



Maintenance & Reliability Management

Oil & Gas Predictive Maintenance and Reliability Centered Maintenance of Plant

Course Introduction

A major challenge facing maintenance people today is not only to learn what maintenance techniques exist but to determine which ones are worthwhile to the organizations. If we make the right choices, it's possible to improve asset performance and at the same time reduce the cost of maintenance. If we make the wrong choices, new problems are created while existing problems only get worse.

Maintenance has too often been the focus of cost cutting without regard to the impact on availability. Money saved on the maintenance budget appears directly on the bottom line. The money lost in production through equipment down time does not appear, however it may be many times greater than the direct maintenance cost saved.

Reliability is defined as the probability that an item will perform a required function without failure under stated conditions for a specific period of time. A statement of reliability has four key components: probability, function, stated conditions & specific period of time.

Reliability analysis takes the long term view and develops cost-effective ways to reduce life cycle cost. The life cycle cost includes the cost to purchase, operate, and maintain during its useful life time.

The goal of RCM

Reliability and predictive maintenance strategies use analytical process to determine appropriate failure management strategies to ensure safe and cost-effective operations of a physical asset in a specific operating environment.

Reliability-Centered Maintenance (RCM) can be defined as an approach that employs reactive, preventive, predictive, and proactive maintenance practices and strategies in an integrated manner to increase the probability that a machine or asset will function in the required manner over its design life cycle with minimum maintenance. The goal of RCM is to preserve equipment function with the required reliability and availability at the lowest cost. RCM requires that maintenance decisions be based on maintenance requirements supported by sound technical and economic justification.

Target Audience

- Maintenance engineers and supervisors

- Maintenance planners
- Reliability engineers
- Maintenance Managers
- Condition monitoring specialists

Learning Objectives

- Prepare a maintenance program using the guidelines & procedures and be able to discuss the important key points in developing the maintenance program
- Recognize the need for modification control and carry-out maintenance implementation strategies
- Apply and gain an in-depth knowledge of Total Plant Reliability Centered Maintenance (RCM) including its history, terminology, objectives and critical success factors
- Recognize reliability and availability and determine the use of reliability information for maintenance
- Enumerate the various maintenance tasks and emphasize the analytical decision logic
- Demonstrate reliability engineering audits and assessments and be able to identify the other tools used in RCM such as Failure Analysis and HAZOP studies
- List the support elements of RCM and use a system approach in work planning, scheduling and work control
- Cost effectively utilizes predictive maintenance and condition based strategy.

Course Outline

• 01 DAY ONE

Module 1 - Reliability engineering and Maintenance Introduction

- The role of maintenance in organization productivity
- Maintenance definition and Cycle
- Maintenance vision and mission
- Maintenance goals and objectives
- Evolution of Maintenance
- Maintenance policies and strategies
- Maintenance and Profitability
- Maintenance organization “Classification of Roles in Maintenance”
- Elements of asset management

Module 2 - Reliability Centered Maintenance

- Background, history & basics
- Definitions & concepts
- Operational reliability
- Benefit of RCM
- RCM Objectives
- RCM features

• 02 DAY TWO

Module 3 - Failure analysis

- Failure definition
- Equipment failure rate and patterns
- Failure management strategy
- Root causes of machinery failure
- Failure patterns

Module 4 - Planned Maintenance

- Introduction
- Age-to-Failure relationship
- Planned maintenance task Applicability and effectiveness

- Determine planned maintenance task interval
- Preventing Failure Concept

• 03 DAY THREE

Module 5 - Predictive (Condition Based) Maintenance

- Condition based maintenance strategy as a reliability driver
- Predictive maintenance (PdM) focuses
- Plant equipment criticality classification
- CBM process
- PdM techniques
- Potential Failure (P-F) diagram
- The P-F interval
- Condition monitoring task applicability and effectiveness
- Determine condition maintenance task intervals
- Establishing CBM task action limits

Module 6 - Operating Context and Function

- Operating Context preparation
- Drafting an Operating Context
- Importance of writing Function
- Design capability Versus required function
- Compose and document functions
- Functional Failures
- Failure modes
- Failure effect

• 04 DAY FOUR

Module 7 - Reliability Centred Maintenance Implementation

- RCM phases
- Seven questions addressed by RCM
- Redundant, standby, and backup functions

- Components classifications
- Preventive and corrective maintenance integration
- Tools & sequential elements

RCM steps

- RCM Process Flow Diagram
- Set up RCM Project Team
- Select System Boundary
- Reliability Centered Maintenance Criticality Matrix

RCM implementation

- defining system
- Determine System Functions and Functional Failure
- Performing Failure Modes, Effects and Criticality Analysis (FMECA)
- Identify Failure Causes
- Perform Non-Critical Evaluation
- Define Planned Maintenance Tasks

Module 8 - Maintenance and Reliability Essential Elements

- Planning and Scheduling
- Preventive Maintenance
- Defect Elimination and Root Cause Analysis
- Reliability leadership

• 05 DAY FIVE

Module 9 - Sustaining the Reliability Program

Sustaining the Analysis

- Trend Analysis
- Maintenance requirements document review
- Task Packaging reviews
- Age exploration tasks
- Failures

- People & Technology

Module 10 - Practical RCM Case Study

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
June 16, 2025	June 20, 2025	5 days	4250.00 \$	UAE - Dubai
Aug. 25, 2025	Aug. 29, 2025	5 days	4950.00 \$	England - London
Dec. 22, 2025	Dec. 26, 2025	5 days	4250.00 \$	UAE - Dubai