

Guide

ESB Networks Code of Practice for Avoiding Danger from Overhead Electricity Lines

To provide feedback or view the errata log for this document, click here:

[Provide Feedback](#)

[View Feedback Log](#)

Issuing Authority:	Networks Safety, Health & Environment (SHE)		
Content Owner:	Michael Murray (ESB Networks)		
Document Number:	DOC-230910-BBA	Version:	2.1
Document Status:	Effective	Status Date:	01/05/2019

The Requirements of this document shall be complied with by all users.
Feedback on this document is welcome and should be given to the Content Owner.
Requests for derogation(s) shall be referred to the Content Owner.

Code of Practice for Avoiding Danger from Overhead Electricity Lines



HEALTH AND SAFETY
AUTHORITY

May 2019

Plain English
Approved by NALA

Code of Practice for Avoiding Danger from Overhead Electricity Lines

Second Edition – May 2019

This Code of Practice comes into effect on the 1 May 2019.

Notice of the publication was published in the Iris Oifigiúil on the 2 April 2019.

This new Code of Practice for Avoiding Danger from Overhead Electricity Lines revokes and replaces the previous Code (issued 2008), in accordance with the Safety, Health and Welfare at Work Act 2005.

Available to download from:

HSA website: hsa.ie

ESB Networks website: esbnetworks.ie

Email: esbnetworks@esb.ie

Phone 1800 372 757

Emergency contact number: 1800 372 999

Table of Contents

Terms used in this Code of Practice	7
1 About this Code of Practice	8
2 Dangers of working close to overhead electricity lines	11
3 Role of the Client	17
4 Design process: roles and activities	21
5 Construction stage: roles and activities	25
6 Consulting and working with ESB Networks	29
7 Construction sites where an overhead electricity line presents a hazard	33
8 Operating high-reach plant near overhead electricity lines	43
9 Road strengthening and resurfacing works	49
10 Installing overhead services for telecommunications	59
11 Transporting high loads by road	63
12 Emergency procedures	67
Annexes	71

Table of Figures

Figure 1.	The path of electrical current flowing to earth for a truck in contact or near contact with overhead lines	13
Figure 2.	Hazard zone	13
Figure 3.	Plant and machinery minimum safe distance	14
Figure 4.	Exclusion zone	15
Figure 5.	Overhead lines with a hazard zone overlaid on a map of a proposed development	24
Figure 6.	Elevation and plan for a site where plant will not pass under electricity lines	36
Figure 7.	Elevation and plan for a site where plant and machinery will pass under electricity lines	38
Figure 8.	Safe system of work when the crossing angle is at 90 degrees to the road	54
Figure 8a.	Safe system of work when the crossing angle is equal to or greater than 45 degrees to the road	55
Figure 8b.	Safe system of work when the crossing angle is equal to or greater than 45 degrees to the road	56
Figure 9.	Road resurfacing parallel or near an un-insulated low voltage line	58
Figure 10.	If you accidentally come in contact with an overhead electricity line	70

Table of Tables

Table of Tables

Table 1.	Hazard zone minimum distances	14
Table 2.	Exclusion zones in metres (which must NEVER be breached)	15
Table 3.	Minimum horizontal distances for barriers from the nearest conductor/overhead line on plan (hazard zone)	34
Table 4.	Specifications for crossing points	37
Table 5.	No-tip zone: minimum lateral clearance from the nearest point of the skip of a truck as measured horizontally on plan view	57



Terms used in this Code of Practice

A number of key terms appear in this Code of Practice. If you see a word in red, it is defined in this section.

Competent person: In brief, this is a person who has the training, knowledge and experience appropriate to the work they are undertaking. Legislation defines a **Competent person** as

“**Competent person:** A person is deemed to be a **competent person** where, having regard to the task he or she is required to perform and taking account of the size or hazards (or both of them) of the undertaking or establishment in which he or she undertakes work, the person possesses sufficient training, experience and knowledge appropriate to the nature of the work to be undertaken”.

Exclusion zone: An **exclusion zone** is a region around a live overhead electricity line which must never be breached in order to avoid electrical arcing or flashover. Figure 4 shows an example of the **exclusion zone** around the three overhead electricity lines on a single pole.

Hazard zone: The **hazard zone** is a lateral area near an overhead electricity line which must normally be isolated from the work site by physical barriers. This minimises the risk of accidental contact or near contact with the overhead line by plant, equipment, scaffolding or other materials. Figure 2 shows an example of the **hazard zone** near an overhead electricity line.

Other useful terms explained

HV: Higher Voltage

kV: kiloVolt

LV: Low Voltage

Overhead line: means any electric line suspended above ground carrying or intended to carry electrical energy at a voltage exceeding 80 volts to earth.

1 About this Code of Practice

1.1 Who this Code of Practice is for

This Code of Practice (COP) provides practical guidance to Clients, Designers, Planners, Project Supervisors Design Process (PSDP), Project Supervisors Construction Stage (PSCS), Contractors, Safety Representatives and any personnel who are involved in carrying out work where they are at risk from overhead electricity lines. It also applies to employers and employees at risk from the hazards of electricity from overhead electricity lines. This COP also gives practical advice to plant and machinery drivers and operators to avoid coming into contact with overhead electricity lines.

This Code of Practice (COP) was first published in 2008. ESB Networks, with the assistance of the Health and Safety Authority, published this edition in 2019.

1.2 Purpose of this Code of Practice

The purpose of this COP is to improve the level of safety while working near overhead electricity lines. It provides guidance to assist personnel working near overhead electricity lines to manage risk and avoid dangers from electric shock and electrocution.

This COP does not address safety issues for underground electricity cables or other underground services.

To deal with underground services, including buried electrical cables, the Health and Safety Authority has published a separate COP titled [Code of Practice for Avoiding Danger from Underground Services.](#)

1.3 The Code of Practice and the law

The Safety, Health and Welfare at Work (Construction) Regulations set statutory requirements which must be observed during the planning and implementation stages of construction projects.

This COP will help you comply with these regulations.

This COP is a joint initiative between ESB Networks and the Health and Safety Authority. This Code of Practice has been approved by the Health and Safety Authority in line with Section 60 of the Safety, Health and Welfare at Work Act 2005.

Accidents with overhead electricity lines may result in criminal prosecutions against individuals and/or companies. If you or your company are taken to court, compliance or non-compliance with the guidelines in this COP may be permitted as evidence in the case.

The requirements of this COP are without prejudice to the general obligations placed

on employers and others by the current Safety Health and Welfare at Work Act 2005, Construction Regulations 2013 and General Application Regulations 2007 and amendments and other relevant legislation. This means that employers must comply with the COP and all relevant legislation.

1.4 Activities that this Code of Practice (COP) will guide you on

This COP gives recommendations and practical guidance on working safely near overhead lines. The COP primarily covers construction activities such as:

- working on building and construction sites
- construction work on farms and in forests
- constructing and resurfacing roadways and roads
- constructing railways or navigable waterways
- using cranes and mobile elevated work platforms (MEWPs)
- using concrete-placing booms and pumps
- using lorry-mounted cranes and other high-reach plant
- using tracked and wheeled excavation equipment
- transporting high loads by road, rail or navigable waterway
- handling long lengths of material
- dumping spoil
- storing, loading and unloading materials
- other construction activities

1.5 Activities excluded from this Code of Practice

This COP does not cover:

- general agricultural, general forestry, vegetation management or hedge-cutting activities;
- **competent persons** (as defined in definitions on page 7) permitted by the network owner/operator to work on or near the electricity network.

For codes of practice that cover general agricultural and forestry activities, visit hsa.ie.

2 Dangers of working close to overhead electricity lines

2.1 Dangers of overhead electricity lines

People are killed and injured each year by accidental contact or near contact with overhead electricity lines. Most of these accidents involve:

- cranes or excavators;
- tipping trucks or truck mounted cranes;
- mobile extendable machinery;
- equipment such as scaffolding, gutters, long-handled concrete floats or ladders; or
- guiding a section of metal shuttering into position using a crane.

Electric shock can cause burns and damage to the heart which can be fatal.

Applying the methods and procedures in this COP will help eliminate these accidents.

Electrical utilities worldwide typically use bare conductors for overhead electricity lines. When you find covered conductors, this covering is usually for mechanical protection of the overhead line and is not rated as insulation. This means that covered conductors must be treated with the same precautions as bare conductors. This applies to all voltage levels.

2.2 Risk of electricity arcing (or jumping) from overhead electricity lines

For overhead electricity lines, there is a risk of electrical arcing even if a person or object does not actually come in direct contact with an exposed live part. Arcing occurs when electrical current jumps across an air gap and flows through the gap from the source of electrical power to another object or body nearby. The size of the gap that electrical current can jump depends on many factors. The most relevant factors are:

- the voltage of the source of electrical energy;
- the level of moisture and other impurities in the air gap; and
- the nature of the object or body at the non-energised side of the gap and how well it is insulated from earth.

This COP advises on the dimensions of the **exclusion zone** for different voltages. Always contact the network owner/operator for confirmation of the actual voltage levels for specific overhead electricity lines.

2.3 Range of voltages of overhead electricity lines

The range of voltages of overhead electricity lines on ESB Networks distribution and transmission systems varies from 230 volts to 400,000 volts.

Figure 1: The path of electrical current flowing to earth for a truck in contact or near contact with overhead lines



2.4 Definitions

2.4.1 Hazard zone

The **hazard zone** is a lateral area near an overhead electricity line which must normally be isolated from the work site by physical barriers. This minimises the risk of accidental contact or near contact with the overhead line by plant and machinery, equipment, scaffolding or other materials. See Figure 2. The dimensions of the **hazard zone** are related to the voltage of the overhead line. For the dimensions of the **hazard zone** (A) see Table I.

Figure 2: **Hazard zone**

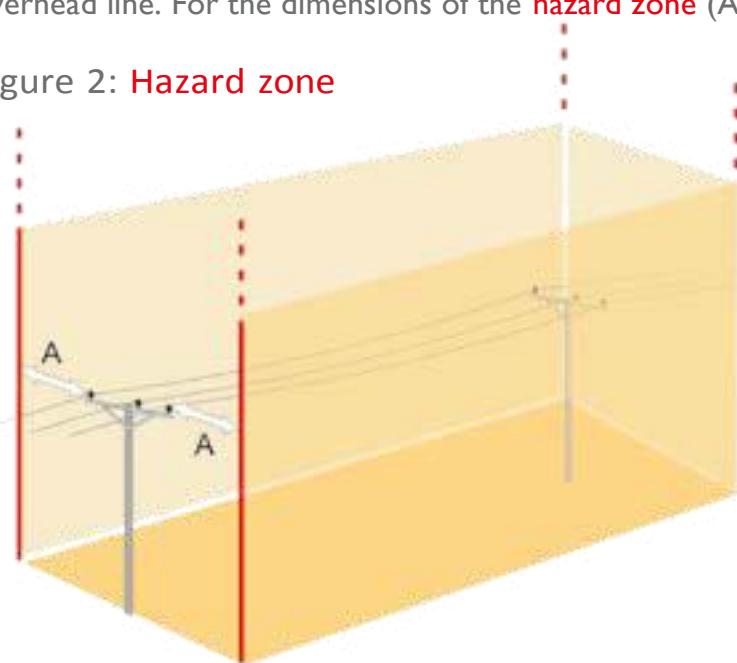
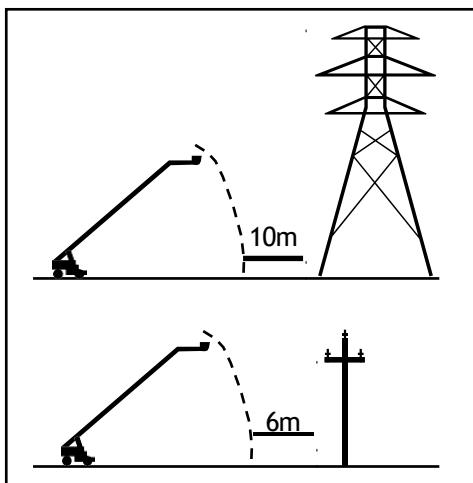


Table 1: Hazard zone minimum distances

Nominal phase-to-phase voltage of overhead line	Minimum horizontal distance (A) in metres
LV, 10kV, 20kV and 38kV	6.0
110kV, 220kV, 400kV (and other voltages in this range)	10.0

Figure 3: Plant and machinery minimum safe distance



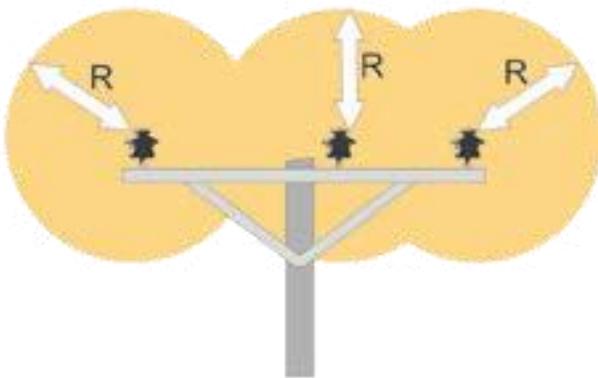
The diagram illustrates the two minimum safe distances

- 10m plus falling distance of fully extended boom (for 110kV and above)
- 6m plus falling distance of fully extended boom (for LV, 10kV, 20kV and 38kV)

2.4.2 Exclusion zone

An **exclusion zone** is a region around a live overhead electricity line which must never be breached in order to avoid electrical arcing or flashover. Figure 4 is an illustration of the **exclusion zone** around the three overhead electricity lines on a single pole.

