

COURSE OVERVIEW RE0097
Rotating Equipment Fundamentals

Course Title

Rotating Equipment Fundamentals

Course Date/Venue

February 18-22, 2024/Boardroom 1, Elite
 Byblos Hotel Al Barsha, Sheikh Zayed
 Road, Dubai, UAE

Course Reference

RE0097

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



Course Description

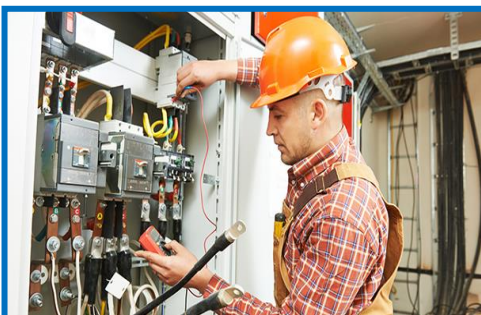


This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

This course is designed to provide participants with a detailed and up-to-date overview of Rotating Equipment Fundamentals. It covers the types and applications of rotating equipment and the fundamental concepts of mechanics like torque, RPM, power and energy; the types, functions and maintenance of bearings and lubrication; the design and alignment of shafts and couplings for efficient operation; the importance of seals and gaskets in maintaining system integrity; the centrifugal and positive displacement pumps; the working principle and components of centrifugal pumps; and the types and applications of positive displacement pumps.



Further, the course will also discuss the pump performance and curves; the types and operational principles of compressors in water treatment; the routine checks, troubleshooting and maintenance of pumps and compressors; the energy efficiency in pump and compressor operation; the techniques and tools of vibration analysis; the methods and importance of balancing a rotating equipment; and the lubrication techniques including grease and oil analysis.





During this interactive course, participants will learn the thermodynamics in rotating equipment covering its heat transfer and efficiency; the mechanical seals, its design, selection and maintenance; the alignment techniques like laser alignment and dial indicator methods; the integration of control systems in rotating equipment; the automation in equipment operation in PLCs and SCADA systems; the safety protocols, standards and OSHA guidelines and the best practices in identifying and mitigating risks; the emergency response planning for equipment failure, and the techniques to disassemble and assemble a pump, operate compressors in water plants as well as maintain and troubleshoot common issues in rotating equipment.

Course Objectives

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

- Apply and gain fundamental knowledge on rotating equipment
- Discuss the types and applications of rotating equipment as well as the fundamental concepts of mechanics like torque, RPM, power and energy
- Identify the types, functions and maintenance of bearings and lubrication
- Illustrate the design and alignment of shafts and couplings for efficient operation
- Discuss the importance of seals and gaskets in maintaining system integrity and identify centrifugal and positive displacement pumps
- Explain the working principle and components of centrifugal pumps and the types and applications of positive displacement pumps
- Analyze the pump performance and curves as well as the types and operational principles of compressors in water treatment
- Conduct routine checks, troubleshooting and maintenance of pumps and compressors as well as explain energy efficiency in pump and compressor operation
- Carryout the techniques and tools of vibration analysis as well as discuss the methods and importance of balancing a rotating equipment
- Apply lubrication techniques including grease and oil analysis
- Describe the thermodynamics in rotating equipment covering its heat transfer and efficiency
- Discuss mechanical seals covering its design, selection and maintenance as well as apply alignment techniques like laser alignment and dial indicator methods
- Determine the integration of control systems in rotating equipment as well as the automation in equipment operation in PLCs and SCADA systems
- Implement safety protocols, standards and OSHA guidelines and best practices in identifying and mitigating risks
- Implement emergency response planning for equipment failure as well as apply environmental considerations and compliance
- Carryout techniques to disassemble and assemble a pump, operate compressors in water plants as well as maintain and troubleshoot common issues in rotating equipment

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, sample video clips of the instructor’s actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.

Who Should Attend

This course provides an overview of all significant aspects and considerations of rotating equipment fundamentals for mechanical engineers, maintenance engineers, reliability engineers and design engineers, managers, supervisors, maintenance technicians as well as maintenance and operations personnel.

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.

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 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 **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.

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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. Karl Thanasis, PEng, MSc, MBA, BSc, is **Senior Mechanical & Maintenance Engineer** with over **30 years** of extensive industrial experience. His wide expertise includes **Piping & Pipeline**, Maintenance, Repair, **Shutdown, Turnaround & Outages**, **Maintenance & Reliability** Management, **Mechanical Maintenance** Planning, Scheduling & Work Control, Advanced Techniques in **Maintenance** Management, **Predictive & Preventive** Maintenance, **Maintenance & Operation Cost Reduction** Techniques, Reliability Centered Maintenance (RCM), **Machinery Failure** Analysis, **Rotating Equipment Reliability** Optimization & Continuous Improvement, **Material Cataloguing**, **Mechanical & Rotating Equipment** Troubleshooting & Maintenance, **Root Cause Analysis & Reliability** Improvement, **Condition** Monitoring, **Root Cause Failure Analysis (RCFA)**, **Steam Generation**, **Steam Turbines**, **Power Generator Plants**, **Gas Turbines**, **Combined Cycle Plants**, **Boilers**, **Process Fired Heaters**, Air Preheaters, Induced Draft Fans, All Heaters Piping Work, Refractory Casting, Heater Fabrication, Thermal & Fired Heater Design, **Heat Exchangers**, Heat Transfer, Coolers, **Power Plant** Performance, Efficiency & Optimization, **Storage Tank** Design & Fabrication, **Thermal Power Plant** Management, **Boiler & Steam** System Management, **Pump** Operation & Maintenance, **Chiller & Chiller Plant** Design & Installation, **Pressure Vessel**, **Safety Relief Valve** Sizing & Selection, **Valve** Disassembling & Repair, Pressure Relief Devices (PSV), **Hydraulic & Pneumatic** Maintenance, Advanced **Valve** Technology, **Pressure Vessel** Design & Fabrication, **Pumps**, Turbo-Generator, Turbine **Shaft Alignment**, **Lubrication**, Mechanical **Seals**, Packing, **Blowers**, **Bearing** Installation, **Couplings**, **Clutches** and **Gears**. Further, he is also versed in **Wastewater Treatment** Technology, **Networking** System, **Water Network Design**, Industrial **Water Treatment** in Refineries & Petrochemical Plants, **Piping** System, Water Movement, Water Filtering, Mud Pumping, **Sludge Treatment** and **Drying**, **Aerobic Process** of **Water Treatment** that includes **Aeration**, **Sedimentation** and **Chlorination Tanks**. His strong background also includes **Design** and **Sizing** of all **Waste Water Treatment Plant Associated Equipment** such as **Sludge Pumps**, **Filters**, **Metering Pumps**, **Aerators** and **Sludge Decanters**.

