COURSE OVERVIEW ME0414
Understanding & Preventing Process Equipment Failures
Testing, Analysis & Inspection

Course Title
Understanding & Preventing Process Equipment Failures: *Testing, Analysis & Inspection*

Course Date/Venue
Session 1: June 23-27, 2025/Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: October 19-23, 2025/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE

Course Reference
ME0414

Course Duration/Credits
Five days/3.0 CEUs/30 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.

This course is designed to provide participants with a detailed and up-to-date overview of Understanding & Preventing Process Equipment Failures through Testing, Analysis & Inspection. It covers the different types of equipment failure and the concept and application of FMEA in identifying potential failure points; the role of risk and reliability in the context of equipment failure; the direct and indirect costs associated with equipment failure; the equipment testing techniques, root cause analysis and material science and metallurgy in equipment failure; the thermographic inspection and analysis and failure analysis using statistical methods; and the most common equipment testing techniques.

Further, the course will also discuss the maintenance strategies, reactive, preventive and predictive maintenance; the preventive maintenance principles and best practices, predictive maintenance and condition monitoring; the robust maintenance plan and the role of equipment operators in failure prevention; the preventive maintenance plan for a hypothetical piece of equipment; and how IoT technology can aid in equipment monitoring and failure prevention.

During this interactive course, participants will learn the role of AI and machine learning in predicting equipment failures and planning maintenance; the digital twin technology for failure prediction and prevention; the wearables and mobile devices for equipment monitoring and integrating new technologies into existing systems; creating a culture of preventive maintenance and training and skill development for failure prevention; and the key performance indicators for equipment maintenance by setting the right metrics to measure the effectiveness of maintenance strategies.

Course Objectives

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

- Prevent process equipment failures in a professional manner through proper testing, analysis and inspection
- Identify the different types of equipment failure including the concept and application of FMEA in identifying potential failure points
- Recognize the role of risk and reliability in the context of equipment failure including direct and indirect costs associated with equipment failure
- Carryout equipment testing techniques and root cause analysis as well as discuss material science and metallurgy in equipment failure
- Apply thermographic inspection and analysis and failure analysis using statistical methods and the most common equipment testing techniques
- Employ maintenance strategies covering reactive, preventive and predictive maintenance
- Apply preventive maintenance principles and best practices as well as predictive maintenance and condition monitoring
- Implement a robust maintenance plan and identify the role of equipment operators in failure prevention
- Create a preventive maintenance plan for a hypothetical piece of equipment
- Discuss how IoT technology can aid in equipment monitoring and failure prevention
- Analyze the role of ai and machine learning in predicting equipment failures and planning maintenance
- Apply digital twin technology for failure prediction and prevention, wearables and mobile devices for equipment monitoring and integrating new technologies into existing systems
- Create a culture of preventive maintenance and apply training and skill development for failure prevention
- Carryout key performance indicators for equipment maintenance by setting the right metrics to measure the effectiveness of maintenance strategies

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward 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 provides an overview of all significant aspects and considerations of understanding and preventing process equipment failures through testing, analysis and inspection for consultants, plant managers, engineers, inspectors, maintenance personnel, reliability professionals and safety personnel who are involved in the operation, maintenance, and inspection of process equipment.

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: -

- 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.

- 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 **3.0 CEUs** (Continuing Education Units) or **30 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.

