COURSE BROCHURE

Predictive Maintenance and Condition Monitoring

A practical course on condition monitoring techniques, including vibration analysis, oil analysis, thermography, ultrasound and electrical testing, and on building a predictive program that finds faults before failure.

Code	HT-OGE-140
Category	Oil & Gas, Engineering & Maintenance
Duration	1 week
Level	Intermediate

Introduction

Most mechanical and electrical failures give early warning weeks or months before the machine stops, but those signals are lost unless someone measures and interprets them. With wireless sensors and online monitoring now widespread, the challenge is no longer collecting data but matching the right technique to each failure mode and turning a reading into a maintenance decision.

Objectives

- Explain the P-F curve and decide which equipment and failure modes justify monitoring
- Interpret vibration spectra to diagnose common faults in rotating equipment
- Read oil analysis reports and judge both oil condition and machine condition
- Use thermography, ultrasound and electrical testing where each is most effective
- Design a condition monitoring program with routes, intervals and alarm limits and assess its value

Who should attend

- Reliability and maintenance engineers
- Condition monitoring and rotating equipment technicians
- Mechanical and electrical maintenance supervisors
- Maintenance planners and preventive maintenance program owners

Skills you will develop

- Vibration spectrum analysis
- Interpreting oil analysis reports
- Reading thermal images
- Building and running monitoring programs

Learning Outcomes

- Separate unbalance from misalignment and mechanical looseness in a vibration spectrum
- Calculate bearing defect frequencies and gear mesh frequency and locate them in the spectrum
- Interpret an ISO 4406 cleanliness code and wear metal trends in an oil report
- Prepare a matrix linking each critical machine to a monitoring technique, measurement interval and alarm limit

Course Outline

Day 1: Condition-Based Maintenance Strategy

- The P-F curve and the six failure patterns, and when monitoring beats time-based maintenance
- Matching techniques to failure modes, equipment criticality, and the general framework of ISO 17359
- Program elements: measurement routes, intervals, baseline readings, and alert and alarm limits

Day 2: Vibration Analysis

- Displacement, velocity and acceleration, the FFT spectrum, time waveform and phase, and sensor and measurement point selection
- Diagnosing unbalance, misalignment, looseness, resonance and journal bearing problems
- Rolling bearings and gears: defect frequencies, envelope analysis and severity limits in the ISO 20816 series

Day 3: Oil Analysis

- Taking a representative sample: sampling point, timing and clean equipment
- Oil condition: viscosity, acid number, oxidation, water and particle contamination and the ISO 4406 cleanliness code
- Machine condition: wear metals by spectrometry, ferrography and trending from sample to sample

Day 4: Thermography, Ultrasound and Electrical Testing

- Infrared thermography: emissivity, reflection and its use on electrical panels, bearings and thermal insulation
- Ultrasound: air and gas leak detection, steam trap surveys and condition-based bearing lubrication
- Electric motors: motor current signature analysis, insulation resistance and polarization index, and phase unbalance

Day 5: Program Integration and Diagnostic Workshop

- Online monitoring, wireless sensors and linking alarms to work orders in the CMMS
- Measuring program success: faults found early, cost avoided and the false alarm rate
- Applied workshop in which teams diagnose a pump and motor train from vibration spectra, an oil report and thermal images, then prepare an action plan and a monitoring matrix for critical equipment

Training methodology

Exercises reading vibration spectra and time waveforms from real rotating equipment
Interpretation of sample oil analysis reports and thermal images
Demonstrations of portable measuring instruments where available
Closing multi-technique diagnostic workshop

Certification

Participants receive a Harbor Training Center certificate of attendance on completing the course.

Upcoming dates

City	Dates	Language	Fee
Istanbul	11 – 15 January 2027	AR	EUR 5,400
Dubai	18 – 22 January 2027	EN	EUR 4,800
London	25 – 29 January 2027	AR	EUR 5,800
Amsterdam	1 – 5 February 2027	EN	EUR 6,100
Online	8 – 12 February 2027	AR	EUR 2,800
Istanbul	12 – 16 July 2027	EN	EUR 5,400
Dubai	19 – 23 July 2027	AR	EUR 4,800
London	26 – 30 July 2027	EN	EUR 5,800
Amsterdam	2 – 6 August 2027	AR	EUR 6,100
Online	9 – 13 August 2027	EN	EUR 2,800

Fees are per participant.

Contact us

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To register and for details, scan the code or visit:

https://harbor4training.com/en/courses/predictive-maintenance-condition-monitoring