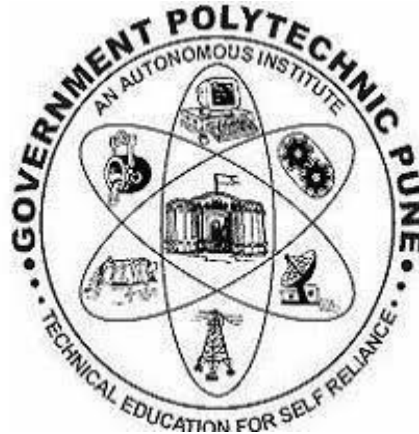


GOVERNMENT POLYTECHNIC PUNE

(An Autonomous Institute of Maharashtra)

DEPARTMENT OF COMPUTER ENGINEERING



Micro-Project Report on the topic "EARTHING"

Course : Basic Electrical
Engineering

Course Code : EE21204

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ACADEMIC YEAR : 2022-23



CERTIFICATE

This is to certify that the micro-project entitled “Earthing” is bonafide work carried out by:

Sr.no	Group Members	Enrollment No
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of class First Year in partial fulfillment of the requirement for the completion of course Basic Electrical Engineering(EE21204) - EVEN 2023 of Diploma in Computer Engineering from Government Polytechnic Pune. The report has been approved as it satisfies the academic requirements in respect of micro-project work prescribed for the course.

Prof.
(Microproject Guide)

Mrs. J.R.Hange
(Head of Department)

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TITLE : EARTHING

- Definition of Earthing:-

Earthing is defined as “the process in which the instantaneous discharge of the electrical energy takes place by transferring charges directly to the earth through low resistance wire.” Low resistance earthing wire is chosen to provide the least resistance path for leakage of fault current.

- Types Of Earthing:-

Basically There are 7 types of Earthing:

1. Plate Earthing. Plate earthing involves burying a metal plate, typically made of copper or galvanized iron, in the ground.
2. Pipe Earthing.
3. Rod Earthing.
4. Strip Earthing.
5. Earthing through Water Pipe.
6. Earthing with Earth Electrode.
7. Chemical Earthing.

- Importance of Earthing :-

Earthing is used to protect you from an electric shock. It does this by providing a path (a protective conductor) for a fault current to flow to earth. It also causes the protective device (either a circuit-breaker or fuse) to switch off the electric current to the circuit that has the fault.

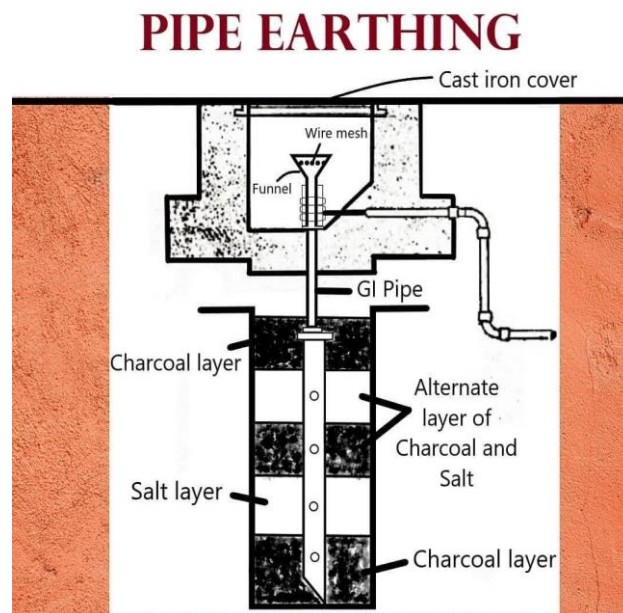
1. Pipe Earthing

*A pipe earthing system that uses a metallic channel establishes electrical conductivity between two points in an electrical system. It's also known as “**grounding**” or “**earth bonding**.”* The most common type of pipe earthing uses metal pipes filled with concrete or other conductive materials buried in the ground. These pipes are then connected to a rod, usually made of copper or another metal alloy.

- *How Does Pipe Earthing Work?*

Pipe earthing systems provide a low-resistance path for current to flow from one point in an electrical system to another. This helps protect people and equipment from potential damage caused by electricity that has escaped from its intended circuit. For example, if there were a short circuit or fault current in one part of the system, the electrical energy would travel through it instead of flowing through people or objects nearby, ensuring their safety.

