknesses and assess their importance. This examination is based on assessment of the risks involved with the type of lifting equipment being used, where it is installed and how it is to be used.

tree condition assessment: the assessment of a tree, predominantly by visual means, for characteristics, hazards and defects that may have implications for tree work at height.

working load limit (WLL): the load that an item of equipment – when new – can safely lift, lower, raise or suspend as specified by a manufacturer. This does not account for particular service conditions.

work restraint: (fall prevention) a technique where a person working at height is prevented by personal fall protection equipment, e.g. a harness and fixed-length lanyard, from reaching areas where there is a risk of a fall.

PART 3: PRINCIPLES AND GUIDANCE

3.1 General

The aim of this ICoP is to set out core principles and specify a consistent approach to safely performing aerial tree work. The key principles are as follows:

- a) defined standards of good management practice, including the commitment to provide leadership and direction in order to build relationships and communicate with operators respectfully so that skills and ability, along with efficient use of resources, can be maximised;
- b) consistent application of safe systems of work (defined safe methods by which work is carried out);
- c) adequate selection, supply, use and maintenance of work equipment;
- d) correctly defined roles and responsibilities;
- e) trained and proficient personnel;
- f) effective planning, supervision and auditing.

3.2 Planning and Management

3.2.1 Principles and objectives of planning for tree work at height

The principles and objectives of planning for tree work at height are to ensure a consistent and safe method of undertaking that work which allows for a flexible approach to meeting the challenges of an ever-changing environment. The principles and objectives below do not present an exhaustive list but are designed to encourage a consistent approach to work planning and safety.

3.2.2 Planning and resourcing

Work at height should be avoided wherever **reasonably practicable**. Therefore, a decision to undertake tree work at height must be based on a judgement that the work cannot be reasonably practicably undertaken from ground level. The decision to work at height must be adequately justified by an individual¹ who is **competent** to do so and, where necessary, authorised to make that judgement. Where it is not reasonably practicable to avoid work at height, the duration of the work and exposure to that risk should be minimised to as low as reasonably practicable (**ALARP**).

All tree work operations at height must be planned by someone² who is competent and has sufficient **proficiency** in the required tasks to plan, assess and resource the work. The **competent person** must ensure that a safe system of work has been implemented.

Before any aerial tree work operations commence, the following must be in place:

- a) an **assessment** of whether tree work at height is appropriate that is based on a pre-work evaluation;
- b) safe systems of work that define the methods to be used to carry out the work;
- c) adequately trained and **proficient operators** to undertake the work;
- d) a point-of-work (site-specific) risk assessment;
- e) adequate emergency planning, to include resources in the event of a requirement for aerial rescue, first aid and/or evacuation;
- f) a clearly communicated plan which covers points (a)–(e).

FOOTNOTES

¹ The responsible or competent person (see section 3.3.1).

² The responsible or competent person.

Figure 2: Resources that must be available and adequate to undertake planned tree work.

Operators:

Adequate number of proficient operators with the relevant competencies to work at height and to assist those working at height and to put into effect the emergency plan as required. An adequate level of supervision must also be in place to ensure suitable direction and control are provided to operators.

Equipment:

Equipment to undertake the work which is fit for purpose and (at least) meets the minimum safety requirements for the task in hand. The equipment must be adequately tested and certificated as appropriate.

Time:

Sufficient time to undertake the work, including a mechanism by which operators can raise concern to those supervising works where they feel insufficient time (or resources) has been allocated.

Specification:

A clear specification and job criteria which are easy to follow and can be used to monitor progress.

Insurance:

Adequate insurance to cover those directly or indirectly involved in the work being undertaken and those affected by the work.

3.3 Roles and Responsibilities

3.3.1 General

Clear and correctly defined roles and responsibilities must be established to ensure a consistent approach to the planning, management and carrying out of tree work at height.

The following designations are used throughout this ICoP and detailed in the diagram below:

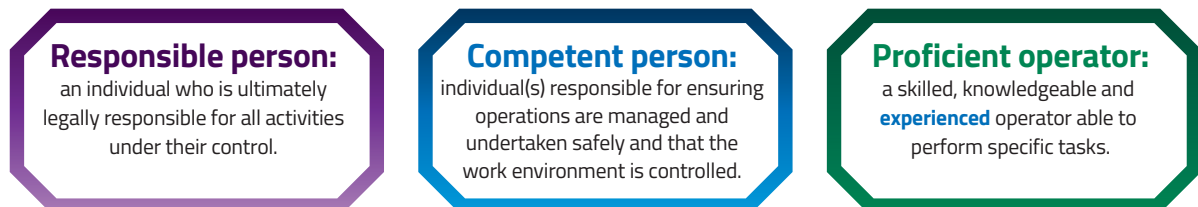
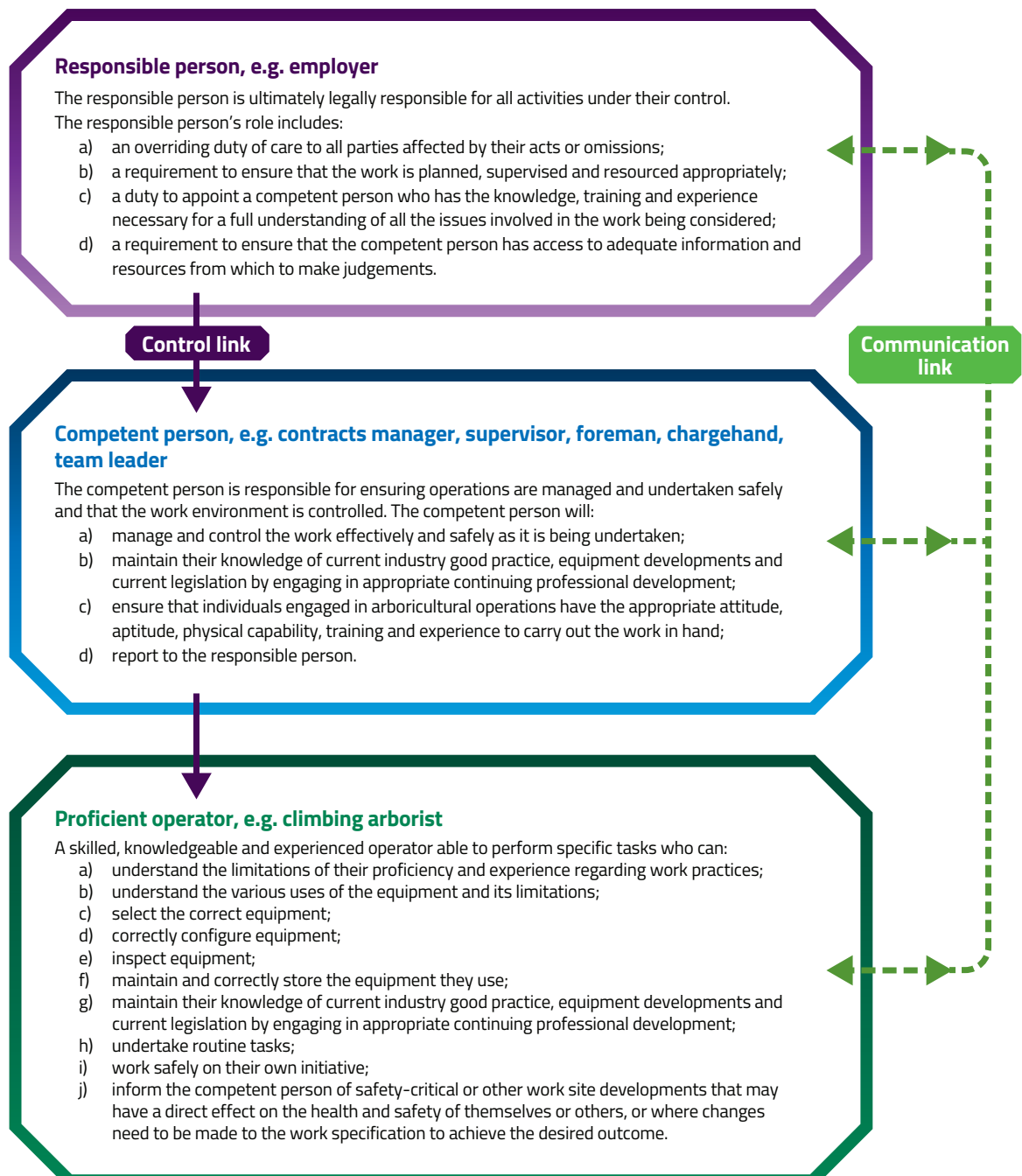


Figure 3: Roles and responsibilities of the responsible person, competent person and proficient operator.



Roles and Responsibilities

In a situation where a self-employed individual is undertaking arboricultural work, the responsible person, the competent person and the proficient operator might be the same person.

Any person commissioning tree work has a responsibility to assess the competency and proficiency of any self-employed individual (contractor) to work safely. Factors that should be considered as part of this assessment may include but are not limited to:

- a) the arrangements that have been put in place to manage the work, including what levels of supervision are appropriate;
- b) matching the right individuals with the right proficiency levels to the risk and complexity of the work;
- c) the health, safety and environmental performance of the contractor;
- d) the health, safety, environmental and quality processes in place;
- e) accreditations demonstrating independent assessment of competence;
- f) the contractor's ability to effectively manage, supervise and communicate with any individual(s) involved with the work;
- g) the arrangements in place to maintain the health, safety and welfare of any party during the completion of works, including the provision of equipment;
- h) the safe systems of work, work procedures, **method statements** and/or good practice to be followed during work activities.

3.3.2 Resources

The responsible person has an overriding duty to ensure that enough resources and equipment are provided or available for the planning, management and undertaking of tree work.

The competent person has a specific responsibility to ensure that there are enough operators with appropriate proficiency for the work to be completed safely and efficiently. This must also include enough operators and equipment to allow any emergency procedures or protocols to be carried out.

3.3.3 Communication

Everyone involved in the planning, management, supervision and carrying out of arboricultural works must engage in an effective chain of communication. An effective communication strategy within a business, project or work site will detail reporting lines between the task originator, e.g. the employer, and those required to undertake the task.

Effective communication must be determined and agreed prior to the start of any work activity and remain effective throughout. Factors influencing the effectiveness of this communication may include:

- a) knowing who to speak to, e.g. the responsible and/or competent person, proficient operator, or client;
- b) the type of communication system being used on site (verbal, hand signals, radio, telephone) and external factors that may influence its effectiveness (noise, weather, visual interference, dense canopy);
- c) the level of understanding and correct interpretation of the on-site communication method, e.g. hand signals, language barriers and/or learning impairment.

3.3.4 Supervision

The responsible person must provide adequate and competent supervision for any arboricultural operation. The level of supervision must be relative to the complexity of the task in hand, as well as the experience and proficiency of the operators on site.

Any individual acting in a supervisory capacity must as a minimum have:

- a) a comprehensive understanding of the arboricultural techniques appropriate to the work;
- b) responsibility for hazard identification and risk assessment for arboricultural operations;
- c) the capability to apply, agree and enforce safe systems of work on site;
- d) the capability and authorisation to stop work where necessary;
- e) the ability to lead by example;
- f) effective communication and interpersonal skills;
- g) the ability to make sound judgements and to act in an authoritative, decisive and measured manner.

Any individual acting in a supervisory capacity must ensure that the overall attitude and conduct of any operator they supervise accord with the standards as defined within this code of practice, industry technical guidance and any specific requirements laid down by whoever they work for.

Roles and Responsibilities

Additionally, observing an individual's ability to communicate and integrate themselves within a work team can be critical to the safety of the operators and people that come into contact with the work; therefore, supervision includes acting on instances of poor communication or isolation.

3.3.5 Operator proficiency

Any operator undertaking arboricultural work at height must have the appropriate level of knowledge and understanding relative to the operation, supported where appropriate by relevant qualifications and a range of practical skills to enable them to carry out the tasks listed in 3.3.5.1: Work at height operations.

Supporting the operator(s) working at height is critical to a safe and efficient operation. Consequently, the role of the ground staff is significant and their proficiency must be commensurate with the level of support required by the work at height operation. Many of the attributes listed in section 3.3.5.1 are applicable to ground staff, with the possible exception of points 'k' through to 'p'.

In all cases, regardless of an operator's role or position, they will need to be adequately fit and healthy to discharge their duties. Operators must not undertake work where issues with fitness and/or health could compromise the health and/or safety of others either directly or indirectly involved with the operation.

