Further reading

Using petrol-driven chainsaws	AFAG301
Top-handled chainsaws	AFAG308
Aerial tree rescue	AFAG402
Emergency planning	AFAG802
Electricity at work: Forestry and arboriculture	AFAG804
Training and certification	AFAG805
First aid at work: Your questions answered	INDG214
Using work equipment safely	INDG229
Managing health and safety in forestry	INDG294
Protect your hearing or lose it!	INDG363
LOLER: How the Regulations apply to arboriculture	AIS30

These publications are available from HSE Books - see 'Further information'.

Notes

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Further information

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e-mail: hseinformationservices@natbrit.com or write to HSE Information Services, Caerphilly Business Park, Caerphilly CF83 3GG.

This leaflet contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do.

This leaflet is available in priced packs of 15 from HSE Books, ISBN 0 7176 2643 1. Single free copies are also available from HSE Books.

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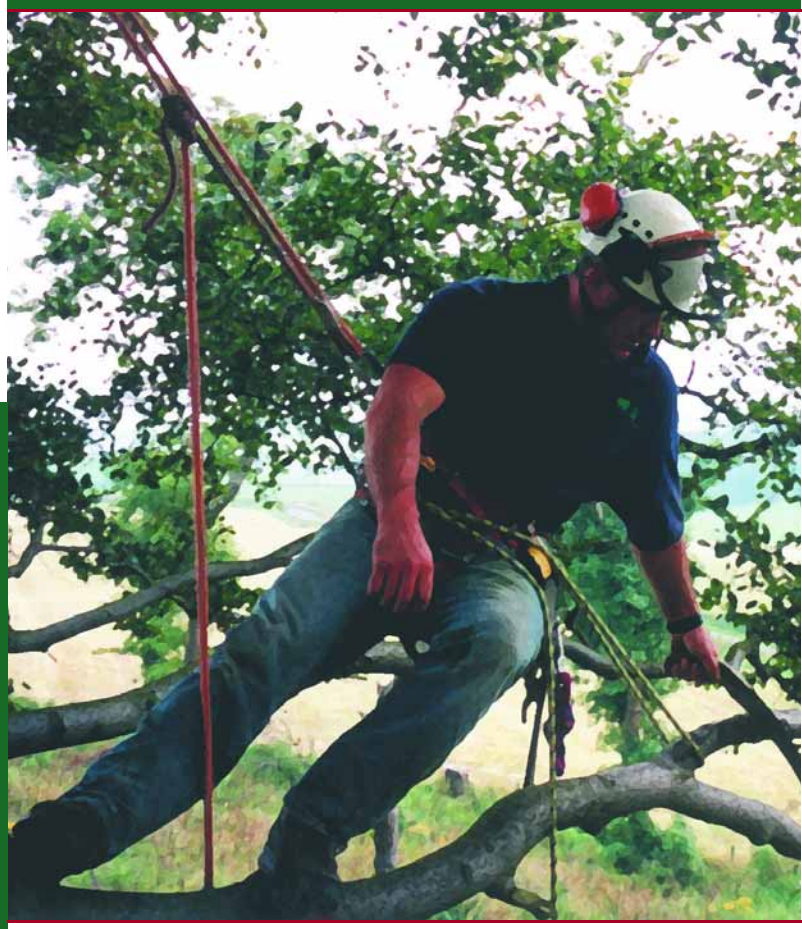
401

Tree climbing operations



AFAG
Arboriculture and Forestry Advisory Group

Introduction

This leaflet covers safe working practices, climbing procedures, ground staff and the use of some common climbing aids for tree-climbing operations. It is applicable where a risk assessment has determined that climbing is the appropriate access method to undertake the work.

This leaflet should be read in conjunction with AFAG leaflets 301 *Petrol-driven chainsaws*, 308 *Top-handled chainsaws* and 402 *Aerial tree rescue*.

You can use this leaflet, along with the equipment manufacturer's handbook, as part of the risk assessment process to help identify the controls to put in place when carrying out tree-climbing operations.

You must also assess the effect of the site and the weather as well as following this guidance.

Everyone engaged in tree-climbing operations must have had appropriate training in all the tasks required (see AFAG leaflet 805 *Training and certification*).

Chainsaw users and other ground staff should be particularly aware of the potential hazards of being cut by the saw, hit by timber and exposure to noise and vibration.

