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IEC Material for electrical safety compliance

In general, workers are electrocuted every week, which contributes to 28 % of workplace deaths globally. It takes very little electricity to cause severe harm and damage to both employees and property and as a result electrical safety non-compliance remains significant risk of causing fires.

1. How electricity works:

- It is the flow of energy from one place to another;
- It normally requires a source of power, usually a generating station;
It is a flow of electrons (current) which travel through a conductor and in a closed circuit meaning with eyes it cannot be seen.

2. Electrical Terms

- Current: electrical movement (measured in amps)
- Circuit: complete path of the current, Includes electricity source, a conductor, and the output device or load (such as a lamp, tool, or heater)
- Resistance: restriction on electrical flow
- Conductors: substances, like metals, with little resistance to electricity that allow electricity to flow
- Grounding: a conductive connection to the earth which acts as a protective measure
- Insulators: substances with high resistance to electricity like glass, porcelain, plastic, and dry wood that prevent electricity from getting to unwanted areas.



3. Electrical injuries

There are four main types of electrical injuries, direct and indirect:

3.1 Direct electrical injuries

- Electrocuting or death shock;
- Electrical shock;
- Electrical burns;

3.2 Indirect electrical injuries

- Falls caused by electricity

4. Electrical Shock

4.1 An electrical shock is received when electrical current passes through the body;

4.2 A person will get an electrical shock if a part of your body completes an electrical circuit by:

- Touching a live wire and an electrical ground, or
- Touching a live wire and another wire at a different voltage

5. Shock Severity

Severity of the shock depends on:

- Path of current through the body;
- Amount of current flowing through the body (amps);
- Duration of the shocking current through the body.

Please note that: **LOW VOLTAGE DOES NOT MEAN LOW HAZARD**

6. Dangers of Electrical Shock

- Currents above 10 mA can paralyze or “freeze” muscles
- Currents more than 75 mA can cause a rapid, ineffective heartbeat -- death will occur in a few minutes unless a defibrillator is used.

7. Effects of electrical shock on the body

1mA	5mA	10mA	15mA	50-100mA
Slight sensation	Sensation of shock	Painful	Can paralyze or freeze muscles	Can kill in just a second



8. Electrical burns

- Cause most common shock-related injury in the workplace;
- Occurs when a person touches electrical wiring or equipment that is improperly used or maintained;
- Typically occurs on hands and are generally led to very serious injuries that needs immediate attention

9. Falls

- Workers in elevated locations who experience a shock may fall, resulting in serious injury or death

10. Electrical hazards and how to control them

Electrical accidents are caused by a combination of **three factors**:

- Unsafe equipment and/or installation;
- Workplaces made unsafe by the environment, and
- Unsafe work practices.

11. Hazard – Defective Cords & Wires

11.1 Plastic or rubber covering or insulation is missing

11.2 Damaged extension cords & tools:

- Aging
- Door or window edges
- Staples or fastenings
- Abrasion from adjacent materials
- Activity in the area, improper use can cause shocks, burns or fire

12. Controls of electrical cords and wires

- Insulate live wires Check before use
- Use only cords that are 3-wire type Use only cords marked for hard or extra-hard usage
- Use only cords, connection devices, and fittings equipped with strain relief
- Remove cords by pulling on the plugs, not the cords
- Cords not marked for hard or extra-hard use, or which have been modified, must be taken out of service immediately

13. Tool Safety Tips

- Use gloves and appropriate footwear Store in dry place when not using
- Don't use it in wet/damp conditions
- Keep working areas well-lit Ensure not a tripping hazard



- Don't carry a tool with the cord
- Don't yank the cord to disconnect it
- Keep cords away from heat, oil, & sharp edges
- Disconnect when not in use and when changing accessories such as blades & bits
- Remove damaged tools from use

14. Preventing electrical hazards tools

- Inspect tools before use
- Use the right tool correctly
- Protect your tools
- Use double insulated tools

15. Lock out and Tagging of circuits

- Apply locks to power source after de-energizing
- Tag deactivated controls
- Tag de-energized equipment and circuits at all points where they can be energized
- Tags must identify equipment or circuits being worked on

16. Safety related work practices

To protect workers from electrical shock:

- Use barriers and guards to prevent passage through areas of exposed energized equipment
- Pre-plan work, post hazard warnings and use protective measures
- Keep working spaces and walkways clear of cords
- Use special insulated tools when working on fuses with energized terminals
- Don't use worn or frayed cords and cables
- Don't fasten extension cords with staples, hang from nails, or suspend by wire.

17. Preventing electrical hazards: planning

- Plan your work with others
- Plan to avoid falls
- Plan to lock-out and tag-out equipment
- Remove jewellery
- Avoid wet conditions and overhead power lines

18. Avoid Wet Conditions

- If you touch a live wire or other electrical component while standing in even a small puddle of water, you'll get a shock.
- Damaged insulation, equipment, or tools can expose you to live electrical parts.



- Improperly grounded metal switch plates & ceiling lights are especially hazardous in wet conditions.
- Wet clothing, high humidity, and perspiration increase your chances of being electrocuted.

19. Preventing electrical hazards by using PPE

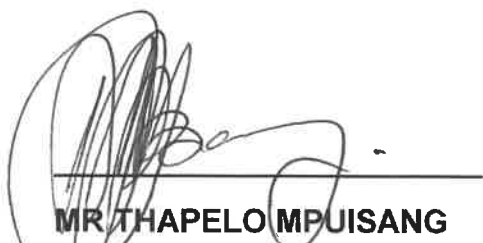
- Proper foot protection (not tennis shoes)
- Rubber insulating gloves, hoods, sleeves, matting, and blankets
- Hard hat (insulated - nonconductive)

20. Training

- Train employees working with electric equipment in safe work practices, including:
 - De-energize electric equipment before inspecting or repairing
 - Using cords, cables, and electric tools that are in good repair
 - Lockout / Tagout recognition and procedures Use appropriate protective equipment.

21. Electrical safety Summary

- Electrical equipment must be:
 - Listed and labelled
 - Free from hazards
 - Used in the proper manner
- If employees use electrical tools, they must be:
 - Protected from electrical shock
 - Provided necessary safety equipment



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