COURSE OVERVIEW ME0698
Pumps Servicing/Overhaul & Condition Monitoring

Course Title
Pumps Servicing/Overhaul & Condition Monitoring

Course Date/Venue
August 04-08, 2024/BoardRoom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
ME0698

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 Pumps Servicing/Overhaul and Condition Monitoring. It covers the importance and benefits of condition monitoring systems in water transmission systems; the types of condition monitoring techniques covering vibration analysis and temperature monitoring; the principles of vibration analysis and vibration measurement parameters; the temperature monitoring techniques; and the tools and techniques for temperature measurement.

Further, the course will also discuss the types of sensors used in condition monitoring and data acquisition systems; the principles of ultrasonic testing for pumps; the basics of infrared thermography; the oil analysis for pump health and acoustic emission monitoring; integrating condition monitoring with SCADA systems and developing predictive maintenance plan; the types and applications of centrifugal pump in water transmission; and the common failure modes of centrifugal pumps.

During this interactive course, participants will learn the pump disassembly procedures as well as inspection and assessment of pump components; the cleaning methods for pump parts, reconditioning techniques for worn components and reassembly and testing of pumps; the types of corrosion, materials and coatings and techniques for detecting corrosion; the maintenance practices to minimize corrosion and chemical treatment for corrosion control; the condition monitoring program and interpreting results for actionable insights; the importance of training personnel and ensuring compliance in condition monitoring; and the emerging technologies and innovations.

Course Objectives

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

- Apply and gain an in-depth knowledge on pumps servicing/overhaul and condition monitoring
- Discuss the importance and benefits of condition monitoring systems in water transmission systems
- Recognize the types of condition monitoring techniques covering vibration analysis and temperature monitoring
- Explain the principles of vibration analysis and vibration measurement parameters
- Apply temperature monitoring techniques and identify the tools and techniques for temperature measurement
- Recognize the types of sensors used in condition monitoring and data acquisition systems
- Discuss the principles of ultrasonic testing for pumps and identify the basics of infrared thermography
- Carryout oil analysis for pump health and acoustic emission monitoring
- Integrate condition monitoring with SCADA systems and develop a predictive maintenance plan
- Identify types and applications of centrifugal pumps in water transmission as well as the common failure modes of centrifugal pumps
- Employ pump disassembly procedures as well as inspect and assess pump components
- Apply cleaning methods for pump parts, reconditioning techniques for worn components and reassembly and testing of pumps
- Recognize the types of corrosion, materials and coatings and techniques for detecting corrosion
- Carryout maintenance practices to minimize corrosion and chemical treatment for corrosion control
- Develop a condition monitoring program and interpret results for actionable insights
- Identify the importance of training personnel, ensure compliance in condition monitoring and discuss the emerging technologies and innovations

Who Should Attend

This course provides an overview of all significant aspects and considerations of pumps servicing/overhaul and condition monitoring for contract supervisors, control room senior engineers, control room senior technicians, control room technicians, network engineers, network senior engineers, network technicians, heads of operation, production engineers, production senior engineers and W&WW operation heads.

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**.*

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 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.

