

1. PURPOSE

This document provides guidance and sets out the arrangements that shall be followed when work is planned to be undertaken near to any overhead electricity power lines and where there is a risk of contact with those power lines. This document describes the steps that should be taken to prevent contact with them.

If contact is made with or if people or equipment come too close to a live overhead electricity power line, then there is a risk of serious injury, including fatality, severe shock and/or burns to a person as well as potential damage to infrastructure and plant.

2. SCOPE

These arrangements apply to all circumstances when work is planned to be undertaken near to any overhead electricity power lines.

Note: This does not include 25kV AC Overhead Line Equipment (OLE) which are covered by the following documents:

- RSSB GE/RT8000 Handbook 16 AC Electrified Lines
- NR/SP/ELP/29987 Working on or about 25kV AC Electrified Lines
- NR/L3/ELP/SAI25 Working on or about Overhead Line Equipment

3. REFERENCES (INPUTS) / RELATED DOCUMENTS

- The Health and Safety at Work Act 1974
- The Management of Health and Safety at Work Regulations 1999
- The Electricity at Work Regulations 1989
- Construction (Design and Management) Regulations 2015
- HSE Guidance Note GS6 (Fourth edition) Avoiding danger from overhead power lines
- The Provision and Use of Work Equipment Regulations 1998 (PUWER).
- The Provision and Use of Work Equipment Regulations 1998 - Approved Code of Practice and guidance L22
- GE/RT8000 RSSB Rule Book
- RIS-1700-PLT Safe Use of Plant for Infrastructure Work
- NR/L2/OHS/019 - Safety of People at Work on or Near the Line
- SAF19 - Planning & Delivering Safe Work
- SAF30 - Risk Assessments
- PE326 - Vehicular Plant and Crane Operations
- ENA Technical Specification 43–8 Overhead Line Clearances
- Look Out Look Up! A Guide to the Safe Use of Mechanical Plant in the Vicinity of Electricity Overhead Lines Energy Networks Association (ENA)

4. DEFINITIONS

None

5. PROCESS
5.1 Background

Every year people at work are killed or seriously injured when they come into contact with live overhead electricity power lines.

These incidents often involve:

- machinery, e.g. cranes, lorry-loader cranes, combine harvesters, MEWP's, tipping trailers etc.;
- equipment, e.g. scaffold tubes and ladders;
- work activities, e.g. loading, unloading, lifting, spraying, and stacking.

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If a machine, scaffold tube, ladder, or even a jet of water touches or gets too close to an overhead power line, then electricity will be conducted to earth. This can cause a fire or explosion and electric shock and burn injuries to anyone touching the machine or equipment. An overhead power line does not need to be touched to cause serious injury or death, as electricity can flashover across small gaps.

Overhead power lines and cables must be considered to be 'live' at all times, unless notified otherwise in writing (usually by the relevant permit to work) by the owners of the overhead power lines.

5.2 Types of Overhead Power Lines and Their Heights



Figure 1 - 275kV Transmission Line

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Figure 2 - 11kV Distribution Line



Figure 3 - 400V Distribution Line

5.2.1 Minimum heights above ground level for overhead power lines

There is a legal minimum height for overhead power lines which varies according to the voltage carried.

Generally, the higher the voltage, the higher the wires will need to be above ground. Equipment such as transformers and fuses attached to wooden poles and other types of supports will often be below these heights.

