XCELERATE TRAINING INSTITUTE

your learning & development partner

MECHANICAL ENGINEERING

Predictive Maintenance, Vibration Analysis and Condition Monitoring of Machines Training Course

DURATION	LANGUAGE	FORMAT
5 days	**English**	**Classroom / Online**

Upcoming dates

Dates	Venue	Format	Fee
22 – 26 Feb 2027	Live online	Online (live)	**€1,200**
2 – 6 Aug 2027	Live online	Online (live)	**€1,200**
6 – 10 Sep 2027	Boston	Classroom	**€4,800**

Register or ask a question

Online: x8ti.com/course/predictive-maintenance-vibration-analysis-and-condit…

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Predictive Maintenance, Vibration Analysis and Condition Monitoring of Machines Training Course

Introduction

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Modern oil, gas, and process plants are highly complex with huge economic stakes. These Plants consist of both static and rotating equipment, including piping. These pieces of equipment must not fail suddenly while in operation. Sudden breakdown failures not only cause huge production and the associated monetary losses but also find a company unprepared as to how to bring them back on stream, apart from safety, health, and environmental issues.

Modern inspection and maintenance strategists believe in Predictive Maintenance which provides sufficient warning about the deteriorating conditions of equipment/machines in advance through Vibration Analysis and Condition Monitoring.

While vibration analysis and condition monitoring are important for all machines/equipment to plan maintenance without surprises, online Vibration Analysis is critical for large rotating machines which don't have standbys in the plant e.g., Turbo-compressors, Turbo-generators, etc.

Vibration Monitoring employs things from simple portable vibration data collectors to the complex in-built online Vibration Monitoring and Diagnostics Systems. Online condition monitoring tools include bearing analyzers, machinery stethoscope, temperature sensors and profilers, acoustics emissions techniques, ultrasonic testing for integrity, etc.

This Xcelerate Training Institute course will empower attendees with comprehensive knowledge about 'Predictive Maintenance, Vibration Analysis and Condition Monitoring of Machines'.

Learning Objectives

- Understand the basic concepts of Predictive Maintenance, Vibration Analysis, and Condition Monitoring of Machines/Equipment
- Learn the fundamentals and advantages of Predictive Maintenance
- Learn the components and methodology of vibration monitoring, including hardware items such as probes and data processing instruments, and the associated software for analysis
- Comprehend various types of condition monitoring such as metal integrity checks, rotating machine bearing checks, condition trending using internal process parameters, and analysis of the composition of fluids at the outlet of processes, equipment, and machines (e.g., ferrography, temperature rise, pressure fluctuation, etc.)
- Appreciate the importance of, and planning around Predictive Maintenance, Vibration Analysis, and Condition Monitoring in oil, gas, and process plants, including their execution
- Grasp the Assessment of remainder life and preparation for repair/ replacement/ maintenance
- Understand some non-destructive testing techniques, aiding in condition monitoring and predictive maintenance

Training Methodology

- Lectures
- Seminars & Presentations
- Group Discussions and workshops
- Assignments
- Case Studies & Functional Exercises

Benefits for Your Organization

- Basic, intermediate, and specialized knowledge on the associated aspects, as per the learning appetite of attendees
- Avoidance of embarrassing and financially crippling breakdowns and interruptions to production
- Sound inspection and maintenance strategies, to the delight of insurance agencies, customers, and regulatory authorities
- Better health, safety, and environmental performance with fewer breakdown failures of machines/equipment
- Enhanced life of machines
- Enhanced confidence of employees and shareholders
- Enrichment of knowledge in market trends on techniques, tools, and services available

Benefits for You

- Have a sense of satisfaction by helping your organization with enhanced and sustained production through predictive maintenance without sudden breakdown failures
- Gain basic, intermediate, and specialized knowledge on Predictive Maintenance, Vibration Analysis, and Condition Monitoring of Machines, as per the learning appetite of attendees
- Enhance your career prospects with the acquisition of knowledge and skills
- More useful to those who want to combine their theoretical knowledge with practical experience
- Emerge as an all-rounder in Plant general knowledge as this training is designed for all plant personnel’s to help in their functions one way or the other

Target Audience

- Engineering, Fire & Safety, Maintenance, Operation, Inspection personnel at all levels, including trainees/interns
- Insurance, Regulatory, and lending agencies
- Middle level and Top management personnel with an introductory version of this course
- Those who provide contractual services on Predictive Maintenance, Vibration Analysis and Condition Monitoring of Machines

Course Outline

CONCEPTS

- Machines/Equipment in the Plants
- Predictive Maintenance
- Vibration Analysis
- Condition Monitoring

PREDICTIVE VS BREAKDOWN MAINTENANCE

- Cost advantages and business implications
- Global Industry trends
- Safety, health, and environmental advantages
- Risk-based practices

VIBRATION (SESSION-1)

- Cause of Vibration/Basic Physics behind it
- The vibration of rotating and static equipment: Relative comparison
- Detecting vibration: Probes – Displacement, Velocity, and Acceleration
- Threshold limits of vibration/Acceptance criteria
- Portable and fixed tools and sophisticated instrumentation
- Data collection, Analysis, and Monitoring
- Consequences of Ignoring vibration

VIBRATION (SESSION-2)

- Case studies on Vibration
- Lack of timely maintenance may give rise to vibration
- Balancing the rotating parts in machines
- Industry advancements
- Vendors providing instruments and tools
- Service providers on data collection and problem diagnostics with troubleshooting

CONDITION MONITORING (SESSION-1)

- What conditions can deteriorate machines/equipment?
- Variations in conditions in machines/equipment in the running plant
- Condition variations as an indication of the trend of deterioration
- Technologies to capture variations

CONDITION MONITORING (SESSION-2)

- Baseline condition
- Online condition
- Risk-based condition
- Risk-based monitoring

GLOBAL INDUSTRY TRENDS

- Culture of machine monitoring via-a-vis human health monitoring by medical doctors
- The analogy between industry and medical condition monitoring
- Predictive maintenance is a lifeline and currently globally accepted strategy
- Condition monitoring and diagnostics as a respected profession

VENDORS SEGMENTS

- Types and ranges of data gathering, and diagnostics instruments available
- Local vs international vendors with brand quality of equipment and service

- Calibration/validation of vibration and condition monitoring instruments
- Inspection, maintenance, proper handling, and appropriate storage of these instruments

HOW TO SELECT SERVICE PROVIDERS?

- What information to share with them?
- Data logging helps the experts to study the trend, diagnose and provide a solution
- Remote/virtual diagnosis of a complex problem by experts
- Reputed global service providers

CASE STUDIES AND ATTENDEES' PARTICIPATION

- Study of incidents as a result of ignorance of predictive maintenance, vibration analysis, and condition monitoring
- Analysis of problem areas, root cause analysis, and corrective actions
- Presentation of solutions by the participants

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Registration Form

Predictive Maintenance, Vibration Analysis and Condition Monitoring of Machines Training Course

Preferred dates: ..... Venue or online: .....

Duration: 5 days Language: .....

Please complete and email this form to us, or register online. We confirm your place and send the invoice within one working day.

Delegate information

Full name (Mr / Ms / Dr / Eng): .....

Position: ..... Telephone / mobile: .....

Official email: ..... Personal email: .....

Company information

Company name: .....

Address: .....

City / country: ..... VAT / tax number: .....

Person responsible for training & development

Full name (Mr / Ms / Dr / Eng): .....

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☐ Please invoice me ☐ Please invoice my company

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