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Soil Resistivity Testing for Earthing Safety – Is there a better way?

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Abstract— One of the fundamental building blocks for reviewing, modelling, and predicting the safety of an earthing system is the soil resistivity. To determine the soil resistivity measurements are taken on site. The measurement methods used can vary from simple to sophisticated. For power system reviews, the soil resistivity testing a number of test methods have been developed, particularly the Wenner and Schlumberger methods. The Wenner and Schlumberger methods use four probes in the ground, where a number of measurements are made to form a test traverse. With the Wenner method, all four probes are shifted for each measurement, which can take time. For both measurements, the current probes are shifted, which can introduce measurement errors. Generally the Wenner method is the preferred method, as the set up and understanding of this method is much simpler. We have developed a test method, which only requires one probe to be shifted and gives the same results as the Wenner method. The advantages of the method are that there is less measurement errors introduced, as well as taking approximately half the time to conduct a traverse. The reduced time can mean that the testing cost can be reduced, or that twice as many tests can be conducted, giving a wider knowledge of the soil structure across a site. Additionally, the personnel conducting the testing will appreciate the reduced walking required. This paper presents the new test methodology, and some of the challenges involved. Several case studies are also provided to show the validity of the site test method.

Keywords— Soil resistivity measurements, Wenner method, Schlumberger method, computer modelling

Intention to submit as Technical paper – Yes