COURSE OVERVIEW FE0016-4D
Piping Design, Construction & Mechanical Integrity
(ASME B31.3 & API 570)

Course Title
Piping Design, Construction & Mechanical Integrity (ASME B31.3 & API 570)

Course Reference
FE0016-4D

Course Duration/Credits
Four days/2.4 CEUs/24 PDHs

Course Date/Venue

Session(s)	Date	Venue
1	January 22-25, 2024	Cheops Meeting Room, Radisson Blu Hotel, Istanbul Sisli, Turkey
2	April 29 - May 02, 2024	Jubail Hall, Signature Al Khobar Hotel, Al Khobar, KSA
3	July 01-04, 2024	Ajman Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
4	October 21-24, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

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 participants with a detailed and up-to-date overview of Piping Design, Construction and Mechanical Integrity in Accordance with ASME B31.3 and API 570 standards. It covers the piping design principles and ASME B31.3 code and its importance in piping design; the design conditions, pressure ratings, temperature limitations and material selection and specifications for piping components including fabrication and construction practices; the fundamentals of piping stress analysis and piping flexibility analysis; the types of supports and restraints in piping systems; the material selection and specifications in piping design; and the piping layout and routing, piping fabrication and construction.

During this interactive course, participants will learn the shop and field fabrication techniques including welding procedures and inspection requirements; the piping inspection, testing, maintenance and repair; the piping integrity management, API 570 inspection intervals and methodologies, risk-based inspection approaches, corrosion monitoring, mitigation strategies, fitness-for-service, evaluations and remaining life assessments; the piping documentation and project management; creating piping documentation packages for construction and maintenance; and complying with regulatory requirements and industry codes.

Course Objectives

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

- Apply and gain an in-depth knowledge on piping design, construction and mechanical integrity in accordance with ASME B31.3 and API 570 standards
- Discuss the piping design principles and objectives as well as ASME B31.3 code and its importance in piping design
- Explain the design conditions, pressure ratings, temperature limitations and carryout material selection and specifications for piping components including fabrication and construction practices
- Discuss the fundamentals of piping stress analysis and piping flexibility analysis
- Identify the types of supports and restraints in piping systems as well as material selection and specifications in piping design
- Illustrate piping layout and routing as well as piping fabrication and construction
- Apply shop and field fabrication techniques including welding procedures and inspection requirements
- Carryout piping inspection, testing, maintenance and repair
- Employ piping integrity management, API 570 inspection intervals and methodologies, risk-based inspection approaches, corrosion monitoring, mitigation strategies, fitness-for-service, evaluations and remaining life assessments
- Apply piping documentation and project management, create piping documentation packages for construction and maintenance and comply with regulatory requirements and industry codes

Who Should Attend

This course provides an overview of all significant aspects and considerations of piping design, construction and mechanical integrity in accordance with ASME B31.3 and API 570 standards for piping design engineers, construction managers, engineering managers, mechanical engineers, plant operators, maintenance personnel, quality control and assurance personnel.

Training Methodology

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Workshops & Work Presentations
30% Case Studies & Practical Exercises
20% Software, Simulators & 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 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 **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.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

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**, **Construction**, **Operation**, **Inspection**, **Pigging**, **Maintenance**, **Repair & Integrity Assessment**, **Process Equipment**, **Maintenance Management**, **Reliability Management**, **Reliability Centred Maintenance** (**RCM**), Total Plant Maintenance (**TPM**) and Reliability-Availability-Maintainability (**RAM**), **Engineering Drawings, Codes & Standards**, **P&ID Reading, Interpretation & Developing**. His experience covers **Design**, **Construction** and **Maintenance** of **Storage Tank**, **Hydraulic Control Valves**, **Rotating and Static Equipment** including **Safety Relief Valves**, **Boilers**, **Pressure Vessels**, **Tanks**, **Heat Exchangers**, **Bearings**, **Compressors**, **Pumps**, **Pipelines**, **Motors**, **Turbines**, **Gears**, **Lubrication Technology** and **Mechanical Seals**. Further, he has experience in Waste Water Treatment, **Water Treatment**, **Welding**, **NDT**, Vehicle Fleet and Budgeting & Cost Control. He is well-versed in **CMMS** and various International Standards including ISO 14001.

During his career life, Mr. Bazley has gained his practical and field experience through his various significant positions and dedication as the **General Manager**, **Branch Manager**, **Refinery Chairman**, **Engineering Manager**, **Maintenance Engineer**, **Construction Engineer**, **Project Engineer**, **Mechanical Engineer**, **Associate Engineer**, **Oil Process Engineer**, **Mechanical Services Superintendent**, **Quality Coordinator**, **Planning Coordinator**, **Consultant/Instructor**, **Lecturer/Trainer** and **Public Relations Officer** 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** 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

Istanbul	**US$ 5,000** per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Al Khobar	**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.
Abu Dhabi	**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
Dubai	**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

