COURSE OVERVIEW DE0093
Wellheads, Flow Control Equipment and Flowline (E-Learning Module)

Course Title
Wellheads, Flow Control Equipment and Flowline (E-Learning Module)

Course Reference
DE0093

Course Format & Compatibility
SCORM 1.2. Compatible with IE11, MS-Edge, Google Chrome, Windows, Linux, Unix, Android, IOS, iPadOS, macOS, iPhone, iPad & HarmonyOS (Huawei)

Course Duration
30 online contact hours
(3.0 CEUs/30 PDHs

Course Description

This E-learning course is designed to provide participants with a detailed and up-to-date overview of wellheads, flow control equipment and flowline. It covers the wellheads, trees, casing hangers, casing head and spools showing annular access ports and lockdown screws; the assembly of seal and casing hanger; the base of a coiled tubing wellhead showing flange groove; the flanges with ring grooves, API type 6B and 5000 psi working pressure; the drift testing of assembled equipment and flange assembly; the typical wellhead and Xmas tree assemblies, wear bushing and back pressure valve; and the valve removal plugs, act X-mas tree cap and surface safety valve with hydraulic actuator.

During this course, participants will learn the combination of wear bushing running tool and BOP test plug; the problems that often arise in the wellhead control panel (WHCP) including the main function of WHCP and its types; HIPPS system, its advantages, types and main features of integral mechanical HIPPS; the main features of full electronic HIPPS, flow nets and water flow through soils; the rules for drawing flow nets and total head using flow nets; the flowlines reaching extreme depth and distance; the part pipeline and flowlines play in offshore installations; and the selection of piping materials and preparation of standard Pms/Vms.

Course Objectives

After completing the course, the employee will:-

- Apply and gain a comprehensive knowledge on wellheads, flow control equipment and flowline
- Describe wellheads, trees, casing hangers, casing head and spools showing annular access ports and lockdown screws
- Assemble seal and casing hanger as well as identify the base of a coiled tubing wellhead showing flange groove
- Identify flanges with ring grooves, API type 6B, for 5000 psi working pressure
- Employ drift testing of assembled equipment including flange assembly
- Identify the typical wellhead and xmas tree assemblies, wear bushing and back pressure valve
- Apply valve removal plugs, act x-mas tree cap and surface safety valve with hydraulic actuator
- Combine wear bushing running tool and BOP test plug
- Discuss the problems that often arise in the wellhead control panel (WHCP) including the main function of WHCP and its types
- Describe HIPPS system and explain its advantages, types and main features of integral mechanical HIPPS
- Illustrate the main features of full electronic HIPPS, flow nets and water flow through soils
- Apply the rules for drawing flow nets and determine total head using flow nets
- Determine flowlines reaching extreme depth and distance as well as identify what part pipeline and flowlines play in offshore installations
- Employ selection of piping materials and preparation of standard Pms/Vms

Who Should Attend

This course provides an overview of all significant aspects and considerations of wellheads, flow control equipment and flowlines for field operations, production, maintenance, petroleum, reservoir and field engineers, wellhead maintenance supervisors, wellhead operations supervisors.

Training Methodology

This Trainee-centered course includes the following training methodologies:-

- Talking presentation Slides (ppt with audio)
- Simulation & Animation
- Exercises
- Videos
- Case Studies
- Gamification (learning through games)
- Quizzes, Pre-test & Post-test

Every section/module of the course ends up with a Quiz which must be passed by the trainee in order to move to the next section/module. A Post-test at the end of the course must be passed in order to get the online accredited certificate.

Course Certificate(s)
Internationally recognized certificates will be issued to all participants of the course.

