

**COURSE OVERVIEW PE0640**  
**Troubleshooting Process Operations**

**Course Title**

Troubleshooting Process Operations

**Course Date/Venue**

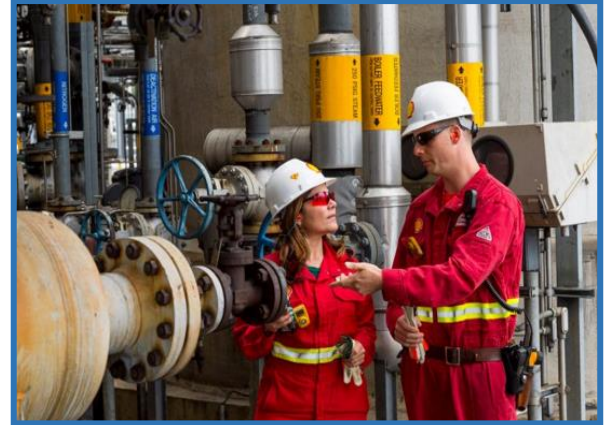
November 17-21, 2024/TBA Meeting Room,  
 Divan Istanbul Hotel, Istanbul, Turkey

**Course Reference**

PE0640

**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.***



Production processes consist of many complex apparatuses involving both moving and static parts as well as interconnecting pipes, control mechanisms and electronics, mechanical and thermal stages, heat exchangers, waste and side product processing units, power ducts and many others.



Bringing such a complicated unit online and ensuring its continued productivity requires substantial skill at anticipating, detecting and solving acute problems. Failure to identify and resolve these problems quickly can lead to lost production, off-spec product, equipment loss, and even catastrophic accidents. Therefore, the ability to troubleshoot process operations is one of the most valuable skills operations personnel can possess.

Troubleshooting is the process used to diagnose the fault safely and efficiently, decide on corrective action and prevent the fault from reoccurring. Process engineering, especially troubleshooting, is different from most other branches of technology in another respect: It is not advancing very quickly.

The principles of distillation, hydraulics, phase separation, and heat transfer, as they apply to process applications, have been well known for quite some time. The challenge in troubleshooting consists of untangling the influence that human error, mechanical failure, and corrosion have on these well-known principles. The aspect of the job that makes it so difficult is that most process problems are initiated by human error – a never-ending source of surprise.

This course is designed to provide instruction in the different types of troubleshooting techniques, procedures, and methods used to solve process problems. Participants will use existing knowledge of equipment, systems, and instrumentation to understand the troubleshooting process operations of an entire unit in a facility. Participants study concepts related to troubleshooting commissioning, normal startup, normal operations, normal shutdown, turnarounds, and abnormal situations, as well as the Process team role in performing tasks associated with these concepts within an operating unit.

### **Course Objectives**

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

- Apply systematic techniques in troubleshooting process operations and carryout successful troubleshooting activities
- Follow a structured technique for problem solving and troubleshooting process operation, using the guide-words: engage – define – explore – plan – do – check
- Analyze the mental problem-solving process and demonstrate the use of the troubleshooter's worksheet
- Practice the rules-of-thumb techniques for trouble-shooting process equipment and enumerate the typical causes of problems with process equipment that covers an extensive range of process equipment
- Develop problem solving, data gathering & interpersonal skills and recognize the importance of these skills in troubleshooting process operations
- Practice the trouble-shooting skills by working in small workshops on a wide range of case studies drawn from the process industries

### **Who Should Attend**

This course covers systematic techniques in troubleshooting process operations and carrying out successful troubleshooting activities. Process engineers, maintenance engineers, maintenance staff, plant engineers, team leaders, section heads, production engineers, operations engineers and field engineers will definitely benefit from the engineering problem solving approach of the course. Shift foremen, plant supervisors and other technical staff will gain an excellent knowledge from the practical aspects of this course.


**Pre-Requisite:** Participants must have a good understanding on the chemical engineering basic principles of operations and process equipment.

### 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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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.

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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.

### Course Fee

**US\$ 6,000** per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

### 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. Saleh Aich** is a **Process Engineer** with over **20 years** of extensive experience within the **Oil & Gas, Petrochemical** and **Refining** industries. His expertise widely covers in the areas of **Fired Heaters & Air Coolers, Pressure Vessels & Valves, Process Troubleshooting, Distillation Towers, Fundamentals of Distillation** for Engineers, **Distillation** Operation and Troubleshooting, **Advanced Distillation**

**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, Process Reactors Start-Up & Shutdown, Gasoline Blending** for Refineries, **Urea Manufacturing Process Technology, Continuous Catalytic Reformer (CCR), De-Sulfurization Technology, Advanced Operational & Troubleshooting Skills and Principles of Operations Planning.** Further, he is also well-versed in **Pump** Operation & Maintenance, **Compressor** Maintenance & Troubleshooting, **Gas Turbine** Control & Protection Systems, **Valve** Troubleshooting & Maintenance, **Vibration** Analysis, **Oil** Analysis, **Dry Gas Seals, Packing & Mechanical Seals, Seal Support Systems, Mechanical Seal Failure Analysis & Troubleshooting, Seal Maintenance & Repair, Bearing Care & Maintenance, Couplings & Alignment, Alignment Methods, Troubleshooting Piping & Pipe Support Systems, Heat Exchangers Maintenance & Inspection, Pressure Vessel Design, Fabrication & Testing, Burners, Blowers, Piston & Plunger Gearboxes, Fin-Fans, Separators, Expansion Drums, Filters, Molecule Sieve, Tanks, Fittings, Root Cause Failure Analysis (RCFA), Computerized Maintenance Management System (CMMS), Maintenance Management, Planning & Scheduling Work Management, Parts & Inventory Management, Turnaround & Shutdowns, Condition Monitoring, Regeneration Unit, NGL & Condensate, Furnace Operation & Troubleshooting, Performance Measure & Indicators, Total Productive Maintenance (TPM), Preventive & Predictive Maintenance Analysis, Rotating & Static Equipment, Machinery & Equipment Failure Analysis, Gas & Steam Turbines, Boilers, Coolers, Diesel & Gas Engines, Heaters, Separators, Storage Tanks, H<sub>2</sub>S and ISO 9001:2008 Internal Quality Management System**

