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MU260D:
Bearing Root Cause Failure Analysis

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Training Description:

This comprehensive and practical training course is designed to provide participants with a comprehensive understanding of bearing failure mechanisms, diagnostic techniques and structured root cause analysis methodologies. Bearings are critical components in rotating equipment and their failure can lead to costly downtime, equipment damage and safety risks. Understanding how and why bearings fail is essential for improving reliability and extending equipment life.

This intensive training course covers bearing types, operating principles, lubrication systems, failure modes, condition monitoring techniques and systematic root cause investigation methods. Participants will gain both theoretical knowledge and practical skills through failure case studies, inspection workshops and analysis exercises based on real industrial scenarios.

By the end of the training course, participants will be able to identify different bearing failure patterns, conduct structured investigations, determine true root causes and implement corrective and preventive actions to enhance equipment reliability. The training course strengthens analytical capability, maintenance decision-making and reliability improvement strategies.

Training Objectives:

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

- ✓ Understand bearing types, design and operating principles
- ✓ Identify common bearing failure modes and damage patterns
- ✓ Interpret visual inspection findings and failure evidence
- ✓ Apply systematic root cause analysis methodologies
- ✓ Analyze lubrication failures and contamination issues
- ✓ Use vibration analysis and condition monitoring data for diagnosis
- ✓ Develop corrective and preventive action plans
- ✓ Improve installation, handling and storage practices
- ✓ Strengthen reliability centered maintenance strategies

Training Designed for:

This training course is designed for maintenance engineers, reliability engineers, rotating equipment specialists, mechanical engineers, condition monitoring technicians and plant supervisors responsible for rotating machinery performance. It is also suitable for quality engineers and technical professionals seeking deeper expertise in failure investigation and reliability improvement.

Training Requirement:

"Hands on practical sessions, equipment and software will be applied during the course if required and as per the client's request."

Contents can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Program:

DAY ONE:

FUNDAMENTALS OF BEARINGS AND FAILURE MECHANISMS

- ❖ Understanding Bearing Operation and Design
  - Overview of Bearing Root Cause Failure Analysis
  - Types of bearings: ball, roller, tapered and spherical
  - Bearing internal components and load distribution
  - Operating conditions: speed, load, temperature and environment
  - Common failure mechanisms: fatigue, wear, corrosion and overheating
  - **Practical exercise:** Identifying bearing components and damage patterns

DAY TWO:

LUBRICATION AND CONTAMINATION EFFECTS

- ❖ Preventing Premature Failures
  - Lubrication principles and lubricant selection
  - Grease and oil lubrication systems
  - Effects of contamination and improper lubrication
  - Seal performance and protection methods
  - Signs of lubrication related failure
  - **Workshop:** Evaluating lubrication practices and identifying failure causes

DAY THREE:

CONDITION MONITORING AND DIAGNOSTIC TECHNIQUES

- ❖ Detecting Problems Early
  - Introduction to condition monitoring methods
  - Vibration analysis fundamentals and bearing fault frequencies
  - Temperature monitoring and thermography
  - Oil analysis and particle contamination assessment
  - Interpreting diagnostic data for failure prediction
  - **Case study:** Diagnosing a bearing issue using vibration and inspection data

DAY FOUR:

ROOT CAUSE ANALYSIS METHODOLOGY

- ❖ Identifying the True Cause of Failure
  - Structured investigation process and evidence collection
  - Differentiating symptoms from root causes
  - Applying 5 Whys and cause and effect analysis
  - Failure documentation and reporting standards
  - Human factors and installation errors
  - **Workshop:** Performing a complete root cause failure analysis

DAY FIVE:

CORRECTIVE ACTION AND RELIABILITY IMPROVEMENT

- ❖ Enhancing Equipment Performance and Longevity
  - Developing corrective and preventive action plans

- Improving installation, alignment and handling practices
- Implementing reliability centered maintenance strategies
- Lifecycle management and performance tracking
- Continuous improvement in rotating equipment reliability
- **Final exercise:** Comprehensive bearing failure investigation and action plan presentation

❖ Course Conclusion
❖ POST-ASSESSMENT and EVALUATION

Training Methodology:

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

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Gamification, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

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

Training Fees:

TBA 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 - 13:00	Recess (Prayer Break & Lunch)
13:00 - 14:00	Last Session

For training registrations or in-house enquiries, please contact:
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