

Condition Monitoring of a 3-Ø Induction Motor by Vibration Spectrum Analysis Using FFT Analyzer- a Case Study

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Abstract : Energy conversion is one of the inevitable parts of any industries. It involves either conversion of mechanical energy in to electrical or vice versa. The later conversion of energy i.e. electrical to mechanical emphasizes the need of motor .Statistics reveals, about 8 % of industries' annual turnover met on maintenance. Thus substantial numbers of efforts are required to minimize in incurring expenditure met towards break down maintenance. Condition monitoring is one of such techniques based on vibration widely used to recognize premature failures and paves a way to minimize cumbersome involved during breakdown of machinery. The present investigation involves a case study of squirrel cage induction motor (frequently in the electro machines) has been chosen for the conditional monitoring to predict its soundness on the basis of results of FFT analyser. Accelerometer which measures the acceleration converts in to impulses by FFT analyser generates vibration spectrum and time spectrum has been located at various positions on motor under different conditions. Results obtained from the FFT analyzer are compared to that of ISO standard vibration severity charts are taken to predict the preventative condition of considered machinery. Initial inspection of motor revealed that stator faults, broken end rings in rotor, eccentricity faults and misalignment between bearings are trouble shootings areas for present investigation. From the results of the shaft frequencies, it can be perceived that there is a misalignment between the bearings at both the ends. The higher order harmonics of FTF shows the presence of cracks on the race of the bearings at both the ends which are in the incipient stage. Replacement of the bearings at both the drive end (6306) and non-drive end (6206) and the alignment check between the bearings in the shaft are suggested as the constructive measures towards preventive maintenance of considered squirrel cage induction motor.

Keywords : FFT analyser, condition monitoring, vibration spectrum, time spectrum accelerometer

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