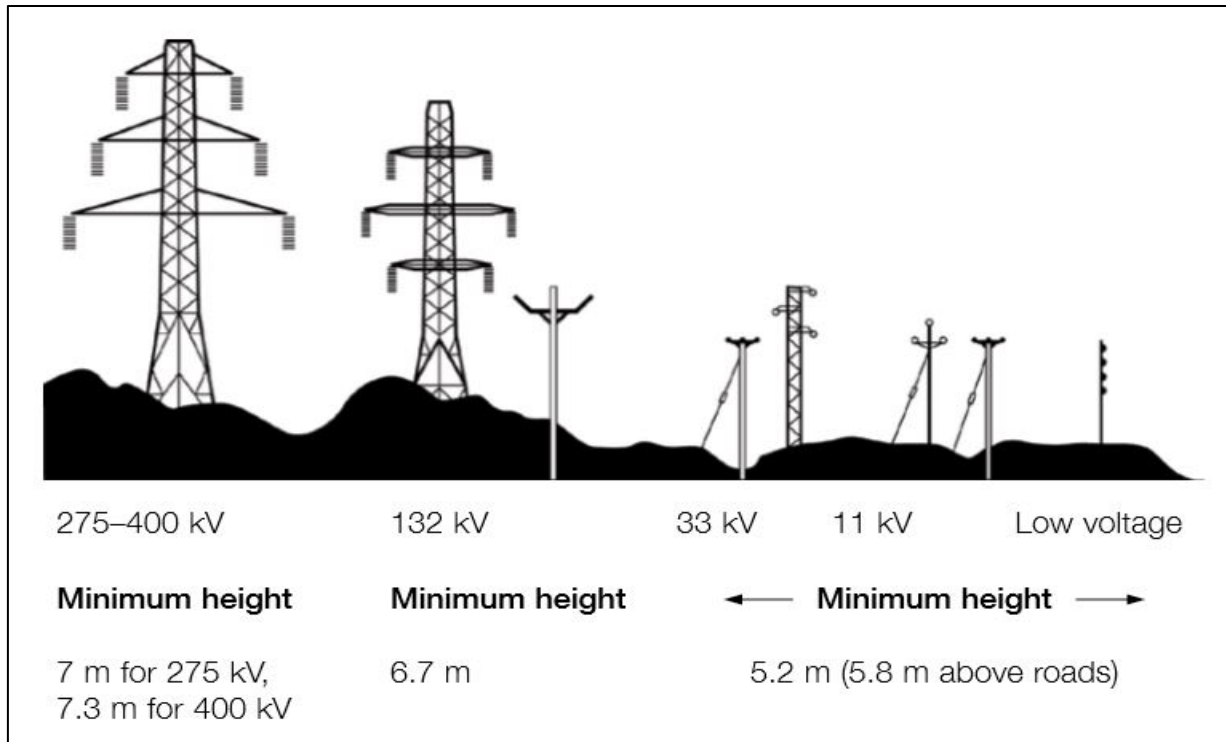


Figure 4 - Minimum Wire Heights for Overhead Power Lines

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5.2.2 The Law

The law requires that work may be carried out in close proximity to live overhead power lines, only when there is no alternative, and only when the risks are acceptable and can be properly controlled.

A suitable and sufficient risk assessment must be carried out that is specific to the site and ensures that all risks are managed properly, and the safety of the workforce and others is maintained. The risk assessment should be undertaken in accordance with VolkerRail SAF30 – Risk Assessment. Businesses and employees who work near to an overhead power line must manage the risks.

5.2.3 Preventing overhead power line contact accidents

Good management, planning and consultation with interested parties before and during any work close to overhead power lines will reduce the risk of accidents. This applies whatever type of work is being planned or undertaken, even if the work is temporary or of short duration. You should manage the risks if you intend to work within 10 metres of overhead power lines, measured at ground level horizontally from below the nearest power line.

5.2.4 General Principles of Prevention

The General Principles of Prevention shall be followed before undertaking any work near to overhead power lines.

5.2.4.1 Remove the risk

The most effective way to prevent contact with overhead power lines is by not carrying out work, where there is a risk of contact with, or close approach to, the wires.

If working near an overhead power line cannot be avoided and there is a risk of contact or close approach to the wires, the owner of the overhead power lines should be contacted to find out if the power lines can be permanently diverted away from the work area or replaced with underground cables. This will often be inappropriate for infrequent, short-duration or transitory work.

If this cannot be done and there remains a risk of contact or close approach to the power lines, enquire whether the overhead power lines can be temporarily switched off, while the planned work is being undertaken.

5.2.4.2 Risk Control

If the overhead power line cannot be diverted or switched off, and there is no alternative to carrying out the work, a risk assessment will be needed to determine how the work can be done safely. If it cannot be done safely, it should not be done at all.

