

ABSTRACT

The performance of transmission lines under lightning conditions is of utmost importance to the distribution engineer. A line which is not adequately shielded would experience outage rates in far excess to one which is properly shielded. Bearing this in mind, the shielding ability of towers, presently existing on T&TEC 132 KV and 66 KV circuits are analysed using a method established by Golde.

From the analysis, it was found that the existing tower designs seem to offer perfect shielding against lightning strokes. Calculations were made of the outage rates of the lines using three different methods. These calculations all showed that the outage rates are indeed normal for the particular line construction and that perfect shielding is indeed untrue. It was concluded that in order to obtain a true picture of the electrostatic field around the tower, Maxwell's equations must be solved.

The analysis also showed that empirical equations exist between the striking distance, the radius of attraction and the total charge on the leader channel. A method is also briefly discussed whereby the lightning performance of an existing line can be improved by the addition of a second earth-wire along the centre line of the tower but beneath the existing earth-wire.