

# Troubleshooting & Maintenance of Bearing and Lubrication Problems

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# Troubleshooting & Maintenance of Bearing and Lubrication Problems



## Overview

The Bearing and Lubrication course is a comprehensive, highly practical and interactive course. This course is designed to provide participants with the required working knowledge for better Selection, Installation, and operation, as well as focus on troubleshooting and maintenance of Bearing and Lubrication Problems they may experience in their Plant equipment.

## Course Objectives

- Understanding Bearings and Lubrication Technology
- Determine the types of Bearings and Methods of Lubrication for different equipment
- Know how to test and recognise the Lubricant Properties
- Understand the Lubrication in Different Machinery
- Learn to apply the Troubleshooting Techniques, Maintenance Tips, and Failure Analysis of Bearing
- Identify, measure and install bearings commonly used in rotating equipment found in the industry
- Understand the Bearing Maintenance Strategies
- Understand the functionality of vibration protection that is widely used in industries

## Course Content

### 1. Bearing Technology

- Identifications & Terms
- Friction / Mass / Force
- Torque / Work/ Energy
- History of Bearings
- Bearing Loads (Radial/Thrust)
- Bearing Technology
- Bearing Types / Components



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## Course Content

### 2. Types of Bearings

- Friction Type (Sliding Surface)
- Anti-Friction Type (Rolling Contact)
- The Pivoted Shoe Type (Radial Bearing)
- The Kingsbury Thrust Bearing
- Shielded Bearing (Sealed)
- Selection of Ball & Roller Bearings

### 3. Mounting and Dismounting

- Maintenance and Replacement of Rolling Bearings
- Working Conditions in the Assembly Area
- Shaft and Housing Preparation
- Mounting Methods and Faulty Mounting Practice
- Bearing Maintenance Checklist and Service Records
- Effective and Ineffective Seals
- Failure Analyses and their causes
- Replacements are too frequent. "Unsatisfactory"

### 4. Vibration / Impact Damages

- Vibration of Machines
- Free / Forced Vibration
- Overheated Bearings, Noisy & Vibration
- Corrective actions to avoid Damage
- Vibration Control & Transfer Function
- Dynamic Stiffness & Damping Coefficients Load, Speed and Temperature



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## Course Content

### 5. Bearing Failures

- Failure Analysis and Its Causes
- Sample of Bearing Failure Modes
- Interpret Actual Bearing Failures
- Trouble Conditions and their Solutions

### 6. Bearing Life Calculations

- Factors Affecting the Performance of Bearings
- Bearing Quality, Operating Environment
- Installation Practices
- Fits and Tolerances
- Bearing Life Cycle

### 7. Lubrication Technology

- Functions of Lubrication
- Lubricant additives and effects
- Avoiding surface damage in Bearings
- Langmuir Theory for Lubrication

### 8. Grease Lubrication

- Grease Function and Properties
- Grease delivery and metering Systems
- Selection of Grease Type
- Compute Grease Intervals and Relubricate
- Other Classification of Greases

### 9. Oil Lubrication

- Cleanliness and Contamination
- Film Lubrication
- Factors Affecting Lubrication
- Properties of Lubricating Oil
- Additives
- Oil Delivery Methods
- Discussion of Different Applications





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## Course Content

### 10. Applying Lubricants to Enhance Reliability

- Lubrication Quantities and Intervals
- Lubrication and Re-Lubrication Procedures
- Enhancing Machine Reliability
- Perform Operation & Maintenance according to Standards
- Failure Analysis & Investigation

## Targeted Audience

This course is intended for Process Engineers, Mechanical Engineers, and technicians involved in troubleshooting, Selection, Operation, and Maintenance of Rotating Equipment Machinery. Supervisors and Technical Staff involved in the Technical Workshop are recommended to attend.

## Course Methodology

Facilitated by an experienced professional trainer, this training course will be conducted as a highly interactive workshop session. A variety of training methodologies and facilitation techniques will be employed before and during the course, as applicable. These methods are aimed at enhancing individual and group interaction while maximising learning. Some of these methods are:

- Online Pre-post Test
- Colourful Visual Aids
- Gamification
- Self-Assessment Instruments
- Simulations
- Case Studies
- Videos
- Group Exercises & Discussions
- Role plays
- Indoor & Outdoor games