Certificate Accreditations
Certificates are accredited by the following international accreditation organizations:-

- USA International Association for Continuing Education and Training (IACET)

  Haward Technology is an Authorized Training Provider by the International Association for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, Virginia 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 1-2013 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 1-2013 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 Association 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 Fee
As per proposal

Course Contents

- Wellheads and Trees
- Casing Hangers
- Hangers
- Casing Head
- Spools Showing Annular Access Ports and Lockdown Screws
- The Wellhead Flange Attaches to the First Cemented Surface Casing String Designed to Hold Pressure.
- Well Flange Attachment to the Casing may be by Welding, Forming, Threaded Connection or set Screws.
- The Second String of Casing is Run and the Hanger is Landed in the Bowl
- The Tubing Spool Follows
- The Tubing is Landed in the Spool.
- Lock Down Pins are Engaged and the Seal Activated.
- One or Two Full Opening Master Valves Come Next.
- Followed by the Flow T or Cross.
- The Tree Before Adding Control Valves.
- Completed Wellhead with Choke and Partly Built Left Side of Flow Cross.
- Tubing Hanger
- Seal Assembly in the Wellhead
- Casing Hanger Assembly
- Example of the Base of a Coiled Tubing Wellhead, Showing Flange Groove.
- Ring and Groove Types
- Cutaway of a Tubing Hanger Spool
- Lockdown Screws and a Tubing “Donut”
- Pressure Tests
- Tubing Hangers and Packoffs
- Tubing Hanger with Pass Thru for Electric Cable.
- Hanger with a Lock Mechanism for Subsea Well.
- Tubing Hanger Spool with Annular Access Valves
- Threaded Tree Caps-Standard Sizes
- Develop One Side Only?
- Flanges
- Flanges with Ring Grooves, API Type 6B, for 5000 psi Working Pressure

- Flange Assembly
- Tightening
- 6 BX Flanges
- 6 B Flanges
- Drift Testing of Assembled Equipment
- Assembly
- Flange Assembly Learnings
- Wellheads and Christmas Trees in the Oil and Gas Industry
- Wellheads and Christmas Trees
- Components of a Wellhead
- Surface Wellhead
- Cellular and Conductor Pipe
- Casing Head Housing
- Casing Heads C-22 Bowl
- Slip Type Casing Hangers C-22 and C-29
- Slip Type Casing Hangers C-21
- Wear Bushing
- Test Plug
- Threaded Bottom
- Slip Lock
- Casing Head Spool
- Casing Spools C22
- Elastomer Seals & Metal to Metal
- Reducer Bushings
- Tubing Head Spool
- TC-60-ET Tubing Heads
- Internal Latch THS
- Tubing Hanger
- Tubing Head Adapters
- Basic Adapters
- ESP Adapters
- Tubing Suspension Adapters
- Coupling Adapters
- Valve Model 120
- Valve Model 130/150

- Basic Single Completion
- Loose Valve X-Tree
- Solid Block X-Tree
- Actuators
- HP-Hy Hydraulic Actuator
- HP-PN Pneumatic Piston Actuator
- HP- HYW Hydraulic Sheer Actuator
- Basics of Wellhead Control Panel
- Typical Wellhead & Xmas Tree Assemblies
- Wear Bushing
- Back Pressure Valve
- Valve Removal Plugs
- Act X-Mas Tree Cap
- Surface Safety Valve with Hydraulic Actuator
- Combination Wear Bushing Running Tool and Bop Test Plug
- Bop Test Plug (PTP)
- Flanged Drilling Spool
- Well Heads
- Subsea Wellheads
- Coiled Tubing Well Heads
- Chokes
- Subsurface Safety Valves
- Valve Removal Tool (PVRT)
- Basics of Wellhead Control Panel (WHCP)
- Overview of Wellhead Control Panel
- The Problems That Often Arise in Wellhead Control Panel (WHCP)
- Main Function of WHCP
- Types of WHCP
- Well Head Control Panel Working Principle
- Overview of HIPPS System
- What is HIPPS?
- Advantages of HIPPS
- Overview of HIPPS
- Two Types of HIPPS
- Main Features of Integral Mechanical HIPPS

