COURSE OVERVIEW ME0240
Advanced Valve Technology

Course Title
Advanced Valve Technology

Course Date/Venue
October 20-24, 2024/TBA Meeting Room, Divan Istanbul Sisli, Istanbul, Turkey

Course Reference
ME0240

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.

The Valve industry has become increasing digital during the last ten years. Even a casual examination of available smart or intelligent positioners reveals significant differences in design philosophies, on-board intelligence, and application options being employed by manufacturers. This course will focus on the new process plant applications for smart valve technology found since 1998. Further, this course offers complete coverage of the operation, application, and pros and cons of today's newest smart valves with digital positioners and actuators. Also includes updates on HART and FieldBus valve technology.

The course will cover the latest spectrum of available valves from gate, plug, butterfly, check, pressure-relief, globe valves to control valves equipped with microprocessors, which provide single-loop control of the process. Further, the course will cover valve materials: steel, iron, plastic, brass, bronze, and a number of special alloys.

Today the global valve industry involves hundreds of global manufacturers who produce thousands of designs of manual, check, pressure-relief and control valves. In addition to the traditional manufacturers in North America and Europe, the course will discuss the emerging Asian market, Japan, Korea, Taiwan, and China.

This course is offering everything the professional and the novice need to know about designing, selecting, installation, application, sizing, maintaining, and troubleshooting of nowadays valves. In addition to serving as an invaluable update for the experienced engineer, this course provides the beginner with a solid understanding of modern valve technology.

Course Objectives

This AVT (Advanced Valve Technology) course encourages attendees to advance from basic installation and maintenance to selection, upgrading and troubleshooting of valve failures. It includes modern technology of new materials that have been made available recently. Upon the successful completion of this AVT course, each participant will be able to:-

- Apply advanced techniques in design, selection, installation, sizing, inspection, maintenance and troubleshooting of valves
- Apply knowledge on control valve theory including cavitation, flashing, choked flow and sizing and identify the various types, features and functions of control valves
- Determine the characteristics of valves and recognize the concept of trims including low noise trim, diffusers & trim selection
- Classify manual valves and identify its components and functions
- Recognize the process considerations for valve technology including pressure classes, materials selection, leakage rates and international standards
- Implement the process of actuator selection by considering the various types and accessories used in valve technology and apply the principle of field communication as applied in valve technology
- Develop knowledge on Smart valves and positioners as well as the Smart partial valve stroke test devices used in valves
- Manage asset of field mounted devices and recognize its importance in advanced valve technology
- Develop in-depth knowledge on check valves, pressure relief valves and fire safe valves by identify their types, features and application in the industry
- List the common valve problems that are encountered including water hammer effects, high noise levels & fugitive emissions and determine how to prevent valve failures
- Apply proven methodology of assessing the valve failures in the oil & gas sector and explain how it affects the maintenance and troubleshooting processes of valves
- Acquire an overview of plant valve management and regulators that are used in valve technology and an overview of extended valve components, hardide & coatings and composite valves including their design, installation, application and sizing
- Apply the proper procedure for corrosion, galling and water testing and carryout proper methodology of valve sizing & selection using the various programs and applications

Who Should Attend

This course provides an overview of all significant aspects and considerations of valve for those who are involved in the design, selection, installation, applications, sizing, inspection, maintenance and troubleshooting of such equipment. This includes maintenance, application, inspection, electrical, mechanical, control, instrumentation, production, wellhead and drilling engineers, designers and other technical staff. Likewise, it is beneficial for users, distributors, purchasers or buyers of this equipment for them to understand the design and manufacturing principles that dictates faster delivery of safer quality product.

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 Advanced **Valve** Technology, **Process Vessels & Valves**, **Control Valves**, **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**, **Dry Seal**, **Fired Heaters**, **Air Coolers**, **Crude Desalter**, **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.

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

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.

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, 20th of October 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0915	***Control Valve Theory*** *Introduction ● Definition of a Control Valve ● Types of Energy ● What is Happening Inside a Control Valve ● Cavitation ● Flashing ● Choked Flow ● Control Valve Sizing ● Turndown vs. Range ability*
0915 – 0930	***Video Presentation*** *Cavitation*
0930 – 0945	*Break*
0945 – 1030	***Control Valve Types*** *Rotary Valves ● Linear Valves ● Valve Selection ● How to Choose the Right Valve ● Selection Guidelines ● Application Comparisons*
1030 – 1100	***Video Presentation*** *Control Valve Body Assembly*
1100 – 1215	***Characteristics & Trims*** *Valve Characteristics ● Application Examples ● Cavitation Control ● Anti-Cavitation Trim ● High Pressure Drop-Applications ● Low Noise Trim ● Diffusers ● Trim Selection*

1215 – 1230	*Break*
1230 – 1330	***Manual Valves*** *Classification of Manual Valves ● Rotating Manual Valves ● Stopper Valves ● Sliding Valves ● Flexible Valves*
1330 – 1420	***Process Considerations*** *End Connections ● Pressure Classes ● Face to Face Criteria ● Materials Selection ● Modes of Failure ● Leakage Rates ● International Standards*
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, 21st of October 2024

