

Course Overview:

This highly relevant Seminar is intended for maintenance and machinery engineers, supervisors, technologists and technicians involved in machinery operation, maintenance, condition monitoring and troubleshooting. Because the methods and examples are generic, personnel from all industries will benefit.

The course can be used as an introduction to the field of failure analysis and prevention for those wishing to specialize in this area, or as an update of the key aspects of the field for those who already work in this area.

Course Objective:

The course presents a systematic approach to fault diagnosis and failure prevention. It firstly adopts a general approach to machine deterioration, the mechanisms involved and the ways in which common deteriorative modes can be combated. It then turns to component-oriented studies of failure mechanisms in common items of plant. For each component type or machine system, the on-line and off-line symptoms of deterioration are presented, with significant emphasis being placed upon an inspection-based approach. Statistical methods of failure analysis are presented and examples are used to demonstrate best practice in the collection, analysis and interpretation of such data. Finally, the course dwells upon the use of condition monitoring methods in a failure analysis and prevention role, and in particular upon the use of machinery vibration monitoring and analysis.

Upon completion of this course, participants will gain an understanding of structured, results-oriented failure analysis methods for all types of machine components and entire machinery systems. Participants will learn how parts fail, why they fail in a given mode, the on-line and off-line symptoms of failure, and general failure prevention methods. 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 rotating and reciprocating machines.

Course Outline:

1. INTRODUCTION Meaning of a mechanical failureMonitoring of the failureImportance of mechanical failure analysisRelation between failure and material depreciationMachine depreciation rate curvesCentrifugal pump operationPump performance curvesPump failure and diagnosisCentrifugal pump trouble shootingRotary pump trouble shootingCauses of failure and its preventionPerformance deteriorationCavitations of pumps and its effect on performanceMonitoring performance during inspection
2. TRANSIENT CONDITIONS Causes of instability and transient conditionsPipeline rupture and its causesHammering phenomena and its effectTransient condition monitoringVibration and its effect on pipeline performanceAnalysis of auxiliary systems transient conditionsSupport services and its effect
3. OPERATION OF MACHINES AND ITS RELATION TO FAILURE Start sequence of machinesStopping sequence of machinesOperation of valvesSelection of equipment and its relation to failure and safetyFault detection and diagnosisDaily, monthly, semi annual maintenanceFailure and failure prevention
4. EQUIPMENT LIFE TIME AND COMPLETE OVERHAULS Equipment life and its relation to depreciationNew and used equipment failure analysisFailure reporting techniquesMaintenance philosophyMaintenance vs. repair issue and the time for

Training Language:

EN / AR

Training Methodology:

- Presentation & Slides
- Audio Visual Aids
- Interactive Discussion
- Participatory Exercise
- Action Learning
- Class Activities
- Case Studies
- Workshops
- Simulation

complete overhauls

Who Should Attend:

Mechanical, Operation, Production, and Maintenance Engineers Senior Technicians, who work in power utilities, should benefit from this course. Also Senior Engineers should update and refresh their knowledge by attending this course.