MACHINERY FAILURE ANALYSIS, PREDICTIVE MAINTENANCE & PROBLEM SOLVING

COURSE TITLE

MACHINERY FAILURE ANALYSIS, PREDICTIVE MAINTENANCE & PROBLEM SOLVING

COURSE DATE/ VENUE

21 – 25 September 2020

London, UK

COURSE REFERENCE

MRE133

COURSE DURATION

05 Days

DISCIPLINE

Maintenance & Reliability Engineering

COURSE 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 trouble-shooting and problem solving

Failure analysis, Troubleshooting and Predictive & Planned Maintenance techniques, including vibration analysis, oil analysis, and others 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

COURSE OBJECTIVE

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

- ✓ Explain the principles of failure analysis in process plant
- ✓ Recognize Machine Failure Analysis and Troubleshooting techniques
- ✓ Discuss 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
- ✓ Explain the Guidelines indicating how these technologies can interact with and support each other

COURSE 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

COURSE CONTENT

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
Endscope (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

COURSE CERTIFICATE

TRAINIT ACADEMY will award an internationally recognized certificate(s) for each delegate on completion of training.

COURSE FEES

$6,150 per Delegate. This rate includes participant's manual, Hand-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

COURSE METHODOLOGY

The training course will be highly participatory and the course leader will present, guide and facilitate learning, using a range of methods including formal presentation, discussions, sector-specific case studies and exercises. Above all, the course leader will make extensive use of real-life case examples in which he has been personally involved. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Case studies & Practical Exercises
- 10% Role Play
- 10% Videos, Software or Simulators (as applicable) & General Discussions