



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)

Course Date/Venue

October 14-17, 2024/Ras Al Khaimah Meeting Room, The Tower Plaza, Dubai, UAE

Course Reference

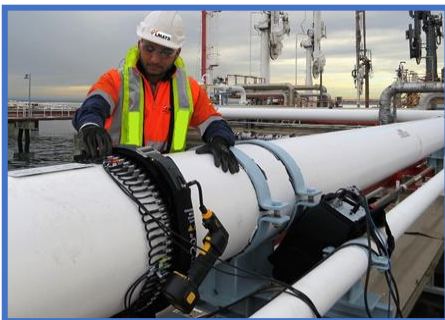
FE0160-4D

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 “Howard 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. Steve Magalios, CEng, PGDip (on-going), MSc, BSc, is a **Survey & Pipeline Engineer** with almost **40 years** of extensive **On-shore/Offshore** experience in the **Oil & Gas, Construction, Refinery** and **Petrochemical** industries. His expertise widely covers in the areas of **Pipeline Operation & Maintenance, Pipeline Systems, Pipeline Design & Construction, Pipeline Repair Methods, Pipeline Engineering, Pipeline Integrity Management System (PIMS), Pipeline Pigging, Piping & Pipe Support Systems, Piping Systems & Process Equipment, Piping System Repair & Maintenance, Piping Integrity Management, Computer Aided Design (CAD), Building & Road Design Skills, Civil Engineering Design, Structural Reliability Engineering, Road Construction & Maintenance, Concrete Structures & Building Rehabilitation, Reinforced Concrete Structures Protection, Geosynthetics & Ground Improvement Methods, Blueprint Reading & Interpretation, Blue Print Documentation, Mechanical Drawings, P&ID, Flow Diagram Symbols, Land Surveying & Property Evaluation, Cartographic Representation, Soil Classification, Cadastral Surveying & Boundary Definition, Project Engineering & Design, Construction Management, Project Planning & Execution, Site Management, Site Supervision, Effective Resource Management, Project Evaluation, FEED Management, EPC Projects Design, Project Completion & Workover, Quality Control and Team Management.** He is also well-versed in Lean & Sour Gas, Condensate, **Compressors, Pumps**, Flare Knockout Drum, Block **Valve** Stations, New Slug Catcher, Natural **Gas Pipeline & Network**, Scraper Traps, Burn Pits, Risk Assessment, HSE Plan & Procedures, Quality Plan & Procedures, Safety & Compliance Management, Permit-to-Work Issuer, ASME, API, ANSI, ASTM, BS, NACE, ARAMCO & KOC Standards, MS Office tools, **AutoCAD, STAAD-PRO**, GIS, ArcInfo, ArcView, Autodesk Map and various programming languages such as FORTRAN, BASIC and AUTOLISP. Currently, he is the **Chartered Professional Surveyor Engineer & Urban-Regional Planner** wherein he is deeply involved in providing exact data, measurements and determining properly boundaries. He is also responsible in preparing and maintaining sketches, maps, reports and legal description of surveys.

During his career, Mr. Magalios has gained his expertise and thorough practical experience through challenging positions such as a **Project Site Construction Manager, Construction Site Manager, Project Manager, Deputy PMS Manager, Head of the Public Project Inspection Field Team, Technical Consultant, Senior Consultant, Consultant/Lecturer, Construction Team Leader, Lead Pipeline Engineer, Project Construction Lead Supervising Engineer, Lead Site Engineer, Senior Site Engineer Lead Engineer, Senior Site Engineer, R.O.W. Coordinator, Site Representative, Supervision Head and Contractor** for international Companies such as the Penspen International Limited, Eptista Servicios de Ingenieria S.I., J/V ILF Pantec TH. Papaioannou & Co. – Emenergy Engineering, J/V Karaylannis S.A. – Intracom Constructions S.A., Ergaz Ltd., Alkyonis 7, Palaeo Faliro, Piraeus, Elpet Valkaniki S.A., Asprofos S.A., J/V Depa S.A. just to name a few.

