



What is Soil Resistivity Test?

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Soil resistivity test is conducted to measure the resistance of soil when current is passed through it. It is a critical factor in the design of systems that rely on passing current through the Earth's surface.

Soil resistivity is the ability of the soil to resist the flow of electricity. Various factors affect the resistivity of a soil such as its composition, temperature and moisture content. Since soil is not a homogeneous substance, its resistivity will vary with depth, with lower soil layers having greater moisture content and hence lower resistivity. For hard and rocky soil, the resistivity increases with depth.

Bhoojal Survey has successfully conducted Soil resistivity test operations at different sites across India using Wenner method. For queries visit <https://bhoojalsurvey.in/soil-resistivity-test.php>

Soil resistivity testing has multiple purposes

1. Soil resistivity test is conducted to determine Low resistivity zone for safe earthing purpose

It is the most effective way to identify location for passage of excess current to ground by installation of proper grounding systems on the basis of resistance offered by soil at a particular location. It is advisable to locate the area of lowest soil resistivity in order to achieve the most economical grounding installation. Wet soil provides a low resistivity zone and hard basaltic rocks generally are high resistivity zones.

Wenner 4 point test for soil resistivity testing

wenner-4

2. Soil resistivity tests using Schlumberger method can determine the geological formation of Subsurface and aid in identifying ore locations, depth to bedrock and other geological phenomena.

Soil resistivity Chart for materials present at subsurface strata

materials

3. Resistivity values affect design of Casing pipe installed beneath earth surfaces. A decrease in resistivity value indicates presence of moisture which leads to corrosion of pipe and leads to failure of the piping system due to early aging through rust.

How is the Soil resistivity test performed?

Soil resistivity test is conducted using Wenner 4 point method.

The Wenner 4-point test method requires driving four spikes into the ground that have been arranged in a straight line and spaced equidistant. A known current is passed between the electrodes placed at the two ends known as the current probes. The potential difference is measured between the two middle spikes which take the soil resistance measurement and are known as the potential probes. Testing is carried out as close to the site as possible.

Instrument required for performing Soil resistivity Testing:

1. Soil resistivity meter with battery to generate current
2. 4 Electrodes
3. Connecting wires (from electrodes to resistivity meter)
4. Hammer
5. Measuring Tape

Wenner 4 Point methodology

The following step used to test the soil resistivity in this method:

1. Placed the soil resistivity measure equipment on the center of the assessment location.
2. Put two potential electrodes on the left and right side point of view based on the distance test required. This electrode is embedded from 5 to 10 cm to ground, based on the soil condition.
3. Put two current electrodes on the left and right side point of view based on the distance test required. This electrode is embedded from 5 to 10 cm to ground based on the soil condition.
4. Connect all electrodes cable with the soil resistivity measuring equipment.
5. Energize the electrode with the power supply from soil resistance measuring equipment.
6. Please make sure no one touches the electrode when the electrode energizes.
7. The value of soil resistivity will be calculated and appear on the soil resistivity measuring equipment LCD's or monitor.

Placement of electrode at equal distance for passing of current through outer electrode and measuring potential difference at inner electrode to determine resistivity of soil

Calculating Resistivity values from Resistance reading

The resistance can be measured and resistivity calculated according to the following formula.

Where: ρ = Resistivity in Ohm-meter

a = spacing between pin in meter

R = Resistance measurement in Ohm

It should be noted that measurements made in this manner indicate average resistivity over a depth of soil corresponding to the spacing between adjacent pins/electrodes.

Wenner Method Work Principle

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