3.3.5.1 Work at height operations

In any work at height operation, operators must be able to:

- a) understand, interpret and implement health and safety legislation, working in a way which maintains health and safety at levels in line with industry good practice;
- b) be aware of and understand arboricultural technical guidance relating to specific tasks carried out as part of tree work at height operations, e.g. **rigging**, crane use;
- c) meet legislative and environmental requirements in relation to carrying out the work;
- d) perform operations in line with management objectives and any nationally accepted standard;
- e) receive, understand and implement risk assessments, method statements or safe systems of work, including relevant emergency procedures;
- f) identify hazards and assess risks associated with the working area and the proposed work;
- g) select an appropriate work strategy and implement safe working methods and practices in accordance with the assessed risks;
- h) select, inspect and prepare tools and equipment appropriate to the work and ensure they are, and remain, safe and fit for use under manufacturers' instructions and relevant legislation;
- i) maintain records for the purposes of legislation or good practice;
- j) effectively communicate with other members of the work team;
- k) perform a **tree condition assessment** prior to commencing work;
- l) rate the severity of structural defects;
- m) use **personal fall protection** or prevention methods appropriate to the assessed risk, safe system of work and/or method statement;
- n) select appropriate **anchor point/s** so that they will not be compromised by tree condition or any part of the work being carried out and evaluate their **load**-bearing capacity;
- o) select and adopt appropriate work positions;
- p) safeguard their own welfare by following any training received and adhering to instructions provided.

In addition to the points listed above, the following task-specific skills will be necessary.

3.3.5.2 Pruning and free-fall dismantling

In pruning and free-fall **dismantling** operations, operators must be able to:

- a) interpret the specification including the measurements used and how to apply them;
- b) have a working knowledge of any applicable industry recommendations for pruning;
- c) understand the impact that completed works have on the tree;
- d) identify the drop zone(s) and sequence of works.

3.3.5.3 Rigging

In rigging operations, operators must be able to:

- a) identify drop zone(s);
- b) estimate log and crown section mass;
- c) calculate expected **peak forces** and select **compatible components** to make up the rigging system;
- d) understand strength loss due to knots within cordage components;
- e) carry out appropriate and accurate cutting techniques.

3.3.5.4 Crane

Where tasks involve a crane, operators must be able to:

- a) agree and communicate a sequence of work;
- b) assess the weight of the sections to be removed;
- c) assess the balance and/or likely directions of pivot, and attach lifting accessories using the correct technique;
- d) carry out appropriate and accurate cutting techniques;
- e) communicate with the **crane supervisor**, crane operator and ground staff in relation to the progress of operations.

3.3.5.5 Mobile elevating work platform

Where tasks involve a mobile elevating work platform (MEWP), operators must be able to:

- a) identify the drop zone;
- b) understand the limitations of the machine in use in terms of its working envelope;
- c) carry out appropriate and accurate cutting techniques;
- d) position the MEWP so that branches or tree sections cannot come into contact with any of the MEWP components at any point.

3.3.5.6 Tower scaffold

Where tasks involve the use of a tower scaffold, operators must be able to:

- a) identify dangerous methods of erection, defects in the scaffold or misuse;
- b) understand the intended use of the scaffold;
- c) understand the maximum working loads to be imposed upon the structure;
- d) use the correct type of access onto the scaffold;
- e) understand any restrictions that may affect the scaffold's use.

3.3.5.7 Ladder

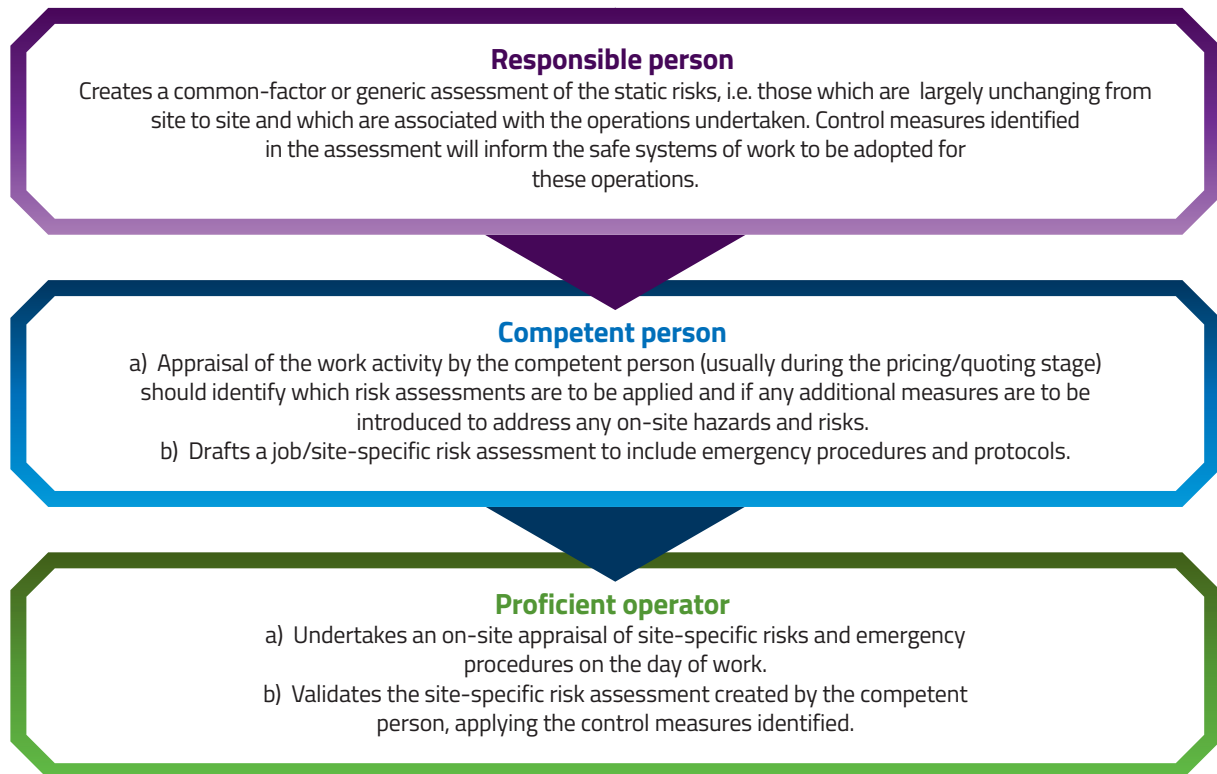
Where tasks involve ladder use, operators must be able to:

- a) erect, secure and dismantle work equipment safely;
- b) recognise when a ladder is not a suitable means of access.

3.3.6 Risk control systems

Before tree work at height starts, a safe system of work must be in place to ensure the protection of people and property so far as is reasonably practicable. The safe system of work must be informed by a suitable and sufficient risk assessment.

Figure 4: Roles and responsibilities in risk control systems.



A risk control system is suitable and sufficient when:

- a) the significant findings have been recorded;
- b) it is demonstrably clear and consistent;
- c) risks are determined and managed as proportionately as possible;
- d) preventative and protective measures are effective;
- e) it is communicated to all those potentially affected.

A common set of principles should be adopted to direct any approach taken when identifying, directing and implementing necessary control measures. They should include:

- a) aim to eliminate the risk – for example, avoid work at height;
- b) evaluate unavoidable risk by carrying out a risk assessment;
- c) control hazards at source – for example, select equipment with low vibration characteristics;
- d) adapt work to the individual(s) concerned, especially regarding the choice of work equipment, **personal protective equipment** (PPE) and work methods;
- e) take advantage of manufacturing, technical and industry progress that could provide an opportunity for improved and safer work methods;
- f) replace the hazardous with the non-hazardous or the less hazardous;
- g) develop a logical and consistent prevention policy;
- h) give priority to **collective protection** measures over individual protection measures;
- i) provide appropriate training, information, instruction and supervision.

A site-specific (point-of-work) risk assessment must be prepared. This assessment must be specific to the actual work site and the nature of the operation to be completed, and based on a pre-work assessment. Site-specific assessments also need to contain emergency planning/emergency response information.

A mechanism must be in place whereby the risk assessment can be updated, revised, reviewed and modified as the operation is undertaken.

All parties engaged in, or who may be affected by, the work activity (e.g. owners, clients, other contractors etc.) are to be made fully aware of the risks they may be exposed to and the measures that have been or must be implemented within the workplace. It is important to differentiate between the hazards and risks affecting those performing the work and the hazards and risks affecting third parties (e.g. the general public) as a consequence of the work.

It is to be ensured that:

- a) the contents of the risk assessment or risk control system are appropriately shared with others;
- b) all parties are briefed before work starts, ensuring appropriate evidence of individuals' acknowledgment is obtained.

3.3.6.1 Method statements

A method statement may be used to record the system of work. This will normally be prepared by the competent person.

The format may vary according to the recipients' requirements. However, it will generally contain the following principal considerations:

- a) scope/description, location and timing of the works to be undertaken, to include reference to job specifications;
- b) access and egress arrangements;
- c) sequence of operations;
- d) the control measures that are necessary to ensure the safety of anyone who is affected by the task or process;
- e) reference to good practice guidance where applicable;
- f) specification, type and number of machines, personnel and equipment to be used;
- g) reference to applicable **certification** and documentation relating to personnel and machinery;
- h) provision for emergencies, including first aid;
- i) welfare;
- j) communication methods between operators and the client as applicable;
- k) safety-critical communication processes during operations, i.e. safety hold points for the exchange of safety-critical information such as site safety induction or permits to work;
- l) measures to address any environmental impacts on the work site.

3.3.7 Auditing and inspection

To ensure that safe systems of work for tree work at height are complied with, the responsible person must ensure that the work planning system and process, from the initial pre-work assessment to job completion, are audited.

Regular audits should be undertaken to determine how the wider tree work planning and management system is performing. Generally, they are a document-review exercise which measures the efficacy of communication between key personnel within the business, such as the responsible person and the competent person.

The following criteria may be considered as part of such a review:

- a) tree work specification;
- b) assessment of how the work is to be carried out;
- c) assigning resources:
 - time
 - labour
 - competency
 - equipment;
- d) pre-work risk assessment and any control measures introduced at this stage;
- e) site-specific (point-of-work) risk assessment;
- f) compliance;
- g) completion to specified standard.

Roles and Responsibilities

Audits undertaken as described above should be further supported by work site inspections and provide key indicators of company, legislative, good practice or client compliance.

Work site inspections provide an important opportunity to assess operators undertaking works and to ensure that supervision of the task is being carried out effectively. Such inspections aim to improve overall standards of compliance and promote a positive safety culture.

Work site inspections may include the following criteria:

- a) correct interpretation and application of the work at height hierarchy;
- b) competency of operators on site;
- c) resource provision;
- d) condition and use of tools and equipment;
- e) demonstration of task competency;
- f) work site planning and control;
- g) task planning and control;
- h) compliance with risk controls and emergency procedures;
- i) environmental factors;
- j) work quality.

Audits and inspections should be documented, with clear criteria set for the auditor/inspector to use. Any highlighted issues should be dealt with by stating clear action points which are assigned to individual personnel and are time limited.

Any audit or inspection should also document examples of good practice, and those positive findings should be communicated to operators in turn.

3.4 Preliminary Work Site Assessment

3.4.1 General

To ensure that tree work at height is suitably and sufficiently planned, managed and carried out, a site survey and assessment of the task(s) required will need to be undertaken before work starts.

Normally conducted as part of the work quotation/pricing stage, the findings of this site survey will need to be considered as an integral part of the work at height planning process.

Any individual carrying out site surveys must be suitably competent to do so and should record and justify their findings as part of work planning.

3.4.2 Site parameters/survey

The parameters of the survey area should be defined by the maximum potential extent of proposed arboricultural operations. This must include access and egress routes; all areas where vehicles are to be operated (or parked); all areas where material may be processed, stored, dropped, felled or lowered; and the maximum potential reach of any machinery (e.g. platform or crane).

3.4.3 Tree work requirements/specification

Detailed consideration should be given to the tree work required in order to ascertain:

- a) if there is a need for tree work at height;
- b) what resources, including personnel and equipment, will be required;
- c) if individuals proposed for the tasks have the necessary proficiency to carry out the required tasks safely, efficiently and effectively.

3.4.4 Tree condition assessment

A tree condition assessment must be conducted to determine:

- a) the implications for working at height, e.g. the use of a personal fall protection or lowering system;
- b) the most appropriate system for safe working at height;
- c) the most appropriate method of access to the tree.

Allowances must also be made for:

- a) the tree species and timber characteristics;
- b) parts of the tree obscured by vegetation, e.g. ivy, epicormic growth;
- c) the site terrain and location;
- d) the possible presence of biotic hazards, e.g. bees or wasps;
- e) surrounding hazards;
- f) structural defects present within the tree or adjoining trees;
- g) protected species.

Any tree condition assessment should also include an assessment for the presence of protected species, particularly in peak periods, e.g. the nesting period for birds.

The condition of trees must be assessed by an individual/individuals competent to do so in relation to the work being proposed, so that a safe system of work can be planned and implemented. Individuals conducting these assessments need a broad understanding of basic tree biology, species identification and characteristics, and the tree as a mechanical structure, including the implications of apparent defects and protected species.