The site-specific risk assessment will inform the decision. Things to consider as part of your risk assessment include:

- the voltage and height above ground of the overhead power lines wires. The wire heights should be measured by a suitably trained person using non-contact measuring devices;
- the nature of the work and whether it will be carried out close to, or underneath the overhead power lines, including whether access underneath the overhead power lines is required;
- the size and reach of any machinery or equipment to be used near the overhead power lines;
- the safe clearance distance needed between the overhead power lines and any machinery, equipment or structures being erected. If in any doubt, the owner of the overhead power lines shall be consulted to advise on safe clearance distances;
- the site conditions, e.g. undulating terrain may affect stability of plant etc...;
- the competence, supervision and training of people working at the site.

If the overhead power line can only be switched off for short periods, schedule the passage of tall plant and as far as is practicable, other work around the power line for those times.

5.3 Management Arrangements

5.3.1 Planning of the Work

Before work commences, the site shall be inspected to ascertain whether there are any overhead power lines, either directly over, or adjacent to the site (including the route from the access point to the site of work).

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Such an inspection must be conducted in daylight.

For sites with overhead power lines where cranes or excavators are required to work, the Machine and Lifting Operations Planner/s concerned, shall also visit the site during daylight to undertake a survey and site familiarisation in accordance with PE326 – Vehicular Plant and Crane Operations.

Prior to the commencement of any site works, the owner the overhead power lines shall be consulted to determine and clarify permissible clearances. If these are insufficient, it may be possible to divert or isolate the power lines and bond metallic structures to allow work to be undertaken. If the overhead power lines cannot be diverted or isolated, precautions must be taken, as determined by the nature of the work.

5.3.2 Working Close to Overhead Power Lines

In normal circumstances, the position of overhead power lines allows the safe passage of persons and normal vehicles etc., however, work operations involving the use of portable access equipment or plant with extending equipment may require restrictions, which are set out below.

Restrictions may be necessary whenever plant or equipment is within the following limits (all distances measured horizontally):

- 15 metres for overhead power lines suspended from steel towers.
- 9 metres for overhead power lines suspended from timber poles.
- In the case of “fixed” ‘Jibbed’ equipment that can only raise and lower, maximum Jib length plus 6 metres from any overhead power line.

These values are for guidance – in all cases the owner of the overhead power lines must agree the values.

It may be necessary to limit plant and equipment with extending jibs or baskets with mechanical or electrical slew/height restrictors. Where this is a consideration, the VolkerRail Plant division shall be consulted.

Where work will be carried out within these distances the restrictions set out in Clauses 5.3.3, 5.3.4 and 5.3.5 will apply.

5.3.3 Working near but not underneath overhead power lines

Where there will be no work or the passage of plant, machinery or equipment underneath the overhead power lines, the risk of accidental contact can be reduced by erecting ground-level barriers to establish a safety zone to keep people and machinery away from the power lines.

Barriers shall be erected parallel to the overhead power lines, not less than 6 metres horizontally from the nearest power line (See Appendix A). The possibility of cranes etc. encroaching on the minimum distance must be taken into account, and where necessary the 6 meter horizontal distance increased in accordance with 5.3.2

The barriers shall be surmounted by coloured bunting which forms an additional warning. If access is only possible from one side, then a barrier on that side will be sufficient.

Note: The owner of the overhead power lines may advise a minimum distance greater than 6 metres, depending on the voltage of the overhead power line. In certain cases, particularly where high voltage lines with long spans are involved, allowance should be made for lateral swing of the conductors, to maintain the safe distance from barriers to the overhead power line, at all times.

Additional guidance on using specific plant and the method of taking measurements, selection and suitability of barriers and bunting is available in HSE Guidance Note GS6.

5.3.4 Passing underneath overhead power lines

If it is necessary for plant working on a site to travel back and forth under overhead power lines, the area where they must pass through should be as small as possible and not more than 10 metres wide. A passageway shall be clearly defined by the use of fencing or barriers and goal posts shall be erected. The goal posts will be a specified height below the lowest conductor, as specified by the owner of the overhead power lines and span across the width of the passageway. Goal posts should be constructed of rigid non-conducting material and distinctly marked in order that they may be clearly identified.

