

## S9 – Opening Statement

### Electricity at Work

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Electricity kills and injures people. Around 1,000 electrical accidents at work are reported to HSE each year and about 25 people die of their injuries.

Many deaths and injuries arise from:

- Use of poorly maintained electrical equipment
- Work near overhead power lines
- Contact with underground power cables during excavation work
- Mains electricity supplies (230V)
- Use of unsuitable electrical equipment in explosive areas such as car paint spraying booths
- Fires started by poor electrical installations and faulty electrical appliances.

Electrical injuries can be caused by a wide range of voltages but the risk of injury is generally greater with higher voltages and is dependent upon individual circumstances.

Alternating current (AC) and direct current (DC) electrical supplies can cause injuries including:

- Electric shock
- Electrical burns
- Loss of muscle control
- Thermal burns.

This procedure gives simple guidance on what is required in an electrical scheme of maintenance and inspection, however, competent electrical advice should always be sought when preparing such a scheme.



## S9 – Electricity at Work — Low Voltage

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### What is this?

This is a written procedure that outlines the basic duties of a responsible manager to ensure the site manages electricity safely. It is recommended that a competent, qualified electrical engineer is employed to develop and implement procedures for low voltage work.

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### The person responsible for implementing this procedure is:

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### What is needed on site?

The person responsible for implementing this procedure must ensure that:

- Requirements of the Site Services Plan;
  - Maintaining up to date distribution drawings;
  - Maintaining an inventory of electrical equipment;
  - Lock Off Procedure;
  - Electrical Isolation Procedure;
  - Requirements for examination, testing and maintenance of low & high voltage equipment;
  - Live Working Procedure including Condition Monitoring;
  - Appointment of Non-Electrician as Competent Person;
  - Procedure for Changing PLC Programme;
  - Guidance on Underground Cables;
  - Permit to Work; and
  - Electrical standards and preferred electrical contractors.
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### What training will employees require?

Employees will require training in basic electrical safety and company procedures, to ensure they:

- Know how to use equipment safely.
- Know what they are not permitted to do.
- Understand what action they should take in an emergency involving electricity.
- Know who is authorised to carry out electrical work.
- Know to whom electrical problems should be reported.



The procedures mentioned above must be prepared and approved by a competent electrical engineer. However, guidance is given below on what should be included in the main topics.

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## What is in a Site Services Plan?

A site survey should be carried out, and a drawing produced to show all site services either overhead or underground. A key should be developed so as to distinguish between the various services. Items on the plan include:

- Overhead Electrical Supply
- Underground Electrical Supply HV
- Underground Electrical Supply LV
- On-site electrical distribution line and depth
- Gas
- Water
- Telecoms
- Security Systems

The plan should have reference to fixed points and where possible show service depths.

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## What is in an Isolation and Lock Off Procedure?

Specific guidance is given in separate procedures relating to Isolation and Lock Off.

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## What forms part of an inspection and maintenance regime?

A scheme of inspection and maintenance should be based around the following structure:

- Details of the system for managing electrical safety.
- An organisational structure for the scheme of maintenance.
- Appropriate authorisation of competent personnel.
- A detailed description of the scheme.
- Testing specifications, procedures and methods.
- Technical notes for specific equipment.

The equipment to be included in the scheme is as follows:

- Electric Motors and associated Cable, Isolator etc.
- Distribution Cables
- Stop Buttons and Pull Wires
- Independent Plant Mounted Starters:
- L V (up to 1000V Primary) Transformers
- Main Power Factor Correction Capacitors



- Control Panels, Contactors and Switches
  - Portable Hand-held Tools
  - Portable Office Equipment
  - Semi-portable Appliances, i.e. Welding Sets
  - Lighting Circuits
  - High Voltage Equipment (Above 1000 V) and Overhead Cables
  - Residual Current Devices (RCDs)
  - Local Isolators
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## Can live working be undertaken?

### Live working

The Regulations state that live working can be carried out only after considering the following points:

1. No Live working may be carried out by persons unless they have sufficient knowledge and technical experience, and:
  - It is unreasonable in all the circumstances for it to be made dead;
  - It is reasonable in all the circumstances for the person to work live; and
  - Suitable precautions have been taken to prevent injury.
2. No person should attempt to work on or near any live conductor capable of causing danger, unless all of the associated risks have been fully assessed, and it has been concluded that it is necessary for the work to be performed live and that it is not practicable to make the conductors dead. The assessment should take into account the danger of:
  - Electric shock;
  - Arc burn and fire; and
  - Ignition of flammable gases.

The procedures adopted following assessment should, where relevant, include:

- The provision of adequate information for the person carrying out the work about the live conductors;
- The use of suitable equipment and protective clothing;
- The use of suitable insulated barriers or screens;
- The use of suitable instruments and test probes;
- Effective control of the area where there is danger from the live conductors; and
- The provision of additional suitably trained personnel.



## Live Testing

Under normal circumstances there should be no need to undertake live working, however, live testing can be carried out providing the following guidelines are adhered to:

- Appointed electricians are fully familiar with the equipment to be worked on.
- Adequate information is provided concerning the nature of the work and the electrical system to be worked on.
- Where possible, the electrical equipment is fitted with an additional switch that will allow the 110 volt control circuit to be energised with the 415 volt supply being isolated.
- Where possible, the electrical equipment is fitted to IP2X rating, which in effect prevents inadvertent contact with any live equipment. If equipment is not fitted to IP2X rating, a risk assessment is carried out and, if necessary, additional precautions are taken.
- Only appropriate test instruments and test probes are used.
- If necessary, the person carrying out the work is accompanied by a person who is trained in how to isolate the equipment. (This person also controls the area where the work is being carried out and, if necessary, restricts the access to the building to ensure there is a controlled working environment for the electrician carrying out the task.)

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## What topics are usually included in training for non-electricians?

The following items should be considered within the training programme:

- Changing of lamps
- Changing fuses
- Resetting overloads
- Emergency switching
- Isolation of plant
- Slip ring motor maintenance

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## Legislation

- The Electricity at Work Regulations 1989

**Note:** This list is by no means exhaustive but it identifies some of the key pieces of legislation relating to Electrical safety.

