



COURSE OVERVIEW FE0210

Equipment, Tanks and Pipe Supports Foundation Construction Techniques

Course Title

Equipment, Tanks and Pipe Supports Foundation Construction Techniques

Course Date/Venue

Session 1: June 22-26, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Session 2: November 17-21, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE



Course Reference

FE0210



Course Duration/Credits

Five days/3.0 CEUs

Course Description



This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

This course focuses on lessons learned from actual plant failures, leaks and significant damage to storage tanks, pressure vessels, piping systems, pipelines and components.



Each day, the participants will review several failure case histories, and will address, in each case:

- Root cause of failure
- System and process aspects
- Materials and corrosion considerations
- Design-related failures and overloads
- Fabrication, welding, and construction-related failures
- Abnormal operation and transients
- Inspection and conduct of maintenance breakdowns



The course will also cover options for repair and life extension, as well as an introduction to fitness-for-service (how to estimate the remaining life of corroded equipment).



The course will also provide a complete guide to failure analysis, starting with on-site investigation, collection of evidence, metallurgical and corrosion analysis, metallographic techniques, the role of stress analysis, and the preparation of investigation reports.

The case histories are selected from petrochemical and chemical process industry, oil and gas pipelines, oil and water storage tanks, pressure vessels, utilities and power plants.

The focus of the course is to learn from actual case histories to prevent their recurrence, as well as provide a structured approach to investigate and trouble-shoot field problems and anomalies discovered during inspections.

Course Objectives

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

- Apply the latest techniques on failure prevention, repair and life extension of pipelines, vessels & tanks
- Identify the causes of storage tank leak due to corrosion, illustrate storage tank failure during hydrotest and determine oil pipeline failure from over-pressure transient and fatigue failure of expansion joint
- Explain the brittle fracture, corrosion damage under coating, localized wall thinning, internal explosion in pipe and local thermal shock in a pressure vessels
- Describe the failure of high-hardness weld, fabrication crack in vessel nozzle, thermal-induced fatigue in a piping tee, failure of furnace tube by high temperature creep, running fracture from an unstable crack, liquid-metal embrittled fracture of flange bolts and hydrogen induced cracking of vessel wall
- Discuss stress-corrosion cracking & leak-before-break, leak in underground pipe due to pitting, corrosion grooving along a weld and vortex shedding around a subsea pipeline
- Employ various failure prevention and repair techniques use in pipelines, vessels and tanks, method of buckling a vacuum tank and carryout the methods of tube plugging and loss of flow from deposits
- Discuss pipeline failure due to ground movement, deep local corrosion at bottom of vessel and trapped water under coating and illustrate dents & gouges in pipelines
- Describe various kinds of failures involved such as vapor-liquid bubble collapse hammer failure, failure of pump casing due to cavitation, erosion-corrosion failure in pipe elbow, vibration-induced fatigue failure of vessel nozzle, dealloying failure of cupronickel tubes, failure in wet H₂S process, failure due to acoustic fatigue in LNG plant and cracking in deaerator vessels
- Review lessons learned from several classic accidents, identify the causes as well as prevention of failures and perform remaining life calculation of pipelines, vessels and tanks

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 conveniently saved in a **Tablet PC**.*

Who Should Attend


This course is intended for integrity assessment engineers, operations engineers, maintenance engineers, maintenance supervisors, specialists, site inspection engineers, inspectors, mechanical engineers, plant managers, plant engineers, project engineers, reliability engineers, piping & pipeline engineers and engineers responsible for the failure prevention, repair & life extension of pipelines, vessels and tanks.

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: -

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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.

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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 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 **Senior Welding & 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 **Welding Technology, Welding & Fabrication, Welding Inspection, Pipeline Operation & Maintenance, 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 and Land Surveying & Property Evaluation. 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, Welding 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 Ingeneria 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.

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 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 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

0730 - 0800	<i>Registration & Coffee</i>
0800 - 0815	<i>Welcome & Introduction</i>
0815 - 0830	PRE-TEST
0830 - 0915	<i>Storage Tank Leak due to Corrosion</i>
0915 - 1000	<i>Storage Tank Failure during Hydrotest</i>
1000 - 1015	<i>Break</i>
1015 - 1045	<i>Oil Pipeline Failure from Over-pressure Transient</i>
1045 - 1130	<i>Fatigue Failure of Expansion Joint</i>
1130 - 1215	<i>Brittle Fracture of Pressure Vessel</i>
1215 - 1245	<i>Break</i>
1245 - 1330	<i>Failure of High-Hardness Weld</i>
1330 - 1430	<i>Special Topic: Failure Analysis</i>
1430	<i>Lunch & End of Day One</i>

Day 2

0730 - 0815	<i>Fabrication Crack in Vessel Nozzle</i>
0815 - 0900	<i>Thermal-Induced Fatigue in a Piping Tee</i>
0900 - 0915	<i>Break</i>
0915 - 1000	<i>Corrosion Damage Under Coating</i>



1000 - 1100	<i>Localized Wall Thinning in a Pressure Vessel</i>
1100 - 1145	<i>Failure of Furnace Tube by High Temperature Creep</i>
1145 - 1200	<i>Break</i>
1200 - 1245	<i>Running Fracture from an Unstable Crack</i>
1245 - 1330	<i>Leak in Underground Pipe due to Pitting</i>
1330 - 1430	<i>Special Topic: Repair Techniques</i>
1430	<i>Lunch & End of Day Two</i>

