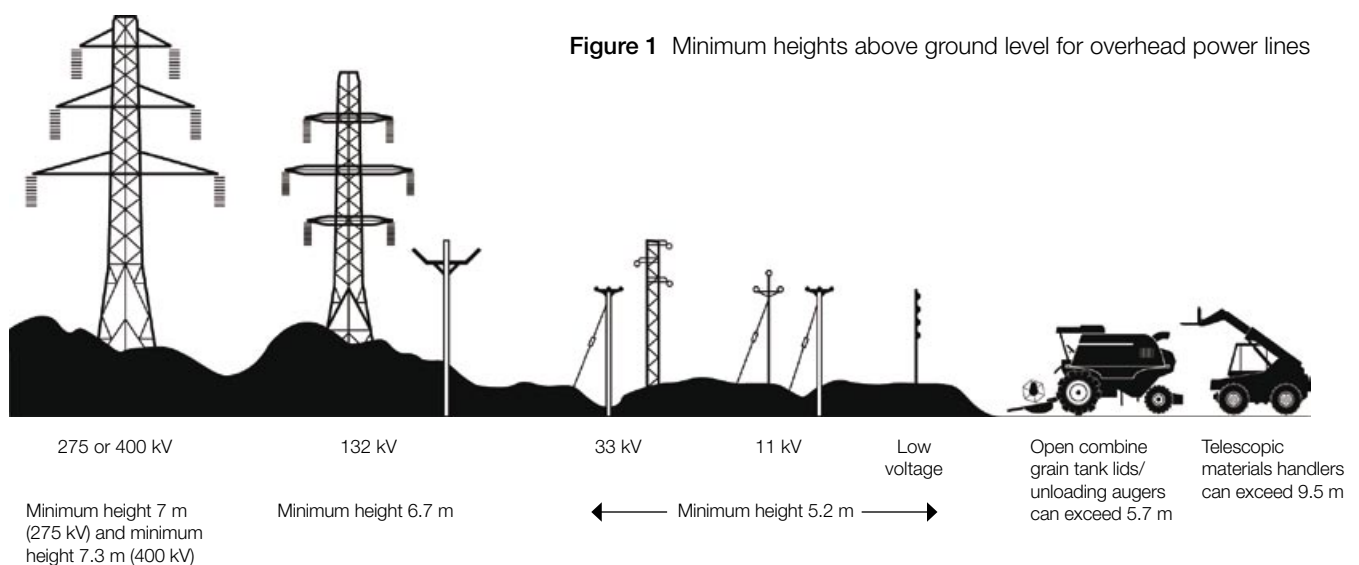


Working safely near overhead electricity power lines

HSE information sheet

Agriculture Information Sheet No 8



Introduction

This information sheet is aimed at everyone in agriculture who may work near overhead electricity power lines (OHPLs) and outlines what you can do to reduce the risks of electric shock when working near them. If a machine or other conductive item of equipment comes into contact with a live OHPL, electricity will be conducted through it to earth. You do not need to touch the line, as in some circumstances electricity can flashover or arc (it can jump across gaps). Anyone touching a machine or equipment in these circumstances risks a serious or fatal electric shock.

Hazards

OHPLs typically carry electricity at voltages from 11 kV to 400 kV. The lines are often uninsulated (bare) cables. Touching anything in contact with live electrical equipment (even at the lowest voltage) can be fatal. The height of the line varies according to the voltage carried (see Figure 1) so for example any 11 kV or 33 kV OHPL on your land should be at least 5.2 m above the ground. Electrical equipment mounted on poles may be lower

than the clearances specified in this guidance. Although the minimum heights of OHPLs may be adequate for most work activities, there are many agricultural machines that are capable of reaching or touching OHPLs or pole-mounted equipment, including:

- rough terrain fork lift trucks and telescopic materials handlers;
- combine harvesters;
- self-propelled harvesters, eg forage harvesters, beet harvesters etc;
- crop sprayers;
- tractors and tractor-mounted fore end loaders.

Remember that the overall height of a machine may be increased by fitting radio aerials, flashing beacons or in the case of combine harvesters, when the discharge auger or grain tank extensions are used.

Other machines often used in agriculture are capable of reaching an OHPL, including:

- construction plant, such as excavators or diggers;
- goods vehicles with tipping bodies or trailers;
- lorry-mounted or self-propelled cranes or grabs.

Some agricultural activities may also create a risk of contacting OHPLs, including:

- operating rain or slurry guns;
- tipping trailers;
- moving irrigation pipes or long boom irrigators;
- building temporary stacks or structures, eg bales, fertiliser, potato boxes;
- moving aluminium ladders or scaffold poles;
- construction work including erecting steel-framed buildings;
- erecting polytunnels and temporary structures;
- fishing (electricity can pass through rods/poles).

