

Electrical Safety at the Workplace



Fig1

Introduction

Electricity plays a vital role in our daily lives but it can also kill or severely injure people and cause damage to property. Every year several accidents at work involving electric shock or burns are reported.

Even non-fatal shocks can cause severe and permanent injury. For example shocks from faulty equipment may lead to falls from ladders, scaffolds or other work platforms.

Those using or working with electricity may not be the only ones at risk- poor electrical installations and faulty electrical appliances can lead to fire, which may also cause death or injury. Most of these accidents can be avoided by careful planning and straightforward precautions.

This leaflet provides some basic measures to help you control the risks from your use of electricity at work.

What are the main hazards?

- Contact with live parts causing shock and burns - normal mains voltage, 230v AC, can kill;
- Faults which could cause fire;
- Fire or explosion where electricity could be the source of ignition in a potentially flammable or explosive atmosphere.



ASSESSING THE RISK

Your health and safety risk assessment should take into account the risks associated with electricity. It will help you decide what action you need to take to use and maintain your electrical installations and equipment and also how often maintenance is needed.

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;
- outdoors – equipment may not only become wet but may be at greater risk of damage;
- in confined spaces with a lot of earthed metalwork such as inside a tank – if an electrical fault developed 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, sockets, connections and the cable itself. Other flexible leads, particularly those connected to equipment which is often moved, can suffer from similar problems.

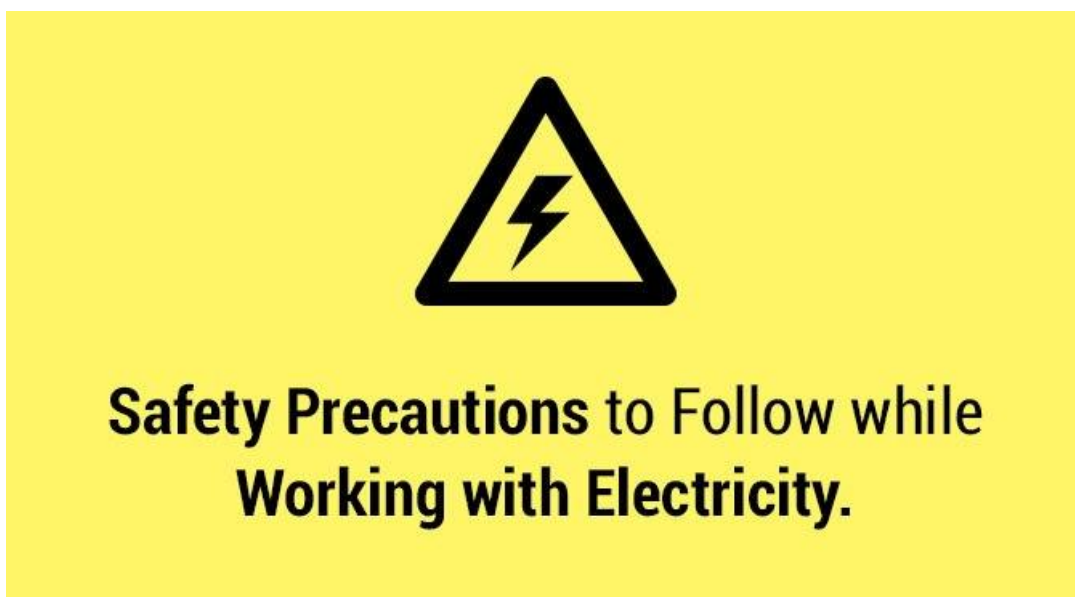


Fig2

REDUCING THE RISK

Once that you have completed the risk assessment, you can use your findings to reduce unacceptable risks from the electrical equipment. Some of the things to be done are listed below.

Ensure people working on or with your electrical equipment or systems are 'competent' for the task.

"Competent" means possessing adequate qualifications, suitable training and sufficient knowledge, experience and skill for the safe performance of the specific task or work required.

