



# ME120

## An Introduction To Predictive Maintenance

## Course Introduction:

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Predictive maintenance attempts to detect the onset of a degradation mechanism with the goal of correcting that degradation prior to significant deterioration in the component or equipment. The diagnostic capabilities of predictive maintenance technologies have increased in recent years with advances made in sensor technologies. These advances, breakthroughs in component sensitivities, size reductions, and most importantly, cost, have opened up an entirely new area of diagnostics to the O&M practitioner.

The reason that plants implement predictive maintenance programs is also changing, as with the introduction of any new technology, proper application and training is of critical importance. This need is particularly true in the field of predictive maintenance technology that has become increasingly sophisticated and technology-driven.

This course provides thorough discussions on the various technologies and techniques that includes vibration monitoring and analysis, thermography, tribology, process parameters, visual inspections, operating dynamics analysis and failure-mode analysis. This course also covers how to establish organizational programs to manage predictive maintenance.

## Course Objectives:

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**Upon successful completion of this course, the delegates will be able to:**

- Gain and apply knowledge on introduction to predictive maintenance
- Explain the impact of maintenance
- Describe the theory, roles, benefits, application and safety considerations of predictive maintenance technologies
- Discuss the classification of vibration monitoring and analysis and thermography, tribology, process parameters and ultrasonic
- Implement visual inspection and methods
- Apply the maintenance strategy and formulating plan for your own environment

## Who Should Attend?

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This course is intended for plant, process, maintenance and reliability managers and engineers.

# Course Outline:

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## Day 1:

### **Impact of Maintenance**

- Maintenance management methods
- Optimizing predictive maintenance

### **Financial Implications and Cost Justification**

- Assessing the need for condition monitoring
- Cost justification
- Justifying predictive maintenance
- Economics of preventive maintenance

### **Role of Maintenance Organization**

- Maintenance mission
- Evaluation of the maintenance organization
- Designing a predictive maintenance program

### **Benefits of Predictive Maintenance**

- Primary uses of predictive maintenance

## Day 2:

### **Machine-Train Monitoring Parameters**

- Drivers
- Intermediate drives
- Driven components

### **Predictive Maintenance Techniques**

- Vibration monitoring
- Thermography
- Tribology
- Visual inspections
- Ultrasonic
- Other techniques

### **Vibration Monitoring and Analysis**

- Vibration analysis applications
- Vibration analysis overview
- Vibration sources

- Vibration theory
- Machine dynamics
- Vibration data types and formats
- Data acquisition
- Vibration analyses techniques

### **Thermography**

- Infrared basics
- Types of infrared instruments
- Training
- Basic infrared theory
- Infrared equipment
- Infrared thermography safety
- Infrared thermography procedures
- Types of infrared problems.

### **Day 3:**

### **Tribology**

- Lubricating oil analysis
- Setting up an effective program

### **Process Parameters**

- Pumps
- Fans, blowers, and fluidizers
- Conveyors
- Compressors
- Mixers and agitators
- Dust collectors
- Process rolls
- Gearboxes/reducers
- Steam traps
- Inverters
- Control valves
- Seals and packing

### **Ultrasonic**

- Ultrasonic applications
- Types of ultrasonic systems
- Limitations

## **Visual Inspection**

- Visual inspection methods
- Thresholds

## **Day 4:**

### **Operating Dynamics Analysis**

- It's not predictive maintenance

### **Failure-Mode Analysis**

- Common general failure modes
- Failure modes by machine-train component

### **Establishing a Predictive Maintenance Program**

- Goals, objectives, and benefits
- Functional requirements
- Selling predictive maintenance programs
- Selecting a predictive maintenance system
- Database development
- Getting started

## **Day 5:**

### **A Total-Plant Predictive Maintenance Program**

- The optimum predictive maintenance program
- Predictive is not enough

### **Maintaining the Program**

- Trending techniques
- Analysis techniques
- Additional training
- Technical support
- Contract predictive maintenance programs

### **World-Class Maintenance**

- What is world-class maintenance?
- Five fundamentals of world-class performance
- Competitive advantage
- Focus on quality
- Focus on maintenance

- Overall equipment effectiveness
- Elements of effective maintenance
- Responsibilities
- Three types of maintenance
- Supervision
- Standard procedures
- Workforce development

## Course Certificate:

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**International Center for Training & Development (ICTD)** will award an internationally recognized certificate(s) for each delegate on completion of training.

## Course Methodology:

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**A variety of methodologies will be used during the course that includes:**

- (30%) Based on Case Studies
- (30%) Techniques
- (30%) Role Play
- (10%) Concepts
- Pre-test and Post-test
- Variety of Learning Methods
- Lectures
- Case Studies and Self Questionnaires
- Group Work
- Discussion
- Presentation

## Course Fees:

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**To be advised as per the course location.** This rate includes participant's manual, Hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

## Course Timings:

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### Daily Course Timings:

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|---------------|----------------------------|
| 08:00 - 08:20 | Morning Coffee / Tea       |
| 08:20 - 10:00 | First Session              |
| 10:00 - 10:20 | Coffee / Tea / Snacks      |
| 10:20 - 12:20 | Second Session             |
| 12:20 - 13:30 | Lunch Break & Prayer Break |
| 13:30 - 15:00 | Last Session               |

