



Work Identification

WI211

Vibration Analysis I – ISO Category II

Recommended for

Plant personnel requiring a basic understanding of analytical methodologies used to determine machinery conditions for improvement of predictive maintenance program results; including maintenance supervisors, rotating machinery engineers, predictive maintenance coordinators, reliability engineers, and advanced mechanics and technicians.

Course objective

At the end of this course, participants will be able to select appropriate sensors and techniques for diagnosing typical machinery malfunctions. Participants will be able to read vibration signatures and evaluate machinery condition from vibration data. Participants will be able to isolate the affected machinery component, recognize various common problems, and be able to make recommendations for continued operation or scheduled repairs.

Course description

An introduction to performing vibration analysis within a condition monitoring program. Various techniques used to diagnose machinery condition are reviewed, including time waveforms, spectral analysis, phase measurements, and amplitude measurement methods.

Applies sensor fundamentals to vibration analysis, including an overview of sensor strengths and weaknesses in applications. Common machinery malfunctions are discussed, including basic guidelines for the best detection tools for each machinery problem, and key signs to be aware of.

Malfunctions and common pitfalls are demonstrated and real-world vibration analysis case histories are shared.

- What is vibration and how can it be used to evaluate machinery condition:
 - Frequency, a time waveform, phase, an FFT spectrum (signature)
 - Displacement, velocity, and acceleration
 - RMS, peak, and peak-to-peak amplitude
 - How to know when vibration is too high
- Vibration sensors and their applications
- Vibration and detection by various instruments. Analog vs. digital methods
- High frequency detection (HFD) and alarm levels at various speeds

- Vibration analysis and how it is used to evaluate machine operating condition
 - Mass unbalance, eccentric rotors, bent shafts, and misalignment
 - Mechanical looseness, improper component fit, soft foot, and belt drive problems
 - Rolling bearing problem detection using vibration spectrum analysis
 - Gear wear problem detection
 - Electrical problems within induction motors
 - Balance resonances, detection, and effects on machinery
- Vibration alarms, spectral band alarms, and optimum frequency ranges
- Common pitfalls in making everyday vibration measurements and the effect on detection and diagnosis of machinery problems
- Time waveform and converting to an FFT spectrum
- Predictive maintenance programs
- Real-world case histories for problems found within the Illustrated Vibration Diagnostic Chart

Prerequisites

Up to six months full-time condition monitoring program experience; knowledge of basic sensor and monitoring instrumentation.

2009 course schedule

Jan. 20–23	Charlotte, NC
Feb. 10–13	Orlando, FL
Feb. 24–27	San Diego, CA
March 17–20	Charlotte, NC
March 24–27	San Francisco, CA
April 21–24	Dallas, TX
May 5–8	Denver, CO
May 12–15	Myrtle Beach, SC
June 9–12	Myrtle Beach, SC
June 16–19	Seattle, WA

July 14–17	Myrtle Beach, SC
Aug. 11–14	Myrtle Beach, SC
Sept. 1–4	Toronto, ON
Sept. 15–18	Cincinnati, OH
Oct. 6–9	Dallas, TX
Oct. 27–30	Charlotte, NC
Nov. 10–13	San Diego, CA
Dec. 8–11	Charlotte, NC
Dec. 15–18	Houston, TX

2009 tuition

Public classes \$1,295

On-site
Tuition on request based on number of students

3.5 days – optional certification test on day 4

A written examination is available for this course. Test Fee – \$250 per person. Successful completion of the written exam results in Level I Vibration Analysis Certification.