# SITE SAFETY TOOLBOX TALK NO.2
# PORTABLE ELECTRIC TOOLS

Electricians and supervisors are often called on to participate in or to give toolbox talks on different issues of site safety. Wiring Matters is addressing a series of safety subjects in this and subsequent issues. In this second talk we will cover the subject of portable electric tools.

**Supply voltage**
Before starting work, it must be established whether only 110 V tools may be used on the particular job or whether both 110 V and 230 V tools are permitted. It is always recommended to use 110 V portable electric tools.

If 230 V tools are permitted, RCD protection should be provided if the work is indoors and RCD protection must be provided if the portable electric tool is likely to be used outdoors. RCD protection must be provided by a residual current device that trips instantaneously (not a time-delayed device) and the RCD must have a rated residual operating current not exceeding 30 mA.

RCD protection is often provided by a plug-in type RCD. If there is any doubt as to whether the particular supply circuit has RCD protection, a plug-in type RCD should always be used. (Note that it is acceptable to connect two RCDs in series).

The RCD should be tested before use by pushing the test button and ensuring the device operates and disconnects the supply.

Use tools only on the correct power supply; as instructed on the maker's label.

**Will the tool be used outdoors?** Outdoor conditions are considerably more arduous with an increased risk of electric shock due to the possibility of :

(i) The person using the tool being in contact with Earth
(ii) The person using the tool being wet or having wet footwear
(iii) The tool, being hand held, means that should an electric shock occur, the electric shock current will pass hand-to-hand or hand-to-foot. In both cases the shock current would pass across the heart.

**Construction sites.** BS 7671 Requirements for Electrical Installations (The IEE Wiring Regulations) places specific requirements for tools used on construction sites. Construction site installations include installations provided for the purpose of electricity supply during the execution of the following works:

- new building construction
- repair, alteration, extension or demolition of existing buildings
- engineering construction
- earthworks
- similar works.

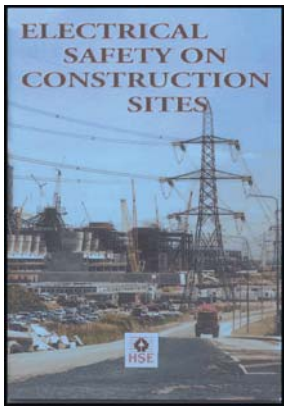

**Damaged or faulty tools must be labelled and removed from service.**

Requirements placed by BS 7671 include permitted voltages which are given in Regulation of 604-02-02, reproduced below:
'**604-02-02** The following nominal voltages shall not be exceeded:

| | |
|---|---|
| SELV | Portable hand lamps in confined or damp locations |
| 110 V, 1-phase, centre point earthed | reduced low voltage system<br>portable hand lamps for general use<br>portable hand-held tools and local lighting up to 2 kW |
| 110 V, 3-phase, star point earthed | reduced low voltage system<br>portable hand-held tools and local lighting up to 2 kW<br>small mobile plant, up to 3.75 kW |
| 230 V, 1-phase | fixed floodlighting |
| 400 V, 3-phase | fixed and movable equipment, above 3.75 kW. |

This requirement shall not preclude the use of a high voltage supply for large equipment where this is necessary for functional reasons.

**The HSE publication:** Electrical safety on construction sites gives valuable information on precautions that can be taken to reduce the risks of electrical accidents during the construction (and demolition) phase of a project.




**HSG 141 Electrical Safety on Construction sites published by the HSE**

**The right tool for the job.** A portable electric tool should only be used for its designed purpose. Never use worn, blunt or damaged bits or other accessories.

**Has the tool been tested?** Electric power tools should be regularly inspected, tested and maintained. A portable electric tool must have passed a Portable Appliance Test. The expiry date, which is the date when the next test is due, will be shown on a label attached to the tool. The tool must not be used if the expiry date has passed.

**Is the tool damaged?** The tool must not be damaged. If it is damaged, the tool must not be used, must be labelled as faulty and the defect reported immediately. Portable tools often suffer damage due to transport and handling.

**Is the plug or the cable damaged?** Make sure that the cable, the plug or the connector is sound and properly connected. Before plugging in the tool or switching on the supply inspect the flexible cable for damage throughout its length both by visual inspection and touch. Supply cords must not be extended by taped joints and should not exceed the length allowed by the equipment standard.

**Is the cable long enough?** The cable must be long enough to reach the place of work without it being strained. Cables should be kept off the floor or suitably routed so that they are not damaged by the movement of persons or vehicles. Cables must not present a trip hazard.

**Extension leads.** Inevitably extension leads are used with portable tools. Electrical safety must not be compromised due to the use of an extension lead. The principle safety issues concerning extension leads are:

- The length of a 230 V extension lead should not exceed the values given in Table 1. An extension lead exceeding the length given in the Table should be fitted with a 30 mA RCD manufactured to BS EN 61008 or BS EN 61009. However, three safety issues need to be considered:

(i) the equipment supplied may not function correctly due to voltage drop in the cable
(ii) there may be a risk of fire due to overloading and
(iii) under fault conditions automatic disconnection may not occur within the prescribed time.

- The lead must not be damaged
- The lead must include a protective conductor where Class I equipment is to be supplied. Two-core extension leads should be removed from service as there will always be the possibility that such a lead is inadvertently used to supply an item of Class I equipment which, as a consequence, would not be earthed
- Cable reels must be used within their coiled or uncoiled ratings as appropriate
- A cable reel must not be used outdoors unless designed for such use.

| Cross-sectional area of the core | Maximum length |
|---|---|
| 1.25 mm$^2$ | 12 metres |
| 1.5 mm$^2$ | 15 metres |
| 2.5 mm$^2$ | 25 metres |

**Table 1: Maximum lengths of extension leads**

2.5 mm$^2$ extension leads are too large for standard 13 A plugs to BS 1363 although they may be used with BS EN 60309 industrial plugs

Final points:

- Never connect a portable electric tool to a lighting socket
- Never stand on a damp or wet surface when using 230 V tools

**A portable tool or an extension lead must not be used outdoors unless designed for such use**

- Keep the electrical tool and the item being worked on both clean and dry
- Disconnect portable tools when not in use
- Never lift or lower a portable electric tool by its cable.

Further information on portable tools and extension leads is given in the IEE's Code of Practice for In Service Inspection and Testing.


**The IEE's Code of Practice for In Service Inspection and Testing**