It must be considered whether any tree condition assessment carried out during the hours of darkness can be done to a suitable and sufficient standard. Tree climbing operations in the dark should only be considered if a tree has been assessed during daylight or where the provision of artificial light is adequate to allow an adequate level of assessment to be carried out to ensure safe working.

At the start of work, operators are required to perform a site-specific confirmation of tree condition and to validate the information gathered prior to work commencement.

Preliminary Work Site Assessment

Significant changes to tree condition, the system of safe working or the method of access must be recorded as part of the site-specific risk assessment and communicated directly to the competent person prior to starting any aerial tree work activity.

It is of the utmost importance that assessment of the condition of the tree continues while it is being accessed and worked on, so that any hazards in the canopy or stem that were not visible from ground level can be identified and appropriate control measures applied.

3.4.5 Constraints

Due consideration must be given to constraints that may affect tree work activity such as, but not limited to:

- a) tree protection or preservation;
- b) utilities (rail, gas, water, overhead/underground services);
- c) public access (road/footpaths);
- d) the health and stability of neighbouring trees.

All constraints affecting a site should be carefully examined and considered as part of the tree work planning process. Where constraints are identified, specific control measures for each constraint type must be implemented such as:

- a) manage risk to as low as reasonably practicable (ALARP);
- b) ensure necessary third-party consents are obtained;
- c) help develop and inform a safe system of work for the intended operation;
- d) allocate specific resources to effectively manage, control and safeguard/protect against any constraints imposed;
- e) ensure environmental loss is not sustained and habitats are protected.

3.4.6 Site conditions

Site layout, access, egress, land use and terrain should be carefully considered as part of the site survey, informing the decision-making process regarding equipment access, management of arisings, available working space, ground conditions and the load-bearing capacity of surfaces.

From the start of work, the layout and organisation of the work area must protect all parties from the risk of falling objects.

Consideration must be given to the fact that certain operations may require the demarcation and identification of pre-determined zones:

- a) Drop Zone: an area where it is anticipated materials may fall and therefore people or property would be at significant risk from falling objects;
- b) Work Zone: an area where hazards could be encountered or created – an area the work team but not the public may enter.

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.

The extent of the Drop Zone must be clear to anyone in the Work Zone; this could be achieved through the use of signs (where reasonably practicable), site features or tree features (e.g. canopy dripline), or proactive supervision of the area by operators.

During the course of tree work, the Drop Zone may be moved many times as a task is carried out. Therefore, the controls put in place to maintain a safe work site must be communicated to the entire work team as the Drop Zone changes. Ideally this will be documented.

The limits of the Work Zone should be clearly marked, signed and guarded and afford suitable protection to all parties. Additional resources may be required, such as lookouts, to help manage any risk associated with anyone entering the work site, including the public. Materials and objects must be stored in such a way as to prevent risk to any person arising from the collapse, overturning or unintended movement of the materials or objects, for example, stacked arisings or timber.

To maintain the safety of operators, third parties and property, ensure that:

- a) the extent of each zone is clear to all operators;
- b) operators are fully aware of the circumstances in which specific zones may or may not be entered;
- c) pre-determined communication links are established between those working at height and ground staff.

3.4.7 Electricity (overhead and underground)

If aerial tree works are contemplated within 10m (United Kingdom specific) of power lines (measuring the shortest distance between any parts of the tree and the power line), a risk-based approach must be adopted. In practice this will mean seeking specialist advice and guidance from the owner of the power line before undertaking any work within this distance.

Consideration must also be given to operations that are outside of this distance but have the potential to breach it.

If work is being carried out within 10m proximity to power lines, the basic principle will be to work with the electricity switched off and/or to establish (and maintain) a measured safety or exclusion zone to/from the electrical apparatus. Such arrangements will be set by, and agreed with, the owner of the power line.

Separate arrangements and competency levels exist for tree work contractors engaged directly by electricity companies that own or have responsibility for power lines.

Principal considerations relating to work in proximity to power lines are:

- a) because of the different hazards posed, obligations in terms of managing the risks, staff training and competency requirements may differ;
- b) the first choice for operators when managing the risks from electricity should be to undertake the works with the lines de-energised;
- c) any decision to undertake works with lines energised must be justified and documented;
- d) all parties must be familiar with, and consider, any specific arrangements that the owner of the power line has in place. This may greatly impact upon safety distances and the use of access equipment on a given site;
- e) all parties must be familiar with, and consider, both industry guidance and any manufacturer's advice regarding the suitability, and use, of access or climbing equipment and tools near power lines;
- f) where arrangements have been made to work with the lines de-energised, it must be ensured work methods are used that avoid damage to the electrical equipment;
- g) work planning must provide for appropriate levels of supervision and emergency procedures specific to the site and working methods selected.

3.4.8 Underground services

Appropriate provision must be made for the identification and avoidance of underground services due to the potential danger they present. Whilst it is acknowledged contact with services may not be from excavation works, the free fall of timber within a defined drop zone may cause both impact and puncture damage.

As an overarching principle, where works are to be undertaken that have the potential to disturb underground services, it is the duty of those in charge of planning the works to consult with the service owner/operator.

Where there is any doubt about the location of a service, the provider should be contacted for further advice.

Preliminary Work Site Assessment

3.4.9 Highways and public rights of way

Where aerial tree works take place that may affect the highway or public rights of way, it must be ensured that:

- a) correct procedures have been followed for works that involve the need for prior consultation, consent or agreement (e.g. highway closures);
- b) site-specific risk assessments have been completed that pay particular attention to the requirements of highway users, pedestrians, neighbouring properties and any vulnerable users;
- c) before work starts, the work site layout should be planned, necessary equipment identified and knowledge relating to the correct site set-up obtained;
- d) any pre-planned site safety requirements are implemented;
- e) work areas are signed, guarded and where appropriate lit safely at all times;
- f) works remain compliant and safe as work progresses or following any alteration;
- g) the safety of both operators and those who pass near or through the works is paramount;
- h) all members of the work team understand all the key safety issues and the site-specific risk assessment relating to the task;
- i) only appropriately trained and competent operators, supervisors, managers or other competent persons are engaged in the assessment, design, setting up, maintenance and removal of signs, lighting, guarding and temporary traffic control;
- j) where applicable, the assessment, design, setting up, maintenance and removal of signs, lighting, guarding and temporary traffic control are conducted in accordance with any published code of practice, good practice or legislative requirement.

Some of the points above are also relevant when undertaking works that affect permissive footpaths or informal desire lines.

3.4.10 Rail

Where aerial tree work operations have the potential to impact rail infrastructure, or land owned or operated by a rail provider, it must be ensured that:

- a) no operator enters the land owned or operated by the rail provider without their consent;
- b) works are carried out in consultation with the relevant asset protection team.

3.4.11 Welfare

Suitable welfare facilities must be identified and available for the duration of the work activity. Arrangements should be recorded and communicated to all parties. These facilities are to include, as a minimum, clean drinking water, hand-washing facilities and sanitary conveniences. Clean welfare facilities located on the work site should be favoured for longer duration works.

3.5 Arboricultural Work at Height

3.5.1 General principles for arboriculture

Careful and detailed consideration must be given to the need to work at height. Work at height should not take place when it is reasonably practicable to do the work from the ground. Where work at height cannot be avoided, justifiable evidence should be available to support that decision.

An individual's or organisation's past working methods should not automatically set precedents for future practice. Therefore, the organisation (or individual) must ensure that their general management approach to work at height is based on objective decisions which are documented, and that specific arrangements (i.e. risk assessments for work at height) are in place for assessing and managing the risks on each and every occasion, across the broad range of work sites likely to be encountered.

3.5.2 Organisation and planning

The responsible person must ensure that all work is:

- a) properly planned;
- b) appropriately supervised; and
- c) carried out in a safe manner.

Planning must include the correct selection and use of equipment; the undertaking and effective communication of thorough and detailed risk assessments; and appropriate emergency procedures, including rescue provision and first aid.

Planning of any work at height should also include avoiding weather conditions that may jeopardise the health and safety of operators.

There must be sufficient opportunity for those implementing any agreed safe system of work at height:

- a) to review the decision; and
- b) where appropriate to make changes to it.

There must be sufficient and robust systems in place to ensure that any changes are communicated to and supported by the responsible/competent person before work starts, or a suitable system of delegation of responsibility is in place.

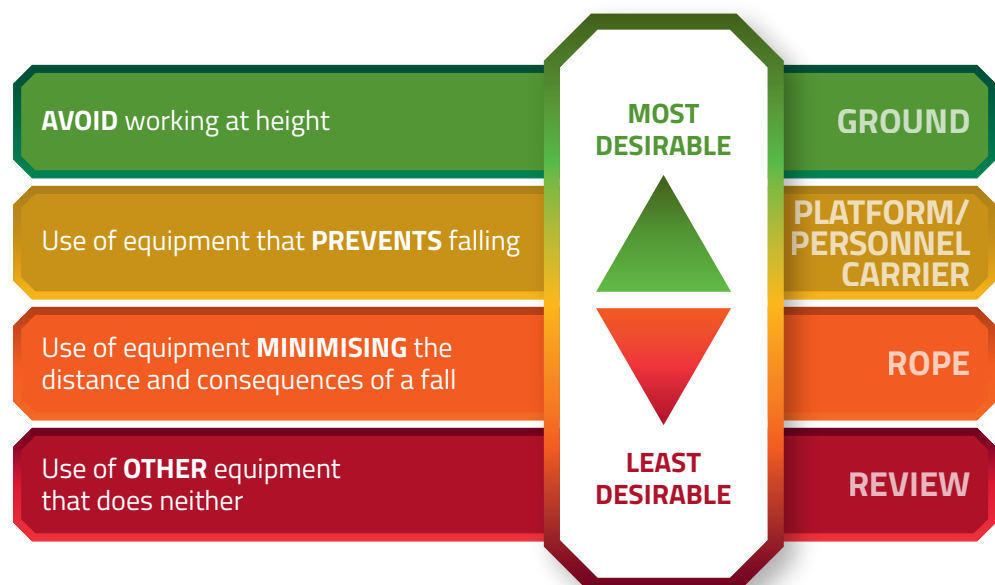
3.5.3 Competence

All tasks, from planning to implementation, must be undertaken by appropriately competent persons or others supervised by such persons.

3.5.4 Fundamental principles

This ICoP sets out a framework for the management of risks associated with working at height. The fundamental principles or risk hierarchy are:

Figure 5:
Risk hierarchy for
tree work at height.



When the most appropriate equipment, techniques or methods of working are being selected, the basic principles outlined in the risk hierarchy in Figure 5 above should be implemented.

When working through the hierarchy, the competent and/or responsible person must select any work method and/or equipment by taking into account the risks associated with its installation, use and/or removal once work is finished, including any rescue requirements for such a method and/or equipment.

When selecting equipment for use in work at height, **collective protection** measures³ have priority over **personal measures**.⁴

If the responsible and/or competent person does not wish to select a work technique or method that sits higher in the hierarchy, they must be able to justify this.

3.5.5 Implementation of the hierarchy

Decisions on working at height methods must be based on the preliminary work site assessment. A process undertaken by the responsible and/or competent person that considers the following key points will help determine whether methods or techniques are reasonably practicable:

- a) the task to be carried out;
- b) legislative requirements;
- c) site constraints, parameters and surrounding use;
- d) the ergonomic constraints associated with the method of work, including operator efficiency and task duration;
- e) the type and effectiveness of rescue provision;
- f) the impact on other site users;
- g) how to meet the arboricultural aims and objectives without causing significant harm to trees and the environment;
- h) the duration of exposure to site-specific risks;
- i) the duration of exposure to ergonomic-specific risks;
- j) the duration of exposure to weather-specific risks;
- k) equipment specification;
- l) the risks associated with installation and removal of equipment;
- m) the costs and time associated with appropriate work methods and equipment.

The implementation of and working through a hierarchy requires a step-wise approach as detailed on page 26.

