MODELING OF POWER TRANSMISSION LINES FOR LIGHTNING BACK FLASHOVER ANALYSIS
A CASE STUDY: 220kV BIYAGAMA - KOTMALE TRANSMISSION LINE

Master of Science Dissertation

M.CHANAKA

Department of Electrical Engineering
University of Moratuwa, Sri Lanka

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A CASE STUDY: 220KV BIYAGAMA - KOTMALE TRANSMISSION LINE

A dissertation submitted to the Department of Electrical Engineering, University of Moratuwa in partial fulfillment of the requirement for the Degree of Master of Science

by

MALLIKARACHCHIGE CHANAKA

Supervised by: Prof. H.Y.R. Perera

Eng. K.P.K. Shanthi

Department of Electrical Engineering

University of Moratuwa, Sri Lanka

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DECLARATION

The work submitted in this dissertation is the result of my own investigation, except where otherwise stated.

It has not already been accepted for any degree, and is also not being concurrently submitted for any other degree.

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M. Chanaka

30th December 2010

We endorse the declaration by the candidate.

UOM Verified Signature

Prof. H.Y.R. Perera

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Eng. K.P.K. Shanthi

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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 lead to total power failures resulting with great financial losses. The lightning back flashover effects are recognized as one of the major causes of transmission line outages.

Several types of solutions are presently available to address the issue of lightning back flashovers. However the modern concept of transmission line mounted surge arresters is of great popularity due to its excellent performance, ease of installation and the low cost compared to the other traditional solutions.

This report describes a case study which was carried out on one of critical 220kV power transmission lines of the Sri Lankan transmission network, having several past records of lightning back flashover related outages resulting with total system failures.

The study described in this report is mainly focuses on the way of analyzing the back flashover events by transient modeling and subsequent simulation of the selected transmission line in an electromagnetic transient computer program. The study uses the Power System CAD (PSCAD) software program as the software tool for the purpose of modeling and simulation of selected 220kV Biyagama-Kotmale power transmission line.

Simulation of the created transmission line model is carried out with and without Transmission Line Arrester (TLA) model to evaluate the improvements in lightning back flashover performance after installation of TLAs in the selected transmission line.

The result of the simulations shows that the installation of 02nos.of TLAs at top phases of each selected towers improves the lightning performance of the selected power transmission line.

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