

Sanguthai Pajit 2007: Protection of Telephone Network in Rural Areas Against the Effects of Ground Potential Rise Originated from Power Line Faults. Master of Engineering (Electrical Engineering), Major Field: Electrical Engineering, Department of Electrical Engineering. Thesis Advisor: Associate Professor Santi Asawasripongton, M.Eng.Sc. 146 pages.

The thesis describes studies on ground potential rise originated from power line faults in the vicinity of a rural telephone network in Singburi province. It was found that during a single line to ground fault on the 22 kV PEA distribution line portion or total of zero sequence fault current flowed back to its source. This produced ground potential rise and create ground potential rise zone of influence. With the shields of the cable grounded at certain interval, transferred potential at various locations are existed causing loop current to flow. Ground potential rise may exceed protection devices' operating level causing them to operate and subsequently the ground potential rise may appear at subscriber's telephone or modem

Ground potential rise at Singburi substation and zone of influence were calculated employing fault level and available information on ground grid design plan from EGAT. Computation by the use of MATLAB and EXCEL found that the maximum ground potential rise is 3819.45 volts and zone of influence is 735 meters around the substation ground grid. The shield of the telephone cables are grounded at between 500 – 600 meters interval. Maximum loop current on the shield conductor was found to be 26.95 amperes. Maximum voltage on the shield is 54.03 volts between the ground point at the exchange and distribution point number 5 of local cable network. Recommendation on telephone cable shield ground relocation is given. A new design of protection devices is proposed.

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Thesis Advisor's signature