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Leakage Current Analysis Of Various Parameters On 11kV Surge Arrester Design

Nurul Ain Binti Abdul Latiff

University of Malaya (UM), Electrical Engineering

Malaysia

Abstract

INTRODUCTION:

In surge arrester, leakage current commonly flows across the arrester under normal condition. In this work, the leakage current of 11kV surge arrester was simulated in finite element method (FEM). The influence of insulator shed widths, housing materials and sizes of ZnO in an 11kV ZnO surge arrester design on its leakage current was studied.

USE OF COMSOL MULTIPHYSICS:

The physic used in the simulation is electric current module to generate the voltage distribution and current density on the surge arrester. Equations of current density and electric field are used by COMSOL software.

Fig.1 show two dimensional (2D) axisymmetric arrester model geometry and meshing elements that was drawn using COMSOL software.

The relative permittivity, εr and electrical conductivity, σ were assigned to the materials in the model. Since ZnO blocks are non-linear elements, the electrical conductivity can be calculated using conductivity based on VI characteristics curve during normal condition.

RESULTS:

Fig.2 show simulated voltage distribution of 11Kv surge arrester silicone housed and Fig.3 show the waveform of simulated leakage current.

The parameters of the surge arrester that have been restructured on the surge arrester design are ZnO radius, insulator shed width and housing materials. Fig. 4 show the results obtained from the simulation.

CONCLUSION:

It was found that the leakage current is influenced significantly by the sizes of ZnO and housing materials. The leakage current increases when the radius of ZnO decreases and the electrical conductivity of the housing increases.

Reference

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Figures used in the abstract

