

Aim:

Measurement of earth resistance.

Objective:

Measurement of earth resistance by three electrode methods.

Apparatus required:

Serial Number	Instrument Name	Specifications	Quantity	Maker's Name
1	Earth resistance testing kit		1	Nanin Bokun Instrument Equipment Co. LTD
1 a.	Earth tester (Model:AR-4105A)	2Ω-0.5 ~ 1.99Ω 20Ω-2 ~19.99Ω 200Ω-20~199.9Ω	1	Nanin Bokun Instrument Equipment Co. LTD
1 b.	Connecting leads (with crocodile clips)	Red , yellow, green color codes	3	Nanin Bokun Instrument Equipment Co. LTD
1 c.	Auxiliary earth spikes		2	Nanin Bokun Instrument Equipment Co. LTD
2	Earth electrode		2	Nanin Bokun Instrument Equipment Co. LTD
3	Metering tape	30 meters	1	FMI LTD

Sayan Mondal

Abantika Saha Sayan Das

Devi Saha

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Sohini Bhattacharya

Anirban Maji

K.Dharmaj Reddy

Subham Gupta

Tuhin Karak

Souradepta Pal

Houstar Sanyal

D. Senapati

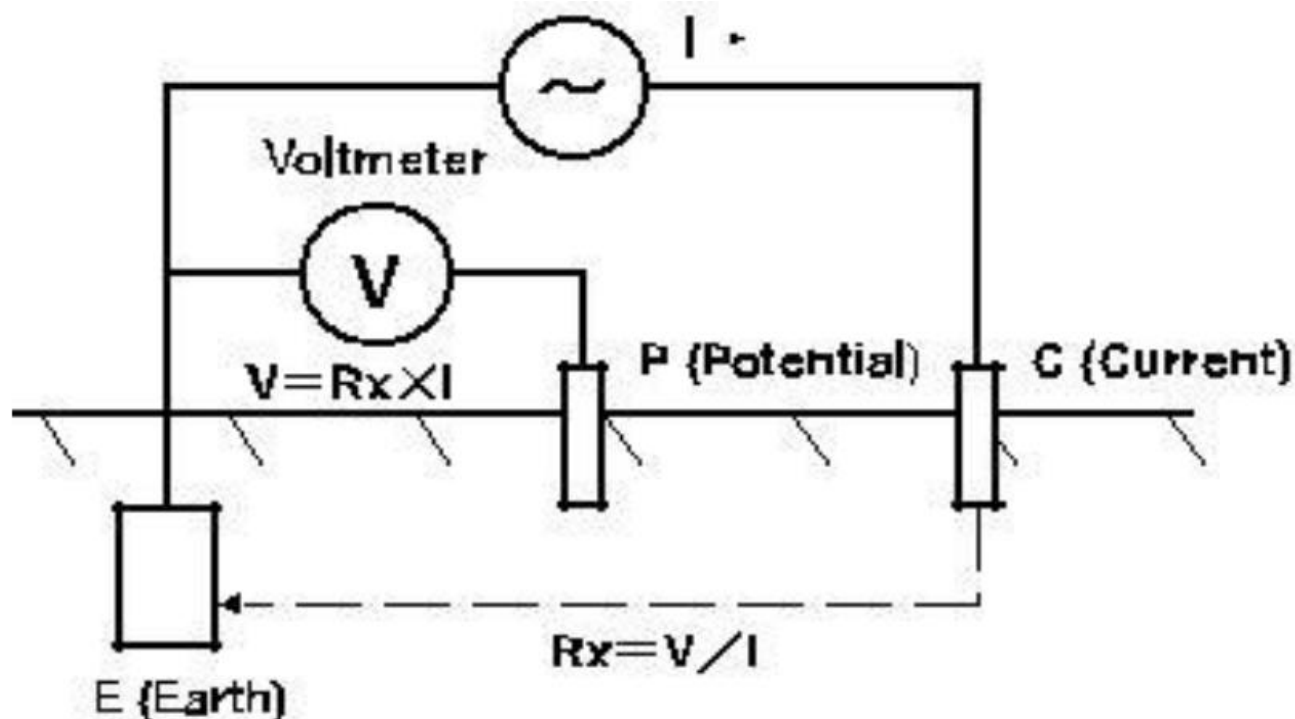
Aman Kumar

Jyoti Sanyal

Theory :

