Vibration Analysis Using Linear Variable Differential Transformer (LVDT) and Discrete Wavelet Transform (DWT)

ABSTRACT

Vibration analysis is a method that can be used to find out the fault indication in induction motor such as mechanical looseness that can be resulting another fault, for example: unbalance and misalignment of induction motor. Therefore, it will affect the induction motor efficiency. Vibration analysis has been one of concern for predictive maintenance in industry nowadays.

In this thesis, two Linear Variable Differential Transformers (LVDT) were used as vibration detectors, as they have linearable range value about 15mm moving core from two secondary coil (left and right direction). Vibration analysis which use Discrete Wavelet Transform (DWT) for vibration data processing can show parts of the low frequency and high frequency. The Backpropagation-Neural Network (NN) method approach used for vibration data identification.

Results of DWT decomposition at 5th level can be analyzed to that in the approximation and vibration to detail for depicting normal condition and the condition of mechanical looseness symptoms. Backpropagation-NN for the identification of vibration data has been successfully conducting training to detect the two conditions, namely: normal/good and mechanical looseness condition (brace bolts loose compressor induction motor) where the vibration data have been identified for 76.6%.

Keyword : Vibration, Mechanical Looseness, LVDT, DWT, Backpropagation-NN.