



Analysis of Lightning Overvoltages on Overhead Hybrid Lines

L. B. Moraes^a, A. Piantini^a, M. Shigihara^a, A. Borghetti^b, F. Napolitano^b, C.A. Nucci^b, F. Tossani^b

1. Institute of Energy and Environment, University of São Paulo, São Paulo, Brazil
2. Dept. of Electrical, Electronic and Information Engineering, University of Bologna, Bologna, Italy

Abstract— This paper analyzes the overvoltages associated with direct strokes to a hybrid overhead line (138 kV and 13.8 kV circuits sharing the same structures). The voltages are calculated using the EMTP-RV, and their dependence on parameters such as the stroke current front time, soil resistivity, and impedance of the grounding system is discussed. Emphasis is given to the voltages on the medium-voltage circuit. A 1:20 scale model of a hybrid line has been implemented, and a good agreement has been found between measured and calculated voltages.