QUEST
Professional Center

PROFESSIONAL TRAINING COURSE

Course No. 1145

Mechanical Equipment Troubleshooting Training Course

MECHANICAL ENGINEERING
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION
5 Days

DELIVERY
Classroom

Course Overview

The Mechanical Equipment Troubleshooting Training Course is a comprehensive professional development program designed to equip engineers, maintenance professionals, operations personnel, technical specialists, and engineering managers with the knowledge and practical skills required to systematically diagnose, analyze, troubleshoot, and resolve mechanical equipment failures in industrial environments. Effective troubleshooting is one of the most valuable engineering competencies for maintaining operational continuity, minimizing unplanned downtime, improving equipment reliability, reducing maintenance costs, and maximizing asset performance across a wide range of industries.

Modern industrial facilities rely on complex mechanical systems such as pumps, compressors, turbines, gearboxes, fans, blowers, heat exchangers, pressure vessels, valves, conveyors, rotating equipment, and auxiliary machinery. Failures in these systems can significantly impact production, safety, environmental performance, and business profitability. This course provides participants with internationally recognized engineering methodologies for identifying equipment failures, diagnosing root causes, implementing corrective actions, and preventing recurring mechanical problems.

Throughout the program, participants will develop a comprehensive understanding of troubleshooting methodologies, failure analysis techniques, root cause analysis (RCA), condition monitoring, vibration analysis, lubricant analysis, thermography, performance monitoring, mechanical inspections, predictive maintenance, reliability-centered maintenance (RCM), failure modes and effects analysis (FMEA), equipment integrity management, and engineering decision-making. Practical engineering exercises and real industrial case studies enable participants to apply systematic troubleshooting techniques to actual mechanical equipment failures.

The Mechanical Equipment Troubleshooting Training Course also demonstrates how troubleshooting engineering integrates with maintenance management, reliability engineering, asset management, operational excellence, engineering safety, risk management, and continuous improvement initiatives. By completing this course, participants will be prepared to improve equipment reliability, reduce maintenance costs, strengthen engineering decision-making, optimize maintenance strategies, minimize operational risks, and support sustainable engineering operations across government entities, ministries, public sector organizations, financial institutions managing engineering infrastructure, oil and gas companies, petrochemical industries, power generation facilities, manufacturing organizations, utilities, mining operations, and multinational corporations.

Objectives

- Analyze mechanical equipment failures using systematic engineering troubleshooting methodologies.
- Develop practical skills for diagnosing faults in industrial mechanical equipment.
- Evaluate equipment condition using engineering inspection and condition monitoring techniques.
- Apply Root Cause Analysis (RCA) methodologies to identify and eliminate recurring failures.
- Design corrective actions that improve equipment reliability and operational performance.
- Improve maintenance effectiveness through predictive and reliability-centered maintenance strategies.
- Strengthen engineering decision-making using operational data and equipment performance indicators.
- Implement structured troubleshooting procedures that reduce downtime and maintenance costs.
- Assess operational risks associated with mechanical equipment failures and recommend appropriate mitigation measures.
- Align troubleshooting activities with organizational objectives for safety, reliability, asset management, and operational excellence.

Who Should Attend

This course is designed for mechanical engineers, maintenance engineers, operations engineers, reliability engineers, rotating equipment engineers, plant engineers, utility engineers, process engineers, project engineers, maintenance supervisors, operations supervisors, engineering technicians, maintenance planners, equipment inspectors, commissioning engineers, engineering consultants, and technical professionals responsible for troubleshooting and maintaining industrial mechanical equipment.

The program is equally valuable for engineering managers, maintenance managers, plant managers, operations managers, facility managers, asset management professionals, project managers, procurement engineers, HSE professionals, quality specialists, executive managers, technical advisors, and decision makers responsible for equipment reliability, maintenance planning, operational performance, engineering asset management, and continuous improvement initiatives.

Professionals working within government entities, ministries, public sector organizations, financial

institutions managing engineering infrastructure, oil and gas companies, petrochemical facilities, refineries, power generation plants, manufacturing industries, mining organizations, water treatment facilities, marine operations, infrastructure developers, utility providers, and multinational engineering organizations will benefit significantly from the practical engineering methodologies and internationally recognized troubleshooting practices presented throughout the course.

Learning Outcomes

- By the end of this course, participants will be able to:
- Explain systematic troubleshooting methodologies for industrial mechanical equipment.
- Diagnose mechanical failures using engineering analysis and structured problem-solving techniques.
- Apply vibration analysis, thermography, lubricant analysis, and condition monitoring technologies.
- Perform Root Cause Analysis (RCA) and Failure Modes and Effects Analysis (FMEA) for mechanical equipment failures.
- Identify common failure mechanisms affecting pumps, compressors, turbines, gearboxes, bearings, valves, fans, and other rotating equipment.
- Develop corrective and preventive maintenance strategies that improve equipment reliability.
- Evaluate operational risks associated with equipment failures and recommend mitigation measures.
- Prepare professional troubleshooting reports supported by engineering evidence and technical recommendations.
- Apply engineering safety principles during equipment inspection, troubleshooting, repair, and recommissioning.
- Support operational excellence through effective troubleshooting, reliability improvement, and lifecycle asset management.

Course Outline

DAY 01

Fundamentals of Mechanical Equipment Troubleshooting

- Principles of mechanical failure analysis
- Systematic troubleshooting methodologies

DAY 01 — CONTINUED

- Mechanical failure modes and equipment degradation mechanisms
- Root Cause Analysis (RCA) fundamentals

PRACTICAL

Practical workshop on diagnosing real industrial mechanical failure scenarios

DAY 02

Diagnostic Techniques and Condition Monitoring

- Vibration analysis for rotating equipment
- Infrared thermography and temperature monitoring
- Lubricant analysis and tribology fundamentals
- Condition monitoring technologies and predictive diagnostics

PRACTICAL EXERCISE

Practical exercise using equipment performance data to identify failure symptoms

DAY 03

Troubleshooting Industrial Mechanical Equipment

- Troubleshooting pumps and pumping systems
- Troubleshooting compressors and compressed air systems
- Troubleshooting turbines, fans, blowers, and rotating equipment
- Troubleshooting bearings, gearboxes, valves, and mechanical power transmission systems

PRACTICAL

Practical workshop on diagnosing and resolving industrial equipment failures

DAY 04

Reliability Improvement and Failure Prevention

- Reliability-Centered Maintenance (RCM)
- Failure Modes and Effects Analysis (FMEA)
- Mechanical integrity management
- Failure reporting, documentation, and corrective action planning

PRACTICAL APPLICATION

Practical application involving root cause investigation and reliability improvement planning

DAY 05

Advanced Troubleshooting and Operational Excellence

- Mechanical asset lifecycle management
- Risk management and engineering safety
- Performance measurement and reliability key performance indicators
- Continuous improvement strategies for maintenance and equipment reliability

FINAL WORKSHOP

Final workshop involving the development of a comprehensive Mechanical Equipment Troubleshooting and Reliability Improvement plan integrating condition monitoring, failure analysis, root cause investigation, maintenance optimization, reliability enhancement, risk management, engineering safety, and continuous improvement to maximize equipment availability, operational efficiency, and engineering excellence.

Register or Request More Information

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