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	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Piping Design & ASME B31.3*** *Piping Design Principles & Objectives • ASME B31.3 Code & Its Importance in Piping Design • Design Conditions, Pressure Ratings & Temperature Limitations • Material Selection and Specifications for Piping Components • Fabrication and Construction Practices*
0930 – 0945	*Break*
0945 – 1100	***Piping Stress Analysis*** *Piping Stress Analysis & Its Significance in Design • Basics of Static and Dynamic Loading on Piping Systems*
1100 – 1215	***Piping Stress Analysis (cont'd)*** *Stress Categories & Allowable Stress Criteria • Caesar II Software for Stress Analysis*
1215 – 1230	*Break*
1230 – 1330	***Piping Stress Analysis (cont'd)*** *Performing Simple Stress Calculations & Load Case Evaluations*
1330 - 1420	***Piping Flexibility Analysis*** *Determining Piping Loads and Supports • Types of Supports and Restraints in Piping Systems • Pipe Flexibility Analysis using Software Tools*
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

0730 – 0830	***Piping Flexibility Analysis (cont'd)*** *Expansion Joint Selection and Application • Spring Supports and Snubbers*
0830 - 0930	***Piping Materials & Specifications*** *Material Selection & Specifications in Piping Design • ASME B31.3 Material Requirements & Limitations • Material Properties, Corrosion Resistance, and Compatibility Considerations*
0930 – 0945	*Break*
0945 – 1100	***Piping Materials & Specifications (cont'd)*** *Selection of Pipe, Fittings, Valves & Flanges • Non-Metallic Piping Materials and their Applications*
1100 – 1215	***Piping Layout & Routing*** *Piping Layout & Routing Principles • Equipment Spacing & Arrangement Considerations • Pipe Routing Techniques for Efficient Flow & Maintenance Access*

1215 – 1230	Break
1230 – 1420	***Piping Layout & Routing (cont'd)*** *Piping Support Design & Installation • Clash Detection & Resolution in Piping Layouts*
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

0730 – 0830	***Piping Fabrication & Construction*** *Piping Fabrication & Construction Processes • Shop & Field Fabrication Techniques • Welding Procedures and Inspection Requirements (ASME Section IX)*
0830 - 0930	***Piping Fabrication & Construction (cont'd)*** *NDT (Non-Destructive Testing) Methods for Weld Inspection • Quality Control & Assurance in Piping Fabrication*
0930 – 0945	Break
0945 – 1100	***Piping Inspection & Testing*** *Piping Inspection & Testing Requirements • API 570: Piping Inspection Code & Its Significance • Types of Inspections (Visual, Ultrasonic, Radiographic, etc.)*
1100 – 1215	***Piping Inspection & Testing (cont'd)*** *Pressure Testing Procedures & Standards • Inspection & Testing Documentation & Record-Keeping*
1215 – 1230	Break
1230 – 1420	***Piping Maintenance & Repair*** *Piping Maintenance Strategies • API 570 Requirements for Piping Repairs & Alterations • Common Piping Defects & Failure Modes*
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

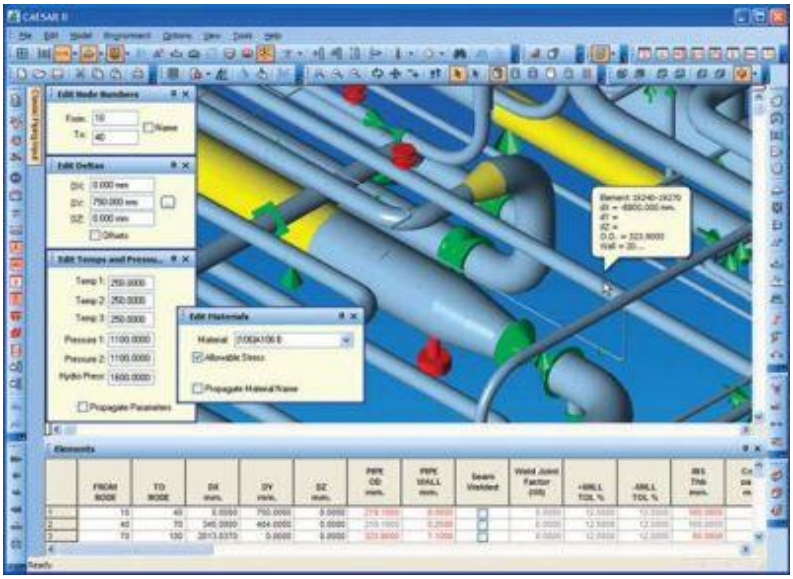
Day 4

0730 – 0830	***Piping Maintenance & Repair (cont'd)*** *Repair Techniques (Welding, Clamps, Etc.) & their Limitations • Mechanical Integrity Assessment & Management*
0830 - 0930	***Piping Integrity Management*** *Piping Integrity Management Systems •API 570 Inspection Intervals and Methodologies • Risk-based Inspection (RBI) Approaches*
0930 – 0945	Break
0945 – 1100	***Piping Integrity Management (cont'd)*** *Corrosion Monitoring & Mitigation Strategies • Fitness-For-Service (FFS) Evaluations and Remaining Life Assessments*
1100 – 1215	***Piping Documentation & Project Management*** *Creating Piping Documentation Packages for Construction & Maintenance • Coordinating with Other Engineering Disciplines (Civil, Electrical, etc.) • Project Scheduling & Resource Management*

1215 – 1230	*Break*
1230 – 1345	***Piping Documentation & Project Management (cont'd)*** *Compliance with Regulatory Requirements & Industry Codes • Reviewing & Finalizing Piping Deliverables for Project Completion*
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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