



## COURSE OVERVIEW PE0650 Troubleshooting Skills

### Course Title

Troubleshooting Skills

### Course Date/Venue

June 30-July 04, 2025/Meeting Plus 9, City  
Centre Rotana, Doha, Qatar

### Course Reference

PE0650

### 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 is designed to provide comprehensive understanding of process equipment operations and troubleshooting techniques. Process equipment operations and troubleshooting methods and techniques are presented and discussed to familiarize participants with practical techniques that include **short-cut methods, rules-of-thumb** and **example problems** on the course topics.

The course covers a wide range of process equipment such as compressors, pumps, boilers, distillation columns, furnaces, heat exchangers, air coolers, fired heaters, vessels, fractionator columns, reactors and ancillary equipment.

Instructor will be available following each day's session to provide participants with further opportunity for discussion and consideration of specific problems.

### Course Objectives

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

- Apply and gain an advanced knowledge on process equipment operations and troubleshooting
- Define process plants and discuss the types, equipment and safety
- Explain the compressors technology including compressor control methods, operations, maintenance and troubleshooting
- Carryout systematic techniques and methods in the operations and troubleshooting of process vessels, pumps, boilers, heat exchangers, distillation columns, furnaces, fired heaters, fractionators, reactors and ancillary equipment.
- Employ the shortcut methods, rules-of-thumb and example problems on operations and troubleshooting process equipment

### 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**.*

### Who Should Attend

This course provides an overview of all significant aspects and considerations of operational and troubleshooting skills for process operators and technicians. Further, the course is suitable for fresh graduate engineers and experienced engineers who are new comers to the process industry. Furthermore, the course will benefit non-technical managers, contract, marketing and sales staff and management who are working in process plants.

### 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\$ 6,000** per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.




### **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 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, 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.



## 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	<b>PRE-TEST</b>
0830 – 0930	<b>Introduction</b> Process Overview • Plant Types • Plant Layout • Process Equipment • Piping System • Control & Instrumentation • Safety
0930 – 0945	Break
0945 – 1100	<b>Compressors Technology</b> Compression Process • Characteristics & Terminologies
1100 – 1230	<b>Compressors Technology (cont'd)</b> Compressor Control Methods • Operations • Maintenance & Troubleshooting
1230 – 1245	Break
1245 – 1420	<b>Process Vessels &amp; Facilities</b> Process Vessels • Storage Vessels for Gases and Liquids • Bins and Hoppers for Bulk Solids • Bagging Machines
1420 – 1430	<b>Recap</b> 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	<b>Pumps Technology</b> Operations
0830 – 0930	<b>Pumps Technology (cont'd)</b> Troubleshooting
0930 – 0945	Break
0945 – 1100	<b>Boilers Technology</b> Operations
1100 – 1230	<b>Boilers Technology (cont'd)</b> Troubleshooting
1230 – 1245	Break
1245 – 1330	<b>Heat Exchangers</b> Types • Shell-and-Tube Construction – TEMA • Heat Transfer Relation
1330 – 1420	<b>Heat Exchangers (cont'd)</b> Maintenance & Troubleshooting
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day Two

### Day 3

0730 – 0930	<b>Distillation Column</b> Flash Stages • Process Design Basic • Reflux Ratio • Minimum Reflux Ratio • Minimum Number of Plates • Optimum Reflux
0930 – 0945	Break
0945 – 1100	<b>How Trays Work</b> Down Common Backup and Flooding • Dumping and Weeping • Optimizing Tower Pressure



1100 – 1230	<b>Furnace/Fired Heaters</b> Effect of Reduced Air Flow • Absolute Combustion • Draft • Air Leakage • Efficient Air/Fuel Mixing • Optimizing Excess Air • Air Preheating, Lighting Burners and Heat Balancing
1230 – 1245	Break
1245 – 1420	<b>Furnace/Fired Heaters (cont'd)</b> Process Duty versus Heat Liberation • Heater Tube Failures • Flow in Heater Tubes • Annular Flow • Low-NOx Burners • Tube Fire-Side Heaters
1420 – 1430	<b>Recap</b> 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 – 0930	<b>Fractionators</b> Introduction • Relative Volatility • Minimum Reflux • Minimum Stages • Actual Reflux and Actual Theoretical Stages • Reflux to Feed Ratio • Actual Trays • Graphical Methods • Tray Efficiency • Diameter of Bubble Cap Trays
0930 – 0945	Break
0945 – 1100	<b>Fractionators (cont'd)</b> Diameter of Sieve/Valve Trays (F Factor) • Diameter of Sieve/Valve Trays (Smith) • Diameter of Sieve/Valve Trays (Lieberman) • Diameter of Ballast Trays • Diameter of Fractionators, General • Control Schemes • Optimization Techniques • Reboilers • Packed Columns
1100 – 1230	<b>Reactors</b> Fixed-Bed Reactors Types • Internals • Maintenance & Troubleshooting
1230 – 1245	Break
1245 – 1420	<b>Ancillary Equipment</b> Steam Jet Ejectors • Pressure Relief Devices • Maintenance & Troubleshooting
1420 – 1430	<b>Recap</b> 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 Four

#### Day 5

0730 – 0930	<b>Troubleshooting Techniques</b>
0930 – 0945	Break
0945 – 1100	<b>Exercises</b>
1100 – 1230	<b>Exercises</b>
1230 – 1245	Break
1245 – 1345	<b>Wrap-up &amp; General Discussion</b>
1345 – 1400	<b>Course Conclusion</b>
1400 – 1415	<b>POST-TEST</b>
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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