

JOB ROLE – WIREMAN-CONTROL PANEL

Sector – Electronics
(Qualification Pack Code: ELE/Q7302)



PSS Central Institute of Vocational Education
Shyamla Hills, Bhopal – 462013 , Madhya Pradesh, India

www.psscive.ac.in

UNIT 4: ELECTRICAL EARTHING SYSTEM

Content

Title	Slide No.
Unit Objectives	4
Introduction	5
Need of Electrical Earthing	6
Electrical Earthing	7
Types of Earthing	11
Analogy of Earthing	16
Steps to Perform Earthing	18
Lightening Arrester	22
Summary	24

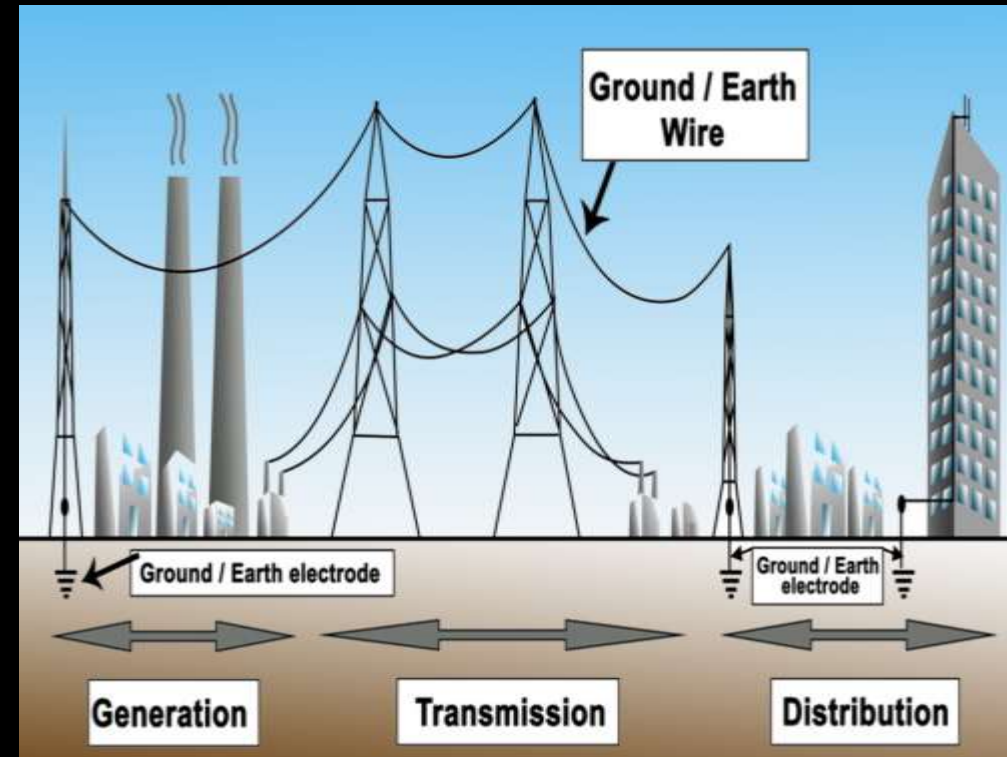
Unit Objectives

The student will be able to:

- Describe the need of electrical earthing,
- Describe the importance of electrical earthing,
- Identify earthing components,
- Demonstrate the earthing procedure.

Introduction

Electrical earthing provides safe operation in electrical system. In order to overcome the risk of electric shock earthing is required. In earthing, electrical system or equipment is connected to the ground by means of a suitable conductor. This conductor provides a return path for the faulty current.



Earthing in electrical system

Need of Electrical Earthing

What happen if earthing is not there in our system?

