Abstract

Switching of disconnectors (DS) and various faults in Gas Insulated Substation (GIS) causes number of pre-strikes and re-strikes happens. The short duration voltage collapse, traveling surges in busbar causes Very Fast Transient Over voltages (VFTO) and Very fast Transient Currents (VFTC) in the GIS substation. The main challenge is to reduce VFTO and VFTC amplitudes. Several methods have been proposed and examined in the past, such as damping Resistor and Ferrite rings. The VFTO and VFTC damping solutions utilizing damping Resistor, ferrite rings has been analyzed using most popular and widely used software package Electro Magnetic Transient Programming (EMTP). The simulation of mitigation methods like damping resistor and Ferrite rings shows that a damping effect can be achieved. The damping resistor suffers with the difficulty of inserting inside the busduct and the other one is Ferrite magnetic material rings goes easily into saturation, which complicates the design and reduces its general applicability and robustness. This paper investigates the new techniques to suppress the VFTO and VFTC in a 245kV GIS substation by considering the complete substation model for simulation using EMTP. Rings of a Nanocrystalline alloy placed around the GIS conductor were investigated, developed the equivalent model and simulated using EMTP. Prominent results have been achieved with the Nanocrystalline models.
References

Keywords
Damping Resistor  EMTP  GIS  Ferrite rings  Nanocrystalline rings  VFTC  VFTO