

Further reading

<i>Management of electricity at work: Forestry and arboriculture</i>	978 1 9017 5800 9
<i>Emergency planning</i>	AFAG802
<i>Training and certification</i>	AFAG805
<i>Management of health and safety in forestry</i>	INDG294
<i>Avoiding danger from underground services</i>	978 0 7176 1744 9

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Notes

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Electricity at work: Forestry and arboriculture



Further information

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

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Introduction

This leaflet covers the safe working practices to be followed by those working near energised overhead power lines and underground power cables in forestry and other tree work.

Where it is necessary to work in close proximity to overhead power lines, agreement should be reached with the owner of the line, usually the electricity company, for the power to the lines to be disconnected. Where it is not possible to disconnect the power, follow the precautions in this leaflet.

More detailed guidance is available in the AFAG priced booklet *Management of electricity at work: Forestry and arboriculture*.

Arborists must follow the electricity industry Code of Practice for establishing and maintaining clearances of trees to overhead power lines (Energy Networks Association Engineering Recommendation G55/1 *Safe tree working in proximity to overhead electric lines* available to buy on www.energynetworks.org).

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

All operators must have had appropriate training in how to operate any equipment or machinery and how to carry out the tasks required (see AFAG leaflet 805 *Training and certification*).

Hazards involved

- ❑ **1** Contact with overhead power lines causes fatal or severe electric shock and burn injuries. This can also happen when a person or object is close enough to a line for a flashover to occur. Striking underground cables frequently leads to burn injuries from the resulting 'explosion' and may also result in electric shock if contact is made with live conductors.

Worksite planning

- ❑ **2** Find out the routes of **all** overhead and underground power lines that cross through or near the worksite and access routes. Clearly mark these on the site map.
- ❑ **3** Establish, in consultation with the electricity company, the minimum safe clearance distance for driving alongside the lines and the maximum safe height for passing under the lines. Clearly mark these on the site map.
- ❑ **4** Ensure there is a warning notice prominently displayed inside the cab of all machines that may have to work in the vicinity of overhead power lines. The notice should give the maximum working height of the machine and the maximum height in the transport position.
- ❑ **5** Organise operations within the worksite to minimise the need for mobile equipment to pass below or close to overhead power lines.
- ❑ **6** Do not reduce the clearance between the ground and overhead power lines in any way, eg by creating brash mats.

- ❑ **7** You must consult the electricity company before erecting or dismantling fences within 40 m of overhead power lines. Voltages that can cause an electric shock may be induced in the fence.
- ❑ **8** Agree and instigate a suitable emergency procedure with the electricity company in case of accidental contact or damage to the power lines.

Access routes

- ❑ **9** Where overhead power lines cross the access road to a worksite, prominently display warning notices at each side of the lines. These should clearly identify the maximum safe height for vehicles passing under the lines.
- ❑ **10** When travelling to and from a worksite, machine attachments and loads must be kept below the maximum safe height.

Within the worksite

- ❑ **11** Within the worksite, clearly identify the safe clearance distance for driving alongside overhead power lines by providing suitable barriers. In many cases, marked trees will form a suitable barrier, as long as there is no opening which would allow vehicular access. The absolute minimum driving distance from the barriers to the overhead line is 6 m. The electricity company may advise distances greater than 6 m depending on the voltage of the overhead line.
- ❑ **12** Erect goalposts at all points within a worksite where it is necessary to cross below overhead power lines. Ensure that barriers exist or are provided to prevent any crossing other than at the designated crossing points.
- ❑ **13** Goalposts also need to be erected where lines cross any route that is used to move between adjacent worksites.
- ❑ **14** When close to overhead power lines move ladders, scaffold poles, other poles or any long objects horizontally and keep them as low as possible.

Underground cables

- ❑ **15** Before you start any digging operation ensure there are no underground power cables where you are working. Check with the site manager or on maps and use location devices to confirm there are no cables.
- ❑ **16** Where digging work must be carried out in the vicinity of underground cables, consult the owner of the cables and carry out the safe digging procedures detailed in the HSE Guidance book HSG47 *Avoiding danger from underground services*.

Tree-felling operations

- ❑ **17** You must not undertake any felling work (using a mechanical harvester or chainsaw) within two tree lengths of overhead lines (see Figure 1) without consultation between the site manager and the electricity company.