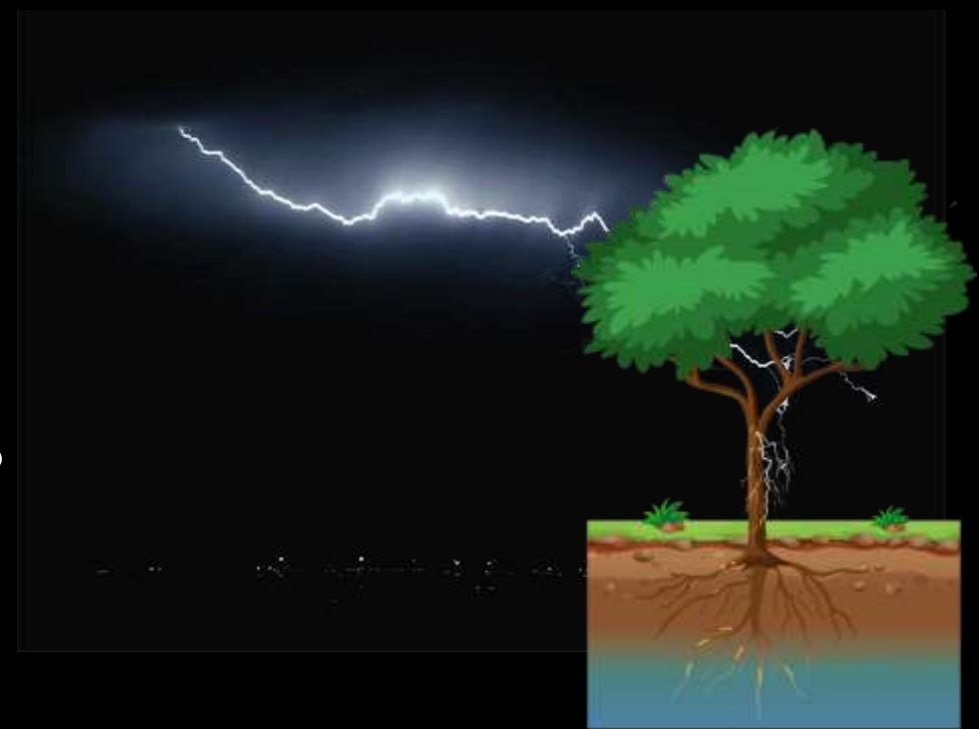
- Person injured due an electric shock and system may get burned.



Definition of Earthing

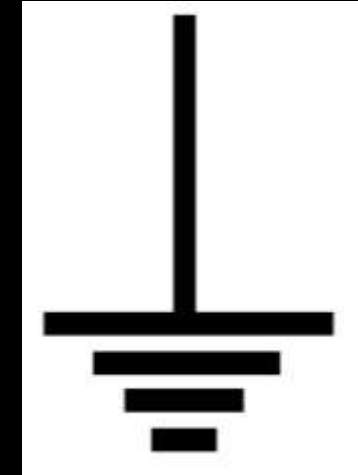
Why lightning hit mostly on trees in rainy season?

- Roots of trees buried deep in the soil. And in rainy season the woods are wet.
- As lightning is the collection of massive charges. Trees provides a conducting path to these charges.

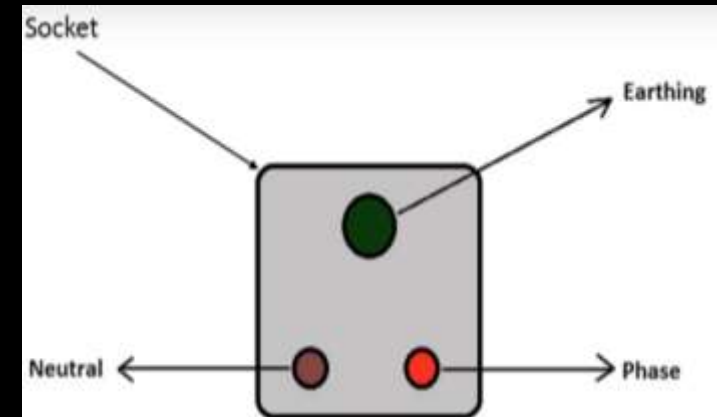


Continue.....

- **Earthing** is the process of transferring extra charge from a charged object to the earth.
- Symbolic representation of earthing.
- Power socket in our home has earthing slot.

