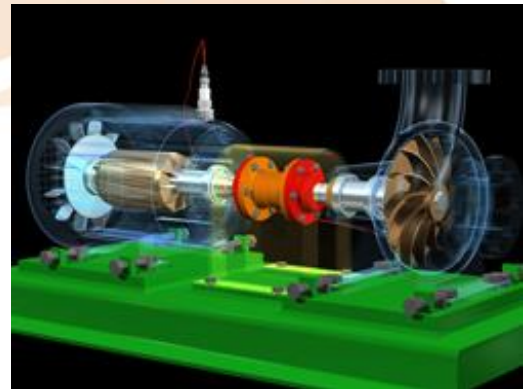


Advanced Vibration Analysis

Mobius Institute's Advanced 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 III and ASNT Level III Vibration Analysis

Public or on-site course conducted by experienced, certified Mobius Institute instructor. The course exceeds ISO 1836-2:2003 and meets ASNT SNT-TC-1A Recommended Practice 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 III & Level III; Review & Certification Examination: 1-Day, 75% Passing Grade (Only the ISO Category III examination is given. The ASNT Level III examination may only be given by ASNT.)

The Vibration Specialist Advanced course is intended for personnel who have at least two years vibration analysis experience and Category II certification by a recognized certification body. The course provides an in-depth study of diagnostic measurement techniques and the associated applications of the techniques. It is expected that the attendee is either the leader of the vibration team, or takes a leading role in diagnosing faults and making the final recommendation. This person must fully understand all data collector options, special test capabilities, all analysis tools and must understand the widest range of fault conditions.

The Category III Vibration Analyst is expected to be able to diagnose all of the common faults conditions with rolling element bearing machines; have a good understanding of fault conditions associated with sleeve bearing machines; utilize time waveforms, phase readings and enveloping/PeakVue type readings to diagnose faults. He/she needs to understand all condition monitoring technologies, how and when to apply them, and how to combine technologies to get the best results.

The Category III Vibration Analyst must also understand machine dynamics (natural frequencies, resonance, ODS), how to perform resonance testing and how to correct resonance problems. He/she must also understand balancing, alignment, and isolation and is also therefore required to understand all of the single and cross-channel measurement capabilities of the analyzer. Finally, he/she is also expected to be able to set up the program, run a successful program, and mentor junior analysts. Topics covered include:

Principles of vibration

- Quick review of Category II fundamentals
- Waveform, spectrum, phase, vectors and orbits
- Transients, pulses, modulation, beating, sum/difference
- Force, response, damping, and stiffness
- Cepstrum analysis

Data acquisition

- Special tests: phase, triggering, strobos, low speed machines and variable speed machines
- Planning routes and route management

- Optimizing test locations and setup options

Signal processing

- Sampling, resolution, Fmax, averaging, windowing, dynamic range, signal-to-noise ratio
- A/D conversion: constant and variable sampling rate

Vibration analysis

- Spectrum analysis review
- Harmonics, sidebands, and the analysis methodology
- Time waveform analysis
- Phase analysis: bubble diagrams and ODS
- Orbit analysis
- Analyzing enveloping/demodulation/PeakVue, etc. data

Fault analysis

- Natural frequencies and resonances
- Imbalance, eccentricity and bent shaft
- Misalignment, cocked bearing and soft foot
- Mechanical looseness
- Rubs and instabilities
- Rolling element bearing analysis
- Analysis of turbo-machinery and sleeve bearings
- Analysis of AC, DC and variable frequency drives
- Analysis of gears
- Analysis of belt driven machines
- Analysis of pumps, compressors and fans
- *LOTS of case studies and exercises for participants*

Equipment testing and diagnostics

- Impact testing (bump tests)
- Phase analysis
- Transient analysis
- Operating deflection shape analysis
- Introduction to modal analysis
- Cross channel measurements

Corrective action

- General maintenance repair activities

- Balancing process: single-plane and two-plane
- Review of shaft alignment procedures: dial and laser
- Flow control and replacement of machine parts
- Resonance control, isolation and damping

Running a successful condition monitoring program

- Managing a successful program
- Reporting and financial management
- Growing the program
- Incorporating additional technologies

Acceptance testing

Review of ISO standards

