

Measurement of Soil Resistivity

The measurements of soil resistivity were carried out using the established Wenner method. Tests were undertaken in two perpendicular traverses alongside each pole and the readings averaged to establish the average resistivity in the vicinity of the poles.

WENNER Method and Procedure to Measure Soil Resistivity

The Wenner Method uses a four-terminal earth tester, four short test spikes and connecting leads with a range of lengths or markings to accommodate a standard range of Wenner probe spacing appropriate for the tests. The range of spacing will be determined by the measurement depths of average resistivity required for driven and placed electrodes and the reinforcement in civil structures.

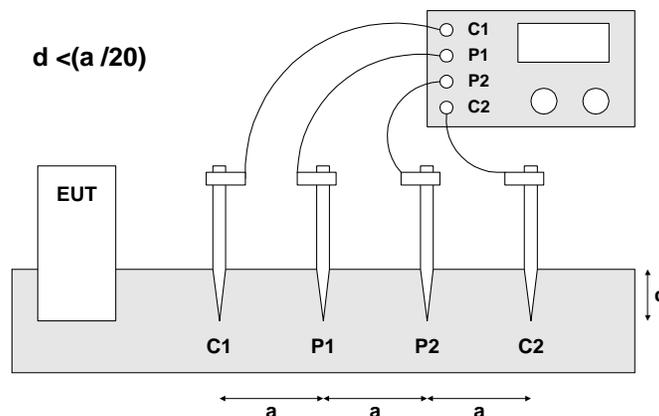
Method

Four test spikes should be inserted into the ground in a reasonably straight line, at a distance "a" metres apart to a depth not exceeding "a/20" metres.

The four spikes should be connected to the tester, as shown, with the outer spikes connected to the Current C-1 and C-2 terminals and the inner spikes to the voltage P-1 and P-2 terminals. It is important to note that all the measurements are symmetrical about the measuring point that should be midway between the voltage spikes.

An instrument connected as above and switched on will provide a resistance reading. If this is called "R" ohms, the apparent and average soil resistivity (ρ) is then given by

$$6.283 \times "a" \times "R" \text{ in ohm/m to a depth of "a" metres.}$$



Results

The results shown on the following two sheets indicate that the introduction of the Perma-Soil has had a positive effect on the resistivity of the soil i.e. the resistivity value been lowered. This is apparent from the comparison of the Perma-Soil mix around Pole 1 and the excavated and unexcavated ground around Poles 2, 3 and 4.

The same effect was noticeable in the second series of results where the three locations with Perma-Soil produced lower readings than the augered hole without the Perma-Soil. The comparison between the results of Pole 7 and Pole 8 and the significant difference in average resistivity values to a depth of 2m highlights the greater burying depth required for the construction and the soil / Perma-Soil mix being present for this increased depth.

Summary

The results of the tests carried out in this particular location have shown that the introduction of Perma-Soil has lowered the value of average resistivity. This appears to be due to the binding effect on the soil rather than any electrical properties of the material.

It is therefore possible that the positive effect of lowering resistivity may also be applicable for other soil types in other locations. However, this can not be conclusively determined by this single series of tests.