MU092:
Machinery Bearings, Lubrication & Reliability
(Engineering Tribology)
Training Description:

Bearing and Lubrication course is a comprehensive, highly practical and interactive course. This course is designed to provide participants with required working knowledge for better Selection, Installation, Operation and made on Troubleshooting & Maintenance of Bearing and Lubrication Problems they may experience in their Plant Equipment.

Bearing and Lubrication plays a vital role in the performance and life of rolling element bearings. The most important task of the lubricant is to separate parts moving relative to one another (balls or rollers and raceways) in order to minimize friction and prevent wear. A lubricant that is designed for specific operating conditions will provide a load bearing wear protective film. The ideal condition is when the friction surfaces are separated by this film. In addition to providing this load bearing film, the lubricant should also allow for the dissipation of frictional heat thus preventing overheating of the bearing and deterioration of the lubricant and provide protection from corrosion, moisture, and the ingress of contaminants.

This course covers real-world bearing lubrication in a dynamic, skills-based learning approach. Upon course completion, students will have learned the skills needed to choose, apply and maintain lubricants, and lubricating procedures in bearing applications plant wide. Case histories will be used to demonstrate concepts and stimulate discussion. Participant will be guided examples, then apply concepts to arrive at practical solutions to their own in-plant situations.

Training Objective:

By the end of the training, participants will be able to:

✓ Have a better understanding Bearings and Lubrication Technology
✓ Determine the types of Bearings and Methods of Lubrication for different equipment
✓ Know how to test and recognize 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 industry
✓ Understand the Bearing Maintenance Strategies
✓ Understand the functionality of vibration protections that are widely used in industries

Training Designed for:

This course is intended for Process Engineers, Mechanical Engineers, Technicians who are involved with Troubleshooting, Selection, Operation and Maintenance of Rotating Equipment Machinery. Supervisors and Technical Staff involved in Technical Workshop are recommended to attend.
Training Program:

**DAY ONE:**
- PRE-TEST
- Introduction
- **Module (01): Bearing Technology**
  - Identifications & Terms
    - Friction / Mass / Force
    - Torque / Work / Energy
  - History of Bearings
  - Bearing Loads (Radial /Thrust)
  - Bearing Technology
  - Bearing Types / Components
- **Module (02): 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

**DAY TWO:**
- **Module (03): Mounting and Dismounting**
  - Maintenance and Replacement of Rolling Bearings
  - Working Conditions in 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 "
- **Module (04): Bearing Life Calculations**
  - Factors effecting the Performance of Bearings
  - Bearing Quality, Operating Environment
  - Installation Practices
  - Fits and Tolerances
  - Bearing Life Cycle

**DAY THREE:**
- **Module (05): Bearing Failures**
  - Failure Analysis and their Causes
  - Sample of Bearings Failure Modes
  - Interpret Actual Bearing Failures
  - Trouble Conditions and their Solutions
❖ Module (06): 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

**DAY FOUR:**
❖ Module (07): Lubrication Technology
  • Functions of Lubrication
  • Lubricant additives and effects
  • Avoiding surface damage in Bearings
  • Langmuir Theory for Lubrication
❖ Module (08): Oil Lubrication
  • Boundary Fluid
  • Cleanliness and Contamination
  • Film Lubrication
  • Factors Affecting Lubrication
  • Properties of Lubricating Oil
  • Additives
  • Oil Delivery Methods
  • Discussion of Different Applications

**DAY FIVE:**
❖ Module (09): Grease Lubrication
  • Grease Function and Properties
  • Grease delivery and metering Systems
  • Selection of Grease Type
  • Compute Grease Intervals and Re-lubrication
  • Others Classification of Greases
❖ Module (10): Applying Lubricants to enhance Reliability
  • Lubrication Quantities and Intervals
  • Lubrication and Re-Lubrication Procedures
  • Enhancing Machine Reliability
  • Perform Operation & Maintenance as Standards
  • Failure Analysis & Investigation
❖ Course Conclusion
❖ POST-TEST and EVALUATION
Training Requirement:

“Hand’s on practical sessions, equipment and software will be applied during the course if required and as per the client’s request”.

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 30% Workshops & Work Presentations, Techniques
- 20% Based on Case Studies & Practical Exercises
- 20% Videos, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

As per the course location - This rate includes participant’s manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00 Morning Coffee / Tea
08:00 - 10:00 First Session
10:00 - 10:20 Recess (Coffee/Tea/ Snacks)
10:20 - 12:20 Second Session
12:20 - 13:30 Recess (Prayer Break & Lunch)
13:30 - 15:00 Last Session

For training registrations or in-house enquiries, please contact:
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Training & Career Development Department