

Course No. 1303

Reliability-Centered Maintenance (RCM) Training Course

RELIABILITY & ASSET MANAGEMENT
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The Reliability-Centered Maintenance (RCM) Training Course provides a structured and risk-based methodology for developing maintenance strategies that preserve the required functions and performance of physical assets. The course enables participants to determine what maintenance should be performed, when it should be performed, and why it is required based on asset functions, functional failures, failure modes, consequences, and applicable maintenance technologies.

Reliability-Centered Maintenance is a core methodology for organizations seeking to move beyond conventional time-based maintenance and establish maintenance programs that are aligned with actual equipment failure behavior and operational requirements. By applying RCM principles, organizations can focus maintenance resources on critical failure modes, reduce unnecessary maintenance activities, improve equipment reliability and availability, and strengthen the relationship between maintenance strategy and business objectives.

The course provides a comprehensive approach to conducting RCM studies, beginning with asset selection, system boundaries, functional analysis, and functional failures, followed by failure mode identification, failure effects, failure consequences, and maintenance task selection. Participants will examine preventive maintenance, predictive maintenance, condition-based maintenance, failure-finding tasks, redesign, and run-to-failure strategies, while considering safety, operational, environmental, and economic consequences.

Through practical exercises, structured workshops, and industry-based case studies, participants will develop the ability to conduct an RCM analysis and translate its findings into practical maintenance programs. The course also demonstrates how RCM integrates with Failure Modes and Effects Analysis, FMECA, Root Cause Analysis, asset criticality, condition monitoring, reliability engineering, and Asset Performance Management to support sustainable asset performance and lifecycle value.

Objectives

- Analyze the principles, objectives, and decision logic of Reliability-Centered Maintenance within the context of asset reliability and maintenance management.
- Develop structured RCM analyses by defining system boundaries, asset functions, performance standards, and functional failures.

- Identify and evaluate failure modes and failure effects for critical equipment and systems using a systematic methodology.
- Assess the safety, operational, environmental, and economic consequences associated with different failure modes.
- Apply RCM decision logic to determine technically appropriate and economically justified maintenance tasks.
- Evaluate preventive, predictive, condition-based, failure-finding, redesign, and run-to-failure strategies for different failure characteristics.
- Design maintenance strategies that address specific failure modes while avoiding unnecessary or ineffective maintenance activities.
- Improve maintenance effectiveness by aligning maintenance intervals and tasks with asset failure behavior and operational requirements.
- Strengthen the integration of RCM with reliability engineering, FMEA, FMECA, criticality analysis, condition monitoring, and asset management.
- Implement structured methods for documenting RCM decisions, assumptions, responsibilities, maintenance tasks, and review requirements.
- Assess the effectiveness of RCM recommendations using reliability, availability, maintenance, risk, and performance indicators.
- Develop a practical RCM implementation roadmap for establishing, improving, or optimizing reliability-centered maintenance within the organization.

Who Should Attend

The Reliability-Centered Maintenance (RCM) Training Course is designed for professionals responsible for reliability, maintenance, engineering, operations, asset performance, and maintenance strategy development. It is particularly suitable for Reliability Engineers, Maintenance Engineers, Asset Management Engineers, Mechanical Engineers, Electrical Engineers, Instrumentation and Control Engineers, Process Engineers, Maintenance Planners, Reliability Specialists, Condition Monitoring Specialists, and Technical Services Professionals.

The course is also highly relevant to Maintenance Managers, Reliability Managers, Asset Managers, Engineering Managers, Operations Managers, Plant Managers, Maintenance Superintendents, Maintenance Supervisors, and professionals responsible for preventive and predictive maintenance programs. It is particularly valuable for multidisciplinary teams conducting equipment criticality assessments, failure analysis, maintenance optimization, reliability improvement, and lifecycle planning.

Executives, senior managers, project managers, engineering leaders, consultants, and technical decision makers can benefit from understanding how RCM supports risk-based maintenance decisions and improves the allocation of maintenance resources. The course is applicable across manufacturing, power generation, utilities, transportation, mining, infrastructure, petrochemicals, oil and gas, process industries, and other asset-intensive environments.