General

❑ **1** Identify the appropriate equipment, number of workers and skills required. **Aminimum of two people must be present during all tree-climbing operations. One of the ground team must be available, competent and equipped to perform an aerial rescue without delay** (see AFAG leaflet 402 *Aerial tree rescue*).

❑ **2** Everyone engaged in tree-climbing operations must be fit to undertake the task. Problems that could affect performance must be reported to management.

❑ **3** Climbing is physically demanding. Allow enough breaks in the work to minimise the risk of impaired judgement. It may be necessary to change the work method or introduce more breaks.

❑ **4** Climbers must be aware of the different characteristics of tree species and how these affect the work to be carried out. Climbers must also be able to recognise potential weakness caused by decay, damage or the structure of the tree.

❑ **5** Ensure a risk assessment has been carried out and the significant findings recorded. Make sure all workers involved in any operation on the worksite are made aware of and comply with the controls identified.

❑ **6** Climbers not specifically trained in utility work must observe the appropriate minimum distances for work adjacent to overhead power lines. Work may only proceed under the authority and guidance of the appropriate electricity company (see AFAG leaflet 804 *Electricity at work: Forestry and arboriculture*).

❑ **7** On all reasonably foreseeable approaches to the worksite, erect warning and prohibition signs conforming to the Health and Safety (Safety Signs and Signals) Regulations 1996, indicating a hazardous worksite and that unauthorised access is prohibited. In areas of very high public access, your risk assessment may indicate that additional controls (eg barrier tape, barriers, extra manning) are required.

❑ **8** Ensure all operations near to highways are adequately signed with appropriate notices as specified in the DTLR Code of Practice *Safety at street works and road works* (available from The Stationery Office ISBN 0 11 551958 0).

❑ **9** Ensure a designated and responsible person knows the daily work programme and agree with them a suitable emergency procedure. Where reasonably practicable use a two-way radio or mobile phone and a pre-arranged call-in system.

❑ **10** In case of emergency, be able to provide the emergency services with adequate information, eg a grid reference, the distance from the main road, the type of access (suitable for car/four-wheel drive/emergency service vehicles). In urban areas, street names are essential. Know the location details before they are needed in an emergency. (Also see AFAG leaflet 802 *Emergency planning*.)

Personal protective equipment (PPE)

❑ **11** **While no PPE can provide 100% protection against cuts from chainsaws**, chainsaw workers should use the following:

- Asafety helmet (complying with EN 397) with a suitable chinstrap when climbing.
- Eye protection (a mesh visor complying with EN 1731 or safety glasses to EN 166).
- Hearing protection (complying with EN 352).
- Gloves* with protective guarding on the back of the left hand for ground use of chainsaws (complying with EN 381-7). Chainsaw gloves are not essential for chainsaw use in trees.
- Leg protection* and groin protection (Type C for climbers, Type Aor C for ground staff) incorporating chain-clogging material (complying with EN 381-5).
- Protective boots* with good grip and protective guarding at front vamp and instep (complying with EN 345-2).
- Non-snag outer clothing. The use of high-visibility clothing may also be appropriate.

* The items marked with an asterisk should bear the chainsaw logo (see AFAG leaflet 301) and show the chain speed to which they have been tested.

❑ **12** Ground staff and climbers not using a chainsaw should wear the following:

- Asafety helmet (complying with EN 397) with a suitable chinstrap when climbing.
- Protective boots with good grip and ankle support (complying with EN 345-1).
- Non-snag outer clothing. The use of high-visibility clothing may also be appropriate.
- Suitable work gloves, not essential during tree climbing.

❑ **13** Each person should carry a personal first-aid kit including a large wound dressing (see HSE leaflet INDG214 *First aid at work: Your questions answered*).

❑ **14** All climbers should carry a suitable knife with a retractable blade.

❑ **15** Hand-cleaning material such as waterless skin cleanser or soap, water and paper towels should be readily available.

Work positioning system

❑ **16** Awork-positioning sit harness for tree climbing must have a pelvic attachment point and leg straps (see Figure 1). Some models are also fitted with shoulder straps (EN 813, EN 358).

❑ **17** Work-positioning equipment supports the climber when working in the tree. It is designed to be used only in situations where any potential fall is of limited distance and force.

