Measurement of Soil Resistivity

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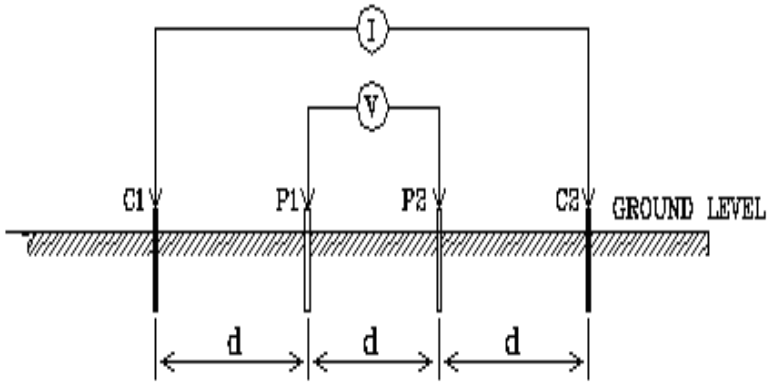
Background

- Resistivity is one of the basic parameter in electrical system.
- The measurement of soil resistivity is widely used in the fields of power system especially on earthing system.
- Commonly, soil resistivity varies with depth, also due to water content and temperature.
- Many methods can be apply for soil resistivity meausrement.
- The most popular method is 4-probe method, also named Wenner method.

Setup arrangement

Equipment been used : Megger



Wenner Method

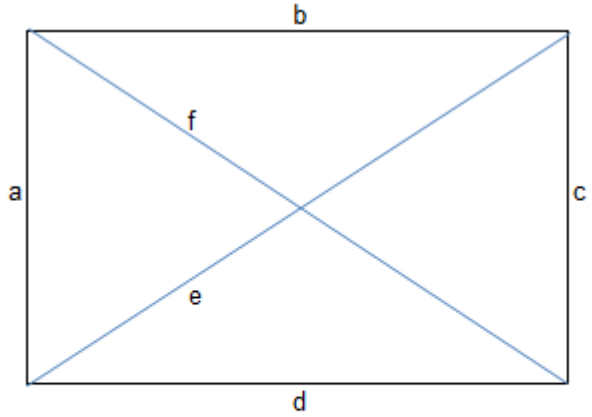
Soil Resistivity Measurement Set-up

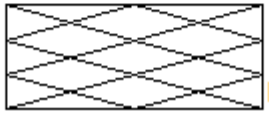
Soil Resistivity Measurement

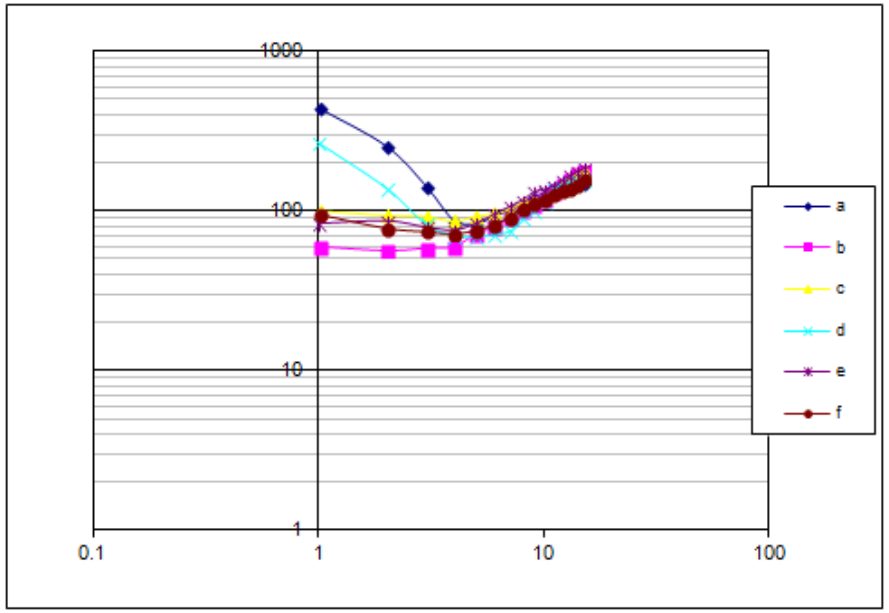
Methodology

- The configuration of the four-method is to arrange four probes along a line with equal spacing as shown in previous slide.
- With *'d' set as the spacing between two neighboring probes, then the respective apparent resistivity,ρa under spacing 'd' is :*
- $$\rho a = 2\pi dR$$
- Where : ρa – apparent resistivity
- d - spacing between probes
- R – Readout meter

Results







Items	a ρa	b ρa	c ρa	d ρa	e ρa	f ρa	Average ρa
ρ1 (Ωm)	328.275	44.775	76.05	199.725	62.625	71.55	130.5
ρ2 (Ωm)	96.194	89.137	99.73	81.726	102.702	91.814	93.225
h1 (m)	1.875	1.875	1.875	1.875	1.875	1.875	1.875

Soil resistivity-interprated into two layers

Conclusion

- In field measurement, choosing the proper measurement technique according to local situations can be make the test easy and effective.
- Wenner method or four-probe method is the most popular technique been applied for soil resistivity measurement at field site.