



NETWORKS

# HOW YOU CAN AVOID HITTING ELECTRICAL CABLES WHEN DIGGING AND DRILLING



# How you can avoid hitting electrical cables when digging and drilling

ESB Networks 2017

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NETWORKS

Serving all electricity customers

# DO YOU KNOW WHAT LIES BELOW? Always dial before you dig

Avoid the dangers of underground electricity cables.

Contact us to get maps which show the locations of ESB Networks' underground cables.

PHONE: **1850 928 960**

EMAIL: **dig@esb.ie**

FAX: **01 6388169**

In case of emergency phone

**1850 372 999** (24 HOUR/7 DAY SERVICE)

[www.esbnetworks.ie](http://www.esbnetworks.ie)



IMPORTANT: Please refer to the HSA "Code of Practice For Avoiding Danger From Underground Services" on how to safely carry out excavation work in the vicinity of underground cables. Available at [www.hsa.ie](http://www.hsa.ie)



# 1. What type of work does this booklet apply to?

This booklet provides guidelines that apply to all work that involves penetrating the ground at or below surface level where there may be:

- buried ESB Networks cables; or
- privately owned cables like street lighting cables.





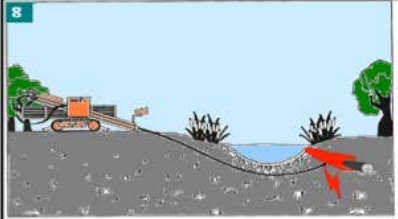



This includes:

- digging trenches to lay pipes or cables; and
- excavation (removing earth to change ground levels or dig a foundation for a house or other structure to be built).

It also includes trenchless techniques like:

- moling (where a machine (mole) forces its way through the soil along the desired path of the pipe),
- pipe ramming (where pipe soil can enter the open pipe when it is being installed),
- horizontal directional drilling (drilling that is precisely directed over a long path using different methods), and
- sheet piling (a wall of connected steel sheets that are driven into the ground to provide support to structures, prevent flooding and so on).

## 2. Examples of work

Digging trenches and excavation		
Using hand tools	Using a jackhammer	Mechanical excavator
		
Moling	Horizontal directional drilling; moling or pipe ramming	
		
Using a concrete saw	Driving earth-rods	Cutting into service ducts
		

### 3. What are the hazards of doing work near cables?

#### **Underground cables**

When digging or drilling, one of the main dangers is damaging underground electricity cables. You can get an electric shock or be electrocuted if you come in contact with live cables of any voltage including low voltage.

#### **Low voltage cables can be fatal**

Contact with cables of any voltage, even low voltage, can cause fatal injuries such as damage to the heart.

#### **Explosion, fire or flames**

If a cable is pierced or crushed causing the outer cable sheath and the inner conductors of the cable to connect, this can cause explosion, fire or flames. You could end up with severe and potentially fatal burns to your hands, face and body.

#### **Catastrophic electrical fires**

High voltage power cables can be oil filled and oil can ignite. Electrical fires can be catastrophic if damage spreads to other nearby services such as gas pipes. If a gas pipe ignites it can further fuel the fire.

## 4. Where can I find the legal requirements?

The legal requirements to ensure a safe place of work are set out in the:

- Safety Health and Welfare at Work Act;
- Safety Health and Welfare at Work Construction Regulations;
- Safety, Health and Welfare at Work (General Application) Regulations; and
- Health and Safety Authority (HSA) Code of Practice for Avoiding Danger from Underground Services

## 5. How can I ensure a safe system of work?

When working near underground cables there are steps to follow which can help you reduce the risk of having an accident. These steps are covered in detail in the 'Code of Practice for Avoiding Danger from Underground Services' produced by the Health and Safety Authority and available from [www.hsa.ie](http://www.hsa.ie).

In this section we describe the three main ways you can make sure that you will have a safe system of work. You must:

- a. use plans correctly to help you locate power cables (see 5.1);
- b. use cable locating devices (see 5.2); and
- c. use safe digging and drilling practices (see 5.3).



These three practices complement each other. You should use all three to ensure that you do not contact or cause damage to a cable buried in the ground.

## 5.1 How do I use plans to locate power cables?

Before you start work, you must have all of the cable plans for the location. Make sure that they are always kept on site while work is under way.

You should make sure cable plans:

- are up-to-date;
- cover all cable voltages at the location; and
- can be understood by you.

You should also make sure that you use cable plans:

- before starting to dig; and
- throughout all of the work.