❑ **18** When using work-positioning techniques, do not climb more than 250 mm above your anchor point. Keep the climbing rope taut. Any slack must not exceed 500 mm, to prevent injury from a free fall and the associated arrest forces.

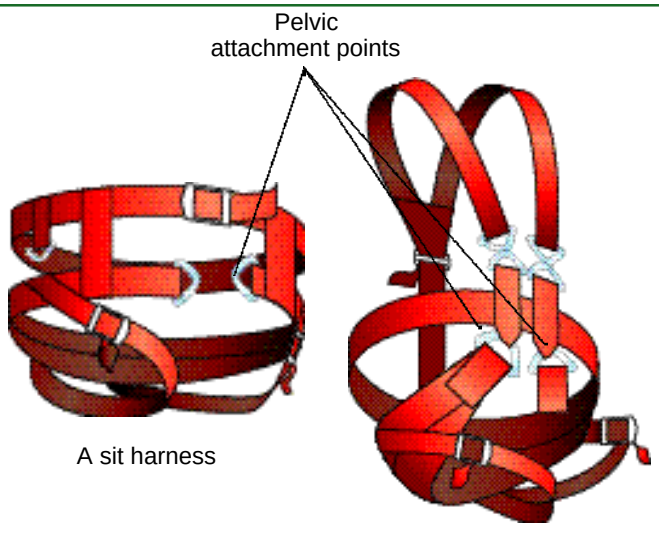


Figure 1 Work-positioning systems

Fall arrest systems

❑ **19** Afall-arrest system is made up of a full-body harness and an energy absorber (EN 361).

❑ **20** Fall-arrest equipment may be appropriate in unusual circumstances if climbers have to work above their anchor point, eg working in densely branched conifers, or rigging spar trees in forestry skyline operations. However, the extension of an energy absorber and the dangers of striking other parts of the tree in a fall, as well as the difficulties in achieving ergonomically acceptable working positions, must be considered in the risk assessment.

Climbing ropes

❑ **21** Select ropes to provide a high margin of safety. Ropes suitable for tree climbing must have a minimum diameter of 10 mm, although most tree-climbing ropes are at least 12 mm in diameter.

❑ **22** Rope or cord used for friction hitches must be of a suitable type and have a minimum diameter of 8 mm. Adiameter of 10 mm is recommended for normal commercial use. Friction hitch materials are subject to high levels of wear and should be replaced regularly, and in any case where significant wear is found.

❑ **23** Climbers must be fully aware of the characteristics and use of any knot, hitch and/or friction system. They should also be aware of how they perform in combination with other aids, eg a micro pulley. The climbing system used must lock and support the climber.

Karabiners

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

❑ **25** The weakest point of a karabiner is the gate. It is essential therefore that it is kept in correct alignment and loaded along its length (see Figure 2). It should not be ‘chain linked’(which can easily lead to twisting and associated pressure on the gate).

❑ **26** To minimise misalignment, ropes and friction hitches should be tightly attached to the karabiner using, for example, a larksfoot hitch.

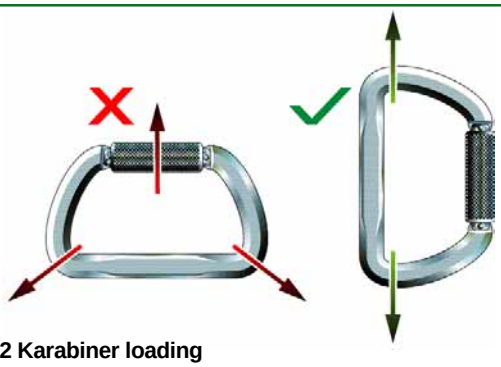


Figure 2 Karabiner loading

❑ **27** To ensure that karabiners are not subjected to a three-way loading, the attachment links on the harness may be connected using a 'maillon'.

Using ladders

❑ **28** Ladders must be checked for defects before use. Refer to the manufacturer's instructions. Also see HSE leaflet INDG229(rev1) *Using work equipment safely*.

❑ **29** Ladders are normally only used as a means of access into the crown of the tree. Once the climber is secured to the tree by rope/strop and harness, the ladder should be removed.

❑ **30** The manufacturer will specify the permitted overlap allowed between sections of an extension ladder. If in doubt, a minimum overlap of three rungs should be used.

