

Optimised transmission tower earthing: experience in design and operation

ABSTRACT

A large percentage of transmission line outages in Malaysia are due to lightning activity with backflashover being the main cause. Previous investigations have indicated that tower footing earth resistance is one of the main factors in reducing the occurrence of backflashovers. The present studies review some of the tower earthing design options. From this standard designs are proposed together with a practical method of optimising the design based on soil resistivity measurement data. The process is presented via a flowchart which includes the main measurement and design steps. This allows different standard designs to be selected to suit the type of soil structure at the site of the proposed transmission tower. Where measurements indicate a high resistivity layer with underlying low resistivity soil, an electrode design relying more on driven rods is used. Conversely, a design using more horizontal electrode would be selected where the soil structure is of low resistivity above high. Some practical methods are also described which can be included in the design to improve the ease with which maintenance testing can be carried out. The results of trial installations on selected towers have been performed and the results are discussed.

Keyword: Earthing; Transmission tower