

Course No. 2031

Rotating Equipment Alignment, Balancing & Troubleshooting Training Course

MAINTENANCE ENGINEERING
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The Rotating Equipment Alignment, Balancing & Troubleshooting Training Course provides a practical and technical framework for the alignment, balancing, inspection, diagnosis, and troubleshooting of rotating machinery. The programme focuses on the mechanical conditions that directly influence equipment reliability, vibration levels, component life, energy efficiency, and operational availability.

Participants will examine shaft and coupling alignment principles, balancing requirements, measurement techniques, tolerances, and common installation errors affecting pumps, compressors, turbines, motors, gearboxes, fans, blowers, and other rotating equipment. The course emphasizes accurate alignment and balancing as fundamental elements of reliability-focused maintenance.

The programme also covers systematic troubleshooting of vibration and mechanical problems, including misalignment, imbalance, mechanical looseness, soft foot, shaft bending, resonance, bearing problems, coupling defects, and lubrication-related issues. Participants will learn how to combine vibration data, inspection findings, operating parameters, and equipment history to identify probable causes and determine appropriate corrective actions.

Through practical alignment exercises, balancing calculations, vibration interpretation, troubleshooting scenarios, and equipment case studies, participants will develop the skills required to diagnose mechanical problems, improve installation quality, reduce recurring failures, and enhance rotating equipment reliability.

Objectives

- By the end of this training course, participants will be able to:
- Explain the principles of rotating equipment alignment and balancing.
- Analyze the relationship between alignment, balance, vibration, and equipment reliability.
- Identify major alignment requirements for shafts and couplings.
- Apply appropriate alignment measurement and correction techniques.
- Evaluate angular and parallel misalignment.

- Identify soft foot and other installation-related conditions.
- Analyze balancing requirements for rotating components.
- Apply appropriate balancing principles and correction methods.
- Interpret vibration patterns associated with imbalance and misalignment.
- Diagnose common mechanical problems in rotating equipment.
- Analyze bearing, coupling, shaft, and lubrication-related problems.
- Evaluate the influence of resonance and operating conditions on vibration.
- Apply systematic troubleshooting methodologies.
- Develop corrective actions for alignment, balancing, and mechanical faults.
- Verify the effectiveness of completed alignment and balancing activities.
- Develop an integrated troubleshooting and reliability improvement strategy for rotating equipment.

Who Should Attend

This course is designed for mechanical engineers, rotating equipment engineers, maintenance engineers, reliability engineers, vibration analysts, condition monitoring specialists, and maintenance technicians involved in rotating machinery maintenance.

It is also suitable for maintenance managers, engineering managers, equipment specialists, inspection professionals, lubrication specialists, maintenance planners, supervisors, and technical personnel responsible for equipment installation, alignment, balancing, troubleshooting, and reliability.

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:
- Assess alignment conditions in rotating machinery.
- Perform shaft and coupling alignment measurements.

- Identify angular and parallel misalignment.
- Detect and correct soft foot conditions.
- Evaluate alignment tolerances according to equipment requirements.
- Select appropriate alignment tools and measurement methods.
- Assess rotating component balance conditions.
- Calculate and determine appropriate balancing corrections.
- Interpret vibration data associated with imbalance and misalignment.
- Identify mechanical looseness, resonance, shaft bending, and coupling problems.
- Diagnose bearing and lubrication-related vibration problems.
- Analyze equipment operating conditions and their influence on mechanical performance.
- Conduct systematic troubleshooting of rotating equipment.
- Develop technically justified corrective and preventive actions.
- Verify equipment condition following alignment and balancing activities.
- Prepare a practical rotating equipment troubleshooting and reliability improvement plan.

Course Outline

DAY 01

Fundamentals of Rotating Equipment Alignment

- Principles of rotating machinery alignment
- Importance of alignment to reliability and equipment life
- Shaft and coupling alignment
- Angular and parallel misalignment
- Alignment tolerances and acceptance criteria
- Soft foot and foundation conditions
- Thermal growth and operating alignment
- Alignment measurement systems and tools
- Common alignment errors

PRACTICAL APPLICATION

Assessing alignment conditions on a rotating equipment system

DAY 02

Alignment Measurement and Correction Techniques

- Alignment measurement principles
- Dial indicator alignment methods
- Laser alignment systems
- Rim and face alignment
- Reverse indicator method
- Alignment calculations and correction values
- Shimming and equipment movement
- Coupling alignment requirements
- Pre-alignment and final verification

PRACTICAL APPLICATION

Performing a complete shaft and coupling alignment exercise

DAY 03

Rotating Equipment Balancing

- Principles of rotor balancing
- Static and dynamic imbalance
- Single-plane and two-plane balancing
- Unbalance causes and symptoms
- Balance quality and acceptance criteria
- Field balancing methods
- Trial weights and correction calculations
- Influence coefficients and balancing procedures
- Verification of balancing results

PRACTICAL APPLICATION

Analyzing and correcting a rotating equipment imbalance condition

DAY 04

Troubleshooting and Vibration-Based Diagnostics

- Systematic troubleshooting methodology
- Vibration fundamentals for rotating machinery
- Identifying imbalance and misalignment through vibration
- Mechanical looseness and structural problems
- Soft foot and foundation-related vibration
- Shaft bending and coupling problems
- Resonance and critical speed
- Bearing and lubrication-related problems
- Operating and process-related vibration

PRACTICAL APPLICATION

Diagnosing a rotating equipment vibration problem using condition data

DAY 05

Integrated Troubleshooting and Reliability Improvement

- Combining alignment, balancing, and condition monitoring
- Failure investigation and recurring problem analysis
- Corrective and preventive maintenance
- Verification of alignment and balancing quality
- Reliability improvement strategies
- Maintenance standards and technical documentation
- Equipment performance indicators
- Reducing vibration and unplanned downtime
- Continuous improvement of rotating equipment maintenance
- Final Integrated Workshop: Diagnosing a complex rotating equipment problem and developing an integrated alignment, balancing, troubleshooting, and reliability improvement plan



Register or Request More Information

Course page: <https://quest-training.com/courses/rotating-equipment-alignment-balancing-troubleshooting-training-course>

Website: <https://quest-training.com>

Email: info@quest-training.com

Phone: +905016771440