Figure 4: **Exclusion zone**



For the dimensions of R,
see Table 2 below

The dimension R of the **exclusion zone** is determined by the operating voltage of the overhead electricity line. The **exclusion zones** for operating plant and machinery and materials are specified in Table 2.

Table 2: **Exclusion zones** in metres (which must NEVER be breached)

Nominal phase-to-phase voltage of overhead line	Exclusion zone (R) in metres
Insulated LV conductors. (insulation to be verified in all cases by network owner/operator before any work starts)	1.0
Un-insulated LV conductors	3.0
10kV, 20kV and 38kV	3.0
110kV	4.5
220kV	6.0
400kV	8.0

2.4.3 No-tip zone

A no-tip zone is the area that no part of a tipped truck or other raised equipment must enter. A no-tip zone applies to road strengthening and resurfacing works such as tarring and chipping existing roads. See chapter 9 for more details.

2.4.4 Crossing point

A crossing point is a defined, protected corridor that crosses under an overhead electricity line. Crossing points are created by installing:

- goalpost-style height-restricting barriers; and
- warning signs for overhead lines at entrances and exits of the crossing point.

The purpose of a crossing point is to:

- limit the location and the height of plant and machinery that can cross under the line; and
- alert drivers and plant operators to the hazard of the overhead line before they cross under it. Figure 7 in section 7.2 illustrates a crossing point.

2.4.5 Voltage levels

There are two levels of voltage.

Low voltage is any voltage less than or equal to:

- 1,000 volts (1kV) alternating current (AC);
- 1,500 volts direct current (DC).

Higher voltage is any voltage greater than:

- 1,000 volts (1kV) alternating current (AC);
- 1,500 volts direct current (DC).

NOTE: ESB Networks uses voltage terms such as LV, 10kV, 20kV, 38kV, 110kV, 220kV and 400kV to describe the different operating voltages of overhead electricity lines.

2.4.6 Particular risks

A particular risk is a situation that involves serious safety risks, which are referred to in the Safety Health and Welfare at Work (Construction) Regulations, such as working near high voltage electricity lines.

3 Role of the Client

3.1 Introduction

A Client is a person or organisation for whom a construction project is carried out. Under the Safety, Health and Welfare at Work (Construction) Regulations, the Client, where required, must appoint a Project Supervisor Design Process (PSDP) and a Project Supervisor Construction Stage (PSCS) to manage health and safety for the design and construction of the project.

Clients have a legal duty to reasonably satisfy themselves that the project supervisors they appoint are competent and will allocate sufficient resources to the project to comply with their legal safety and health obligations. Clients also have legal duties in relation to Designers and Contractors. For further information, see [Clients in Construction Best Practice Guidance](#) available from hsa.ie.

3.2 Information from Clients

When a Client or a Client's agent appoints a PSDP and PSCS, they must:

- give the PSDP and PSCS any information about overhead electricity lines that they already have, making sure this information is as up to date as possible; and
- give the PSDP and PSCS any safety files that are relevant to the work.

Am I a Client?

You are a Client if you:

- commission the building of a house or apartment or a scheme of housing;
- commission the construction or renovation or the maintenance of farm buildings;
- extend or carry out repair and maintenance work on commercial or domestic premises such as shops, supermarkets, houses, cottages or apartments;
- build, extend or refurbish any type of structure including roads, motorways, railways, waterways, electricity networks or telecommunications networks.

If you commission work to be carried out on your home, you are a Client. You are subject to all the legal requirements that any other Client is subject to.

For further information, see [HSA Guide for Homeowners](#) available from hsa.ie.



3.3 Notifying the Health and Safety Authority (HSA)

If construction work is due to last more than 30 working days or 500 person days, a Client must notify the Health and Safety Authority that they are appointing a Project Supervisor Design Process (PSDP) and Project Supervisor Construction Stage (PSCS).

When a Client appoints a PSDP, they should submit an AFI form at the beginning of the detailed design process. You can download an AFI form from hsa.ie.

When a Client appoints a PSCS, they should submit an AFI form before the construction begins. The PSCS has a duty to notify the HSA before construction work starts using the AF2 form. You can download forms from hsa.ie.

3.4 Looking after health and safety

A Client must cooperate with the PSDP and PSCS to make sure that the project complies with all health and safety requirements. This is particularly important in relation to timescales. A Client must agree to a timescale that can be achieved without compromising health and safety.

A Client is responsible for including a preliminary safety and health plan with any request for tenders for a PSCS. This preliminary safety and health plan is prepared by the PSDP.

3.5 Required alterations or diversions

In some projects, overhead electricity lines might have to be diverted or undergrounded to reduce risk in line with the Principles of Prevention that are listed in the Safety, Health and Welfare at Work Act (Annex I). The Designer, Client or PSDP shall consult with the network owner/operator before works start, who shall advise the best course of action to reduce as far as practicable the hazard relating to the overhead line. This may require the overhead line to be diverted or undergrounded. The Client may be requested to pay for some **or** all of this work before the project commences.

4 Design process: roles and activities

4.1	Definition of Designer	22
4.2	The Project Supervisor for the Design Process (PSDP)	22
4.3	Contents of the preliminary safety and health plan	22
4.4	Overhead electricity lines as a design issue	22
4.5	Using plans and site visits during design	23
4.6	Coordinating the design of temporary works	24

4 Design process: roles and activities

4.1 Definition of Designer

Design means preparing drawings, design details, specifications and bills of quantities for commercial and domestic construction. A Designer is any person who is involved in the type of design work listed above.

4.2 The Project Supervisor Design Process (PSDP)

When there is a PSDP appointed, the Project Supervisor for Design Process (PSDP) is responsible for coordinating Designers.

The PSDP may issue directions to Designers or Contractors or others.

For further information, see the document Clients in Construction Best Practice Guidance available from hsa.ie.

The PSDP must:

- prepare a written preliminary safety and health plan;
- organise co-operation among Designers; and
- coordinate the work of Designers to ensure compliance:
 - with the Principles of Prevention (Annex I); and

- when there are unforeseen circumstances that result in a change to the design of a project, work with the Designers on safety, health and welfare implications that result from a change to the design;

- prepare a safety file for the completed project and give it to the Client.

4.3 Contents of the preliminary safety and health plan

The preliminary safety and health plan must contain:

- an overall description of the project;
- the proposed timescale;
- appropriate information about other work on site; and
- details of any work that will involve particular risks such as working near overhead electricity lines.

For information about the voltage of overhead lines, contact network owner/operator.

4.4 Overhead electricity lines as a design issue

The PSDP/Designer is initially responsible for coordinating design in relation to overhead electricity lines. PSDP/Designers should contact the network owner/operator for up-to-date information.

4.5 Using plans and site visits during design

Designers must contact the relevant network owner/operator to obtain up to-date maps and records of all overhead electricity lines so they can assess the risks early in the design process. Annex 5 explains how to get copies of maps.

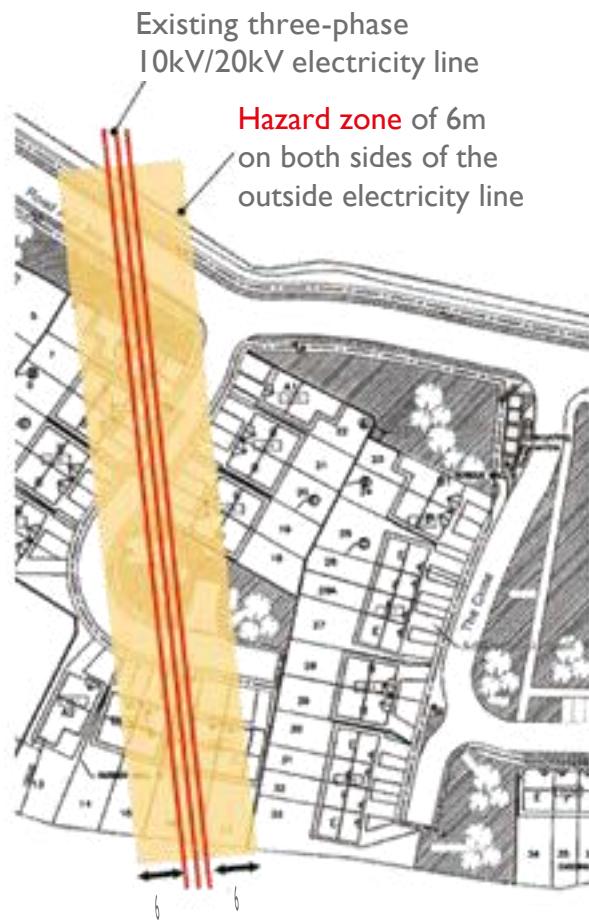
Designers should inspect the site to assess the situation in relation to overhead lines and consult with the PSDP to determine which design options to apply.

If overhead lines are present on site and if these lines will have an adverse effect on safety during construction, the PSDP/Designer should make sure the network owner/operator is contacted to formulate risk control measures to prevent accidental contact or near contact with the overhead lines during construction.

In consultation with the network owner/operator, adopt some or all of these risk control measures to reduce risk as much as possible.

- Divert lines early or, where possible, put them underground.
- Agree with the network owner/operator on power outages at critical points in project.
- Use barriers, bunting, height-restricting goalposts, warning signs and lighting while the electricity lines are still in place.

Figure 5: Overhead lines with a **hazard zone** overlaid on a map of a proposed development



4.6 Coordinating the design of temporary works

The PSDP is responsible for coordinating the design of temporary works on site. For overhead electricity lines, temporary works will generally involve putting up barriers, bunting, height-restricting goalposts, warning signs and lighting where plant and machinery or vehicles may cross under lines. Other structures such as physical barriers might also be installed to prevent unsafe activity in **hazard zones**.

Identifying these issues early in the design process and planning for them is key to controlling hazards. Arrangements should be in place before any construction work is undertaken.

Remember that installing a temporary structure in the vicinity of the **hazard zone** is also a risk that needs to be managed and installed without risk to individuals.

Design drawings for temporary works should include:

- the routes of overhead lines that:
 - cross over the site;
 - cross over the access route to the site;
 - are next to the site boundary;
- the voltage of the overhead lines;
- the **hazard zones** (Table 1); and
- the level of construction works that may be permitted in **hazard zones** while the lines are still present and energised, provided the safety of site personnel, visitors and the general public is assured.

The PSDP and Designers should take into account any additional work that may be required, including:

- building roadways;
- excavation work that may be required to put overhead lines underground;
- the potential impact of any excavations or other site works on the integrity and stability of the overhead line support structures, including stay wires; and
- the effect of changing site levels on existing clearances.

All temporary works should be carried out by a competent Designer and where required coordinated by the PSDP.

5 Construction stage: roles and activities

5.1	Project Supervisor Construction Stage (PSCS)	26
5.2	The Contractor	27
5.3	Employees and others at work	28

5 Construction stage: roles and activities

5.1 Project Supervisor Construction Stage (PSCS)

These are the key responsibilities of the PSCS.

- Manage and co-ordinate health and safety matters during the construction stage.
- Develop the safety and health plan for the construction stage.
- Facilitate safe access to the site.
- Coordinate the overall implementation of safe working procedures.
- Work with Contractors and the network owner/operator to make sure the level of risk is as low as possible.
- Apply the Principles of Prevention, which are listed in Annex I. Consider the planning of the work to facilitate line removal or diversion as early as possible, including:
 - installing underground ducts early;
 - laying kerbs, footpaths and roadways; and
 - facilitating the positioning of items such as mini-pillars.

If lines have not been diverted use other methods to minimise the danger.

Examples may include:

- arranging for the switching out and earthing of the line(s);
- using barriers, bunting, height-restricting goalposts, warning signs and lighting; or
- in certain limited cases, using a competent dedicated observer, electromechanical limiting devices, or both.

Make sure barriers, bunting, goalposts, warning signs and lighting are maintained in good working order and are installed in accordance with chapter 7 of this COP. Also, see Form OH1 in Annex 2.

5.2 The Contractor

These are the key responsibilities of the Contractor.

- Cooperate with the PSCS.
- Cooperate with other Contractors on health and safety.
- Work with the network owner/operator to make sure the level of risk is as low as possible.
- Supply accurate information in a timely manner to the PSDP to allow for the preparation of the Safety File.
- Supply accurate as-built drawings of underground cable ducts showing the location, depth and size of ducts to allow for the safe undergrounding of overhead electricity lines on site where applicable.
- Maintain the specific aspects of the safe systems of work, as described in this COP, and take direction from the PSCS, who has a statutory right to issue directions.
- Carry out site-specific risk assessments.
- Make sure that employees have adequate training.
- Make sure that any plant or machinery is, so far as is reasonably practical, safe and does not pose a risk to safety or health.
- Put in place measures to ensure that the health and safety of personnel are not adversely affected by the work they are doing.