❑ **31** When erecting a ladder for access into a tree, the top of the ladder should be set firmly, minimising the risk of the ladder twisting.

❑ **32** The base of the ladder should be positioned at a distance approximately one quarter the height of the ladder away from a vertical line dropped from the point of contact with the tree.

❑ **33** The unsupported part of the ladder must not touch any obstructions, even when loaded with the climber's weight.

❑ **34** The ladder should incorporate a non-slip or stabilising base and must be secured appropriately, either by being footed by a member of the ground staff, or by a rope being attached from the tree to the ladder base.

❑ **35** Extended ladders too heavy or too long to be taken away from the tree by ground staff should be lowered using a rope tied to the ladder and passed over a convenient branch.

❑ **36** When using a ladder for ascent into a tree, the climber must be secured to the tree before leaving the top of the ladder or carrying out any other work.

❑ **37** Remove ladders and store them out of the work zone when not in use.

❑ **38** If work is to be carried out standing on a ladder, the climber must be secured onto the tree by rope/strop and harness. In such cases the ladder should be secured at the top before work starts.

Using climbing irons

❑ **39** When using climbing irons the climber should be secured to the tree with a climbing rope and strops. When using a chainsaw, a wire or wire-reinforced strop should be used.

❑ **40** When ascending, the climber must be adequately secured and remain tied to the tree when passing branches and other obstructions.

❑ **41** The means of attachment to the tree should be adjustable to allow for the taper of the trunk and for passing the rope over small obstructions such as branch stubs.

❑ **42** The climbing rope and/or strop must only be connected to approved climbing attachment points on the harness.

❑ **43** When cutting with a chainsaw, check that the rope and wire strop are not at risk of being cut by the chainsaw.

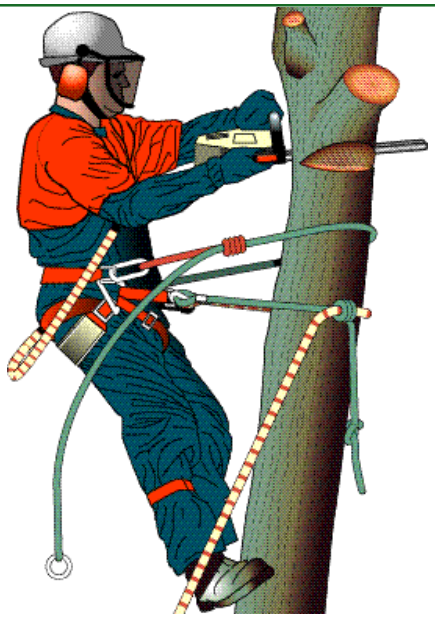


Figure 3 Section felling using spikes

Preparing to climb

❑ **44** All items of climbing equipment must be used according to the manufacturer's instructions and no structural alterations to any item should be made.

❑ **45** Climbing equipment must only be used for its intended purpose.

❑ **46** Climbing equipment must be checked every time before use. For example, the climbing rope, climbing rope hitches, and rope strops must be given a close visual and tactile inspection along their complete length looking for:

- cuts;
- frays;
- glazing;
- condition of eye splices;
- contamination; or
- any other defects.

❑ **47** Check other equipment for excessive wear or damage, for example:

- damaged stitching, cuts or fraying on a harness;
- the general condition and stitching on webbing strops;
- the general condition of karabiners. The karabiner gate and barrel must be checked to see that it functions correctly, ie it closes fully by the return spring without sticking;
- the general condition and serviceability of all climbing aids.

❑ **48** As well as pre-use inspection, the Lifting Operations and Lifting Equipment Regulations 1998 (LOLER) require that a weekly inspection of equipment subject to high levels of wear and tear should be recorded, and that climbing equipment should be 'thoroughly examined'by a 'competent person'every six months (see HSE Information Sheet AIS30 *LOLER*: *How the Regulations apply to arboriculture*).

❑ **49** Any equipment that becomes defective must be withdrawn from use. Withdrawn equipment should be destroyed or marked, so that it cannot be used by mistake.

❑ **50** All safety equipment and protective clothing should be kept clear of cutting tools, fuel, chemicals and any other potential hazards at all times while on site and during storage or transit.

❑ **51** The climber must check that ground staff are aware and ready before starting any work operation.

