COURSE OVERVIEW ME0468

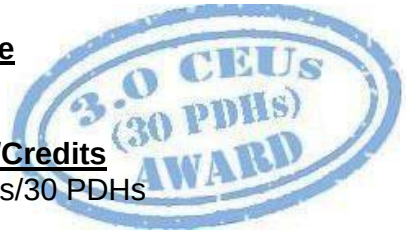
Inspect and Evaluate Performance of Rotating Equipment

Course Title

Inspect and Evaluate Performance of Rotating Equipment

Course Reference

ME0468



Course Duration/Credits

Five days/3.0CEUs/30 PDHs

Course Date/Venue

Session(s)	Date	Venue
1	June 09-13, 2024	Kizkulesi, Crown Plaza Istanbul Asia Hotels & Convention Center, Istanbul, Turkey
2	September 08-12, 2024	The Kooh Al Noor Meeting Room, The H Dubai Hotel, Sheikh Zayed Rd - Trade Centre, Dubai, UAE
3	February 23-27, 2025	Oryx Meeting Room, Doubletree By Hilton Doha-Al Sadd, Doha, Qatar

Course Description

This practical and highly-interactive course includes 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 Inspect and Evaluate Performance of Rotating Equipment - Fundamental. It covers the different types of rotating equipment in industries and the basic working principles and operational considerations; the role of condition monitoring in plant integrity maintenance; the impact of poor condition monitoring on equipment lifespan and plant safety; the function of key components of rotating equipment and the locations of these parts and their significance in performance monitoring; and the common tools used in the industry and the principle behind each tool and its application.

Further, the course will also discuss the difference between regular checks and detailed evaluations; the importance of routine checks for early detection; the monitoring instruments comprising of vibration analysis tools, thermographic cameras, ultrasonic detection instruments and oil analysis equipment; the key parameters to be captured during routine inspection and the critical indicators of equipment health; using instruments for specific equipment types; customizing monitoring based on equipment; and adjusting equipment size, operational load and other specifics.

During this interactive course, participants will learn to respond to abnormal conditions by identifying the abnormalities; apply immediate steps to be taken when abnormalities are observed; maintain inspection logs and use records for predictive maintenance and analysis; identify the global and industry-specific standards, interpret maintenance manuals and tailor monitoring processes based on manufacturer recommendations; apply advanced tools and methodologies and cost-benefit analysis for advanced monitoring; interpret the importance of periodic in-depth evaluations; and compare findings from routine checks and comprehensive evaluations.

Course Objectives

At the end of this course, the Trainee will be able to:-

- Apply and gain a fundamental knowledge on the inspection and evaluation of rotating equipment performance
- Explain the importance of condition monitoring for rotating equipment as part of plant integrity maintenance
- Describe the parts of rotating equipment to be monitored or evaluated and their locations
- Demonstrate correct use of the tools/instruments used to perform condition monitoring
- Explain the use of the various types of instruments/tools in performing condition monitoring on rotating equipment
- Describe the key parameters to be captured when performing routine inspection
- Respond appropriately in accordance to relevant procedures if abnormal conditions are observed
- Perform condition monitoring by routine inspection and monitor performance of rotating equipment as per required standards and maintenance manual
- Explain the different types of rotating equipment in industries and the basic working principles and operational considerations
- Emphasize the role of condition monitoring in plant integrity maintenance
- Discuss the impact of poor condition monitoring on equipment lifespan and plant safety
- Identify the function of key components of rotating equipment and the locations of these parts and their significance in performance monitoring
- Recognize the common tools used in the industry and the principle behind each tool and its application
- Differentiate between regular checks and detailed evaluations and discuss the importance of routine checks for early detection
- Identify monitoring instruments covering vibration analysis tools, thermographic cameras, ultrasonic detection instruments and oil analysis equipment
- Discuss the key parameters to be captured during routine inspection and the critical indicators of equipment health

- Use instruments for specific equipment types, customize monitoring based on equipment and adjust equipment size, operational load and other specifics
- Respond to abnormal conditions by identifying the abnormalities and applying immediate steps to be taken when abnormalities are observed
- Maintain inspection logs and use records for predictive maintenance and analysis
- Explain the global and industry-specific standards, interpret maintenance manuals and tailor monitoring processes based on manufacturer recommendations
- Apply advanced tools and methodologies and cost-benefit analysis for advanced monitoring
- Discuss the importance of periodic in-depth evaluations and compare findings from routine checks and comprehensive evaluations

Who Should Attend

This course provides an overview of all significant aspects and considerations of inspection and evaluation of rotating equipment performance for mechanical engineers, maintenance and reliability engineers, technicians, operators, plant managers, supervisors, maintenance planners, schedulers, asset management professionals, reliability professionals, energy and power generation professionals.