0730 – 0900	***Actuator Selection*** *Types of Actuators ● Linear Actuators ● Rotary Actuators ● Actuator Forces ● Positioners ● Fail Safe Systems ● Auxiliary Hand wheels ● Valve Accessories*
0900 – 0930	***Video Presentation*** *Actuator Assembly*
0930 – 0945	Break
0945 – 1030	***Field Communications*** *Analogue Signals ● Digital Communications ● Fieldbus Technologies*
1030 – 1100	***Video Presentation*** *HART Protocol*
1100 – 1215	***Smart Valves & Positioners*** *Introduction ● Development ● Digital Valve Controllers ● Future Development*
1215 – 1230	*Break*
1230 – 1330	***Smart Partial Valve Stroke Test Devices*** *Overview*
1330 – 1420	***Asset Management of Field Mounted Devices*** *Maximizing Asset Uptime*
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: Tuesday, 22nd of October 2024

0730 – 0930	***Check Valves*** *Introduction to Check Valves ● Lift Check Valves ● Swing Check Valves ● Tilting Disc Check Valves ● Double Disc Check Valves*
0930 – 0945	*Break*
0945 – 1100	***Pressure Relief Valves*** *Introduction ● Principles of Operation ● Standards (ASME, National Board, etc.) ● Applications ● Installation*
1100 – 1215	***Pressure Relief Valves (cont'd)*** *Testing ● Assembly ● Repair ● Troubleshooting ● VR Accreditation*

1215 – 1230	*Break*
1230 – 1420	***Fire Safe Valves*** *Overview*
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, 23rd of October 2024***

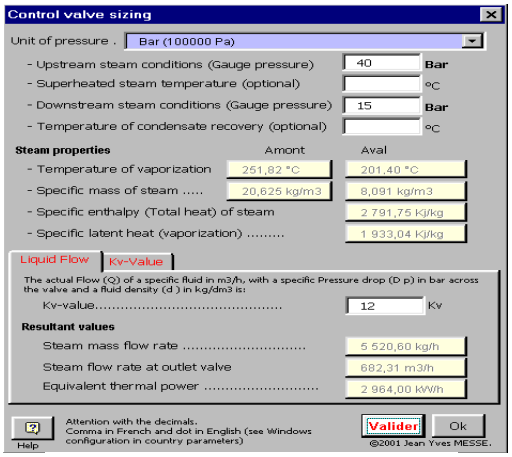
0730 – 0930	***Common Valve Problems*** *Water hammer Effects ● High Noise Levels ● Noise Attenuation ● Fugitive Emissions ● How to Prevent Valve Failures ● Installation Issues ● Practical Problems ● Maintenance Considerations*
0930 – 0945	Break
0945 – 1100	***Assessment of Valve Failure in the Oil & Gas Sector*** *Overview*
1100 – 1215	***Plant Valve Management*** *Overview*
1215 – 1230	*Break*
1230 – 1420	***Regulators*** *Overview*
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: ***Thursday, 24th of October 2024***

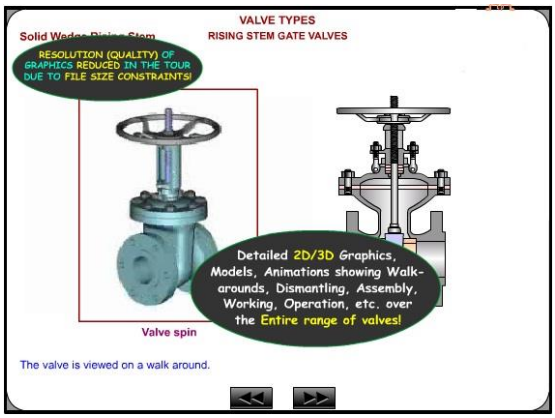
0730 – 0930	***Extended Valve Components, Hardide & Coatings*** *Overview*
0930 – 0945	*Break*
0945 – 1100	***Composite Valves*** *Overview*
1100 – 1215	***Corrosion, Galling & Water Testing*** *Overview*
1215 – 1230	*Break*
1230 – 1345	***Valve Sizing & Selection*** *Computer Program ● Liquid & Gas Applications ● Linear & Rotary Valves ● Actuator Sizing*
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 Certificates*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

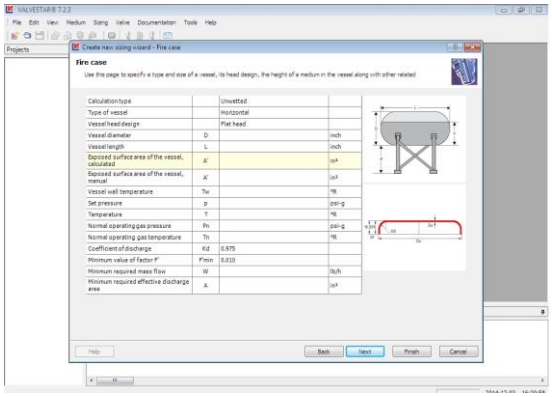
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art simulators "Valve Sizing Simulator", "Valve Simulator 3.0", "Valvestar 7.2 Simulator" and "PRV2SIZE Simulator".



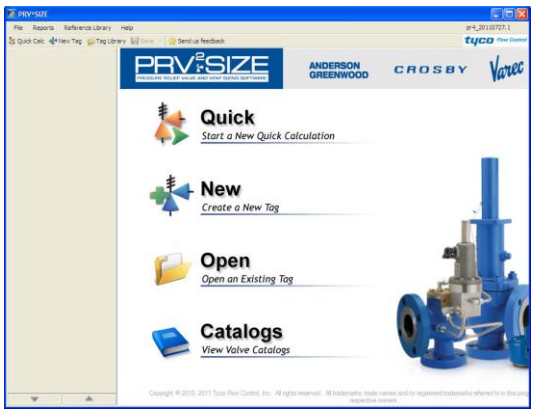
Valve Sizing Simulator



Valve Simulator 3.0



Valvestar 7.2 Simulator



PRV²SIZE Simulator

Course Coordinator

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