

# TURBO MACHINERY - OPERATIONAL PERFORMANCE & MAINTENANCE MANAGEMENT

*"Maximizing Efficiency, Reliability, and Service Life of Critical Rotating Equipment"*

## Schedule

Date	Venue	Fees
10 - 13 Feb 2026	Dubai, UAE	USD 2995 per delegate

## Introduction

Turbomachinery—such as compressors, turbines, and pumps—plays a critical role in industrial operations, especially in sectors like oil & gas, petrochemicals, and power generation. Poor performance or failure of this equipment can result in costly downtime, safety risks, and reduced operational efficiency.

This intensive 4-day course equips operations and maintenance personnel with the knowledge and tools to enhance the performance and reliability of turbomachinery. Through real-world case studies, technical deep-dives, and practical exercises, participants will gain insights into performance optimization, failure prevention, and maintenance best practices tailored specifically for rotating equipment.

## Objectives

By the end of this course, participants will be able to:

- Understand the operating principles of key turbomachinery types
- Analyze performance parameters and efficiency indicators
- Identify failure modes and implement preventive measures
- Apply condition monitoring and diagnostic techniques
- Improve maintenance planning and reduce unplanned shutdowns

## Why Attend

- Deepen your knowledge of rotating equipment behavior and optimization
- Reduce operational risk and avoid catastrophic failures
- Enhance asset lifespan through proactive maintenance strategies
- Learn practical tools for troubleshooting and performance analysis
- Align operations and maintenance goals for higher equipment availability

## Target Audience

This program is designed for:

- Mechanical and reliability engineers
- Rotating equipment and turbomachinery specialists
- Maintenance planners and supervisors
- Operations personnel responsible for compressors and turbines
- Process and utility engineers in oil, gas, and energy sectors

## Individual Benefits

Key competencies that will be developed include:

- Technical knowledge of turbomachinery design and function
- Skill in identifying performance deviations and diagnosing issues
- Proficiency in interpreting vibration and other condition monitoring data
- Confidence in planning and executing maintenance shutdowns
- Ability to align reliability goals with production objectives

## Organizational Benefits

Upon completing the training course, participants will demonstrate:

- Improved availability and reliability of critical rotating equipment
- Reduced maintenance costs and unplanned failures
- Enhanced safety performance by managing mechanical risks
- Stronger diagnostic capabilities using modern condition monitoring tools
- Better alignment between operations, maintenance, and reliability teams

## Instructional Methodology

The course follows a blended learning approach combining theory with practice:

- Strategy Briefings - Technical deep-dives into equipment performance and design
- Case Studies - Root cause analysis and turnaround success stories
- Workshops - Failure diagnostics and vibration data interpretation exercises
- Peer Exchange - Practical experience sharing on turbomachinery challenges
- Tools - Maintenance templates, inspection checklists, and monitoring dashboards

## Course Outline

### DETAILED 4-DAY COURSE OUTLINE

**Training Hours:** 07:30 AM – 03:30 PM **Daily Format:** 3-4 Learning Modules | Coffee breaks: 09:30 & 11:15 | Lunch Buffet: 01:00 – 02:00

#### Day 1: Fundamentals of Turbomachinery and Operational Performance

- Module 1: Introduction to Turbomachinery Types and Principles (07:30 – 09:30) • Overview of turbines, compressors, and pumps • Operating principles: dynamic vs. positive displacement machines • Applications across oil & gas, energy, and industrial sectors
- Module 2: Performance Metrics and Efficiency (09:45 – 11:15) • Key performance parameters: flow, head, efficiency, power • Interpretation of curves and OEM data • Causes of performance degradation
- Module 3: Equipment Matching and Operating Conditions (11:30 – 01:00) • Matching machine capability with system demand • Effects of off-design operation • Control systems and protective devices
- Module 4: Group Workshop – Performance Evaluation (02:00 – 03:30) • Reviewing real performance curves • Identifying signs of inefficiency • Case-based group recommendations

#### Day 2: Reliability and Failure Prevention in Turbomachinery

- Module 1: Common Failure Modes and Mechanisms (07:30 – 09:30) • Mechanical, thermal, and process-related failures • Erosion, cavitation, misalignment, and surge • Recognizing failure signatures early
- Module 2: Condition Monitoring Fundamentals (09:45 – 11:15) • Basics of vibration analysis, thermography, and oil analysis • Monitoring bearing health and imbalance • Establishing alarm limits and response actions
- Module 3: Diagnostic Tools and Techniques (11:30 – 01:00) • Using FFT, orbit plots, and spectrum analysis • Root cause identification from monitoring data • Role of advanced monitoring systems (online and offline)
- Module 4: Group Activity – Failure Case Diagnosis (02:00 – 03:30) • Simulated failure case with data and symptoms • Teams propose diagnosis and preventive actions • Peer presentation and discussion

#### Day 3: Maintenance Strategies and Execution Planning

- Module 1: Maintenance Philosophies and Strategy Selection (07:30 – 09:30) • Reactive, preventive, predictive, and RCM approaches • When to apply time-based vs. condition-based maintenance • Economic considerations of each strategy
- Module 2: Planning and Scheduling of Turbomachinery Maintenance (09:45 – 11:15) • Maintenance workflow: planning, execution, close-out • Managing planned shutdowns and overhauls • Coordination between OEM, contractors, and internal teams
- Module 3: Spare Parts and Lubrication Management (11:30 – 01:00) • Critical spare identification and stocking strategies • Lubrication planning and contamination control • Reducing failure risks through parts standardization
- Module 4: Workshop – Building a Maintenance Plan (02:00 – 03:30) • Drafting a preventive maintenance plan • Integrating inspections, condition data, and corrective tasks • Feedback from trainer on completeness and realism

#### Day 4: Troubleshooting and Continuous Improvement

- Module 1: Troubleshooting Operational Issues (07:30 – 09:30) • Diagnosing instability, noise, high vibrations, and temperature rise • Tools and techniques for troubleshooting rotating equipment • Escalation and shutdown decision criteria
- Module 2: Turnaround and Post-Maintenance Start-Up (09:45 – 11:15) • Critical steps in safe startup post-maintenance • Inspection, alignment, balancing, and verification • Managing risks during re-commissioning
- Module 3: Continuous Reliability Improvement (11:30 – 01:00) • Reliability improvement programs (RCM, RCA, LCC) • Maintenance audits and performance tracking • Training and cross-functional alignment
- Module 4: Final Review and Action Planning (02:00 – 03:30) • Review of lessons and key takeaways • Development of individual and team action plans • Certification and course wrap-up

## Certification

Participants will receive a Certificate of Completion in Turbomachinery – Operational Performance & Maintenance Management, recognizing their expertise in optimizing, diagnosing, and maintaining high-performance turbomachinery systems to meet demanding industrial requirements.

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