SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

Accredited by NBA-AICTE and Accredited by NAAC – UGC with A+ Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME: 19EEE302-ELECTRICAL SAFETY ENGINEERING

III YEAR / V SEMESTER

UNIT 1- INTRODUCTION TO ELECTRICAL SAFETY, SHOCKS AND THEIR PREVENTION

Topic 2 – **Hazards associated with electric current, and voltage, who is exposed, principles of electrical safety**

SUCCESSFUL STUDENT

Positive Attitude

Professionally Groomed

Socially Interactive

Technically Skillful

Hazards associated with electric current

INFLUENCING FACTORS

Physical Condition and Physical Response
Current Duration
Frequency
Voltage Magnitude
Current Magnitude

The division of the electrical power hazard into three components is a classic approach used to simplify the selection of protective strategies. The worker should always be aware that electricity is the single root cause of all of the injuries described in this and subsequent chapters. That is, the worker should treat electricity as the hazard and select protection accordingly.

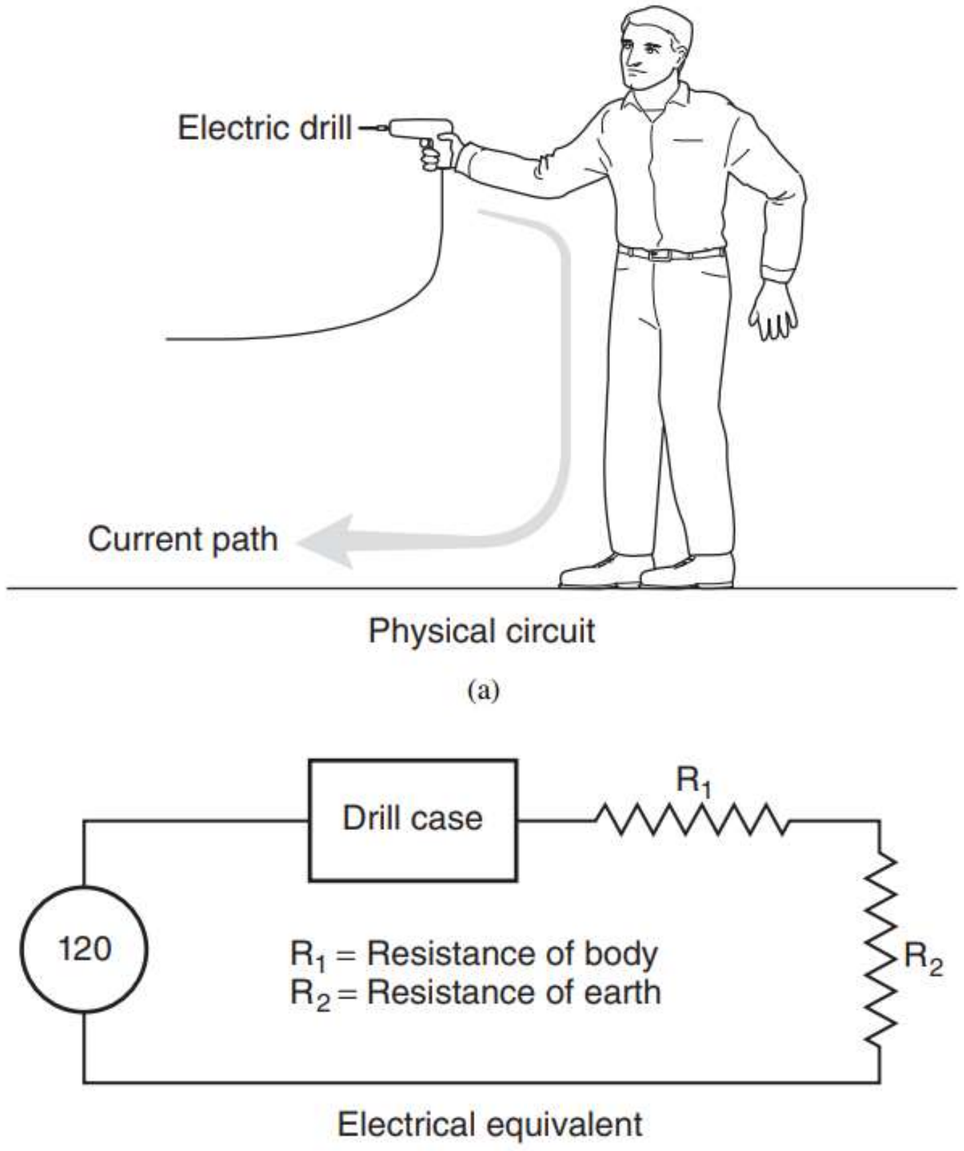
Nominal Resistance Values for Various Parts of the Human Body

Condition (area to suit)	Resistance	
	Dry	Wet
Finger touch	40 kΩ–1 MΩ	4–15 kΩ
Hand holding wire	10–50 kΩ	3–6 kΩ
Finger-thumb grasp*	10–30 kΩ	2–5 kΩ
Hand holding pliers	5–10 kΩ	1–3 kΩ
Palm touch	3–8 kΩ	1–2 kΩ
Hand around $1\frac{1}{2}$-inch (in) pipe (or drill handle)	1–3 kΩ	0.5–1.5 kΩ
Two hands around $1\frac{1}{2}$-in pipe	0.5–1.5 kΩ	250–750 Ω
Hand immersed	—	200–500 Ω
Foot immersed	—	100–300 Ω
Human body, internal, excluding skin	—	200–1000 Ω

Nominal Resistance Values for Various Materials

Material	Resistance*
Rubber gloves or soles	>20 MΩ
Dry concrete above grade	1–5 MΩ
Dry concrete on grade	0.2–1 MΩ
Leather sole, dry, including foot	0.1–0.5 MΩ
Leather sole, damp, including foot	5–20 kΩ
Wet concrete on grade	1–5 kΩ

* Resistances shown are for 130-cm^2 areas.


Electric drill
Current path
Physical circuit
(a)
Drill case
R_1
120
R_1 = Resistance of body
R_2 = Resistance of earth
R_2
Electrical equivalent

Electrical Safety Principles

When planning and performing work on electrical systems and equipment, keep these principles in mind:

- Plan every job
- Think about what could go wrong
- Use the right tools for the job
- Use procedures, drawings and other documents as tools to do the job
- Isolate the equipment from energy sources
- Identify the electric shock and arc flash, as well as other hazards that may be present
- Minimize the hazard by guarding or approach limitations
- Test every circuit, every conductor, every time before you touch
- Use personal protective equipment as a last line of defense in case something goes wrong
- Ask yourself, "Do I have the skills, knowledge, tools and experience to do this work safely?"

ASSESSMENT

REFERENCE

- Pradeep Chaturvedi, “Energy management policy, planning and utilization”, Concept Publishing company, New Delhi, 1997.
- ”Accident prevention manual for industrial operations”, N.S.C., Chicago, 1982.
- Indian Electricity Act and Rules, Government of India

THANK YOU!!