Mr. Thanasis has acquired his thorough and practical experience as the **Project Manager**, **Plant Manager**, **Area Manager - Equipment Construction**, **Construction Superintendent**, **Project Engineer** and **Design Engineer**. His duties covered **Plant Preliminary Design**, **Plant Operation**, **Write-up of Capital Proposal**, **Investment Approval**, **Bid Evaluation**, **Technical Contract Write-up**, **Construction** and **Sub-contractor Follow up**, **Lab Analysis**, **Sludge Drying** and **Management of Sludge Odor** and **Removal**. He has worked in various companies worldwide in the **USA**, **Germany**, **England** and **Greece**.

Mr. Thanasis is a **Registered Professional Engineer** in the **USA** and **Greece** and has a **Master** and **Bachelor** degrees in **Mechanical Engineering** with **Honours** from the **Purdue University** and **SIU** in **USA** respectively as well as an **MBA** from the **University of Phoenix** in **USA**. Further, he is a **Certified Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management (ILM)** a **Certified Instructor/Trainer** and has delivered numerous trainings, courses, seminars, workshops 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: Sunday, 18th of February 2024

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0900	Overview of Rotating Equipment: Types & Applications in the Water Industry
0900 – 0930	Fundamental Concepts of Mechanics: Torque, RPM, Power & Energy
0930 – 0945	Break
0945 – 1100	Bearings & Lubrication: Types, Functions & Maintenance
1100 – 1215	Shafts & Couplings: Design & Alignment for Efficient Operation
1215 – 1230	Break
1230 – 1300	Seals & Gaskets: Importance in Maintaining System Integrity
1300 – 1420	Introduction to Pumps: Centrifugal & Positive Displacement Pumps
1420 – 1430	Recap
1430	Lunch & End of Day One

Day 2: Monday, 19th of February 2024

0730 – 0830	Centrifugal Pumps: Working Principle & Components
0830 – 0930	Positive Displacement Pumps: Types & Applications
0930 – 0945	Break
0945 – 1030	Pump Performance & Curves: Understanding & Analysis
1030 – 1215	Compressors in Water Treatment: Types & Operational Principles
1215 – 1230	Break
1230 – 1320	Maintenance of Pumps & Compressors: Routine Checks & Troubleshooting
1320 – 1420	Energy Efficiency in Pump & Compressor Operation
1420 – 1430	Recap
1430	Lunch & End of Day Two

Day 3: Tuesday, 20th of February 2024

0730 – 0830	Vibration Analysis: Techniques & Tools
0830 – 0930	Balancing Rotating Equipment: Methods & Importance
0930 – 0945	Break
0945 – 1030	Advanced Lubrication Techniques: Grease & Oil Analysis
1030 – 1215	Thermodynamics in Rotating Equipment: Heat Transfer & Efficiency
1215 – 1230	Break
1230 – 1320	Mechanical Seals: Design, Selection & Maintenance
1320 – 1420	Alignment Techniques: Laser Alignment & Dial Indicator Methods
1420 – 1430	Recap
1430	Lunch & End of Day Three





Day 4: Wednesday, 21st of February 2024

0730 - 0830	<i>Control Systems in Rotating Equipment: Basics & Integration</i>
0830 - 0930	<i>Automation in Equipment Operation: PLCs & SCADA Systems</i>
0930 - 0945	<i>Break</i>
0945 - 1030	<i>Safety Protocols & Standards: OSHA Guidelines & Best Practices</i>
1030 - 1215	<i>Risk Assessment & Management: Identifying & Mitigating Risks</i>
1215 - 1230	<i>Break</i>
1230 - 1320	<i>Emergency Response Planning for Equipment Failure</i>
1320 - 1420	<i>Environmental Considerations & Compliance</i>
1420 - 1430	<i>Recap</i>
1430	<i>Lunch & End of Day Four</i>

Day 5: Thursday, 22nd of February 2024

0730 - 0800	<i>Workshop: Disassembling & Assembling a Pump</i>
0800 - 0930	<i>Case Study: Efficient Operation of Compressors in Water Plants</i>
0930 - 0945	<i>Break</i>
0945 - 1100	<i>Troubleshooting Common Issues</i>
1100 - 1200	<i>Best Practices in Maintenance & Operation</i>
1200 - 1215	<i>Break</i>
1215 - 1345	<i>Observing Rotating Equipment in Action</i>
1345 - 1400	<i>Course Conclusion</i>
1400 - 1415	<i>POST-TEST</i>
1415 - 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-



Course Coordinator

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