THERMAL ANALYSIS OF H.V INSULATION OIL DURING PARTIAL DISCHARGE DETECTION

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To my God, Allah ‘azza wa jalla
Then to my beloved mother, family, and all my friends
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ABSTRACT

Historically, the arc discharge analyzing technique was one of the first methods to determine the status of the insulation oil. Due to the harsh environment and the continue usage of the high voltage transformers, many problems of insulation can be produced leading to the failure of the transformer. The problem of the thesis is to find the best available solution to conduct real time analyzing of insulation oil of high voltage transformers, so that the high voltage transformer can be safeguarded from failure in the most effective and economic manner. In this work, the temperature of the insulation oil will be captured and calculated with and without partial discharge occurring. The simulated arc discharge is generated using 7.5 kV power source in two round shape steel electrodes having 5 mm gap. This distance (between the sensor and arc discharge source) is set at 5 cm. The infrared thermometer (laser gun) was used to capture the insulation oil temperature by sending a laser light toward the insulation oil and that light will be reflected beck and received by the device and then the temperature of the oil will be captured and measured. This study will help to predict the insulation oil age of high voltage transformers, which reduce the maintenance cost of high voltage transformer.
ABSTRAK

Menurut sejarah, teknik menganalisis pelepasan arka adalah satu daripada kaedah pertama untuk menentukan status minyak penebat. Oleh kerana persekitaran yang sukar dan penggunaan yang berterusan daripada transformer voltan kuasa tinggi, banyak masalah penebat boleh dihasil membawa kepada kegagalan transformer. Masalah kajian adalah untuk mencari penyelesaian terbaik untuk menjalankan analisis masa sebenar minyak penebat transformer voltan kuasa tinggi supaya transformer voltan kuasa tinggi dapat dilindungi daripada kegagalan dengan cara yang paling berkesan dan ekonomi. Dalam kajian ini, suhu minyak penebat akan diambil dan dikira dengan dan tanpa pelepasan separa yang berlaku. Discar arka simulasi dihasilkan menggunakan sumber kuasa 7.5 kV dalam dua elektrod keluli bentuk bulat yang mempunyai jurang 5 mm. Jarak (antara sensor dan pelepasan arka sumber) ditetapkan pada 5 cm. Termometer infra merah (pistol laser) telah digunakan untuk menangkap suhu minyak penebat dengan menghantar cahaya laser ke arah minyak penebat dan cahaya tersebut akan dipantulkan semula dan diterima oleh peranti dan kemudian suhu minyak itu akan ditangkap dan diukur. Kajian ini akan membantu untuk meramalkan umur minyak penebat bagi transformer voltan kuasa tinggi, yang mengurangkan kos penyelenggaraan transformer voltan kuasa tinggi.