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Warning notices shall be provided on each side of the passageway advising people of the hazard and giving the clearance height of the goal posts. These notices shall be placed in a position which allows drivers sufficient time to lower Jibs etc. It is advisable to place advance warning notices before the goal posts at a position greater than the length of the Jib on the machines being utilised for the works.

(Examples of use of rigid barriers and goal posts is shown in Appendix B).

Where it is not possible to limit the passage of plant to a specific location, goal posts may consist of tensioned steel plastic covered rope and should be erected on both sides of the line at a distance of not less than 12 metres from the conductor. The increased distance allows the possibility of ropes being stretched by cranes. Where steel ropes are used, they must be effectively earthed. All systems should be fitted with coloured bunting. Signing of approaches shall be carefully considered dependent on the planned movements that will occur.

5.3.5 Working underneath overhead power lines

If it is essential for work to be carried out underneath overhead power lines and they cannot be isolated or diverted, it will be necessary to take the following precautions in addition to those noted above.

Access for plant and material and the working of plant should be under the direct control of a responsible person who shall be appointed to ensure that the safety control measures identified are observed. This person, with agents if necessary, should be stationed in a suitable position to control machine and equipment movements underneath overhead power lines. Plant and equipment or tools that could reach beyond the safe clearance limit should never be taken under the overhead power lines. Plant such as cranes and excavators shall be modified with suitable physical restraints / limiters, so that they cannot reach beyond the safe clearance limit.

The owner of the overhead power lines should be consulted for guidance as to what additional precautions may be required. Guidance may also be obtained from HSE Guidance Note GS6.

5.3.6 Unexpected Contact with the Live Overhead Power Lines

If someone or something comes into contact with an overhead power line, it is important that everyone involved knows what action to take to reduce the risk of anyone sustaining an electric shock or burn injuries.

Key points are:

- Never touch the overhead power line wires;
- Assume that the power lines are live, even if they are not arcing or sparking, or if they otherwise appear to be dead;
- Remember that, even if lines are dead, they may be switched back on either automatically after a few seconds or remotely after a few minutes or even hours if the line's owner is not aware that their line has been damaged.;
- If you can, call the emergency services. Give them your location, tell them what has happened and that overhead electricity power lines are involved, also ask them to contact the owner of the overhead power lines;
- If you are in contact with, or close to, a damaged power line, move away as quickly as possible and stay away until the owner of the overhead power line advises that the situation has been made safe;
- If you are in a vehicle that has touched a power line, either stay in the vehicle or, if you need to get out, jump out of it as far as you can. Do not touch the vehicle while standing on the ground and do not return to the vehicle until the owner of the overhead power line advises that the situation has been made safe;
- Be aware that if a live overhead power line is touching the ground, the area around it may also be live. Keep a safe distance away from the overhead power line or anything else it may be touching and keep others away.
- The incident must be reported as soon as practicable to VolkerRail Control Centre (VRCC) as a "Dangerous Occurrence" and must be reported to the Distribution Network Operator (DNO);
- Any plant or equipment involved in an incident shall be left at the site, or as near as possible to the site, for a reasonable period to enable the Inspecting Officer to examine it.
- Plant and equipment must be thoroughly examined by a competent person from the Plant Supplier before being brought back into use.

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5.3.7 Specific Safety Requirements

The method of work and all control measures must be fully documented and briefed to all site staff that are affected. The required clearances must have been agreed with the owner of the overhead power lines prior to works commencing. There must be robust arrangements to brief internal and Subcontract Plant Operators who are being used to deliver the works.

5.4 Targeted Assurance

The assurance checklist (form PE323F01) has been produced to provide evidence of compliance with this procedure.

The frequency of checks will be mandated by the HSQESLG members and communicated through to the project/delivery/HSQES teams.

