ABSTRAK

Harmonisa merupakan suatu fenomena yang timbul akibat pengoperasian beban listrik non linier, yang merupakan sumber terbentuknya gelombang frekuensi tinggi (kelipatan dari frekuensi fundamental, misal: 150Hz, 250Hz, 350Hz, dan seterusnya). Tingkat kecacatan harmonisa dapat dinyatakan dengan *Total Harmonic Distortion* (THD). Hasil pengukuran di Gedung FPIPS UPI menunjukan nilai THD I (arus) yang cukup besar, yaitu 74%. Hasil tersebut belum sesuai dengan standar yang dibolehkan IEEE 519-1992, yaitu < 5%. Salah satu solusi untuk mereduksi harmonisa tersebut adalah dengan pemasangan filter pasif. Pada penelitian ini, disimulasikan pemasangan filter pasif jenis *double tuned* dan tipe C menggunakan *software* PSIM 9.0.3 untuk mereduksi harmonisa agar THD arus berkurang. Uji coba pemasangan filter pada sistem kelistrikan yang lain dilakukan sebelum pengukuran dan pengolahan data. Hal itu dilakukan untuk memastikan bahwa filter bekerja pada sistem. Setelah filter *double tuned* dipasang, THD I berkurang 34,64% menjadi 39,36%. Sedangkan, setelah dipasang filter tipe C, THD I berkurang 25,59% menjadi 48,41%. Orde kerja dari filter *double tuned* dan filter tipe C adalah orde 5 dan 7. Untuk filter *double tuned*, harmonisa orde 5 berhasil dikurangi sebesar 6,12% dan harmonisa orde 7 sebesar 2,32%. Sementara untuk filter tipe C, harmonisa orde 5 berhasil dikurangi 1,14% dan harmonisa orde 7 sebesar 0,08%. Filter *double tuned* berhasil mengurangi THD I lebih banyak dibandingkan filter tipe C. Namun, hasil reduksi dari kedua jenis filter pasif tersebut belum memenuhi standar yang dibolehkan IEEE.

Kata kunci: Harmonisa, *Double Tuned Filter*, Filter Tipe C, *Total Harmonic Distortion* (THD).

COMPARISON OF DOUBLE TUNED FILTER AND C-TYPE FILTER TO REDUCT CURRENT TOTAL HARMONIC DISTORTION (THD) (CASE IN FPIPS UPI BUILDING)

Harmonic is a phenomenon caused by the operation of the non linear electrical load, which is a source of high frequency waves (multiples of the fundamental frequency's like 150Hz, 250Hz, 350Hz, and so on). Level of harmonic distortion can be expressed with Total Harmonic Distortion (THD). Based on the results of the measurement in the FPIPS UPI building showed the value of current THD was high enough, that was 74%. Those results did not allow in the IEEE 519-1992 standards, that is less than 5%. One of the solutions to reduce harmonic is by installing a passive filter. In this study, the installation of passive filter was simulated by software, that is PSIM 9.0.3. Double tuned and C-type were choosen to be installing to reduce current THD. Filter testing was installed to another electrical system before measuring and calculating the data. The aim is to make sure the filter work proprely in the system. After the installation of double tuned filter, current THD reduced 34,64% to 39,36%. Whereas, after installing C-type filter, current THD reduced 25,59% to 48,41%. Order of double tuned filter and C-type filter are 5^{th} and 7^{th} order. For double tuned filter, harmonic distortion of 5^{th} order successfully reduced 6.12% and harmonic distortion of 7th order is 2,32%. And to the C-type filter, harmonic distortion of 5^{th} order successfully reduce 1.14% and harmonic distortion of 7th order is 0.08%. Each filters showed a decrease. Although there is no drastic decline but both filters can be said to successfully reduce current THD. Double tuned filter successfully reduce current THD more than C-type filter. However, the current THD reduction results from both filters has not yet allowed of the IEEE 519-1992 standard.

Key words: Harmonics, Double Tuned Filter, C-type Filter, Total Harmonic Distortion (THD).