

GROUNDING AND SHIELDING FOR THE HIGH-VOLTAGE LABORATORY

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MOHD. YUSRY BIN BAHARUDIN
Department of Electrical Engineering
INSTITUT TEKNOLOGI MARA
40450 Shah Alam, Malaysia
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Abstract

This report describes the grounding system for a high-voltage laboratory. The report also contain the proposed layout for the high-voltage lab. The layout consist of the arrangement of the equipments, clearances and shielding of the laboratory in the Electrical Engineering Department of ITM. The existing grounding system is insufficient and also the route of the grounding electrodes is not known. In this project, efforts have been made to determine the location of grounding electrodes by making use of the earth's electric field nearby the suspected electrode's location and its nearby. Several data are obtained and then have been compared so as to determine the exact location. The potential gradient at that point is expected to be higher than its surrounding which is due to the existence of the electrode (or charged object) at that point.

1.1 Introduction

The suitable and sufficient grounding system is very important to prevent electric shocks to human being and also to protect the equipment from damage when the failure of the system occurs. Grounding system is needed to be as a path for the current leaving any supply voltage line to return to its source. Because of the earth can be considered to be a huge conductor which is at reference (zero) potential, the ground is terminated or buried in the earth.

Earth is a very huge and complex conductor as mentioned by Ralph Morrison ref. [1]. The soil condition, contact area and frequency will effect the pattern of the current flow as stated in ref.[1]. Resistance of earth varies as a function of soil type and moisture content in the earth. Rocky areas, desert, frozen tundra and etc. give different values of resistivity. Grounding is very important as its help to provide stability of voltage conditions, preventing excessive voltage peak during disturbance and a protection against the lightning. For protection from the lightning, surge arresters are often used which are provided with low earth resistance connection to enable the large currents discharged to general mass of the earth.