



**COURSE OVERVIEW RE0210-4D**  
**Excellence in Maintenance & Reliability Management**  
*Advanced Techniques in Maintenance Management*

**Course Title**

Excellence in Maintenance & Reliability Management:  
*Advanced Techniques in Maintenance Management*

**Course Date/Venue**

Session 1: August 19-22, 2024/Al Aziziya Hall, The Proud Hotel Al Khobar, Al Khobar, KSA  
Session 2: November 11-14, 2024/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE



**Course Reference**

RE0210-4D

**Course Duration/Credits**

Four days/2.4 CEUs/24 PDHs



**Course Description**



***This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.***

Every year, industry in the United States alone is spending around one trillion dollars on plant and equipment maintenance. According to maintenance specialists, at least one third of this amount is wasted, and that's just the tip of the iceberg. Bad maintenance management is responsible for equipment failures, disrupted production schedules, delays in deliveries, and poor product quality. Why is industry wasting one out of every three dollars spent on maintenance? The answer is simple: Poor management and poor systems.



This course is designed to assist maintenance management personnel responsible for delivering maximum reliability and availability of equipment at the lowest possible cost. The course will present techniques designed to improve the effectiveness of maintenance management activities, to ensure that physical assets perform their required functions, operate reliably, and support corporate goals.



The course sessions will focus on the modern methods and techniques on the most critical aspects of maintenance management such as Organizing maintenance resource, Selecting the right maintenance work, Analyzing failures, Setting and conducting a maintenance plan, Planning spare parts, Estimating and controlling maintenance costs, Computerizing maintenance planning and measurement operations. The delegate will also be introduced to Reliability tools and the effect human reliability has on plant availability.





To maximize the benefits of the course, delegates should be prepared to actively participate in the Course and bring examples of standard work plans, a list of plant performance metrics, the work priority system in-place, and any other maintenance or reliability material they would like to review and discuss.

The course includes an e-book entitled "*Case Studies in Maintenance & Reliability: A Wealth of Best Practices*", published by Industrial Press, which will be given to the participants to help them appreciate the principles presented in the course.

### **Course Objectives**

Upon the successful completion of this course, each participant will be able to:-

- Achieve excellence in maintenance and reliability management and establish the environment for improvement
- Recognize the aspects of maintenance today through the various types of maintenance including maintenance strategy development and productive maintenance
- Apply maintenance business model, maintenance organization, and business elements and identify the different equipment failure patterns and the reasons why equipment fails
- Determine the process of developing maintenance objectives in accordance to the business plan, R&M policy and maintenance strategy, discuss the significance of equipment plans in maintenance planning and identify several equipment plans development, approaches and plan options
- Employ the methods of preventive maintenance and condition monitoring including vibration monitoring, equipment monitoring frequency and infrared thermography
- Implement the procedure of work selection in accordance with work screening procedure, work request requirements, prioritization systems and cost benefits
- Carryout various strategies of work planning and scheduling by identifying the planning effectiveness, planners and staffing, routine maintenance planning and use of various planning tools and specify the different proven turnaround practices in accordance with success factors and management practices
- Recognize the purpose of work execution and job completion and characterize its advantages and disadvantages, implement the methods of maintenance quality assurance and continuous improvement and employ the method of Root Cause Failure Analysis (RCFA)
- Apply the various stewardship and performance metrics including performance work management, KPIs, maintenance effectiveness metrics and work force utilization metrics
- Distinguish the factors of human reliability through classification of human error and human reliability analysis, familiarize the different reliability tools using life cycle cost analysis and life data analysis and discuss the key elements of reliability engineering and how to manage assets in projects
- Apply the concept of Computerized Maintenance Management Systems (CMMS) with focus on SAP system and identify the CMMS components, benefits, implementation plan and more

### **Exclusive Smart Training Kit - H-STK®**



Participants of this course will receive the exclusive “Howard Smart Training Kit” (H-STK®). The H-STK® consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.

