

Course No. 2030

Mechanical Seals, Bearings & Lubrication Systems for Rotating Equipment Training Course

MAINTENANCE ENGINEERING
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The Mechanical Seals, Bearings & Lubrication Systems for Rotating Equipment Training Course provides a practical and technical framework for understanding, selecting, operating, inspecting, maintaining, and troubleshooting critical sealing and bearing systems used in rotating machinery. The programme focuses on the components that directly influence equipment reliability, leakage control, friction, heat generation, and operational availability.

Participants will examine the construction, operating principles, selection criteria, failure mechanisms, and maintenance requirements of mechanical seals, bearings, lubrication systems, pumps, compressors, turbines, gearboxes, motors, and other rotating equipment. Particular attention is given to seal arrangements, bearing types, lubrication methods, operating conditions, installation practices, and equipment-specific requirements.

The programme addresses common problems such as seal leakage, face damage, bearing overheating, premature wear, lubrication contamination, incorrect viscosity, inadequate lubrication, misalignment, shaft deflection, vibration, and improper installation. Participants will learn how to diagnose these conditions using inspection findings, operating data, vibration information, temperature measurements, lubricant analysis, and failure history.

Through practical component identification, seal and bearing failure analysis, lubrication exercises, troubleshooting scenarios, and an integrated workshop, participants will develop the ability to improve component selection, installation quality, maintenance effectiveness, and rotating equipment reliability.

Objectives

- By the end of this training course, participants will be able to:
- Explain the operating principles and functions of mechanical seals, bearings, and lubrication systems.
- Identify major mechanical seal and bearing types used in rotating equipment.
- Analyze seal and bearing operating requirements for different machinery applications.
- Evaluate appropriate seal and bearing selection criteria.
- Apply correct installation and inspection practices.

- Analyze common mechanical seal failure mechanisms.
- Identify bearing failure modes and their underlying causes.
- Evaluate lubrication requirements for different rotating equipment.
- Assess lubricant selection, viscosity, contamination, and degradation.
- Apply appropriate lubrication methods and practices.
- Analyze the effects of misalignment, vibration, shaft movement, and operating conditions.
- Diagnose seal leakage, bearing overheating, excessive wear, and premature failures.
- Interpret relevant temperature, vibration, and lubrication condition indicators.
- Develop corrective and preventive maintenance actions.
- Improve maintenance and troubleshooting procedures for sealing and bearing systems.
- Develop an integrated strategy for improving mechanical seals, bearings, and lubrication system reliability.

Who Should Attend

This course is designed for mechanical engineers, rotating equipment engineers, maintenance engineers, reliability engineers, equipment specialists, and maintenance technicians responsible for rotating machinery performance and reliability.

It is also suitable for maintenance managers, engineering managers, vibration analysts, lubrication specialists, condition monitoring professionals, inspection engineers, maintenance planners, supervisors, and technical personnel involved in equipment maintenance and troubleshooting.

The programme is particularly relevant to professionals working in oil and gas, refineries, petrochemicals, power generation, energy, manufacturing, chemical processing, water and utilities, mining, marine operations, and other asset-intensive industries.

Learning Outcomes

- Upon completion of the course, participants will be able to:
- Identify and explain the functions of major mechanical seal and bearing components.
- Select appropriate seal arrangements for different rotating equipment applications.

- Select suitable bearing types according to load, speed, temperature, and operating conditions.
- Evaluate mechanical seal and bearing installation requirements.
- Inspect seal and bearing components for damage, wear, and deterioration.
- Identify common mechanical seal failure patterns and their causes.
- Diagnose bearing failures caused by lubrication, contamination, loading, or installation problems.
- Assess lubrication requirements for pumps, compressors, turbines, motors, and gearboxes.
- Select appropriate lubricants and lubrication methods.
- Evaluate lubricant contamination, degradation, and viscosity-related problems.
- Analyze the effects of vibration, misalignment, shaft deflection, and thermal conditions.
- Use condition monitoring information to identify developing seal and bearing problems.
- Develop effective troubleshooting procedures for recurring component failures.
- Recommend corrective and preventive actions to extend component service life.
- Improve maintenance practices for sealing and lubrication systems.
- Develop a practical reliability improvement plan for seals, bearings, and lubrication systems.

Course Outline

DAY 01

Mechanical Seals and Sealing Systems

- Principles and functions of mechanical seals
- Mechanical seal components and construction
- Seal types and arrangements
- Single and multiple seal configurations
- Seal selection according to process and operating conditions
- Seal materials and compatibility
- Seal installation and alignment requirements
- Common seal failure mechanisms
- Leakage, face damage, wear, overheating, and vibration

PRACTICAL APPLICATION

Identifying mechanical seal components and analyzing a seal failure

DAY 02

Bearings and Bearing Reliability

- Bearing functions and operating principles
- Rolling-element and plain bearing types
- Bearing selection criteria
- Radial and axial loading
- Speed, temperature, clearance, and operating conditions
- Bearing installation and mounting practices
- Bearing inspection and condition assessment
- Common bearing failure modes
- Fatigue, wear, overheating, contamination, and electrical damage

PRACTICAL APPLICATION

Diagnosing bearing damage and identifying failure causes

DAY 03

Lubrication Systems and Lubricant Management

- Fundamentals of lubrication for rotating machinery
- Lubrication regimes and operating conditions
- Lubricant selection and viscosity
- Grease and oil lubrication systems
- Lubrication methods and delivery systems
- Oil mist and circulating lubrication systems
- Lubricant contamination and degradation
- Oil analysis and condition monitoring
- Over-lubrication and under-lubrication

PRACTICAL APPLICATION

Developing a lubrication strategy for critical rotating equipment

DAY 04

Troubleshooting Seals, Bearings and Lubrication Failures

- Systematic troubleshooting methodology
- Seal leakage and premature seal failure
- Bearing overheating and abnormal wear
- Lubrication-related failures
- Misalignment and shaft deflection
- Vibration and its effects on seals and bearings
- Operating and process-related failure causes
- Failure history and recurring problem analysis
- Corrective and preventive maintenance actions

PRACTICAL APPLICATION

Investigating a combined seal, bearing, and lubrication failure

DAY 05

Reliability Improvement and Maintenance Management

- Condition monitoring of seals and bearings
- Temperature and vibration monitoring
- Lubrication monitoring programmes
- Failure trend analysis
- Preventive and predictive maintenance strategies
- Spare parts and component management
- Installation quality and maintenance standards
- Reliability indicators and component performance
- Continuous improvement and failure prevention
- Final Integrated Workshop: Developing a complete Reliability & Maintenance Improvement Plan for Mechanical Seals, Bearings & Lubrication Systems



Register or Request More Information

Course page: <https://quest-training.com/courses/mechanical-seals-bearings-lubrication-systems-for-rotating-equipment-training-course>

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