By the nature of their work, some Contractors have a higher risk exposure from contact or near contact with electricity lines. These include:

- ground workers;
- road workers;
- piling contractors;
- plant drivers or operators;
- guttering installers;
- scaffolders; and
- roofers.

The Contractor is responsible for making sure all health and safety precautions are in place to protect these workers.

5.3 Employees and others at work

These are the responsibilities of workers on site.

- Follow the safe systems of work used on site.
- Take reasonable care to protect their own safety and the safety of others who might be affected by their actions.
- Report immediately any defects in health and safety that might endanger anyone in the workplace such as missing signage, broken barriers or goalposts or plant and machinery coming near to overhead lines.
- Avoid any behaviour likely to endanger health and safety on site.
- Avoid alcohol or any other intoxicant which might place them or their colleagues at risk.
- Attend health and safety training and assessments that are required by their employers and update training requirements as necessary.
- Never intentionally or accidentally cause plant, equipment or construction materials to enter the **exclusion zone**.

6 Consulting and working with ESB Networks

6.1	Consultation	30
6.2	Diverting lines or putting lines underground	30
6.3	Switching out and earthing overhead lines	31
6.4	Getting copies of maps and records	31
6.5	Applying to alter or divert overhead electricity lines	32
6.6	Requesting information and assistance	32
6.7	Contacting ESB Networks in an emergency	32

6 Consulting and working with ESB Networks

6.1 Consultation

You need to contact ESB Networks at the planning stage of work to get maps and records for existing overhead electricity lines running:

- over the site;
- near the site boundaries; or
- over access roads to the site.

Contact details are in Annex 5.

ESB Networks will work with you to determine the best approach to minimising the hazard and risk.

Options may include:

- switching out and earthing lines;
- putting lines underground;
- diverting lines; or
- implementing other measures such as physical barriers, which are covered in chapter 7.

Contacting ESB Networks or any other network owner/operator is the responsibility of the Client/PSDP and Designer and must be done at the earliest stages of planning and design. It is the responsibility of the PSCS/Contractor to contact the network owner/operator at the construction stage.

As soon as hazards from overhead electricity lines are identified, contact ESB Networks for information.

6.2 Diverting lines or putting lines underground

The PSDP in conjunction with the Designer(s) should identify the hazards and manage the risks associated with the presence of overhead electricity lines on site. This includes the preservation of safety zone clearances. Diverting overhead lines or putting them underground are options to consider.

If the work near a line does not involve building permanent structures above ground, diverting a line may not be appropriate.

If there is no alternative route for a line, it will not be possible to divert it. In general, lines with voltages of 110kV, 220kV and 400kV cannot be diverted. In these cases, the Designer must design a safe system of work that minimises the hazard without diverting lines. The PSDP should coordinate the work of the Designer(s) to ensure that this occurs.

It is critical to contact ESB Networks as soon as possible because of the time it takes to apply for and get a line diverted.

- Diverting lines involves serving wayleaves and balancing workload. This can take several months.
- Diverting higher voltage lines involves applying for planning permission, serving wayleaves and balancing workload. This can take a year or more.

6.3 Switching out and earthing overhead lines

In some cases, switching out and earthing overhead lines may be the best approach to reducing the hazard.

In general, switching out and earthing lines is possible only for a few hours at a time. It may not be possible to switch out lines if work will take longer than that or if certain customers require an uninterrupted power supply.

If ESB Networks agree that switching out and earthing is appropriate, they will agree with you when the lines will be switched out. This will depend on local electricity demand, the feasibility of changing the electricity networks and informing customers of an outage.

Before starting work, you must wait for ESB Networks to notify you that the line is switched out and earthed. Do not begin works until you receive notification from ESB Networks.

The Contractor doing the work must be contactable at all times during the switch out in case ESB Networks need to switch the line back on.

6.4 Getting copies of maps and records

Maps and records can help you verify the location and voltage of overhead lines. Contact ESB Networks on 1800 928 960 to request maps and records. Contact information is in Annex 5.

When applying for overhead maps or records, you should include:

- a reference map of the area where work is to take place;
- a contact name and phone number; and
- the email address where the information is to be sent.

ESB Networks will send maps to you by email within 10 days in PDF format.

If you frequently need electricity maps and records and you are a licensed holder of electronic Ordnance Survey map data, you can register with ESB Networks for access to an electronic version of the electricity networks map and records. You can email your request including your site map to dig@esb.ie.

Call 1800 928 960
or +353 (0) 1 858 2060
or
Fax +353 (0) 1 638 8169

Alternatively, you can make a postal request to:

Central Site
ESB Networks
St Margaret's Road
Finglas
Dublin 11
Ireland
D11 X3W7

6.5 Applying to alter or divert overhead electricity lines

When applying to alter or divert existing overhead electricity lines, send:

- a written request; and
- a copy of a site plan showing any proposed developments.

Send the application to:

ESB Customer Service Bureau, PO Box 29, Garrycastle, Athlone, Co. Westmeath.

6.6 Requesting information and assistance

For general information or advice on dealing with overhead electricity line conflicts:

- call 1800 372 757
- email esbnetworks@esb.ie

Your request will be forwarded to the local contact person for your area who will get back to you.

6.7 Contacting ESB Networks in an emergency

Emergency Contact No.
24 Hour/7 Day Service

1800 372 999

7 Construction sites where an overhead electricity line presents a hazard

When overhead electricity lines present a hazard, the preferred choice is to switch out or divert the lines before site works begin.

If the lines cannot be switched out or diverted (see section 6.2), the nature of the work and the voltage at a site will determine the protective measures that are required. In all cases, you must establish a **hazard zone**. Determine the voltage during the planning stage and before any works begin. The voltage will affect the size of the **hazard zone** and the placement of barriers.

Most sites can be categorised in one of three categories.

7.1 Sites where there will be no work or plant passing in or under the **hazard zone**

7.2 Sites where plant will pass under a live overhead line

7.3 Sites where work will be carried out in the **hazard zone**

7.1 Sites where there will be no work or plant passing in or under the **hazard zone**

7.1.1 Set up barriers

On sites where machinery or plant may accidentally enter the **hazard zone**, you must erect a barrier on the work side (outside the edge of the **hazard zone**) at the correct distance from the line. See Figure 6.

Table 3: Minimum horizontal distances for barriers from the nearest conductor/overhead line on plan (**hazard zone**)

Nominal phase-to-phase voltage of overhead line	Minimum horizontal distance (A) in metres
LV, 10kV, 20kV and 38kV	6.0
110kV, 220kV, 400kV (and other voltages in this range)	10.0

7.1.2 Barrier materials (bunting, uprights and goalposts)

Use strong and sturdy, non-conducting and clearly visible materials.

See Figure 6.

7.1.3 Visibility equipment

Put standard electricity hazard warning signs along the route at intervals of 20 metres or less.

See Figure 6.

7.1.4 Prevent breaches of the hazard zone

Make sure that safe systems of work are in use for all plant and equipment.

Anything being used, moved or handled outside the **hazard zone** must not cross the barriers and breach the zone, for example when installing guttering, handling roofing timbers or erecting scaffolding.

7.1.5 Create task-specific risk assessments and work method statements

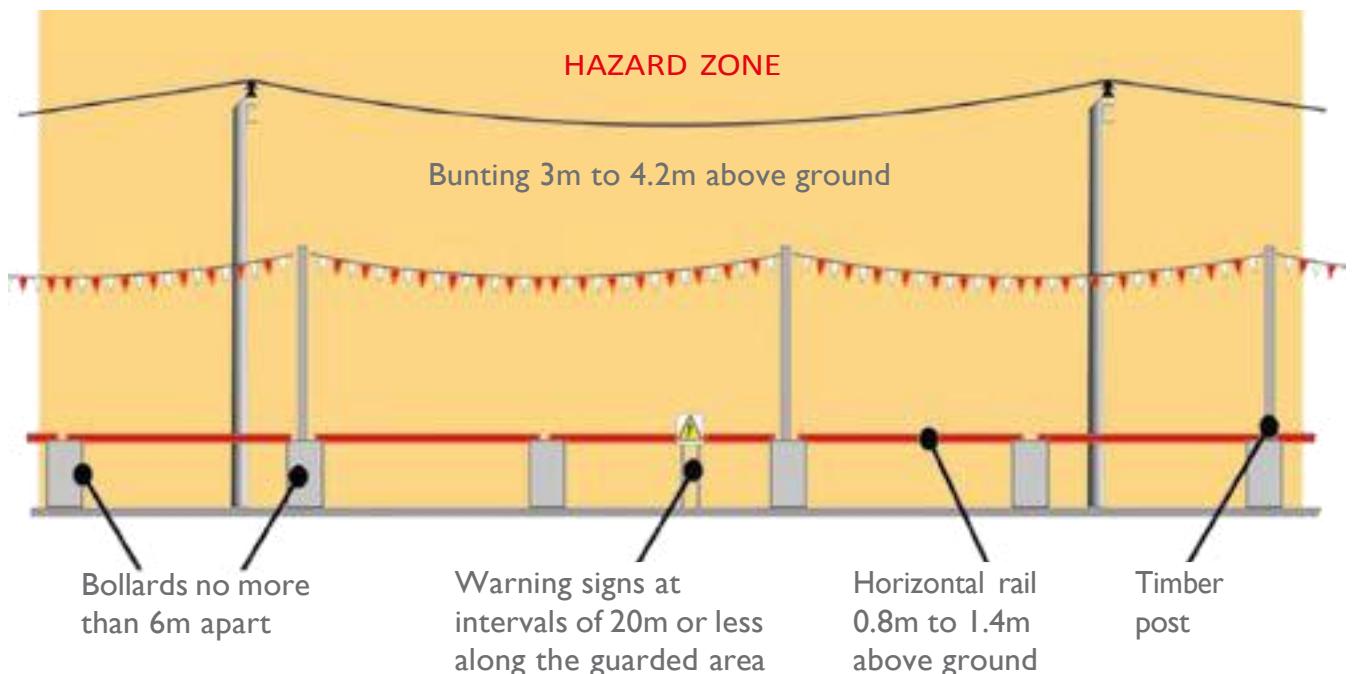
If machinery, ladders, scaffolding or other equipment are being used outside the **hazard zone** and this equipment could fall or otherwise inadvertently breach the relevant **exclusion zone**, create a task-specific risk assessment and work method statement. Outline the control measures to be used to eliminate this risk.

Make sure this risk assessment and method statement are available on site at all stages of construction.

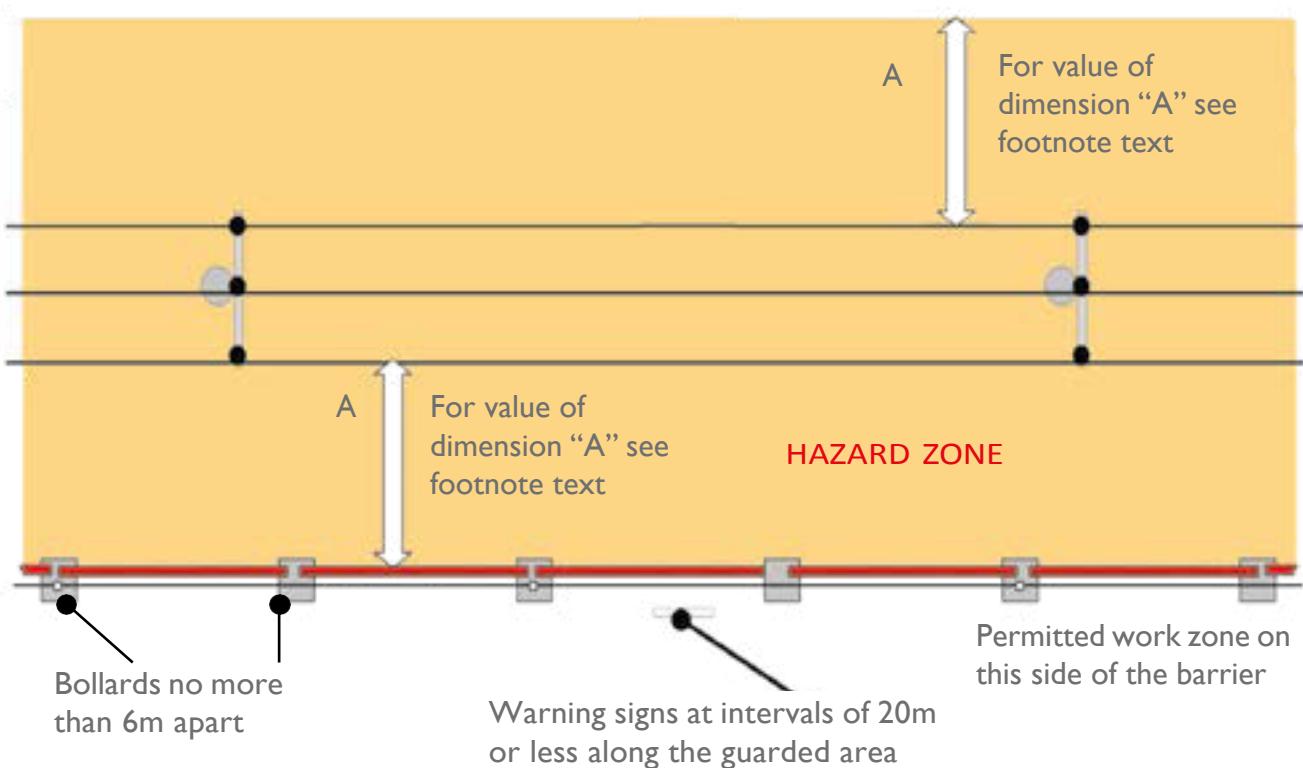
For information on the area required for **exclusion zones**, see section 2.4.2 and section 8.