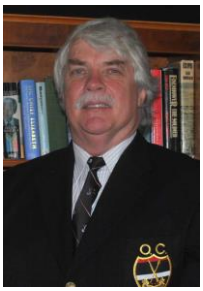
  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation 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. Den Bazley, PE, BSc, is a **Senior Mechanical Engineer** with over **30 years** of industrial experience in **Oil**, **Gas**, **Refinery**, **Petrochemical**, **Power** and **Utilities** industries. His wide expertise includes **Pumps & Compressors** Maintenance & Troubleshooting, **Centrifugal Pump** Design, **Hydraulic Turbines**, Axial Flow **Compressor**, **Centrifugal Pump** Installation & Operation, **Centrifugal Pump** Maintenance & Troubleshooting, **Centrifugal & Positive Displacement Pump** Technology, **Pumps & Valves** Operation, **Bearings**, **Seals & Couplings**, **Compressors & Turbines** Maintenance & Troubleshooting, **Gas Turbine** Design & Maintenance, **Gas Turbine** Troubleshooting, **Pressure Vessel** Design, Fabrication & Testing, **Tank & Tank Farms**, **Heat Exchangers** Operation & Maintenance, **Boilers & Steam System** Management, Re-tubing & Tube Expanding Technology, Propylene **Compressor & Turbine**, **Valve** Installation & Repair, **Safety Relief Valve** Sizing & Troubleshooting, **Dry Gas Seal** Operation, **Mechanical Seal** Installation & Maintenance, Industrial Equipment & **Turbomachinery**, **Pumps**, **Compressors**, **Turbines & Motors**, **Boiler & Steam** System Management, Tune-Up, Heat Recovery & Optimization, **Bearing & Lubrication**, Installation & Failure Analysis, **Boiler** Operation & Maintenance, Process **Control Valves**, **Steam Turbine** Operation, **Bearing** Mounting/Dismounting, **Valve** Types, Troubleshooting & Repair Procedure, **Pressure Vessels & Heat Exchangers**, **Corrosion** Inspection, **PSV** Maintenance & Testing, **Pump** Maintenance, Machinery Troubleshooting, **Valves**, **Safety Relief Valves**, Strainers & Steam Traps, **Pipeline Rules of Thumb**, Analytical Prevention of Mechanical Failure, **Gear Boxes** Troubleshooting & Repair, **Piping & Pipeline** Design & Inspection, **Pigging** & Integrity Assessment, Process Piping Design, **Pipeline** Operation & Maintenance, **Welding & Fabrication**, **Brazing**, Fitness-for-Service (**FFS**), **Process Plant** Equipment, **Pressure Vessels**, Piping & Storage Facilities, Layout of **Piping Systems & Process Equipment**, **Pipe Work** Design & Fabrication, Mechanical Integrity & Reliability, Mechanical **Rotating Equipment & Turbomachinery**, **Motors & Variable Speed Drives**, Mechanical Engineering Design, **Process Plant Shutdown**, Turnaround & Troubleshooting, **Mechanical Alignment**, **Laser & Dial-Indicator** Techniques, **Material Cataloguing**, **Condition Based** Monitoring, **Maintenance** Management, **Reliability** Management, Reliability Centred Maintenance (**RCM**), Total Plant Maintenance (**TPM**) and Reliability-Availability-Maintainability (**RAM**), **Engineering Drawings, Codes & Standards**, **P&ID Reading, Interpretation & Developing**, **Maintenance & Reliability** Best Practices, **Maintenance** Auditing, **Benchmarking & Performance** Improvement, Excellence in **Maintenance & Reliability** Management, **Preventive & Predictive** Maintenance & Machinery Failure Analysis (**RCFA**), Total Plant Reliability Centered Maintenance (**RCM**), Rotating Equipment Reliability Optimization, Machinery Failure Analysis, Prevention & Troubleshooting, **Maintenance** Planning, Scheduling & Work Control and **Maintenance Planning & Cost** Estimation.

During his career life, Mr. Bazley has gained his practical and field experience through his various significant positions and dedication as the **General Manager**, **Branch Manager**, **Refinery Chairman**, **Engineering Manager**, **Maintenance Engineer**, **Construction Engineer**, **Project Engineer**, **Mechanical Engineer**, **Associate Engineer**, **Oil Process Engineer**, **Mechanical Services Superintendent**, **Quality Coordinator**, **Planning Coordinator**, **Consultant/Instructor**, **Lecturer/Trainer** and **Public Relations Officer** for numerous international companies like **ESSO**, **FFS Refinery**, Dorbyl Heavy Engineering (**VECOR**), Vandenbergh Foods (**Unilever**), **Engen Petroleum**, Royle Trust and **Pepsi-Cola**.

Mr. Bazley is a **Registered Professional Engineer** and has a **Bachelor** degree in **Mechanical Engineering**. Further, he is a **Certified Engineer** (Government Certificate of Competency GCC Mechanical Pretoria), a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership and Management** (**ILM**), an active member of the **Institute of Mechanical Engineers** (**IMechE**) and has delivered numerous trainings, courses, seminars and workshops internationally.

Course Program

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

Day 1: ***Sunday, 04th of August 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Overview of Condition Monitoring Systems*** *Definition and Importance • Benefits in Water Transmission Systems*
0930 – 0945	*Break*
0945 – 1100	***Types of Condition Monitoring Techniques*** *Vibration Analysis • Temperature Monitoring*
1100 – 1230	***Principles of Vibration Analysis*** *Vibration Basics • Vibration Measurement Parameters*
1230 – 1245	*Break*
1245 – 1330	***Temperature Monitoring Techniques*** *Importance of Temperature Monitoring • Tools and Techniques for Temperature Measurement*
1330 - 1420	***Sensors & Data Acquisition*** *Types of Sensors Used in Condition Monitoring • Data Acquisition Systems*
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: ***Monday, 05th of August 2024***

