COURSE OVERVIEW FE0160-4D

Pipeline and Piping Design, Installation, Operation, Inspection, Testing, Maintenance, Repair, FFS, Pigging, Integrity & Rehabilitation

(ASME B31 & API 579 Standards)

Course Title

Pipeline and Piping Design, Installation, Operation, Inspection, Testing, Maintenance, Repair, FFS, Pigging, Integrity & Rehabilitation *(ASME B31 & API 579 Standards)*

H-STK© INCLUDED

Course Date/Venue

August 05-08, 2024/YAS A Meeting Room, Royal Rose Hotel, Abu Dhabi, UAE

Course Reference

FE0160-4D

Course Duration/Credits

Four days/2.4 CEUs/24 PDHs

Course Description

This practical 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 delegates with a detailed and up-to-date overview of piping design, inspection and testing. Participants will be introduced to the technical basis of the ASME and API integrity rules, and their application to case studies and exercises.

The participants will be able to recognize causes of degradation in-service, whether mechanically induced (pressure, vibration, fatigue, pressure transients, external damage) or due to corrosion (wall thinning, pitting, cracking), and apply integrity analysis techniques to make run-or-repair decisions.

The participants will become knowledgeable in the technical basis and application of ASME B31.3, B31.4 and B31.8 piping codes, and API 579 Fitness-for-Service and Flaw Evaluation.

The participants will review inspection techniques, from the most common (PT, MT, UT, RT, MFL pigs) to most recent (AE, PED, UT pigs and multi pigs), and the implementation of integrity management programs, periodic inspections and evaluation of results.

During this interactive course, participants will review the various repair techniques, their advantages and shortcomings, and the logic to be followed in making repair decisions and selecting the applicable repair.

Course Objectives

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

- Apply systematic techniques on pipeline and piping engineering in accordance with the correct ASME and API codes and standards
- Discuss the fundamentals of pipes and pipeline design, maintenance, integrity and rehabilitation
- Evaluate the fitness for service including wall thinning, remaining life, general and local corrosion, analysis of dents and cracks in piping and pipelines
- Classify the causes of vibration in service as well as measure, analyze and resolve vibration
- Define pressure transients and enumerate its four classes such as pump station transients, two-phase liquid-vapor transients, two phase liquid-gas transients and gas discharge transients
- Analyze weld properties, heat treatment, liquid penetrant and ultrasonic testing as well as identify the different types of flanges, gaskets, bolt selection, tube fittings and different kinds of bending
- Carryout pressure and leak testing, prevent mechanism degradation due to corrosion and employ new ASME repair standards
- Demonstrate different repairing techniques of grinding, welding, flush patch, mechanical clamp and pipe coating for the expansion of buried pipes

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 is intended for engineers, maintenance staff and inspectors responsible for the integrity, maintenance and repair of pipelines and piping systems. Further, the course is essential for engineers in charge of pipeline or piping design. Project engineers, site/field engineers and piping/pipeline project managers will be very interested in the pipeline/piping installation part of the course. Senior draftsmen and technical staff in the engineering department will benefit from the pipeline/piping design part of this state-of-the-art course. The fitness-for-service and integrity techniques are based on quantitative analysis, please bring a calculator.

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.

Certificate Accreditations

Certificates are accreditation 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 **2.4 CEUs** (Continuing Education Units) or **24 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 Piping & Pipeline Engineer** with over **25 years** of industrial experience within **Oil**, **Gas**, **Petrochemical** and **Power** industries. His specialization widely covers **ASME B31 Piping & Pipeline** Design & Inspection, **Process Piping** Design & Maintenance, **Pipeline & Piping** Operation & Testing, **Pipeline** Equipment Operation Standard & Procedures, **Pipeline** Operation & Maintenance, Fitness-for-Service (**FFS**), **Pigging**, **Mechanical Integrity & Reliability**, **Integrity** Assessment, Integrity & Rehabilitation (**ASME B31 & API 579** Standards), **Process Plant Equipment** Maintenance & Repair, **Piping** Systems - Mechanical Design & Specification, **Pressure Vessels**, **Piping & Storage** Facilities, **Pipe** Work Design & Fabrication, Layout of **Piping Systems** & Process Equipment, **Welding** Technology, **Welding** Fabrication & Inspection and **ASME Sec IX: Welding & Brazing**. Further, he is also well-versed in **Pump** Installation & Troubleshooting, **Valve** Maintenance & Troubleshooting, **Bearing & Lubrication** Troubleshooting & Failure Analysis, **Compressor & Turbine** Maintenance & Troubleshooting, **Dry Gas Seal** Installation & Commissioning, **Heat Exchanger** Inspection & Maintenance, **Tank & Tank Farms** Maintenance & Troubleshooting, **ASME VIII Code: Pressure Vessel** Fabrication & Testing, **ASME Section 1: Power Boilers**, **Maintenance & Reliability** Management, Reliability Centred Maintenance (**RCM**), Total Plant Maintenance (**TPM**), Reliability-Availability-Maintainability (**RAM**), **Process Plant** Shutdown & Turnaround, **Rotating Equipment** Reliability Optimization **Maintenance** Planning, Scheduling & Work Control, **Preventive & Predictive Maintenance** & Machinery Failure Analysis (**RCFA**), Equipment's Reliability & Optimization, **Housing & Facilities** Maintenance Management, **Machinery** Failure Analysis & Troubleshooting, **Maintenance Auditing & Benchmarking**, **Material** Cataloguing & Handling, Laser & Dial **Mechanical Alignment**, **Engineering Drawings**, **Codes & Standards** and **P&ID** Reading.

