



UNIT-8

Managing Electric and Gas Safety

Learning Outcomes

By the end of this unit the learner will be able to:

Unit 8

Managing Electric and Gas Safety

Electrical Safety

Electricity can kill or severely injure people and cause damage to property. However, you can take simple precautions when working with or near electricity and electrical equipment to significantly reduce the risk of injury to you, your workers and others around you. This section provides a summary of those precautions.

Case Study

A 19-year-old man was electrocuted and killed when he touched a refrigerated display cabinet in a café. Investigation showed that the 13A plug had been incorrectly refitted to the cabinet's main lead.

This meant the metalwork of the cabinet, which should have been safe to touch, was dangerously live at mains voltage. The man's sister received two shocks from the cabinet before realising what had happened to her brother.

How to avoid similar accidents

Even wiring a plug incorrectly can have serious consequences. You must ensure that your electrical installation and equipment is safe. Don't cut corners – electrical installations must be installed by someone who has the necessary training, skills and experience to carry out the work safely.

What are the hazards?

The main hazards of working with electricity are:

- electric shock and burns from contact with live parts
- injury from exposure to arcing, fire from faulty electrical equipment or installations
- explosion caused by unsuitable electrical apparatus or static electricity igniting flammable vapours or dusts, for example in a spray paint booth

Electric shocks can also lead to other types of injury, for example by causing a fall from ladders or scaffolds etc.

What do I have to do?

You must ensure an assessment has been made of any electrical hazards, which covers:

- who could be harmed by them
- how the level of risk has been established
- the precautions taken to control that risk

The risk assessment should take into consideration the type of electrical equipment used, the way in which it is used and the environment that it is used in.

You must make sure that the electrical installation and the electrical equipment is:

- suitable for its intended use and the conditions in which it is operated
- only used for its intended purpose

In wet surroundings, unsuitable equipment can become live and make its surroundings live too. Fuses, circuit-breakers and other devices must be correctly rated for the circuit they protect. Isolators and fuse-box cases should be kept closed and, if possible, locked.

Cables, plugs, sockets and fittings must be robust enough and adequately protected for the working environment. Ensure that machinery has an accessible switch or isolator to cut off the power quickly in an emergency.

Maintenance

So far as is reasonably practicable, you must make sure that electrical equipment and installations are maintained to prevent danger.

Users of electrical equipment, including portable appliances, should carry out visual checks. Remove the equipment from use immediately and check it, repair it or replace it if:

- the plug or connector is damaged
- the cable has been repaired with tape, is not secure, or internal wires are visible etc
- burn marks or stains are present (suggesting overheating)

Repairs should only be carried out by a competent person (someone who has the necessary skills, knowledge and experience to carry out the work safely).

Have more frequent checks for items more likely to become damaged (eg portable electrical tools and equipment that is regularly moved, or used frequently or in arduous environments). Less frequent checks are needed for equipment less likely to become damaged (eg desktop computers etc).

Visual checks are not usually necessary for small, battery-powered items, or for equipment that works from a mains-powered adaptor (laptops or cordless phones etc). However, the mains-powered adaptor for such equipment should be visually checked.

Consider whether electrical equipment, including portable appliances, should be more formally inspected or tested by a competent person. Also think about the intervals at which this should be done.

An HSE leaflet maintaining portable electrical equipment in low-risk environments can help you decide whether and when to test portable appliances in low-risk environments.

Make arrangements for inspecting and testing fixed wiring installations, ie the circuits from the

meter and consumer unit supplying light switches, sockets, wired-in equipment (eg cookers, hairdryers) etc, to be carried out regularly so there is little chance of deterioration leading to danger. This work should normally be carried out by a competent person, usually an electrician

When is someone competent to do electrical work?

In this context, a competent person is someone who has the suitable training, skill and knowledge for the task to be undertaken to prevent injury to themselves and others.

A successfully completed electrical apprenticeship, with some post-apprenticeship experience, is one way of demonstrating technical competence for general electrical work.

More specialised work, such as maintenance of high-voltage switchgear or control system modification, is almost certainly likely to require additional training and experience.

Key points to remember

- Ensure that workers know how to use the electrical equipment safely
- Make sure enough sockets are available. Check that socket outlets are not overloaded by using unfused adaptors as this can cause fires
- Ensure there are no trailing cables that can cause people to trip or fall
- Switch off and unplug appliances before cleaning or adjusting them
- Ensure everyone looks for electrical wires, cables or equipment near where they are going to work and check for signs warning of dangers from electricity, or any other hazard. Checks should be made around the job, and remember that electrical cables may be within walls, floors and ceilings (especially when drilling into these locations) etc
- Make sure anyone working with electricity has sufficient skills, knowledge and experience to do so. Incorrectly wiring a plug can be dangerous and lead to fatal accidents or fires
- Stop using equipment immediately if it appears to be faulty – have it checked by a competent person
- Ensure any electrical equipment brought to work by employees, or any hired or borrowed, is suitable for use before using it and remains suitable by being maintained as necessary
- Consider using a residual current device (RCD) between the electrical supply and the equipment, especially when working outdoors, or within a wet or confined place (see HSE's electrical safety at work site)

