

Investigation on the effects of line parameters to the lightning performance of 132 kV Kuala Krai-Gua Musang transmission line

ABSTRACT

Lightning has been a major concern to the power system researchers as it may cause damage to the transmission line. One of the event that will cause lightning overvoltage and most likely to occur is backflashover. A study has been carried out to investigate the effects of line parameters such as ground resistance, soil resistivity, tower surge impedance, tower height and number of shield wires to the values of tower top voltage, backflashover rate (BFR) and probability of transformer damage at substation. A sample of worst performance of transmission line in Peninsular Malaysia i.e. 132 kV Kuala Krai-Gua Musang transmission line data was obtained from Tenaga Nasional Berhad (TNB) for the purpose of backflashover analysis. Power System Computer Aided Design (PSCAD) software was used to model integral part of transmission line components such as insulator gap, tower and footing resistance followed by doing the backflashover simulation and analysis. Findings from the analysis imply that the values of BFR and probability of transformer damage are strongly influenced by the values of line parameters. Right selection of line parameters may reduce BFR and probability of transformer damage, thus improve the transmission line performance. Findings of this research can be useful guideline towards high voltage transmission line design and planning in Malaysia.

Keyword: Backflashover analysis; Transmission line; PSCAD; Backflashover rate; Line parameters