### **Understanding plans and maps**

You should understand the scale of the plans and be able to read and understand the map legends, symbols and guideline notes. However, you should understand that plans may only give an indication of the location, configuration (how they are organised) and number of cables present. You cannot rely on plans for accurate distance measurement.

## **Assume there are more cables than you know about**

Always assume that there are more buried cables present than you have located. You should understand that service cables (small cables which bring electricity to a building or lighting point) are not usually shown on cable plans. This includes things like low voltage cables serving individual premises or other electrical supplies like:

- lamp posts,
- parking ticket machines,
- bus shelters,
- advertising hoardings, and
- traffic lights.

You should always check the area for signs that might suggest the presence of service cables and use a cable locator and safe digging practice (see 5.3).

## **Depth of cables**

Most cable plans will not show you cable depths so you must never assume you know how deep cables are. This means you must always be cautious.

Some cables may be found at very shallow depths.

## 5.2 Use cable locating devices to help find cables

You should use suitable cable-locating devices along with the cable plans to find out as accurately as possible the position of underground cables in or near the work area. You should be trained and able to use the cable-locating device to locate underground cables.

### **Hum detectors**

Hum detectors are used to locate a cable buried in the ground. An example of a hum detector is a cable-locating device set on power mode. Hum detectors are the easiest cable-locating devices to use, but they do not respond to unloaded (where no current is flowing) or direct current (where the current flows only in one direction) cables.

Hum detectors may also fail to detect:

- lightly loaded low voltage cables (such as those used for street lighting); and
- high voltage power cables.

### **Radio frequency detection mode**

A locator with a radio frequency detection mode may detect unloaded, lightly loaded, direct current and high voltage power cables. This means that you should use this for additional back-up checks. Even where a locating device does not give a positive reading there may still be cables present and these may still be live.

## Mark cable position on the ground

You should make the position of all cables located on the ground using waterproof paint or crayon.

### 5.3 Safe digging and drilling practices

#### 1. **Proceed with caution**

Treat all cables found anywhere as 'live'.

#### 2. **Hand dig when possible**

- Wherever possible, hand dig near buried cables.
- Use insulated hand tools with wooden or fibreglass handles.

#### 3. **Watch those picks and crowbars**

Take special care using picks or insulated crowbars.

#### 4. **Protect yourself**

Wear gloves and eye protection.

#### 5. **Keep handheld power tools away from cables**

Do not use hand held power tools within 0.5m of marked position of electricity cables

#### 6. **Follow advice for handheld power tools over marked cable lines**

Do not use handheld power tools directly over a marked line of a cable unless:

you have already found the cable at that position by careful hand digging beneath the surface;

and

it is a safe depth (at least 300mm) below the bottom of the surface to be broken; or

you have used a physical barrier to prevent the tool striking the cable.

**7.**

### **Keep using the cable locator right throughout the project**

- When the surface has been broken out, use a cable locator again to reconfirm the position of services.
- You should use the cable locator frequently and repeatedly during the work.

**8.**

### **Mechanical excavators**

- Before using a mechanical excavator near electricity cables, you should excavate trial holes by careful hand-digging.
- Confirm the depth of the cable(s) at the point of work.
- You should not operate the excavator within a radial distance of 300mm (300mm in any direction) from the cable or cables.
- When using a mechanical excavator near electricity cables keep everyone clear of the bucket and the excavator while it is digging.

**9. Watch out for concrete**

Where an electric cable is embedded in concrete, arrange for the cable to be disconnected before breaking off concrete.

**10. Protect exposed cables**

Where cables become exposed for any reason, you should take suitable precautions to prevent damage while other works are going ahead. For example, you could use physical ways to do this like using timber boarding or sand bags.

**11. Leave exposed cables alone**

Do not use exposed electricity cables as a convenient step or hand-hold.

**12. Don't move cables**

- Do not handle or try to alter the position of exposed ESB electricity cables unless under the instruction of an authorised ESB person.
- Take extreme care where joints in the cables have been exposed.

**13. Damaged cables, gas pipes or high pressure water mains**

Watch out for even slight damage, like a scrape to the outer surface, to:

- electricity cables,
- gas pipes, or

- high pressure water mains.

If they are even slightly damaged, you should tell the owner of the property immediately. People should be kept well clear of the area until it has been made safe by the owner.

#### **14. Keep contact numbers handy**

You should have the 24-hour emergency contact number for ESB and other relevant utilities readily available for immediate contact if damage occurs to an:

- electricity cable,
- gas pipe, or
- high pressure water mains.