Learning Outcomes

- Explain the principles, methodology, terminology, and decision-making framework of Reliability-Centered Maintenance.
- Define asset functions, performance standards, system boundaries, and functional failures for selected equipment.
- Identify credible failure modes and failure mechanisms associated with critical assets and systems.
- Analyze failure effects and determine the operational, safety, environmental, and economic consequences of failures.
- Classify failure consequences and establish appropriate priorities for maintenance strategy development.
- Apply RCM decision logic to select appropriate maintenance tasks for different failure characteristics.
- Distinguish when preventive maintenance, predictive maintenance, condition monitoring, failure-finding, redesign, or run-to-failure is appropriate.
- Develop practical maintenance task descriptions, frequencies, responsibilities, and performance requirements based on RCM findings.
- Identify ineffective, excessive, or unnecessary maintenance activities and recommend more appropriate alternatives.
- Integrate RCM findings with FMEA, FMECA, Root Cause Analysis, asset criticality, and reliability improvement programs.
- Establish performance measures for evaluating the effectiveness of an RCM-based maintenance strategy.
- Prepare a practical RCM implementation and review plan for sustaining maintenance strategy effectiveness.

Course Outline

DAY 01

Foundations of Reliability-Centered Maintenance

- Introduction to Reliability-Centered Maintenance and its role in modern asset management
- Evolution from reactive and preventive maintenance toward reliability-centered maintenance
- Core principles and objectives of RCM
- Relationship between reliability, maintainability, availability, risk, and maintenance strategy
- Identifying critical assets and selecting systems for RCM analysis
- Defining system boundaries, equipment hierarchy, operating context, and performance standards
- Asset functions and required performance standards
- Understanding functional failures and loss of required functions
- RCM team structure, responsibilities, and multidisciplinary analysis

PRACTICAL APPLICATION

Select a critical asset and define its operating context, functions, performance standards, and system boundaries

DAY 02

Failure Modes, Effects and Consequence Analysis

- Systematic identification of functional failures and failure modes
- Failure mechanisms and physical causes of equipment failure
- Distinguishing failure modes, failure causes, and failure effects
- Local, subsystem, and system-level effects of failures
- Failure evidence and failure history analysis
- Safety and environmental consequences
- Operational and production consequences
- Non-operational and hidden failure consequences
- Economic consequences and maintenance-related impacts

DAY 02 — CONTINUED

PRACTICAL APPLICATION

Develop an RCM failure analysis for selected equipment and document failure modes, causes, and effects

DAY 03

RCM Decision Logic and Maintenance Task Selection

- RCM decision logic and structured maintenance strategy selection
- Preventive maintenance and age-related failure characteristics
- Predictive maintenance and condition-based maintenance
- Condition monitoring technologies and task selection principles
- Inspection, testing, measurement, and performance monitoring tasks
- Failure-finding tasks for hidden and protective system failures
- Run-to-failure strategies and conditions for justified corrective maintenance
- Redesign and engineering modification as reliability improvement options
- Determining appropriate maintenance intervals and task frequencies

PRACTICAL APPLICATION

Apply RCM decision logic to selected failure modes and determine the most appropriate maintenance strategy for each

DAY 04

RCM Program Development and Reliability Improvement

- Translating RCM analysis results into practical maintenance programs
- Developing maintenance task descriptions and job requirements
- Establishing maintenance frequencies based on failure behavior and risk
- Optimizing preventive maintenance programs using RCM findings
- Integrating predictive maintenance and condition monitoring into RCM programs
- Eliminating unnecessary or ineffective maintenance activities

DAY 04 — CONTINUED

- Linking RCM with FMEA, FMECA, Root Cause Analysis, criticality analysis, and reliability improvement
- Spare parts, maintenance resources, tools, skills, and logistical considerations
- Measuring the impact of RCM on reliability, availability, downtime, maintenance workload, and risk

PRACTICAL APPLICATION

Develop an optimized maintenance program for a critical asset based on completed RCM analysis

DAY 05

RCM Implementation, Governance and Continuous Improvement

- Developing an organizational framework for implementing Reliability-Centered Maintenance
- Selecting assets and prioritizing RCM studies based on criticality and business impact
- Establishing RCM governance, roles, responsibilities, documentation, and review processes
- Managing RCM implementation and stakeholder engagement
- Integrating RCM with Asset Performance Management and strategic asset management
- Using maintenance and operational data to validate and update RCM decisions
- Reviewing maintenance task effectiveness and adjusting strategies when asset conditions change
- Developing RCM performance indicators and management reporting
- Establishing continuous improvement and periodic RCM review processes

FINAL WORKSHOP

Conduct an end-to-end RCM study for a critical asset, develop the resulting maintenance strategy, and prepare an implementation and continuous improvement action plan



Register or Request More Information

Course page: <https://quest-training.com/courses/reliability-centered-maintenance-rcm-training-course>

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