

**Training Title:**

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

**Training Duration:**

**5 Days**

**Training Venue and Dates**

RM015	Advanced Machinery Failure Analysis, Predictive Maintenance & Problem solving	5	04-08 Aug 2025	\$6,000	Kuala Lumpur, Malaysia
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In any of the 4 or 5-star hotels. The exact venue will be informed soon.

**Training Fees**

- \$6,000 per participant for Public Training including Course Materials/Handouts, Tea/Coffee, Refreshments & Lunch

**Training Certificate**

Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.

**TRAINING OVERVIEW**

**TRAINING DESCRIPTION**

The course presents an 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 (Pd.M.) 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 analyses 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 to optimize the maintenance engineering effort while maximizing production

DMCT/OL/9/18(Rev3Dt:23/9/18)

This course provides the fundamentals of Pd.M. 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 of these technologies to maintenance efficiency
- Guidelines indicating how these technologies can interact with and support each other

### WHO SHOULD ATTEND?

This seminar is directed toward 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 METHODOLOGY

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions, and motivate everybody to find the right answers. The delegates will also be encouraged to raise their questions and to share in the development of the right answers using their analysis and experiences.

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- 30% of Lectures
- 30% Workshops and work presentation
- 20% Group Work& Practical Exercises
- 20% Videos& General Discussions

## DAILY COURSE OUTLINE

### DAY 1

Failure Analysis techniques

Equipment failure

Six patterns of the component failure rate over the 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

- a) Equipment data
- b) Failure data
- c) Maintenance data
- d) Data format

### DAY 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

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**DAY 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 Pd.M. Technologies**  
**Four Reasons Why Pd.M. Doesn't Work**  
**Are You Collecting The Right Data?**  
**World-Class Maintenance**

**DAY 4**

**Predictive Maintenance – Pd.M.**  
**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**

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**DAY 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**

**Note:**

**Pre & Post Tests will be conducted.**

**Case Studies, Group Exercises, Group Discussions, Last Day Reviews & Assessments will be carried out.**

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