This instrument makes earth resistance measurement with fall-of-potential method, which is a method to obtain earth resistance value R_x by applying AC constant current I between the measurement object E (earth electrode) and C (current electrode), and finding out the potential difference V between E and P (Potential electrode).

$$R_x = V/I$$



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Debnata Pal

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Amirban Moi

K.Dhanyajyoti

Subham Gupta

Tuhin Karmak

Souradip Pal

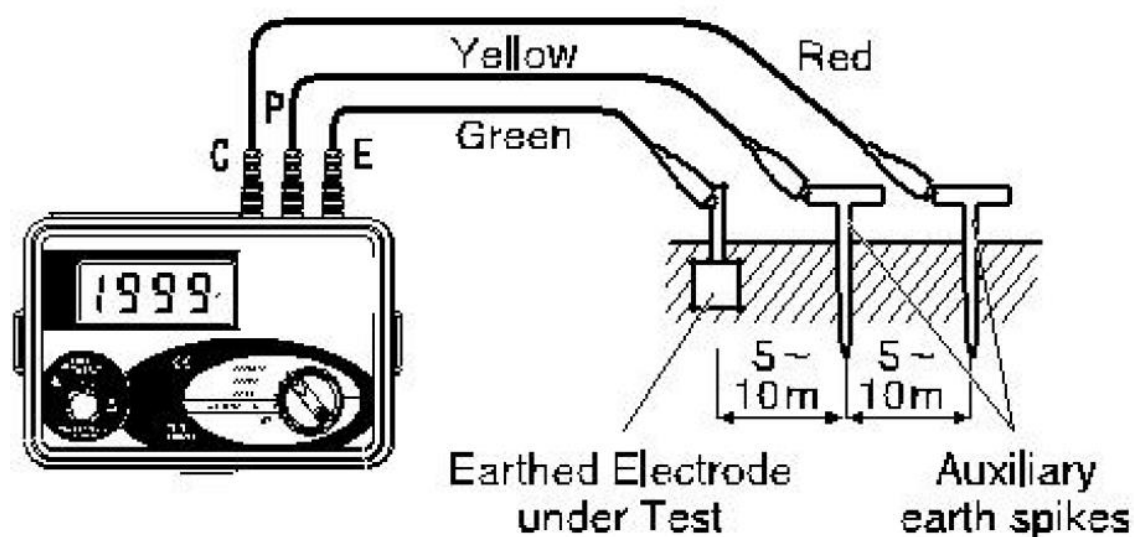
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Original Circuit:

