

Prediction of Rotating Machines with Rolling Element Bearings and Its Components Deterioration

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Abstract : In vibration analysis (with accelerometers) of rotating machines with rolling element bearing, the customers are interested to know the failure of the machine well in advance to plan the spare inventory and maintenance. But in real world most of the machines fails before the prediction of vibration analyst or Expert analysis software. Presently the prediction of failure is based on ISO 10816 vibration limits only. But this is not enough to monitor the failure of machines well in advance. Because more than 50% of the machines will fail even the vibration readings are within acceptable zone as per ISO 10816. Hence it requires further detail analysis and different techniques to predict the failure well in advance. In vibration Analysis, the velocity spectrum is used to analyse the root cause of the mechanical problems like unbalance, misalignment and looseness etc. The envelope spectrum are used to analyse the bearing frequency components, hence the failure in inner race, outer race and rolling elements are identified. But so far there is no correlation made between these two concepts. The author used both velocity spectrum and Envelope spectrum to analyse the machine behaviour and bearing condition to correlated the changes in dynamic load (by unbalance, misalignment and looseness etc.) and effect of impact on the bearing. Hence we could able to predict the expected life of the machine and bearings in the rotating equipment (with rolling element bearings). Also we used process parameters like temperature, flow and pressure to correlate with flow induced vibration and load variations, when abnormal vibration occurs due to changes in process parameters. Hence by correlation of velocity spectrum, envelope spectrum and process data with 20 years of experience in vibration analysis, the author could able to predict the rotating Equipment and its component's deterioration and expected duration for maintenance.

Keywords : vibration analysis, velocity spectrum, envelope spectrum, prediction of deterioration

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