INTISARI

Perbedaan rentang frekuensi kerja antara trafo konvensional (50/60 Hz) dan *high frequency transformer* (HFT) membuat karakteristik kedua trafo berbeda. Peningkatan frekuensi operasi pada HFT berimplikasi pada penurunan dimensi, peningkatan kerapatan daya, dan penghematan biaya produksi. Namun, hal ini juga berkonsekuensi pada meningkatnya rugi-rugi trafo, khususnya rugi-rugi belitan. Kenaikan rugi-rugi belitan terjadi karena efek frekuensi tinggi seperti *skin effect* dan *proximity effect*. Nilai rugi-rugi belitan dapat dipengaruhi beberapa faktor, seperti desain, tipe, dan konfigurasi belitan. Penelitian ini bertujuan untuk mengetahui pengaruh perubahan ketiga faktor tersebut pada nilai rugi-rugi belitan pada HFT. Metode yang digunakan adalah perhitungan parameter HFT dan rugi-rugi belitan, pembuatan desain HFT, dan simulasi rugi-rugi belitan pada *Ansys Electronic Desktop*. Hasil penelitian menunjukkan bahwa penggunaan *foil conductor* lebih disarankan dibandingkan dengan *round conductor* karena *foil conductor* memiliki rugi-rugi belitan yang lebih baik dibandingkan *round conductor*. Metode "Hurley" terbukti memiliki nilai rugi-rugi belitan yang lebih baik dari pada metode "Ned Mohan" sebesar 20-27%. Pada *foil conductor*, konfigurasi belitan apapun dapat digunakan karena memiliki nilai rugi-rugi belitan yang tidak jauh berbeda. Akan tetapi, pada *round conductor* disarankan menggunakan konfigurasi *interleaved* karena dapat menurunkan rugi-rugi belitan.

Kata kunci : *Winding loss*, *Skin effect*, *Proximity effect*, HFT, *Ansys Electronic Desktop*

ABSTRACT

The difference in working frequency range between conventional transformers (50/60 Hz) and high frequency transformers (HFT) makes the characteristics of the two transformers different. The increase in operating frequency in HFT has implications for decreased dimensions, increased power density, and production cost savings. However, this also has the consequence of increasing transformer losses, especially winding losses. The increase in winding losses occurs due to high frequency effects such as skin effect and proximity effect. The value of winding losses can be influenced by several factors, such as design, type, and winding configuration. This study aims to determine the effect of changes in these three factors on the value of winding losses in HFT. The methods used are the calculation of HFT parameters and winding losses, the creation of HFT designs, and simulation of winding losses on Ansys Electronic Desktop. The results show that the use of foil conductor is more recommended than round conductor because foil conductor has better winding losses than round conductor. The "Hurley" method is proven to have a better winding loss value than the "Ned Mohan" method by 20-27%. In foil conductor, any winding configuration can be used because it has a winding loss value that is not much different. However, the round conductor is recommended to use the interleaved configuration because it can reduce the winding losses.

Keywords : *Winding loss*, *Skin effect*, *Proximity effect*, HFT, *Ansys Electronic Desktop*