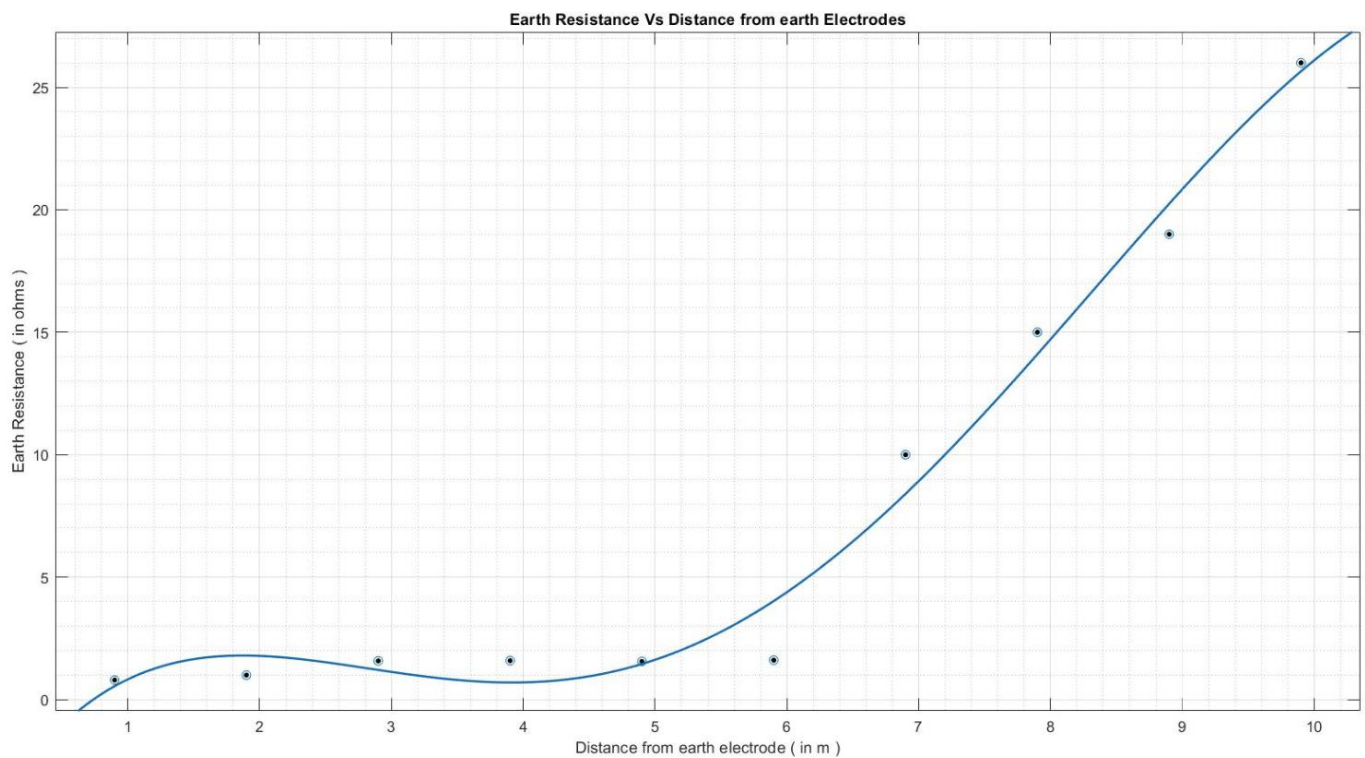


Observation Table:

Serial Number	Distance from Earth Electrode (in meters)	Earth Resistance(Ω)
1	0.9	0.8
2	1.9	1.0
3	2.9	1.58
4	3.9	1.59
5	4.9	1.56
6	5.9	1.61
7	6.9	10
8	7.9	15
9	8.9	19
10	9.9	26

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K.Dharmajyoti Subhom Gupta Tukin Karak Samadhepta Pal Houshar Sanyal Dhanapati Anan Kumar Jyoti Samal

Graph:



Calculations:

From the graph we find the value of earth resistance remain almost constant from 2.9m to 5.9m. Thus, earth resistance offered by the earth electrode $\sim 1.58\Omega$.

Rayan Mondal

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Raj Saha

Deenu Pal

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Sowadeepta Pal

Houstar Sanyal

D. Senapati

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Yashraj Samanta

Conclusion:

- The measured earth resistance readings are better on a rainy day than a sunny day due to the moisture in the soil.
- The earth resistance value should not exceed 5 ohms in practice (according to Indian Electricity Earthing Standards).
- The measured earth resistance increases with the increase in distance from the earth electrode until it becomes constant. However, when we move closer to the current electrode, the value of earth resistance increases again. This is because the electric field lines are concentrated at the earth and current electrodes and become almost constant around the midway point between the 2 electrodes, provided that they are sufficiently far apart from each other and their effective resistance areas don't overlap.

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