International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 7 July 2022, pp: 770-773 www.ijaem.net ISSN: 2395-5252

"Study of Earthing Phenomenon at Sscet"

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Submitted: 05-07-2022 Revised: 15-07-2022 Accepted: 18-07-2022

ABSTRACT- In electrical supply systems, an electrical earthing system defines the electrical potential of the conductors absolute to that of the Earth's conductive surface. The choice of earthing system has suggestions for the safety and electromagnetic compatibility of the power source. Note that regulations for earthing (foundation) systems vary considerably among different countries.

A useful earth connection serves a purpose other than providing protection beside electrical shock. In difference to a defensive earth connection, a functional earth joining may carry a current throughout. the normal operation of a device. Functional earth joining s may be required by devices such as surge suppression and electromagnetic interference filters, some types of antennas and various measurement instruments. Generally the self-protective earth is also used as a useful earth, though this requires care in particular situations.

Key Words: Copper Plate, Copper Rod, Copper GI Wire, haedware Nut Bolt

I. INTRODUCTION

The procedure of electrically connecting to the earth itself is often called "earthing", mainly in Europe where the term "foundation" is used.

All the people living or working in housing, commercial and industrial connections, particularly the operators and workers who are in close operation and contact with electrical systems and1 machineries, should fundamentally be safe against possible electrification. To achieve this protection, earthing system of an connection is defined, Designed and fixed affording to the standard necessities.

The main aim for doing earthing in electrical system is for the safety. When all metallic parts in electrical equipments are2 grounded then if the protection inside the equipment's fails there are no risky voltages present in the equipment case. If the live wire touches the grounded case then the circuit is efficiently shorted and fuse will immediately blow. When the fuse is gusted then the unsafe voltages are away.

1.1.OBJECTIVE OF EARTHING

- Afford an alternative path for the error current to flow so that it will not imperil the user
- Confirm that all exposed conductive parts do not reach a risky impending
- Maintain the voltage at any portion of an electrical system at a known value so as to avoid over current or unnecessary voltage on the appliances or equipment.

1.2.GOOD EARTHING MEANS

Good earthing must have low impedance sufficient to ensure that enough current can flow through the security device so that it separates the source (<0.4 sec). Fault current is much more than the full load current of the tour which melts the fuse. Hence, the appliance is separated mechanically from the source mains.

II. LITERATURE SURVEY

This section comprises literature review on earthing size techniques, a relative study of commercially available earth testers and detailed explanation of smart ground meter (SGM) industrialized by EPRI and recent trends in earthing impedance sizes for power frequency and impulse condition.

2.1.METHODS OF MEASUREMENT OF EARTH IMPEDANCE

The impedance of an earthing scheme is typically resolute with alternating current of power occurrence to avoid imaginable division effects when using direct current [5]. When the power frequency current is injected into the earthing scheme under test, care has to be taken to avoid the intrusion in quantity

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system due to the power system leakage currents. It is normally considered to inject the current signal at the occurrence close to the power frequency such as either close to 48Hz or 52Hz but not exactly at 50Hz (when the power system frequency is 50Hz) to avoid the power regularity signal meddling which can distort the size results. Commercially available earth trial size tend to inject the switched DC

III. CIRCUIT DIAGRAM

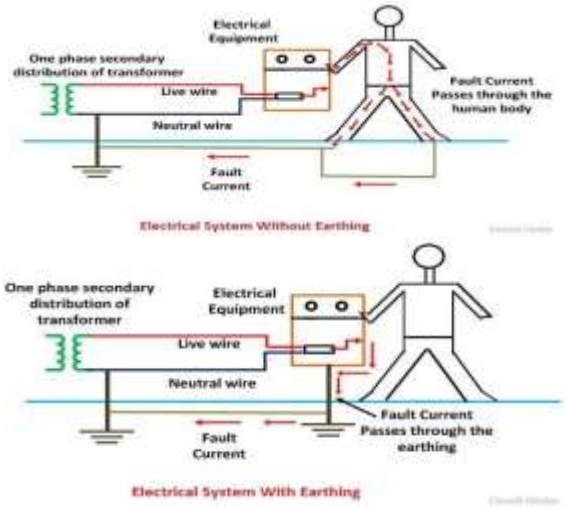

Fig -1: Circuit diagram of electrical earthing system

IV. WORKING PRINCIPLE

The procedure of connecting iron bodies of all the electrical device and apparatus to huge mass of earth by a wire have small resistance is called Earthing.