**The ESB emergency telephone number for cable damages is 1850 372 999.**

## **6. Diversion of underground cables**

Contact ESB Networks as early as possible in the planning stage if you need to divert the underground network to make your construction work possible.

### **Cable diversions can take several months**

Cable diversions can take several months due to things like:

- wayleave serving (sorting out the legal rights to access private land to install cables);

- road opening licence requirements; and
- ESB Networks workloads.

Sometimes, we cannot design a suitable cable diversion because there is no alternative route. Generally, it is significantly more costly and difficult to divert cables at the higher voltages.

## 7. What happens if you damage an underground cable?

### **Oil-filled cables**

Some cables are filled with oil and if damaged, the oil may ignite leading to an explosion.

### **High voltage cables**

Repairs to high voltage cables are extremely costly and time consuming. Costs can be more than €50,000.

### **Low voltage cables**

Low voltage cables are unsafe to handle and can cause injury and electrocution. They are not safer than other voltages.

### **Loss of electricity supply**

Damage to cables can cause loss of supply to customers. This may result in serious consequences for emergency services like hospitals.



## National Grid at risk

For higher voltages the effects can extend to the entire national electricity grid.

## Person responsible for damage must pay all costs

All costs associated with damage to cables must be borne by the party who did the damage.

# 8. What to do if someone is injured

## Serious accident

If there is a serious accident, seek medical help immediately.

Contact the emergency services on:

- 112; or
- 999.

You should also phone the ESB Networks Emergency number:

- 1850 372 999.

## Do not approach person until clear

Do not approach the injured person unless:

- they are well clear of the electrical hazard; or
- the electricity supply is confirmed to be **Off** by an ESB Networks authorised person.



## **Do not move the injured person unless they are in further danger**

You should not move an injured person unless they are in further immediate danger.

## **Be cautious when attending a casualty**

Anyone attending a casualty should be sure not to touch exposed cables, tools or machinery in case they are still live.

## **Guard the site**

Guard the site so that other people do not enter the danger area.

## **Treat burns urgently**

Any burns should be treated by trained medical staff and severe burns should receive urgent attention as they may prove fatal.

## **Have a first aid kit**

A first aid kit should always be available.

# 9. Further safety information

ESB Networks provide a range of safety information on our website:

- [www.esbnetworks.ie](http://www.esbnetworks.ie).

You can download free PDF versions of safety booklets and posters at:

<https://www.esbnetworks.ie/tns/publications/-in-category/categories/publications/safety/safe-digging>

## Our booklets

- Avoidance of electrical hazards when working near overhead electric lines
- How you can avoid hitting electrical cables when digging or drilling
- Construction Safety.
- Be Winter Ready.
- The Safe use of Electricity in the Home.
- Farm Safely with Electricity.
- ESB Networks Electrical and Magnetic Fields.
- Consequences of Flooding for Electrical Safety.
- How you can avoid hitting electrical cables when digging or drilling

You can see our safety videos on our website

[www.esbnetworks.ie](http://www.esbnetworks.ie)

## 10. Useful contacts

### How to contact ESB Networks

**ESB Network's emergency number**

1850 372 999

**ESB Network's general queries number**

1850 372 757

Use this general number to find about:

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

**ESB Network's website**

[www.esbnetworks.ie](http://www.esbnetworks.ie)

### For cable maps and records

To get power cable maps or records:

Email us at:

[dig@esb.ie](mailto:dig@esb.ie);

1850 928 960

+353 1 858 2060

Phone us at:

This service operates Monday to Friday only.

Fax us at

01-638 8169

ESB Networks Central Site,  
St Margaret's Road,

Write to us at:

Finglas,  
Dublin 11.

When applying to us for power cable maps or records, you should include:

- a 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.

Note: We will send maps to you by email within 10 days in PDF format.

**ESB NETWORKS** Serving all electricity customers

**DIAL BEFORE YOU DIG**

**If your machine contacts cables:**

- Stay in cab and call ESB Networks
- Keep others away
- If machine catches fire - jump clear

**Emergency No. 1850 372 999**

# How to contact the Health and Safety Authority (HSA)

## **Phone or website**

- Phone: 01-614 7000
- Website: [www.hsa.ie](http://www.hsa.ie)

## **Address**

You can write to the HSA at:

HSA

The Metropolitan Building

James Joyce Street

Dublin 1

D01 K0Y8.



ESB Networks Emergency Number:

**Phone 1850 372 999**

(24 hour / 7 day service)

[www.esbnetworks.ie](http://www.esbnetworks.ie)