Ensure the electrical installation is safe

Make sure that:

- New electrical systems are installed to a suitable standard, e.g. BS 7671: Requirements for electrical installations, and then maintain them in a safe condition;
- Existing installations are maintained periodically in a safe condition;
- Ensure that the appropriate amount of socket outlets are installed because overloading socket outlets can cause a fire.
- Ensure that multi sockets are not overloaded



Fig3

Provide safe and suitable equipment

- Choose equipment that is suitable for its working environment.
- Electrical risks can sometimes be eliminated by using compressed air, hydraulic hand-powered tools, which are ideal in harsh environmental conditions.
- Ensure that equipment is safe to use when supplied to employees and that it is kept adequately maintained at all times, in a safe working condition.
- Provide an easily accessible and clearly identified switch near each fixed machine together with an emergency stop button. Ensure that on power failure the switch will trip out and on reinstating the power supply the same machine will not operate automatically.
- The ends of flexible cables should always have the outer sheath of the cable firmly clamped to stop the wires pulling out of the terminals.
- Replace damaged section of cable completely.
- Use proper connectors to join lengths of cable. Do not use strip connector blocks covered in insulated tape.
- Some types of equipment are double insulated. The supply leads have only two wires-live and neutral.
- Protect light bulbs and other equipment which can easily be damaged in use.
- In potentially flammable or explosive atmospheres, only special electrical equipment designed for these areas should be used. You may need a specialist advice.



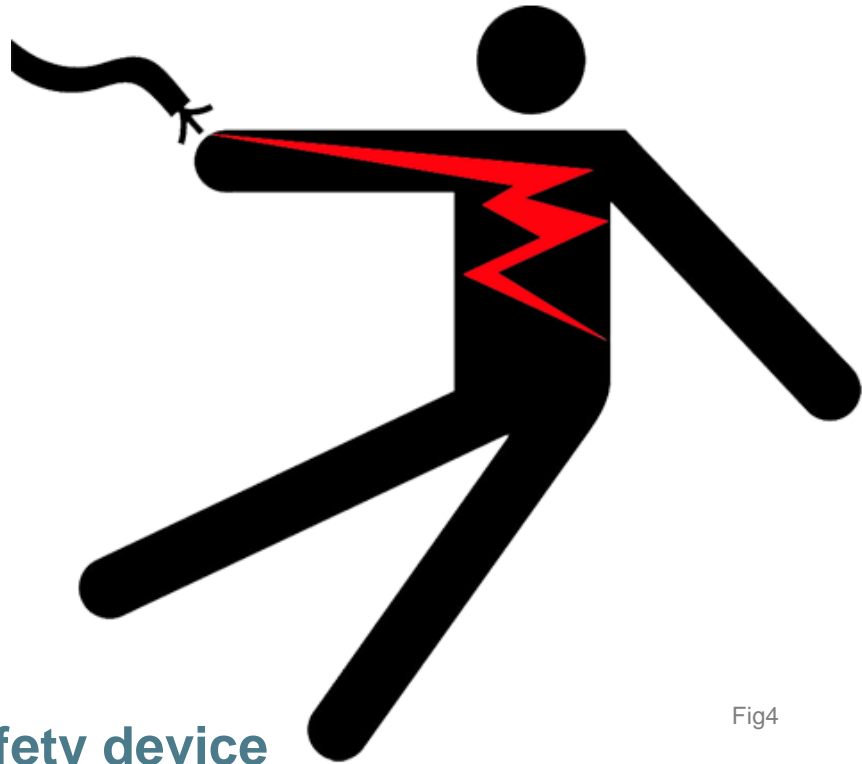


Fig4

Provide a safety device

For equipment operating at 230 volts or higher, an RCD (residual current device) 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 socket outlet, as this means that the supply cables are permanently protected.