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. Dimitry Rovas, CEng, MSc, PMI-PMP, SMRP-CMRP is a **Senior Mechanical & Maintenance Engineer** with extensive industrial experience in **Oil**, **Gas**, **Power** and **Utilities** industries. His expertise includes **Boiler** Inspection & Maintenance, **Boiler** Systems, **Boiler** instrumentation & Controls, **Boiler** Start-up & Shutdown, **Boiler** Operation & Steam System Management, **Boiler** Water Chemistry & Treatment, **Boiler** Efficiency & Waste Heat Recovery, **Boiler** Inspection & Testing, **Boiler** Maintenance, **Boiler** Troubleshooting & Safety, **Boiler** Emissions & Pollution Control, **Combustion** Analysis & Tuning Procedures, **Water Treatment** Technology, Heat Recovery Steam Generating (**HRSG**), **Impulse Tube** Installation & Inspection, **Parker Compression Fittings**, **Pipes & Fittings**, **PSV Inspection**, **Root Cause Failure Analysis**, **Tank** Design & Engineering, **Tank Shell**, **Tanks & Tank Farms**, **Vacuum Tanks**, **Gas Turbine** Operating & Maintenance, **Diesel Engine**, **Engine Cycles**, **Governors & Maintenance**, **Crankshafts** & Maintenance, **Lubrication** System Troubleshooting & Maintenance, **Engines/Drivers**, **Motor** Failure Analysis & Testing, **Motor** Predictive Maintenance, **Engine** Construction & Maintenance, **HP Fuel Pumps & Maintenance**, **Fired Equipment** Maintenance, Combustion **Techniques**, **Process Heaters**, Glass Reinforced Epoxy (**GRE**), Glass Reinforced Pipes (**GRP**), Glass Reinforced Vent (**GRV**), **Mechanical Pipe Fittings**, **Flange Joint Assembly**, Adhesive Bond Lamination, **Butt Jointing**, **Joint & Spool Production**, **Isometric Drawings**, **Flange Assembly** Method, **Fabrication & Jointing**, Jointing & Spool Fabrication, **CAESAR**, **Pipe Stress Analysis**, **Pipe Cuttings**, **Flange Bolt Tightening** Sequence, **Hydro Testing**, **Pump** Technology, Fundamentals of **Pumps**, **Pump** Selection & Installation, **Centrifugal Pumps & Troubleshooting**, **Reciprocating & Centrifugal Compressors**, **Screw Compressor**, **Compressor** Control & Protection, **Gas & Steam Turbines**, **Turbine** Operations, **Gas Turbine** Technology, **Valves**, **Process Control Valves**, **Bearings & Lubrication**, Advanced **Machinery Dynamics**, **Rubber Compounding**, **Elastomers**, **Thermoplastic**, **Industrial Rubber Products**, **Rubber** Manufacturing Systems, **Heat Transfer**, **Vulcanization Methods**, **Process Plant Shutdown & Turnaround**, **Professional Maintenance Planner**, Advanced **Maintenance Management**, **Maintenance Optimization & Best Practices**, **Maintenance Auditing & Benchmarking**, **Material Cataloguing**, **Reliability** Management, **Rotating Equipment**, **Energy Conservation**, **Energy Loss Management** in Electricity Distribution Systems, **Energy Saving**, **Thermal Power Plant** Management, **Thermal Power Plant** Operation & Maintenance, **Heat Transfer**, **Machine Design**, **Fluid Mechanics**, **Heating & Cooling Systems**, **Heat Insulation Systems**, **Heat Exchanger & Cooling Towers**, **Mechanical Erection**, **Heavy Rotating Equipment**, Material Unloading & Storage, Commissioning & Start-Up. He is currently the **Project Manager** wherein he is managing, directing and controlling all activities and functions associated with the domestic heating/cooling facilities projects.

During his life career, Mr. Rovas has gained his practical and field experience through his various significant positions and dedication as the **EPC Project Manager**, **Maintenance Manager**, **Mechanical Engineer**, **Field Engineer**, **Preventive Maintenance Engineer**, **Lead Rotating Equipment Commissioning Engineer**, **Construction Commissioning Engineer**, **Offshore Lead Maintenance Engineer**, **Researcher**, **Instructor/Trainer**, **Telecom Consultant** and **Consultant** from various companies such as the Mytilineos Aluminium Group, Podaras Engineering Studies, Metka and Diadikasia, S.A., **Hellenic Petroleum Oil Refinery** and COSMOTE.

Mr. Rovas has **Master's** degrees in **Energy Production & Management** and **Mechanical Engineering** from the **National Technical University of Athens** (**NTUA**), **Greece**. Further, he is a **Certified Instructor/Trainer**, a **Certified Maintenance and Reliability Professional** (**CMRP**) from the Society of Maintenance & Reliability Professionals (**SMRP**), **Certified Project Management Professional** (**PMI-PMP**), **Certified Six Sigma Black Belt**, **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**), **Certified Construction Projects Contractor**, **Certified Energy Auditor** and a **Chartered Engineer**. Moreover, he is an active member of **American Society for Quality**, Project Management Institute (**PMI**), **Body of Certified Energy Auditors** and **Technical Chamber of Greece**. He has further received various recognition and awards and delivered numerous trainings, seminars, courses, workshops and conferences internationally.

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$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation

