ABSTRACT

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Title : *The Effect of Vehicle Smoke Contamination on the Flashover Voltage of Porcelain Insulators Using the Slow Rate of Rise Test Method*

Insulators have an important role in maintaining the stability and reliability of the power grid system. Vehicle smoke contamination on the insulator surface can reduce dielectric strength and increase the risk of flashover in the insulator. This study was conducted to analyze the effect of vehicle smoke contamination on insulator flashover voltage. The insulator used is a peg-type porcelain insulator, and the pollutant is vehicle smoke soot from motorcycle exhaust. The mass of pollutant varied was 1-9 g. The process of contamination of the insulator by pollutants is done by mixing pollutants and 50 ml of distilled water and then applying it to the entire surface of the insulator using a brush. Flashover voltage testing was carried out on wet and dry insulator conditions using AC high voltage through the Slow Rate of Rise Test method. The level of pollutant contamination on the insulator surface was identified using the IEC 60815-1 standard expressed by NSDD (Non-Soluble Deposit Density). NSDD is a parameter measuring the level of insoluble pollutant deposits per unit area on the insulator surface. Clean porcelain insulators have a flashover voltage of 79.49 kV dry conditions and 58.84 kV wet conditions, after being contaminated the flashover voltage decreases with the addition of pollutant mass and pollutant deposits on the insulator surface until it reaches 48.69 kV dry conditions and 28.54 kV wet conditions at a mass of 9 g pollutants. The NSDD value increases with the addition of pollutant mass, ranging from 0.6 mg/cm² for 1 g of pollutant to 5.53 mg/cm² for 9 g, which contributes to the decrease in flashover voltage and porcelain insulator performance.

Keywords: Porcelain Insulator, Vehicle Smoke Pollutants, Flashover Voltage, Standard IEC 60815-1, Slow Rate of Rise Test, Non-Soluble Deposit Density