

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

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Report on

“Creative Assignment on **EARTHING**”

For

INTRODUCTION TO ELECTRICAL ENGINEERING (BESCK204B)

Submitted By

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DATE	MAX MARKS	MARKS SCORED	FACULTY SIGN	STUDENT SIGN

INTRODUCTION

⌚ What is Earthing?

Earthing (also called Grounding) is the process of connecting the non-current carrying parts of electrical equipment or the neutral point of the supply system to the earth (ground). This is done using a low-resistance conductor to allow the leakage or fault current to flow safely into the ground, preventing electric shocks, fires, and equipment damage.

When electrical insulation fails or a live wire touches the metal body of an appliance, the whole body becomes live. Touching such an appliance could be fatal. If the appliance is earthed properly, the current flows into the ground instead of through a human body. Thus, earthing saves lives, prevents fires, and protects devices from voltage surges and short circuits

We may not always see it, but earthing is present in nearly every building and device:

The three-pin plug in your home appliances has a third pin for earthing.

Tall buildings and towers are equipped with lightning arrestors connected to earthing systems.

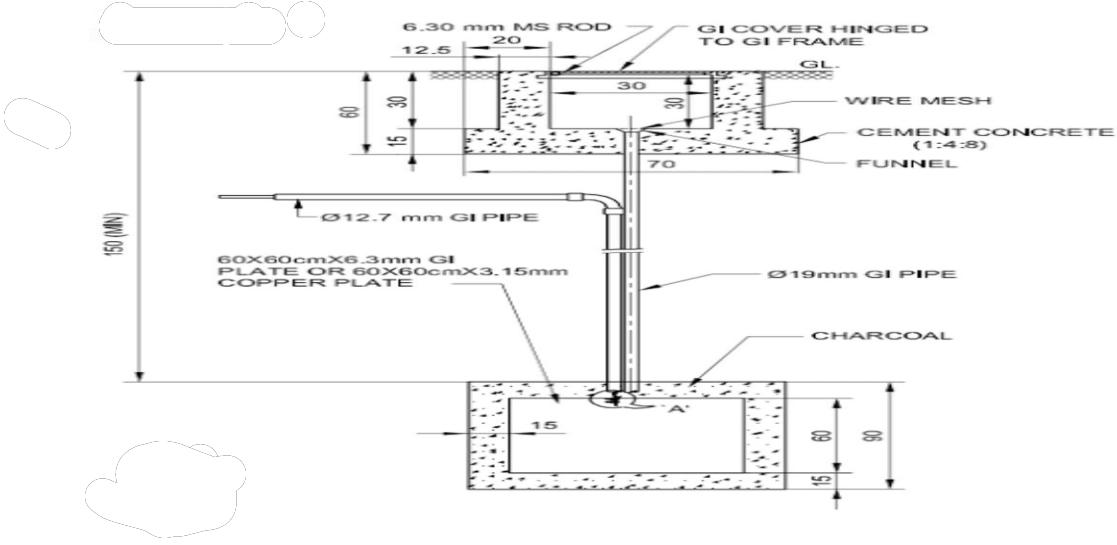
Industrial equipment uses heavy-duty grounding for protection and stability.

Types of Earthing:

A. Plate Earthing

B. Pipe Earthing

A. Plate Earthing:



◇ Definition:

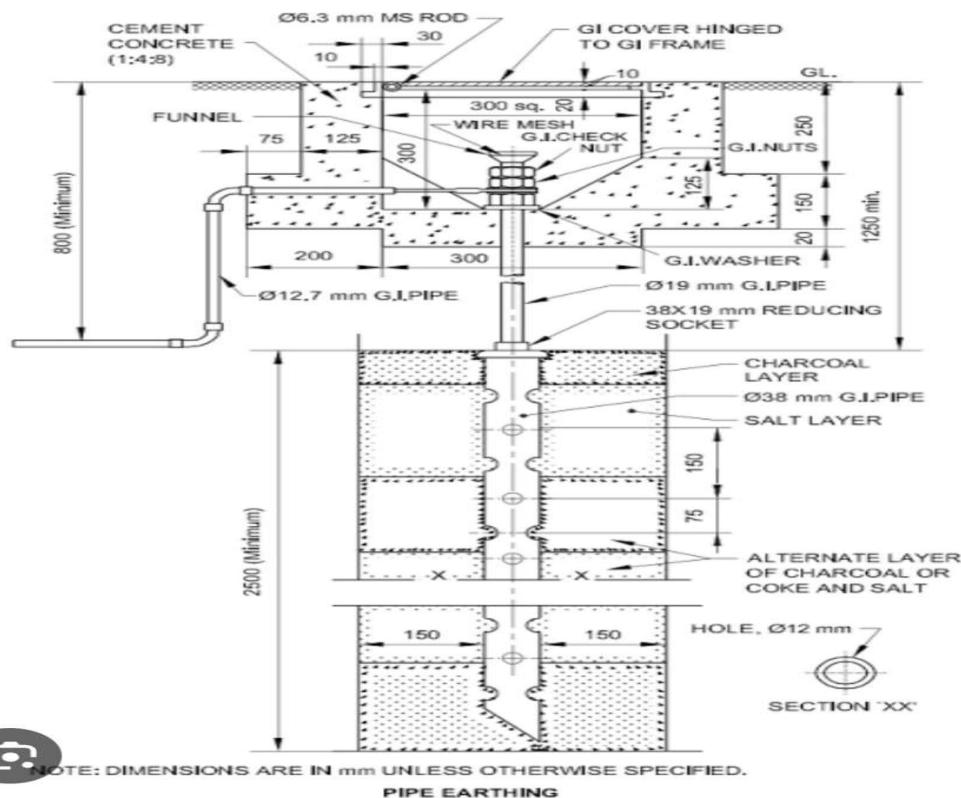
In plate earthing, a copper or galvanized iron (GI) plate is buried vertically in the ground. This setup provides a low-resistance path for fault current to dissipate safely into the earth.