During his career life, Mr. Bazley has gained his practical and field experience through his various significant positions and dedication as the **Engineering Manager**, **Maintenance Manager**, **Construction Manager**, **Project Engineer**, **Mechanical Engineer**, **Pipeline Engineer**, **Mechanical Services Superintendent**, **Pipeline Construction Supervisor**, **Quality Coordinator** and **Planning Manager** 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's** 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 Fee

US$ 4,500 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 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: ***Monday, 05th of August 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction*** *History of Pipeline Technology • ASME B31 Piping & Pipeline Codes • ASME B&PV Pressure Vessel Codes • API Tank Standards • API Pipeline Inspection Standards • ASME B16 Fitting Standards • NACE, MSS-SP, PFI Standards • Fundamentals of Maintenance & Integrity*
0930 – 0945	*Break*
0945 – 1100	***Materials*** *Overview of Ferrous Pipe & Pipeline Materials • Carbon & Alloy Steels • Practical Aspects of Metallurgical Properties • Chemistry & Material Test Reports • Fabrication of Line Pipe & Forged Fittings • Mechanical Properties: Strength & Toughness • Ductile & Brittle Fracture • API 5L & ASTM Material Specifications • Markings on Pipe & Fittings*
1100 – 1215	***Operating & Design Pressure*** *How to Establish the System Design Pressure • Introduction to Pressure Relief Valves • Pipe & Pipeline Sizing Formula with Applications • Flange & Fitting Class: Origins & Application • Branch Reinforcement, Stopple & Hot taps*
1215 – 1230	*Break*
1230 – 1420	***Layout & Support*** *Rules of Good Practice in Layout • Pump & Compressor Piping • Thermal Expansion & Flexibility • How to Support a Piping System • Review of Support Types & Their Application • Lessons Learned from Poor Support Practices*
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: ***Tuesday, 06th of August 2024***

0730 – 0930	***Fitness-for-service Overview*** *Making Run-or-Repair Decisions • Analysis of Inspection Results: Integrity Management • How to Evaluate Wall Thinning • Application of ASME B31G to Determine Remaining Life • Application of API 579 to General & Local Corrosion • Application of API 579 to Analyze Pitting • Analysis of Dents & Gouges in Pipelines • Introduction to Fracture Mechanic • How to Evaluate Cracks in Piping & Pipelines*
0930 – 0945	*Break*
0945 – 1100	***Vibration in Service*** *How to Classify the Cause of Vibration In-Service • Mechanical & Hydraulic Induced Vibration in Piping • How to Measure Vibration • How to Analyze Vibration & Decide if it is Acceptable • Options for Resolving Vibration*

1100 – 1215	***Pressure Transients*** *The Four Classes of Pressure Transients • Recognizing & Solving Liquid Hammer • Pump Station Transients • Study of Pipeline Failures Due to Transients • Two-Phase Liquid-Vapor Transients • Two-Phase Liquid-Gas Transients • Gas Discharge Transients*
1215 – 1230	*Break*
1230 – 1420	***Welding*** *Overview of Pipe & Pipeline Welding Practice • API 1104 & ASME IX Requirements • Weld Properties • Weld Size & Lessons Learned from Weld Failures • Heat Treatment: When & Why • Welding In-Service: Challenge & Solutions*
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: ***Wednesday, 07th of August 2024***