Mr. Magalios is a **Registered Chartered Engineer** and has **Master** and **Bachelor** degrees in **Surveying Engineering** from the **University of New Brunswick, Canada** and the **National Technical University of Athens, Greece**, respectively. Further, he is currently enrolled for **Post-graduate** in **Quality Assurance** from the **Hellenic Open University, Greece**. He has further obtained a Level 4B Certificates in Project Management from the National & Kapodistrian University of Athens, Greece and Environmental Auditing from the Environmental Auditors Registration Association (EARA). Moreover, he is a **Certified Instructor/Trainer**, a **Chartered Engineer** of Technical Chamber of Greece and has delivered numerous trainings, workshops, seminars, courses and conferences internationally





Course Fee

US\$ 4,500 per Delegate + **VAT**. This rate includes H-STK® (Howard 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, 14th of October 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, Stopples & 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, 15th of October 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, 16th of October 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, 17th of October 2024

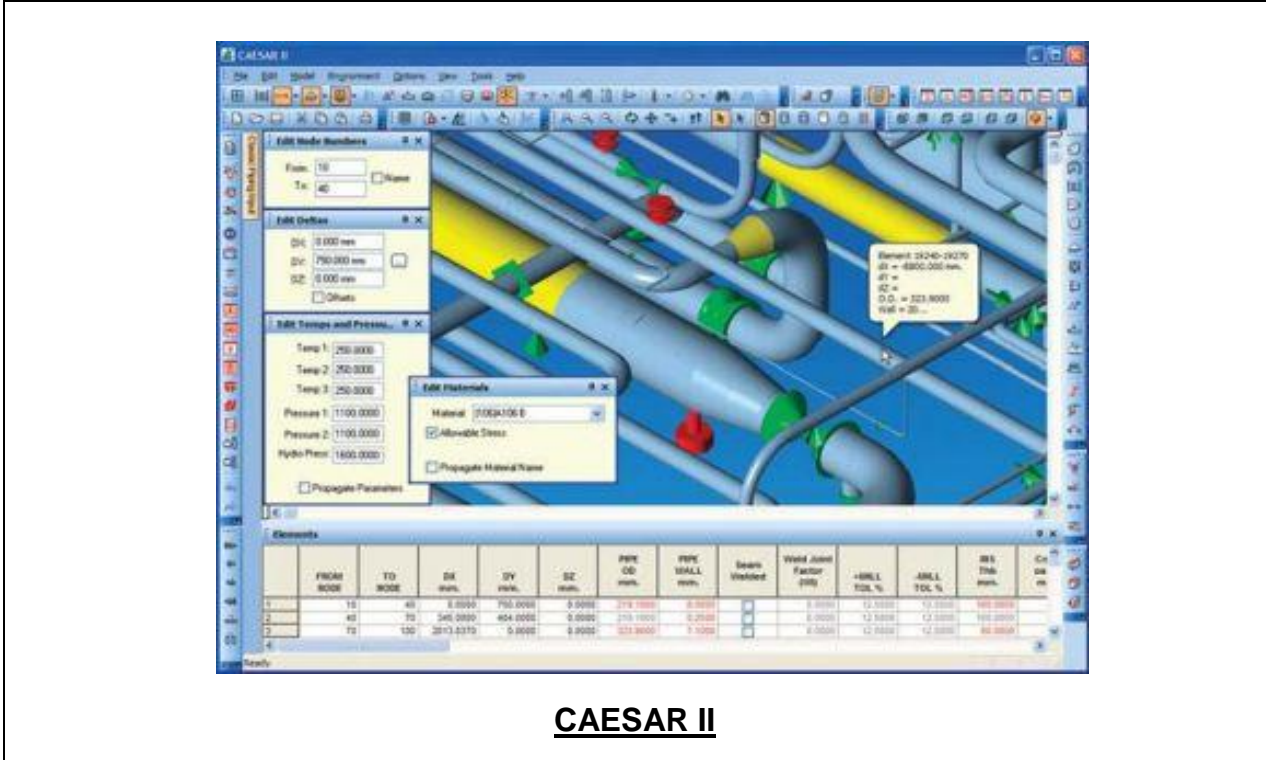
0730 – 0930	Degradation Mechanisms Introduction to Practical Corrosion • Classification of Corrosion Mechanisms • General Wall Thinning • Local Corrosion: Galvanic Effects • Crevice Corrosion • Pitting Corrosion • Environmental Effects • Hydrogen & H2S Effects • Microbiological Corrosion • Corrosion 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

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org