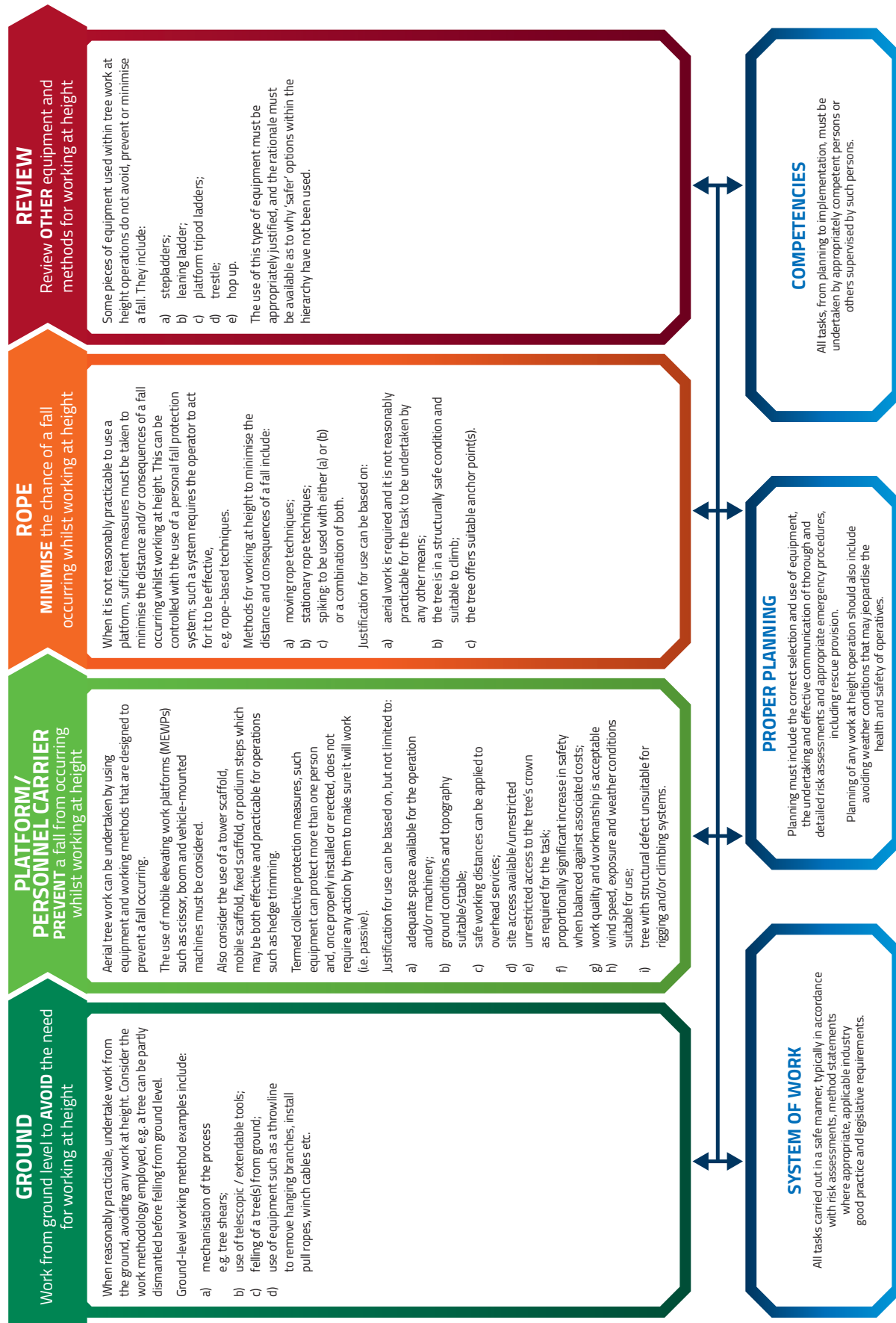
FOOTNOTES

³ **Collective protection measures:** equipment which can protect more than one person and, once properly installed or erected, does not require any action by them to make sure it will work (passive).

⁴ **Personal measures:** measures that are generally active (i.e. measures that require the user to do something in order to work effectively, e.g. knot tied and **karabiner** attached; friction hitch advanced manually) and will only protect one user at a time.

Arboricultural Work at Height

Figure 6: Step-wise approach to working through the hierarchy for tree work at height.



3.6 Rescue Planning

Appropriate rescue planning procedures, equipment and personnel requirements must be considered as part of a preliminary site assessment. It must be ensured that an effective, documented and well-communicated rescue plan is in place during aerial tree work operations.

All rescue planning and operations must address the following issues:

- a) provision for rescue covering a range of scenarios relevant to the work, whether they be equipment/mechanical failure, operator incapacity or other;
- b) the first aid needs of the operator to be rescued from height, with respect to personal injury and who will deliver the first aid;
- c) the safety of those carrying out or assisting with the rescue;
- d) the safety of the public, site owners and other parties;
- e) provision for contacting, maintaining communication with and updating the emergency services;
- f) site access, highlighting specific geographical constraints, e.g. remote location;
- g) the effective deployment of the rescue equipment;
- h) the suitability of the equipment that may have already arrested the fall of the casualty for use during the rescue;
- i) the method that will be used to attach the casualty to the rescue system;
- j) the direction in which the casualty needs to be moved to get them to the point of safety (raising, lowering or horizontal);
- k) the possible needs of the casualty following the rescue.

Specific rescue equipment must always be present at the work site. This equipment needs to be sufficient to carry out a rescue of an individual from any situation on the site. The anticipated loads during the rescue situation must be within any loadings specified in the manufacturer's user instructions.

Any rescue plan must indicate that those performing a rescue of an individual incapacitated at height are suitably trained, equipped and practised in rescue techniques appropriate to the work being undertaken and the equipment being used.

3.7 Delivery of Training for Tree Work at Height

All training for work at height must be delivered to a nationally recognised (or equivalent) high standard, in a safe, controlled environment, and it must be delivered by competent and experienced individuals.

All individuals who receive training for tree work at height should, as a minimum, also be trained to participate in the rescue of an injured worker from the tree and in the use of the equipment used to gain access to the tree.

Operators who wish to use a chainsaw for work at height should have received appropriate training and obtained a relevant certificate of competence or national qualification, unless they are undergoing such training and are adequately supervised.

Refresher or update training is to be undertaken by operators:

- a) if the risks to which operators are exposed change due to a change in their working tasks;
- b) because new technology or equipment is introduced;
- c) if the system of work changes;
- d) where skills are not regularly used;
- e) where the ability to carry out safety-critical tasks rely on an operator maintaining a level of proficient ability, e.g. aerial rescue.

Instructors/trainers must be able to demonstrate a high level of knowledge and practical ability. They must be competent and have proven working experience within the sector. A competent instructor must be able to provide an exemplary demonstration of the relevant task on demand. They should have an in-depth understanding of the principles being taught, including the planning of such operations, and be able to explain the relevant knowledge and understanding to learners using a range of clear and effective methods appropriate to the learners' needs and the skills being taught. To further support this, documented evidence of prior and current experience, training undertaken, relevant qualifications and the continuing professional development of the instructor/trainer must be maintained.

Instructors should be able to demonstrate the following abilities, training, knowledge and experience:

- a) experience of tree work at height;
- b) knowledge of relevant industry sectors;
- c) relevant health and safety training;
- d) practical arboricultural knowledge, including a working knowledge of tree biology and associated pests and diseases relevant to the safety of tree work at height;
- e) instructional techniques training;
- f) experience of the equipment on which he/she is to provide training;
- g) ability to supervise;
- h) ability to carry out safely and efficiently any emergency procedures that may be necessary.

Any formal training provision must have clearly defined and recorded aims and objectives, including a course syllabus.

Appropriate records should be kept by training providers to confirm appropriate levels of fitness of verifiers, instructors, **assessors** and learners, and any medical conditions which may affect an individual's ability to work at height.

Any structure used for work at height training, whether natural or engineered, must be subject to thorough pre-use examination, along with ongoing periodic inspection, to confirm its continued status as safe for use.

Appropriate equipment, facilities and personnel must be available at any training location to enable first aid treatment to be provided if required. Instructors must ensure that they are appropriately trained in the provision of first aid.

3.8 Work Methods

A work method will be chosen and implemented following a suitable and sufficient risk assessment and pre-work assessment. Consideration must be given to the duration of the access and therefore the duration of exposure to any risk(s) presented by the chosen method.

3.8.1 General

During any work at height activity, all measures should be taken that prevent the risk of a fall.

Should the prevention of a fall not be mitigated through the implementation of such measures, the distance and consequences of any potential fall must be minimised.

A minimum of two people must be present during all tree work at height operations. At least one team member must be available, proficient and equipped to perform aerial rescue without delay.

The planning and selection of a work method should take account of:

- a) assessment of hazards and risks: take account of the work to be undertaken, the work site conditions and the effect of the work method and associated equipment on the site and the individuals engaged in the proposed operation;
- b) access and egress: does the work method provide safe and suitable access and egress to the place of work?
- c) falls from height: what are the distance and consequences of a potential fall and does the selected work method provide adequate risk reduction?
- d) duration of exposure to potential risks presented by the work method;
- e) operator proficiency: is the operator adequately trained and proficient in the use of the selected method?
- f) the tree: to include consideration of size, structure, species, drop zone(s) and condition;
- g) the identification and installation of suitable anchors;
- h) rescue: the selection of work method must include planning and provision for rescue.

3.8.2 Ladder

The use of ladders or steps must be restricted to low risk, short duration tasks (typically less than 30 minutes in duration), such as accessing the lower portion of the tree canopy in order to begin a staged ascent or limited duration access for hedge trimming. If ladders are to be used for tasks which require the user to be 'hands free', the operator should ensure they are also correctly anchored into the tree structure. If the task requires working from a ladder for extended periods of time, another work method must be considered.

3.8.2.1 Planning and management

A competent person must ensure that where the selected work method includes ladder use:

- a) a risk assessment has shown that using equipment offering a higher level of fall protection is not justified because of the low risk and short duration of use;
- b) operators have received adequate training in their safe use;
- c) the ladder specified is appropriate for its intended use;
- d) operators are aware of pre-use check and periodic inspection requirements.

3.8.3 Mobile elevating work platform (MEWP)

MEWPs are versatile pieces of work equipment that can provide an efficient and appropriate access solution. In addition to access, operational activities may also be conducted from a MEWP.

As collective protection equipment, a MEWP can protect more than one person, and once properly installed or erected, it does not require any action by the operator to make sure it will work (i.e. passive). In circumstances where an operator is working from the platform of a MEWP, the use of a **work restraint** system (personal **fall prevention**) may be required. An operator using personal fall protection equipment such as **harness** and **lanyard** would be prevented from reaching an area where there is a risk of a fall, e.g. climbing on the guard rails.

The selection, planning for the use of and deployment of MEWPs in tree work should take account of the following:

3.8.3.1 Planning and management

A competent person must plan and establish a safe system of work for the operation on each site, taking into consideration the common principles of planning and resourcing tree work and the preliminary work site assessment:

- a) the selection of an appropriate MEWP with regard to the work site conditions, the **safe working load (SWL)**, working height and the outreach of the MEWP;
- b) access to and egress from the site with regard to the height and width of entrances, the width of access roads, the gradient and the condition of the ground the MEWP will travel on;
- c) space for placing the MEWP, other equipment such as vehicle and chipper, and the drop zone for tree sections to be dropped or lowered into;
- d) the suitability of the ground to take the loads imposed by the MEWP in preparation for and during the operation, and the gradient of the ground on which the MEWP will operate;
- e) selection of an appropriate personal fall prevention system for those in the MEWP;
- f) wind speed in excess of the wind speed limits of the MEWP, or wind acting adversely on trees that are to be worked on at wind speeds below the wind speed limits of the MEWP.

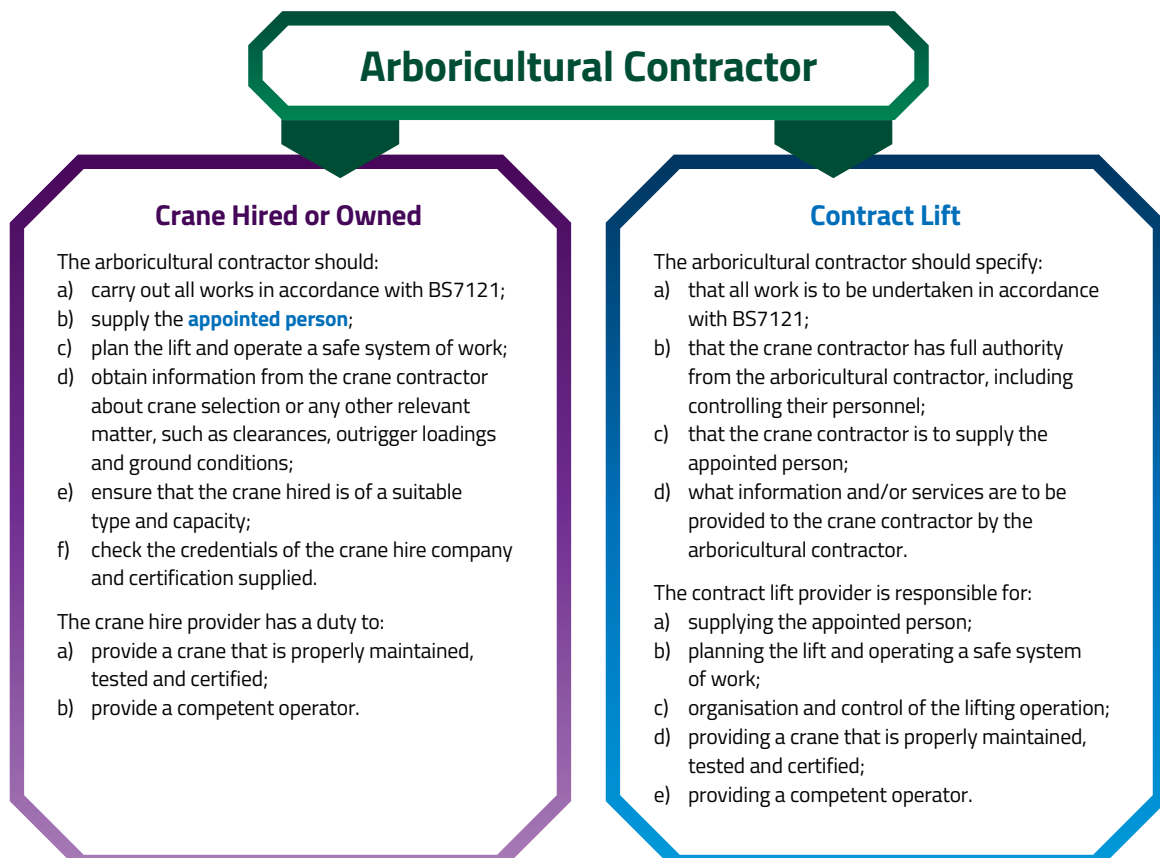
3.8.4 Crane (mobile, telescopic jib, wheeled type)

Arboricultural contractors who plan to undertake tree work operations using a crane but who do not have their own crane have two options:

- a) crane hire: hiring a mobile crane, planning, managing and undertaking the lifting operation themselves;
- b) contract lift: using a crane contract lift provider to carry out the lifting operation.

