

# **MODELING OF TRANSMISSION TOWER GROUNDING SYSTEM**

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The above candidate has carried out research for the Masters dissertation under my supervision.

Dr. Asanka Rodrigo

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## ABSTRACT

Performance of power transmission lines has a great impact on reliability aspects of a particular power supply system of a country. Unreliable power transmission lines can even leads to total power failures resulting with great financial losses. In order to improve the withstand level of transmission lines, to reduce line lightning trip-out rate and the accident rate grounding resistance in grounding grid of transmission line tower should be effectively ameliorated.

This thesis is a study of a 132 kV transmission line tower grounding system. Several standards are developed for designing a grounding system for AC substations and building installation but it is harder to find references for transmission line tower grounding specially when the soil condition is poor. The transmission line is routed over a high resistive soil, where the requirements from the design standard can not be fulfilled.

During normal conditions, each tower can be properly grounded to earth with ground electrodes, but for high soil resistivity conditions there should be a properly designed earthing arrangement for transmission towers. By studying different practical earthing method being using all over the world for high voltage transmission towers, a suitable solution can be found. A Practical earthing design for different soil types was proposed for the modeling and simulation to find a suitable eathing design for Ceylon Electricity Board transmission lines specification.

This thesis will discuss the Finite Element Method (FEM) developed for grounding analysis. Computer software analysis packages can be used to assist in earthing design by modeling and simulation of different earthing configurations. FEM method of ETAP's Ground Grid Design Assessment software is used for modeling the new tower earthing design for different soil types based on soil resistivity values.

For the each earthing design type theoretical verification of the earth resistance values was done using Thapar-Gerez equation which is developed for the calculation of earth resistance values.

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