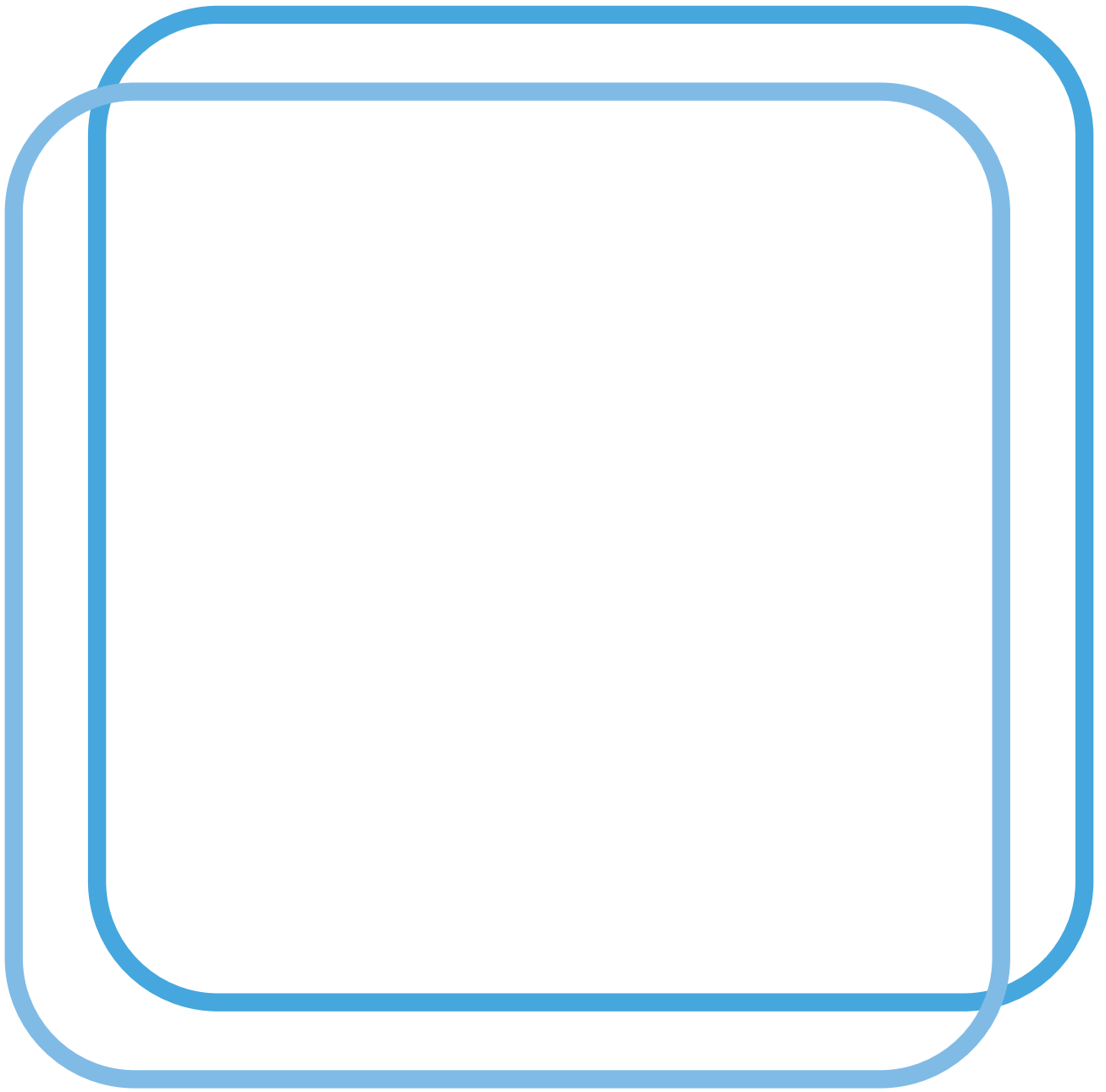


# Electricity



# Electrical Safety



Safer Business - Better Health

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## Introduction

### Introduction

Each year approximately 1000 accidents at work involving electric shock or burns are reported to the Health and Safety Executive or Local Authority. Around 30 of these are fatal. Most of these fatalities arise from contact with overhead or underground power cables.

Even non-fatal shocks can cause severe and permanent injury. Shocks from faulty equipment

may lead to falls from ladders, scaffolds or other work platforms. Those using electricity may not be the only ones at risk: poor electrical installations and faulty electrical appliances can lead to fires which may also cause death or injury to others. Most of these accidents can be avoided by careful planning and straightforward precautions.

### What are the Hazards?

The main hazards are:

- contact with live parts causing shock and burns (normal mains voltage, 230 -240 volts AC, can kill);
- faults which could cause fires;

- fire or explosion where electricity could be the source of ignition in a potentially flammable or explosive atmosphere, e.g. in a paint spray booth.

### Assessing the Risk

Hazard means anything which can cause harm

Risk is the chance, great or small, that someone will actually be harmed by the hazard.