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.

Accommodation

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

Course Fee

Istanbul	**US$ 6,000** per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Dubai	**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.
Doha	**US$ 6,000** per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

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: -

- 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.

- 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 Maintenance & Reliability 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 **Modern Maintenance & Reliability** Management, **Maintenance Errors**, **Maintenance Audit & Site Inspection**, **Maintenance Management** Best Practices, **Rotating Equipment** Reliability Optimization, Practical **Machinery Vibration**, **Vibration** Techniques, Effective **Reliability Maintenance**, Excellence in **Maintenance & Reliability** Management, **Preventive & Predictive Maintenance**, Machinery Failure Analysis (**RCFA**), **Reliability** Optimization & Continuous Improvement, **Maintenance** Planning, Scheduling & Work Control, **Maintenance Management** Strategy, **Mechanical & Rotating Equipment** Troubleshooting, Preventive Maintenance, Predictive Maintenance, Reliability Centered Maintenance (**RCM**), Condition Based Monitoring (**CBM**), **Centrifugal Compressor & Steam Turbine**, **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**, **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 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 - 0930	***Introduction to Rotating Equipment*** *Different Types of Rotating Equipment in Industries • Basic Working Principles & Operational Considerations*
0930 – 0945	*Break*
0945 – 1100	***Importance of Condition Monitoring*** *Emphasis on Its Role in Plant Integrity Maintenance • Impact of Poor Condition Monitoring on Equipment Lifespan & Plant Safety*
1100 - 1230	***Overview of Parts to be Monitored*** *Identification & Function of Key Components of Rotating Equipment*
1230 - 1245	*Break*
1245 - 1420	***Overview of Parts to be Monitored (cont'd)*** *Locations of these Parts & their Significance in Performance Monitoring*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Basic Tools & Instruments for Condition Monitoring*** *Introduction to Common Tools Used in the Industry • Understanding the Principle Behind Each Tool & Its Application*
0930 – 0945	*Break*
0945 – 1100	***Routine Inspection vs. Advanced Monitoring Techniques*** *Differentiating Between Regular Checks & Detailed Evaluations • Importance of Routine Checks for Early Detection*
1100 – 1230	***Case Study: Real-world Analysis of Equipment Failure*** *Discussion on a Real-Life Incident Caused by Improper Condition Monitoring • Lessons Learned & How to Avoid Similar Incidents*
1230 – 1245	*Break*
1245 – 120	***Detailed Study of Monitoring Instruments*** *Vibration Analysis Tools • Thermographic Cameras • Ultrasonic Detection Instruments • Oil Analysis Equipment*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Key Parameters to be Captured During Routine Inspection*** *Critical Indicators of Equipment Health • Interpreting the Data: What's Normal & What's Alarming?*
0930 – 0945	*Break*
0945 – 1100	***Using Instruments for Specific Equipment Types*** *Customizing Monitoring Based on Equipment (e.g., Pumps vs. Compressors) • Adjustments for Equipment Size, Operational Load & Other Specifics*
1100 – 1230	***Hands-on Workshop: Practical Use of Monitoring Tools*** *Real-Time Demonstration on Operating Equipment • Participants Practice using Tools under Supervision*
1230 – 1245	*Break*
1245 – 120	***Responding to Abnormal Conditions*** *Identification of Abnormalities • Immediate Steps to be Taken when Abnormalities are Observed • Role of Emergency Procedures & Safety Protocols*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4