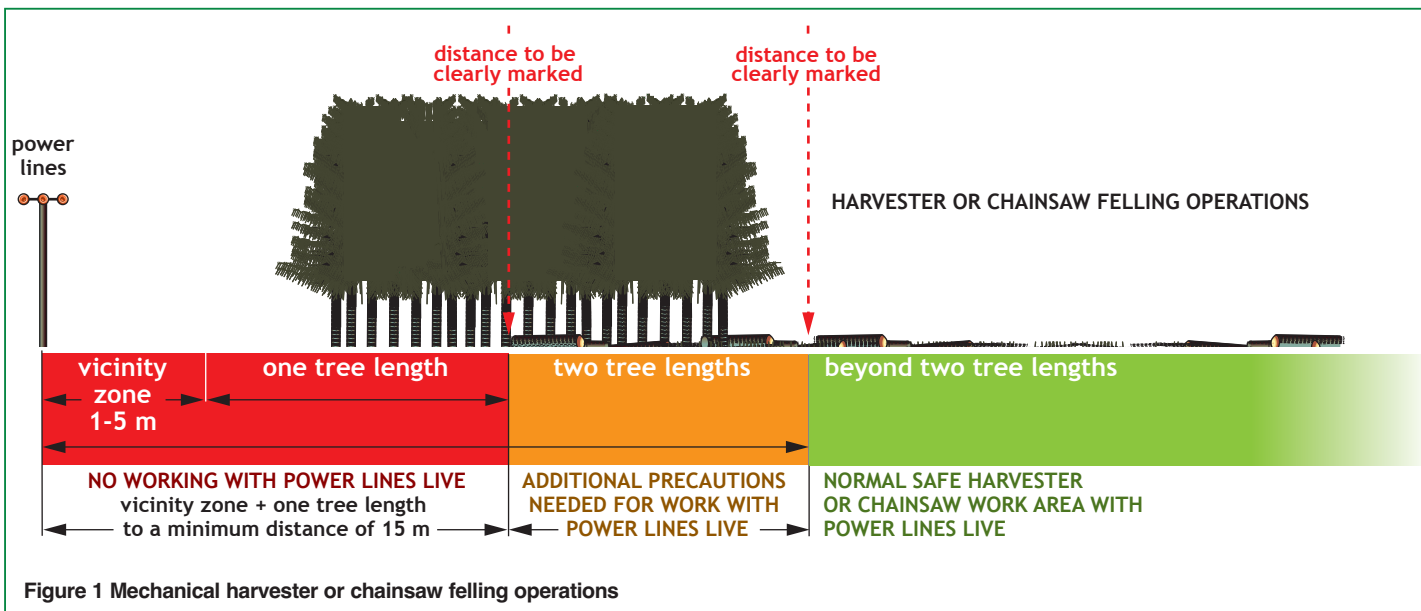


Figure 1 Mechanical harvester or chainsaw felling operations

18 Do not fell trees that are **within two tree lengths** of an energised overhead power line without first consulting the electricity company. Where the company indicates that the power to the line cannot be disconnected for the duration of the work, agree a safe working procedure that incorporates the following precautions:

- No trees to be felled if any part of the machine or the tree can come **within one tree length + the vicinity zone** (down to a minimum distance of 15 m) of an energised overhead power line (see Figure 1). The vicinity zone will vary between 1 and 5 m depending on the line voltages (see Table 1).
- Only fell trees parallel to or away from energised lines.
- Ensure you use only trained and competent operators with the relevant Chainsaw or Forestry Machine Operator Certificate of Competence and electrical awareness training from the electricity company.
- Assess and take account of the site and the ground conditions.
- Assess the weather conditions and ensure the wind direction does not affect control of the felling direction.

19 Clearly mark the limit of normal working (**two tree lengths**) and the limit of work with the overhead lines energised (**one tree length + the vicinity zone**). Marked trees, high-visibility tape or another suitable marking method should be used as well as organised felling and extraction routes (see Figure 1).

Table 1 Vicinity zone distances

Nominal system voltage (kV)	Minimum distance for vicinity zone (metres)
Up to and including 1 kV	1 m
Exceeding 1 kV but not exceeding 11 kV	2 m
Exceeding 11 kV but not exceeding 33 kV	2.5 m
Exceeding 33 kV but not exceeding 66 kV	3 m
Exceeding 66 kV but not exceeding 132 kV	3.5 m
Exceeding 132 kV but not exceeding 275 kV	4 m
Exceeding 275 kV but not exceeding 400 kV	5 m

Timber extraction operations

20 Do not operate a skidder unit or forwarder if any part of the machine or its load can come within one tree length + the vicinity zone (down to a minimum distance of 15 m) of energised overhead power lines (see Figure 2).

