



MUE135

Mechanical Failure Analysis

Course Introduction:

The course will provide a refreshment of knowledge for the how rotating equipment work and what are main problems facing it during operations of them. Also, it will provide a solid foundation for technologists moving into a machine monitoring and diagnostic role

It gives a detailed advanced treatment of the detection, location and diagnosis of faults in Rotating and Reciprocating Machinery. Industrial case study and examples are used throughout the course to emphasize key points and to underline the relevance and applicability of the topics being addressed.

Maintenance spare part stores have to function well, see illustration. Maintenance Planning and Scheduling is critical for every successful individual and company.

This comprehensive 5-day course has been designed to all Industrial fields to benefit both new professionals as well as experienced professionals. It covers advanced best maintenance practice that a qualified professional would require to carry out his duty starting with the first steps and building up in a stair case fashion to a fully functional maintenance organization.

Course Objectives:

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

- ✓ Employ a systematic approach to investigating mechanical failure
- ✓ Plan testing, measurement and analysis to help discover the causes of a failure
- ✓ Design and evaluate solutions based on your understanding of the causes of failure Design and evaluate measures to prevent the failure reoccurring
- ✓ Recognize a good explanation from a poor; understand how evidence supports explanations and when it doesn't, and be able to evaluate explanations qualitatively and quantitatively using a variety of simple techniques

Who Should Attend?

This course is intended to anyone who is responsible for fixing machinery or equipment when it goes wrong, who needs to manage teams of experts, all of whom are absolutely convinced they're right and all of whom violently disagree. Facility managers, technical managers, project managers, lead discipline experts. Anyone who wants better to understand how to solve problems from understanding the fundamental physics.

Course Outline:

Day 1:

Machine Failure

- Why Machine Failure?
- Types of Failure Causes
- Effect of Failure in the Plant
- Failure Cascading
- Failure Modes
- Chronic vs. Sporadic Failure

Machinery Troubleshooting

- Pumps
- Compressors
- Turbine
- Bearings
- Couplings
- Lubrication System for Machinery Equipment

Day 2:

Alignment and Balance

- Importance of Alignment
- Benefits of good machinery alignment
- Consequences of defective alignment
- Types of Misalignment
- Important Balancing Considerations
- Types of unbalance
- Causes of unbalance

Failure Analysis Tools

- Failure mode & Effects Analysis
- Technical Integrity Audits
- Risk based maintenance Regimes
- Use of FMEA / FMECA
- Benefits of FMEA
- Limitation and Deficiencies of FMEA
- FMEA Worksheet
- Case Study

Day 3:

Methodologies & Strategies

- Brainstorming
- Flow Charts
- Histograms
- Cause and Effect Diagrams
- Fishbone Diagrams
- Pareto Charts
- Fault Tree Analysis
- Recommendations

Issues Related to Failure Analysis

- Problems and Opportunities
- Keys for Enhancing Plant Profitability
- Five (5) Why's for Effective RCA
- Seven (7) points to perform successful RCA
- Keeping up to date

Day 4:

Planning & Scheduling Techniques

- Why we have a Maintenance Plan?
- Maintenance Process
- Levels of Planning
- Effective Planned Maintenance
- Scheduling Techniques
- Scheduling Procedures
- Weekly Scheduling
- Establishing Priority
- "Look—Ahead" Scheduling
- Maintenance Scheduling Check List

Maintenance Hierarchy

- Maintenance Goals
- Reactive Maintenance
- Preventive Maintenance
- Predictive Maintenance
- Total Productive Maintenance
- Reliability Centered Maintenance (RCM)
- Overall Equipment Effectiveness (OEE)
- Principles of Maintenance Management

Day 5:

Maintenance Performance Evaluation

- Working Environment
- Operation Support
- Maintenance Organization
- Information and Knowledge
- Planning and Scheduling
- Materials Control
- Cost Control
- Mobile Equipment, Facilities and Services

Machinery Reliability

- Reliability Techniques
- Dependability and Life Cycle Management
- Reliability and Maintainability
- Human and System Reliability

Course Certificate:

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

Course Methodology:

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:

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

Course Timings:

Daily Course Timings:

08:00 - 08:20	Morning Coffee/Tea
08:20 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:30	Recess (Coffee/Tea/Snacks)
13:30 - 15:00	Last Session

