



## Rotating Equipment: Exemplary Maintenance in Reliability Optimization, and Continual Improvement

02 - 06 Feb 2025  
Cairo (Egypt)



# Rotating Equipment: Exemplary Maintenance in Reliability Optimization, and Continual Improvement

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## Introduction

Rotating equipment reliability distribution and optimization problems have been extensively studied by world-class process companies over the past decade. Instead of focusing solely on allocating redundancy with traditional maintenance, you can estimate the minimum required reliability for each component of your equipment to meet your equipment reliability goals at the lowest cost. .

Engineers can determine whether this minimum required component reliability is achieved through failure avoidance or redundancy. This new philosophy assigns reliability to components according to the cost of increasing reliability.

Continuously improving asset reliability by optimizing predictive maintenance of rotating machinery is one of the key challenges facing assets today. Knowing how to effectively prevent equipment failures, perform successful root cause analysis, and improve condition monitoring of pumps, turbines, and compressors is a constant challenge for engineers. Save time and money by properly analyzing and resolving chronic problems at their source.

This course is designed to teach you how to effectively monitor the health of your components. This method can be used both as a predictive maintenance and root cause analysis tool. It also covers root causes of failure, global best practices for root cause analysis with exercises and case studies, installation, pre-commissioning planning, functional testing and commissioning, preventive maintenance strategies, and more.

## Targeted Groups:

- Operation Professionals
- Maintenance Professionals
- Reliability Professionals
- Key Operations Supervisors
- Internal Improvement Consultants

## Course Objectives

The course will concentrate on the problems and solutions surrounding equipment failures, diagnostics and effective methods to prevent them. This results in more efficient plant maintenance, increased operational efficiency, lower operating costs and improved plant availability. Upon the successful completion of the course, participants will be able to:

- Recognize the concept of organizing for world class operations particularly the characteristics and steps used toward pacesetter performance
- Explain equipment failure patterns by distinguishing repairable from non-repairable equipment, identifying the types of equipment failure, reviewing why equipment fails and employing actions to minimize failure effect
- Develop in-depth understanding on the maintenance effect on reliability and recognize how maintenance influences equipment performance
- Heighten awareness and understanding on root cause failure analysis RCFA including the various types and approaches used in rotating equipment's
- List down and describe the step by step process of root cause failure analysis RCFA
- Know the principle of predictive maintenance and be able to employ the various predictive

- maintenance techniques and strategies used in rotating equipment's
- Identify the various types and components of conditioning monitoring techniques and recognize their importance in rotating equipment reliability optimization and continuous improvement
- Understand the concept of optimizing reliability particularly conditioning monitoring and predictive maintenance and be able to identify its components and importance

## **Targeted Competencies:**

- Breaking a problem down into its constituent parts or components, in the framework of a hierarchy
- Establishing importance or priority to rank the alternatives is a comprehensive & general way to look at the problem in a formal manner
- Application of Multi-Criteria Decision-Making MCDM to practical problems
- Introduction to different operational research & management science methods
- Enhance decision-making with goals and criteria & show how to measure and rank them

## **Course Outline**

### **Unit 1: Reliability Overview**

- The end user's objectives
- Optimizing reliability

### **Unit 2: The major causes of machinery failure**

- Rotating equipment does not fail randomly
- The major causes of machinery failure - failure classifications

### **Unit 3: How to prevent machinery failures**

- Component function awareness - "What should it do?"
- Component condition monitoring - "What is it doing?"
- Preventive PM and predictive PDM
- Troubleshooting
- Reliability, everyone's responsibility

### **Unit 4: Optimizing CCM and PDM Component condition monitoring and predictive maintenance**

- The major machinery components
- Component condition monitoring
- Predictive maintenance PDM techniques

## **Unit 5: Effective predictive maintenance including root cause analysis techniques**

- Troubleshooting procedure overview
- Initial fact finding
- Thorough knowledge of equipment, component and system functions
- Defining abnormal conditions
- Listing abnormal conditions
- Eliminating causes of the problem
- Develop an action plan to eliminate root cause

## **Unit 6: Root cause analysis example problem**

- Example case history
- Answers and comments for the example case history

## **Unit 7: Root cause analysis techniques Improving component function knowledge base**

- Component function
- Component failure causes
- Component condition monitoring
- Examples of knowledge base enhancement



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