



Consulting and Training | Reach New Heights

Course Name

Vibration Analysis and Condition Monitoring

Sector Name

Mechanical Engineering

Document Type

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Vibration Analysis and Condition Monitoring

Course Introduction

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.

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Vibration Analysis and Condition Monitoring

Target Audience

- ✓ Automotive Engineer
- ✓ Boiler Engineer
- ✓ Ceramics Engineer
- ✓ Equipment Engineer
- ✓ High-Pressure Engineer
- ✓ Marine Engineer
- ✓ Mechanical Design Engineer
- ✓ Mechanical Engineer
- ✓ Naval Architect
- ✓ Pipeline Engineer
- ✓ Power Engineer
- ✓ Rotating Equipment Engineer
- ✓ Senior Mechanical Engineer
- ✓ Turbine Engineer
- ✓ Validation Engineer

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Vibration Analysis and Condition Monitoring

Learning Objectives

- ✓ Participants should learn how to select appropriate sensors and techniques for diagnosing typical machinery malfunctions.
- ✓ Participants will be learned to read vibration signatures and evaluate machinery condition from vibration data.
- ✓ Participants will understand how to isolate the affected machinery components, recognize various common problems, and make recommendations for continued efficient operation or scheduled repairs.

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Vibration Analysis and Condition Monitoring

Course Outline

✓ **01 DAY ONE**

Module (01) Condition Monitoring Introduction

- ✓ Maintenance strategy and types
- ✓ Source of vibration
- ✓ Infra thermography technique overview
- ✓ Oil Analysis Technique Overview

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Course Outline

✓ 02 DAY TWO

Module (02) principles of vibration analysis

- ✓ Vibration amplitude
- ✓ Vibration displacement
- ✓ Vibration velocity
- ✓ Vibration acceleration
- ✓ Data Acquisition Technique
- ✓ Measurement point's identification
- ✓ Phase concept and measurement

Module (03) vibration measurement sensors

- ✓ Proximity report theory and operation
- ✓ Velocity transducer theory and operation
- ✓ Accelerometer theory and operation
- ✓ Sensor Selection Criteria
- ✓ Sensors fixation methods and effect

Vibration Analysis and Condition Monitoring

Course Outline

✓ **03 DAY THREE**

Module (04) Vibration analysis fundamentals

- ✓ Converting from time waveform spectrum.
- ✓ Free Vibration Concept
- ✓ Forced vibration
- ✓ Resonance phenomena identification and problem solving
- ✓ Critical Speed Identification
- ✓ Non, sub, and synchronous frequencies

Module (05) Rotor unbalance fault detection and solving

- ✓ Unbalanced defect reasons
- ✓ Unbalance detection using vibration analysis
- ✓ Detection using spectrum and timewaveform
- ✓ Detection using phase analysis
- ✓ Detection using orbit analysis
- ✓ Unbalance Correction Method
- ✓ Unbalanced impact on machinery health

Vibration Analysis and Condition Monitoring

Course Outline

✓ 04 DAY FOUR

Module (06) misalignment defect detection and solving

- ✓ Misalignment sources
- ✓ Misalignment detection using vibration analysis
- ✓ Detection using spectrum analysis
- ✓ Detection using timewave form analysis
- ✓ Detection using phase analysis
- ✓ Detection using orbit analysis
- ✓ Misalignment solving problem
- ✓ Alignment using dial gauges
- ✓ Alignment using a laser alignment device
- ✓ Belt alignment

Module (07) Bearing defects detection and solving

- ✓ Bearing failure sources
- ✓ Bearings failure stages
- ✓ Bearing failure detection
- ✓ Bearing failure effect on machinery health
- ✓ Proper bearing installation methods

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Course Outline

✓ **05 DAY FIVE**

Module (08) Other Common Machinery Defects

- ✓ Rotor Eccentricity Detection
- ✓ Belt defect detection
- ✓ Bent Shaft Detection
- ✓ Looseness defect detection
- ✓ Internal looseness
- ✓ External looseness

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
June 14, 2027	June 18, 2027	5 days	4950.00 \$	Spain , Barcelona
Aug. 30, 2027	Sept. 3, 2027	5 days	4250.00 \$	UAE , Dubai
Dec. 13, 2026	Dec. 17, 2026	5 days	4250.00 \$	Qatar , Doha
April 5, 2027	April 9, 2027	5 days	4250.00 \$	UAE , Abu Dhabi

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