COURSE OVERVIEW ME0630
The Layout of Piping Systems & Process Equipment

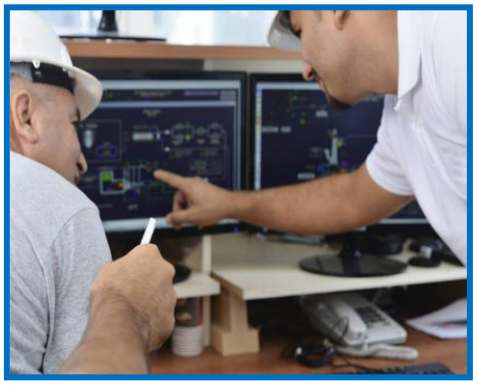
Course Title
The Layout of Piping Systems & Process Equipment

Course Date/Venue
February 03-07, 2025/TBA Meeting Room, London Marriott Hotel Regents Park, London, United Kingdom

Course Reference
ME0630

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

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 will familiarize engineers, designers and construction personnel with layout, design procedures and practices involved in the location of equipment and layout of piping systems. Traditionally there has been little formal training in this area and design decisions have to be made based on practical considerations without formulae or code reinforcement.

Completing piping arrangements take up the majority of manhours in the design of a process plant and the designer is required to apply acceptable layout procedures. This is an intensive five-day course that will give attendees the background required to complete a typical equipment layout and piping arrangement.

The course will also highlight the equipment layout and plot plans; civil, structural, electrical, instrumentation and maintenance considerations; distribution systems; pipe racks; pumps and piping, layout at horizontal centrifugal, vertical inline, double suction, positive displacement, performance characteristics, maintenance, cavitation, suction piping considerations, strainers, valving, parallel layouts, series layouts, supports, loads at nozzles.

During this interactive course, participants will learn the heat exchanger piping, maintenance requirements, shell and tube, plate, fin fan, valving, T.E.M.A. standards; horizontal and vertical vessels, placement, nozzle orientation, internals, platforms, ladders, manholes, maintenance requirements, valving, instrumentation, process considerations; and the process and utility piping.

Course Objectives

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

- Apply systematic techniques in the layout of piping systems and process equipment including design procedures and good international practices
- Implement the correct procedures involved in the layout of process equipment and piping system for a typical process unit containing pumps, valves, hangers, tanks, exchangers, horizontal drums and vertical towers
- Employ the requirements for the design and layout of piping system in order to achieve a well-structured installation of piping systems and process equipment
- Identify the factors that should be considered in the layout of equipment and plotting of plans including civil, structural, electrical and instrumentation aspects and other maintenance considerations
- Practice the various types of design and layout of piping system through workshops including process & utility piping, pump piping, storage tank piping, steam and condensate piping
- Implement nozzle orientation procedures in horizontal and vertical vessels
- Apply proper CAD techniques used in piping layout and piping stress analysis
- Perform the proper methodology for stress analysis using stress analysis programs and build flexible layouts

Who Should Attend

This course provides an overview of all significant aspects of the layout of piping systems & process equipment for piping, process and design engineers and designers entering the plant design field, senior draftsmen, piping and process draftsmen and practicing engineers requiring to expand their understanding of layout procedures. Further, it is suitable for piping fabricators, contractors and suppliers wishing to understand the relationship of manufacture and fabrication to the design, layout and construction of piping systems and piping design as well as analysis personnel wishing to expand their knowledge through this program which will offer practical solutions to design problems.

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

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: -

- 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.

- 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.

Accommodation

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

Course Fee

US$ 8,800 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

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. Mervyn Frampton is a **Senior Process Engineer** with over **30 years** of industrial experience within the **Oil & Gas**, **Refinery**, **Petrochemical** and **Utilities** industries. His expertise lies extensively in the areas of **Process Troubleshooting**, **Distillation Towers**, **Fundamentals of Distillation** for Engineers, **Distillation** Operation and Troubleshooting, **Advanced Distillation** Troubleshooting, **Distillation** Technology, Vacuum **Distillation**, **Distillation Column** Operation & Control, **Oil Movement** Storage & Troubleshooting, **Process Equipment** Design, **Piping Systems**, Applied **Process Engineering** Elements, **Process Plant** Optimization, **Revamping & Debottlenecking**, **Process Plant** Troubleshooting & Engineering Problem Solving, **Process Plant** Monitoring, **Catalyst** Selection & Production Optimization, Operations Abnormalities & Plant Upset, **Process Plant** Start-up & Commissioning, **Clean Fuel** Technology & Standards, Flare, Blowdown & Pressure Relief Systems, **Oil & Gas Field Commissioning** Techniques, **Pressure Vessel** Operation, **Gas Processing**, **Chemical** Engineering, **Process Reactors** Start-Up & Shutdown, **Gasoline Blending** for Refineries, **Urea Manufacturing** Process Technology, Continuous Catalytic Reformer (**CCR**), **De-Sulfurization** Technology, Advanced Operational & Troubleshooting Skills, Principles of Operations Planning, **Rotating Equipment** Maintenance & Troubleshooting, **Hazardous Waste Management & Pollution Prevention**, **Heat Exchangers & Fired Heaters** Operation & Troubleshooting, **Energy Conservation** Skills, **Catalyst Technology**, **Refinery & Process Industry**, **Chemical Analysis**, **Process Plant**, **Commissioning & Start-Up**, **Alkylation**, **Hydrogenation**, **Dehydrogenation**, **Isomerization**, **Hydrocracking & De-Alkylation**, **Fluidized Catalytic Cracking**, **Catalytic Hydrodesulphuriser**, **Kerosene Hydrotreater**, **Thermal Cracker**, **Catalytic Reforming**, **Polymerization**, **Polyethylene**, **Polypropylene**, Pilot Water Treatment Plant, **Gas Cooling**, **Cooling Water Systems**, Effluent Systems, Material Handling Systems, **Gasifier**, **Gasification**, Coal Feeder System, **Sulphur Extraction Plant**, **Crude Distillation Unit**, **Acid Plant Revamp** and **Crude Pumping**. Further, he is also well-versed in HSE Leadership, Project and Programme Management, Project Coordination, Project Cost & Schedule Monitoring, Control & Analysis, Team Building, Relationship Management, Quality Management, Performance Reporting, Project Change Control, Commercial Awareness and Risk Management.