Figure 6: Elevation and plan for a site where plant and machinery **will not** pass under electricity lines

Elevation



Plan



Dimension A = Minimum distance of 6m for LV, 10kV, 20kV and 38kV

Dimension A = Minimum of 10m for 110kV 220kV, 400kV (and other voltages in this range)

7.2 Sites where plant will pass under a live overhead line

When you need to move plant and machinery under a live overhead electricity line, you must create crossing points.

To create crossing points, erect height-restricting goalposts. These must be made from rigid, non-conducting, clearly visible material at the entrance to the crossing point on each side of the line.

Figure 7 shows the correct design of a crossing point.

Table 4: Specifications for crossing points

Location	Outside the hazard zone and in line with the protection barriers.
Maximum height	4.2 metres measured relative to ground level of the original site. This must be implemented by the dutyholder or responsible person.
Maximum width	9 metres. Crossings should be as narrow as is practical and safe. 9 metres is a maximum width.

Place this equipment along the crossing point.

- Suitable rigid barriers 0.8 to 1.4 metres in height on both sides of the crossing point corridor to prevent deviation from the corridor
- Two warning signs near the goalposts at each entrance at spacings of 20 metres or less along the barriers

Where possible, select locations for crossing points that are closer to the supporting poles or towers rather than to the middle of the overhead line span. This will give greater clearances at the crossing points and reduce the variations in clearances.

Do not erect bunting along the sides of the passageway. This may compromise safety clearances where the bunting crosses under the electricity line.

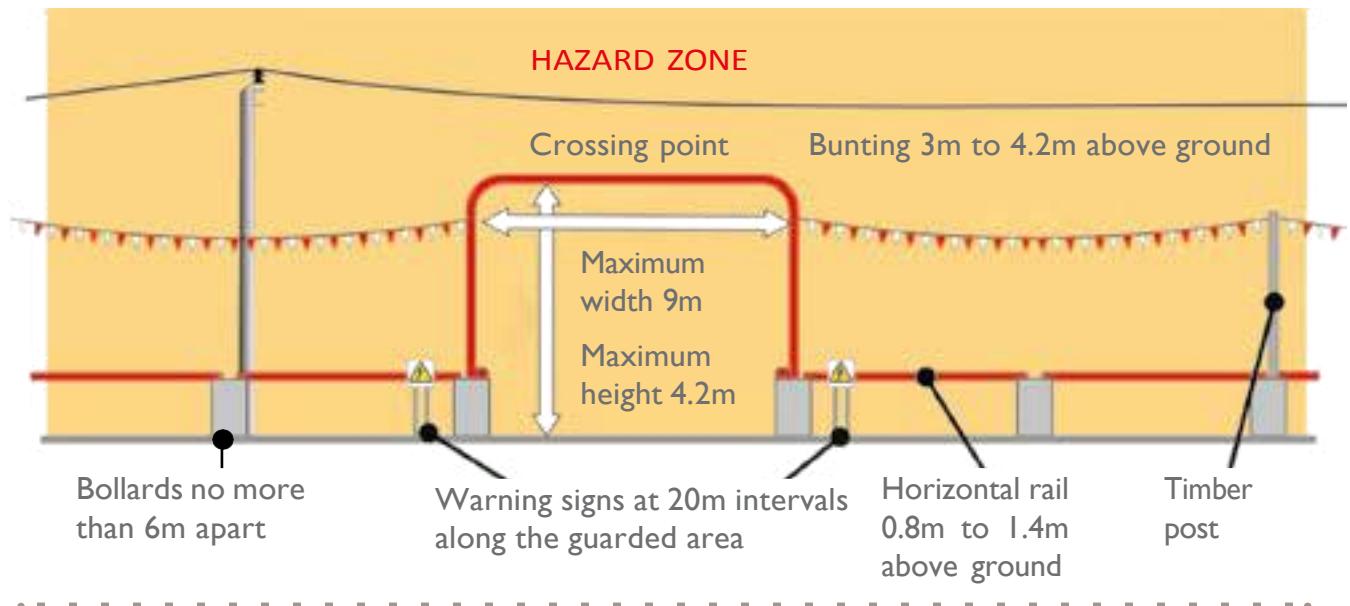
The clearances for overhead electricity lines can vary from time to time based on changing conditions such as:

- external physical loading conditions such as wind, ice or snow loading;
- changes in ambient temperature;
- variations in the amount of electrical current flowing in the line. This will cause variations in the temperature of the line conductors, which will cause variations in the line sags and ground clearances;
- other factors such as damaged poles, staywires or crossarms;
- any changes in ground levels close to the line.

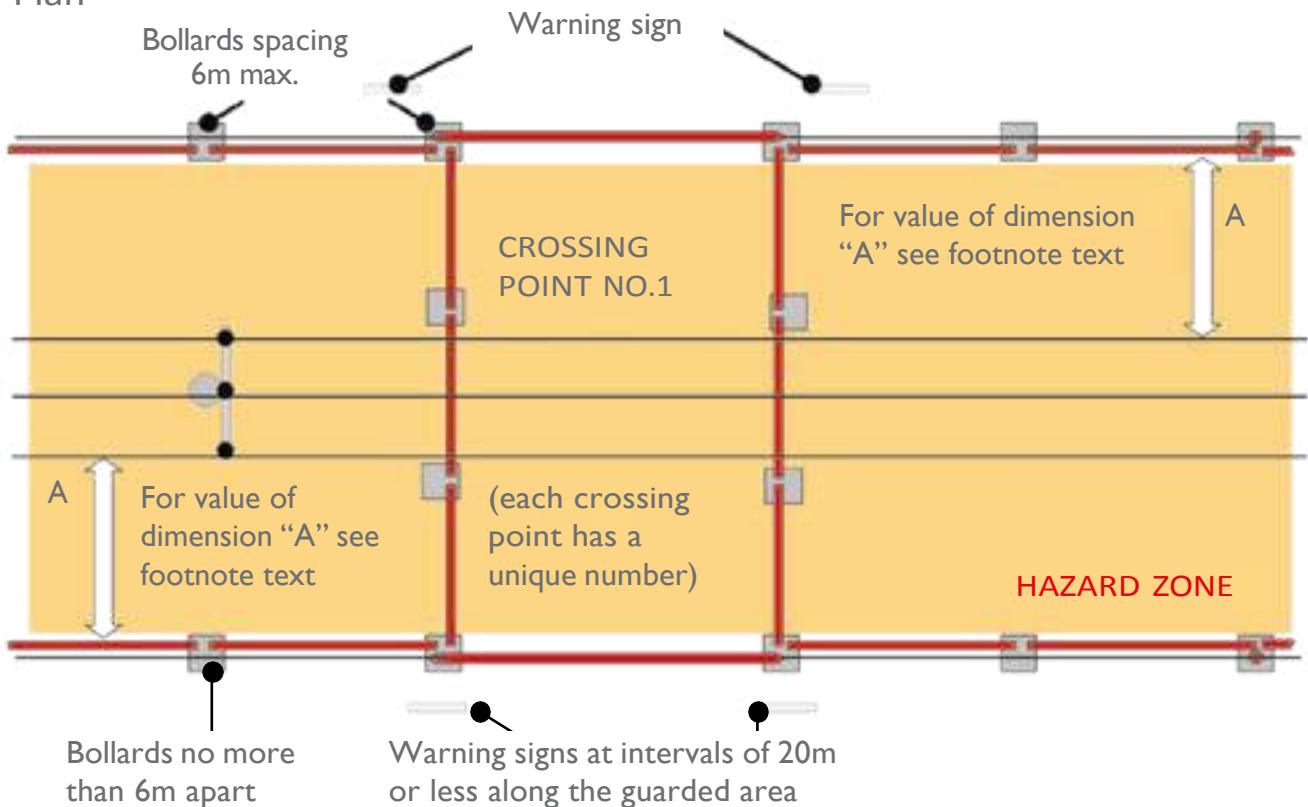
Figure 7: Elevation and plan for a site where plant and machinery **will pass** under electricity lines

At the crossing point, the maximum height of the crossbar must not exceed 4.2 metres except where this has been specifically approved by ESB Networks for that particular crossing location. This height must be measured relative to the original ground levels.

Elevation



Plan



Dimension A = 6m minimum for LV, 10kV, 20kV, 38kV

Dimension A = 10m minimum for 110kV, 220kV, 400kV (and other voltages in this range)

7.3 Sites where work will be carried out in the hazard zone

In certain very limited circumstances, work in the **hazard zone** of live overhead electricity lines, including the use of specified equipment, may be permitted.

In all cases, before work begins, you must:

- verify the line voltage with the network owner/operator;
- determine the **hazard zone**; and
- determine the **exclusion zone**.

Do not dig or pour foundations for buildings within the **hazard zone** until lines that are to be diverted or put underground have been removed or disconnected.

Digging or pouring foundations is specifically excluded from the classification of work permitted under 7.3.1 and 7.3.2 below.

7.3.1 Work that does not require consultation with the network owner/operator

If works do not involve plant and machinery, equipment or activities that could breach the **exclusion zone** (Table 2), you do not have to further consult with the network owner/operator after you have verified the voltage, as outlined above. If in doubt about anything, consult with network owner/operator. However, the PSCS and Contractor are responsible for safely managing the work.

Depending on the equipment and the height of the line, such work may include the use of:

- a bulldozer;
- small front tipping dumper; or
- mini diggers.

A site-specific risk assessment and work method statement must be prepared before deciding what work can be done in the **hazard zone**. The risk assessment and work method statement must cover the following:

- the height of the line, taking into account any possible sag;
- the maximum potential height that the equipment can reach, ignoring any mechanical, electronic or electromechanical height limiters that may be fitted to the equipment;
- the possible effect of varying or changing ground levels within the **hazard zone** on the height of the line;
- the possible effect of works on support structures such as poles, towers, stay wires and other structures. The stability and integrity of these support structures are key to the safe operation of the overhead line infrastructure.

The work must be planned in order that it does not affect the structural integrity of the poles or towers supporting the electricity lines.

To access the **hazard zone** for this specific work, the barriers around the **hazard zone** may have to be temporarily removed. These barriers must be put back as soon as possible to prevent other vehicles or plant accessing the **hazard zone**.

7.3.2 Work that requires consultation with the network owner/operator

In extremely limited circumstances, work that could **accidentally** breach the **exclusion zone** can go ahead if:

- the network owner/operator is consulted before works begin;
- there is a comprehensive, detailed safe system of work in place; and
- when it is appropriate to de-energise the network, the work does not begin until after the network owner/operator switches out and earths the line.

It is not always possible to switch out or divert lines to permit work that could accidentally breach the **exclusion zone**.

Where work is permitted that could accidentally breach the exclusion zone, the following minimum precautions apply:

- Prepare a written risk assessment and work method statement in consultation with the people who will be doing the work. See 7.4 for factors to include in the risk assessment and method statement.
- Establish and use a daily permit-to-work system.

- Use only equipment that has certified operational limiters installed to prevent any part of the equipment breaching the **exclusion zone**.
- In the risk assessment, specify the limits to which the equipment can operate.
- On site, ensure only a **competent person** sets and fixes these limits and that the limits are verified by testing.
- Establish on-site management systems to make sure limits cannot be tampered with.
- Put in place a competent dedicated observer for plant and equipment. The dedicated observer must be able to communicate with the machine operator at all times and must not do any other work while work in the **hazard zone** is in progress.

7.4 Possible special arrangements for some low-voltage (LV) overhead lines

For LV overhead lines, to facilitate certain work within the **hazard zone**, especially in urban environments, it may be possible for ESB Networks to:

- replace bare conductors with insulated bundled conductors; or
- temporarily insulate the conductors by applying approved temporary shrouding and other protection to the conductors.

In these situations, you must consult with the network owner/operator to agree:

- site specific arrangements; and
- control measures for each individual conflict.

If LV overhead line conductors have been temporarily shrouded or appear to be insulated, this does not mean that they are safe to touch. The effectiveness of shrouding or insulation will depend on conditions such as the prevailing weather conditions.

If this insulation appears to be damaged or dislodged, stop all work within 3 metres of the damaged area and notify the network owner/operator immediately.

Implement all control measures that are specified by the network owner/operator and make all relevant employees and subcontractors aware of the safety requirements.

7.5 Maintain barriers and warning notices

The PSCS must put in place a care and maintenance system to make sure that barriers, bunting, warning signs, goalposts and lighting are in place and effective throughout the works. This system must include:

- daily visual checks of protective measures, the behaviour of site personnel and the operation of plant and machinery that is close to overhead lines;
- weekly recorded checks of protective measures; and
- a follow-up process for all protective measures and works to make sure defects are notified to the responsible person and corrected without delay.