Checklists can be completed directly onto the EcoOnline system or completed on paper then transferred onto the EcoOnline system. If assistance is required, please contact a member of your HSQES team.

6. ASSOCIATED GUIDANCE & INFORMATION

- Appendix A - No passage of plant under overhead power lines
- Appendix B - Passage of plant under overhead power lines

7. DOCUMENTATION (OUTPUTS)

- PE323F01 - Targeted Assurance Checklist - Avoidance of Danger From Overhead Power Lines

8. ISSUE RECORD

Issue	Date	Comments
1	Oct 2007	First Issue. This document was previously issued in Engineering & Safety Manual as 'ESI 303' (this should be removed and destroyed).
2	Apr 2008	Periodic review and minor modifications to Appendix A to show diagrams on a larger scale.
3	14/09/2012	Reviewed in line with current organisation and job titles, minor amendments throughout.
4	09/11/2017	Amended diagrams included at Appendices A & B.
5	25/06/2024	Periodic review and minor amendments and formatting changes throughout. New Targeted Assurance checklist included (PE323F01)

9. WHAT HAS CHANGED IN THIS LATEST ISSUE AND WHY

Procedure:

The document has been through a periodic review and minor amendments and formatting made throughout.

Form:

A new form has been introduced to this procedure: PE323F01 - Targeted Assurance Checklist - Avoidance of Danger From Overhead Power Lines

10. BRIEFING REQUIREMENTS

All new employees will receive an introduction to the Integrated Management System (IMS) at induction, according to the nature of the role.

All employees with an email address receive the 'Record of Revisions' each month, which details changes to the IMS. All Line Managers retain the responsibility to ensure their staff are briefed on changes as appropriate.

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The following table defines how revised issues of this document are briefed to existing employees according to related specific responsibilities.

This is determined using the 'RACI' principle. Those roles identified as 'Responsible' and 'Accountable' should receive a formal awareness briefing facilitated by the Document Owner.

Discipline	Role	RACI	Type of briefing
Engineering	Professional Head of OCS	Accountable	Detailed
Senior Management	Chief Engineer	Consulted	Awareness
Senior Management	HSQES Director	Consulted	Awareness
Senior Management	Plant Business Manager	Consulted	Awareness
Project Management	Senior / Assistant / Project Managers	Responsible	Detailed
Delivery	Senior / Construction Managers	Responsible	Detailed
Delivery	Delivery Manager - Plant	Informed	Awareness
Delivery	Plant Coordination Manager	Informed	Awareness
Delivery	Site Manager	Responsible	Detailed
Supervisory	Senior / Supervisor	Responsible	Detailed
Engineering	Engineering Managers	Informed	Awareness
Engineering	Senior / Junior / Assistant Project Engineers	Informed	Awareness
Engineering	Engineering Apprentice	Informed	Awareness
Planning	Programme Managers	Informed	Awareness
Planning	Materials & Plant Coordinator	Informed	Awareness
Planning	Operations Planning Manager	Informed	Awareness
Procurement	Head of Procurement	Informed	Awareness
Procurement	Procurement Manager	Informed	Awareness
Procurement	Procurement Administrator	Informed	Awareness
HSQES	H&S Advisors / Managers / Senior Manager	Consulted	Awareness
VRCC	VRCC Manager	Informed	Awareness
VRCC	VRCC Duty Controller	Informed	Awareness

Competence	RACI	Type of briefing
Lift Planner	Responsible	Detailed
POS Representatives	Responsible	Detailed
Machine Operator	Responsible	Detailed
Machine Controller	Responsible	Detailed
Crane Controller	Responsible	Detailed
Banksmen	Responsible	Detailed
CRE/CEM	Informed	Awareness
H&S On-call	Informed	Awareness

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Assurance	RACI	Type of briefing
Operational Director	Accountable	Detailed
Director of Major Projects	Responsible	Detailed
Director of Specialist Businesses	Responsible	Detailed
Regional Director LNW	Responsible	Detailed
Regional Director LNE	Responsible	Detailed
Plant Director	Responsible	Detailed
General Manager	Responsible	Detailed

