

ANALYSIS OF IVAT LABORATORY GROUNDING SYSTEM USING
CDEGS SOFTWARE

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ABSTRACT

Practical tests on grounding systems has proved very costly and pose hazards on operating personnel. Therefore, numerical methods using computers provide the most appropriate tool to assess the earthing systems. The research has been conducted with the utilization of CDEGS software as a tool to simulate all necessary phenomena on the built CDEGS model of the grounding system in IVAT's laboratory. In particular, the ground potential rise, touch voltages, and step voltages plots are the main outputs generated. Six lightning scenarious catergorized into low, medium and hight levels are applied on the proposed grounding system to assess for the IVAT's earthing structure safety. The IEEE 80-2000 standard is used to calculate the maximum allowable limits for surface potentials and employed as set point. Obtained results were compared to the safety limit of the standard and proved safe only for the low level when no protective layer is in use. However, the system was completely safe and met the standard's limits for low, medium and high levels of lightning strikes when a protective layer is in place.

ABSTRAK

Ujian praktikal pada sistem pembumian membabitkan kos yang sangat mahal dan menimbulkan bahaya kepada penguji. Oleh itu, kaedah berangka menggunakan komputer merupakan teknik yang paling sesuai untuk menilai sistem pembumian. Kajian ini telah dijalankan dengan penggunaan perisian CDEGS sebagai alat untuk mensimulasikan semua fenomena sistem pembumian makmal IVAT. Khususnya, kenaikan potensi bumi, voltan sentuh, voltan langkah voltan plot adalah hasil utama simulasi. Enam senario kilat iaitu tahap rendah, sederhana dan tinggi digunakan pada sistem pembumian yang dicadangkan untuk menilai tahap keselamatan struktur IVAT. Standard IEEE 80-2000 digunakan untuk mengira had maksimum yang dibenarkan untuk potensi permukaan dan sebagai titik set. Keputusan yang didapati dibandingkan dengan had keselamatan yang standard dan terbukti selamat untuk hanya tahap rendah apabila tiada lapisan perlindungan digunakan. Walau bagaimanapun, sistem ini selamat dan memenuhi had standard bagi tahap rendah, sederhana dan tinggi apabila lapisan perlindungan digunakan

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