Arboricultural contractors who do not have in-house qualified expertise in tree work operations using a crane should not hire cranes but should opt for a contract lift to ensure that the operation is properly planned.

Figure 7: Options for undertaking tree work using a crane.



Work Methods

Regardless of whether arboricultural operations using a crane are undertaken by a crane hire or contract lift agreement, the arboricultural contractor and the crane contractor must work closely together to ensure that:

- a) a qualified and competent appointed person plans all aspects of the proposed work;
- b) all relevant information about site conditions is obtained;
- c) the operation is planned and a safe system of work is followed;
- d) the operation is appropriately supervised;
- e) the operation is conducted in a safe manner consistent with the lift plan;
- f) the crane is appropriately maintained, inspected and thoroughly examined;
- g) a competent crane operator is provided;
- h) lifting operations are carried out in accordance with specific arboricultural crane good practice.

3.8.4.1 Planning and management

Arboricultural lifting operations using a crane must be planned by the appointed person to ensure that they are carried out safely and that all foreseeable risks are eliminated or controlled so far as is reasonably practicable. The outcome of the planning process should be a written lift plan which includes a risk assessment, a method statement and supporting information, such as a site drawing and photographs.

The risk assessment carried out by the appointed person as part of the planning process must identify all hazards associated with the proposed lifting operation. In situations where the appointed person lacks the adequate practical and theoretical knowledge and experience of specific arboricultural aspects of the lift, then the responsible person for the arboricultural contractor must ensure that they provide that information and input into the risk assessment. In all cases, the lift plan is to be a collaborative document which includes information from the appointed person and the arboricultural contractor.

The planning should consider:

- a) the selection of an appropriate crane with regard to the lift radius/height and weight of both the crane and the intended load;
- b) the selection of appropriate lifting accessories;
- c) the number of operators on the team;
- d) access to site for the crane and other equipment;
- e) the site of the lifting operation including proximity hazards such as electricity cables, other plant and equipment, structures, members of the public;
- f) the suitability of the ground to take the loads imposed by the crane during preparation for the lift and during the lift itself and other environmental conditions;
- g) areas where the crane and/or parts of the crane and load-lifting attachments are prohibited from entering or oversailing, such as railways;
- h) rigging and derigging of the crane;
- i) appropriate communication system;
- j) weather conditions – prevailing and forecast;
- k) lifting people with the crane and aerial tree work operations;
- l) the load, its characteristics and the method of lifting, including the stability of the load when being lifted and set down;
- m) ground-based operations including chainsaws and chippers;
- n) vehicle movements around the work site;
- o) slips, trips and falls;
- p) emergency procedures.

3.8.4.2 Lifting people

Cranes are not specifically designed for the raising and lowering of people in a tree climbing harness or personnel carrier. An operator should only be raised or lowered by a crane to access the tree during tree work operations where it is not practicable to access the crown using a MEWP and following the completion of a risk assessment which fully justifies the plan.

When a risk assessment has determined that the safest method of accessing the tree is by using a crane, each raising and lowering operation must be carefully planned and must address the following:

- a) the weight of any climbing equipment and attachments should be included as part of the load;
- b) equipment used to attach the personal fall protection system to the hook is both suitable and safe, and considers the presence of other lifting accessories;
- c) the crane safety hook must have a latch;
- d) the climbing rope must be bagged and the rope bag clipped to the climber's harness to prevent trailing and possible entanglement with lifting accessories, the tree or other obstacles;
- e) the crane should have a rated capacity for the crane configuration to be used which is at least twice the weight of the climber, climbing equipment and its lifting accessories;
- f) the crane should be equipped with a motion control system that automatically stops the movement of the crane when the controls are released;
- g) the crane should have power lowering. Cranes with a free fall facility should not be used to lower and raise people unless the free fall facility is locked out;
- h) load-bearing hydraulic cylinders on the crane should be fitted with a device to stop movement in case of hose failure;
- i) crane movements should be gentle and the working speed of the crane for all movements should be limited to a maximum of 0.5m/s;
- j) wire ropes used for raising and lowering people should have a minimum diameter of 8mm;
- k) the crane should be fitted with an anemometer or other device to monitor wind speeds during lifting operations;
- l) the rated capacity limiter/rated capacity indicator on the crane should be maintained in good working order;
- m) when lowering below the crane base level, a fail safe procedure should be provided to ensure that sufficient hoist rope remains on the drum at all times to prevent the end of the rope running off the drum while lowering;
- n) the crane operator should be present at the normal crane control station when people are being lifted;
- o) proximity hazards during the lift must be taken into account;
- p) constant communication should be maintained between the operator being lifted, the crane supervisor and the crane operator at all times during the lifting operation, preferably by the use of two-way radios;
- q) the raising and lowering of people should not be carried out in the following conditions:
 - winds exceeding 7m/s (25km/h)
 - thunderstorms
 - snow, sleet, or ice
 - fog
 - any other weather conditions that could affect the safety of personnel;
- r) the crane, lifting attachments and climbing equipment should be subject to regular pre-use inspections and **thorough examination** where appropriate at specified intervals;
- s) planning must be carried out for emergencies and rescue.

3.8.5 Scaffold (mobile scaffold towers)

Where ground conditions allow, mobile scaffold towers may be a convenient way to access work at a specific, limited height, for example when carrying out small tree or hedge work. The use of such equipment can help provide a stable, temporary platform from which tasks such as hedge trimming can be carried out, as opposed to alternatives such as working from stepladders or leaning ladders.

A competent person (competent in the type of scaffolding work being undertaken and suitably trained) with the assistance of a proficient operator must plan and establish a safe system of work for the operation, taking into consideration:

- a) site location;
- b) weather conditions;

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- c) period of time the scaffold is required to be in place;
- d) intended use;
- e) height and length and any critical dimensions which may affect the scaffold;
- f) maximum working loads to be imposed and maximum number of people using the scaffold at any one time;
- g) type of safe access onto the scaffold;
- h) nature of the ground conditions or supporting structure, ensuring ground conditions are suitable, including slopes;
- i) any restrictions that may affect the erection, alteration or dismantling process;
- j) proximity hazards (e.g. buildings, vehicles, overhead and underground services); the risks associated with people or objects colliding with the structure must be appropriately managed and precautions implemented.

Ensure that any scaffold is subject to inspection as determined by any applicable legislation. Such inspections must only be carried out by individuals who are competent to do so and relevant records of the inspections must be maintained.

3.8.6 Personal fall protection systems

3.8.6.1 General

Trees, by their nature and growing environment, are all different; they are three-dimensional structures. The personal fall protection systems used in other work at height sectors do not necessarily meet the needs of tree work operatives and may only apply in certain, or limited, circumstances. As a result, tree climbing involves a variety of different systems and techniques brought together to achieve safe and efficient working systems for the duration of a task.

When a personal fall protection system is chosen for tree work at height, a comprehensive risk assessment must determine that it is the most appropriate method for working.

The personal fall protection systems (**moving rope technique** and **stationary rope technique**) used within tree work are a collection of components which, when used correctly, combine to prevent a fall, limit the potential of a fall or minimise the distance and consequences of a fall.

Moving rope technique (MRT)

A technique where the rope passes over or through an anchor and is formed into a large adjustable loop when both parts are brought together. The operator connects to both parts of the rope; one part remains static relative to the operator (often the **termination** of the rope) and the other is connected via a midline friction-based **element**, i.e. a friction **hitch** or mechanical device.

When the proficient operator (attached to the system) is ascending, moving around the tree and descending, the rope travels through or over the anchor as a result of the operator's actions, i.e. the taking in or letting out of rope from the friction-based element.

Stationary rope technique (SRT)

A technique where the rope is secured to an anchor or multiple anchors so that the rope remains stationary. The operator connects to the rope using one or more friction-based elements and can ascend, move around the tree and descend whilst the rope remains stationary at the anchor.

An SRT system can also consist of two parallel sections of rope in order to allow a friction hitch or a mechanical device to be secured around both parts simultaneously. This system could be a single rope doubled over and secured to prevent separation, two independently anchored lines or two independently acting lines.

Both types of system, subtly distinct in their functionality, may allow the user to ascend, move around the tree and descend using the branch structure for support and anchorage. These techniques can either be used individually or combined where they may provide the safest and most efficient method of work.

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When a proficient operator is using personal fall protection systems for tree climbing, it is expected that there will be a **backup** system to prevent them falling a distance that is likely to cause injury if the primary system (including the main line, components or anchor) were to fail. The backup should be attached to an independent anchor where possible.

The anchor point of a personal fall protection system must be unquestionably reliable and be capable of withstanding any foreseeable loading throughout the task undertaken.

It may be that in some cases the technique used for initial ascent is also the technique employed for movement around the canopy of the tree. However, where two separate techniques are used, consideration must be given to:

- a) the suitability and compatibility of the techniques;
- b) the transition from one technique or system to another;
- c) the proficient operator's movement around the tree;
- d) achieving and maintaining safe work positions.

3.8.6.2 Planning, management and supervision of fall protection systems

The planning, management, supervision and selection of equipment when considering the use of personal fall protection system(s) must take account of:

- a) the appointment of a competent person to plan, manage and oversee the operation;
- b) the risks associated with the personal fall protection systems and an established risk assessment and defined safe system of work;
- c) the proficiency of the operator;
- d) anchor points: their availability and suitability to be used as either personal fall protection or positioning anchors;
- e) installation of the system(s);
- f) selection of equipment which is fit for both purpose and use;
- g) the weather;
- h) rescue and emergency procedures.

3.8.6.3 Performance criteria for personal fall protection systems in tree work

The following criteria must be applied to personal fall protection systems selected for tree work at height:

- a) the operator is supported in tension or suspension by correctly configured PPE components which prevent or minimise the distance and/or consequences of a fall, reducing the risk of contact with obstacles, structures and the ground; the system design considers any ergonomic constraints on the operator, allowing the correct positioning and posture for the work in hand to be adopted so that there is no undue stretching or overreaching;
- b) the operator's primary system and backup only use anchors that are capable of withstanding any foreseeable loading;
- c) each component part, and where appropriate the system itself, conforms to relevant legislation, standards or regulations.
- d) any item of equipment in the system must be capable of withstanding any foreseeable loading, with an appropriate margin of safety, within the context of its correct application and use;
- e) the system design must ensure so far as reasonably practicable that the user cannot become unintentionally disconnected from any anchor and that suitable systems are employed to prevent the unintentional release of a load;
- f) items of equipment must be compatible with:
 - 1. neighbouring components in terms of shape, size, construction and materials used;
 - 2. (where applicable) the mode of connection;
 - 3. the technique in use;
 - 4. the structural constraints of the tree;
 - 5. the user, including the correct fit and fitting.

