

# **MACHINERY FAILURE ANALYSIS, PREDICTIVE MAINTENANCE & PROBLEM SOLVING**



CONTACT US ON:

T: +971 7 2042072 | Email: [training@maestrouae.net](mailto:training@maestrouae.net)

Website: [www.maestrouae.net](http://www.maestrouae.net)

**TRAINING TITLE**

MACHINERY FAILURE ANALYSIS, PREDICTIVE MAINTENANCE & PROBLEM SOLVING

**VENUE**

Dubai, UAE

**DURATION**

5 Days

**DATES**

29 August - 02 September 2021

**PRICE**

US\$4,000 per attendee including training material/handouts, morning/afternoon coffee breaks and Lunch buffet.

**TRAINING INTRODUCTION**

The course presents understanding of equipment failure characteristics. To achieve an optimal maintenance program that meets specified safety, environmental, and economic goals. Participants will learn to preserve equipment functions by identifying appropriate predictive maintenance (PdM) tasks, failure finding tasks and other actions that protect against failure or mitigate the consequences of failure

This course presents a systematic approach to fault diagnosis and failure prevention in a broad range of machinery used in many industries. The key routes to preventive maintenance are demonstrated through both overview and the study of examples in different failure analysis and a sequential approach to machinery troubleshooting and problem solving

Failure analysis, Troubleshooting and Predictive & Planned Maintenance techniques, including vibration analysis, oil analysis, and other techniques are discussed in the course with a view to optimising the maintenance engineering effort while maximising production

This course provides the fundamentals of PdM and condition monitoring applicable to plants, facilities and manufacturing lines. Predictive Maintenance & Condition Monitoring will provide Participants with a framework to make the right decisions on what equipment needs condition monitoring, what technologies to use to meet their needs and how to measure the effectiveness of their decisions

## **TRAINING OBJECTIVES**

Participants will learn how to collect, analyze and interpret failure statistics and will also gain an understanding of FMECA. Participants will be instructed in condition monitoring methods and will be taught how vibration analysis can be used to detect, locate, severity assess and diagnose a range of common faults in machines

### **Upon the successful completion of this course the participant shall be able to:**

- understand the principles of failure analysis in process plant
- An understanding of Machine Failure Analysis and Troubleshooting techniques
- learn about machinery troubleshooting in pumps, centrifugal compressors, gas turbines and electric motors
- Describe the Benefits of a PdM & Condition Monitoring Program
- Identify What Equipment to Monitor
- Predict What Maintenance Needs to be done and When
- An understanding of a range of Planned & Predictive Maintenance Technologies
- Knowledge of the potential contribution of each these technologies to maintenance efficiency
- Guidelines indicating how these technologies can interact with and support each other

## **TRAINING AUDIENCE**

This seminar is directed towards Supervisors, Team Leaders and Managers in Maintenance, Engineering and Production. The seminar will also benefit anyone who wishes to update themselves on Predictive Maintenance Technologies and Failure Analysis techniques, as well as those who have to judge the suitability of these technologies for their needs, and learn how to implement them for the benefit of their organizations

## **TRAINING OUTLINE**

### **Module 1**

Failure Analysis techniques

Equipment failure

Six patterns of component failure rate over life

Controlling introduced failure

Failure rate bathtub curve

Where to start: equipment criticality or risk

Failure analysis tools

Failure Mode & Effects Analysis

Reliability Centered Maintenance

Computer Maintenance Management Systems

Failure analysis - closing the loop

Root cause failure analysis (rcfa)

Building a system for equipment condition indicating

- Equipment data
- Failure data
- Maintenance data
- Data format

## **Module 2**

Failure and maintenance notations

Failure descriptors

Failure causes

Method of detection

Maintenance activity

Data requirements for various applications

Electrical motor

Gas turbines

Pumps

Compressors

## **Module 3**

The Basic Concept of Predictive Maintenance

The Top 6 Benefits of Predictive Maintenance  
Establishing a Predictive Maintenance Program  
Goals, objectives, and benefits  
Functional requirements  
Selling predictive maintenance programs  
Selecting a predictive maintenance  
System  
Database development  
Getting started  
The optimum predictive maintenance Program  
How to Choose the Right PdM Technologies  
Four Reasons Why PdM Doesn't Work  
Are You Collecting The Right Data?

World-Class Maintenance

## **Module 4**

Predictive Maintenance – PdM  
Scheduled predictive  
Predictive Technologies  
Condition Monitoring Technologies  
Vibration Analysis  
General Analysis Method  
IR Thermography  
Ultrasonic Leak Detection  
Oil and Wear Particle Analysis

Oil Analysis

Motor Circuit

Surface Flaw Detection

Liquid Penetration

Magnetic Particle

Sub-Surface Flaw Detection

Ultrasonic Thickness (Auto/Manual)

Eddy Current

Radiography

Endoscope (Borescope) inspection

## **Module 5**

Vibration analysis

Introduction

Data acquisition

Data interpretation

Vibration due to plane (journal) bearings

Vibration due to resonance

Turbomachinery problems

Vibration problems with specific machinery types

Gearbox vibration

Condition Monitoring

Condition Monitoring

The machine life cycle

Standards Organizations

List of BS/ ISO condition monitoring standard

BS ISO 17359

Computer application in machine condition monitoring

### **TRAINING CERTIFICATE**

**MAESTRO CONSULTANTS** Certificate of Completion for delegates who attend and complete the training course

### **METHODOLOGY**

Our courses are highly interactive, typically taking a case study approach that we have found to be an effective method of fostering discussions and transferring knowledge. Participants will learn by active participation during the program through the use of individual exercises, questionnaires, team exercises, training videos and discussions of “real life” issues in their organizations. The material has been designed to enable delegates to apply all of the material with immediate effect back in the workplace.