The first stage in controlling risk is to carry out a risk assessment in order to identify what needs to be done (This is a legal requirement for all risks at work.) (For further information please see the risk assessment section)

The risk of injury from electricity is strongly linked to where and how it is used. The risks are greatest in harsh conditions, for example:

- in wet surroundings - unsuitable equipment can easily become live and can make its surroundings live;
- out doors - equipment may not only become wet but may be at greater risk of damage;

cont'd

## Assessing the Risk (cont'd)

- in cramped spaces with a lot of earthed metalwork, such as inside a tank or bin - if an electrical fault develops it could be very difficult to avoid a shock.

Some items of equipment can also involve greater risk than others. Extension leads are

particularly liable to damage to their plugs and sockets, to their electrical connections, and to the cable itself. Other flexible leads, particularly those connected to equipment which is moved a great deal, can suffer from similar problems.

## Reducing the Risk

Once you have completed the risk assessment, you can use your findings to reduce unacceptable risks from the electrical equipment in your place of work.

There are many things you can do to achieve this:

### Ensuring the electrical installation is safe:

- install new electrical systems to a suitable standard
- existing installations should also be properly maintained;
- provide enough socket-outlets - overloading socket-outlets by using adaptors can cause fires.

### Provide safe and suitable equipment:

- choose equipment that is suitable for its working environment;
- electrical risks can sometimes be eliminated by using air, hydraulic, battery or hand-powered tools. These are especially useful in harsh conditions;
- ensure that equipment is safe when supplied and then maintain it in a safe condition;
- provide an accessible and clearly identified switch near each fixed machine to cut off the power in an emergency;

- for portable equipment, use socket-outlets which are close by so that equipment can be easily disconnected in an emergency;
- the ends of flexible cables should always have the outer sheath of the cable firmly clamped to stop the wires (particularly the earth) pulling out of the terminals;
- replace damaged cables completely;
- use proper connectors or cable couplers to join lengths of cable. Do not use strip connector blocks covered in insulating tape;
- some types of equipment are double insulated. These are often marked with a 'double-square' symbol. The supply leads have only two wires - live (brown) and neutral (blue). Make sure they are properly connected if the plug is not a moulded-on type;
- protect light bulbs and other equipment which could easily be damaged in use. There is a risk of electric shock if they are broken;
- electrical equipment used in flammable/explosive atmospheres should be designed to stop it from causing ignition. You may need specialist advice.

### Reducing the Voltage

One of the best ways of reducing the risk of injury when using electrical equipment is to limit the supply voltage to the lowest needed to get the job done, such as:

- temporary lighting can be run at lower voltages, e.g. 12, 25, 50 or 120 volts;

- where electrically powered tools are used, battery operated are safest;
- portable tools are readily available which are designed to be run from a 110 volts centre-tapped-to-earth supply

### Provide a Safety Device

If equipment operating at 230 volts or higher is used, a residual current device (RCD) can provide additional safety. An RCD is a device which detects some, but not all, faults in the electrical system and rapidly switches off the supply. The best place for an RCD is built into the main switchboard or the socket, as this means that the supply cables are permanently protected. If this is not possible a plug incorporating an RCD, or a plug-in RCD adaptor, can also provide additional safety.

RCDs for protecting people have a rated tripping current (sensitivity) of not more than 30 milliamps (mA). However you must remember:-

- an RCD is a valuable safety device, never bypass it;
- if the RCD trips, it is a sign there is a fault. Check the system before using it again;
- if the RCD trips frequently and no fault can be found in the system, consult the manufacturer of the RCD and the equipment being used.
- the RCD has a test button to check that its mechanism is free and functioning. Use this regularly. If it is faulty, replace it straight away.

### Carry out preventative maintenance

All electrical equipment and installations should be maintained to prevent danger. It is strongly recommended that this includes an appropriate system of visual inspection and, where necessary, testing.

By concentrating on a simple, inexpensive system of looking for visible signs of damage or faults, most of the electrical risks can be controlled. This will need to be backed up by testing as necessary.

It is recommended that both fixed installations and portable

appliances are inspected and tested periodically by a competent person.

The frequency of inspections and any necessary testing will depend on the type of equipment, how often it is used, and the environment in which it is used. Records of the results of inspection and testing can be useful in assessing the effectiveness of the system.

Employees can help by reporting any damage or defects they find.

## Work Safely

Make sure that people who are working with electricity are competent to do the job. Even simple tasks such as wiring a plug can lead to danger - employers must ensure that people know what they are doing before they start.

### Check that:

- suspect or faulty equipment is taken out of use, labelled 'DO NOT USE' and kept secure until examined by a competent person;
- where possible, tools and power socket-outlets are switched off before plugging in or unplugging;
- equipment is switched off and/or unplugged before cleaning or making adjustments.

More complicated tasks, such as equipment repairs or alterations to an electrical installation, should only be tackled by people with knowledge of the risks and the precautions needed.

You must not allow work on or near exposed live parts of equipment unless it is absolutely unavoidable and suitable

precautions have been taken to prevent injury both to the workers and to anyone else who may be in the area.

### Underground power cables

Always assume cables will be present when digging in the street, pavement or near buildings. Use up-to-date service plans, cable avoidance tools and safe digging practice to avoid danger.

### Overhead power lines

When working near overhead lines, it may be possible to have them switched off if the owners are given enough notice. If this cannot be done, consult the owners about the safe working distance from the cables. Remember that electricity can flash over from overhead lines even though plant and equipment do not touch them. Over half of the fatal electrical accidents each year are caused by contact with overhead lines.