See Annex 2 for Form OHLI, which is the recommended form.

8 Operating high-reach plant near overhead electricity lines

8.1	Introduction	44
8.2	Safe system of work	44
8.3	Planning for high-reach plant	44
8.3.1	Identify overhead electricity lines before works begin	44
8.3.2	Assess the risks	44
8.3.3	Position plant at a safe distance	45
8.3.4	What to do if you cannot comply with 8.3.3	45
8.4	Critical safety requirements for exclusion zones	46
8.5	Special precautions when the hazard zone may be breached	46
8.5.1	Using dedicated observers	47
8.5.2	Personnel near to high-reach plant when in operation or being moved	47
8.6	General good practice guidelines for operating high-reach plant	48

8 Operating high-reach plant near overhead electricity lines

8.1 Introduction

Using cranes, mobile elevated work platforms (MEWPs) and other high-reach plant near overhead electricity lines is hazardous and there have been many deaths associated with this equipment. Construction plant and/or materials being lifted or moved must never breach the **exclusion zone** at any stage. You must carefully manage works so they are safe.

8.2 Safe system of work

This chapter outlines a safe system of work that you can use for minimising the risk from using high-reach plant. Where it may not be practical to use the system described here, use an alternative safe system which offers the equivalent level of protection.

Examples of high-reach plant include:

- concrete-placing booms;
- mobile elevated work platforms (MEWPs); and
- lorry-mounted cranes and other high-reach plant.

The safe system of work should include the following:

- qualified, competent supervisors;
- written risk assessment and work method statement;

- effective controls for preventing contact or near contact with overhead lines; and
- effective communication.

8.3 Planning for high-reach plant

8.3.1 Identify overhead electricity lines before works begin

Before cranes, high-reach plant and equipment are used on site, assess the proximity of overhead electricity lines and determine the location and area of **hazard zones**.

The area of a **hazard zone** is related to the voltage of the overhead electricity lines, so the voltage of overhead lines must be identified. To do this, contact ESB Networks for assistance or get maps and records from ESB Networks Central Site. Contact details are in Annex 5.

Always treat overhead electricity lines as live unless ESB Networks has confirmed that they are switched out and earthed.

8.3.2 Assess the risks

Consider the factors listed here when you assess the risks and establish the safe work method. This list is not exhaustive. You may also have to consider other factors.

- The type of crane or high-reach plant

Different types of plant have different characteristics and operating methods. This means that safety requirements vary.

- Load measurements

Consider the weight, size, shape and surface area of the load. In particular, consider how the load will move as a result of the surface area facing the wind.

- Overhead line span and support structures

Wind can cause line conductors to swing sideways, which reduces clearances. The ambient temperature and the electrical loading can cause lines to sag, which also reduces clearances. These effects can be significant and are greatest on long spans and at the mid-span position.

- Nature of the load

The materials in a load and the way it is secured may cause movement during an operation. This movement may accidentally breach the **exclusion zone**.

- Terrain, ground and surface

Consider the surface that the plant is placed on. Is the surface likely to change or move? This can cause plant and equipment to move toward overhead lines or into the **exclusion zone**.

- Visibility, light and weather

Visibility, light levels and weather conditions all affect the operation of plant and how the load behaves.

- Competent workers

Ensure workers are competent and hold valid CSCS (Construction Skills Certification Scheme) cards where required by legislation.

Incorporate this information into your risk assessment and work method statement.

8.3.3 Position plant at a safe distance

When determining the safest position for cranes and high-reach plant, evaluate the maximum extended and falling distance of the plant and the voltage of the line. Then place the plant farther than its maximum extended and falling distance from the nearest point of the **hazard zone** for the particular voltage of overhead electricity line. See section 2.4.1 for **hazard zone** definition and dimensions.

Incorporate this information into your risk assessment and work method statement.

8.3.4 What to do if you cannot comply with 8.3.3

If it is not possible to achieve the recommended **hazard zone** clearances, you must make every effort during planning to redesign the set up and operation of plant and its load so that the **exclusion zone** cannot be breached.

If you cannot meet the requirements in 8.3.3, you must either contact the network owner/operator to discuss the feasibility of having the line switched out and earthed **or** use an alternative safe system of work. For example, choosing different plant or a limiter on long-reach plant. See section 8.5.

In certain limited circumstances, it may be necessary to set up and operate the crane or high-reach plant closer to the overhead electricity line. In this situation, the **hazard zone** might be breached during set up or operation. This means there must be a higher degree of safety management. In this situation, you must:

- consult with ESB Networks about the works;
- implement the special precautions in section 8.5; and
- observe the critical safety requirements for **exclusion zones**. These are specified in section 8.4.

Incorporate this information into your risk assessment and work method statement.

8.4 Critical safety requirements for **exclusion zones**

A person must not operate a crane or any other plant or equipment in a way that breaches the **exclusion zone(s)** as specified in section 2.4.2. This includes:

- any part of the crane or plant or the load being moved;
- a person operating or working on a mobile elevated work platform (MEWP);
- any hand tools or other equipment held by any person involved with the operation.

8.5 Special precautions when the **hazard zone** may be breached

When there is no option but to set up high-reach plant where the **hazard zone** may be breached and the overhead electricity lines cannot be switched out and earthed, you must take these special precautions. These include but are not limited to:

- completing a written risk assessment and work method statement specifically for the high-reach plant. Detail the controls you will put in place to make sure that the plant does not breach the **exclusion zone**;
- setting up a daily permit-to-work system. This is the responsibility of the Contractor;
- putting in place a competent dedicated observer for each item of plant. Section 8.5.1 explains this;
- setting up warning devices, limiting devices or both to notify the operator of any potential breach of the **exclusion zone**;
- limiting and controlling the personnel in contact with the high-reach plant or load. Section 8.5.2 explains how to do this.

8.5.1 Using dedicated observers

There are special provisions that apply where a dedicated observer is required.

An operator's employer or a self-employed operator is responsible for appointing a dedicated observer.

If a dedicated observer is required, the operator must not operate high-reach plant without a dedicated observer.

The dedicated observer must:

- warn the operator if any part of the crane, plant or load is about to enter the **exclusion zone**;
- be competent, that is, appropriately trained;
- be fully aware of the boundaries of the **exclusion zone** and have an appropriate means of preventing encroachment, such as by placing appropriate markers in a safe position which the dedicated observer and the operator can easily see;
- be able to instantly communicate effectively with the operator of the crane or plant at all times and use specialist equipment to communicate if necessary;
- be satisfied that there is adequate visibility or adequate lighting provided to perform their role;
- be satisfied that there is adequate visibility and be aware of blind spots, obstructions and lighting conditions; and
- wear eye protection to reduce glare, if necessary.

Dedicated observers must not:

- perform any other duty while acting as a dedicated observer;
- observe more than one item of high-reach plant at a time; or
- be in the basket of a MEWP that they are observing.

8.5.2 Personnel near to high-reach plant when in operation or being moved

In the **hazard zone**, only authorised personnel should be near or on high-reach plant. All other personnel must keep clear of high-reach plant when it is being moved or is in operation.

Only two types of personnel are permitted to touch high-reach plant or its load when it is being moved: operators and appropriately trained personnel who are essential to the operation.

Operators may be near to the plant or load when:

- they are in the cabin, not standing on the ground beside the high-reach plant; or
- they are using radio-operated remote control and standing well clear of the plant. Remote control with directly connected control leads are not permitted.

Appropriately trained personnel who may touch the high-reach plant, its attachments or its load include:

- slingers;
- signallers; and
- workers helping to set up the plant.

Personnel using guide ropes who are in direct or continuous contact with plant must not be in the **hazard zone**.

If personnel must make contact with the high-reach plant or its load, they should verify that all parts of the plant, load and slinging gear are outside the **exclusion zone**.

To control load movement, they must use non-conductive objects such as appropriately insulated poles, guide ropes or, where practical, insulated crane hooks.

The insulation must be effective against the maximum voltage of an overhead electricity line. The employer or self-employed operator is responsible for making sure the insulation meets international standards.

8.6 General good practice guidelines for operating high-reach plant

- Always assume that overhead electricity lines are live unless ESB Networks has verified that they are switched out and earthed.
- Operate high-reach plant at a slower than normal rate when it is near overhead electricity lines.
- Exercise caution when travelling over uneven ground that could cause a crane or other high-reach plant to weave or jolt close to overhead electricity lines.
- Keep all personnel well away from high-reach plant that is close to overhead electricity lines.
- Be careful near long spans of overhead electricity lines. Wind can cause significant sway in the conductors and reduce the clearance between the plant and the line.
- Transport long objects horizontally and below shoulder level near overhead lines.
- Know what emergency procedures to follow if there is contact with a live overhead electricity line. See Annex 5 for details.

9 Road strengthening and resurfacing works

9.1	Introduction	50
9.2	Procedure for roads that are crossed by overhead electricity lines: recommended safe system of work	50
9.2.1	Minimum safety controls	50
9.2.2	Actions to take before works begin	51
9.2.3	Actions to take during works	51
9.2.4	Operating plant and machinery safely in the no-tip zone	51
9.2.4.1	Operating a tipper truck	51
9.2.4.2	Filling a paver	52
9.2.4.3	Filling a chipping spreader	52
9.2.4.4	Using a planer or other elevated equipment	52
9.2.5	Alternative safe systems of work	52
9.2.5.1	Using goal posts	52
9.3	Procedure where overhead electricity lines approach close to or are parallel to the roadway.	57
9.3.1	Minimum clearances for different overhead line voltages	57

9 Road strengthening and resurfacing works

9.1 Introduction

This chapter covers road strengthening and resurfacing works only. It does not cover new road construction.

Use this safe system of work for most road strengthening and resurfacing works. In situations where it may not be practical to use the system described here, use an alternative safe system which provides an equivalent level of protection.

Whatever system you use, you should:

- prepare a written risk assessment and work method statement;
- put in place effective controls for preventing contact or near contact with overhead lines; and
- evaluate whether it would be best to switch out and earth a line before work begins.

9.2 Procedure for roads that are crossed by overhead electricity lines: recommended safe system of work

9.2.1 Minimum safety controls

When road strengthening and resurfacing works take place near overhead electricity lines, a no-tip zone must be established. Minimum safety requirements:

- a survey before works start; and
- appointment of a **competent person** to:
 - control work near the lines and in crossing or conflict locations; and
 - communicate directly with operators of machinery and plant in or near the no-tip zone;
- a no-tip zone must have the following minimum horizontal distances from the nearest live overhead electricity lines as measured in plan view.

3 metres for lines with voltages up to 38kV*

4.5 metres for lines with voltages at 110kV

6 metres for lines with voltages at 220kV

8 metres for lines with voltages at 400kV

*These are illustrated in Figures 8, 8a and 8b of this Code of Practice.

9.2.2 Actions to take before works begin

- Survey all overhead electricity lines.
- Contact ESB Networks on 1800 928 960 to request maps and records. Further contact information is in Annex 5.
- Assign a unique identification number to each place where an overhead line crosses the road.
- On the road and using indelible (permanent) paint:
 - mark the boundaries of each no-tip zone; and
 - label each no-tip zone with its identification number.

9.2.3 Actions to take during works

Every day, the person in control of the site must make sure that safety measures are in place.

- On the day works begin, verify the survey is complete and markings are in place.
- Every day on site, fill in an Electrical Hazard Risk Assessment (EHRA) for each crossing and conflict. The EHRA template is in Annex 3.
- Make sure that warning signs are in place at the entrance and exits of the no-tip zone. For visual guidance on placing these signs, see Figure 8.
- Audit site safety [frequency is determined by the nature, scale and complexity of the works]. A template for a safety audit form is in Annex 4.

9.2.4 Operating plant and machinery safely in the no-tip zone

9.2.4.1 Operating a tipper truck

Ensure a safe system of work is in place at all times and that the tipper truck is in good working order and on safe level ground. Be aware that tipper trucks may overturn. Maintain a safe distance from the truck.

When the tipper truck reaches the beginning of the no-tip zone lower the skip completely.

Move forward until the rear of the truck has passed far enough beyond the exit that no part of the skip will be in the no-tip zone when it is tipped. Allow enough space between the exit and the truck to permit a paver or chip spreader to be filled safely.

Do not reverse into the no-tip zone with the skip raised.

9.2.4.2 Filling a paver

Ensure the paver is moved beyond the exit point to ensure that there is sufficient clearance from the no-tip zone, while the tipper truck is carrying out the loading process.

To reduce hazards while filling pavers, consider using low equipment such as a front-tipping dumper instead of a tipper truck.

For visual guidance on using pavers, see Figures 8, 8a and 8b.

9.2.4.3 Filling a chipping spreader

Ensure the chipping spreader is moved beyond the exit point to ensure that there is sufficient clearance from the no-tip zone while the tripper truck is carrying out the loading process.

The chipping spreader should be reversed or towed backwards through the no-tip zone.

9.2.4.4 Using a planer or other elevated equipment

At all times, make sure that no part of the planer or other equipment or any person positioned on the equipment is more than 4.2 metres above the road surface while in the no-tip zone.

9.2.5 Alternative safe systems of work

If the safe system of work outlined earlier is not practical, you should use a system that includes risk control measures, such as goalposts, that are at least equivalent to the measures described above.

