

Introduction

All systems which use electrical energy have the potential to cause serious harm.

Injuries caused by electric current

Electric current can pass through the body when the body becomes part of the electric circuit.

Electric current flowing through the body can cause:

- electric shock
- electrocution
- burns caused by electric current and arc flash

The severity of the injury depends on:

- Amount of current flowing through the body.
- Path of the current through the body.
- Length of time the body is in the circuit.
- The voltage of the current.

The following table contains details of the effect of alternating electric current during a hand-to-foot shock of one second duration:

Current level (milliamperes)	Probable Effect on Human Body
1 mA	Perception level. Slight tingling sensation.
5 mA	Slight shock felt; not painful but disturbing. Average individual can let go.
6 – 16 mA	Painful shock. Loss of muscular control. Commonly referred to as the freezing current or "let-go" range.
17 – 99 mA	Extreme pain, respiratory arrest, severe muscular contractions. Individual cannot let go the source in contact with. Can cause ventricular fibrillation.
100 – 2000 mA	Ventricular fibrillation (uneven pumping of the heart.) Muscular contraction and nerve damage begins to occur. Death likely.

<p>> 2,000 mA</p>	<p>Cardiac arrest, internal organ damage, and severe burns. Death probable.</p>
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A person receiving a shock caused by grabbing a bare conductor can generally release himself when the current passing through his body is less than 15 mA.

The high resistance of a dry skin is rapidly broken down by a high voltage. High voltages can cause violent muscular contraction, often so severe that the victim is thrown clear.

An electric shock may injure the human body in several ways:

- Contraction of chest muscles causing interference with breathing, leading to asphyxiation.
- Temporary paralysis of the nerve center leading to breathing failure.
- Ventricular fibrillation which is an irregular movement of heart muscles leading to failure of blood circulation. The heart cannot spontaneously recover, causing death.
- Hemorrhage and destruction of nerves, tissues and muscles, caused mainly by heat.
- When electricity passes through the body, it can interfere with the normal electrical signals between the brain and other body systems.
- Arc flashes result in intense heat causing burns or ignition of other materials.
- Contact with high voltage can cause burns in internal tissues.

Precautions to be taken while working with electricity

- Check for damage on power plugs, wire and other electrical fittings. If found damaged, repair or replace damaged equipment immediately.
- Keep electrical wires of equipment away from hot surfaces to prevent damage of the insulation.
- Do not lay electric wires along passage. It can be a trip hazard. Further contact with sharp edges can cause damage to insulation leading to short circuit.
- Know the location of switches/circuit breaker boxes for use in case of an emergency.
- All circuit breakers in the switch board must be clearly labelled for easy identification.
- Access to circuit breakers must not be blocked.

- Extension cords must be used only to supply power temporarily.
- Do not handle electrical equipment when hands, feet or body are wet or perspiring, or when standing on a wet floor.
- Consider all floors as conductive unless covered with insulating matting of suitable type for electrical work.
- Whenever possible, use only one hand when working on circuits or control devices.
- Do not wear rings, metallic watchbands, chains etc. when working with electrical equipment.

Precautions to be taken while using power tools

- Before connecting the tool to the power supply, switch the tool OFF.
- Disconnect power supply before making adjustments.
- The tool must be properly grounded with a 3-wire cord with a 3-prong plug. Use double insulated tools wherever possible.
- Do not use electrical tools in wet conditions or damp locations unless the tool is connected to an Earth Leakage Circuit Breaker.