0730 – 0830	***Case Studies & Real-world Applications*** *Examples of Condition Monitoring in Water Transmission Systems • Success Stories and Lessons Learned*
0830 – 0930	***Ultrasonic Testing for Pumps*** *Principles of Ultrasonic Testing • Application in Pump Condition Monitoring*
0930 – 0945	*Break*
0945 – 1100	***Infrared Thermography*** *Basics of Infrared Thermography • Uses in Detecting Thermal Anomalies*
1100 – 1230	***Oil Analysis for Pump Health*** *Importance of Oil Analysis • Techniques and Interpretation of Results*
1230 – 1245	*Break*
1245 – 1330	***Acoustic Emission Monitoring*** *Introduction to Acoustic Emission • Application in Pump Diagnostics*
1330 – 1420	***Integrating Condition Monitoring with SCADA Systems*** *SCADA Basics • Benefits of Integration*
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 3: Tuesday, 06th of August 2024

0730 – 0830	***Predictive Maintenance Strategies*** *Developing a Predictive Maintenance Plan • Tools and Software for Predictive Maintenance*
0830 – 0930	***Introduction to Centrifugal Pumps*** *Types and Applications in Water Transmission • Basic Working Principles*
0930 – 0945	*Break*
0945 – 1045	***Common Failure Modes of Centrifugal Pumps*** *Identification and Causes of Failures • Impact on Water Transmission*
1045 – 1145	***Pump Disassembly Procedures*** *Step-by-Step Guide to Disassembling Pumps • Safety Precautions*
1145 – 1230	***Inspection & Assessment of Pump Components*** *Identifying Wear and Tear • Techniques for Component Assessment*
1230 – 1245	*Break*
1245 – 1330	***Cleaning & Reconditioning Techniques*** *Cleaning Methods for Pump Parts • Reconditioning Techniques for Worn Components*
1330 - 1420	***Reassembly & Testing of Pumps*** *Reassembly Procedures • Testing and Validation of Overhauled Pumps*
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: Wednesday, 07th of August 2024

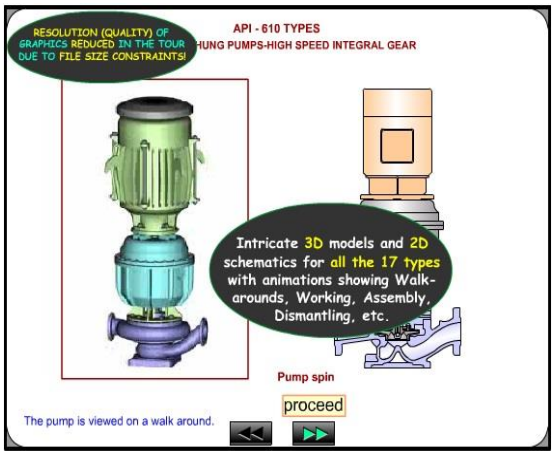
0730 – 0830	***Basics of Corrosion*** *Types of Corrosion • Factors Contributing to Corrosion in Pumps*
0830 – 0930	***Materials & Coatings*** *Materials Used in Pump Construction • Protective Coatings and their Applications*
0930 – 0945	*Break*
0945 – 1100	***Corrosion Detection & Monitoring*** *Techniques for Detecting Corrosion • Monitoring Tools and Technologies*
1100 – 1230	***Corrosion Prevention Strategies*** *Design Considerations to Prevent Corrosion • Maintenance Practices to Minimize Corrosion*
1230 – 1245	*Break*
1245 – 1330	***Chemical Treatment for Corrosion Control*** *Types of Chemicals Used • Application Methods and Safety Considerations*
1330 - 1420	***Case Studies on Corrosion Management*** *Real-World Examples of Corrosion Management • Lessons Learned from Field Applications*
1430 - 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: Thursday, 08th of August 2024

0730 – 0830	***Developing a Condition Monitoring Program*** *Steps to Establish a Monitoring Program • Key Considerations for Implementation*
0830 – 0930	***Data Analysis & Interpretation*** *Techniques for Analyzing Monitoring Data • Interpreting Results for Actionable Insights*
0930 – 0945	*Break*
0945 – 1100	***Training & Skill Development*** *Importance of Training Personnel • Resources and Programs for Skill Enhancement*
1100 – 1230	***Regulatory & Compliance Requirements*** *Overview of Relevant Standards and Regulations • Ensuring Compliance in Condition Monitoring*
1230 – 1245	*Break*
1245 - 1345	***Future Trends in Pump Condition Monitoring*** *Emerging Technologies and Innovations • Future Directions in Pump Maintenance and Monitoring*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about t Topics that were Covered During the Course*
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 our state-of-the-art simulators "Centrifugal Pumps and Troubleshooting Guide 3.0" simulator.



Centrifugal Punps and Troubleshooting Guide 3.0

Course Coordinator

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