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- g) the operator's primary system, which may be used for ascent, moving around the tree and descent, should:
 - 1. allow an operator to regulate speed and brake reliably;
 - 2. include an auto-locking or brake-assist system that reduces the potential of an uncontrolled descent;
 - 3. be positioned throughout the duration of the task to allow the operator an uninterrupted descent to the ground, i.e. without the need to re-anchor;
 - 4. not allow a potential fall distance exceeding 500mm.
- h) the operator should be connected to a backup that provides a **fail-to-safe** in the event of failure of the primary system, during ascent, moving around the tree and descent:
 - 1. any system employed to act as a backup must:
 - i. limit the distance and consequences of a fall if the primary system, including main line, components or anchor, were to fail;
 - ii. use an anchor which is independent of the primary system anchor or, if there is not one that is suitable, be installed over a shared anchor.
 - 2. the backup may only be omitted in cases where it is not practical to maintain it for specific, short-duration tasks. In such circumstances, all measures must be taken to ensure that the primary system anchor point and the personal fall protection system cannot fail.

3.8.7 Use of climbing irons

The use of climbing irons (often referred to as spikes or spiking) is a technique that can be used for ascent, descent and movement where the operator needs to maintain a secure, mobile connection with the stem. This can be most advantageous when working on featureless vertical or near-vertical stems.

The use of spikes is invasive and can significantly damage the tree. For this reason, their use should be considered carefully and they should be employed only where tree health is of negligible consequence, e.g. when the tree or tree section being climbed is being removed, or during aerial rescue where the safety of a casualty takes priority.

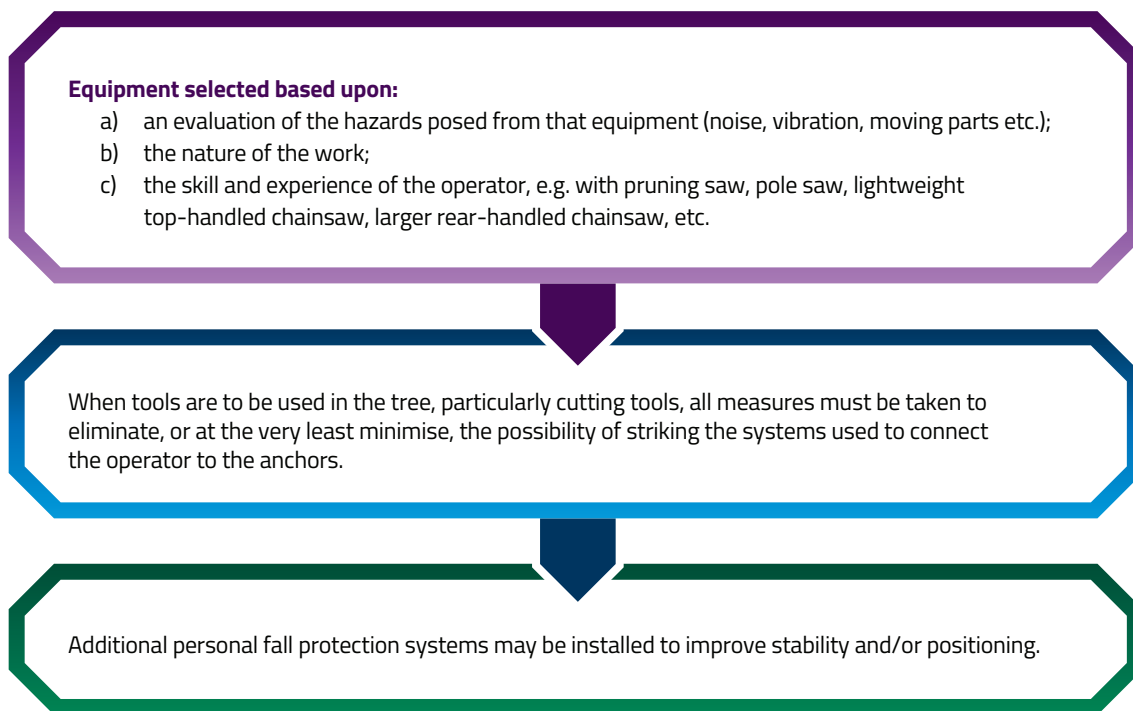
Spiking is not a stand-alone technique and must be used with a personal fall protection system.

3.9 Use of Tools for Tree Work at Height

3.9.1 General

A risk hierarchy should be implemented in determining which tools are to be used. The risk hierarchy is based on an evaluation of the hazards presented by using a particular tool and the measures necessary to mitigate those hazards.

Figure 8: Risk hierarchy: use of tools for tree work at height.



3.9.2 Equipment hauling

When in use, equipment hauling systems should be configured using some form of fail-to-safe so as to minimise the potential for loads to be inadvertently released.

In order to avoid dropping tools, it is important to secure them in the tree or to the operator's harness prior to disconnection from the hauling line.

If the climbing or access lines are used for equipment hauling, care should be taken to ensure no damage is inflicted to the ropes by way of the method of attachment or direct contact with the tool.

3.10 Equipment Selection

3.10.1 General

Before any tree work at height begins, an assessment should be carried out to select the most appropriate equipment.

It is essential to have a thorough understanding of the methodology behind the system, the technique and the individual components to be used. This can be gained through training, consulting specialists (e.g. competent persons) and manufacturers, and through written instructions or guidance for using the products and systems.

Component **configuration** and compatibility will have a significant bearing on the overall efficiency and system safety. Therefore, operators must select and configure components so that when they are in use, neighbouring elements are compatible.

The selection process must consider not only whether equipment is fit for purpose but also whether it is fit for use. For this reason, inspections must take place at suitable intervals. It is expected that operators will carry out visual and tactile pre-use inspections, in addition to recorded inspections carried out at intervals determined by the intensity of use and specified by a competent person under an examination scheme.

3.10.2 Principles of selection

An application-specific assessment should be made for the purposes of establishing the suitability of a piece of tree access and rigging equipment and this assessment should be made prior to its use or integration in a system.

To enable a user to carry out an application-specific assessment, the following principles of selection are suggested as points for consideration and guidance:

- a) application: where and how the item is to be used – primary system or backup, PPE, non-PPE, load-bearing/non-load-bearing, lowering and/or lifting, **dynamic loading** or gradual loading;
- a) construction, design and materials: abrasion, heat resistance and elongation;
- b) anticipation of foreseeable misuse;
- c) compatibility: with other components in terms of shape, size, construction and materials used; with (where applicable) the nature and mode of connection; with the technique and structural constraints;
- d) correct configuration and alignment: reducing the possibility of items becoming cross-loaded when not appropriate as per manufacturer's guidance, e.g. three-way loaded;
- e) functionality: friction control and reliability, overall dimensions;
- f) strength and loading: equipment should be capable of supporting and withstanding, with an appropriate safety margin, any foreseeable loading within the context of its correct application and use; users should refer to the manufacturer's guidance for information on the working load limit and correct application of any attachment points;
- g) mode of attachment: to structure, device or system;
- h) type: a single component or an **assembly** of components;
- i) effective **lifespan** in use;
- j) rates of wear to selected components, maintenance and inspection requirements;
- k) ergonomic constraints;
- l) resistance to: UV degradation, chemical contact, abrasive surfaces, resin/sap and general wear;
- m) environmental exposure: extremes of heat and cold, tolerance to wet, dry or dirty conditions, poor storage, lack of maintenance.

NB: The principles of selection are a basis from which to begin equipment selection and can be applied to textile components, hardware components, equipment combining both elements and items of PPE worn by the user.

Equipment Selection

3.10.3 Loading parameters

The loading parameters can be described as the minimum and maximum foreseeable loads that a piece of equipment or a system will be subject to during its operational service.

Before equipment is selected for use, consideration must be given to the loading parameters presented by the proposed operation in order to ensure the equipment is suitable for its intended application.

All tree access and rigging equipment must be capable of supporting and withstanding, with an appropriate margin of safety, any foreseeable loading within the context of its correct application and use.

Manufacturer's instructions will provide guidance about the equipment, its intended purpose, applications and limitations, and should therefore be taken as a point from which to begin the selection process. Most equipment will be supplied with load ratings; these ratings can specify minimum or maximum loading, a safe working load (SWL) or **working load limit** (WLL). Whether set out in manufacturer's instructions or specified by a competent person, load ratings should not be exceeded. If they are, that equipment or system should be removed from service and subjected to a thorough examination. After the thorough examination, dependant upon the context of use, the equipment and/or system in question may either be reintroduced or removed from service.

3.10.4 Manufacturer/supplier information

Equipment for use in tree work at height should be supplied with information, instructions or guidance pertaining to its safe use, maintenance, storage, examination and repair.

Instructions or guidance should include:

- a) name and contact information for the manufacturer or authorised representative;
- b) statement describing the equipment model, type, identification marks and if appropriate the document and year to which it conforms;
- c) evidence of conformity and reference to any test standard(s) and if appropriate the corresponding notified body;
- d) information about the meaning of any markings and/or symbols on the equipment;
- e) details describing the equipment, where and how it should be used and any limitations;
- f) warnings about: medical conditions affecting the safety of the user in normal and exceptional conditions; the equipment only being used by personnel trained in its safe use; aftermarket alterations, additions, modifications or repairs; using the equipment outside its safe operating parameters; the dangers that may arise from combining the equipment with other items; hazards affecting the performance of the equipment;
- g) guidance as to the compatibility of the equipment when assembled into a system;
- h) instructions as to the nature and frequency of any inspection to ensure the equipment is serviceable and operational;
- i) information about the safe useful life expectancy of the equipment and/or any part of it and how to determine when the product is no longer safe to use.

If the equipment is to be used, configured, loaded or function in a way not prescribed by a manufacturer, this must be approved in writing by the manufacturer or their appointed representative, prescribing the parameters for safe use.

3.10.5 User knowledge

Manufacturers are required to supply instructions providing guidance about the equipment, its intended purpose, applications and limitations. It is expected that users will read and understand the information provided. This will also apply to any subsequent versions of the equipment where the manufacturer may have modified, altered or repaired the equipment and such changes that could affect the functionality. Users can further improve their knowledge by referring to manufacturers' catalogues and websites and other similar publications.

Equipment Selection

3.10.6 Performance specifications

Operators will often self-build their personal fall protection system which as a minimum should be made up of certificated components. For any items of equipment, a set of standards or characteristics is required which describes the minimum performance criteria.

Operators should seek to use relevant performance criteria when:

- a) introducing a new piece of equipment into their system;
- b) developing alternative methods or techniques for tree work at height;
- c) determining an item's suitability as part of a personal fall protection system.

3.10.6.1 General

The following performance specifications for personal fall protection components selected will apply:

- a) each item is suitably rated, relative to the mass of the operator, including any equipment worn;
- b) consideration is given to the environmental conditions to which the item is exposed and the effects of dirt and debris on its functionality;
- c) components are compatible and cause no conflict with others, including inadvertent opening;
- d) each item is clearly identifiable, carrying sufficient information to allow traceability back to the manufacturer, product name construction properties and thorough examination records;
- e) components are manufactured against validated performance criteria;
- f) when applicable components are subject to independent verification by a notified/approved body;
- g) components are used in accordance with manufacturer's guidance relating to their application, configuration and compatibility with other components.

3.10.6.2 Anchorage

i. Temporary anchor devices

Components that provide an artificial, temporary anchor point, as opposed to using the natural structure of the tree. Typical examples may include tape slings or cambium/pulley savers.

It must be ensured that:

- a) any equipment used is manufactured to the standard for temporary anchors;
- b) anchors are configured so that they cannot slip up or down the stem;
- d) any **connector** used is configured in such a way as to prevent minor axis or cross-loading, inadvertent opening and/or release of the rope or system which it is supporting;
- e) the anchor has a **minimum breaking strength** (MBS) of at least 18kN.

ii. Artificial anchors

Items such as machinery and vehicles that may be used to provide an effective anchor e.g. basal tie off for SRT.

It must be ensured that:

- a) the item has sufficient mass to provide an unquestionably reliable anchor;
- b) frictional resistance to the ground is sufficient;
- c) the anchoring of any equipment will not cause damage to the anchor;
- d) movement of the anchor cannot occur during its use.

3.10.6.3 Ascending devices

Ascending devices are components that provide a connection to the rope which when correctly configured allows the rope to travel through during ascent, but will 'lock-off' when loaded to prevent unintentional descent.

Ascending devices must:

- a) be compatible with the ropes used in terms of diameter and type;
- b) provide ease of adjustment when moving up and down the working and/or backup line;
- c) provide effective grip on line(s) used.

Equipment Selection

3.10.6.4 Backup devices

The role of a device as part of a backup is to protect the user in the event of a catastrophic failure of the primary system, its components and/or anchors.

Backup devices must:

- a) ensure that any fall distance is as short as possible;
- b) be configured so that they cannot be inadvertently disconnected from the line;
- c) be compatible with rope type and diameter;
- d) require minimal intervention by the operator if the device is to be used as a 'trailed' or 'follower' device.

3.10.6.5 Connectors

A component used to connect elements of a personal fall protection or rigging system.