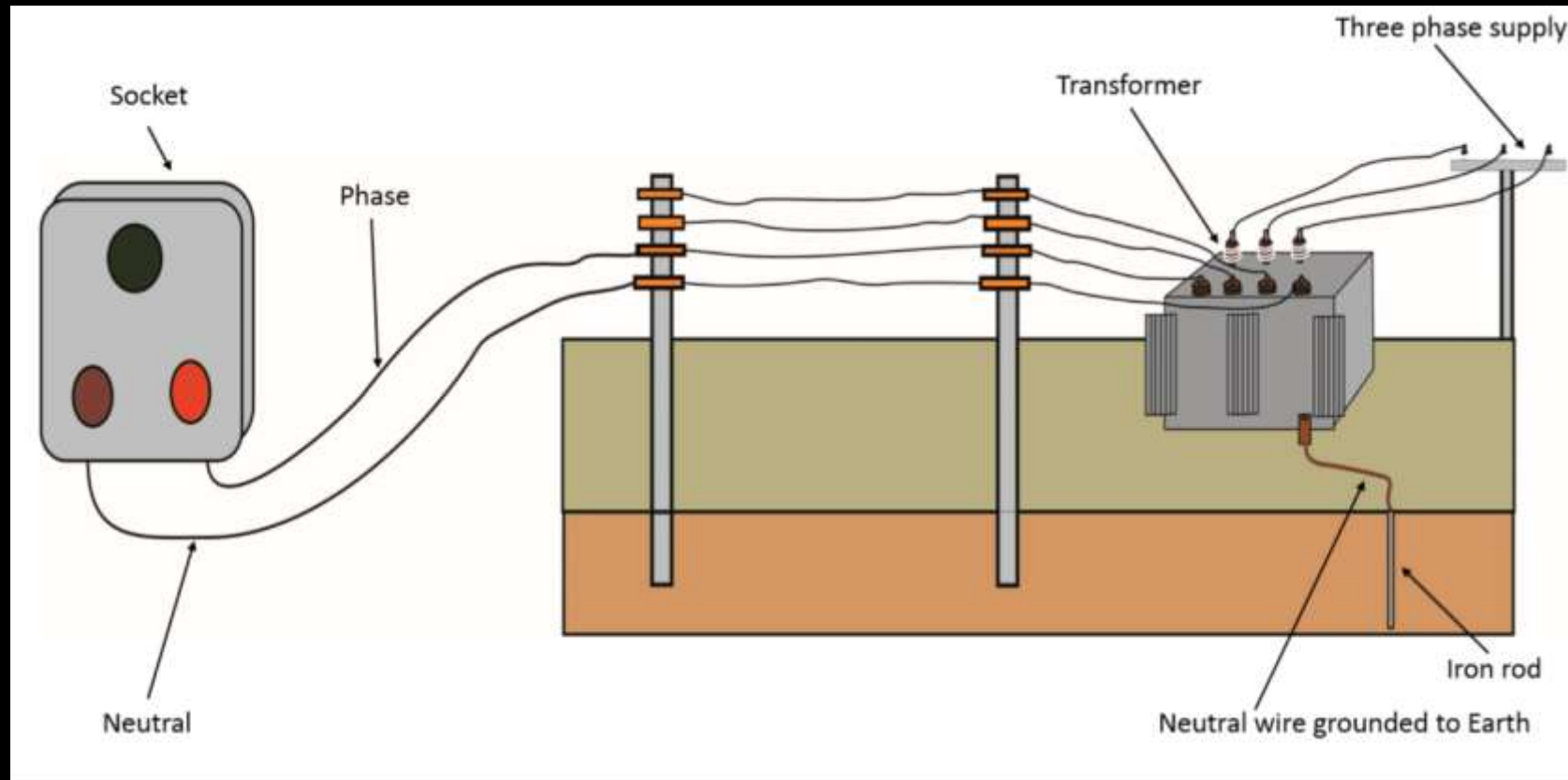


Earthing Symbol



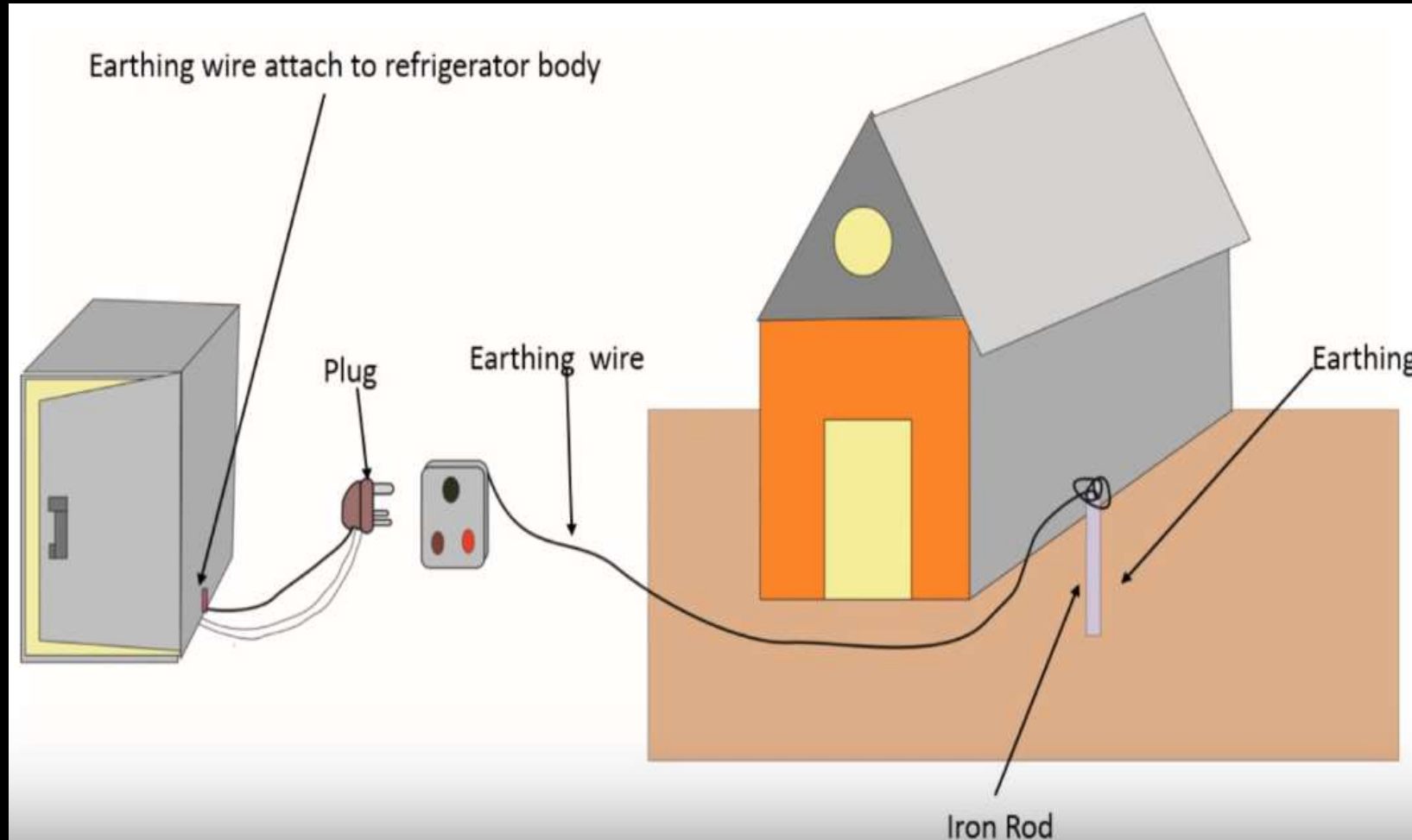
Earthing port in the socket

- Body of distribution transformer is grounded to pass any faulty current into the ground.



Earthing in the distribution transformer

- Body of refrigerator is grounded to pass any faulty current into the ground.