9.2.5.1 Using goal posts

Goal posts are required to restrict the height of plant passing close to or underneath live overhead electricity lines.

The maximum height of the goal posts must not be more than 4.2 metres above the original road surface level unless it has been specifically determined that a greater height is permissible for the specific crossing or conflict.

The maximum height for goal posts takes into account:

- the minimum height of the overhead electricity line; and
- the appropriate radial **exclusion zone** clearance for the voltage of the line involved.

Refer to section 2.4.2 for information on **exclusion zones**.

You must assess and control the risks when erecting and removing goal posts.

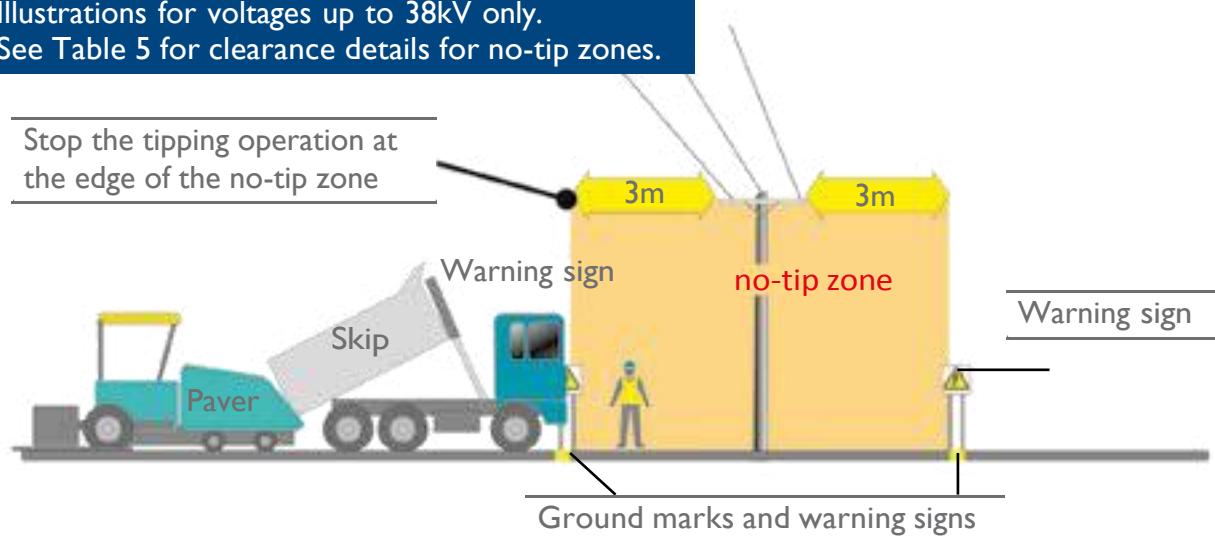
Goalposts must be suitably erected and maintained for the duration of the works.



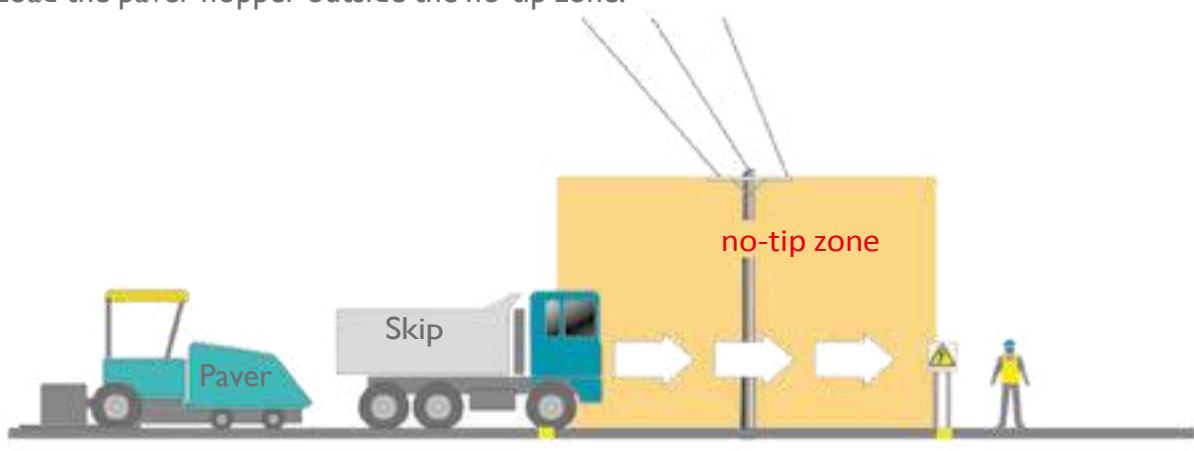
Figure 8: Safe system of work when the crossing angle is at 90 degrees to the road

Illustrations for voltages up to 38kV only.

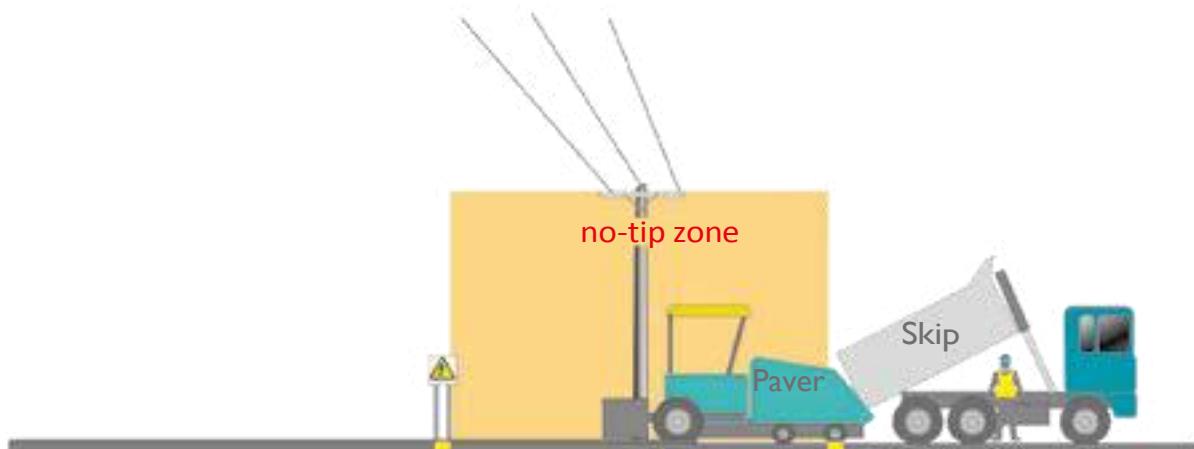
See Table 5 for clearance details for no-tip zones.



- I. Load the paver hopper outside the no-tip zone.



2. Fully lower the skip on the tipper truck, and any other elevated plant, such as a planer, before passing through the no-tip zone.



3. Continue normal operation when the tipper truck or other elevated plant is completely clear of the no-tip zone.

Figure 8a: Safe system of work when the crossing angle is equal to or greater than 45 degrees to the road

Illustrations for voltages up to 38kV only.
See Table 5 for clearance details for no-tip zones.

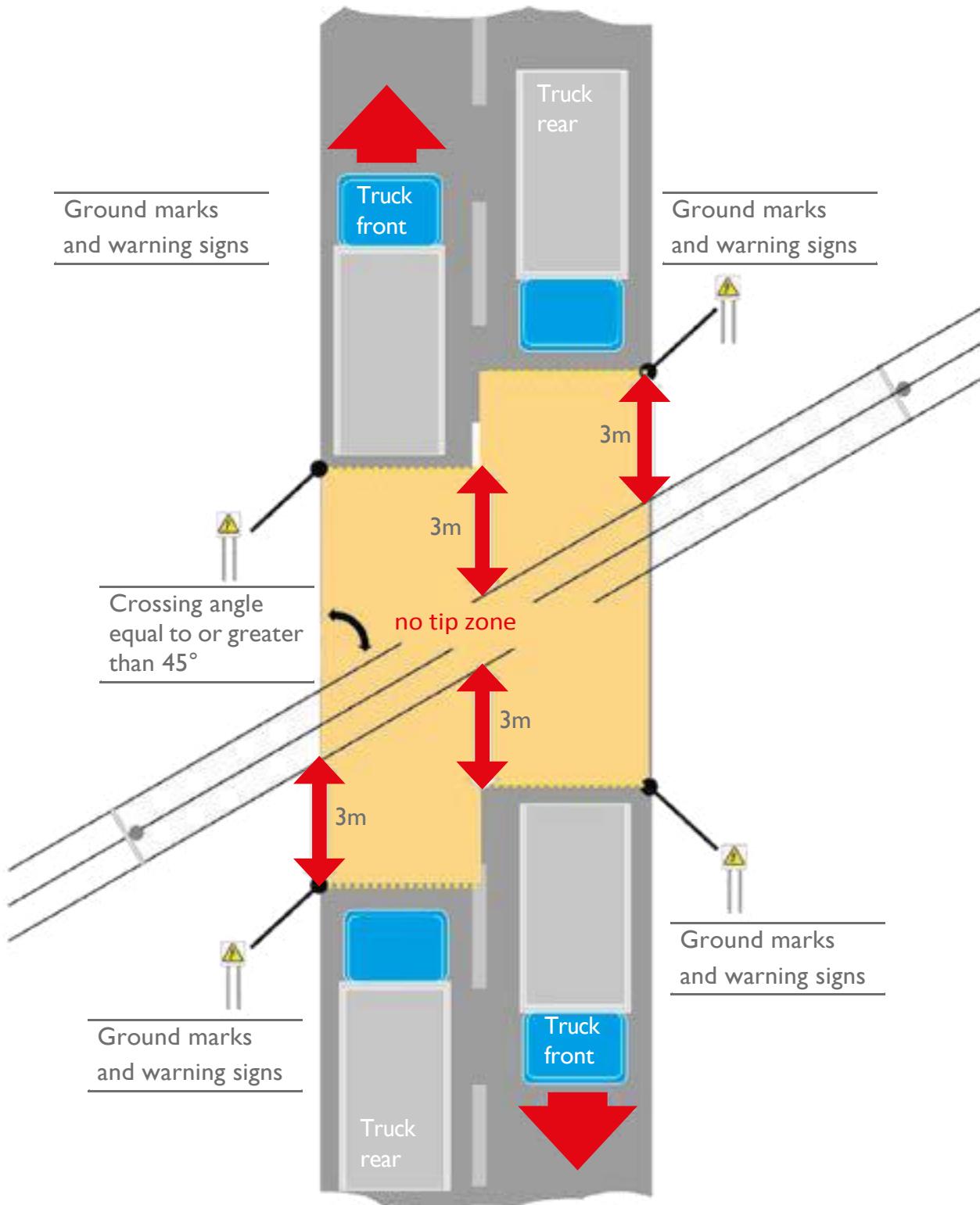
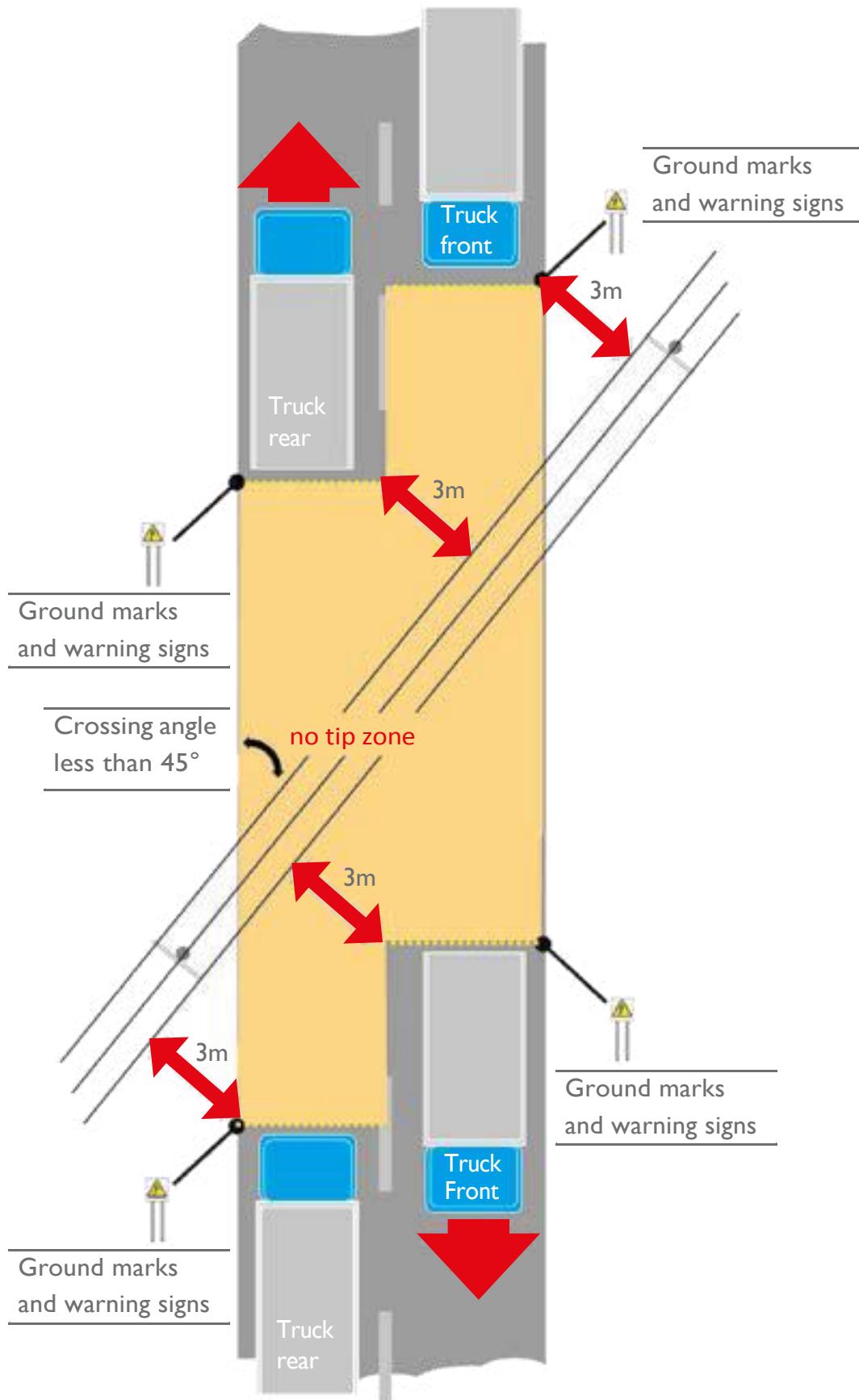


Figure 8b: Safe system of work for road resurfacing when the crossing angle is less than 45 degrees to the road

Illustrations for voltages up to 38kV only.
See Table 5 for clearance details for no-tip zones.



