



Optimizing Equipment Maintenance & Replacement Practices



Introduction:

Major world companies from the process and petrochemical industry have developed their maintenance practices based on the optimization of predictive maintenance management system. This approach works well for both stationary and rotating equipment and includes continuous condition monitoring and the detailed inspection of vital elements of the equipment.

The optimization of the maintenance activities includes the spare parts handling, the selection of the right size and skill of maintenance crew with consideration of potential outsourcing i.e. subcontracting. Based on the collected data on reliability of the equipment in operation, Maintenance department can complete the Fitness for Service analysis based on which the decision can be made about 3Rs: Run, Repair or Replace, for the particular component of the equipment. Final decision regarding equipment replacement depends very much on the economic and safety aspect that must be taken into consideration.

This course is intended to introduce the participant to the process of making decisions regarding equipment maintenance optimization including equipment replacement. Various optimization techniques will be presented and

the optimization criteria explained. This course will also include several courses with case studies and real world problems to be solved. This will enable all participants to actively take part in the team work and classroom discussions.

The training course will feature:

- Risk assessment and management
- Main types of equipment failure mechanisms
- Maintenance methodologies and economic aspects
- Spare parts handling and storage modeling
- Equipment inspection and fitness for service analysis

Who Should Attend?

Reliability Engineers, Maintenance Managers, Engineers & Planners, Reliability and Maintenance Engineers, Facilities and Utilities Managers, Design Engineers, Top Level Maintenance Technicians, OE Champions, Predictive and Preventive Maintenance, Technicians & Supervisors, Planners, Maintenance Supervisors, Crafts and Tradesmen, Operations Supervisors, Process Engineers, Inspectors and Inspection Supervisors, Equipment Engineers Team Leaders and Professionals in Maintenance, Engineering and Production, Maintenance managers, reliability and maintenance Engineers, Production Managers, Plant Engineers, Design Engineers, Reliability Engineers and Technicians, Operators, Safety Engineers, Risk Engineers, Safety Engineers and anyone who is involved in Reliability Engineering strategies or methodologies to include design engineers for capital projects engineers, Foreman and Technicians, Mechanical, Electrical and Operational Personnel, Personnel designated as Planners, Key leaders from each maintenance craft, Key operations personnel, Technical professionals responsible for maintenance and repair of equipment, Professionals involved in inspection and maintenance and repair, professionals involved in asset & maintenance management auditing, Quality & Compliance Managers, Lead Auditors & Audit Team Members, Process Controllers, Maintenance Supervisors, Maintenance Planners, Predictive Maintenance Technicians & Supervisors, Materials Management Managers and Supervisors, Service Company Representatives, Asset owners & Asset Managers

Course Objectives:

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

- Identify equipment failures, and the impact on plant reliability
- Understand the cost-effectiveness of Preventive and Predictive Maintenance program
- Apply techniques of optimization of various maintenance activities
- Define criteria for work-crew size, spare parts and equipment replacement
- Make the important decision on the basis of the cost and benefit analysis
- Incorporate safety objectives to the equipment repair or replacement optimization

Course Outline:

Physical Asset Management & Failure Analysis

- Physical Asset Management
- Maintenance Management: Preventive and Predictive Approach
- Nature and Modes of Equipment Failure
- Failure Modes & Effect Analysis (FMEA)
- Analysis of Component Failure data using the Weibull Distribution
- Censored Data, the 3-Parameter Weibull, and the Kolmogorov-Smirnov Test

Preventive Maintenance & Spare Parts Replacements

- Reliability and Availability Concept: MTBF & MTTR
- Reliability Improvement through Reduction of Downtime
- Maintenance Performance Quantification
- Preventive Maintenance & Spare Part Handling
- Spare Parts Provisioning: Prediction Models and Techniques
- Management of Change: In-Kind Spare Parts

Equipment Inspection & Fitness for Service

- Condition Monitoring & Inspection
- Risk Based Inspection (RBI)

- Risk Matrix: Management and Mitigation Measures
- Reliability Improvement through Inspection
- Inspection Scope & Frequency
- Fitness for Service Analysis (FFS)

Economics of Maintenance, Repair & Replacement

- Management of Maintenance Resources
- Effective Use of CMMS
- Maintenance Organization Analysis
- Equipment Repair or Replacement Decision
- Economic Aspect of Maintenance Outsourcing
- Economic Aspect of Equipment Replacement

Total Productive Maintenance & Safety

- Capital Investment in Equipment and Maintenance: ROI
- Total Productive Maintenance
- Safety in Maintenance Work

KPI and OEE: Leading and Lagging Indicators