Wilkins Safety Group

H & S Guidance - Electricity

INTRODUCTION

Each year there are almost 1000 reportable accidents at work due to contact with electricity including a significant number of fatalities (about 20 a year). Even non-fatal shocks can cause severe and permanent injury or lead to other accidents (e.g. falls from ladders). Almost all workplaces are subject to the Electricity at Work Regulations 1989 which require 'duty holders' to take precautions against the risk of death or personal injury from electricity in work activities

WHAT ARE THE HAZARDS?

- Contact with live parts causing shock and burns
- Fires arising from faults
- Ignition of potentially flammable or explosive atmospheres

The **risk** of injury from electricity depends on where and how it is used. For example, risks are greatest:-

- In wet surroundings
- Out of doors (includes greater risk of damage)
- In cramped conditions with a lot of earthed metalwork
- Where flexible/extension leads are used

REDUCING THE RISK OF INJURY

Ensure the electrical installation is safe:-

New installations of fixed systems or the maintenance of existing fixed systems (where appropriate) should be to a suitable standard, e.g. BS7671 'Requirements for electrical installations', or the current edition of the Institution of Electrical Engineers Regulations for Electrical Installations (the 'IEE Wiring Regulations). The IEE Wiring Regulations are non-statutory regulations and are a code of practice widely recognised and accepted in the UK. Compliance with them is likely to achieve compliance with relevant aspects of the Electricity at Work Regulations 1989.

Provide enough socket outlets.

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Provide safe and suitable equipment

1. Choose suitable equipment
2. Use of alternative power source (e.g. air tools)
3. Maintenance, which may involve a combination of the following:-

- User checks - of cables, plugs, joints, cable clamps, general condition and appearance.
- Formal visual inspection - by a competent person; may involve removal of plug cover to check fuse, cord grip, cable termination etc. but does not involve taking equipment apart.
- Combined inspection and test - requiring a wider degree of competency; checks are for loss of earth integrity, correct polarity and fusing, cable termination and suitability of equipment.

NB The frequency of checking/inspection and testing will be influenced by the risk assessment, which will take into account such factors as:-

- working environment
- if hand-held
- manufacturers' recommendations
- frequency of use
- likelihood of 'abuse'
- previous maintenance history

It is recommended that all reports are kept and used as a management tool to help control electrical safety.

- Accessible and identified emergency cut-off (isolation) switch near each fixed machine.
- Suitable protection for electrical equipment in flammable/explosive atmospheres.

Reduce the Voltage - e.g.

- Temporary lighting at 12, 25, 50 or 110 volts
- Battery operated tools
- 110 V centre-tapped-to-earth portable tools

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Provide a safety device - such as a residual current device (RCD) with a sensitivity of not more than 30 milliamps (mA). An RCD is a device that 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, but a plug-in RCD can be used as a least-preferred option. Remember to operate or check the operation of the test button regularly.

Work safely - following established safe systems of work and ensuring appropriate level(s) of competency. Remember the hidden dangers from underground power cables and the particular hazards of overhead power lines.

PARTICULAR ELECTRICAL SAFETY ISSUES

FLEXIBLE LEADS, PLUGS AND SOCKETS

Defective leads, plugs and sockets cause more accidents than their appliances. Safety considerations include the following:

Cables & cords

- If moved only occasionally consider fixed cabling.
- Ensure insulation and protection of cable is appropriate.
- Ensure adequate strength/support if needs to be suspended.
- Joints:- better to replace cable that to make a repair; if repaired, use a cable coupler with the 'connector' part on the supply side. Insulating tape should never be used.
- Extension leads preferred to long cable attached to the apparatus; reels to have notice of maximum safe current when coiled and to be fully unwound if above this.
- Flexing damage - usually where the cable enters the apparatus at the cord grip.
- Sheath damage (e.g. floor polishing machines).

Adaptors-Use of adaptors is not recommended due to increases in mechanical stresses and the potential for electrical overload.

Cord Grips-Failure to grip cable may result in the earth conductor becoming loose near to the live terminal or metalwork of the fuse (and fuse carrier) resulting in metalwork becoming live.

Children-Where access by children may be likely, shutters/covers etc. could be fitted to socket outlets or connectors.

CABLE JOINTS AND REPAIRS

Proprietary joints and cable connectors should be used which incorporate terminals or compression fittings suitable for stranded conductors, cable clamps and sleeving. Open-type connectors have disadvantages and should be discouraged.