RCD for protecting people have a rated tripping current of not more than 30mA. Remember:

- An RCD is a valuable safety device, never bypass it;
- If it trips, it is a sign there is a fault – check the system before using it again;
- If it trips frequently and no fault can be found in the system, consult a competent person or the manufacturer of the RCD;
- The RCD has a test button to check its mechanism is free and functioning. This should be tested periodically.

Carry out preventative maintenance

All electrical equipment, including portable equipment and installations, should be maintained so far as reasonably practicable to prevent danger. (You may not be able to remove all the risks but the regulations require you to do everything “reasonably practicable” to protect people from harm.)

Decisions on maintenance levels and the frequency of checks should be made in consultation with manufacturer’s instructions and equipment users, based on the risk of electrical items becoming faulty. There is an increased risk of this happening if the equipment is not used correctly, is not suitable for the job, or is used in harsh environment.

An appropriate system of maintenance is strongly recommended. This can include:

- User checks by employees, e.g. a pre-use check for loose cable or signs of fire damage;
- A visual inspection by someone with more knowledge, e.g. checking inside of the plug for internal damage, bare wire and correct fuse;
- Where necessary, a portable appliance test (PAT) by a competent person;
- Periodic inspections of fixed installations (the wiring and equipment between the supply meter and the point of use, e.g. socket outlets) by a competent person

Damaged or defective equipment should be removed from use and either repaired by someone competent or disposed of to prevent its further use.

By concentrating on a simple, inexpensive system of looking for visible signs of damage or faults, most of the electrical risks can be controlled.

Records of inspection and testing of equipment should be kept. It is also advisable to keep records of maintenance and repair of equipment..



Work safely

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

Check that:

- Suspect or faulty equipment is taken out of use, labeled 'DO NOT USE ' and kept secure until examined by a competent person;
- Where possible, tools and power sockets outlets are switched off before plugging in or unplugging;
- Equipment is switched off and, or unplugged before cleaning or making adjustments.
- Do not let any wire/conductor be caught in a door.
- Check for embedded wires before any drilling /chasing is done.
- Do not let loose wire hanging around, this may cause tripping.
- When a circuit is switched off to work on; label the switch with "MEN ON MAINS" and padlock it for security reasons.

More complicated tasks, such as equipment repairs or alterations to an electrical installation, should only be carried out by competent persons.

Do 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 a building and even in the rural areas. Use up-to-date service plans, cable avoidance tools and safe digging practice to avoid danger.

Service plans should be available from Enemalta plc.



Fig5

Overhead power lines

When working near overhead lines, it may be possible to have them switched off or be covered by insulated material, if they are on the low voltage network.

Remember that electricity can flash over from overhead lines even though plant and equipment, do not touch them if they are on the high voltage network. In this case they have to be switched off.

If any machinery getting electrified due to power lines, the driver in such case should remain safely inside until the lines are switched off.

References

BS 7671:2008 Requirements for electrical installations (Also known as IET Wiring Regulations)

Maintaining portable electrical equipments in low-risk environments. HSE Books 2012 www.hse.gov.uk/pubns/indg236.htm

Maintaining portable and transportable electrical equipment HSG107(second edition) HSE Books 2004 WWW.hse.gov.uk/pubns/books/hsg_107.htm

HSE's "Electrical safety at work'site: www.hse.gov.uk/electricity

Source: Electrical safety and you. A brief guide:HSE

Image sources

Fig1.

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Fig2. <https://pino489.files.wordpress.com/2016/06/safety-precautions-to-follow-while-working-with-electricity.jpg?w=739>

Fig3. <http://www.advancedct.com/wp/wp-content/uploads/2016/02/electrical-safety.jpg>

Fig4. https://www.on-line-classes.com/sc_images/products/452_large_image.png

Fig5. <https://s-media-cache-ak0.pinimg.com/originals/03/2a/a5/032aa5ef6cff520bd57324f196fdc9f2.jpg>

