DESIGN OF FILTER FOR REDUCING HARMONIC DISTORTION IN INDUSTRIAL DISTRIBUTION SYSTEMS

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ABSTRACT

Power quality is the degree to which both the utilization and delivery of electrical power affects the performance of electrical equipment. Harmonics power quality issues have been taken into consideration. Harmonic is a term that describes sinusoidal waveforms that operate at a frequency that is a multiple of the fundamental 50 or 60 Hz frequency. Frequency in Malaysia is 50 Hz. Harmonic in power systems shortens the equipment's life expectancy and effect in the electrical distribution system. The most significant effects of high frequency harmonic currents such as inductive heating of transformers, generators, motors, relays, coils and etc.

This paper presents the mitigation techniques in power distributions system by using passive filter and active filter. The basic principle operations for both type of filter have also been observed. Both type of filter was designed to mitigate the harmonic generated by adjustable speed drives (ASD). Studies are made to investigate which filters are more effective in reducing harmonic distortions using PSCAD software.

PSCAD is a general-purpose time domain simulation program for multiphase power systems and control networks. PSCAD enables the user to schematically construct the circuit, run a simulation, analyze the results, control meter and plotting the graph.

The simulation results show that these two types of filter can reduce the harmonic distortion. Simulation results show that the active filter is more effective in reducing harmonics as compared to passive filter. The study also proves that both filters give better performance in reducing harmonics when they are placed close to the harmonic producing loads. The evaluations of harmonic distortion for end users are according to IEEE Standard 51.

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