Working safely: Assessing the risks

Before you start work near OHPLs, you should assess the risks. To help do this you should:

- find out the maximum height and maximum vertical reach of your own and your contractors' machines;
- find out the routes of all OHPLs on your land or near your boundaries and mark them on the farm map;
- make sure you have information about all the lines on your land – if not, contact their owners;
- make sure you have details of the maximum working heights permitted under each span of OHPL on your farm and next to each structure. Record these on the farm map. The map can then be used as a reference when assessing risks, planning cropping or other work, instructing machine operators and contractors, planning access routes or buying new or used equipment;
- get advice from the electricity distribution network operator (DNO) and/or the National Grid on line heights, minimum vertical clearance distances and precautions to take. DNOs can also arrange to have the height of the lines checked. Operating voltages are displayed on signs attached to steel towers;
- look at the guidance produced by the Energy Networks Association on clearance distances (see 'Further reading').

Control measures

When considering what you need to do to work safely, you should follow the preferred hierarchy of measures described below:

- The safest option is always to avoid working near OHPLs if you can. Creating alternative access routes or work areas to avoid OHPLs is often the easiest and cheapest option.

- Consider re-routing or burying OHPLs in certain locations, such as farmyards or silage clamps where machines often pass below the lines. Consult the DNO for advice and do not attempt to do this work yourself.
- Where you cannot relocate OHPLs, select machines that can safely pass below the lines without being able to reach the vertical clearance distance.
- For some short duration work activities you may be able to get the power supply switched off. Speak to the DNO for advice.
- Where you cannot avoid working near OHPLs, you will need to carry out a risk assessment and implement a safe system of work.

Key factors to consider for safe work near OHPLs

Selecting suitable machinery

Larger farm machinery has increased the risks of contacting OHPLs. You can reduce the risks of contact or flashover greatly by selecting machinery that will not reach more than 4 m from the ground. Check the working heights of machines and the maximum heights that any folding or extending elements can reach. Check with the manufacturer or supplier if necessary to obtain these details and check these heights against the clearances marked on the farm map to identify areas of risk. Consider line heights when you buy new or replacement machinery.

Safe use of machinery and equipment

Moving equipment or machinery when extensions are raised could bring it into contact with OHPLs. Reduce risks by making sure machines can operate safely near OHPLs. For example:

- retract the booms of telescopic handlers and keep them close to the ground when the vehicle is moving;
- lower grain tank lids and ensure that unloading augers on combines are stowed and not in the extended/unloading position;
- use sprayers with horizontally folding booms and never fold vertical sprayer booms on the move;
- fit shorter radio aerials and beacons, reposition or remove existing ones on high machines, so they cannot cause danger;
- take care not to damage poles and stays.

Remember that risks increase at dusk, in darkness or in poor visibility when it becomes harder for machine operators to see OHPLs.

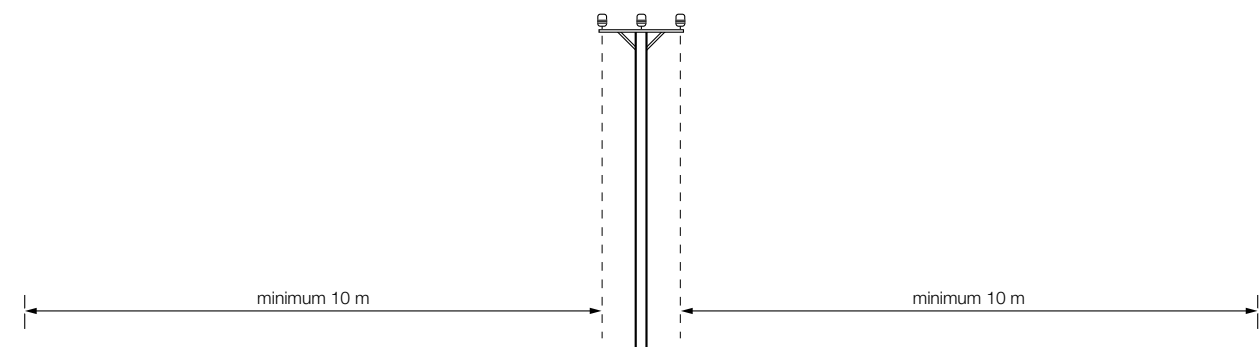


Figure 2 Minimum horizontal distances to overhead power lines

Safe work activities

Risks can be reduced if the following activities are not carried out within a horizontal distance of at least 10 m from OHPLs. These distances should be measured from the line of the nearest conductor to the work, projected vertically downwards onto the floor, and perpendicular to the route of the line (see Figure 2). The activities are:

- stacking materials, eg bales, fertiliser bags or potato boxes etc;
- erecting temporary structures, eg polytunnels;
- folding sprayer booms;
- tipping trailers or lorries with tipping bodies;
- operating materials handlers or lift trucks;
- working on top of combines or other high machinery;
- moving ladders, irrigation pipes or scaffolding;
- tree work.