### **Who Should Attend**

This course covers systematic techniques in maintenance and reliability management to assist maintenance management team in delivering maximum reliability and availability of equipment at the lowest possible cost. The course will present techniques designed to improve the effectiveness of maintenance management activities, to ensure that physical assets perform their required functions, operate reliably, and support corporate goals. It is essential for all maintenance and reliability management staff.

### **Training Methodology**

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Practical Workshops & Work Presentations
- 30% Hands-on Practical Exercises & Case Studies
- 20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

### **Course Fee**

**US\$ 4,500** per Delegate + **VAT**. This rate includes H-STK® (Howard Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

In addition to the Course Manual, participants will receive an e-book “*Case Studies in Maintenance & Reliability: A Wealth of Best Practices*”, published by Industrial Press.

### **Accommodation**


Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

**Course Certificate(s)**

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

**Certificate Accreditations**

Certificates are accredited by the following international accreditation organizations: -


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The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology’s courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **2.4 CEUs** (Continuing Education Units) or **24 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant’s involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant’s CEU and PDH Transcript of Records upon request.

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British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.



### Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



**Mr. Mohamed Refaat, MSc, BSc, is a Senior Mechanical & Maintenance Engineer** with almost **30 years** of extensive experience in **Rotating Equipment** and **Machinery** including **Pumps, Compressors, Turbines, Motors, Turbo-expanders, Gears, etc.** His wide experience also covers **Centrifugal Compressor & Steam Turbine, Gas Compressors, Air Compressors and Gas Turbines, Centrifugal Pump, Pump Technology, Gas Turbine Technology, Heat Exchanger, Turbines & Motors, Variable Speed Drives, Seals, Control Valves, Advanced Valve Technology, Dry Seal, Fired Heaters, Air Coolers, Crude Desalter, Process Vessels & Valves, Industrial Equipment & Rotating Machinery, Mechanical Engineering, Mechanical Equipment & Turbomachinery, Piping, Pipelines, Valves, Lubrication Technology, Vibration Analysis, Power System Hydraulics, Security Detection Systems & Operation, Process Plant Equipment, Troubleshooting Process Operations, Maintenance Management Best Practices, Rotating Equipment Reliability Optimization, Practical Machinery Vibration, Vibration Techniques, Effective Reliability Maintenance, Excellence in Maintenance & Reliability Management, Preventive & Predictive Maintenance, Maintenance Management, Practical Machinery Vibration Monitoring, Machinery Failure Analysis (RCFA), Reliability Optimization & Continuous Improvement, Maintenance Planning, Scheduling & Work Control, Maintenance Management Strategy, Corrective Maintenance, Mechanical & Rotating Equipment Troubleshooting, Preventive Maintenance, Predictive Maintenance, Reliability Centered Maintenance (RCM), Condition Based Monitoring (CBM), FMEA and Troubleshooting of machinery and rotating equipment including turbines, bearings, compressors, pumps etc.** He is currently the **Mechanical Maintenance Section Head** of the **Arab Petroleum Pipelines Company** where he is in charge of planning, scheduling & managing the execution of preventive & corrective mechanical maintenance activities for all equipment. He is responsible for executing the scheduled inspections & major overhauls for gas turbines, valves & pumps, carrying out off-line vibration monitoring plans, troubleshooting, fault diagnosing & investigating failures of machinery.

During his career life, Mr. Mohamed was able to modify the gas turbines self cleansing system to improve its maintainability and extend the air filters' lifetime. He was responsible for defining & updating the equipment codes and parameters for replacing the old **CMMS** with **MAXIMO**. He also worked as the Operations Supervisor wherein he was closely involved with the operation of the crude oil internal **pipeline** system between the tankers and tank farm, operation & control of the booster pumps for pumping crude oil for main pipelines and the development & implementation of the plans & procedures for draining the main terminal internal lines for maintenance purposes. He also held the position of Measurement Engineer where he was responsible for the crude oil custody transfer, performing loss control analysis and operating the crude oil automatic sampler & related equipment. Prior to that, he was the Design Engineer responsible for the design phase of the Truck Mixer Manufacturing Project of the Mechanical Design Department.