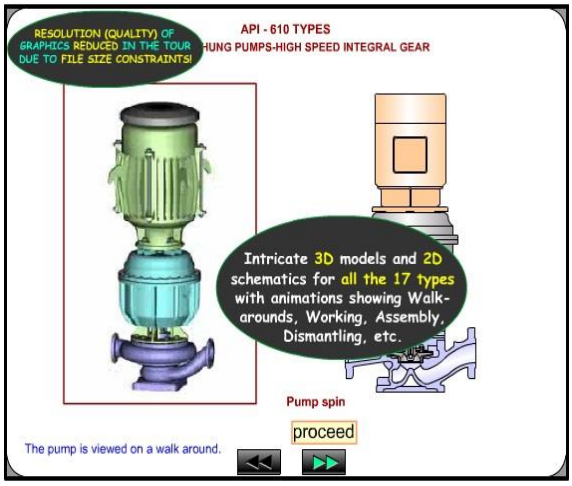
0730 – 0930	***Documentation & Record Keeping*** *Importance of Maintaining Inspection Logs • Using Records for Predictive Maintenance & Analysis*
0930 – 0945	*Break*
0945 – 1100	***Standards in Condition Monitoring*** *Introduction to Global & Industry-Specific Standards • Importance of Adhering to these Standards*
1100 – 1230	***Maintenance Manuals & their Role in Condition Monitoring*** *Understanding & Interpreting Maintenance Manuals • Tailoring Monitoring Processes Based on Manufacturer Recommendations*
1230 – 1245	*Break*
1245 – 120	***Advanced Techniques in Condition Monitoring*** *Introduction to Advanced Tools & Methodologies • Cost-Benefit Analysis for Advanced Monitoring*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

Day 5

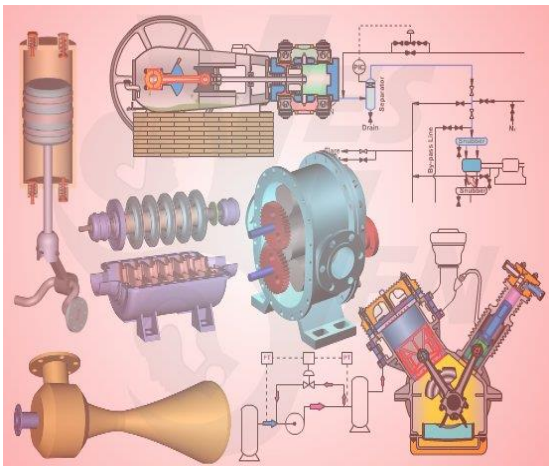
0730 – 0930	***Routine Inspection vs. Comprehensive Performance Evaluation*** *Importance of Periodic In-Depth Evaluations*
0930 - 0945	*Break*
0945 – 1100	***Routine Inspection vs. Comprehensive Performance Evaluation (cont'd)*** *Comparing Findings from Routine Checks & Comprehensive Evaluations*
1100 – 1230	***Case Study: Successful Condition Monitoring Implementation*** *Discussion on a Company that Averted Major Issues through Effective Monitoring • Importance of Training, Proper Tools & Proactive Measures*
1230 – 1245	*Break*
1245 - 1345	***Wrap-up & Q&A Session*** *Recapping Key Topics Covered in the Course • Open Floor for Participants to Clarify Doubts & Discuss Experiences*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1400 - 1415	***POST-TEST***
1415 - 1430	*Presentation of Course Certificate*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

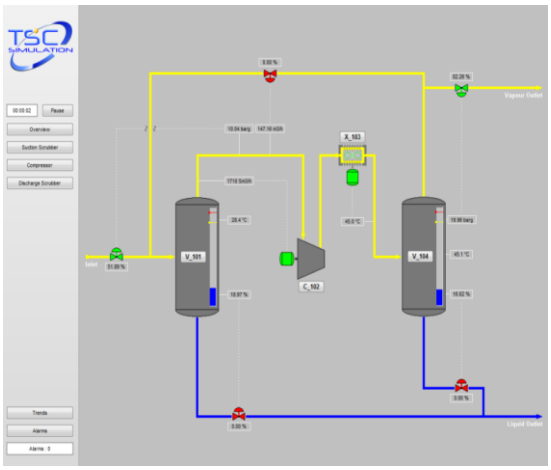
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art "Centrifugal Pumps and Troubleshooting Guide 3.0", "SIM 3300 Centrifugal Compressor Simulator", "CBT on Compressors" Simulators and "iLearnVibration".



Centrifugal Pumps and Troubleshooting Guide 3.0



SIM 3300 Centrifugal Compressor Simulator



CBT on Compressors

iLearnVibration Simulator

Course Coordinator

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