ELECTRICAL DISPLAYS

Lighting or electrical display safety involves consideration of the following:

- Staff competency (limits stipulated in writing)
- Layout - recommended to be in accordance with IEE Regs, RCD protection, subdivision of large displays each with its own circuit, isolation and protective device(s).
- Connections - properly constructed; cord grips
- Adjustments - utilise switched sockets or lighting tracks; disconnect/ isolate and lock off prior to work.
- Routine inspection/testing.
- Domestic appliances - in addition to the above the larger power needs will necessitate a domestic type ring main with the addition of suitable lockable isolation facilities.

ELECTRICAL SAFETY AT PLACES OF ENTERTAINMENT

Guidance Note GS50 (Electrical safety at places of entertainment) gives useful guidance under headings, which include the following:-

- Risks
- Managing electrical safety
- Preventing electrical danger
- Power supplies and power distribution (fixed installations, generators, 110-125 volt supplies)
- Equipment (general, lighting systems, sound systems, maintenance)

Leaflet IND(G)247 'Electrical Safety for Entertainers gives advice to entertainers who use electrical equipment for sound, lighting or other effects. The main precautions recommended are:-

- Maintenance, inspection, testing and repairs should only be carried out by someone who is suitably qualified and/or experienced, such as an electrician.
- Always ensure/check that other people's equipment is in a safe condition or properly connected - never assume this.
- Always use compatible equipment.
- Use a residual current device on the power supply to instruments and equipment. These are best located at the main switchboard or at the socket outlet but if these are not provided, an RCD fitted plug or RCD adapter is better than nothing.
- Ensure good earth connections with sound equipment (either double insulated or correctly fitted with a protective (safety) earth).
- Correct use of suitable transformers if using American equipment (110-125 volts). It is strongly recommended that a competent person (e.g. an electrician) is an always consulted.

CHECKLIST - ELECTRICITY

Have you considered the possibility of injury from electrocution, electric shock, heat, radiation or uncontrolled fire arising from the use of electricity? YES/NO

Have you identified what electrical systems and equipment are within your control? YES/NO

Have you informed, instructed and trained your staff to an appropriate level regarding the provisions of the Electricity at Work Regulations 1989? YES/NO

Have you policies and procedures that define personal responsibilities and competencies regarding electricity? YES/NO

Do you ensure that the fixed electrical system is checked periodically? (The IEE Regs recommend every 5 years). YES/NO

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Do you have a system in place for purchasing, using and maintaining all portable and transportable electrical appliances? YES/NO

Does it include 'user' checks? YESNO

Does it include 'formal visual inspections'? YESNO

Does it include 'combined inspection and testing' if necessary? YES/NO

Are written records/registers/maintenance logs kept? YES/NO

Are employees trained etc. in the hazards, risks and precautions of using electricity and your procedures for preventing danger? YES/NO

REFERENCES/FURTHER DETAILS

1. Booklet HS (G) 85 Electricity at Work - Safe Working Practices HSE. ISBN 0 7176 0442X
2. Booklet HS(G) 107 Maintaining portable and transportable electrical equipment HSE. ISBN 0 7176 0715 1
3. Leaflet IND(G) 236 Maintaining portable electrical equipment in offices and other low risk environments. HSE. **www.hse.gov.uk/pubns/indg236.pdf**
4. Leaflet IND (G) 237 Maintaining portable electrical equipment in hotels and tourist accommodation. HSE. **www.hse.gov.uk/pubns/indg237.pdf**
5. Guidance Note GS38 - Electrical test equipment for use by electricians. HSE. ISBN 0 7176 0845 X
6. Guidance Note PM29 - Electrical hazards from steam/water pressure cleaners etc. (HSE). ISBN 0 7176 0813 1.
7. Guidance Note PM38 - Selection and use of electrical hand lamps. HSE. ISBN 0 11 886360 6.
8. Leaflet IND(G)231 - Electrical Safety and You. HSE.ISBN 0 7176 1207 4. **www.hse.gov.uk/pubns/indg231.pdf**
9. The Electricity at Work Regulations 1989 - an open learning course. HSE. ISBN 0 11 885443 7
10. Booklet HS(G) 118 - Electrical Safety in Arc Welding. HSE. ISBN 0 7176 0704 6

11. Leaflet - Electricity at Work Regulations 1989: compliance for firms without electrical staff. (The Loss Prevention Council, 140 Aldersgate Street, London, EC1A 4HY).
12. Leaflet IND(G)247 - 'Electrical Safety for Entertainers' (HSE)
13. Guidance Note GS50 - 'Electrical Safety at Places of Entertainment' (HSE). ISBN 0 7176 1387 9.
14. CD ROM. Your guide to the essentials of electrical safety. (HSE). ISBN 0 7176 1714 9.