Anchor points

❑ **52** Whatever method of climbing or ascent is used, anchor points must be selected carefully.

❑ **53** The choice of anchor involves assessing its strength and suitability in relation to its intended purpose.

❑ **54** Amain anchor in the tree must be strong enough to withstand significant lateral (ie sideways) force as well as the maximum possible loadings encountered during climbing operations.

❑ **55** If in doubt about the strength or suitability of a branch to be used as an anchor, the climbing rope (or adjustable strop, or false anchor) should be passed around the main stem, above the anchor branch.

❑ **56** Supplementary anchor points must be strong enough to support the climber's weight, but will not be subjected to any significant lateral force. The supplementary system may take the form of a short adjustable strop, a redirect, a steel-cored adjustable flip line or a complete secondary rope system.

❑ **57** Once in the tree, supplementary anchors should be installed where the risk assessment dictates. For example:

- where there is a risk of the climbing rope being cut;
- where the strength of the anchor point may be compromised or uncertain.

❑ **58** It is expected that supplementary anchors should normally be used, unless the risk assessment identifies the need for the climber to be able to move freely, for example where there is a risk of a cut section striking the climber.

Ascent

❑ **59** The climber must be securely attached to a suitable anchor point at all times by means of a climbing rope, safety strop(s) and harness.

❑ **60** When changing anchor points, climbers should transfer their weight to the newly established rope system before releasing the original anchor.

❑ **61** The climber must ascend to a suitable anchor point, always maintaining a secure attachment, and 'tie-in'before moving to the working position.

Movement within the tree

❑ **62** The climber must be securely anchored to the tree by the climbing system which must be kept as taut as possible.

❑ **63** When changing position the climbing rope must be re-routed as necessary and placed in a safe position.

❑ **64** The climber removing sections of the tree should habitually check the position of their anchor point, especially that it is not snagged on a weak shoot or dead branch that may give way, and that the climbing rope will be free from falling debris.

Descent

❑ **65** Before descent, the climber must check the climbing system is of a suitable length. The climbing system must be terminated in a way that prevents accidental release of the climbing knot or descender.

❑ **66** The climber must descend to the ground in a controlled manner to avoid excessive friction heat.

Working with tools in the tree

❑ **67** Ensure all equipment is serviceable before being passed up to the climber.

❑ **68** The climber and ground staff team should be aware of risks from falling debris or equipment.

❑ **69** Equipment should be transferred to the climber using the climbing rope or a separate tool line. Equipment should be attached so it does not damage the rope.

❑ **70** In many instances, tree-pruning work can be safely and efficiently carried out with hand saws, eliminating chainsaw hazards, eg noise, vibration and fumes. However, the risks of cut injury, particularly to the hand holding the material being cut, can be serious, and appropriate PPE should be worn.

- ❑ **71** Chainsaws must be checked, started, warmed up and turned off by ground staff before being passed up to the climber.
- ❑ **72** Tree work requiring the use of a chainsaw should be carried out only by a trained and competent climber who has experience in chainsaw use or by a trainee under supervision who is competent using a chainsaw on the ground.
- ❑ **73** Operators should use chainsaws of an appropriate size and configuration for the material being cut in the tree. The chainsaw must be started and operated in the tree in an approved manner (see AFAG leaflets 301 *Using petrol-driven chainsaws* and 308 *Top-handled chainsaws*).
- ❑ **74** Where the operation dictates that a larger rear-handled chainsaw is required, the method of use should be carefully considered, eg the starting and work position, and control of the saw.

Ground work What ground staff must do

- ❑ **75** Plan the job with the climber(s) before the work starts and be aware of the task(s) involved.
- ❑ **76** Maintain effective communication with the climber(s).
- ❑ **77** Maintain concentration and watch the climber(s). Anticipate their needs, passing up tools and other equipment.
- ❑ **78** Keep climbing and work ropes on the ground free of knots, kinks, tangles, debris and branch wood, and clear of machinery.
- ❑ **79** Keep ropes in safe positions away from obstructions, vehicles, equipment and colleagues.
- ❑ **80** Ensure the precautions taken to exclude the public and traffic from the work area are maintained while work is in progress.
- ❑ **81** Keep tools and equipment not in use away from the immediate work area.
- ❑ **82** Control working ropes, but do not wrap a rope around any part of the body to gain extra grip or purchase.

Notes

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