Earthing in the house

Types of Earthing

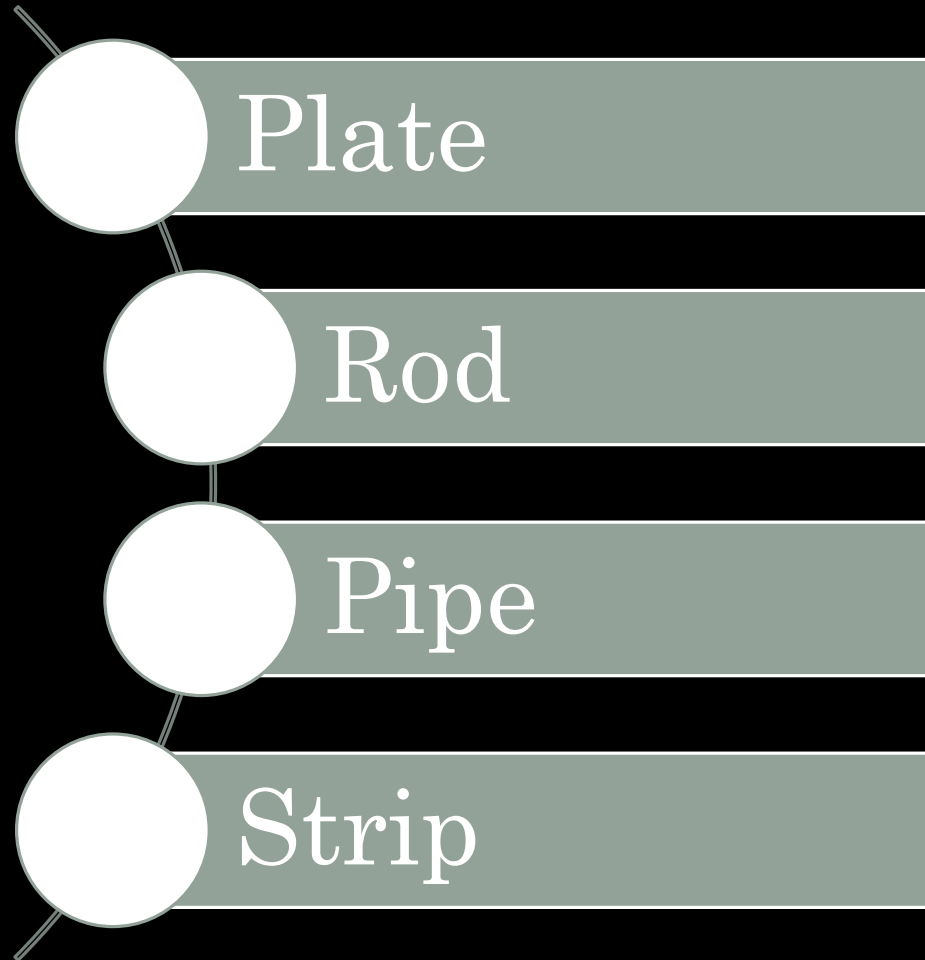
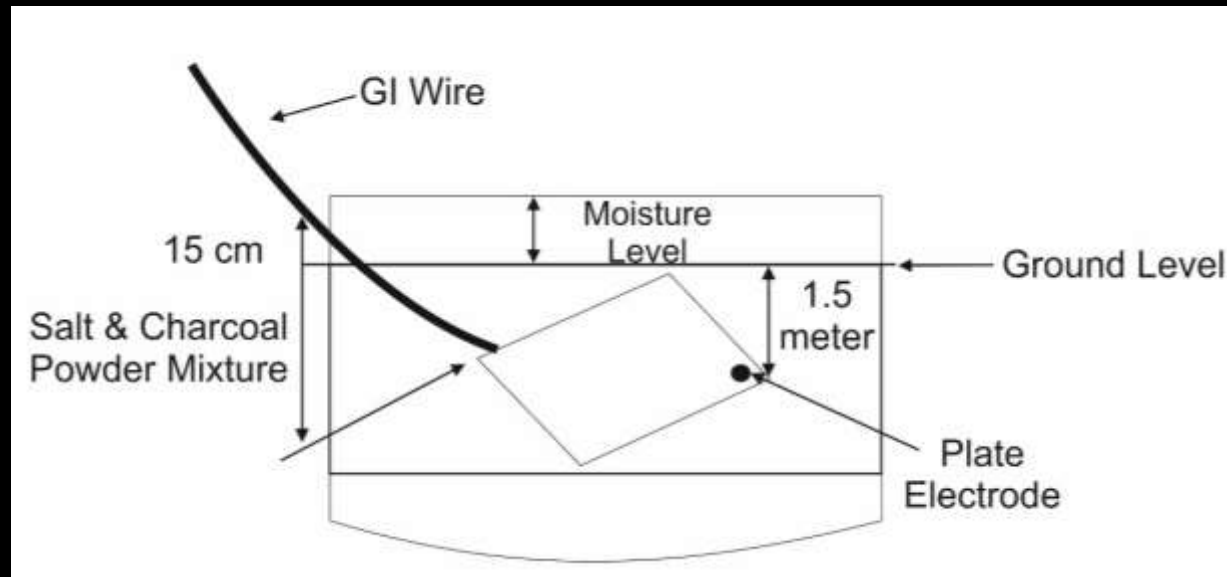


