Reliability Centered Maintenance (RCM)

Introduction:

This course provides the fundamentals of Reliability-Centered Maintenance (RCM). The course is not process specific but gives the participant fundamental tools and knowledge required to participate in any RCM analysis process. The course will use life-cycle cost analysis and an understanding of equipment failure characteristics to achieve an optimal maintenance program that meets specified safety, environmental, and economic goals. The course focuses on preserving equipment functions by identifying appropriate preventive maintenance (PM) tasks, predictive maintenance (PdM) tasks, failure finding tasks, and other actions that protect against failure or mitigate the consequences of failure. This course will enable the candidates to learn RCM techniques and tools and stop maintenance problems and equipment failures, select maintenance strategy for in-field equipment and make use of maintenance history to improve your operation.

Who Should Attend?

Maintenance managers, maintenance supervisors, reliability and maintenance engineers, maintenance technicians, production managers, production supervisors, operators, plant engineers, and anyone who is involved in operating and maintaining of assets

Course Objectives:

By the end of this course delegates will be able to:

- Make your operating plant and equipment more reliable and available for use
- Audit your operational and maintenance performance to identify improvement opportunities
- Design optimum maintenance strategies for in-the-field plant and equipment
- Make proper use of RCM results to deliver the maintenance performance that your management want
- Identify a clear approach to reliability improvement for both fixed plant and moving equipment
- Select applicable technologies for Condition Monitoring and Predictive Maintenance
- Appreciate how to use failure data and industry failure databases and standards
- Introduce reliability growth principles on new, existing or old equipment
- Make sound Cost Benefit Decisions and spares holding selection
- Address dominant failure modes with correct selection of primary and secondary maintenance actions

Course Outline:

- Introduction to Reliability Cantered Maintenance (RCM) concepts
- Foundation Reliability Knowledge
- Physics of Failure
- Why parts fail
- Equipment Failure Curves
- Early Life – Random – Age
- Maintenance strategy selection

- Risk Management
- The components of risk
- Measuring risk
- Maximum Reliability
- Series and Parallel Systems
- Life-cycle considerations
- Quality and Precision
- Human Factors
- Recognising Equipment Risk
- Identifying Effects of Failure
- Failure Modes and Effect Analysis (FMEA)
- Identifying failures and ways to eliminate them
- Identifying the root-cause
- Feasible ways (technically) of analysis
- Proactive Maintenance
- Maintenance Strategy Selection
- Making Reliability Centered Maintenance Work
- Changing to Better Maintenance Practices
- Purpose of RCM – on-condition based maintenance
- RCM – The 7 basic questions
- Describing and listing functions
- Performance Standards
- Applying the RCM process
- Integration of RCM and Implementation of Strategies
- Design Principles of Low-Cost, Usable, Reliable, Maintainable & Safe System
- Identifying Project and Operating Risk
- Setting Reliability Standards
- Reducing Operating Risk at Design
- Maximizing Availability

- Controlling Human Factors
- Quality Control – setting pass/fail criteria
- Importance of Standardization
- Accuracy controlled procedures
- Optimize Your Maintenance Systems
- Creating a Useful Maintenance Management System
- Maintenance Planning and Scheduling
- Developing and Implementing RCM with a Limited Staff
- Precision Operation – degradation management
- TPM - Operator Maintenance activities
- RCM analysis preparation
- Techniques for prioritizing systems for analysis
- Failure Modes and Effect Consequence Analysis for RCM
- Evaluating failure consequences
- Statistics in RCM
- Statistical principles used in RCM
- Use of Weibull analysis in RCM processes
- Selecting the right maintenance tasks for reliability
- How to select preventive maintenance (PM) tasks and intervals
- How to select predictive maintenance (PdM) tasks and intervals
- How to select failure finding tasks and intervals
- Functional maintenance strategies
- When Run-to-Failure is appropriate
- Packaging and implementing RCM results
- When to use a Subject Matter Expert team
- Barriers to implementation and getting buy-in from all levels
- Techniques of Reliability Growth