

Course No. 1846

# Reliability-Centered Maintenance (RCM) for Oil & Gas Facilities Training Course

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**MECHANICAL MAINTENANCE, RELIABILITY & TURNAROUND  
OIL & GAS**

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DURATION

**5 Days**

DELIVERY

**Classroom**



## Course Overview

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This advanced training course provides a structured and practical approach to Reliability-Centered Maintenance (RCM) for oil and gas facilities. It focuses on improving equipment reliability, asset availability, operational continuity, and maintenance effectiveness while reducing unplanned failures, production losses, and unnecessary maintenance activities.

The course examines how RCM can be applied across upstream, midstream, downstream, refining, petrochemical, and gas-processing facilities. Participants will learn how to identify critical assets, define required functions, analyze functional failures and failure modes, assess failure consequences, and determine the most appropriate maintenance strategy for each asset and failure mechanism.

A major focus is placed on developing maintenance strategies based on reliability, risk, equipment condition, and operational consequences. Participants will explore how preventive, predictive, condition-based, inspection-based, and planned corrective maintenance can be strategically combined to achieve optimum asset performance and cost effectiveness.

Through practical exercises, industry-based case studies, and integrated workshops, participants will develop the capability to build RCM-based maintenance programs for critical oil and gas assets. The course also connects RCM with asset integrity, process safety, maintenance planning, spare parts management, performance measurement, and continuous improvement.

## Objectives

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- By the end of the course, participants will be able to:
- Analyze the principles, methodology, and business value of Reliability-Centered Maintenance in oil and gas facilities.
- Identify critical asset functions and performance requirements across production and processing systems.
- Evaluate functional failures, failure modes, failure causes, and failure consequences.
- Assess the operational, safety, environmental, and financial consequences of equipment failures.
- Apply a structured RCM methodology to determine appropriate maintenance requirements.

- Design preventive, predictive, and condition-based maintenance strategies based on failure characteristics.
- Evaluate maintenance strategies for rotating, static, mechanical, electrical, instrumentation, and utility systems.
- Integrate RCM with asset integrity management and process safety requirements.
- Improve existing maintenance programs by eliminating ineffective or unnecessary maintenance tasks.
- Apply reliability and maintenance performance indicators to evaluate program effectiveness.
- Develop improvement strategies for critical assets to reduce failures and unplanned downtime.
- Support maintenance, spare parts, resource, and investment decisions using reliability and risk-based information.

## Who Should Attend

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This course is designed for maintenance, reliability, mechanical, electrical, instrumentation, inspection, asset integrity, and engineering professionals working in oil and gas exploration, production, processing, refining, petrochemical, and energy facilities.

It is highly relevant to maintenance and reliability engineers, rotating equipment engineers, mechanical engineers, maintenance planners, condition monitoring specialists, asset integrity professionals, operations personnel, maintenance supervisors, and engineering managers involved in asset performance and maintenance strategy development.

The program is also suitable for maintenance managers, reliability managers, asset managers, operations managers, engineering leaders, and decision-makers responsible for improving equipment performance, operational reliability, maintenance costs, process safety, and long-term asset value.

## Learning Outcomes

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- Upon completion of the course, participants will be able to:
- Explain the principles and methodology of Reliability-Centered Maintenance and its role in oil and gas asset management.
- Define the primary and secondary functions of critical equipment and operating systems.

- Distinguish between functional failures, failure modes, failure causes, and failure effects.
- Conduct structured failure mode and consequence analysis for critical oil and gas assets.
- Classify failures according to their operational, safety, environmental, and economic consequences.
- Select appropriate maintenance tasks based on failure characteristics, probability, detectability, and consequences.
- Develop preventive, predictive, and condition-based maintenance strategies for critical equipment.
- Identify assets requiring enhanced inspection, monitoring, and reliability improvement programs.
- Integrate RCM outcomes with asset integrity, risk management, and process safety programs.
- Use equipment history, failure data, maintenance records, and operating information to identify reliability improvement opportunities.
- Evaluate reliability, availability, maintainability, and maintenance performance indicators.
- Optimize maintenance strategies to reduce unnecessary work and improve maintenance effectiveness.
- Improve spare parts and resource planning based on asset criticality and failure characteristics.
- Develop practical reliability improvement plans for critical equipment and systems.
- Establish continuous improvement mechanisms for maintaining and enhancing RCM program effectiveness.

## Course Outline

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### DAY 01

## Fundamentals of Reliability-Centered Maintenance in Oil & Gas

- Introduction to Reliability-Centered Maintenance and its evolution.
- RCM principles, objectives, methodology, and business value.
- Comparison of reactive, preventive, predictive, condition-based, and reliability-centered maintenance.
- Reliability, availability, maintainability, and operational continuity.
- Asset criticality and identification of critical equipment and systems.
- Relationship between RCM, asset management, process safety, production, and maintenance cost.

## DAY 01 — CONTINUED

**PRACTICAL APPLICATION**

Develop an initial criticality assessment for selected oil and gas assets.

**DAY 02****Functional Analysis, Failure Modes & Failure Consequences**

- Defining equipment and system functions and required performance standards.
- Identification and classification of functional failures.
- Failure modes, failure causes, and failure mechanisms.
- Failure effects and operational consequences.
- Safety, environmental, production, quality, and financial consequences of failures.
- Differentiating random failures, age-related failures, and degradation-related failures.

**PRACTICAL APPLICATION**

Conduct a failure mode and effects analysis for a critical oil and gas equipment system.

**DAY 03****Maintenance Task Selection & RCM Strategy Development**

- RCM decision logic and maintenance task selection.
- Developing effective preventive maintenance programs.
- Applying predictive maintenance and condition monitoring.
- Determining appropriate inspection and monitoring requirements.
- Identifying when planned corrective maintenance is preferable to preventive maintenance.
- Optimizing maintenance intervals based on failure characteristics and asset condition.

**PRACTICAL APPLICATION**

Develop an RCM-based maintenance strategy for a critical equipment package.

**DAY 04**

## Applying RCM to Oil & Gas Facilities

- RCM applications for pumps, compressors, turbines, and other rotating equipment.
- Reliability strategies for pressure vessels, tanks, piping systems, and static equipment.
- Integrating RCM with inspection, asset integrity, and process safety management.
- Using failure history, operating data, and maintenance records for reliability improvement.
- Integrating spare parts and resource planning with asset criticality.
- Managing reliability risks across interconnected production and processing systems.

**PRACTICAL APPLICATION**

Develop a reliability improvement strategy for a critical oil and gas operating system.

**DAY 05**

## Performance Measurement, Implementation & Continuous Improvement

- Developing reliability and maintenance performance indicators.
- Measuring equipment reliability, availability, maintainability, and maintenance effectiveness.
- Evaluating maintenance program performance and identifying improvement opportunities.
- Integrating RCM with maintenance planning, scheduling, shutdowns, and turnaround management.
- Developing governance and implementation frameworks for RCM programs.
- Building a continuous improvement approach based on failure data and performance results.

**FINAL WORKSHOP**

Develop an integrated RCM implementation plan for an oil and gas facility, including asset priorities, maintenance strategies, performance indicators, responsibilities, and continuous improvement actions.



## **Register or Request More Information**

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

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