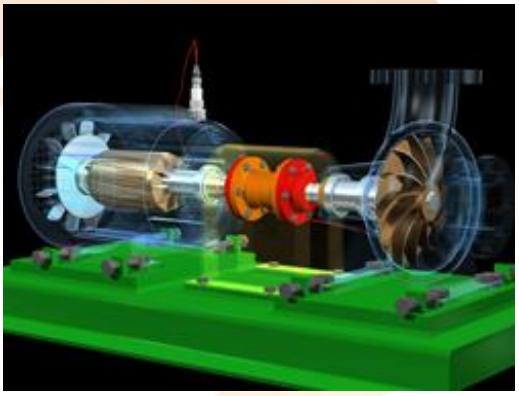
Intermediate Vibration Analysis

Mobius Institute's Intermediate Vibration Analysis course is offered in public venues and by special arrangement at customer facilities throughout North America. This course is also offered by certified Training Partners in over 30 other countries around the world.

Our courses are uniquely understandable through the extensive use of 3D CAD animations of typical machinery found in plants and facilities of all types. These animations convey a better understanding of the machinery components and how faults affect the vibration that is transmitted through the machine.



Animated simulators allow the students to adjust the speed, severity of faults, measurement locations and so on to see how these differences manifest themselves in the vibration signal.

Registered students are given access to the online version of the course via the Mobius Institute Learning Zone before the class and for 6 months after course completion to assist them with converting the course information into practice. Our focus is on practical knowledge and understanding of machine knowledge, faults and how to recognize problems in time to plan for an outage and act before catastrophic failure or collateral damage occurs.

ISO Category II and ASNT Level II Vibration Analysis

Public or on-site course conducted by an experienced, certified Mobius Institute instructor. The course exceeds ISO 1836-2:2003 Category II and meets ASNT SNT-TC-1A Recommended Practice Level II for training and certification of vibration analysts.

This course includes a Course Manual, Quick Reference Guide, Mobius mouse pad with fault diagnostic reminders and pen. Examinations for certification are offered as an option at the end of the course.

All Mobius certified analysts receive personalized logos with their certification number and name for their own professional use. Mobius Institute also maintains a listing of all certified analysts on mobiusinstitute.com and provides each analyst with a personal webpage.

Course Description

Duration: 4-days Cat II / Level II, Optional Review & Certification Examination: 1-Day, 75% Passing Grade

The Intermediate Vibration Analysis course is intended for personnel who have at least twelve months vibration analysis experience and a thorough understanding of vibration theory and terminology. Eighteen months of vibration analysis experience is required for Category II or Level II certification. The course provides an in-depth study of machinery faults and their associated spectrum, time waveform and phase characteristics.

A Category II analyst is expected to know how to test machines correctly, how to diagnose faults accurately, perform additional diagnostic tests for verification, how to set vibration alarm limits, and how to correct certain types of faults. You need to understand what your analyzer settings mean so that you can take the best measurements. You also need to understand why the vibration patterns change the way they do and how to use time waveform analysis and phase analysis to verify the fault condition. Topics covered include:

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, sum/difference

Data acquisition

- Transducer types: Non-contact displacement proximity probes, velocity sensors, and accelerometers
- Transducer selection
- Transducer mounting and natural frequency
- Measurement point selection
- Following routes, and test planning
- Common measurement errors

Signal processing

- Filters: Low pass, band pass, high pass, band stop
- Sampling, aliasing, dynamic range

- Resolution, Fmax, data collection time
- Averaging: linear, overlap, peak hold, time synchronous
- Windowing and leakage

Vibration analysis

- Spectrum analysis
  - Harmonics, sidebands, and the analysis methodology
- Time waveform analysis (introduction)
- Orbit analysis (introduction)
- Phase analysis: bubble diagrams and ODS
- Enveloping (demodulation), shock pulse, spike energy, Peak Vue

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: band, envelope/mask, statistical
- Setting goals and expectations (avoiding common problems)
- Report generation
- Reporting success stories

Mobius Institute

Acceptance testing

Review of ISO standards