Connectors must:

- a) be configured in such a way as to ensure that only the major axis is loaded (where applicable);
- b) be selected with a locking mechanism to prevent inadvertent opening and reduce the risk of rope roll out;
- c) be compatible with other items of the system, or devices used;
- d) have an MBS of at least 22kN.

3.10.6.6 Rope adjustment devices

A device that may be applied at a mid-point, or threaded on to the end of personal fall protection components, such as a lanyard, allowing for the operator to introduce or remove slack within a system.

It must be ensured that:

- a) any rope adjustment device used within a system can grab positively and reliably at each use;
- b) rope diameter and type used within the device are in accordance with manufacturer's specifications;
- c) any device used as part of a personal fall protection system can be operated under control and act predictably across a range of work and rescue scenarios;
- d) preference is shown for devices that allow an operator to gradually apply or release pressure in order to grab.

3.10.6.7 Descending devices

A manually operated device used for descending a rope, often incorporating a smooth cam, a roller or other friction system to regulate the speed of descent. Some descending devices incorporate auto-locking functions and fail-to-safe mechanisms.

Descending devices must:

- a) be designed or configured in such a way that a fall cannot occur either via release of a control element or grip position;
- b) be appropriate for the length and duration of the descent;
- c) be capable of two-person loading if required for the purposes of rescue;
- d) have the ability to regulate the speed of descent;
- e) be compatible with rope type and diameter.

3.10.6.8 Rope and friction cord

Rope: a component part of a personal fall protection system with which the operator will ascend, move around the tree or descend.

It must be ensured that:

- a) when it is new, rope with a **termination** has an MBS of 15kN and rope without a termination has an MBS of 22kN;
- b) rope used for primary or backup systems has a diameter which is compatible with any of its neighbouring components;
- c) splices in rope are only formed by the manufacturer or with their consent against validated performance criteria and subject to independent verification.
- d) rope length allows for at least one of the systems in use by the operator to be capable of providing an uninterrupted descent to the ground;

Equipment Selection

Friction cord: a component part of a personal fall protection system used in a variety of different knots and hitches to control ascent, descent or to maintain position on the rope.

Any friction hitch cord must meet the following criteria:

- a) be suitable for its intended use, based on its diameter and construction from materials suitably resistant to the abrasion and temperatures experienced during work and rescue;
- b) the way in which cord is attached to a connector or placed within a system does not inhibit or restrict the functionality of the hitch, locking positively and reliably when advanced or during descent.

3.10.6.9 Harnesses

A harness must:

- a) allow the user a full range of movement whilst providing the necessary connection points for the personal fall protection systems;
- b) have a means of adjustment and provide adequate and comfortable support for the operator;
- c) allow for the replacement of components, subject to authorisation from the manufacturer (always follow user instructions);
- d) include any closure and adjustment systems that do not inadvertently open or loosen under load.

3.10.6.10 Lanyards

Lanyards are a multi-functional piece of equipment often comprising a series of components. Lanyards can be fixed or adjustable. However, in the most common context of use, an adjustable lanyard is preferred because of its ability to minimise slack and therefore reduce the distance and consequences of a fall.

A lanyard selected for use as part of a personal fall protection system must:

- a) be compatible with the connectors being used;
- b) have a means of adjustment and be of a suitable length;
- c) be efficiently, positively and reliably adjustable in terms of its length when under load;
- d) be suitably attached to the harness to prevent torsion or cross-loading of components;
- e) have an MBS of at least 15kN.

3.10.6.11 Lowering devices

Lowering devices are based upon the design principle of a tube or bollard around which the rope is wound to create friction or a deviation in the rope. They can range from simple tubular components with attachments to more advanced modular systems incorporating a winching function.

Lowering devices must conform to the following performance specification:

- a) rated appropriately for the anticipated loads, including any potential dynamic loading experienced during rigging;
- b) compatible with the proposed technique: lowering, lifting or a combination of both;
- c) compatible with neighbouring components, particularly rope diameter relative to tube/bollard diameter;
- d) configured to prevent the device slipping excessively when in use.

Equipment Selection

3.10.6.12 Pulleys, blocks and trolleys

Pulleys, blocks or trolleys can allow for a range of functions. They can be used to create deviations in the course of a rope, incorporate valuable friction reduction, generate mechanical advantage or facilitate lateral movement.

Pulleys, blocks and trolleys must conform to the following performance specification:

- a) rope diameter is compatible with sheave diameter and cheek plate profile;
- b) mode of connection to neighbouring components prevents misconfiguration when in use and under load;
- c) when configured as part of the system, does not adversely affect adjacent components;
- d) sheave efficiency is commensurate with application, e.g. a bearing may provide greater levels of efficiency and be better suited to an application where friction reduction is beneficial;
- e) design and configuration of the cheek plates prevent inadvertent opening in use.

3.10.6.13 Slings and strops

Slings and strops are textile components which can be found in a variety of configurations, sizes and lengths. Because of their diversity, slings have numerous applications.

Slings and strops must conform to the following performance specification:

- a) mode of connection prevents unintentional or uncontrolled movement or inadvertent release;
- b) when configured for use, the safe working load is known;
- c) application will not cause conflict or detriment to the material construction, e.g. high modulus fibres may provide greater strength to weight, but they may be less abrasion-resistant.

3.10.7 Rods

Rods can provide a viable alternative to certain work at height operations if they are selected and used for the correct application.

Rods must conform to the following performance specification:

- a) any attachment used must be securely fixed to the rod as defined by the manufacturer to facilitate safe and accurate function;
- b) if length adjustable and the context of their use requires that they remain so, rods must have the facility to be secured in position;
- c) any flexibility in the rod experienced during operation must not compromise the safety of the operator/operation or the accuracy of the task being performed.

3.10.8 Personal protective equipment

Personal protective equipment (PPE) should be worn when the task being undertaken, or the machine being operated, presents a risk or risks and those risks can be adequately controlled by wearing PPE.

For the purposes of the following selection criteria, PPE is considered to be items worn by the user, for example, helmet, gloves, boots, trousers, ear and eye protection.

The selection of PPE should take into account the following criteria:

- a) appropriate for the intended task;
- b) adequately controls the risks presented by the task and/or machine being operated;
- c) fits the wearer correctly and if adjustable can be fitted appropriately within the range of adjustment;
- d) where applicable, allows the wearer an unrestricted range of movement and/or vision within the scope of the task and/or operation;
- e) compatibility (if required to be worn simultaneously) with other items of PPE;
- f) does not expose the wearer to risks greater than those presented by the task and/or machine being operated.

3.11 Equipment Inspection, Care, Storage and Maintenance

3.11.1 General procedures

All equipment should be supplied with sufficient information about its inspection, care and maintenance, and it is advised that all such procedures are followed carefully.

When implementing or undertaking equipment inspection, care and maintenance, consideration should be given to:

- a) the type of equipment;
- b) where and how it is used;
- c) intensity of use;
- d) operating environment;
- e) consequences of failure and/or malfunction;
- f) how and where it is stored out of use.

Equipment should be periodically inspected using the above criteria, or as mandated by legislation.

The care, storage and maintenance of equipment should comply with the manufacturer's instructions and should not deviate from those instructions unless on the advice of a competent person with the written consent of the manufacturer or the manufacturer's chosen representative.

Items of equipment that are defective or displaying symptoms that could lead to their defect in use should be withdrawn from service.

Any individual carrying out pre-use checks or **interim inspection** of arboricultural **lifting equipment** should be able to:

- a) understand the parameters for use of the item being inspected;
- b) detect defects;
- c) establish whether the nature of the defect poses immediate risk;
- d) exercise autonomy when removing the defective item(s) from service.

In addition to the factors listed above, the individual carrying out thorough examination of arboricultural lifting equipment (competent person) should:

- a) be able to act without fear or favour;
- b) be sufficiently independent and impartial to make objective decisions;
- c) have appropriate practical experience and theoretical knowledge of the equipment being examined.

When undertaking pre-use and interim inspections of equipment, it may be necessary to carry out routine maintenance⁵ such as cleaning and lubrication. This will most often be done by the operator of the equipment; however, it may also be done by the competent person where the risk mitigated by the maintenance is low.

Routine maintenance may also entail rectifying minor defects, such as resealing terminations, milking ropes and trimming broken fibres. Any and all of these actions must be done judiciously to avoid causing safety-critical damage.

FOOTNOTES

⁵ Any maintenance activities must strictly accord with the information and guidance issued by the manufacturer of the product, or their chosen representative. Any actions taken outside of their authorisation could be considered as alteration and/or modification and could result in the item being unsafe or non-compliant.

3.11.2 Textile and hardware components

Textile and hardware components include a wide variety of pieces of equipment ranging from single items to multifunctional modular systems incorporating moving parts. It is for this reason that a considered approach to their inspection, care, storage and maintenance is required, in addition to a comprehensive understanding of the materials and their safe operating parameters.

The degree to which any one or more types of damage or deterioration will affect a component and its continued integrity in use will depend upon the specific type of material(s) used and the nature of construction. It is therefore essential to refer to the information supplied with the equipment and/or obtain the advice of the manufacturer or their chosen representative regarding continued use following inspection.

3.11.3 Personal protective equipment

The inspection, care and maintenance of all items of personal protective equipment (PPE) should be carried out in accordance with the manufacturer's guidance. Any deviation from this could result in the malfunction and premature deterioration of the equipment.

3.11.4 Equipment lifespan

The lifespan of equipment is determined as the period for which an item of equipment remains safe for use within the tolerances specified by the manufacturer or competent person.

Manufacturer's guidance should be referred to when assessing the lifespan of an item of equipment; the age, use and storage conditions will have a significant bearing on its continued use.

Where manufacturers specify a lifespan, this should be adhered to. Any equipment outside the specified timeframe should be withdrawn from service. Lifespans may only be exceeded where manufacturers have granted special dispensation which can be evidenced.

3.11.5 Storage and transport

The storage and transport of equipment must follow the manufacturer's guidance. Storage and transport must be carried out in such a way that the equipment will be preserved in a chemically neutral, dry and dark environment away from extremes of heat, sharp edges, corrosive substances and rodents. All equipment must be dried before storage to prevent corrosion and fungal attack (particularly textiles).

3.11.6 Marking and traceability

All equipment should be marked to enable its identification and maintain traceability. The nature of the marking and content of the information may vary between items of equipment; however, information relating to safe use and operating parameters should be displayed.

The marking of equipment may include:

- a) a unique identification mark, e.g. a manufacturer's serial number;
- b) where applicable, the name of the manufacturer, model, type or class of equipment;
- c) a reference to documentation relating to its conformity and/or safe use;
- d) a clear indication as to its application, i.e. PPE, rigging or other;
- e) where applicable, a load rating.

Where the equipment is required to be marked by the user or by a competent person acting on their behalf, the markings should be made in such a way as to not adversely affect the integrity of the item. This may only be done with the approval of the manufacturer or their chosen representative.

3.11.7 Records

Records of equipment should be kept to enable a reasonable level of accountability for each item. The following list provides a basis from which more detailed and context-specific information could be gathered:

- a) name of manufacturer;
- b) name of model, type or class;
- c) date of manufacture (where applicable);
- d) date of purchase;
- e) date into service;
- f) date of obsolescence (where applicable);
- g) serial number or other unique identification number;
- h) any information supplied by the manufacturer;
- i) any information pertaining to load ratings and safety-critical configurations;
- j) any information regarding storage requirements;
- k) the nature and frequency of inspections;
- l) dates of inspections;
- m) details of any alterations, modifications or repairs (particularly who undertook the work).

Records of inspections should be kept at least until subsequent inspections take place and should be available on request (where applicable).

Any individual undertaking a thorough examination should notify defects and make a report of the examination. The competent person should notify the equipment owner immediately of any defect which in their opinion is or could become a danger to people.

Copies of declarations of conformity for any lifting equipment should be kept for as long as the equipment remains in use. Information contained in any thorough examination report should be kept available for inspection.

3.11.8 Equipment withdrawal

Any equipment found to be defective whilst in use or following an inspection must be immediately withdrawn from service.

Subject to the nature and context of the defect, it may be necessary to implement a quarantine procedure in order to preserve the condition of the equipment and allow for a thorough examination to be undertaken by a competent person.

Defective equipment must be labelled, and any equipment which cannot be repaired and reintroduced into service should be indelibly marked in such a way as to prevent inadvertent use or, if necessary, destroyed.

3.11.9 Equipment alterations and/or modifications

Alterations and/or modifications should only be carried out by the manufacturer or by a competent person with the consent of the manufacturer or the manufacturer's chosen representative.

PART 4: LEGISLATION (LOCAL/NATIONAL)

The following list details UK statutory provisions applicable to tree work at height. This section does not intend to provide an interpretation of the law; rather it is guidance in the form of a summary and/or outline of key points.

