

Training Title

BEARING MAINTENANCE AND LUBRICATION

Training Duration

5 days

Training Venue and Dates

REF RM028	Bearing Maintenance and Lubrication	5	16-20 Sep	\$4,250	Dubai, UAE
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In any of the 5 star hotels. The exact venue will be informed once finalized.

Training Fees

- 4,250 US\$ per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Buffet Lunch.

Training Certificate

Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.

TRAINING INTRODUCTION & DESCRIPTION

This five days 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

WHO SHOULD ATTEND?

- Technicians and Supervisors
- New Engineers
- Supervisors and Technicians in Refurbishment Facilities

➤ **Bearing Procurement Specification Writers and Supervisors**

TRAINING METHODOLOGY:

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions, and motivate everybody find the right answers. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course.

Very useful Course Materials will be given.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work & Practical Exercises
- 20% Videos & General Discussions

DAILY 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

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Anti friction 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

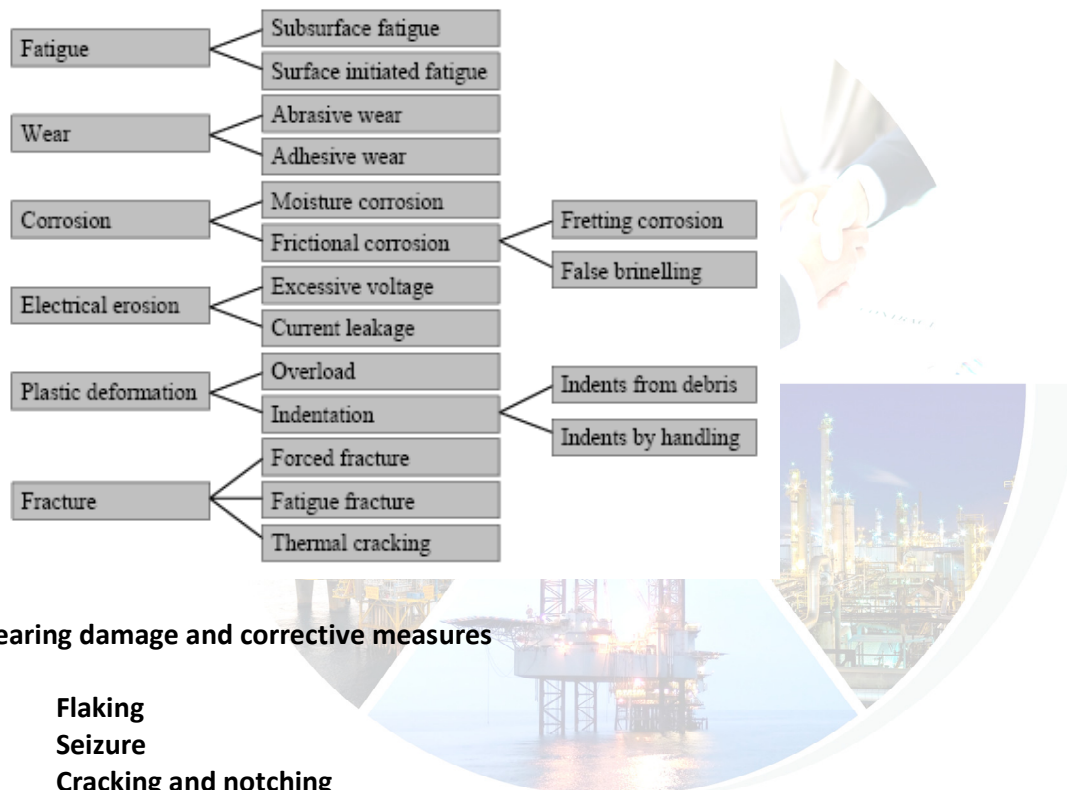
Removal Techniques

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

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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

Case Studies, Pre & Post Tests, Group Discussions, Last day review will be carried out.

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