

# Vibration Analysis

## Course Objectives:

The Vibration Analysis Level-II course is intended for personnel who have vibration analysis experience and a thorough understanding of vibration theory and terminology. The course provides an in-depth study of machinery faults and their associated spectrum, time waveform and phase characteristics. After attending this course the participant will be able to test machines correctly, to diagnose faults accurately, to perform additional diagnostic tests for verification, to set vibration alarm limits and to correct certain types of faults. The course is designed in such a way that participant will fully understand the analyser setting to take the best measurements, to understand the change in vibration pattern and verification of fault condition by time waveform and phase analysis.

## Detailed topic list:

### Review of Maintenance Practices

### Review of Condition monitoring Technologies

### Principles of vibration

- + Complete review of basics
- + Waveform, spectrum (FFT)
- + Phase and orbits
- + Understanding signals: modulation, beating,

### Data acquisition

- + Transducer types
- + Transducer selection
- + Transducer mounting and natural frequency
- + Measurement point selection
- + Following routes, and test planning
- + Common measurement errors

### Signal processing

- + Filters
- + Sampling, aliasing, dynamic range
- + Resolution, Fmax, data collection time
- + Averaging
- + Windowing and leakage

### Vibration analysis

- + Spectrum analysis
- + Time waveform analysis (introduction)
- + Orbit analysis (introduction)
- + Phase analysis: bubble diagrams and ODS
- + Demodulation

### Fault Analysis

- + Natural frequencies and resonances
- + Imbalance, eccentricity and bent shaft
- + Misalignment, cocked bearing and soft foot
- + Mechanical looseness
- + Rolling element bearing analysis

- + Analysis of induction motors
- + Analysis of gears
- + Analysis of belt driven machines
- + Analysis of pumps, compressors and fans

### Equipment testing and diagnostics

- + Impact testing (bump tests)
- + Phase analysis

### Corrective action

- + General maintenance repair activities
- + Review of the balancing process
- + Review of shaft alignment procedures

### Running a successful condition monitoring program

- + Setting baselines
- + Setting alarms
- + Avoiding common problems
- + Report generation
- + Reporting success stories

### Acceptance testing

### Review of ISO standards

### Course Duration

- The course consists of Four full days of training & 1-hour exam

### Hours

- 9.00 am to 4.00 pm (Days 1-4)
- Exam: 1 hour - end of Day 4

### Who should attend

- ☞ Maintenance Professionals
- ☞ Plant/Rigs Supervisors
- ☞ R & D Personnel
- ☞ QA/QC Supervisors
- ☞ Equipment designers
- ☞ HVAC Engineers

- ☞ Plant Technicians
- ☞ Vibration Engineer
- ☞ Inst. Technicians
- ☞ Maintenance Technicians
- ☞ Equipment Operators
- ☞ Reliability Engineers
- ☞ Industrial Engineers
- ☞ Operations Managers

### Practical Applications of Training Course

This course provides unique opportunities to study Vibration principles beyond the textbook.



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