COURSE OVERVIEW ME0146(OX1)
Mechanical Seals and Systems (John Crane)

Course Title
Mechanical Seals and Systems
(John Crane)

Course Date/Venue
Session 1: August 04-08, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: December 07-11, 2025/ Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
ME0146(OX1)

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 knowledge on the design, application, selection, installation, troubleshooting and maintenance of mechanical seals. It covers the common pump types in the oil & gas industry; centrifugal pump build-up; seal chamber dimensions and working pressures as well as gland packing; mechanical seals; and basic seal principles that includes primary seal, secondary seal and tertiary seal.

The course will also cover the proper assembly and fitting of pusher seals, non-pusher seals and metal bellows seal. It will further cover the hydraulic balance; environment of a mechanical seal; fitting balanced seal; cartridge seals; spiral groove technology; john crane seal coding; seal materials and selection; standards for mechanical seals; and seal failure analysis.

Course Objectives

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

- Apply and gain systematic techniques on the design, application, selection, installation, troubleshooting and maintenance of mechanical seals
- Identify pumps and rotating equipment including gland packing and mechanical seals
- Discuss basic seal principles and illustrate proper assembling and fitting of pusher, non-pusher seals and metal bellows seal
- Describe hydraulic balance and the environment of a mechanical seal
- Explain cartridge seals and spiral groove technology
- Define John Crane seal coding as well as enumerate seal materials and selection
- Review ISO 21049/API 682 standards for mechanical seals and evaluate why seals fail

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 covers systematic techniques and methodologies on the design, application, selection, installation, troubleshooting and maintenance of mechanical seals for mechanical engineers, hydraulics and hydraunics engineers, plant engineers, machinery engineers, maintenance and materials engineers, superintendents, supervisors and other technical staff will acquire an outstanding skills and knowledge on the practical aspects of the course. Design engineers, senior design draftsmen and draftsmen will definitely benefit from the operational aspects of this course. Further, the course is also beneficial for mechanical/rotating/workshop technicians and engineers, control monitoring/reliability/asset integrity inspection engineers and technicians and OE specialists.

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:-

- 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 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 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 course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1

0800 – 0830	*Registration & Coffee*
0830 – 0845	*Welcome & Introduction*
0845 – 0900	***PRE-TEST***
0900 – 0930	***Pumps & Rotating Equipment*** *Common Pump Types in the Oil & Gas Industry • Centrifugal Pump Build-Up • Seal Chamber Dimensions & Working Pressures*
0930 - 0945	*Break*
0945 – 1100	***Gland Packing*** *Brief Overview ● Video: Neville & the Problem Pump*
1100 – 1230	***Why Mechanical Seals?*** *Simple Seal Development*
1230 – 1235	*Break*
1235 - 1350	***Basic Seal Principles Part 1*** *Primary Seal: Faces Separated by Fluid Film including Materials Used for Mating Rings & Primary Rings • Handling Seals Correctly • Lapping – Why & Practical Demonstration of Lapping & Measurement*
1350 - 1400	***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*
1400	*Lunch & End of Day One*

Day 2

0800 – 0930	***Basic Seal Principles Part 2*** *Secondary Seal: Seal Area in Contact with Shaft including Materials Used & Surface Finishes • Pusher & Non-Pusher Seals • Tertiary Seal: Methods Used to Prevent Mating Ring Leakage including Various Stationary Face Shapes & their Uses ● Pump Assembly Checks – Tolerances to Give Extended Seal Life*
0930 – 0945	*Break*
0945 – 1100	***Hands-on Assembly & Fitting Seals (Pusher & Non-Pusher Seals)*** *Points to Note to Prevent Early Seal Failure*
1100 - 1230	***Hands-on Fitting Metal Bellows Seal***
1230 – 1245	*Break*
1245 – 1350	***Basic Seal Principles Part 3***
1350 – 1400	***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*
1400	*Lunch & End of Day Two*

Day 3

0800 – 0930	***Hydraulic Balance*** *What is it? • Why do we do it? • How do we do it?*
0930 – 0945	*Break*
0945 – 1100	***The Environment of a Mechanical Seal*** *Cooling the Seal Area • Secondary Containment • Multiple Seals: Dual Pressurised & Un-Pressurised • Sealant Systems • API Flush Plans*
1100 - 1230	***Hands-on Fitting Balanced Seal***
1230 – 1245	*Break*
1245 – 1350	***Cartridge Seals*** *Advantages & Fitting • Hands-on Assembly & Fitting Cartridge Seals*
1350 – 1400	***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*
1400	*Lunch & End of Day Three*

Day 4

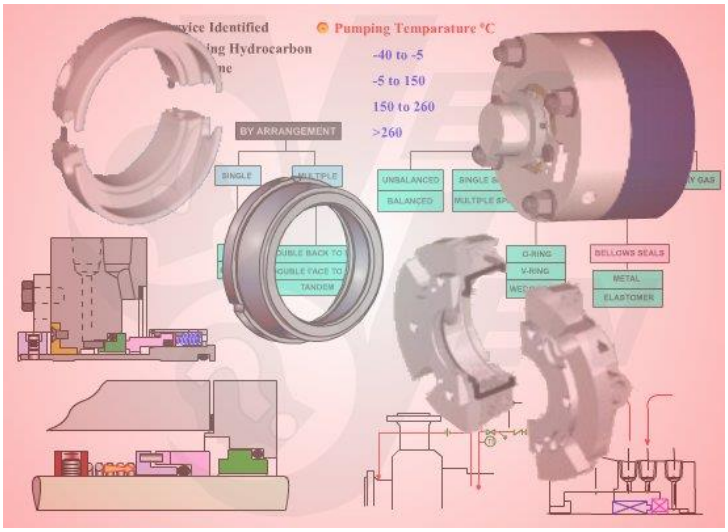
0800 – 0930	***Basic Seal Principles Part 4***
0930 – 0945	*Break*
0945 – 1100	***Spiral Groove Technology*** *Pumps • Compressors*
1100 - 1230	*Prayer Break/Lunch*
1230 – 1245	***John Crane Seal Coding*** *Brief Overview • Material Description Code*
1245 – 1330	*Break*
1330 - 1350	***John Crane Seal Coding (cont'd)*** *What does 35mm T59B/QR1SH/BP mean? • Component & Material Codes*
1350 – 1400	***Recap***
1400	*Lunch & End of Day Four*

Day 5

0800 – 0830	***Seal Materials & Selection*** *Seal Families • Use of Seal Selection Guide • Practical Exercise with Worked Examples*
0830 – 0930	***ISO 21049/API 682 Standard for Mechanical Seals*** *A Brief Overview • Meeting Emission Legislation*
0930 – 1015	***Why Seals Fail*** *Seal Failure Overview*
1015 – 1020	*Break*
1020 – 1115	***Why Seals Fail (cont'd)*** *Seal Failure analysis*
1115 - 1130	***Case Studies - Hands-on***
1130 – 1145	***Course Conclusion***
1145 – 1200	***POST-TEST***
1200	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

Practical session 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 simulator "Mechanical Seals CBT".



Mechanical Seals CBT Simulator

Course Coordinator

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