Application of substation transient modelling technique for surge arrester studies

ABSTRACT

This paper presents the application of transient modelling technique in representing the substation and performing the analysis on the prediction of the transformer damage. Modelling parameters and the substation layout design are based and adapted from 132/11 kV Simpang Renggam – Ayer Hitam substation in Johor Baharu, Malaysia, courtesy of the Tenaga Nasional Berhad (TNB). The model is based on single phase line model as it was suggested by the IEEE to represent the substation in transient analysis simulation. Extensive analyses on the placement of the surge arresters at the substation and prediction of the transformer damage are also presented. The results obtained from this analysis are then compared with the suggested Basic Lightning Insulation Level (BIL) by the TNB, according to the standards, for assessing the percentage of transformer damage and optimizing the substation performance in terms of its reliability and cost effectiveness.

Keyword: Insulation coordination; Lightning; Basic Lightning Insulation Level (BIL); Surge arrester