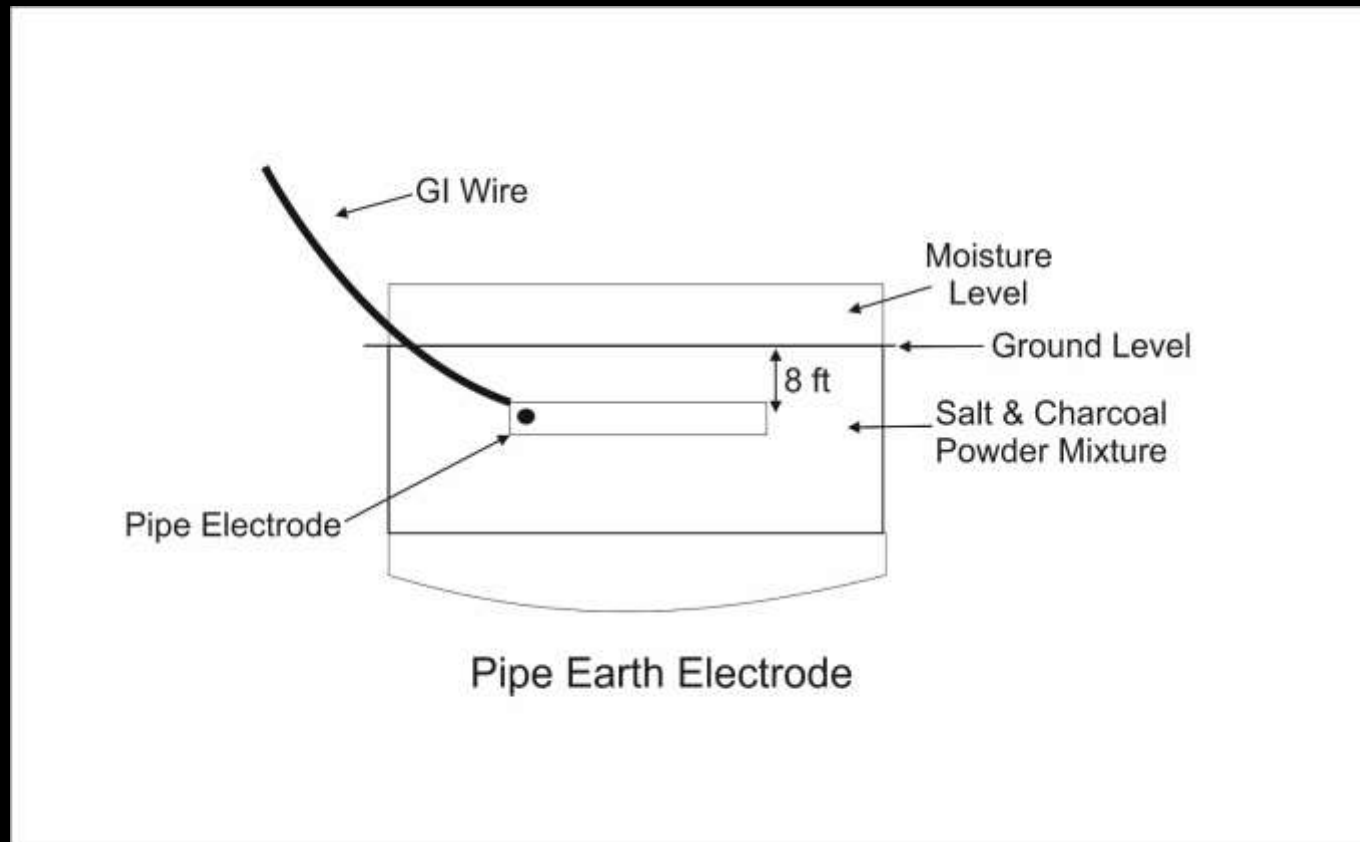
Plate Type Earthing

- In this type of earthing metallic plate is used.



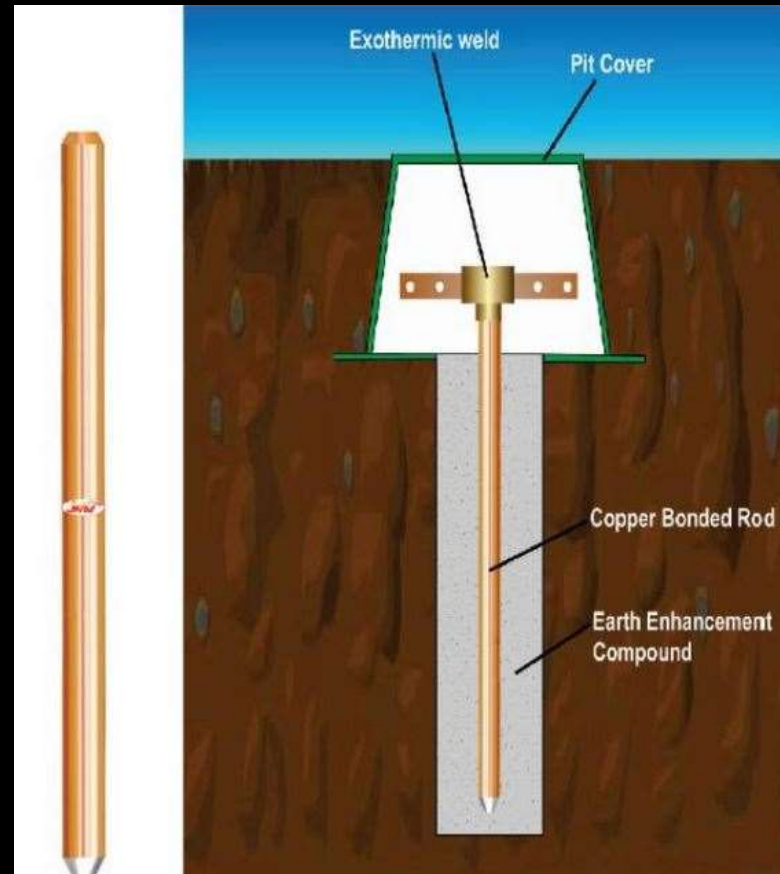
Rod Type Earthing

- In this type of earthing metallic rod is used.