11. IMS AUTHORISATION

Document owner approval:

Andrew Cartwright, Professional Head of OCS, 25/06/2024

Approval for IMS:

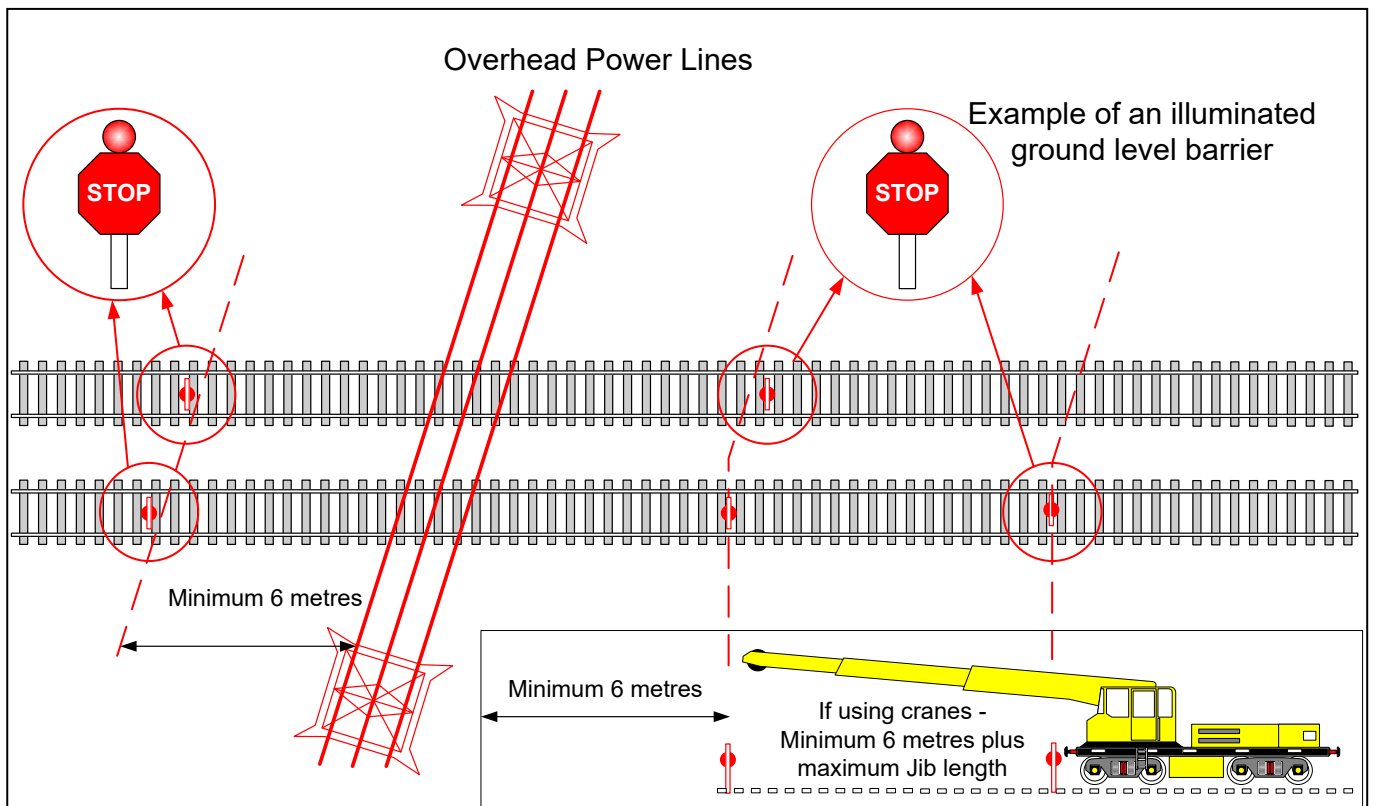
Paula Roberts, IMS Coordinator, 25/06/2024