During his career life, Mr. Frampton held significant positions as the **Site Engineering Manager**, **Senior Project Manager**, **Process Engineering Manager**, **Project Engineering Manager**, **Construction Manager**, **Site Manager**, **Area Manager**, **Procurement Manager**, **Factory Manager**, **Technical Services Manager**, **Senior Project Engineer**, **Process Engineer**, **Project Engineer**, **Assistant Project Manager**, **Handover Coordinator** and **Engineering Coordinator** from various international companies such as the **Fluor Daniel**, **KBR** South Africa, **ESKOM**, MEGAWATT PARK, CHEMEPIC, PDPS, CAKASA, **Worley Parsons**, Lurgi South Africa, **Sasol**, **Foster Wheeler**, **Bosch** & **Associates**, **BCG** Engineering Contractors, Fina Refinery, Sapref Refinery, Secunda Engine Refinery just to name a few.

Mr. Frampton has a **Bachelor's degree** in **Industrial Chemistry** from **The City University** in **London**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**) and has delivered numerous trainings, courses, workshops, conferences and seminars 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 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, 03rd of February 2025***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Piping Layout*** *P&ID's ● Piping Arrangements ● Isometrics ● B.O.M.'s ● Piping Specifications*
0930 – 0945	*Break*
0945 – 1100	***Piping Components & Valves*** *Fittings – Butt Weld ● Socket Weld ● Threaded, Valve Types & Application*
1100 – 1215	***Equipment Layout & Plot Plans*** *Civil, Structural, Electrical, Instrumentation, Maintenance Considerations*
1215 – 1230	*Break*
1230 – 1420	***Workshop (1)*** *Problem Set*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: ***Tuesday, 04th of February 2025***

0730 – 0830	***Workshop (1) Review***
0830 – 0930	***Process & Utility Piping*** *Design & Layout of Piping Containing Liquid ● Vapour ● Steam ● Condensate ● Slurries ● Etc.*
0930 – 0945	*Break*
0945 – 1100	***Distribution Systems*** *Plot Plans ● Pipe Racks – Line Spacing ● Pipe Spans ● Alloy Lines ● Vibrating Lines ● Expansion Loops*
1100 – 1215	***Pipe Supports & Hangers*** *Selection & Location ● Anchors ● Guides ● Restraints ● Variable Springs ● Constant Load Springs*
1215 – 1230	*Break*
1230 – 1420	***Horizontal Vessels*** *Placement ● Nozzle Orientation ● Internals ● Platforms ●Ladders*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: Wednesday, 05th of February 2025

0730 – 0830	***Workshop (2)*** *Review*
0830 – 0930	***Pumps & Piping*** *Layout at Horizontal Centrifugal ● Vertical Inline ● Double Suction ● Positive Displacement ● Performance Characteristics ● Maintenance*
0930 – 0945	*Break*
0945 – 1100	***Pumps & Piping (cont'd)*** *Cavitation ● Suction Piping Considerations ● Strainers ● Valving ● Parallel Layouts ● Series Layouts ● Supports ● API 610 Loads at Nozzles*
1100 – 1215	***Heat Exchangers*** *Shell & Tube ● Fin-Tube ● Plate ● Piping Layout Considerations ● Nozzle Loading*
1215 – 1230	*Break*
1230 – 1420	***Fin Fans*** *Locations ● Types ● Piping Arrangements*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4: Thursday, 06th of February 2025

0730 – 0830	***Workshop (3)*** *Review*
0830 – 0930	***Storage Tanks*** *Tank Types ● Fixed & Floating Roofs ● Dyked Area Design ● Fire Protection ● Off Site Piping*
0930 – 0945	*Break*
0945 – 1100	***Instrumentation*** *Level, Flow, Pressure & Temperature Variables ● Control Valves & Sets ● Relief Valves*
1100 – 1215	***Steam & Condensate Piping*** *Steam Traps ● Condensate Collection Systems ●Drip Legs ● Steam Tracing Manifolds*
1215 – 1230	*Break*
1230 – 1420	***Workshop (4)*** *Problem Set*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5: Friday, 07th of February 2025

0730 – 0830	***Towers & Vertical Vessels*** *Distillation Columns ● Tower Internals ● Trays ● Packings ● Reboilers ● Nozzle Orientation ● Piping at Towers ● Supports*
0830 – 0930	***Towers & Vertical Vessels (cont'd)*** *Platforms & Ladders ● Piping Layout*
0930 – 0945	*Break*
0945 – 1115	***Compressors*** *Reciprocating ● Centrifugal ● Piping at Compressors ● Vibration Considerations*
1115 – 1215	***Purposes of Stress Analysis*** *Methodology ● Static Analysis ● Using Stress Analysis Programs*

1215 – 1230	*Break*
1230 – 1315	***Stress Analysis*** *Building Flexible Layouts*
1315 – 1345	***Static Stress Analysis*** *Problem Set*
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*

Practical Sessions

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

Course Coordinator

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