Mr. Refaat has **Master** and **Bachelor** degrees in **Mechanical Engineering** and a General Certificate of Education (**GCE**) from the **University of London, UK**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management (ILM)** and a member of the Engineering Syndicate of Egypt. He has further delivered numerous training, courses, workshops, seminars and conferences worldwide.



### **Course Program**

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

#### **Day 1**

0730 – 0830	<i>Registration &amp; Coffee</i>
0800 – 0815	<i>Welcome &amp; Introduction</i>
0815 – 0830	<b>PRE-TEST</b>
0830 – 0930	<b>Course Overview</b> <i>Course Objectives • Delegate Expectations • Overview • Discussions</i>
0930 – 0945	<i>Break</i>
0945 – 1100	<b>Maintenance Excellence</b> <i>Framework for Maintenance Excellence • Overall Philosophy • Maintenance Principles • Work Environment • Equipment • Information Systems • Elements for Effective Maintenance • Establishing the Environment for Improvement</i>
1100 – 1230	<b>Maintenance Today</b> <i>Types of Maintenance • Maintenance Strategy Development • Productive Maintenance • Discussion</i>
1230 – 1245	<i>Break</i>
1245 – 1330	<b>Equipment Failure Patterns</b> <i>Types of Equipment Failures • Why Equipment Fails • Failure Analysis &amp; Root Cause • Discussions</i>
1330 – 1420	<b>Maintenance Management</b> <i>Managing Maintenance • Basic Principles • Maintenance Business Model • Business Elements • Maintenance Organization • Discussion</i>
1420 – 1430	<b>Recap</b>
1430	<i>Lunch &amp; End of Day One</i>

#### **Day 2**

0730 – 0830	<b>Maintenance Objective Setting</b> <i>Business Plan • R&amp;M Policy • Maintenance Plans • Discussions • Objectives</i>
0830 – 0930	<b>Equipment Plans</b> <i>Equipment Plans Development • Plan Options • Approaches • Discussion</i>
0930 – 0945	<i>Break</i>
0945 – 1230	<b>Preventive Maintenance &amp; Condition Monitoring</b> <i>Types of Condition Based Monitoring • Vibration Monitoring • Pump Monitoring Frequency • Infrared Thermography • Physical Effects Monitoring • Lube Oil Analysis • Discussion</i>
1230 – 1245	<i>Break</i>
1245 – 1330	<b>Advanced Maintenance Management: Work Selection</b> <i>Mission • Work Screening Procedure • Work Request Requirements • Prioritization Systems • Cost Benefit Analysis • Discussion</i>
1330 – 1420	<b>Advanced Maintenance Management: Work Planning &amp; Scheduling</b> <i>Planning Objectives • Planning Effectiveness • Planning Metrics • Planners &amp; Staffing • Routine Maintenance Planning • Work Plan • Planning Tools • Scheduling &amp; Considerations • Types of Schedules • Work Execution Packages • Maintenance Backlog • Discussion</i>
1420 – 1430	<b>Recap</b>
1430	<i>Lunch &amp; End of Day Two</i>



**Day 3**

0730 – 0930	<b>Advanced Maintenance Management: Proven Turnaround Practices</b> Success Factors • T/A Concern Areas • Management Practices • Milestone Plan • Work Scope • Projects • Material Procurement • Process Operations • Pre-T/A Reviews • Discussions
0930 – 0945	Break
0945 – 1230	<b>Advanced Maintenance Management: Work Execution</b> Objective and Actions • Job Completion • Supervisor • Contracting Types • Advantages and Disadvantages • Discussions
1230 – 1245	Break
1245 – 1330	<b>Advanced Maintenance Management: Stewardship &amp; Performance Metrics &amp; KPIs</b> Performance Indicator Characteristics • Business Results Indicators • Process Unit Run-Length Goals • Work Management KPIs • Maintenance Effectiveness Metrics • Equipment Specific Indicators • Work Force Utilization Metrics • Discussion
1330 – 1420	<b>Quality Assurance &amp; Continuous Improvement</b> Objectives and Implementation • Data to be Screened • Bad Actors & RCFA • Quality Audits • Discussion
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day Three

