

Kittiwut Chinnabutr 2009: Computation of Induced Overvoltages for the Protection of Telecommunication Subscriber Lines. Master of Engineering (Electrical Engineering), Major Field: Electrical Engineering, Department of Electrical Engineering. Thesis Advisor: Associate Professor Santi Asawasripongtorn, M.Eng.Sc. 125 pages.

This thesis describes an evaluation and analysis on the computation of induced overvoltages into telephone subscriber lines due fault occurring in adjacent parallel power lines. A TOT cable route in Singburi Province in parallel with 115 kV and 22 kV PEA power lines is selected in this study. The length of 115 kV line is 5.50 kilometers in parallel with adjacent telephone cables portion of 2.8 kilometers.

The research work in this thesis include collecting information on telephone geometric data, geographic cable routing, line parameters, line length and the separating distances from power line conductors required for the calculation of induced voltages due to PEA power line faults. Calculation was done with the aid of MatLab, Exel and ATP/EMTP Simulation tool. Comparison of the results shows good agreement between them. It was found that during a single line to ground fault occurring in the nearest 115 kV power line a longitudinal induced voltage of 0.9545 V/m along the 2.8 kilometers of telephone cables. Total longitudinal voltage amounted to 2,672.6 volts. The telephone cable model used in the calculation of induced voltage is verified with field test by measuring induced voltage during normal steady state operating condition at the terminal station

The calculated results show that the induced overvoltages due to power line fault present a real danger for electronic equipments of communication system. It was concluded that addition of a suitable protective device is required in order to minimize damage risk for the existing communication system from the threat of damages due to both power line fault and lightning induced overvoltages.

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Thesis Advisor's signature

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