Reliability Centered Maintenance Overview

Introduction:

Risk-Based Reliability Centered Maintenance (RCM) sets out to highlight and formalize the identification, categorization and management of risk as part of the development of failure management and maintenance management plans. Risk-Based RCM is focused on firstly identifying the risks involved with possible failures, quantifying the risks and then determining the most effective way, from a direct physical risk and economical risk point of view, to deal with the risks in the most appropriate manner, thereby avoiding the consequence altogether or mitigating the consequence of a failure to a level that will be tolerable to the organization.

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:

- Understand the concepts and processes required to perform a Risk Based RCM
- Participate in a Risk Based RCM Analysis
- Learn the fundamental Reliability Centered Maintenance (RCM) philosophies
- How to evaluate failure consequences
- How to select preventive & predictive maintenance tasks and intervals
- How to select failure finding tasks and intervals
- Identify and allocate resources for a RCM program
- Identify techniques for prioritizing systems for analysis
- Use of Weibull and statistical analysis in RCM processes
- Understand packaging and implementing RCM analysis results
- Spot the barriers to implementation and getting buy-in from all levels

Course Outline:

Introduction to Maintenance Management

- The History of Maintenance
- The role of Maintenance in the new generation plants and operations
- The effect of automation and mechanisation on required availability and reliability
- The effect of automation and mechanisation on the requirement for safety and environmental integrity
- The effect of automation and mechanisation on the requirement for product and service quality
- The effect of automation and mechanisation on maintenance costs

The Development of RCM

- Traditional view
- RCM development history

The Nature of Failures

- Failure patterns
- Failure mechanisms associated with direct wear
- Failure mechanisms associated with erosion, corrosion, metal fatigue, etc.
- Failure mechanisms associated with situations where initial forces are exerted on equipment during startup periods
- Failure mechanisms where there are no relationship between operating age and the likelihood of failure
- Typical cover-up work in shutdowns
- Failure mechanisms associated with some form of human error

The Meaning of Maintenance

- Definition of maintenance
- Opportunity for maintenance to play a meaningful role
- Objective of maintenance
- The role of RCM in maintenance

Physical Asset Management

- Moving beyond maintenance
- Development of physical asset management

The RCM Process

- Complies completely with the SAE JA 1011 standard
- Defines the circumstance in which a physical asset or system is expected to operate
- Defines all the functions of the asset / system, including that of protecting devices
- Defines and quantifies performance standards
- Determines the level of analyses and analysis boundaries
- Defines all the failed states associated with each function
- Considers the different causes for functional failures
- Defines all the different failure modes
- Defines the processes involved in the failure mode causes

- Identifies failure modes at the level of causation
- Develops maintenance policies that are focused on pre-venting failure modes or at least manage the effect and consequence of a failure mode
- Considers physical failures, human errors and latent causes
- Describes the immediate failure effects that will happen when a failure mode occurs
- Considers hidden failures, safety and environmental con-sequences as well as operational and non-operational consequences
- Determines the risk of each functional failure
- Determines the probability of each functional failure
- Quantifies the risk of each functional failure
- Allow for the development of maintenance tasks that will reduce the risk of failure to a level that will be tolerable to the organization else defaults to a suitable maintenance policy
- Ensures cost effective maintenance plans
- Considers the relationship between age and failure
- Considers pro-active and reactive failure management policies
- Makes provision for different implementation strategies
- Provides for training of personnel in RCM principles