Day 3

0730 - 0750	<i>Fracture from Corrosion Grooving along a Weld</i>
0750 - 0810	<i>Stress-Corrosion Cracking and Leak-before-Break</i>
0810 - 0830	<i>Vortex Shedding Around a Subsea Pipeline</i>
0830 - 0850	<i>Buckling a Vacuum Tank</i>
0850 - 0910	<i>Vapor-Liquid Bubble Collapse Hammer Failure</i>
0910 - 0925	<i>Break</i>
0925 - 0955	<i>Failure of Pump Casing due to Cavitation</i>
0955 - 1015	<i>Erosion-Corrosion Failure in Pipe Elbow</i>
1015 - 1035	<i>Vibration-Induced Fatigue Failure of Vessel Nozzle</i>
1035 - 1055	<i>Failure from Internal Explosion in Pipe</i>
1055 - 1115	<i>Local Thermal Shock and Stratified Flow</i>
1115 - 1130	<i>Break</i>
1130 - 1200	<i>Liquid-Metal Embrittled Fracture of Flange Bolts</i>
1200 - 1230	<i>Hydrogen Induced Cracking of Vessel Wall</i>
1230 - 1300	<i>Tube Plugging and Loss of Flow from Deposits</i>
1300 - 1345	<i>Dents and Gouges in Pipelines</i>
1345 - 1430	<i>Special Topic: Fatigue Failures</i>
1430	<i>Lunch & End of Day Three</i>

Day 4

0730 - 0815	<i>Pipeline Failure due to Ground Movement</i>
0815 - 0900	<i>Dent with Gouge in Pipeline</i>
0900 - 0945	<i>Deep Local Corrosion at Bottom of Vessel</i>
0945 - 1000	<i>Break</i>
1000 - 1015	<i>Dealloying Failure of Cupronickel Tubes</i>
1015 - 1100	<i>Trapped Water Under Coating</i>
1100 - 1145	<i>Failure in Wet H2S Process</i>
1145 - 1200	<i>Break</i>
1200 - 1245	<i>Failure due to Acoustic Fatigue in LNG Plant</i>
1245 - 1330	<i>Cracking in Deaerator Vessels</i>
1330 - 1430	<i>Special Topic: Calculating Remaining Life</i>
1430	<i>Lunch & End of Day Four</i>

Day 5

0730 - 0815	<i>Classic Accidents: Feyzin</i>
0815 - 0900	<i>Classic Accidents: Piper Alpha Platform</i>
0900 - 0945	<i>Classic Accidents: Crescent City</i>
0945 - 1000	<i>Break</i>

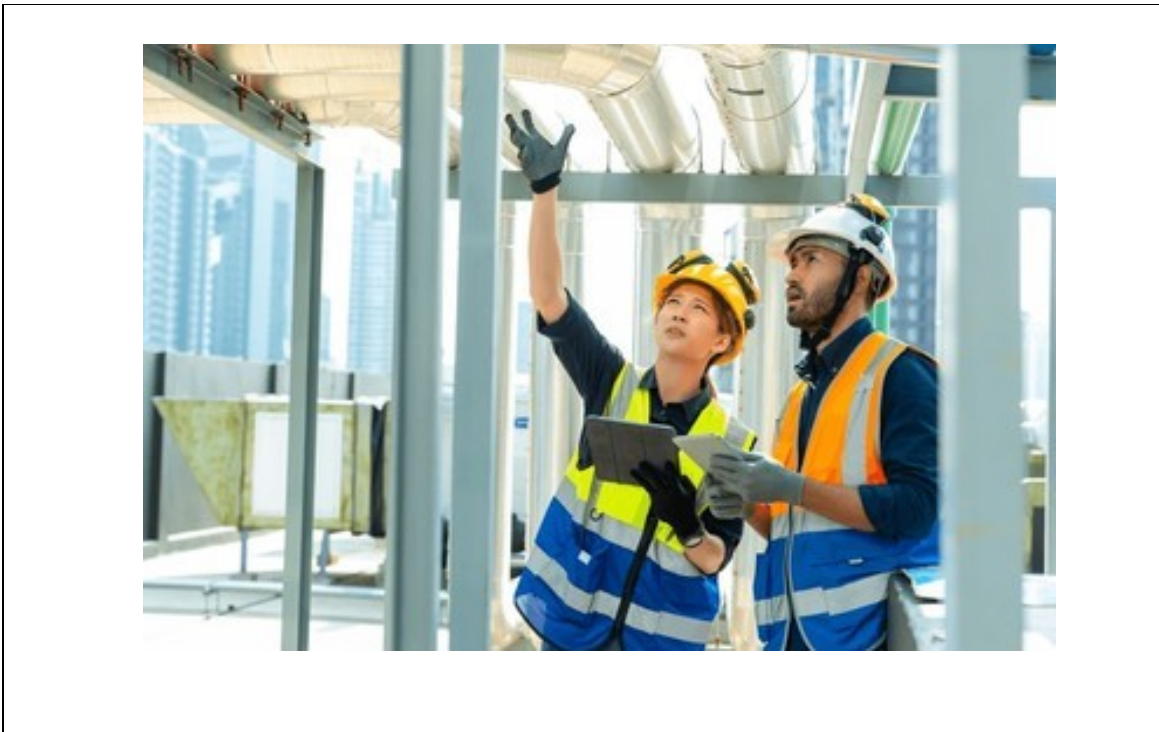




1000 - 1045	<i>Classic Accidents: Bhopal</i>
1045 - 1130	<i>Classic Accidents: Beek</i>
1130 - 1215	<i>Classic Accidents: Flixborough</i>
1215 - 1230	<i>Break</i>
1230 - 1315	<i>Classic Accidents: Seveso</i>
1315 - 1400	<i>Classic Accidents: Texas City</i>
1400 - 1415	POST-TEST
1415 - 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-



Course Coordinator

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