Course Title	Machine Failure , Vibration Analysis and Control

Credit Hours	Venue	Date
As Scheduled	As Scheduled	As Scheduled

Objectives

- **By At the end of this course participants will have:**
  - ✓ An understanding of Machine Failure Analysis techniques.
  - ✓ An understanding of a range of Predictive Maintenance Technologies.
  - ✓ Knowledge of the potential contribution of each these technologies to maintenance efficiency.
  - ✓ Guidelines indicating how these technologies can interact with and support each other.
  - ✓ Hints and Tips for practical application of these technologies so as to achieve the best results.
  - ✓ A practical approach to developing an action plan to utilise these technologies in their own areas of responsibility, fitting them into the overall maintenance strategy, and measuring benefits.
  - ✓ Provide valuable information on machine condition monitoring as a tool for quickly identifying and correcting the root causes of machinery problems.
  - ✓ Achieving precise operation, and improving machinery performance. Special emphasis is given to trouble shooting, data interpretation, health assessment, and maintenance decision-making.
  - ✓ Gain a clear understanding of the most critical aspects of your processes
  - ✓ Learn to develop fault trees and event trees and also to solve fault trees quantitatively
  - ✓ To provide clear understanding of the key aspects of Risk Based Inspection, its advantages and limitations, and how it is linked to Reliability Centered Maintenance and to fitness-for-service assessment.
  - ✓ Show you how to develop optimum Inspection intervals for individual equipment based on the assessment of the active degradation mechanisms.

The Delegates

- ✓ This training course is intended for maintenance engineering, planner, scheduler, supervisors and technician working in the field of Condition Monitoring, vibration, Preventive & predictive maintenance .
- ✓ Supervisors, Team Leaders and Managers in Maintenance, Engineering and Production.
- ✓ The course 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 organisations.

Contents

- **An introduction to Reliability**
- **Rotating Machines**
  - ✓ Centrifugal pump
  - ✓ Centrifugal & rotary compressors. Fans & blowers
  - ✓ Drivers – turbines and motors
- **Common problems on rotating machines**
  - ✓ Performance deterioration
  - ✓ Vibration as an indicator
  - ✓ Failure of function
- **Economics of maintenance engineering**
  - ✓ Maintenance & asset management
  - ✓ Cost of equipment failure
  - ✓ Economic evaluation & financial concepts
  - ✓ Life cycle costs
- **Equipment Reliability**
  - ✓ Reliability in design

- ✓ Specifications & application
- ✓ Operational reliability, including first line maintenance and TPM
- ✓ Maintenance reliability, including Maintenance Planning and Management
- ✓ Maintenance strategies and their implementation

- **Reliability Engineering**
  - ✓ Reliability basics
  - ✓ Reliability prediction
  - ✓ Reliability assessment
  - ✓ Life cycle assessment
  - ✓ FMEA & FMECA
- **Reliability Maintenance**
  - ✓ Strategies
  - ✓ CBM, RBM, RCM & PdM
  - ✓ CMMS
  - ✓ Maintenance roles & responsibilities
- **Statistical analysis in maintenance**
  - ✓ MTTR, MTBF, availability & reliability
  - ✓ Data collation , Data manipulation , Data interpretation
- **Machine Failure Analysis**
  - ✓ Understanding fault causes
  - ✓ Wear and tribology
  - ✓ Diagnosis of fatigue mechanisms – mechanical & thermal
  - ✓ Bearings
  - ✓ Bearing types & application
- **Pump & compressors seals**
  - ✓ Construction , Application ,Failures types – identification and analysis
- **Trouble shooting techniques**
  - ✓ Field trouble shooting
  - ✓ Engineering trouble shooting – problem solving
- **Condition Monitoring & Predictive Maintenance**
- **Predictive Maintenance Concepts**
- **On Line or off line?**
  - ✓ Protection systems
  - ✓ Monitoring systems
  - ✓ Analytical systems
- **Vibration Analysis**
  - ✓ Introduction to Vibration Analysis
  - ✓ Frequency Analysis and the Fast Fourier Transform
  - ✓ Vibration Transducers
  - ✓ Basic Failure Mechanisms with examples
  - ✓ Vibration Standards and Alarm Levels
  - ✓ Vibration Diagnostics
  - ✓ Amplitude Demodulation – aka Enveloping, SSE, HFD, Peak-Vue
  - ✓ Vibration on Rolling Element Bearings
  - ✓ Resonance – identification & cure
- **Managing Predictive Maintenance**
  - ✓ Performance and Efficiency Monitoring

- ✓ managing the Predictive Maintenance effort
- ✓ Cost Analysis
- ✓ Reporting Techniques

- **Risk Based Inspection (RBI) :**
  - ✓ Definitions
  - ✓ Evolution
  - ✓ Key Elements of RBI
- **Reasons for implementing RBI :**
  - ✓ Benefits and Limitations of using RBI
  - ✓ RBI as a part of plant integrity management
  - ✓ Economic benefits
- **Integrated Asset Management**
  - ✓ Linking Risk Assessment, RBI, and RCM
  - ✓ Managing Risk Using RBI
- **Reliability Centred Maintenance (RCM) :**
  - ✓ Definitions
  - ✓ Evolution
  - ✓ Key Elements of RCM
- **Reasons for implementing RCM :**
  - ✓ Benefits and Limitations of using RCM
  - ✓ RCM as a part of plant integrity management
  - ✓ Economic benefits
- **Evaluation of Inspection Results :**
  - ✓ Data Quality
  - ✓ Corrosion Rate calculations
  - ✓ Remaining Life Calculations
- **Progress Monitoring and Control**
  - ✓ Progress Monitoring and Control
  - ✓ Earned Value, Earned Hours and Key Performance Indicators
  - ✓ Finalization, Post-Audit and Improvement planning
  - ✓ Contractors and Contractor Management
  - ✓ Managing Safety
- **Integrating Predictive Maintenance into the Maintenance Plan**
- **Course summary.**

Notes:

- Great Discount for companies and governmental Organizations .
- All programs are held in five star hotels .
- All lecturers have sufficient knowledge and experience to implement the programs at an optimal level .
- Large package of services is offered to the participants .

Discount	Language	Fees
10% in case of Three P. (or more)	English & Arabic	As Scheduled
Timetable	**How to Register ?**	**Other Dates**
9 Am : 11 Am 11.30 Am : 1 Pm 1.30 Pm : 3 Pm	www.titlehr.com Info@titlehr.com Tell | 00971559687070	As Scheduled