

Investigation of Relationship between Mechanical Vibration and Energy Consumption of an Induction Motor

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Abstract

Vibration diagnosis of induction motor operation has many cases such as imbalance, misalignment, bearing defect, and so on. These causes have been continuously studied and researched to reduce mechanical vibration of an induction motor. The mechanical vibration is one of the reasons for decreasing motor efficiency, increasing energy consumption and also maintenance time. The purpose of this research is to find a relationship between mechanical vibration and energy consumption of an induction motor. This research simulates the motor operating situation and concentrates on mechanical vibration that may affect energy consumption at various motor speeds. Then there is the creation of an energy consumption regression equation by analyzing variances (ANOVA). The result shows the energy equation as 85% coefficient of determination. Therefore this approach can estimate that if vibration amplitude is higher, the energy consumption will also continually increase as 97% accuracy compared with experiment data.

Keywords : Mechanical vibration, Energy consumption, Induction motor, Coefficient of determination

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