The term earthing means joining the impartial point of supply system or the non-current resonant parts of the electrical gadget to the overall mass of earth in such a method that all times an instantaneous discharge of electrical dynamism takes place without dangers.

V. TYPES OF EARTHING

5.1 Plate Earthing :-

The earthing scheme, where a copper or spurred iron plate is used to connect all the earthing electrodes to the earth is called Plate Earthing. Usually, the plate is placed precipitously at a depth not less than three meters or 10 feet from the ground level. And all the electrodes are connected to the plate.

- Cast iron plate of size 600mm *600mm*12mm. OR
- Spurred iron plate of size 600mm *600mm *6mm. OR
- Copper plate of size 600mm *600mm *1.5mm.
- The plate conductors shall be buried such that its Top edge is at a complexity not a smaller amount than 1.5m from the superficial of the ground.

Plate shall be set precipitously.

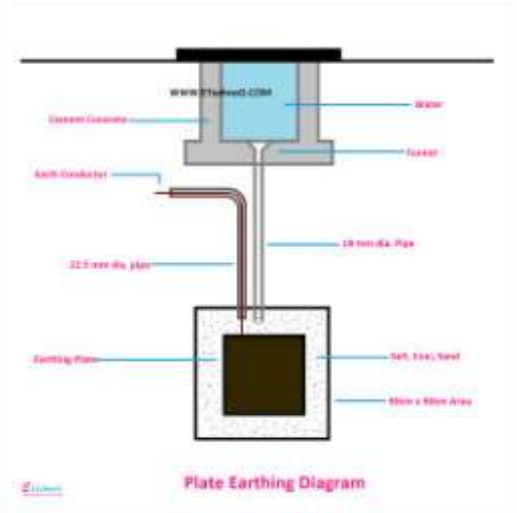

Fig -2: Plate Earthing

5.2 Rod Earthing

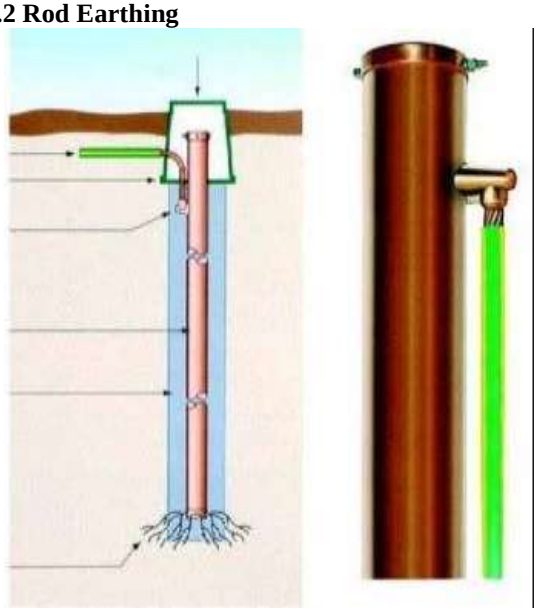

Fig-3: Rod Eartrhing

The Rod earthing is essentially non - action earthing. A copper rod of 12.5mm (1/2 inch) quantity or 16mm (0.6in) quantity of galvanized steel or hollow piece 25mm (1inch) of GI pipe of length above 2.5m (8.2 ft) are buried standing in the earth physically or with the help of a pneumatic hammer. The length of

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embedded electrodes in the soil diminishes earth resistance to a favorite value.