Overhead electric lines

- Be aware of the dangers of working near or underneath overhead power lines. Electricity can flash over from them, even though machinery or equipment may not touch them
- Don't work under them when equipment (eg ladders, a crane jib, a tipper-lorry body or a scaffold pole) could come within a minimum of six metres of a power line without getting advice. Speak to the line owner, eg the electricity company, railway company or tram operator, before any work begins

Underground cables

- Always assume cables will be present when digging in the street, pavement and/or near buildings
- Consult local electricity companies and service plans to identify where cables are located

Gas Safety

If gas appliances, such as ovens, cookers and boilers, are not properly installed and maintained, there is a danger of fire, explosion, gas leaks and carbon monoxide (CO) poisoning.

Employers need to comply with the relevant regulations to help ensure worker and public safety. You can do this by following our advice on maintaining and servicing gas appliances, by using a Gas Safe registered engineer or a competent person.

Case Study 1

The importance of being Gas Safe registered

A plumber who was not Gas Safe registered, and had previously been served with a prohibition notice by HSE, persisted in carrying out illegal gas work in a shop. He was caught on CCTV doing so, was prosecuted for two breaches of health and safety law and was sentenced to two concurrent terms of six months in prison.

How cases like this can be avoided

Working with gas appliances is difficult, specialised and potentially very dangerous. Only competent engineers should attempt it. If unregistered workers try to bypass the law, they are not only putting themselves at risk of prosecution and a large fine or even imprisonment, they are also putting their customers' lives at risk.

Who is competent to work on gas fittings?

Domestic properties, schools etc

In domestic properties and workplaces such as shops, restaurants, schools and hospitals, this must be carried out by someone on the Gas Safe Register who is qualified to work on gas appliances.

It is illegal for an unregistered person to carry out work on any domestic gas appliance. You can check this by contacting the Gas Safe Register online or by calling them on **0800 408 5500**.

All those who are registered carry a Gas Safe ID card, which shows the type of work they are qualified to do and whether their qualifications are up to date.

Factories, mines etc

In factories, mines, quarries, agricultural premises, construction site huts and sewage works,

work on gas fittings must be carried out by a competent person. It is your responsibility to check that they are competent. If the engineer is on the Gas Safe Register, with the qualifications to do the work required, then they will be a competent person.

Work in any parts of these premises used as domestic, residential or sleeping accommodation must be carried out by someone on the Gas Safe Register.

What do I have to do?

The basics

- Use a competent engineer to install, maintain or repair your appliances
- Ensure that your gas pipework, appliances and flues are regularly maintained
- Check that all rooms with gas appliances have adequate ventilation – don't block air inlets to prevent draughts, and don't obstruct flues and chimneys

Gas

- If you suspect a leak, turn off the supply and immediately call the National Gas Emergency Service on 0800 111 999 for natural gas. For liquefied petroleum gas (LPG), call your LPG supplier
- If in doubt, evacuate the building and inform the police as well as the National Gas Emergency Service or your gas supplier
- Do not turn a gas supply back on until a leak has been dealt with by a competent person

Appliances and pipework

- Use a competent engineer to install, maintain or repair your appliances
- Ensure that your gas pipework, appliances and flues are regularly maintained
- Don't use any appliance you know or suspect is unsafe
- Check that the room has adequate ventilation – don't block air inlets to prevent draughts and don't obstruct flues and chimneys

Industrial and commercial plant

Explosions can be caused by the ignition of unburnt gas.

- Consider the need for explosion relief and/or flame-failure protection as necessary
- Make sure that the gas supply is interlocked with the ventilation of the appliance
- The equipment should be designed, operated and maintained to make sure dangerous levels of carbon monoxide (CO) are not produced. It should not be used in poorly ventilated spaces
- There should be enough ventilation to remove combustion products
- Make sure the operators are fully trained – use a safe procedure for purging, lighting up and shutting down the plant

Case Study 2

Maintaining Gas Systems

Twenty-five pupils and two members of teaching staff were evacuated from a classroom in a primary school when they were overcome by dangerous levels of carbon monoxide.

The investigation found that carbon monoxide was being produced by an inadequately maintained boiler and was leaking into the classroom above. The employer was fined a total of £10 000 and ordered to pay costs of £6830.

The employer did have a maintenance system but poor practices had crept in, which they did not identify until after the incident. The consequences could have been much more serious.

How such incidents can be avoided

It's important that employers make sure their gas appliances are maintained in a safe condition by a competent person and in line with manufacturers' instructions and appropriate standards.

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