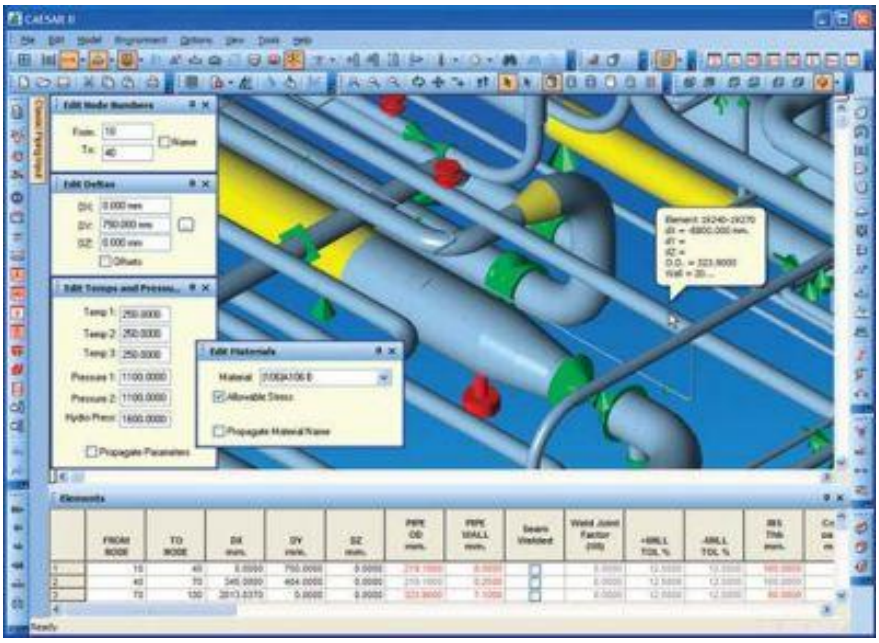
0730 – 0830	***Examination & Inspection*** *Weld Inspection Techniques • Liquid Penetrant Testing: Advantages & Limitations • Magnetic Particle Testing: Advantages & Limitations • Radiographic Testing: Advantages & Limitations • Ultrasonic Testing: Advantages & Limitations • Eddy Current, Acoustic Emission, Thermography • Pulsed Eddy Current Inspections Through Insulation • Pigging Technology: Overview of Utility & Smart Pigs • Overview of 49CFR Regulations for In-Line Inspections • What to Inspect & How • Workmanship Standards (ASME B31) • Integrity Standards (B31G, API 1104, API 579) • Application of Inspections & Analysis of Results*
0830 – 0930	***Flange Joints*** *Overview of Different Types of Flanges & Application • Gasket & Bolt Selection • Causes of Flange Leaks & How to Resolve • Case Study of Flange Failure • Assembly of Flange Joints & Leak Tightness*
0930 – 0945	*Break*
0945 – 1100	***Mechanical Joints*** *Tube Fittings • Bolted Fittings • Unlisted Components • Swage Fittings*
1100 – 1215	***Bending*** *Cold Bending of Pipe & Pipelines • Limitations on Cold Bending • Wall Thinning During Bending • Ripples & Buckles in Bends • Ovality & Dents*
1215 – 1230	*Break*
1230 – 1420	***Pressure & Leak Testing*** *The Difference Between Leak Testing & Pressure Testing • Review of Different Testing Techniques • The Purpose of Hydrotest • How to Conduct a Hydrotest • Pipeline & Piping Systems Testing • Pneumatic Testing*
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: **Thursday, 08th of August 2024**

0730 – 0930	***Degradation Mechanisms*** *Introduction to Practical Corrosion • Classification of Corrosion Mechanisms • General Wall Thinning • Local Corrosion: Galvanic Effects • Crevice Corrosion • Pitting Corrosion • Environmental Effects • Hydrogen & H2S Effects • Microbiological Corrosion • Corrosion Protection • Cathodic Protection Overview*
0930 – 0945	*Break*
0945 – 1100	***Maintenance Strategies*** *Fundamentals of Maintenance Practice • Corrective & Predictive Maintenance • Reliability Engineering: Maintenance Analysis & Trending*
1100 – 1215	***Repair Techniques*** *The New ASME Repair Standards • The Fundamentals of Repair Packages • Welding on Line (In-Service) • Pipe & Component Replacement • Grinding & Welding • Welded Sleeve: Type A & Type B • Flush Patch Repair • Fillet Welded Patch • Weld Overlay Repair • Mechanical Clamp with Sealant Injection • Mechanical Clamp without Sealant Injection • Insertion Liners • Painted & Brushed Liners • Pipe Coating*
1215 – 1230	*Break*
1230 – 1345	***Buried Pipe*** *Soil Loads • Surface Loads • Expansion of Buried Pipe • Soil Settlement • In-Service Movement of Pipeline*
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 the "CAESAR II" simulator.



CAESAR II

Course Coordinator

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