

## ABSTRAK

Aqil Syujais: “Analisis Rugi – Rugi Daya *Hysterisis* dan *Eddy Current* Pada Transformator *Step Up Shell Type 220V/ 3 kV 75 VA*”.

Penelitian ini bertujuan untuk: 1) Mengetahui nilai rugi-rugi daya *hysterisis* dan rugi-rugi daya *eddy current* pada transformator *Step Up Shell Type 220 V/ 3 kV 75 VA* terhadap variasi nilai frekuensi, 2) Menganalisis rugi-rugi daya *hysterisis* dan rugi-rugi daya *eddy current* pada transformator *Step Up Shell Type 220 V/ 3 kV 75 VA* untuk mengetahui hubungan antara variasi frekuensi terhadap besar rugi-rugi daya *hysterisis* dan rugi-rugi daya *eddy current*, 3) Mengetahui dan menganalisis nilai rugi-rugi daya *hysterisis* dan rugi-rugi daya *eddy current* yang dihasilkan pada transformator *Step Up Shell Type 220 V/ 3 kV 75 VA* dengan pemberian minyak *Shell Diala S4 ZX-I* dan tanpa minyak serta menganalisis pengaruh penambahan minyak *Shell Diala S4 ZX-I* terhadap rugi-rugi daya inti.

Metode penelitian yang digunakan adalah metode penelitian kuantitatif eksperimen. Analisis data yang digunakan adalah analisis data secara analitik dengan menggunakan persamaan daya rugi-rugi *hysteresis* dan rugi-rugi *Eddy current*. Pengumpulan data dilakukan dengan pengukuran dan observasi lapangan. Pengolahan data dilakukan dengan melakukan *plotting* data untuk melihat hubungan antara rugi-rugi inti terhadap variasi frekuensi. Data rugi-rugi daya inti yang diperoleh dari hasil pengukuran yang terbaca pada alat ukur instrumentasi listrik dihasilkan dari perubahan frekuensi generator secara bertahap.

Berdasarkan hasil penelitian ini, nilai rugi-rugi daya *hysteresis* terendah yang diperoleh bernilai 1,07 Watt pada frekuensi 45 Hz dan nilai tertinggi mencapai 6,875 Watt pada frekuensi 30 Hz. Nilai rugi-rugi daya *eddy current* terendah bernilai 9,57 Watt pada frekuensi 20 Hz dan nilai tertinggi mencapai 51,67 Watt pada frekuensi 50 Hz untuk kondisi tanpa pemberian minyak transformator. Kondisi dengan pemberian minyak transformator, nilai rugi-rugi daya *hysteresis* yang terendah bernilai 0,34 Watt pada frekuensi 25 Hz dan untuk nilai tertinggi mencapai 5,08 Watt pada frekuensi 30 Hz. Nilai rugi-rugi daya *eddy current* yang terendah bernilai 8,614 Watt pada frekuensi 20 Hz dan nilai tertinggi mencapai 61,5 Watt pada frekuensi 50 Hz. Hal ini menunjukkan bahwa semakin tinggi nilai frekuensi maka rugi-rugi daya *eddy current* akan relatif semakin besar, sedangkan rugi-rugi daya *hysteresis* relatif berfluktuatif terhadap variasi frekuensi. Hubungan antara kedua rugi-rugi tersebut terhadap variasi frekuensi ini berlaku baik pada kondisi tanpa pemberian minyak trafo maupun dengan pemberian minyak trafo. Namun, pada kondisi dengan pemberian minyak, nilai rugi-rugi daya *hysteresis* cenderung relatif lebih kecil dan stabil serta rugi-rugi daya *eddy current* yang diperoleh cenderung relatif lebih linier dibandingkan dengan kondisi tanpa minyak. Jadi, pemberian minyak trafo dapat menurunkan rugi-rugi inti, yaitu rugi-rugi daya *hysteresis* dan rugi-rugi daya *eddy current*.

Kata kunci: Rugi-rugi daya *Hysterisis*, rugi-rugi daya *Eddy Current*

## **ABSTRACT**

Aqil Syujais: “*Analysis of Hysterisis and Eddy Current Power Losses in The Shell Type Step Up Transformer 220V/ 3 kV 75 VA*”.

*This study aimed : 1) Determine the value of hysteresis and eddy current power losses in the Shell Type Step Up Transformer 220V/ 3 kV 75 VA to the variations of frequency values, 2) Analyze hysteresis and Eddy current power losses in the Shell Type Step Up Transformer 220V/ 3 kV 75 VA to determine the relationship between frequency variations on the amount of hysteresis and eddy current power losses 3) Know and to analyze the value of hysteresis and eddy current power losses which generated in the Shell Type Step Up Transformer 220V/ 3 kV 75 VA with applying the Shell Diala S4 ZX-I oil and without applying oil and to analyze the effect of adding Shell Diala S4 ZX-I oil to the core power losses.*

*The research method used was a quantitative experimental research method. The data analysis used was analytical data analysis using the power equation for hysteresis losses and eddy current losses. Data collection was done by measurement and field observation. Data processing was done by plotting the data to see the relationship between the core losses and the variations in frequency. The data of core power losses obtained from the results of measurements read on electrical instrumentation measuring instruments resulted from a change in the frequency of the generator gradually.*

*Based on the results of this study, the lowest value of hysteresis power losses obtained was 1.07 watts at a frequency of 45 Hz and the highest reached 6.875 watts at a frequency of 30 Hz. The lowest of eddy current power losses was 9.57 watts at a frequency of 20 Hz and the highest reached 51.67 watts at a frequency of 50 Hz for conditions without transformer oil. For conditions with the addition of transformer oil, the lowest hysteresis power losses was 0.34 watts at a frequency of 25 Hz and for the highest it reached 5.08 Watts at a frequency of 30 Hz. The lowest of eddy current power losses was 8.614 watts at a frequency of 20 Hz and the highest was 61.5 watts at a frequency of 50 Hz. This showed that the higher the frequency value, the greater the eddy current power losses, while the hysteresis power losses fluctuated relatively with frequency variations. The relationship between both losses to the variation of frequency was valid both in conditions without transformer oil application and with transformer oil application. However, under oil conditions, the hysteresis power losses tend to be relatively smaller and more stable, and the eddy current losses obtained tend to be relatively more linear compared to the oil-free condition. So, the addition of transformer oil can reduce core losses, namely hysteresis and eddy current power losses.*

*Keywords: Hysteresis Power Losses, Eddy Current Power Losses*