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

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 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0900	***Understanding Equipment Failures:*** *Overview of Different Types of Equipment Failures & the Impact on Businesses*
0900 - 0930	***Introduction to the Failure Modes & Effects Analysis (FMEA):*** *An Introduction to the Concept & Application of FMEA in Identifying Potential Failure Points*
0930 – 0945	*Break*
0945 – 1030	***Risk & Reliability in Equipment Failure:*** *Understanding the Role of Risk & Reliability in the Context of Equipment Failure*
1030 – 1130	***Costs of Equipment Failure:*** *Understanding Direct & Indirect Costs Associated with Equipment Failure, Including Downtime, Repair Costs, & Impact on Productivity*
1230 - 1245	*Break*
1245 – 1345	***Case Study Discussion:*** *Discussion of a Real-Life Case of Equipment Failure, its Causes, Impacts & Remedies*
1345 - 1420	***Equipment Testing Techniques:*** *Overview of Various Testing Techniques Used to Identify Potential Failures, Including Non-Destructive Testing (NDT)*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Root Cause Analysis (RCA):*** *An In-Depth Look at How RCA is Applied in Equipment Failure Identification*
0830 – 0930	***Material Science & Metallurgy in Equipment Failure:*** *Understanding the Role of Material Properties & Characteristics in Equipment Failure*
0930 – 0945	*Break*
0945 – 1030	***Thermographic Inspection & Analysis:*** *Learning about Thermographic Inspection as a Method to Predict Equipment Failure*
1030 – 1230	***Failure Analysis using Statistical Methods:*** *Introduction to the Use of Statistical Tools in Analysing Equipment Failures*
1230 - 1245	*Break*
1245 – 1345	***Workshop on Testing Techniques:*** *Hands-on Training on Some of the Most Common Equipment Testing Techniques*
1345 - 1420	***Maintenance Strategy Overview:*** *Understanding Different Types of Maintenance Strategies such as Reactive, Preventive & Predictive Maintenance*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Preventive Maintenance Principles & Best Practices:*** *Detailed Discussion on the Principles, Benefits, & Practical Implementation of Preventive Maintenance*
0830 - 0930	***Predictive Maintenance & Condition Monitoring:*** *Understanding the methods & Tools Used in Predictive Maintenance & Condition Monitoring*
0930 – 0945	*Break*
0945 – 1030	***Implementing a Robust Maintenance Plan:*** *How to Develop & Implement an Effective & Efficient Maintenance Plan to Prevent Equipment Failures*
1030 – 1230	***The Role of Equipment Operators in Failure Prevention:*** *Training, Communication, & Feedback Systems for Operators to Prevent Equipment Failures*
1230 - 1245	*Break*
1245 – 1345	***Exercise on Creating a Maintenance Plan:*** *Participants will Create a Preventive Maintenance Plan for a Hypothetical Piece of Equipment*
1345 - 1420	***Internet of Things (IoT) & Equipment Failure Prevention:*** *Discussion on How IoT Technology Can Aid in Equipment Monitoring & Failure Prevention*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0830	***AI & Machine Learning in Predictive Maintenance:*** *Understanding the Role of AI & Machine Learning in Predicting Equipment Failures & Planning Maintenance*
0830 - 0930	***Digital Twin Technology for Failure Prediction & Prevention:*** *Introduction to the Concept of Digital Twins & How they Can be Used in Failure Prediction*
0930 – 0945	*Break*
0945 – 1130	***Wearables & Mobile Devices for Equipment Monitoring:*** *Discussing How Modern Devices Can Aid in Real-Time Equipment Monitoring*

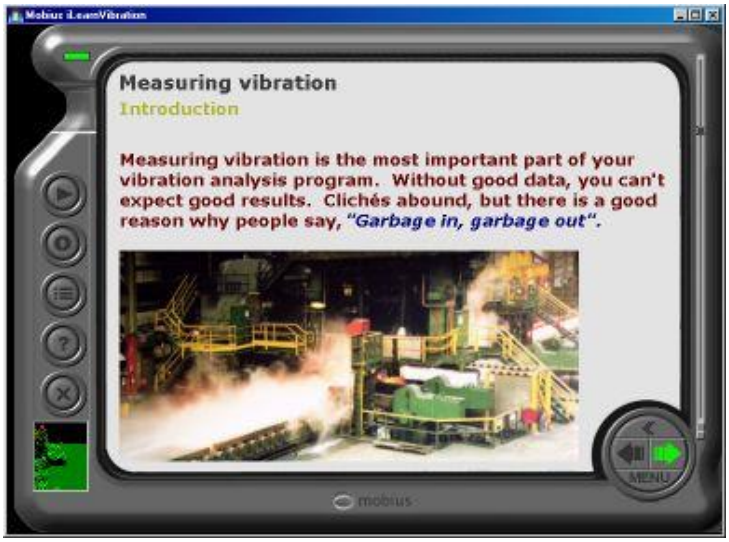
1130 – 1230	***Integrating New Technologies into Existing Systems:*** *Challenges & Best Practices When Integrating New Technologies into Existing Maintenance Systems*
1230 - 1245	*Break*
1245 – 1420	***Hands-on Activity on Using AI Tools for Predictive Maintenance:*** *Participants will Use a Sample AI Tool to Analyse Equipment Data & Predict Potential Failures*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0930	***Creating a Culture of Preventive Maintenance:*** *Discussion on Strategies to Promote a Culture of Proactive Maintenance Within an Organization*
0930 - 0945	*Break*
0945 – 1130	***Training & Skill Development for Failure Prevention:*** *Understanding the Role of Continuous Learning & Skill Development in Preventing Equipment Failures*
1130 – 1300	***Key Performance Indicators (KPIs) for Equipment Maintenance:*** *Setting the Right Metrics to Measure the Effectiveness of Maintenance Strategies*
1300 – 1315	*Break*
1315 – 1345	***Final Case Study Discussion:*** *Discussion of Another Real-Life Case of Equipment Failure & its Resolution, Incorporating Concepts Learned During the Course*
1345 - 1400	***Course Conclusion***
1400 – 1415	***POST TEST***
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

Course Coordinator

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