

Simulation Analysis for 33 kV Porcelain Insulator String Based on Room Temperature Vulcanize Coating

Abstract

Porcelain insulator is widely used in high voltage (HV) transmission lines due to its high mechanical strength, performing well on heat and aging resistance. However, porcelain insulator string is always exposed to environmental contamination. The presence of accumulation contamination on the porcelain insulator string surface reduces the electrical performance and causes insulation failure in transmission and distribution lines. Literature has shown that the conventional method to prevent contamination is limited to periodically water washing and silicone grease, involving some limitations in practice from the technical and economic point of view. Therefore, this research investigates the performance of porcelain insulator string due to the contamination effect based on Room Temperature Vulcanize (RTV) coating in 33 kV transmission line system. The four-unit porcelain insulator string in 2-D form was first developed using computer-aided design (CAD). Electric field and voltage distribution results were analysed using finite element method (FEM) software. After adding RTV coating, the percentage decrement of electric field distribution value is 9.73% from the study. This has proven that the porcelain insulator string with a significantly lower electric field distribution may protect the transmission lines from a higher risk of corona or even flashover.

Keywords

Coating; Contamination; Insulator; Room Temperature Vulcanize (RTV)