9.3 Procedure where overhead electricity lines approach close to or are parallel to the roadway

Some overhead electricity lines may not cross roadways, but they may approach close to or run parallel to the roadway for a section of the road.

The preliminary site survey must identify locations where overhead electricity lines could present a hazard to tipping trucks, taking into account:

- the route of the resurfacing works;
- the camber of the road;
- the presence or use of lay-bys;
- material storage dumps; and
- any other relevant factors.

If the risk assessment identifies a risk of accidental contact or near contact, apply appropriate additional controls in addition to the controls listed in section 9.2.

To work out the clearance that must be maintained, determine the operating voltages of the overhead electricity lines. This must be done at the planning stage and before any work starts.

Consult maps and records to determine voltages, or contact ESB Networks. See Annex 5 for contact information.

For this type of work, the minimum clearance for the relevant voltage is the minimum horizontal clearance as measured on plan view between the skip of the tipper truck and the nearest overhead line conductor.

9.3.1 Minimum clearances for different overhead line voltages

For road strengthening or resurfacing works where overhead electricity lines approach close to and/or run parallel to the roadway, use the clearances in Table 5.

Table 5: No-tip zone: minimum lateral clearance from the nearest point of the skip of a truck as measured horizontally on plan view

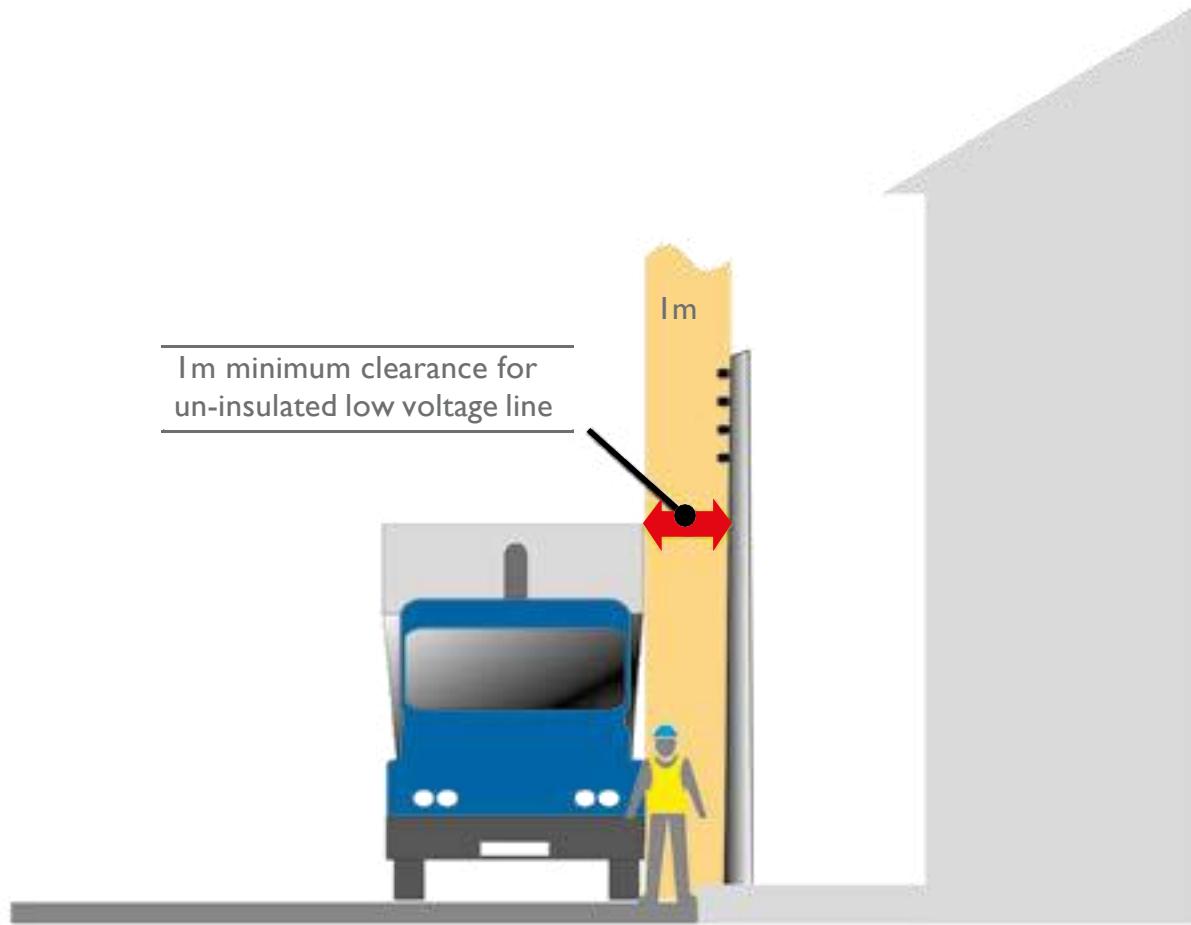
Nominal phase-to-phase voltage of overhead line	Minimum lateral clearance in metres
LV conductors	1.0
10kV, 20kV and 38kV	3.0
110kV	4.5
220kV	6.0
400kV	8.0

If the risk assessment identifies that the relevant minimum clearances cannot be achieved at all times, use an alternative safe method. Some alternative methods are:

- using a low-level front-tipping dumper to transport the road materials to the paver or spreader;
- using combination spreader units; and
- using height-limiting control measures in conjunction with a competent dedicated observer.

In certain limited situations, it may be necessary to have an electricity line switched out and earthed before proceeding with the work.

Figure 9: Road resurfacing parallel or near an un-insulated low voltage line



10 Installing overhead services for telecommunications

10.1 Introduction

Work on overhead telecommunication networks involves installing equipment on poles and structures which can be close to overhead electricity lines.

Where possible, work on these telecommunication networks must be planned and carried out to make sure that the **exclusion zone** is not breached.

The safest way to achieve this is to ensure that where possible work is carried out outside of the **hazard zone**.

Where telecommunications work is carried out inside the **hazard or exclusion zone**, this must be on the basis of a pre-existing agreement with the network owner/operator.

10.2 Scope

This section identifies what must be done to be able to work safely on overhead telecommunication networks where an overhead electricity line presents a hazard.

These requirements are additional to the more general requirements, specified elsewhere in this Code of Practice, including section 7 and section 8. This section does not cover activities relating to attaching communication networks on electrical networks as provided for in SI 391 of 2016 European Union (Reduction of Cost of Deploying High-Speed Public Communications Networks) Regulations. These are subject to compliance with separate requirements.

10.3 Roles and responsibilities

Telecommunications asset owners and/or operators must ensure compliance with this Code of Practice and/or with other requirements as agreed with the network owner/operator.

10.4 Safety management requirements

The telecommunications asset owner/operator must put procedures and processes in place to manage the risks associated with carrying out telecommunications work close to overhead electricity lines. The **exclusion zone** must not be breached – unless it is done based on a pre-existing agreement with the network owner/operator.

10.4.1 Work outside the hazard zone

Where possible, work must be carried out outside of the **hazard zone**. Where you need to operate plant near live overhead electricity networks, you must:

- plan and assess the likely risks; and
- make sure that the appropriate controls and method statements are in place.

These measures will ensure that the **exclusion zone** cannot be breached.

10.4.2 Work inside the hazard zone

Where the work takes place inside the **hazard zone**, additional controls must be put in place to prevent inadvertent breaching of the **exclusion zone**.

10.4.3 Work inside the exclusion zone

In limited circumstances, work inside the **exclusion zone** can go ahead if:

- there is agreement with the network owner/operator; and
- there is a detailed safe system of work in place.

10.5 Communications and work management

The telecommunications asset owner/operator must put in place effective work management and communications arrangements to facilitate:

- the safe working of the electricity network system by ESB Networks;
- the safety of all personnel;
- the safety of members of the public.



11 Transporting high loads by road

11.1	Introduction	64
11.2	Definition of a high load	64
11.3	Planning for the transport of high loads	64
11.4	Information required by ESB Networks	65
11.5	Responsibilities of the road transport operator	66
11.6	Additional requirements and recommendations	66

11 Transporting high loads by road

11.1 Introduction

When moving high loads, implement appropriate control measures to address the electrical and physical hazards of overhead electricity lines.

Electrical hazards arise from the risk of a high load contacting live electricity lines or coming close enough to cause electricity to flashover from live electricity lines.

Physical hazards arise from electricity lines, but also from obstacles such as telecommunications lines, trees and bridges.

11.2 Definition of a high load

As specified in the Road Traffic (Construction And Use Of Vehicles) (Amendment) Regulations 2003 to 2017, a high load is any load that is more than 4.65 metres high at its highest point. This height is measured vertically from a flat horizontal surface where the loaded transporting vehicle is parked.

ESB Networks standard clearances for electricity lines on designated local high load routes that cross public roads are designed to enable loads up to 4.65 metres high to pass safely. It is the responsibility of high load transporters to plan and implement a safe system of work.

For loads greater than 4.65 metres high, you must consult ESB Networks well before the proposed transportation date.

11.3 Planning for the transport of high loads

Before transporting a high load, you must consult ESB Networks on 1800 372 757 to discuss transportation and to agree control measures.

Voltage determines the minimum safe clearance required between the nearest point of any load and a live electricity line. This minimum safe clearance can vary substantially across the possible range of voltages – public roads are crossed by overhead lines ranging from 230 volts to 400,000 volts.

To determine the control measures required for a high load, ESB Networks will have to individually assess each overhead line crossing on the proposed route. In some cases, no specific control measures beyond this assessment may be required. In general, control measures may vary from having to arrange for ESB Networks to supervise load transport to switching out and earthing lines or, in more extreme cases, making arrangements for raising the height of the lines before the load is transported.

11.4 Information required by ESB Networks

When you contact ESB Networks about transporting a high load, provide this information.

- a clearly marked road map that shows:
 - the planned route for the load;
 - planned deviations to avoid other hazards such as bridges;
 - the starting and finishing locations of the journey;
- accurate detailed dimensions of the load including maximum height and width;
- the name and contact details of the road transport operator;
- the planned schedule for transporting the load including:
 - dates and times;
 - stopover arrangements; and
 - whether more than one load is involved.

11.5 Responsibilities of the road transport operator

A road transport operator must:

- notify ESB Networks of its intention to move a high load under or close to ESB Networks overhead electricity lines or equipment;
- provide accurate information on the high load to ESB Networks;
- comply with all precautions and control measures advised by ESB Networks;
- comply with all directions given by any ESB Networks staff that escort the high load.

11.6 Additional requirements and recommendations

You may be required to apply to other statutory or public bodies for a permit to transport a high load before you transport the load.

The definition of high loads in section 11.2 relates to safe passage under ESB Networks overhead electricity lines only. When you apply to other statutory or public bodies for permission or approval to move a high load, the height definition may be different to the one used in this Code of Practice.

12 Emergency procedures

Case 1:

An electricity line is on the ground or conductors are low or fallen 68

Case 2:

A machine, truck or high-lift plant is in contact with an overhead line 68

Case 2(a):

Machine is operable 68

Case 2(b):

Machine is not operable. No immediate risk from fire or other hazard 69

Case 2(c):

Machine is not operable. Is at risk from fire or other hazard 69

12 Emergency procedures

These are designed to reduce the risk of injury and death if there is accidental contact with electricity networks.

Emergencies include:

- fallen or low conductors
- conductors in contact with a vehicle or machine
- fire
- electric shock
- an injury/casualty on site
- road accident
- damage to overhead lines, underground cables or other electrical plant

If you are unsure of the voltage of overhead lines, treat them as if they are high voltage. Remember, low voltage (LV) is less than or equal to 1000 volts (1.0kV). Higher Voltage (HV) is more than 1000 volts (1.0kV).