5.3 Strip Earthing

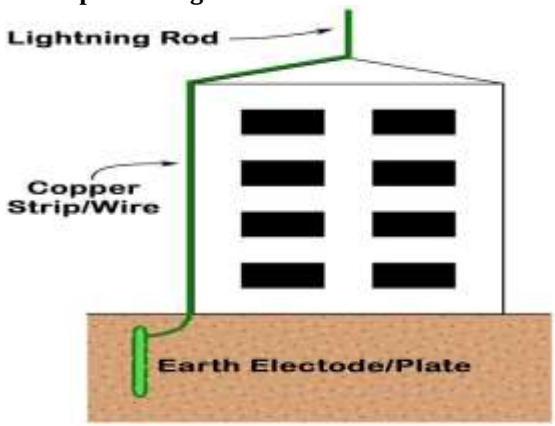

Fig-4 Strip Earthing

This technique of earthing is used where earth pit as a rocking soil and diggings of earth is very difficult. To overcome this 3mm2 round copper wire of 6mm2 stimulated iron round. Additional copper strip 25mm×1.6mm is laid under trench not less than 0.5 meter parallel. Here the earth resistance is around 5Ω

5.4 Pipe Earthing

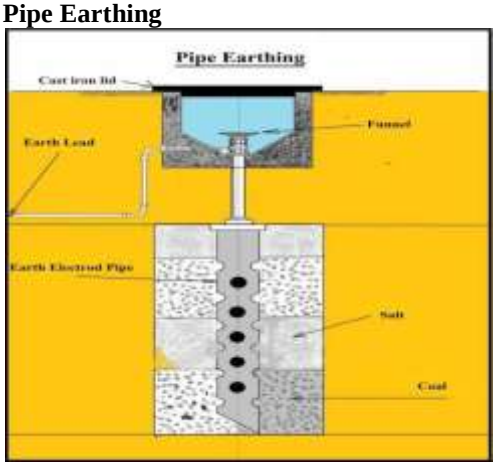

Fig-5 Pipe Earthing

Pipe Earthing is one of the most mutual earthing practices. The pipe earthing uses a stimulated iron (GI) pipe, and the dimension of the GI pipe used for a structure be contingent mainly on the greatness of possible current and the soil type.

The height of the pipe is usually 40mm (1.5in) diameter and 2.5m (9ft) length for regular soil and greater for dry and rocky earth as the soil resistivity is higher in such cases.

VI. VALUE OF EARTHING RESISTANCE

- Large power station= 0.5Ω
- Major sub-station= 1.0Ω
- Small sub-station=2Ω
- Neutral bushing =2Ω
- Service connection = 4Ω
- Medium voltage network =2Ω
- L.T. Lightning arrestor=4Ω
- L.T. Pole= 5Ω
- H.T. Pole = 10Ω
- Tower = 20-30Ω
- In all the other cases = 8

VII. CONCLUSIONS

Foundation and Earthing schemes form the first line of protection in every type of electrical systems. The scheme may be a producer/transformer/housing installation/producing station/etc. So it is severely advised to know the basic concepts of foundation as far as electrical engg. is troubled.

VIII. RISULT

- First it was a really splendid knowledge while execution earthing connection in Shree Sai College of Engineering and Technology, Bhadrawati.
- An earthing system or foundation system connects precise parts of an electric power system with the milled, typically the Earth's conductive surface, for safety and useful purposes. The choice of earthing system can affect the safety and electromagnetic compatibility of the connection.
- While execution the installation process in college we cast-off the plate and rod type of earthing as it was most efficient amongst all types, easy, convenient and super reasonable.
- We functioned really hard while connecting the earthing in college and the result i.e., the resistance we got after the connection was 2 ohm.

ACKNOWLEDGEMENT

I avail this prospect to extend my hearty acknowledgement to my project guide Prof. Nilima B. Dhande, Department of Electrical Engineering, for their valuable guidance, continuous reassurance and kind help at different stages for the execution of this work, for his ever heartening and moral provision.

I also express our sincere thankfulness to Prof. Umesh G. Bonde, Head of the Department, Electrical Engineering, for providing valuable departmental services.

I would like to thank all staff members of the Electrical Engineering Department for extending the

conveniences without which the project would not have been a achievement.
Last but not least we thank Principal Dr. Vinod S. Gorantiwar of Shri Sai College of Engineering and Tech…

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