If you cannot avoid carrying out any of these work activities closer than 10 m, consult your DNO for advice. If the line cannot be moved or made dead you will need to assess the risks and agree a safe system of work. This may involve the erection of barriers to keep machinery a safe distance away from OHPLs, and other precautions as described in the HSE guidance note *Avoidance of danger from overhead electric power lines* (see 'Further reading').

Rain and slurry guns

- Position rain and slurry guns so that jets of water or slurry cannot contact OHPLs when they are in use.
- Guns should travel parallel to OHPLs, not below them.
- Check that jet breaker devices are working, as a continuous jet in contact with an OHPL could cause the equipment to become live.
- Slurry guns should not come within 30 m of an OHPL and this distance should be increased in high winds to take account of slurry being carried further by the wind.

Long boom irrigators

- When a machine is being moved or used, keep it under close observation and control.
- Booms should have a nylon or polypropylene control rope at each end.
- If a boom is assembled or dismantled on site this should be done at least 10 m away from OHPLs.
- Check that the jets are not near OHPLs and that jet breaker devices are fitted and working.

Sprinklers

- Do not store pipes under or close to OHPLs.
- Always move irrigation pipes horizontally, using two people to carry them as low as possible.
- Plan the layout of the system carefully, so risks are minimised when putting pipes in position.

Fencing

- If fencing wire is being stretched, it could spring upwards and come into contact with OHPLs, so always keep the wire under control.
- Long runs of wire on undulating ground or hillsides present an increased risk, so anchor the fence securely at several points.

Stacks and temporary structures

- Before building a stack or other temporary structure, plan where to locate it to avoid OHPLs. Do not site them in areas where machines such as telescopic handlers will need to travel underneath OHPLs to get to them.
- Avoid creating clamps below OHPLs, as vehicles rolling the clamp or trailers tipping grass etc will be at risk.
- Silos or bins should be sited so bulk feed delivery vehicles or trailers can tip safely.

Construction work

- There may be occasions when construction work has to be carried out, eg erecting farm buildings, excavation work for laying pipes etc which means machines or vehicles pass near OHPLs. In such cases, you and your contractors should follow the precautions set out in *Avoidance of danger from overhead electric power lines* (see 'Further reading').

Information, instruction and training

After assessing the risks and planning how to do the work safely, you will need to make sure anyone working near OHPLs with a machine or work equipment is provided with information about the hazards, the risks and the precautions to follow, including what to do if they contact the line.

Contractors and temporary staff may be at an increased level of risk when they work on your farm, so make sure they know where the lines are and discuss and agree with them the precautions they need to take before they start work. More detailed instructions may be needed for those workers whose first language is not English.

The location of OHPLs can be highlighted by displaying suitable hazard warning signs in prominent positions and supplementing them with appropriate text, eg '**Danger – overhead power lines**'.

If you come into contact with an OHPL

- Stay in the cab of the machine and lower any raised parts in contact with the line or try to drive the machine clear, if you can.
- Inform the DNO immediately (display the telephone number in the cab or keep it on your mobile phone).
- Electrocutation is possible if anyone touches both the machine and the ground at the same time. If you need to get out jump well clear so that no simultaneous contact is made between you, the vehicle and the ground. Do not touch any wires. Stay clear and warn others not to approach.
- Get the DNO to disconnect the supply. Even if the line appears dead, do not touch it, or any part of the machine. Contact with the line may cause the power supply to trip out temporarily and it may be reconnected and re-energised automatically, without warning.
- Never touch an overhead line that has been brought down by machinery, or has fallen, eg in a storm. Do not try to disentangle equipment, until you have received confirmation that the line has been de-energised and made safe.

Further reading

Avoidance of danger from overhead electric power lines General Guidance Note GS6 HSE Books 1997 ISBN 978 0 7176 1348 9 www.hse.gov.uk/pubns/books/g6.htm

Information is also available from the Energy Networks Association (ENA): www.energynetworks.org and the Distribution Network Operators publish information on their own websites. Safety information is also available from the National Grid at www.nationalgrid.com/uk/electricity

Safety information for farmers and agricultural contractors ENA 2007 www.energynetworks.org

Safety information for farmers utilising polytunnels ENA 2008 www.energynetworks.org

Overhead line clearances - ENA Technical Specification 43-8 – specifies minimum vertical clearances for vehicles/machines passing below OHPLs.

Further information

For information about health and safety, or to report inconsistencies or inaccuracies in this guidance, visit www.hse.gov.uk/. You can view HSE guidance online and order priced publications from the website. HSE priced publications are also available from bookshops.

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

This document is available at www.hse.gov.uk/pubns/ais8.htm

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