**Day 4**

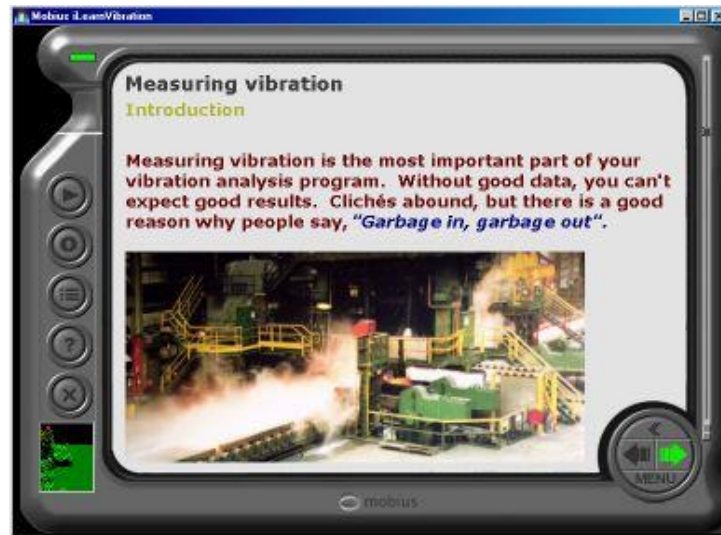
0730 – 0830	<b>Human Reliability</b> Classification of Human Error • Human Reliability Analysis • Discussion
0830 – 0930	<b>Reliability Tools</b> Life Cycle Cost Analysis • Discussion • Life Data Analysis (“Weibull Analysis”) • Discussion
0930 – 0945	Break
0930 – 1100	<b>Reliability Engineer &amp; Asset Management of Projects</b> Key Elements of Reliability • Establish Reliability During Design • Why Build Reliability into a Project • Work Process for Implementing • Overall Reliability Goals • Elements of an R&M Program • Exercise • Discussion
1100 – 1230	<b>Computerized Maintenance Management Systems (CMMS)</b> Components • Benefits • Implementation Plan and Issues
1230 – 1245	Break
1245 – 1330	<b>Computerized Maintenance Management Systems (CMMS) (cont’d)</b> SAP Maintenance • Discussion: What System Installed? Are all the Features Used? How long did it take to Implement? Do you have a SAP System? Do you Know How to Use it? What are the difficulties you Face with SAP?
1330 – 1345	Summary & Open Forum
1345 – 1400	<b>Course Conclusion</b>
1400 – 1415	<b>POST-TEST</b>
1415 – 1430	Presentation of Course Certificates
1430	Lunch & End of Course





**Simulator (Hands-on Practical Sessions)**

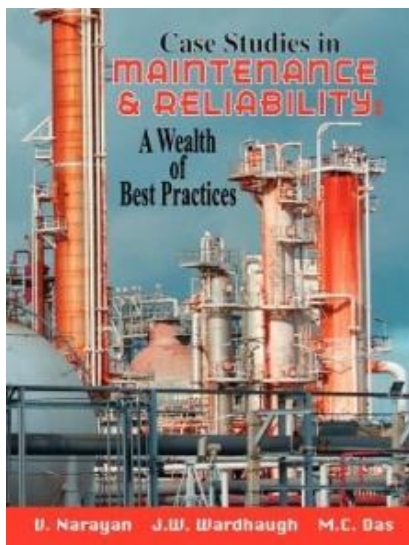
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the state-of-the-art simulator “iLearnVibration”.



**iLearnVibration**

**Book(s)**

As part of the course kit, the following e-book will be given to all participants:



**Title** : Case Studies in Maintenance & Reliability: A Wealth of Best Practices  
**ISBN** : 9780831102210  
**Author** : V. Narayan, J.W. Wardhaugh, M.C. Das  
**Publisher** : Industrial Press

**Course Coordinator**

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