**Emergency
Contact No.
24 Hour /
7 Day Service**

1800 372 999

Case 1: An electricity line is on the ground or conductors are low or fallen

- Stop work, remain calm and stay away.
- Keep everyone away from live conductors.
- Do not allow yourself or others to come into contact with a person who is in contact with live conductors.
- Contact the ESB Networks emergency service at 1800 372 999 to get the network disconnected.
- Do not leave the site unattended. Remain on site until ESB Networks staff arrive.
- Do not approach conductors until ESB Networks confirm it is safe.

Case 2: A machine, truck or high-lift plant is in contact with an overhead line

There are three scenarios in this case.

- The machine is ‘operable’.
- The machine is ‘not-operable’. There is no immediate risk from fire or other hazards.
- The machine is ‘not-operable’. There is an immediate risk from fire or other hazards.

Case 2(a): Machine is operable

- Stop work, remain calm and stay in the cab.
- Instruct everyone outside the vehicle not to approach it or to make contact with it.
- Disengage from the line.

- Lower the plant.
- Slowly drive well clear of the line only if this does not risk breaking the conductor or dragging it to the ground.
- Contact ESB Networks emergency service at 1800 372 999 to get the network disconnected.
- Do not leave the cab until ESB Networks confirm it is safe.
- Do not leave the site unattended. Remain on site until ESB Networks staff arrive.
- After the emergency has ended, check vehicles for damage before using them again.

Case 2(b): Machine is not operable. No immediate risk from fire or other hazard

- Stop work, remain calm and stay in the cab.
- Instruct everyone outside the vehicle not to approach it or to make contact with it.
- Contact ESB Networks emergency number at 1800 372 999 to get the network disconnected.
- Do not leave the cab until ESB Networks confirm it is safe.
- Do not leave the site unattended. Remain on site until ESB Networks staff arrive.
- After the emergency has ended, check vehicles for damage before using them again.

Case 2(c): Machine is not operable. Is at risk from fire or other hazard.

- Stop work and remain calm.
- Instruct everyone outside the vehicle not to approach it or to make contact with it.
- Jump clear of the machine or plant.
- Land with your feet as close together as possible to minimise the possibility of electric shock.
- Avoid placing your hands on the ground.
- Avoid making contact with any part of the vehicle when you are on the ground.
- Shuffle away from the vehicle. Take half steps only or hop with both your feet together. Avoid taking full steps or spreading your feet in any direction.
- When you are clear of the vehicle, machine or plant, continue to treat the conductors and vehicles as if they are live.
- Maintain a safe distance from the vehicle and never attempt to re-enter the vehicle. Ensure no one approaches the vehicle.
- Contact ESB Networks Emergency Service at 1800 372 999 to request disconnection of the network.
- Do not leave the site unattended. Remain on site until ESB Networks staff arrive.
- After the emergency has ended, check vehicles for damage before using them again.

Figure 10: If you accidentally come in contact with an overhead electricity line.



Correct method for exiting a vehicle when there is a risk of fire or other hazard

Emergency Contact No.
24 Hour/7 Day Service

1800 372 999

Contents

ANNEXES

Annex 1: Principles of Prevention	72
Annex 2: Form OHLI	73
Annex 3: Electrical Hazard Risk Assessment form: EHRA (template)	75
Annex 4: Road resurfacing safety audit form (template)	76
Annex 5: Contacting ESB Networks	77
Annex 6: Other useful contacts	78
Annex 7: Changes to the Code of Practice	79
Other useful codes of practice and guidelines	81

Annex 1: Principles of Prevention

Schedule 3 to the Safety, Health and Welfare at Work Act 2005 lists the General Principles of Prevention of accidents and ill-health in the workplace. The Principles of Prevention are a hierarchy of control methods for risk elimination and risk reduction.

The General Principles of Prevention are set out in descending order of preference.

1. The avoidance of risks.
2. The evaluation of unavoidable risks.
3. The combating of risks at source.
4. The adaptation of work to the individual, especially as regards the design of places of work, the choice of work equipment and the choice of systems of work, with a view, in particular, to alleviating monotonous work and work at a predetermined work rate and to reducing the effect of this work on health.
5. The adaptation of the place of work to technical progress.
6. The replacement of dangerous articles, substances or systems of work by safe or less dangerous articles, substances or systems of work.
7. The giving of priority to collective protective measures over individual protective measures.
8. The development of an adequate prevention policy in relation to safety, health and welfare at work, which takes account of technology, organisation of work, working conditions, social factors and the influence of factors related to the working environment.
9. The giving of appropriate training and instructions to employees.

The employer, employee, PSDP, Designer, PSCS and Contractors are responsible for implementing these principles.

Further details in relation to applying the Principles of Prevention can be found at hsa.ie.

Annex 2: Form OHL1

Protective measures: safety check for barriers, goalposts, warning signs, bunting and other protection (example)

Recommended weekly safety check for overhead line protection				Site: ABCD at Newtown Road	PSCS: Joe Bloggs
Date and time	Inspected by	Location and crossing ID	Protection type	Comment	Action
1 May 2016 11.00am	J Smith Safety Officer	Grid 3-5, A-B	Bunting	Bunting damaged at the north side of the ESB line	Reported to J Murphy, site engineer at 13.00, 1 May 2016
"	"	"	Goalposts	In order	Reported to J Murphy, site engineer at 13.00, 1 May 2016
"	"	"	Traffic barriers	In order	No action
"	"	"	Signage	In order	No action
"	"	Grid 6-12, A-B	Bunting	In order	No action
"	"	"	Goalposts	Not applicable	Not applicable
"	"	"	Traffic barriers	4 traffic barriers removed at the south side of the line	Reported to J Murphy, site engineer at 13.00, 1 May 2016
"	"	"	Signage	In order	No action

Every day, check the condition and placement of protective measures.

Once a week, fill in a copy of OHL1 or a similar form and file it in your safety file.

Annex 2: Form OHL1

Protective measures: safety check for barriers, goalposts, warning signs, bunting and other protection (template)

Every day, check the condition and placement of protective measures.

Once a week, fill in a copy of OH&I or a similar form and file it in your safety file.

Annex 3: Electrical Hazard Risk Assessment form: EHRA (template)

On-site Electrical Hazard Risk Assessment form: EHRA

Fill in this form when you are resurfacing or strengthening roads near live overhead electricity lines or equipment.

Every day on site, fill in an Electrical Hazard Risk Assessment form (EHRA) for each crossing and conflict.

Name of contract: _____

Road number and section number : _____

Conflict identification number

Specify the voltage of electricity lines that cross,
run parallel to or closely approach a road
(LV; 10/20/38kV; 110kV; 220kV; 400kV)

Are the crew familiar with chapter 9 of the Code of Practice for Avoiding Danger from Overhead Electricity Lines?(LV; 10/20/38kV; 110kV; 220kV; 400kV) Y / N* Y / N* Y / N* Y / N* Y / N*

Are the extremities of the no-tip zone established and marked out on site? Y / N* Y / N* Y / N* Y / N* Y / N*

Are warning signs erected at both entry and exit of no-tip zone? Y / N* Y / N* Y / N* Y / N* Y / N*

Has a person been appointed to control work at the overhead line crossing or conflict location? Y / N* Y / N* Y / N* Y / N* Y / N*

Has a procedure for safe working at the overhead line crossing or conflict location been decided by the person in charge (PIC)? Y / N* Y / N* Y / N* Y / N* Y / N*

Do all staff understand the proposed safe work method statement and agree that work can proceed safely with the networks live? Y / N* Y / N* Y / N* Y / N* Y / N*

Signed by person in charge: _____ Date: _____

Agreed by crew (Circle one): Yes / No* ESB Emergency Phone: 1800 372 999

*If the answer to any of these questions is no, appropriate action must be taken to address the issue before working at that location.

Annex 4: Road resurfacing safety audit form (template)

Annex 4: Road resurfacing safety audit form (template)

Contractor:

Audit Date:

Work location:

Auditor(s):

Description of work:

Names of crew members:

Issue	Status	Comments
Does the crew have a copy of the preliminary survey or pre-work planning assessment?	Y / N*	
Has an electrical hazard risk assessment (EHRA) been completed for all relevant crossings and conflicts?	Y / N*	
Is the crew familiar with EHRA requirements?	Y / N*	
Are no-tip zones established, marked on site and being complied with?	Y / N*	
Are there warning signs at crossing and conflict locations?	Y / N*	
Is there an appointed person controlling work at crossing and conflict locations?	Y / N*	
Are crew members trained for the tasks they are completing?	Y / N*	
Is the crew working in line with the appropriate method statement?	Y / N*	
Has the crew got the ESB Networks Emergency contact number? (1800 372 999)	Y / N*	
Commendable safe actions		
Deviations observed		
Suggestions taken and items for follow up		

Signed by person in charge: _____ Date: _____

Signed by auditor: _____ Date: _____

Annex 5: Contacting ESB Networks

For all emergencies, including contact with overhead electricity lines, call 1800 372 999

ESB Networks

General queries: 1800 372 757

Use this general number to find out about:

- new electricity connections;
- increased capacity;
- transporting high loads;
- voltage enquiries; and
- safety and technical queries.

Website esbnetworks.ie

To get electricity line maps or records

Email: dig@esb.ie

Phone: 1800 928 960
+353 1 858 2060

This service operates Monday to Friday only.

Fax us at: 01 638 8169

Write to us at: ESB Networks Central Site
St Margaret's Road
Finglas
Dublin 11
D11 X3W7

To get copies of free safety material

Email us at: esbnetworks@esb.ie

Phone: 1800 372 757

Visit: esb.ie/esbnetworks

Annex 6: Other useful contacts

Gas Networks Ireland

24 Hour Emergency Service: 1800 20 50 50

Gas Networks Ireland 'Dial Before You Dig': 1800 427 747

Gas Networks Ireland Transmission Enquiries: 021 453 4 562

Email: dig@gasnetworks.ie

EIR

'Click Before You Dig'

<http://support.eir.ie/article/clickbeforeyoudig>

Eir Home: 1800 773 729

Annex 7: Changes to the Code of Practice

This document updates the 2008 version of the Code of Practice for Avoiding Danger from Overhead Electricity Lines. The main changes are:

- improved readability using NALA Plain English guidelines;
- increased use of bullet pointing;
- early introduction of definitions for ‘Competent Person’, ‘Exclusion Zone’, ‘Hazard Zone’ and ‘Overhead Line’ and explanations of abbreviations such as HV, LV and kV;
- use of the term ‘network owner/operator’ rather than ‘ESB Networks’ to reflect the possibility of different network owner/operators in the future;
- early introduction of what the COP does and doesn’t cover, specifically the exclusion from the code of workers competent to deal with the hazards of electricity. (Concern had been expressed that the 2008 version of the COP could be interpreted as placing an impediment on competent workers coming within 6 metres of an overhead line, even if adequate safety precautions were in place);
- explanation of the use of bare and insulated overhead lines and the need for similar levels of caution in both cases;
- use of more Irish and up-to-date photos and graphics to illustrate the messages contained in the COP;
- updating the responsibilities of the client in accordance with the 2013 Safety Health and Welfare at Work (Construction) Regulations;
- inclusion of additional information on notifying the HSA about construction activities;
- removal of inconsistencies between the COP and the HSA’s ‘Guidelines on the Procurement, Design and Management Requirements of the Safety Health and Welfare at Work (Construction) Regulations 2013’;
- inclusion of emergency procedures and up-to-date illustrations in the body of the COP (rather than in an annex);
- updated contact information in Annex 5 and Annex 6;
- a bibliography after Annex 7;
- technical updates and references to current legislation;

- colour-coding of sections for ease of use;
- figures and tables – they are now cross-referenced throughout the document for ease of use.

Other useful codes of practice and guidelines

[Guidelines for Safe Working Near Overhead Lines in Agriculture \(HSA\)](#)

[Irish Forestry Safety Guide \(IFSG\) 804 \(HSA\)](#)

[Code of Practice for Avoiding Danger from Underground Services \(HSA\)](#)

[Summary of Key Duties under the Procurement, Design and Site Management Requirements of the Safety Health and Welfare at Work \(Construction\) Regulations, 2013 \(HSA\)](#)

[Guidelines on the Procurement, Design and Management Requirements of the Safety Health and Welfare at Work \(Construction\) Regulations 2013 \(Updated\) \(HSA\)](#)

[Guide for Homeowners. Getting Construction Work Done Safely \(HSA\)](#)

[Mobile Elevated Work Platforms \(MEWPs\) Guidance on Safe Operating Procedures \(HSA\)](#)

ARE YOU SURE IT'S SAFE?



- Always ask yourself the question, are you sure it's safe?
- When working outdoors, watch out for overhead electricity lines and underground cables.
- Remember, electricity is there for the good of everyone but can be dangerous and cause serious injury, or worse.
- Stay safe, stay clear of the electricity network.

For emergencies call
[1800 372 999](tel:1800372999)

Follow us on twitter
[@ESBNetworks](https://twitter.com/ESBNetworks)

Website
esbnetworks.ie

Notes

Notes



Stock No 9803203-3