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APPENDIX A: NO PASSAGE OF PLANT UNDER OVERHEAD POWER LINES

PE323

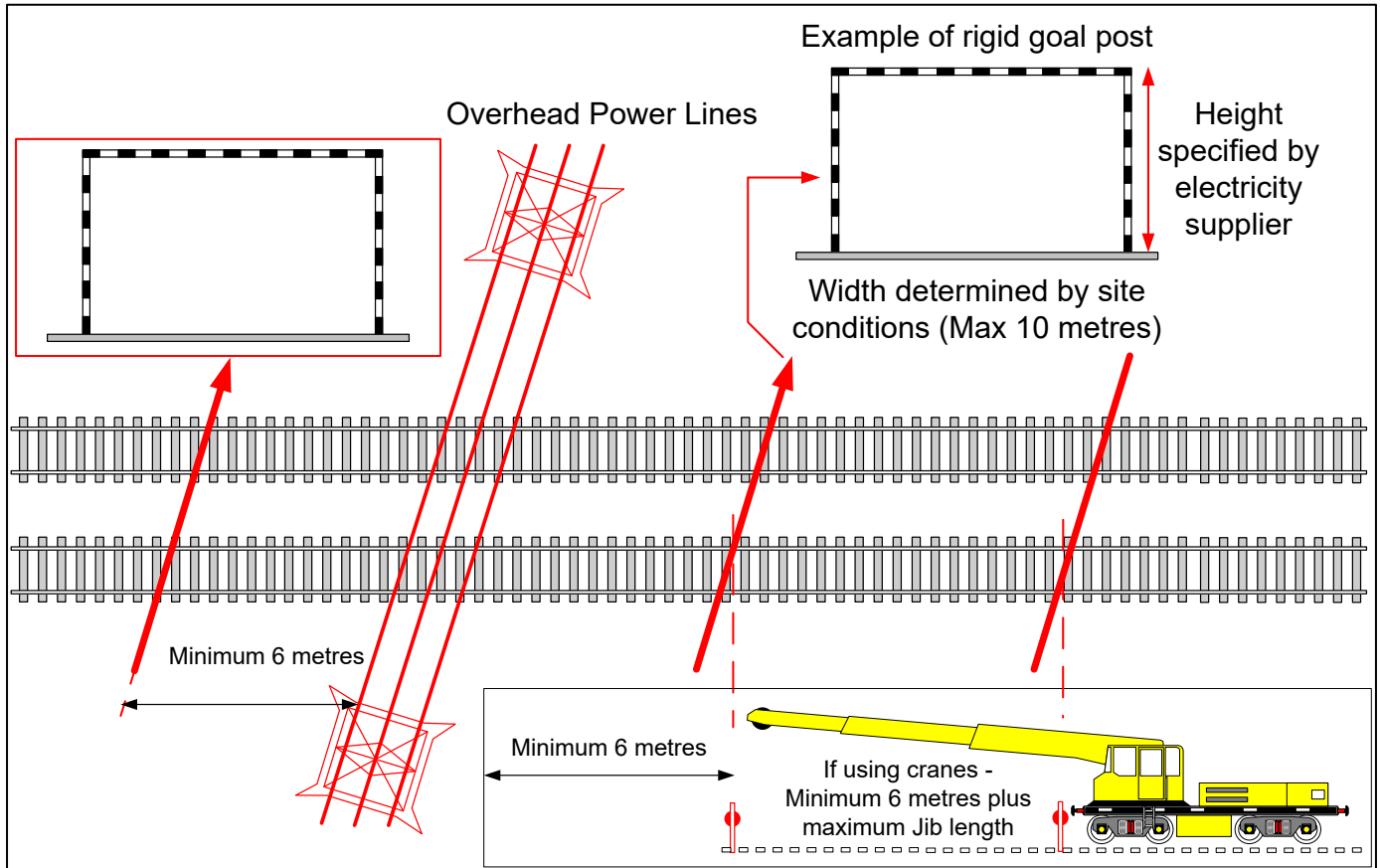
Where there will be **NO** passage of plant under the overhead power lines.



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APPENDIX B: PASSAGE OF PLANT UNDER OVERHEAD POWER LINES PE323

Where there **WILL** be passage of plant under overhead power lines.



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