Course Outline

IMPLEMENTATION OF RELIABILITY CENTERED MAINTENANCE (RCM) TOWARDS ZERO EQUIPMENT FAILURES

Learn From the best

Introduction

Reliability Centered Maintenance (RCM), initially developed by the Aviation industry, is recognized as the most efficient technique focuses on preventing failures whose consequences are serious, excellent results seen from the implementation was later adapted by other Industries, Nuclear Power, US Air Force and recently expanded to Manufacturing Industries.

RCM processes begins with a Failure Mode Effect Criticality Analyze (FMECA) that identifies the
failure modes in a systematic and structured way. The process then requires the assessment of each
critical failure mode or cause to determine the optimum maintenance policy to reduce the severity or
occurrence of each failure by using the Decision Tree Analysis.

When appropriate effective Maintenance Task is assigned to prevent failures from reoccurring, the component life span is extended, this improves equipment reliability, preserves system functionality while optimizing maintenance requirements and resources with cost effective Maintenance.

Learning Points

- Make your operating plant and equipment more reliable and available for use
- Understanding of the use of RCM key questions (Seven questions)
- Recognize the importance of data structure before you do any kind of strategy work
- Understand the importance of equipment selection.
- Audit your operational and maintenance performance to identify improvement opportunities using (FMECA) analytical tools
- Address failure modes with correct selection of primary and secondary maintenance actions.
- Make risk-based decisions for applicable technologies using Task selection process.
- Design optimum maintenance strategies for in-the-field plant and equipment
- Developing maintenance procedures
- Recognize RCM as a living program.

Impact to the Organization

RCM is the only quantitative approach to minimize unnecessary maintenance and potentially risky disruption while maximizing the stability of the equipment.

RCM philosophy employs preventive maintenance, predictive maintenance (PdM), real-time monitoring (RTM), run-to-failure (RTF) and proactive maintenance techniques is an integrated manner to increase the probability that a machine or component will function in the required manner over its design life cycle with a minimum of maintenance

- Improves “Equipment Effectiveness”.
- “Cross Functional Working Team” by eliminating departmental walls.
- Makes possible “Man-less Operation”, “Factory-operation

Course Outline

Module 1

Introduction to RCM (What makes RCM different)

1. What makes RCM different
2. Introduction to Maintenance
3. RCM Definition
4. RCM History
5. RCM Seven Basic Questions
6. RCM Implementation
7. RCM Principles
8. RCM Benefits

Module 2

RCM Team Formation Developing High Performance Teams

1.RCM Team
2.RCM Team Roles
3.Team Responsibilities
4.RCM Team Goals

- Plan Resource Management
- Estimate Activity Resources
- Develop Team
- Manage Team

Module 3

(I)System Selection for FMECA Analysis

Identifying the correct assets that are most likely to benefit.

(II)Workshop Exercise

Selecting the target system for RCM analysis using 80/20 Pareto analytical tool
Past performance data as an baseline to compare the improvements.

Module 4

(I)Create a System Block Diagram

(II)Workshop Exercise

Identifying the critical subsystems of the selected asset for analysis.
Selecting the critical subsystems from the block diagram for FMECA analysis using 80/20 Pareto analytical tool.

Module 5

(I)Topic - Functions

1. Describing primary Functions
2. The Operating Context
3. The types of Functions

(II)Workshop Exercise

1. Describe and identify the functions of the selected asset.
2. Identifying different types of Functions
3. Understand each asset precisely as possible the level of performance
4. How Functions should be listed.

Module 6

(I)Topic – Performance Standard

Performance standard

(II)Workshop Exercise

Quantifying the performance standard wherever possible
Listing of multiple performance standards
Define the minimum standard of performance.

Module 7

(I)Topic - Functional Failures

Defining Functional Failures by identifying in what ways an asset can fail to meet its operating standards.

(II)Workshop Exercise

Identifying and listing of all the functional failures.
Identify the ways in which the system might fail function.

1. Total function failure
2. Partial function failure

Module 8

(I)Topic - Failure Modes Analysis

1. What is a failure mode?
2. Why analyse failure modes?
3. Categories of failure modes
4. How much detail?
5. Levels of analysis and the information worksheets

(II)Workshop Exercise

1. Identifying the potential Failure Modes
2. Lists of failure modes failures caused by deterioration or normal wear and tear.
3. List should include failures caused by human errors
4. Identify the cause of each failure in detail
5. Listing failure effects which describe what happens when each failure mode occurs

Module 9

(I)Topic - Failure Effects Failure Consequence Analysis

(II)Workshop Exercise

1. Describe the effects what happens when a failure occurs
2. Identifying the potential effects
3. List the Failure Consequence

Module 10

(I)Proactive Maintenance 1: Preventive Tasks

1. Technical feasibility and proactive tasks
2. Age and deterioration
3. Scheduled restoration tasks
4. Scheduled discard tasks
5. Failures which are not age-related

(II)Workshop Exercise

1. Introduced to the types of Preventive Tasks and how they fit into the Decision Diagram.

Module 11

(I)Proactive Maintenance 2: Predictive Tasks

1. Potential failures and on-condition maintenance
2. The P-F intervals
3. The technical feasibility of on-condition tasks
4. Categories of on condition techniques
5. On-condition task and some pitfalls
6. How to determine the P-F Interval
7. When on-condition tasks are worth doing
8. Selecting proactive tasks

(II)Workshop Exercise

1. Understanding P-F curve shows how a failure starts, deteriorates to the point at which it can be detected.
2. Understanding the Categories of On-condition Techniques

Module 12

Other Default Actions

1. Failure-finding task.
2. Redesign
3. No scheduled maintenance.
4. Run To Failure

Module 13

(I)The Decision Diagram process

1. To identify effective maintenance tasks,
2. To evaluate these tasks by some cost–benefit analysis.
3. To prepare a plan for carrying out the identified maintenance tasks at optimal intervals.
4. Completing the decision worksheet

(II)Workshop Exercise

1. Learn the technical criteria which a failure mode must satisfy for each preventive task to be applicable and to assess if a task is worth doing by assessing if it successfully deals with the consequences of failure.

Module 14

(I)What FMECA Achieves

1. Overall Equipment Effectiveness
   - Measuring maintenance performance
   - Maintenance effectiveness
   - Maintenance efficiency.
2. Reliability analysis
   - MTBF
   - MTTR

About Elite Indigo

Elite Indigo Consulting provides corporate training to the semiconductor and manufacturing industries. With a humble beginning of one founding member with passion and desire to share his 20 years of experiences in Smart Manufacturing for global manufacturing facilities, now, we have a strong and competent team of 20 members, all aligned with company mission, vision and core values.

Our Mission

"Transform Data into Insights - Leap Forward"

Our Vision

Be a Global Trusted Advisor in the Areas of Skills Development, Consultancy & Software Solutions specialising in Semiconductor & Manufacturing industries.

Our Core Values