The Health and Safety at Work etc. Act places general duties on employers, the self-employed and employees to ensure the health, safety and welfare of people at work and for protection of other people who may be affected by the work activity. Various sets of regulations are made under the Act and detail specific duties for those in control or managing work activities.

The Management of Health and Safety at Work Regulations (as amended) require risk assessments to be carried out to identify the measures necessary to comply with health and safety legislation. In particular the assessments should cover risks to the health and safety of employees, the self-employed and others who are not at work, i.e. members of the public. They also require arrangements for managing the work to be put in place and for control measures to be used to reduce the risks to an acceptable level. These regulations also detail requirements for employees to be suitably trained; for employers to appoint one or more competent persons to assist them in complying with health and safety law; and for employers (and self-employed persons) sharing workplaces to co-operate and co-ordinate on health and safety measures.

The Construction (Design and Management) Regulations (CDM) are about focusing attention on the effective planning and management of construction projects, from design concept onwards. The aim is for health and safety considerations to be treated as a normal part of a project's development, not an afterthought or bolt-on extra. The object of the CDM Regulations is to reduce the risk of harm to those who have to build, use, maintain and demolish structures.

Consultation with Employees

The law sets out how employers must consult their employees in different situations and the different choices they have to make. There are two sets of general regulations outlining employers' duties to consult with their workforce about health and safety:

- The Safety Representatives and Safety Committees Regulations
- The Health and Safety (Consultation with Employees) Regulations

These regulations will apply to most workplaces. They are designed to enable employers and employees to work together:

- a) to develop, maintain and promote measures that ensure health and safety at work; and
- b) to check the effectiveness of such measures.

Employers are required to consult with employees or their representatives about the following:

- a) the introduction of any measure which may substantially affect their health and safety at work, e.g. the introduction of new equipment or new systems of work, such as the speed of a process line or shift-work arrangements;
- b) arrangements for getting competent people to help them comply with health and safety laws;
- c) the information employees must be given on the risks and dangers arising from their work, measures to reduce or get rid of these risks, and what employees should do if they are exposed to a risk;
- d) the planning and organisation of health and safety training; and
- e) the health and safety consequences of introducing new technology.

The Control of Noise at Work Regulations require employers to prevent or reduce risks to health and safety from exposure to noise at work. Employees also have duties under the regulations. The regulations require an employer to:

- a) assess the risks to employees from noise at work;
- b) take action to reduce the noise exposure that produces those risks;
- c) provide employees with hearing protection if the noise exposure cannot be reduced enough by using other methods;
- d) make sure the legal limits on noise exposure are not exceeded;
- e) provide employees with information, instruction and training;
- f) carry out health surveillance where there is a risk to health.

The Control of Substances Hazardous to Health Regulations require employers to:

- a) assess the risks that arise from the use of hazardous substances. This will include any arrangements to deal with accidents, incidents or emergencies, such as those resulting from serious spillages. The assessment must also include the health and safety risks arising from storage, handling or disposal of any of the substances;
- b) prevent, or if this is not reasonably practicable control, exposure to such substances;
- c) provide staff with information, instruction and training about the risks, steps and precautions the employer has taken to control these risks, e.g. provision of suitable PPE.

The Control of Vibration at Work Regulations require employers to prevent or reduce risks to health and safety from exposure to vibration at work. Employees also have duties under the regulations. The Control of Vibration at Work Regulations require an employer to:

- a) assess the vibration risk to employees;
- b) take action to reduce vibration exposure that produces those risks;
- c) decide if employees are likely to be exposed above the:
 - daily exposure action value (EAV) and if they are, introduce a programme of controls to eliminate risk, or reduce exposure to as low a level as is reasonably practicable;
 - daily exposure limit value (ELV) and if they are, take immediate action to reduce their exposure below the limit value;
- d) make sure the legal limits on vibration exposure are not exceeded;
- e) provide information and training to employees on health risks and the actions that are being taken to control those risks;
- f) carry out health surveillance (regular health checks) where there is a risk to health;
- g) consult a trade union safety representative or employee representative on proposals to control risk and to provide health surveillance;
- h) keep a record of risk assessment and control actions;
- i) keep health records for employees under health surveillance;
- j) review and update the risk assessment regularly.

The Electricity at Work Regulations require precautions to be taken against the risk of death or personal injury from electricity in work activities. Duties are imposed on people in respect of systems, electrical equipment and conductors, and in respect of work activities on or near electrical equipment.

It is to be ensured that:

- a) Systems are constructed and maintained to prevent danger.
- b) Work carried out near a system shall be carried out in a manner not to give rise to danger.
- c) Adequate precautions are taken to prevent electrical equipment which has been made dead in order to prevent danger becoming electrically charged during work.
- d) No person shall work near any live conductor, other than one suitably insulated, unless it is unreasonable in all the circumstances for it to be dead, it is reasonable to work near the conductor while it is live and suitable precautions have been taken.

Employers Liability (Compulsory Insurance) Act and **Employers Liability (Compulsory Insurance) Regulations** require most employers to insure against liability for injury or disease to their employees arising out of their employment. Insurance cover for this purpose should be at least £5m. A copy of the current certificate of insurance must be displayed where employees have reasonable access, such as a noticeboard or intranet page.

The Health and Safety (First-Aid) Regulations require employers to provide adequate and appropriate first aid equipment, facilities and people so employees can be given immediate help if they are injured or taken ill at work.

What is 'adequate and appropriate' will depend on the circumstances in the workplace; an assessment of first aid needs should be undertaken to assess what is required.

The minimum first aid provision on any work site is:

- a) a suitably stocked first aid box;
- b) a first aider or an appointed person to take charge of first aid arrangements;
- c) information for employees about first aid arrangements.

The Health and Safety (Safety Signs and Signals) Regulations require employers to provide safety signs where other methods, properly considered, cannot deal satisfactorily with certain risks and where the use of a sign can further reduce that risk. Aspects of safety signs design are standardised so that wherever a particular safety sign is seen it provides the same message. The intention is that workers moving from site to site, such as service engineers, will not be faced with different signs at different workplaces.

The Lifting Operations and Lifting Equipment Regulations aim to ensure that:

- a) all lifting operations are properly managed;
- b) lifting systems are properly designed;
- c) lifting equipment is inspected and maintained to ensure that it is safe to use;
- d) lifting equipment is fit for purpose;
- e) equipment is regularly inspected to ensure it remains fit for purpose;
- f) equipment is marked and any other information is provided to inform the user of the parameters of the use for that piece of equipment;
- g) equipment is uniquely identifiable.

LOLER requires equipment strength, stability and installation to be addressed as well as setting out how equipment should be marked and thoroughly examined at prescribed intervals.

In addition to the required pre-use checks of climbing equipment by the operator, there are requirements under LOLER for:

- a) recorded interim inspections for items subject to high levels of wear and tear;
- b) thorough examination of arboricultural equipment by a competent person who has genuine authority and the independence to make an objective decision about whether the equipment remains safe to operate or not;
- c) thorough examination of equipment used for lifting people at least every 6 months;
- d) other equipment, such as rigging equipment, must be thoroughly examined at least every 12 months.

The Manual Handling Operations Regulations

The employer's duty is to avoid manual handling as far as is reasonably practicable if there is a possibility of injury. If this cannot be done, then the employer must reduce the risk of injury as far as is reasonably practicable. If an employee is complaining of discomfort, any changes to work to avoid or reduce manual handling must be monitored to check they are having a positive effect. However, if they are not working satisfactorily, alternatives must be considered.

The regulations set out a hierarchy of measures to reduce the risks of manual handling. These are:

- 1. avoid hazardous manual handling operations so far as is reasonably practicable;
- 2. assess any hazardous manual handling operations that cannot be avoided;
- 3. reduce the risk of injury as far as is reasonably practicable.

In addition, employees have duties to take reasonable care of their own health and safety and that of others who may be affected by their actions. They must communicate with their employers so that they too are able to meet their health and safety duties.

Employees have general health and safety duties to:

- a) follow appropriate systems of work laid down for their safety;
- b) make proper use of equipment provided for their safety;
- c) cooperate with their employer on health and safety matters;
- d) inform the employer if they identify hazardous handling activities;
- e) take care to ensure that their activities do not put others at risk.

The Personal Protective Equipment at Work Regulations require employers and others to carry out an assessment to determine whether PPE is required and if so, what type is required for the job to be done. All PPE should be properly maintained, stored and worn. Appropriate information, instruction and training should be given to those using the equipment, so they know how to use it.

The Provision and Use of Work Equipment Regulations apply to all work equipment used within arboriculture including ropes, harnesses, strops, tools and plant. The regulations require employers to select suitable work equipment, maintain it and prevent access to dangerous parts of machinery, as well as setting out other duties concerning machinery controls and lighting. The regulations also set out requirements for the instruction, training and supervision of those using work equipment.

The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations require employers, and other people in control of work premises, to report and keep records of:

- a) work-related accidents which cause death;
- b) work-related accidents which cause certain serious injuries (reportable injuries);
- c) diagnosed cases of certain industrial diseases; and
- d) certain 'dangerous occurrences' (incidents with the potential to cause harm).

Reporting certain incidents is a legal requirement. The report informs the enforcing authorities (Health and Safety Executive, local authorities and the Office for Rail Regulation) about deaths, injuries, occupational diseases and dangerous occurrences, so they can identify where and how risks arise, and whether they need to be investigated. The reporting of accidents and incidents at work allows the enforcing authorities to target their work and provide advice about how to avoid work-related deaths, injuries, ill health and accidental loss.

The Work at Height Regulations apply to all work at height where there is a risk of injury in the event of a fall. The regulations set out arrangements required for the effective management of work at height. They cover selection, installation and use of work equipment and techniques for working at height, including tree climbing using a rope and harness (personal fall protection), and MEWP, platform and ladder use.

The Workplace (Health, Safety and Welfare) Regulations cover a wide range of basic health, safety and welfare issues and apply to most workplaces. Employers are required to demonstrate regulatory compliance with regard to issues relating to: ventilation, temperature, lighting, cleanliness, room dimensions, workstations and seating, floor conditions, gates and walls, windows, skylights and ventilators, traffic routes, sanitary conveniences, washing facilities and drinking water.

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PART 6: WORK EQUIPMENT STANDARDS

Abbreviations

BS	British Standard
EN	European Norm
ISO	International Organization for Standardization

BS EN 341	Personal fall protection equipment. Descender devices for rescue.
BS EN 353-1	Personal fall protection equipment. Guided type fall arresters including an anchor line. Part 1: Guided type fall arresters including a rigid anchor line.
BS EN 353-2	Personal protective equipment against falls from a height. Guided type fall arresters including a flexible anchor line.
BS EN 354	Personal fall protection equipment. Lanyards
BS EN 355	Personal Protective Equipment against falls from a height. Energy absorbers.
BS EN 358	Personal protective equipment for work positioning and prevention of falls from a height. Belts and lanyards for work positioning or restraint.
BS EN 360	Personal protective equipment against falls from a height. Retractable type fall arresters
BS EN 361	Personal protective equipment against falls from a height. Full body harnesses.
BS EN 362	Personal protective equipment against falls from a height. Connectors.
BS EN 363	Personal fall protection equipment. Personal fall protection systems.
BS EN 364	Personal protective equipment against falls from a height. Test methods.
BS EN 365	Personal protective equipment against falls from a height. General requirements for instructions for use, maintenance, periodic examination, repair, marking and packaging.
BS EN 564	Mountaineering equipment. Accessory cord. Safety requirements and test methods.
BS EN 565	Mountaineering equipment. Tape. Safety requirements and test methods.
BS EN 566	Mountaineering equipment. Slings. Safety requirements and test methods.
BS EN 567	Mountaineering equipment. Rope clamps. Safety requirements and test methods.
BS EN 795	Personal fall protection equipment. Anchor devices.
BS EN 813	Personal fall protection equipment. Sit harnesses.
BS EN 892	Mountaineering equipment. Dynamic mountaineering ropes. Safety requirements and test methods.
BS EN 1868	Personal protective equipment against falls from a height. List of equivalent terms.
BS EN 1891	Personal protective equipment for the prevention of falls from a height. Low stretch kernmantel ropes.
BS EN 12275	Mountaineering equipment. Connectors. Safety requirements and test methods.
BS EN 12277	Mountaineering equipment. Harnesses. Safety requirements and test methods.
BS EN 12278	Mountaineering equipment. Pulleys. Safety requirements and test methods.
BS EN 12841	Personal fall protection equipment. Rope access systems. Rope adjustment devices.
EN 15151	Mountaineering equipment. Braking devices. Braking devices with manually assisted locking, safety requirements and test methods.
ISO 22159	Personal equipment for protection against falls. Descending devices.

Arboricultural Association

The Malthouse, Stroud Green, Standish, Stonehouse, Gloucestershire GL10 3DL
Tel: **01242 522152** Email: admin@trees.org.uk Web: www.trees.org.uk

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