

**A CURRENT INJECTION TECHNIQUE BASED TWELVE-PULSE  
RECTIFIER**



**UNIT PENGURUSAN PENYELIDIKAN (RMU)  
UNIVERSITI TEKNOLOGI MARA  
40450 SHAH ALAM  
MALAYSIA**

**BY :**

**MOHD NAJIB BIN MOHD HUSSAIN  
INTAN RAHAYU BINTI IBRAHIM  
AHMAD ASRI BIN ABD SAMAT**

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Penolong Naib Canselor (Penyelidikan)  
Unit Pengurusan Penyelidikan (RMU)  
Universiti Teknologi MARA  
40450 Shah Alam

Ybhg. Prof.,

**LAPORAN AKHIR PENYELIDIKAN "A CURRENT INJECTION TECHNIQUE BASED  
TWELVE-PULSE RECTIFIER"**

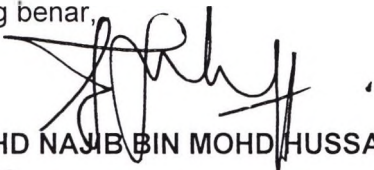
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## ABSTRACT

A twelve-pulse rectifier structure will apply the current injection method which automatically generated in order to reduce the total harmonic distortion (THD) for the three-phase diode rectifier. The twelve pulse operation applying of three-phase diode rectifier, two additional diode, two transformers with low VA rating and simple zig-zag transformer will be designed to achieve the low THD. The losses in the current injection system considerably affect the input current THD and volt-ampere ratings of applied magnetic circuit. The zig-zag transformers are used as a current injection device to provide low-leakage impedance for the current harmonics generated, resulting in pure sinusoidal input current in the three-phase diode bridge rectifier.

This thesis also implement a prototype of a three phase harmonic reduction using current injection method. Variable resistor is used as the load of this prototype and the function of the capacitor put during laboratory work is to provide the midpoint of the output voltage. This approach is provided as a function of current injection network where it will inject back the current to the injection device. Injection device used for this prototype is the zig-zag transformer. The circulating third harmonic current injected to the input current is pure sinusoidal shape with significant reduction in line current harmonics.

For this project, the main focus is to reduce the total harmonic distortion (THD) in the input current sources and also the shape of the input current waveform. Referring to the standard requirement of the IEEE 519-1992, the total harmonic distortion (THD) should be less than 5% at the input current source. A suitable design has been used to achieve this standard requirement.