- *Diagram Of Pipe Earthing:-*



2. Plate Earthing:-

Plate Earthing is a method where a plate made of galvanized copper or iron is buried vertically at least 3 meters below ground level. This plate connects all conductors to the earth, providing a path for electrical discharge. The Diagram of Plate Earthing typically illustrates this setup, showing the plate's position in relation to the ground level and the conductors it connects. The Plate Earthing Diagram also often includes the dimensions of the plate. For instance, a copper plate used in this method typically

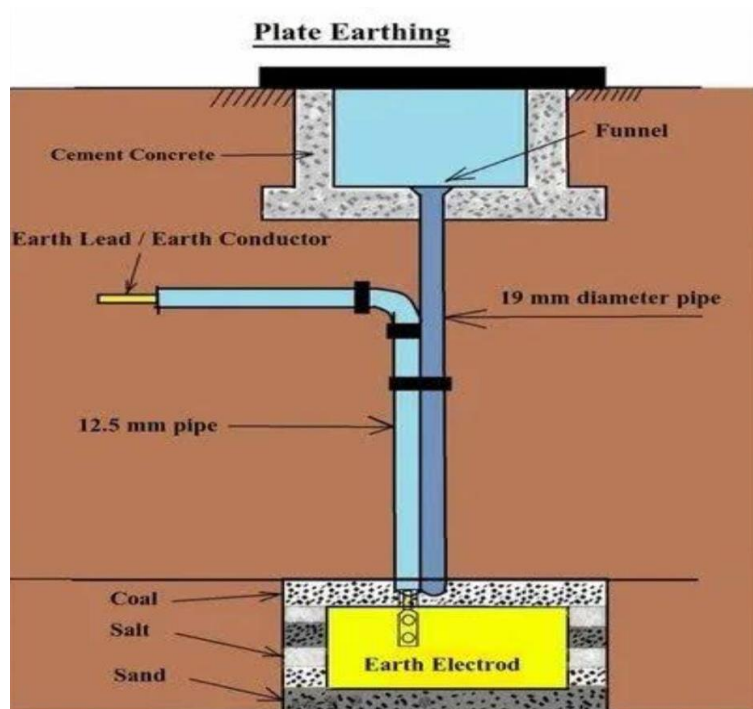
measures 600mm x 600mm x6.35mm. The plate's size and material can vary based on specific requirements, but the principle remains the same, to provide a safe path for fault current to the earth.

- Plate Earthing Procedure

The procedure for Plate Earthing involves several steps, often illustrated in a Diagram of Plate Earthing:

1. Earth Pit: An earth pit is excavated at a suitable location in the substation, with a minimum size of 900mm x900mm and a depth of 3m below the surface.
2. Plate Electrode: A GI plate of minimum size 600mm x600mm and thickness of 6.3 mm is used. If a copper plate is used, a minimum thickness of 3.15mm is required. The plate is surrounded by alternating layers of charcoal and salt.
3. Earthing Connection: Galvanized Iron strips are fixed and welded to the plate at two different locations. Loose earthing can adversely affect the electrode system resistivity, so these connections are made strong.
4. Water Connection: A pipe is fixed at the top to maintain moist conditions around the earth plate. The pipe is covered with a wire mesh, and water is poured through it. The excavated pit is then filled with stone-free soil.
5. Inspection Chamber: A brick chamber is built over the earth pit on a P.C.C layer. The top cover is placed with cast iron hinges to a CI frame.

- Diagram Of Plate Earthing:-



- Conclusion:-

The selection of earthing between pipe earthing and plate earthing is made based on soil condition, current carrying capacity, installation space, cost, etc. The most significant difference between plate earthing and pipe earthing is in their type of earthing electrode used, i.e. pipe earthing uses a metal rod or pipe as an earthing electrode, while plate earthing uses a metal plate as an earthing electrode.

- Chart Photo:-

EARTHING

Definition: Earthing is defined as "The process in which the instant discharge of the electrical energy takes place by transferring charges directly to the Earth through low resistance wire."

TYPES OF EARTHING

PIPE EARTHING



1. **Definition:** Pipe earthing is a type of electrical earthing system that uses a copper-coated steel rod as an earthing electrode.

2. **Shape of Earthing Electrode:** Pipe earthing has a cylindrical shaped earthing electrode.

3. **Protection Efficiency:** Pipe earthing is more efficient in providing protection against electric faults.

4. **Soil Condition:** Pipe earthing requires the soil with high moisture content and low resistance.

5. **Applications:** Pipe earthing is mainly used to protect electrical systems residential and commercial buildings.

PLATE EARTHING



1. **Definition:** Plate earthing is a type of electrical earthing system that uses a flat metal plate as an earthing electrode.

2. **Shape of Earthing Electrode:** Plate earthing has a rectangular shaped earthing electrode.

3. **Protection Efficiency:** Plate earthing is comparatively less efficient in providing protection against electric faults compare to pipe earthing.

4. **Soil Condition:** Plate earthing requires soil with low moisture content and higher resistance.

5. **Applications:** Plate earthing is mainly used in industrial electrical installation where high fault currents are to be handled.

IMPORTANCE OF EARTHING

Earthing is used to protect you from an electric shock. It does this by providing a path (A protective conductor) for a fault current to flow to earth. It also causes the protective device (either a circuit-breaker or fuse) to switch off the electric current to the circuit that has the fault.

CONCLUSION:

The pipe and plate earthing systems were installed efficiently providing reliable grounding testing and monitoring confirmed there observance to safety standards. On going maintenance recommendations were outlined to uphold the effectiveness of these earthing systems.