

## **A Scale Model for the Study of the LEMP Response of Complex Power Distribution Networks**

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**Abstract** - This paper deals with scale models of power distribution systems for the study of lightning induced voltages on overhead lines. The scale model technique is useful for the investigation of situations which are prohibitively complex to be treated theoretically. For instance, urban distribution networks are usually characterized not only by complex topologies but also by the presence of nearby buildings, whose influence on the lightning induced effects can be successfully evaluated by means of reduced models. The paper first describes the scale model implemented for such a purpose at the University of São Paulo, São Paulo, Brazil. It then presents a comparison between the experimental data obtained with the scale model and the computer simulations obtained by using the LIOV-EMTP code, a software tool able of calculating lightning-induced electromagnetic transients in distribution systems having complex configurations. Finally, the paper shows an application of the scale model in the evaluation of lightning induced voltages on distribution networks considering the presence of nearby buildings.

**Index Terms** - Electromagnetic induction, lightning, lightning-induced voltages, LIOV-Electromagnetic Transients Program (EMTP) code, power distribution lines, power system lightning effects, reduced-scale model.