

ABSTRAK

ANALISIS ARUS BOCOR PADA ISOLATOR TEGANGAN MENENGAH TERPOLUSI

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Dalam sistem kelistrikan, isolator memiliki peranan penting dalam penyaluran suplai energi listrik pada saluran transmisi dan distribusi. Akan tetapi akibat adanya ketaksempurnaan pada pembuatan isolator, cacat pada bagian isolator, dan polusi pada penggunaan isolator dalam jangka waktu lama dapat mempengaruhi ketahanan isolasi. Polusi dapat menyebabkan terbentuknya endapan pada permukaan isolator yang mengakibatkan arus bocor. Arus bocor menurunkan fungsi isolator dan mengurangi keandalan sistem kelistrikan.

Tujuan dari penelitian ini adalah menganalisis pengaruh polusi menggunakan larutan garam untuk mensimulasikan kondisi lingkungan yang berpolusi, mengingat wilayah geografis Lampung yang dikelilingi oleh laut. Pengukuran arus bocor dilakukan menggunakan Current Transformer (CT). Analisis arus bocor dilakukan dengan menghitung nilai Total Harmonic Distortion (THD). Ada 3 tingkat ESDD (Equivalent Salt Deposit Density) yang diujikan pada penelitian ini yaitu : rendah ($0,06 \text{ mg/cm}^2$), sedang ($0,1 \text{ mg/cm}^2$), dan tinggi ($0,6 \text{ mg/cm}^2$).

Hasil penelitian menunjukkan bahwa tingkat polusi yang meningkat menyebabkan peningkatan amplitudo arus bocor dan nilai THD pada isolator. Amplitudo arus bocor dan nilai THD tertinggi terjadi pada tingkat polusi tinggi ($0,6 \text{ mg/cm}^2$) dengan tegangan input 8 kV.

Kata Kunci: Isolator, Polusi, Arus bocor, Larutan garam, Trafo Arus (CT), Total distorsi Harmonik (THD), Equivalent Salt Deposit Density (ESDD).

ABSTRAK

BY

ANALYSIS OF LEAKAGE CURRENT IN POLLUTED MEDIUM VOLTAGE INSULATORS

In electrical systems, insulators play a crucial role in the distribution of electrical energy on transmission and distribution lines. However, imperfections in the manufacturing process, defects in insulator parts, and prolonged use of insulators can lead to deterioration of insulation resistance. Pollution result in the formation of deposits on the surface of the insulator, which it can cause leakage currents. These leakage currents reduce the performance of the insulator and affect the reliability electrical system.

The objective of this research is to analyze the impact of pollution on insulator performance using a salt solution. Hence, its to simulate polluted environmental conditions, with particular attention to the geographical area of Lampung, which is surrounded by the sea. Leakage current measurements has been conducted using a current transformer (CT). Leakage current analysis was conducted by calculating the total harmonic distortion (THD) value. Three levels of ESDD (equivalent salt deposit density) were tested in this study: low (0,06 mg/cm²), medium (0,1 mg/cm²), and high (0,6 mg/cm²).

The results demonstrated that increasing pollution levels led to an increase in leakage current and THD in the insulator. The highest amplitude of the leakage current and the THD of the valve was observed at the highest contamination level (0,6 mg/cm²) with an

input voltage of 8 kV.

Keywords : *insulator, Pollution, Leakage current, Current Transformer (CT), Total Harmonic Distortion (THD), Equivalent Salt Deposit Density (ESDD).*