



CONTROLLING ELECTRICITY RISKS IN THE WORKPLACE (OSH003)

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HSE portal

For better HSE practice

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Module 1: Controlling electricity risks in the workplace

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Electricity can kill or severely injure people and cause damage to property. Every year many accidents at work involving electric shock or burns are reported. Most of the fatal incidents are caused by contact with overhead power lines.

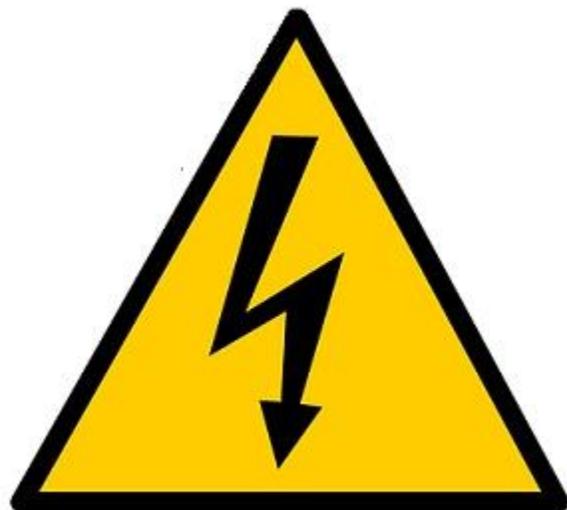
Even non-fatal shocks can cause severe and permanent injury. For example, shocks from faulty equipment may lead to falls from ladders, scaffolds or other work platforms.

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 to others. Most of these accidents can be avoided by careful planning and straightforward precautions.

1.1. What are the hazards?

The main hazards are:

- Contact with live parts causing shock and burns – normal mains voltage, 230 volts 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.



1.2. Reducing the risk

To reduce unacceptable risks from the electrical equipment in the workplace, employers should:

Ensure people working on or with electrical equipment or systems are 'competent' for the task (Competent means having suitable training, skill, and knowledge for the task) to prevent injury to themselves and others.

Ensure the electrical installation is safe by making 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 in a safe condition.
- Enough socket outlets are provided to avoid overloading socket outlets by using adaptors which can cause fire.

Provide safe and suitable equipment. In doing so, the employer should:

- Choose equipment that is suitable for its working environment.
- Where possible, eliminate electrical risks by using air, hydraulic or hand-powered tools which are especially useful in harsh conditions.
- Make sure that equipment is safe when supplied and that it is then maintained in a safe condition.
- Provide an accessible and clearly identified switch near each fixed machine to cut off power in an emergency.
- For portable equipment, use socket outlets which are close by so that equipment can be easily disconnected in an emergency.

- Ensure that the ends of flexible cables always have the outer sheath of the cable firmly clamped to stop the wires (particularly the earth) pulling out of the terminals.
- Replace damaged sections of cable completely.
- Use proper connectors or cable couplers to join lengths of cable and do not use strip connector blocks covered in insulating tape.
- Ensure that 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) and make sure they are properly connected if the plug is not moulded.
- Protect light bulbs and other equipment which could easily be damaged in use.
- Ensure that in potentially flammable or explosive atmospheres, only special electrical equipment designed for these areas are used. A specialist may be needed for this purpose.

Limit the supply voltage to the lowest needed to get the job done. For instance:

- Temporary lighting can be run at lower voltages, e.g. 12, 25, 50 or 110 volts.
- Where electrically powered tools are used, battery-operated ones are safest.
- Portable tools designed to be run from a 110 volt centre-tapped-to-earth supply can be made readily available.

Use an RCD (residual current device) for equipment operating at 230 volts or higher. 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 outlet, 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).

Maintain all electrical equipment, including portable equipment and installations (so far as reasonably practicable) to prevent danger. Decisions on maintenance levels and the frequency of checks should be made in consultation with equipment users, based on the risk of electrical items becoming faulty. There is an increased risk of this happening if the equipment isn't used correctly, isn't suitable for the job, or is used in a 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 cables or signs of fire damage.
- A visual inspection by someone with more knowledge, e.g. checking inside the plug for internal damage, bare wires and the correct fuse.
- Where necessary, a portable appliance test (PAT) by someone with the necessary knowledge and experience to carry out a test and interpret the results.

Make sure that people who are working with electricity are competent to do the job. The employer must ensure 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.

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. Service plans should be available from regional electricity companies, local authorities, highways authorities etc.

When working near overhead lines, and if possible, switch them off after giving the owners enough notice. If this cannot be done, consult the owners about the safe working distance from the cables.

When working near electrified railways or tramways, consult the line or track operating company.

1.3. Sources of information on electricity risks

Information on workplace electricity risks can be obtained from:

- Enforcement bodies such as the Health and Safety Executive (website: <http://www.hse.gov.uk>) and OSHA (website: <http://www.osha.gov>).
- Professional bodies such as IOSH (website: <http://www.iosh.com>) and IIRSM (website: <http://www.iirsm.org>).

1.4. Module quiz

Select the best answer for the questions below:

Q1: Your manager wants to know about RCDs rated tripping sensitivity for protecting people. Which of the following would be your answer?

- A) 30 milliamps.
- B) 20 milliamps.
- C) 35 milliamps.
- D) 10 milliamps.

Q2: You are preparing a purchase order for cabinets that guard against accidental contact with live parts of the equipment of the US-based company you currently work for. Which equipment you should consider in the order?

- A) Equipment operating at 50 volts or more.
- B) Equipment operating at 40 volts or more.
- C) Equipment operating at 45 volts or more.
- D) Equipment operating at 30 volts or more.

Answers:

The correct answer for question one is A. RCDs for protecting people have a rated tripping current (sensitivity) of not more than 30 milliamps (mA).

The correct answer for question two is A. According to OSHA, live parts of electric equipment operating at 50 volts or more shall be guarded against accidental contact by use of approved cabinets or other forms of approved enclosures or by any of the approved means.

Answer to question two can be found in the OSHA website at: <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.303>.