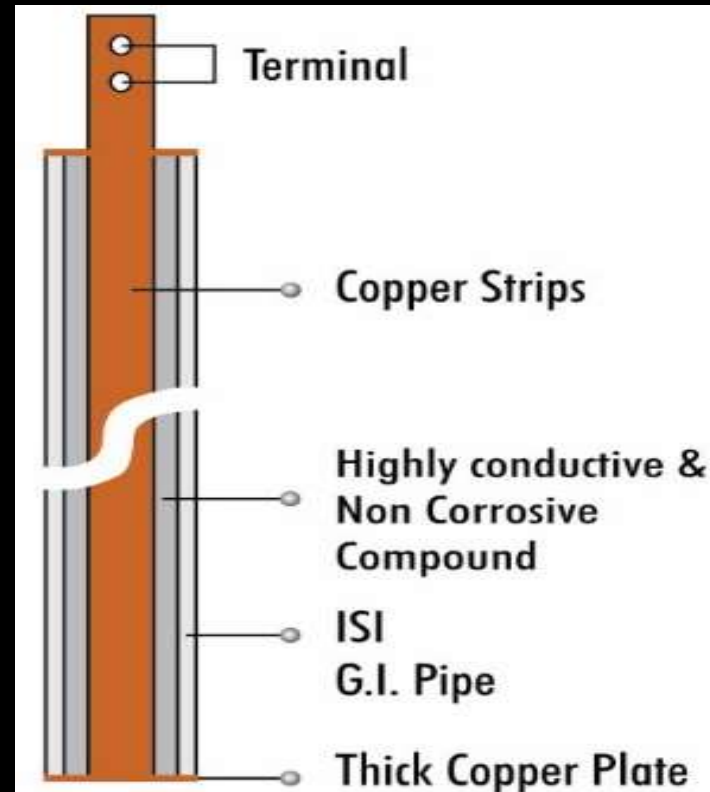
Pipe Type Earthing

- In this type of earthing metallic pipe is used.



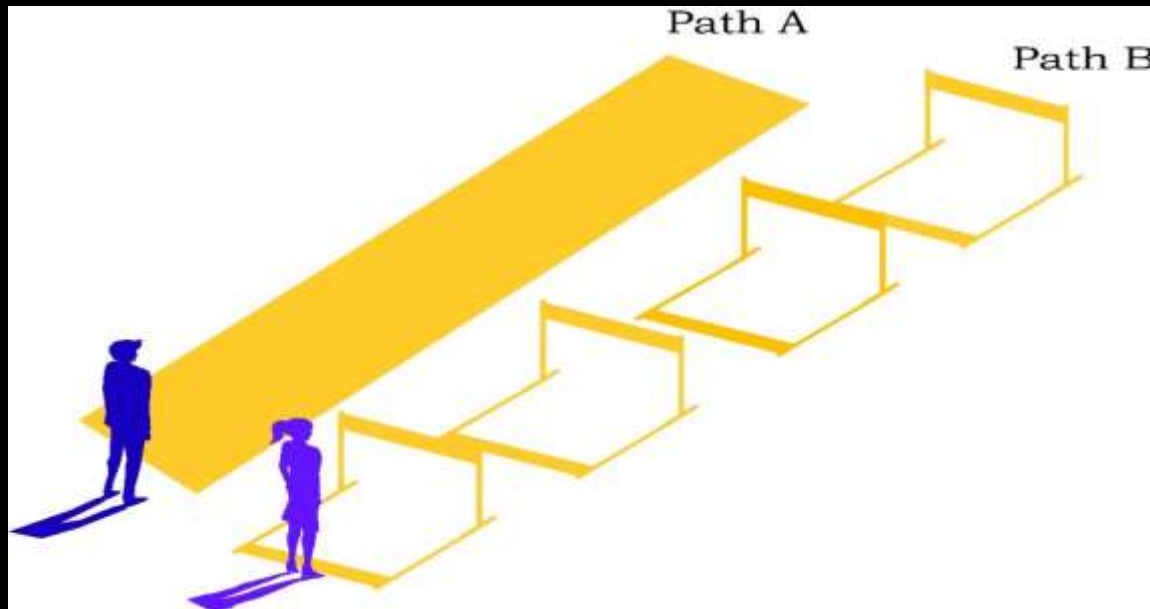
Strip Type Earthing

- In this type of earthing metallic strip is used.