Plate earthing is one of the oldest and most widely used methods of earthing. In this system, a copper or galvanized iron (GI) plate of standard size is buried vertically in the earth at a depth of at least 3 meters from the ground level. To enhance conductivity, the plate is surrounded by layers of charcoal and salt, which help retain moisture and reduce resistance. A copper wire or GI strip is connected from the plate to the electrical installation to safely carry any fault current into the earth. Water is poured regularly through a pipe to maintain soil moisture, ensuring effective performance. Plate earthing is commonly used in homes, commercial buildings, and substations for safe grounding.

B. Pipe Earthing:

- ◊ Definition:

In pipe earthing, a GI pipe (hollow galvanized iron pipe) is used instead of a plate. It is widely used due to its low cost and better efficiency in areas with high soil moisture.



Pipe earthing is the most popular and efficient type of earthing, especially suitable for locations with high soil moisture content. In this method, a galvanized iron (GI) pipe of appropriate dimensions (usually 38 mm in diameter and 2.5 to 3 meters long) is placed vertically into a wet soil pit. The

pipe has small holes that allow moisture to seep in, which helps maintain conductivity. Like plate earthing, layers of charcoal and salt are packed around the pipe to reduce earth resistance. A copper or GI conductor is connected to the pipe using a clamp and is then linked to the equipment to be earthed. A funnel with mesh is provided at the top of the pipe to pour water and keep the soil moist. Pipe earthing is cost-effective, simple to install, and highly effective, making it ideal for residential and industrial applications.

Applications of Plate Earthing:

1. Power Distribution Systems:

Used in power stations and substations to ensure effective grounding and System stability.

2. Industrial Electrical Installations:

Protects heavy electrical equipment like transformers, motors, and control panels from faults and leakage currents.

3. High-rise Buildings:

Ensures safe grounding for elevators, HVAC systems, and other critical equipment.

4. Communication Towers:

Protects against lightning strikes and electrostatic discharges, maintaining signal integrity.

5. Hospitals and Data Centers:

Provides stable grounding to sensitive electronic devices and ensures patient or data safety.

6. Laboratories:

Essential in labs using high voltage or sensitive electronic equipment.

Applications of Pipe Earthing:

1. Residential Buildings:

Protects household wiring and appliances from voltage surges and leakage current.

2. Small Offices and Commercial Shops:

Ensures basic grounding for electrical safety and protection of office equipment.

3. Telecommunication Installations:

Grounds telephone and internet equipment, minimizing the risk of lightning damage.

4. Street Lighting and Traffic Systems:

Ensures safety and continuity in outdoor electrical installations.

5. Agricultural Areas:

Protects pumps and motor sets used in irrigation systems.

6. Temporary Electrical Setups:

Used in events, construction sites, or temporary power supply installations due to its simplicity.

Conclusion:

Plate earthing and pipe earthing are two fundamental methods used to ensure electrical safety in various settings. While plate earthing is ideal for industrial and high-load applications due to its low resistance and high efficiency, pipe earthing is more economical and suitable for residential and small-scale use. Both methods serve the vital function of protecting lives and equipment from electrical faults and surges by safely directing excess current into the ground. Understanding and applying the right earthing method based on the requirement is essential for building safe and reliable electrical systems. These practices not only enhance safety but also improve the overall performance and longevity of electrical installations.

