

CYMGRD Ground Resistivity Method

Resistivity Measurements

There are many methods to measure earth resistivity. Some of these methods will be discussed here.

1. The Wenner Four-Point Method
2. Variation of Depth Method (sometimes called the driven-rod method)
3. The Fall of Potential Method (sometimes called the three-pin method)
4. Ratio Method

The Wenner Four-Pin Method

- The Wenner four-pin method is the most commonly used technique
- Figure 39 shows a schematic of the test set-up.

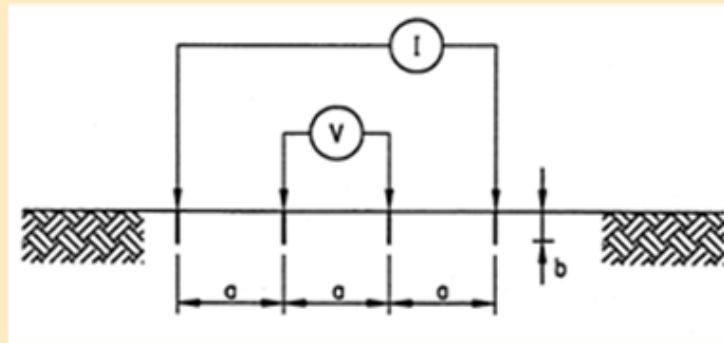


Figure 39

The Wenner Four-Pin Method (cont.)

Procedure:

- Four probes are driven into the earth along a straight line, at equal distances a apart, driven to a depth b .
- The voltage between the two inner (potential) electrodes is then measured and divided by the current between the two outer (current) electrodes to give a value of resistance R .

The Wenner Four-Pin Method (cont.)

- The resistivity is then given by:

$$\rho_a = \frac{4\pi a R}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$$

ρ_a is the apparent resistivity of the soil in $\Omega \cdot m$

R is the measured resistance in Ω

a is the distance between adjacent electrodes in m

b is the depth of the electrodes in m

The Wenner Four-Pin Method (cont.)

- If b is small compared to a , as is the case of probes penetrating the ground only a short distance, the above equation can be reduced to:

$$\rho_a = 2\pi a R$$