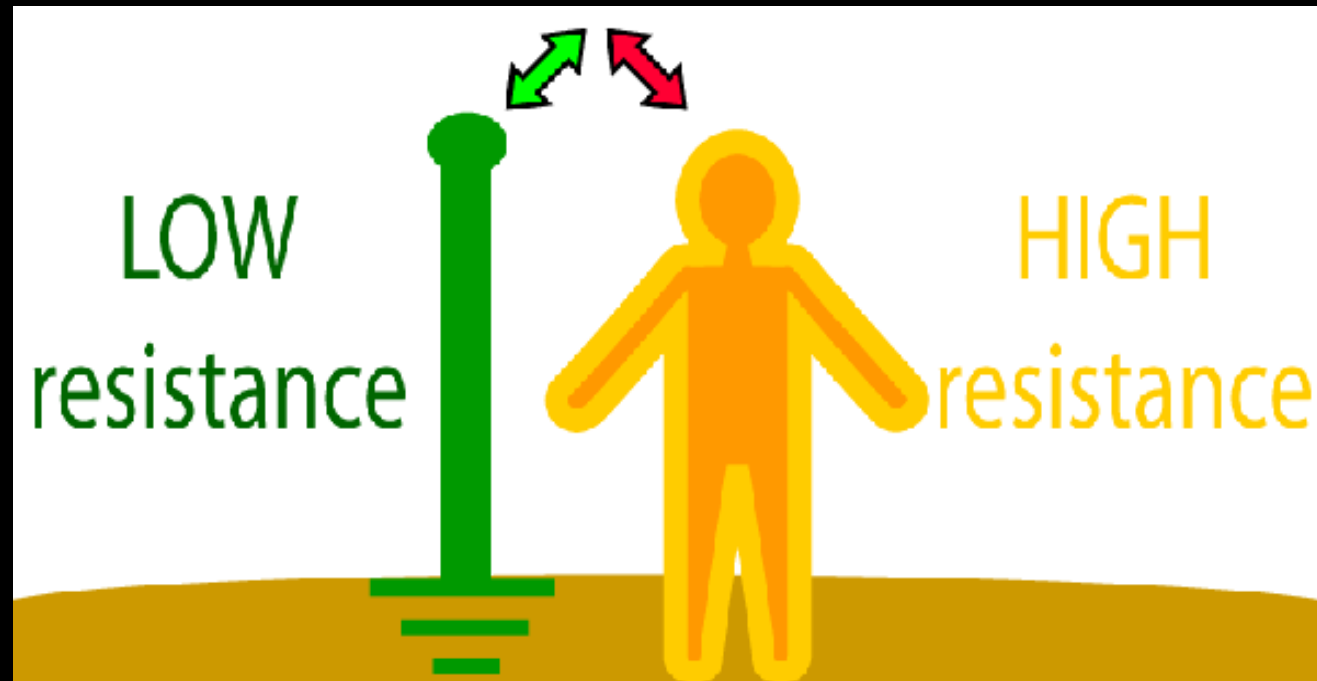
Analogy of Earthing

- Consider, two path 'A' and 'B'.
- Path 'A' do not have any hurdles. But, path 'B' have hurdles.
- It will be easy to run in path 'A' and require less time as compare to path 'B'.



Continue.....

- In the same way, earthing provide the least resistive path to the extra current which is in the appliance.
- Electric current flow through the least resistive path.
- Earthing pits are designed to reduce earth resistance, ideally to 1 ohm.



Low Resistance path of earthing

Steps of Earthing

- An area of 1.5m × 1.5m is excavated to a depth of 3m.



Manpower making a pit

- A 500mm × 500mm × 10mm plate (earth plate) is placed in the middle of the pit.



Plate in the pit

- The pit is half filled with a mixture of coal and salt.
- Make a connections between the earth plate and the surface using rod, pipe.
- The rest of the pit is filled with the coal, sand or salt mixture.



Pit filled with salt and coal

- To connect the earth plate to the surface, two galvanised iron strips with a cross section of 30mm × 10mm can be used.



GI pipe to connect plate to the earth surface

Why do buildings have lightning rods?

Why we call it as the lightning rod.

- Because it protect us from the lightning.
- As lightning is the collection of massive charge.
- This lightning can harm the entire build. Hence, lightning rod protects the building.



Lightning Arrester



Natural Lightning

- They are used for earthing.
- Lightning rod is made up of metal.
- The lower end is made up of copper plate, which is buried deep in the earth. It has spikes.

Summary

- Earthing provides a least resistive path which is used for faulty current.
- Earthing protects the electrical system, electrical and electronic appliances.
- Earthing protects us from an electric shock.
- Lightning rod is used to protect the building from natural lightning.

Project Coordinator : Dr. Dipak Shudhalwar

Assistance

Mr. Parag Shrivastava



Joint Director

**PSS Central Institute of Vocational Education
Shyamla Hills, Bhopal – 462013 , Madhya Pradesh, India**

E-mail: jdpsscive@gmail.com

Tel. +91 755 2660691, 2704100, 2660391, 2660564

Fax +91 755 2660481

Website: www.psscive.ac.in