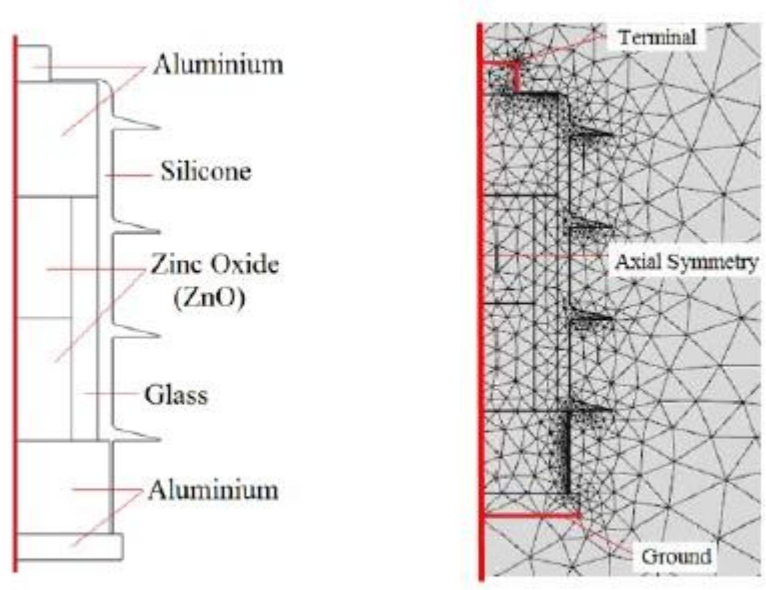

Figure 1: Arrester model geometry and meshing elements

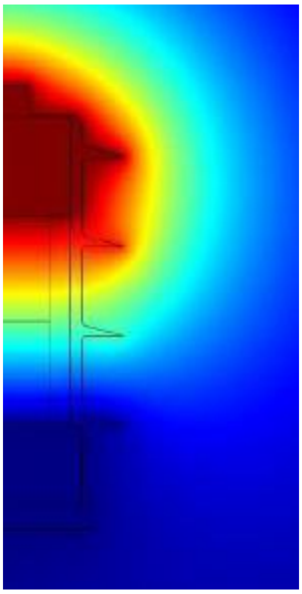

Figure 2: Voltage distribution

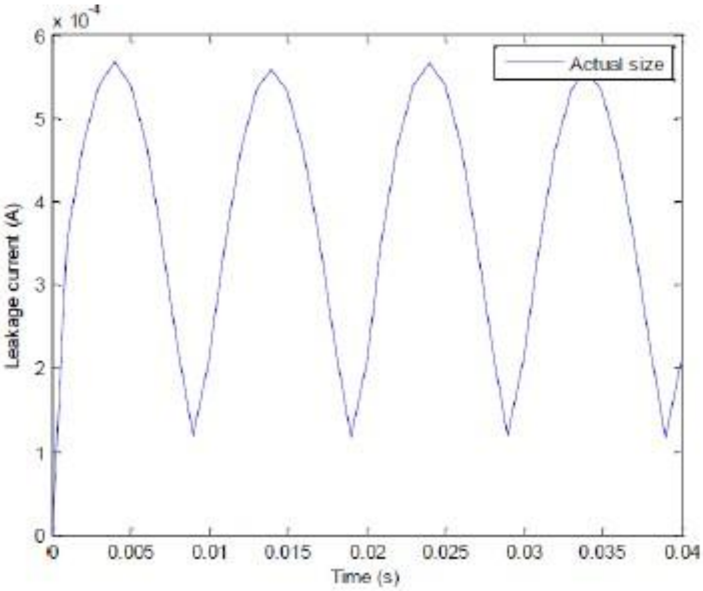

Figure 3: Waveform of leakage current

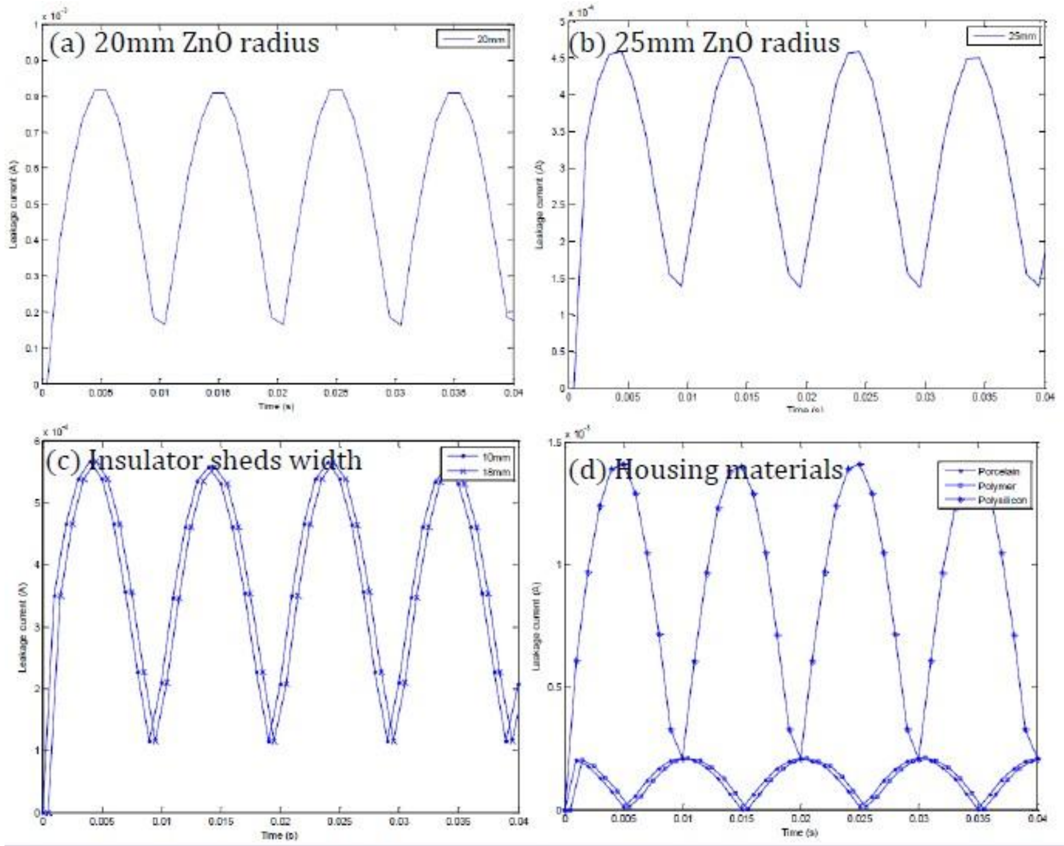

Figure 4: Leakage current waveform for different parameters