Technical training

Advanced machinery dynamics

Key benefits

Get highest level of technical training with Bently Nevada bringing the in depth machinery dynamic knowledge and 60+ years of experience. Leverage real case histories analysis. Recognize, explain and account for the effects of more complex rotor dynamics interaction of rotor mode shapes, bearing design, gears, torsional and structural vibration. Duration: 5 days.

Course duration
5 days (35 hours)

Audience
- Engineers involved in the design, acceptance testing, and maintenance of rotating machinery
- Academic researchers and professors involved in rotor dynamics

Prerequisites
- Machinery Diagnostics (MD) course
- ISO Category 3 certification

Course objectives

- Understand the behavior of rotating and reciprocating machinery, including anisotropic systems
- Conduct machinery diagnostics using rotor modeling
- Uncover the pros and cons of different machine balancing methods
- Identify and diagnose rotor-to-stator rubs, fluid-induced instabilities, and shaft cracks
- Perform gear failure inspections to recognize different gear types and calculate gear frequencies
- Learn how to measure torsional vibrations, understand impact testing and analysis, and examine signal processing issues

Program components

- **Rotor modeling for machine diagnostics** – identify design parameters that determine rotor dynamic behavior – understand the relationship between critical speeds, resonances and natural frenquencies
- **Anisotropic systems** – recognize machine behavior due to support stiffness anisotropy
- **Machine balancing** – differentiate between balancing methods such as influence vectors, static/coupled, and polar (modal) – learn about balancing for the thermal bow effect
- **Rotor-to-stator rubs** – detect machine rubs – uncover how rub condition can show fractional frequency – differentiate between the different types of variable bow effects
- **Fluid-induced instabilities** – determine root cause of fluid instabilities – learn how to control/prevent malfunctions through design changes
- **Shaft cracks** – discover symptoms related to shaft crack diagnosis – uncover relationship between cracks, thermal sensitivity and rotor radial vibration
- **Gear forces and frequencies** – recognize pros and cons of different gear types – understand normal gear force directions – calculate five discrete gear frequencies
- **Torsional vibration** – learn about torsional excitations and the importance of torsional calculations – measure torsional vibration using Time Interval Measurement (TIM) and other methods
- **Impact testing and analysis** – understand the difference beteen operating deflection shape (ODS) and mode shape analysis – use impact testing to identifiy component natural frequencies
- **Signal processing** – understand the importance of sampling – convert an analog signal to a digital format