WI 201 – Introduction to Vibration Analysis

Recommended for

Engineers and technicians whose responsibilities require them to be proficient in the setup and use of the SKF condition monitoring system; maintenance supervisors, predictive maintenance coordinators, reliability engineers, inspectors, shop supervisors, advanced mechanics, and millwrights who wish to become familiar with vibration monitoring and analysis.

Course objective

The course objective is to provide a practical approach to detecting and analyzing common machinery problems using vibration monitoring and analysis.

Course description

Designed for maximum class participation. A combination of overhead presentations, group exercises, video tapes, and written reviews are used to peak participant interest and encourage participation and understanding.

Basics of vibration

- Time waveform analysis
- Amplitude vs. frequency
- Vibration – measurable characteristics
- Vibration sensors
- Scale factors
- Measurements and units
- Displacement probe/eddy probe
- Multi-parameter monitoring
- Resonance
- Detection vs. analysis

Setting up the vibration measurement

- Physical and database considerations
- Selecting the machinery
- Sensor location and mounting methods
- Cable attachments
- Setting Fmax

Alarm methods and setting alarms limits

- ISO guidelines
- Assessing overall vibration severity
- Spectral enveloping and bands
- Phase alarms
- Exception criteria

Considerable time shall be dedicated to hands-on practical sessions, taking vibration data and simulating machinery faults including unbalance, misaligment, losseness, bent shaft, rubbing and bearing damage.

Spectral analysis and phase analysis

- Spectral analysis techniques and pattern recognition
- Sidebands
- Harmonics
- Waterfall plot
- Understanding phase

Vibration signal processing methods

- Enveloping
- SEE™ Technology (Spectral Emitted Energy)
- HFD (High Frequency Detection)

Analyzing typical machinery problems

- Imbalance and misalignment
- Bent shaft
- Mechanical looseness
- Cocked bearing

Monitoring rolling bearings

- Why do bearings fail?
- Bearing failure stages
- Bearing defect frequencies
- Displaying fault frequencies

Vibration diagnostic tables

- ISO 10816 Vibration diagnostic table

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Course length

2 days