- Main Features of Full Electronic HIPPS
- Flow Nets
- Water Flow Through Soils
- Flow Nets – Flow Lines.
- Flow Nets – Equipotential Lines
- Drawing Flow Nets
- Rules for Drawing Flow Nets
- Flow Nets Under Dam
- Flow Net Under Dam with Toe Filter
- Flow Net Under Dam with Sheet Pile
- Seepage and Flow Net Through Dam
- Seepage Analysis Using Seep/W
- Sample Flow Nets
- Flow Calculations
- Practice Problem
- Total Head Determination Using Flow Nets
- Flowlines
- Introduction
- Flowlines Reach Extreme Depth and Distance
- What Part Do Pipelines and Flowlines Play in Offshore Installations
- Pipeline/Flowline Construction and Installation Methods
- Towing Pipelines on the Surface
- Towing Pipelines Mid-Depth and Off-Bottom
- Onshore Flowline Construction and Laying from a Reel Vessel
- S-Lay Technique for Laying Pipe
- S-lay Stinger
- Construction and Deployment from an S-Lay Vessel
- J-Lay Technique for Laying Pipe
- J-Lay Technique
- J-Lay on Crane Barges
- Subsea 7 Ship
- Seafloor Topology
- Seafloor Topology and Seafloor Currents
- Subsea Connections
- Subsea Connections – Vertical

- Subsea Connections – Horizontal – I
- Subsea Connections – Horizontal – II
- Subsea Connections – Horizontal – III
- Repair
- Flow Assurance
- Flow Assurance: Inhibitor Injection
- Flow Assurance: Pigging
- Flow Assurance: Temperature Control
- Flow Assurance: Slug Flow and Sand Erosion
- Flow Assurance: Challenging Example
- Piping Fundamentals
- Pipe
- Piping
- Selection of Piping Materials
- Engineering Materials
- Most commonly used materials in refineries
- Preparation of Standard Pms/Vms
- Flanges
- Types of Flanges
- material
- Bolts & Gaskets
- Valves
- Piping Flexibility
- Piping Layout
- Insulation
- Materials Used for Insulation
- Pipe Stress Analysis
- Flow Through Pipes
- Introduction
- Head Losses Through Pipe
- Types of Losses
- Major Loss
- Hydraulic Grade Line
- Total Energy Line
- Pipes in Series

- Pipes in Parallel
- Syphon
- Condition of Maximum Power
- Efficiency of Power Transmission
- Power Transmission through Pipe
- Flow through Nozzle at End of Pipe
- Water Hammer in Pipes
- Valves, Fittings & Flanges
- Seamless Pipe
- Butt-Welded Pipe
- Sizing of Pipe
- Wall Thickness
- Methods of Joining Pipe
- Difference between Pipe and Tube Pipe
- Pipe Types
- Pipe Size
- Plate Formed Pipe and Seamless Pipe
- Pipe Ends
- Beveled Ends
- Socket Weld Pipe Joint
- Screw Pipe Joints
- Disadvantages
- Flanged Pipe Joints
- Spigot Socket Pipe Joints
- Standard Fitting Types
- Fittings
- 90◦ Elbows
- Ninety degree ells can be classified
- Mitered Elbows
- 45◦ Elbows
- Weld Tee
- The Stub-In
- Coupling
- Reducers
- Elbows

- Tees
- Pipe Caps
- Lateral Pipe Fittings
- Weldolets
- Full Couplings and Threaded Unions
- Swage Nipple
- Flanges and Valve
- Flanges
- Types of Flange
- Weld Neck Flange
- Socket Welded Flanges
- Threaded Flanges
- Lap Joint Flanges
- Orifice Flanges
- Strainers
- Steam Traps
- Classification of Traps
- Valves
- Classification of Valves Types
- Functions of a valve
- Gate Valves
- Globe Valves
- Ball Valves
- Butterfly Valves
- Check Valves
- Plug Valves
- Diaphragm Valves
- Safety & Relief Valves
- Gaskets
- Well Monitoring Systems
- Easy to Install turnkey
- What is the benefit of Remote Well Monitoring and Control?
- We Start at the Wellhead
- Next Comes Separation
- Now the Product Goes to Storage