



# MU099: Rotating Equipment Condition Monitoring & Care Management

## Training Description:

Maximum Efficiency, Reliability, and Longevity of Compressors, Pumps, Fans, Bearings, Motors, and Variable-Speed Drives are of great concern to Many Industries. These objectives can only be achieved by understanding the Characteristics, Selection Criteria, Sizing Calculations, Sealing Arrangements, Common Problems and Repair Techniques, Preventive and Predictive Maintenance of this equipment. This course is a MUST for anyone who is involved in the Selection, Calculations, Sizing, Applications, or Maintenance of Compressors, Pumps, Bearings, Motors or Variable-Speed Drives.

This intensive course is designed to provide a comprehensive understanding of the various types of compressors, pumps, bearings, motors, and variable-speed drives. Participants will be able to specify, select, size, commission and maintain these equipment for their applications. Further, participants will learn how to achieve reduced capital, operating and maintenance costs along with increase in efficiency. Condition Monitoring (CM) has a unique benefit in that conditions that would shorten Normal Lifespan can be addressed before they develop into a Major Failure. Condition Monitoring Techniques are normally used on Rotating Equipment and other Machinery (Pumps, Compressors, Electric Motors, and Internal Combustion Engines), while periodic inspection using non-destructive testing techniques and Fit for Service (FFS) evaluation are used for stationary plant equipment such as Steam Boilers, Piping and Heat Exchangers.

## Training Objectives:

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

- ✓ Explain the Concepts and Principles of Equipment Care and Condition Monitoring and Monitor and Care for Process Equipment
- ✓ Identify common causes of rotating equipment failures to ensure successful troubleshooting
- ✓ Apply troubleshooting procedures that lead to the determination of root causes of failures
- ✓ Investigate troubleshooting tools and select the most appropriate ones for the situation in hand
- ✓ Implement best practice maintenance on the common causes of failures like shaft alignment, rotor balancing, performance testing, and others
- ✓ Design and plan a failure prevention program that reduces the number of failures of the most critical equipment to reduce maintenance cost and increase equipment reliability
- ✓ Have in-depth knowledge of Equipment Selection, Proper Operation Activities, Fault Diagnosis and Troubleshooting through Presentation of actual Case Studies

## Training Designed for:

This course is intended for Maintenance Engineers and Technician, Rotating Engineers and Technicians. Also, Operation Engineers and Operators.

## 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.”

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:

- ❖ PRE-TEST
- ❖ Introduction
- ❖ **Introduction and Common Basics**
  - Introduction to Rotating Equipment
  - Classification of Rotating Equipment
  - Performance Parameters
  - Different of Applications
  - Common Problems of Rotating Machines
  - Accessories of Rotating Machines
  - Auxiliary Systems
- ❖ **Lubrication & Bearings**
  - Types of Bearings and their Applications
  - Lubricants function, Properties and Types
  - Bearings Failure and Common Problems
  - Troubleshooting of Lubrication Systems
  - **Case Studies and Discussion**

### DAY TWO:

- ❖ **Rotating Equipment Failure**
  - Failure Definition
  - Failure Modes Identification
  - Categories of failure Causes
  - Physical
  - Human
  - Latent (Hidden)
  - Failure Effects
  - Failure Cascading
  - Chronic Vs. Sporadic Problems
  - **Exercises (Applications)**
- ❖ **Condition Monitoring for Pumps**
  - Centrifugal Pumps
  - Reciprocating Pumps
  - Rotary Pumps
  - Controlling Leaks
  - Cavitation Phenomena

### DAY THREE:

- ❖ **Condition Monitoring for Compressors**
  - Centrifugal Compressors
  - Reciprocating Compressors
  - Rotary Compressors
  - Excess Heat Problem

- Unwanted Moisture
- Compressor Surge Phenomena
- ❖ **Condition Monitoring for Motors**
  - Overheating
  - Frequency (Fixed/Variable)
  - Lubrication System
  - Overcurrent

#### DAY FOUR:

- ❖ **Rotating Equipment Support System**
  - Lubrication System
  - Alignment & Balancing
  - Vibration Monitoring & Analysis
  - Mechanical Seals
  - Cooling System
  - Warm Up System
- ❖ **Condition Monitoring for Attachments**
  - Hammering
  - Leakage
  - Corrosion
  - Vibration
  - Sealing Problems
  - Operation Problems

#### DAY FIVE:

- ❖ **Equipment Care Management**
  - Standard Operation Procedures (SOP)
  - Safe Standard Isolation Procedures (SSIP)
  - Plan Preventive Maintenance Work
  - Execute Preventive Maintenance Tasks
  - Manage Predictive /Proactive Maintenance
  - Work with Reliability Improvements
  - Supervise Maintenance Staff
  - Coordinate with CM/PM Tasks
  - Historical Data for Equipment using CMMS
  - Managing & Leading always Operators
- ❖ **Enhancing Plant Reliability System**
  - Reliability as Maintenance Strategy
  - Basic System Analysis
  - Stand by Equipment/System/ Unit
  - Life Cycle Cost (LCC) Analysis
  - How we can Contribute with Reliability Improvement?
- ❖ 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 01<sup>st</sup> 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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