During his career life, Mr. Saleh has gained his practical and field experience through his various significant positions and dedication as the **Maintenance Instructor, Mechanical Supervisor, Maintenance Engineer, Mechanical Engineer, Process Engineer, Contract Engineer, Planning Engineer** and **Senior Instructor/Lecturer** for various multi-national companies such as the **ADNOC Gas Processing (GASCO), ConocoPhillips** and **Syrian Gas Company.**

Mr. Saleh has a **Bachelor's** degree in **Mechanical Engineering.** Further, he is a **Certified Instructor/Trainer** and has acquired various certifications and has further delivered numerous training, courses, workshops, seminars and conferences worldwide.



**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: Sunday, 17<sup>th</sup> of November 2024**

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	<b>PRE-TEST</b>
0830 – 0930	<b>What is Troubleshooting?</b> Characteristics of a Trouble-Shooting Problem • Characteristics of the Process Used to Solve Trouble-Shooting Problems
0930 – 0945	Break
0945 – 1100	<b>Self-Assessment &amp; Case Studies</b>
1100 – 1230	The Mental Problem-Solving Process Problem Solving • Troubleshooting • Overall Summary of Major Skills & a Worksheet • Example Use of the Trouble-Shooter’s Worksheet
1230 – 1245	Break
1245 – 1420	<b>Video</b>
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day One

**Day 2: Monday 18<sup>th</sup> of November 2024**

0730 – 0930	<b>Rules of Thumb for Troubleshooting</b> Overall • Transportation Problems • Energy Exchange • Homogenous Separation • Heterogenous Separations • Reactor Problems • Mixing Problems • Size-Decrease Problems • Size Enlargement • Vessels, Bins, Hoppers & Storage Tanks • “Systems” Thinking • Health, Fire & Stability
0930 – 0945	Break
0945 – 1100	<b>Case Study Observation</b>
1100 – 1230	<b>Problem Solving Skills</b> Developing Awareness of the Problem-Solving Process • Strategies • Exploring the “Context”: What is the Real Problem?
1230 – 1245	Break
1245 – 1420	<b>Video</b>
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day Two





**Day 3: Tuesday, 19<sup>th</sup> of November 2024**

0730 – 0930	<b>Problem Solving Skills (cont'd)</b> <i>Creativity • Self-Assessment</i>
0930 – 0945	<i>Break</i>
0945 – 1100	<b>Data Gathering Skills</b> <i>How to Select Valid Diagnostic Actions • Consistency: Definitions, Cause-Effect &amp; Fundamentals • Classification • Recognizing Patterns • Reasoning</i>
1100 – 1230	<b>Interpersonal Skills</b> <i>Interpersonal Skills • Factors that Affect Personal Performance • The Environment</i>
1230 – 1245	<i>Break</i>
1245 – 1420	<b>Video</b>
1420 – 1430	<b>Recap</b>
1430	<i>Lunch &amp; End of Day Three</i>

**Day 4: Wednesday, 20<sup>th</sup> of November 2024**

0730 – 0930	<b>Case Studies - Working in Groups</b> <i>Case Study chosen from a list by the class</i>
0930 – 0945	<i>Break</i>
0945 – 1145	<b>Case Studies - Working in Groups (cont'd)</b> <i>Case Study Chosen from a List by the Class (cont'd)</i>
1145 – 1230	<b>Case Studies - Working in Groups (cont'd)</b> <i>Case Study Chosen from a List by the Class (cont'd)</i>
1230 – 1245	<i>Break</i>
1245 – 1420	<b>Video</b>
1420 – 1430	<b>Recap</b>
1430	<i>Lunch &amp; End of Day Four</i>

**Day 5: Thursday, 21<sup>st</sup> of November 2024**

0730 – 0930	<b>Case Studies - Working in Groups (cont'd)</b> <i>Case Study Chosen from a List by the Class (cont'd)</i>
0930 – 0945	<i>Break</i>
0945 – 1145	<b>Case Studies - Working in Groups (cont'd)</b> <i>Case Study Chosen from a List by the Class (cont'd)</i>
1145 – 1230	<b>Case Studies - Working in Groups (cont'd)</b> <i>Case Study Chosen from a List by the Class (cont'd)</i>
1230 – 1245	<i>Break</i>
1245 – 1345	<b>Case Studies - Working in Groups (cont'd)</b> <i>Case Study Chosen from a List by the Class (cont'd)</i>
1345 – 1400	<b>Course Conclusion</b>
1400 – 1415	<b>POST-TEST</b>
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch &amp; End of Course</i>

### Practical Sessions

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



- The Case of the Cycling Column
- The Sulfuric Acid Pump Problem
- The Case of the Reluctant Crystallizer
- The Lousy Control System
- The Case of the Flashy Flare
- The Drooping Temperatures
- The Case of the Platformer Fires
- The Case of the Utility Dryer
- The Lazy Twin
- The Case of the Dirty Vacuum Gas Oil
- The Case of the Delinquent Exchangers
- The Boiler Feed Heater

### Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: [mari1@haward.org](mailto:mari1@haward.org)