21 If you are using a cable crane system:

- it must not cross the route of overhead power lines;
- maintain a safe working distance between the cable crane system and any energised overhead power lines;
- consult the electricity company and agree the safe working distance between the type of cable crane system being used and the overhead power lines;
- **do not transport a cable crane with the mast raised.**

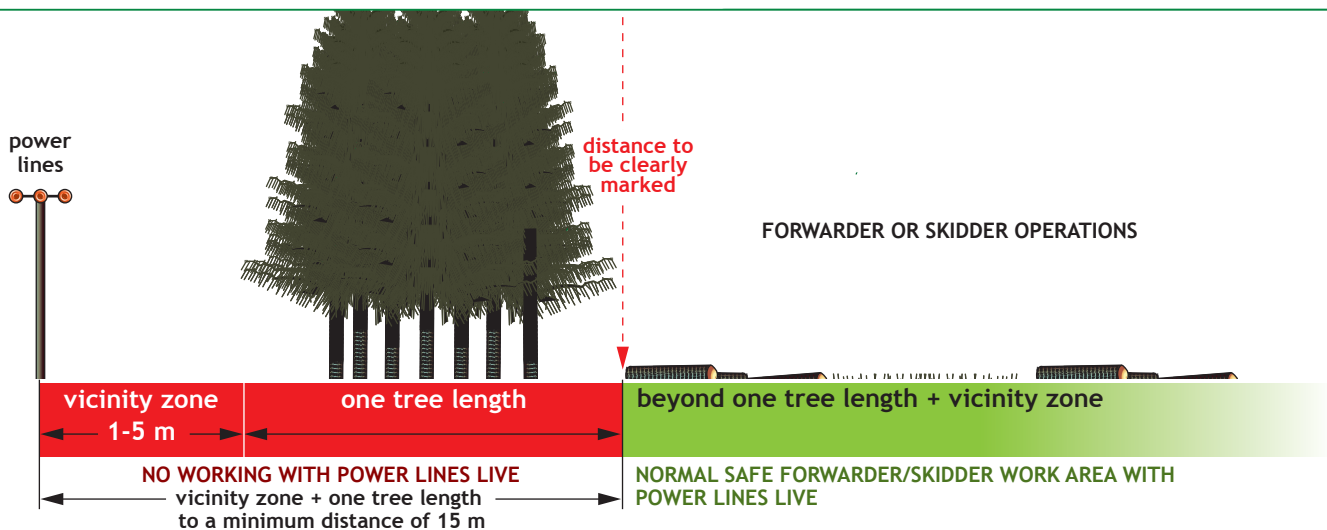


Figure 2 Skidder or forwarder extraction operations

Arboricultural operations

- 22 You must not undertake arboricultural pruning or dismantling work if any part of the tree is or can come within 15 m of overhead power lines, unless you have consulted the electricity company and follow the precautions contained in the Energy Networks Association Engineering Recommendation G55/1.
- 23 For arboricultural felling operations at ground level, follow the guidance given in 'Tree-felling operations' above.

Aerial operations

- 24 Aerial spraying or fertilising contractors must follow the nationally agreed procedures dealing with aerial spraying/fertilising in the vicinity of overhead power lines. The electricity company must have been consulted before operations start.

What to do in an emergency

- 25 After an incident in which the circuit-breaker protecting the line has operated, power may be restored to the line automatically or by remotely located control room operators. This means that lines either are, or will become live at any time, unless an accidental contact has been properly reported or arrangements have been made in advance with the electricity company to prevent the re-energisation from happening.
- 26 Do not go near or touch any person, machine, other plant or tree that is touching or very near a power line, until advised by the electricity company that it is safe to do so. Warn others to keep away.
- 27 The operator of a machine that is in contact with an overhead power line should:

- if the machine is operable:
 - lower any raised parts that are controlled from the driving

position, and/or drive the machine clear of the line, as long as neither of these actions risk breaking the line or dragging it to ground level;

- contact the site manager and/or electricity company immediately by radio or mobile phone, or as soon as possible by any other method.
- if the machine is not operable (or cannot be driven free of the line):
 - stay in the cab;
 - contact the site manager and/or electricity company immediately by radio or mobile phone, or as soon as possible by any other method;
 - instruct everyone outside the vehicle not to approach it;
 - do not exit the cab until given confirmation that the power line is de-energised.
- if the machine is not operable (or cannot be driven free of the line) and there is a risk of fire or other immediate hazard:
 - jump clear of the machine avoiding simultaneous contact with any part of it and the ground;
 - land with the feet kept as close together as possible;
 - where possible continue to 'bunny hop' with the feet together until well away from the machine;
 - warn other people not to approach the vehicle;
 - do not return to the machine until given confirmation that the power line is de-energised;
 - contact the site manager and/or electricity company immediately by radio or mobile phone, or as soon as possible by any other method.
- 28 After any vehicle has been safely cleared of the power lines, it must be checked by a competent person to ensure it is working properly before returning to normal use.