# BEARING MAINTENANCE AND LUBRICATION

MAESTRO CONSULTANTS

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**TRAINING TITLE**

BEARING MAINTENANCE AND LUBRICATION

**VENUE**

Dubai, UAE

**DURATION**

5 Days

**DATES**

02 - 06 October 2022

**PRICE**

US$4,000 per attendee including training material/handouts, morning/afternoon coffee breaks and Lunch buffet.

**TRAINING INTRODUCTION**

This five-day course covers principles and applications of various types of bearings, including plain journal, ball, and roller bearings. It explains installation, inspection and repair of bearings, deals with specialized bearings. Covers bearing failure modes, lubrication, Failure analysis and services practices.

**TRAINING OBJECTIVES**

- Name the two main categories of bearings and cite their advantages.
- Identify bearings by the kind of support they provide.
- Describe the three kinds of stresses acting on shafts.
- Explain the function of lubricating
- Name and explain the characteristics that are most important in materials for bearings
- Explain bearing repair procedures.
- Identify the functions of the various parts of a typical rolling-element bearing.
- Describe the common methods of mounting bearings
- State typical applications for oil lubrication of bearings.

- Detail the cleaning procedures for different oil lubrication systems
- Give five easy rules for lubricating bearings.
- Identify a principal cause of early bearing failure.
- Describe installation procedures for antifriction and plain journal bearings.
- Name the different types of bearing failure and their causes.
- Tell how bearings should be cleaned and lubricated after inspection

## TRAINING AUDIENCE

- Technicians and Supervisors
- New Engineers
- Supervisors and Technicians in Refurbishment Facilities
- Bearing Procurement Specification Writers and Supervisors

## TRAINING OUTLINE

**Day 1**

**BEARING TECHNOLOGY**

Introduction to bearing technology

Bearing description

Terminology

Bearing application

**Type of bearings**

Frictional Bearings

Types of Plain Bearings

Journal bearing

Tilting pad bearing

Axial thrust bearing

Combination Radial/Thrust Bearings

**Vibration due to bearing**

**Bearing materials**

**Plain Bearing Lubrication**

**Troubleshooting—Plain Bearing Failure**

- Wiping
- Wiping on a White-metal
- Scoring
- Erosion
- Fatigue
- Fretting
- Misalignment
- Corrosion and Deposits
- Lubricant Oxidation

**Anti frication Bearings**

- Classification and Characteristics of Rolling Bearings
- Terminology of Bearing Parts
- Characteristics
- Bearing Life
- Sound
- Part numbering
- Bearing accessories
- Bearing selection

**Day 2**

**BEST PRACTICE FITTING AND REMOVAL**

- Shaft and Housing Design
- Housings

Misalignment

Replacement Considerations

Mounting Accessories

Shaft and Housing Fits

- Bearing Fit Criteria
- Checking Fit Integrity
- Bearing Internal Clearances
- Typical Fit Examples

**Fixing of Bearings**

- Tolerances
- Mounting Preparation
- Cold, temperature and hydraulic mounting
- Types of shaft mounting
- Mechanical Mounting
- Temperature Mounting
- Mounting with Sleeves Hydraulically

- How to fit and remove common bearing types
- Using workshop and specialist fitting tools
- Effects of Loose Fit: Rotating Shaft and Inner Ring
- Bearing Arrangements
- Dismounting Procedures
- Removal Techniques

**Day 3**

**BEARING DIAGNOSTICS**

**Bearing Failure Analysis**

- Overview
- Bearing Life
- Misalignment
- Failure Mode Classification
- False Brinelling Caused by Static
- Vibration
- Conducting the Analysis
- Securing evidence

**Bearing damage and corrective measures**

- Flaking
- Seizure
- Cracking and notching
- Cage damage
- Meandering wear patterns
- Smearing and scuffing
- Rust and corrosion
- Fretting
- Wear
- Electrolytic corrosion
- Dents and scratches
- Creep
- Surface matting
- Peeling

Fatigue

Misalignment

Lubrication Failure

**Troubleshooting—Anti-friction Bearing Failure**

Wear Marks

Fatigue

Misalignment..

Damage Caused by Incorrect Fitting

Brinnelling and False Brinnelling

Lubrication Failure

**Day 4**

**APPLICATION OF BEARINGS**

Critical considerations when selecting and applying bearings into machinery

**Bearing housing/bearing isolators**

Cantilevers or overhung impeller pumps

In-between bearing or fully supported shaft pumps

Vertical pumps

**Bearing housing protection devices**

Felt and lip seals

Labyrinths

Magnetic seals

**Power turbine bearings**

**Shaft and Housing Repair**

**Maintaining Bearings**

- Dismount anti-friction bearings using a bearing press and/or a bearing puller
- Inspect the bearing for signs of failure
- Clean the shaft and check for taper and out-of-round using the proper measuring instruments
- Clean the housing and check for damage
- Select the proper bearing for replacement, if necessary
- Properly orient a bearing prior to installation
- Mount a bearing using an induction heater and/or an arbor press
- Measure the bearing's inner and outer clearances during installation
- Properly lubricate bearings per manufacturers' recommendations

**Day 5**

**TRIBOLOGY AND LUBRICATION Oil**

Oil Lubrication Method

Selection of lubricating oil

Oil quantity

**Lubricating oil analysis**

Oil analysis tests

Viscosity

Contamination

Fuel dilution

Solids content

Fuel soot

Nitration

Total acid number (tan)

Total base number (tbn)

Particle count

Spectrographic analysis

Wear particle analysis

Ferrography

Setting up an effective program

**Lubricant audit process**

Baseline signature

Equipment evaluation

Routes

Frequency of monitoring

Tests

Post-overhaul testing

Contractor overhaul templates

Data analysis

Root-cause analysis

**Grease**

Grease Lubrication

Types of grease

Grease filling and replacement

Overfilling and underfilling

**TRAINING CERTIFICATE**

**MAESTRO CONSULTANTS** Certificate of Completion for delegates who attend and complete the training course

## METHODOLOGY

Our courses are highly interactive, typically taking a case study approach that we have found to be an effective method of fostering discussions and transferring knowledge. Participants will learn by active participation during the program through the use of individual exercises, questionnaires, team exercises, training videos and discussions of “real life” issues in their organizations.
The material has been designed to enable delegates to apply all of the material with immediate effect back in the workplace.