Best Technology Soultions **(BTS)**

Training Program

Machinery Bearings, Lubrication , Reliability (Engineering Tribology)& Root Cause Failure Analysis

Training Program

Introduction:

In this 5-day course, participants will gain a strong technical and practical understanding of bearing design features and implications of many bearings types. This course will provide the participants with the knowledge needed to properly maintain service, inspect, select and repair a variety of industrial bearings.
Participants will also be taught about the basics in machinery lubrication, condition monitoring and maintenance.
Participants will understand the configurations and operating characteristics of bearings and become familiar with the lubrication system types, key lubricant characteristics and modes of lubrication failure.
In general this course provides an in-depth understanding of berings and lubrication fundamentals.

Who Should Attend?

Mechanical Engineers, Superintendents, Supervisors, Foremen & Technicians
Machinery Engineers, Superintendents, Supervisors, Foremen & Technicians
Plant Engineers, Superintendents, Supervisors, Foremen & Technicians
Maintenance Engineers, Superintendents, Supervisors, Foremen & Technicians

Methodology:

This interactive Training will be highly interactive, with opportunities to advance your opinions and ideas and will include:

- Lectures
- Workshop & Work Presentation
- Case Studies and Practical Exercise
- Videos and General Discussions

Certificate:

BTS attendance certificate will be issued to all attendees completing minimum of 80% of the total course duration.

Course objectives:

The course is intended for individuals directly involved in the machinery lubrication process whose job titles may include Lubrication Technician, PM Technician, Mechanic, Operator, etc.

Course outline:

Introduction

- History
- Basics of bearings and their applications
- Geometric dimensioning and tolerance

    - ✓ Straightness,

- ✓ Flatness,
- ✓ Circularity,
- ✓ and Cylindricity.

Power transmission

- Belts
- Chains
- Couplings
- Gearboxes

Torque

- What is torque?
- Torque transmission
- Pump drives
- Couplings

Lubrication theory

- Introduction
- Purpose of a Lubricant
- Functions of Lubricating Oil
- Tribology & Friction
- Coefficient of Friction
- Metal-to-Metal Contact
- Dynamic Clearances in Design of Components
- Lubricant Film Types
- Boundary Lubrication
- Mixed Film Lubrication

- Hydrodynamic Lubrication

Lubricant types

- Introduction
    - ✓ Lubricant Composition
    - ✓ Base Oils
    - ✓ Base Stock Quality
- Mineral Lubricants
- Synthetic Lubricants
- Vegetable Lubricants
- Greases
- Solid Lubricants

Lubricant selection

- Introduction
- Machine Elements That Require Lubrication
- Lubricating Machine Elements
- Journal Bearings
- Types of Bearings
- Type of Plain Bearings
- Properties of Plain Bearings
- Journal Bearing Types
- Journal Bearing Metallurgy
- Lubrication Regimes
- Bearing Fit and Clearances
- Rolling Element Bearings

- Types of Bearings
- Rolling Element Bearing Classifications
- Ball Bearing Nomenclature
- Bearing Loads
- Lubrication Selection
- Viscosity Requirements
- Minimum Viscosity Requirements
- General Guide for Lubricant Selection
- Bearing Life (L10)
- Bearing Lubricant Requirements
- Re-lubrication Grease Quantity

Seals

- Lubricant Quality
- Types of Seals
- Lip Seals
- Labyrinth/Bearing Isolator Seals
- Magnetic Seals
- Seal Comparison

Lubrication applications

- Introduction
    - ✓ Selecting a Lubricant Delivery System
    - ✓ Lubricant Delivery Options
- Manual Lubrication
- Natural Delivery Methods

- Oilers
- Pressure Delivery Methods
- Centralized Lubrication

Principles of mounting and dismounting bearings

- Cylindrical seating
- Tapered seating
- Adapter and withdrawal sleeves
- Cold and hot mounting and dismounting
- Mounting and dismounting using oil injection
- Principles of mounting plain bearings

Introduction to bearing failures and their causes

- Identify and interpret actual bearing failures
- Practical Mounting and Dismounting of Bearings

    - ✓ Preparation for mounting and dismounting
    - ✓ Checking the components
    - ✓ Mounting and dismounting tools

Maintenance

- Preventive maintenance
- Reliability-centered maintenance
- Combination of condition-based and preventive maintenance
- Maintenance activities