# COURSE OVERVIEW PE0640
# Troubleshooting Process Operations

**Course Title**
Troubleshooting Process Operations


**Course Date/Venue**
September 28-October 02, 2025/Safir Meeting Room, Divan Istanbul, Taksim, 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

## 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 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**

Haward's 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**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). 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.

## 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:

**Dr. John Petrus**, PhD, MSc, BSc, is a **Senior Process Engineer** with over **30 years** of **onshore & offshore** experience within the **Oil & Gas**, **Refinery** and **Petroleum** industries. His wide experience covers in the areas of **De-Sulfurization** Technology, **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**), Advanced Operational & Troubleshooting Skills, Principles of Operations Planning, **Rotating Equipment** Maintenance & Troubleshooting. Further he is also well versed in **Rotating Machinery** Principles & Applications, **Rotating Equipment** Selection, Operation, Maintenance, Inspection & Troubleshooting, **Rotating Machine/Equipment** in Industry, **Control Valves & Actuators**, **PSV** Maintenance & Testing, **Pump Selection**, Installation, Performance & Control, **Screw Compressor** Theory and Troubleshooting, **Reliability-Centered Maintenance** (**RCM**), **Preventive & Predictive Maintenance**, **Spare Parts Planning & Inventory** Management, Computerized Maintenance Management Systems (**CMMS**), **Process Plant Shutdown & Turnaround**, **Maintenance Optimization** & Best Practices, **Reliability Centered Maintenance** Principles & Application, Efficient Shutdowns, Turnaround & Outages, Effective Reliability Maintenance & Superior Maintenance Strategies, **Integrity & Asset** Management, **Total Plant Reliability** Maintenance, **Vibration** Measurement, **Advanced Analytics** in Oil & Gas, **Business Intelligence Data Analytics**, Audit Analytics & Computer-Assisted Audit Techniques (**CAATs**), **Basic Database** Concepts & Data Formats, **Data Analysis** Cycle & Best Practices, **Data Importing & Integrity** Verification, **Advanced Analytics Tools** in **Auditing**, Leveraging **AI & Machine Learning** in **Audits**, **Data Mining Techniques** for Auditors, **Data Analytics** for Managerial Decision Making, **Business Process Analysis**, Mapping & Modeling, **Research Methods & Analysis**, **Statistical Data Needs Analysis**, Oil & Gas Industry **Business Environment & Competitive Intelligence Gathering & Analysis**, Petroleum **Economics & Risk Analysis**, Certified **Data Analysis**, **Risk Management** & SWIFT Analysis, Best Practices Management System (**BPMS**), **GIS System** Management, **Database** Management, Strategic Planning, Best Practices and Workflow, **Quality** Management, **Project** Management and **Risk Assessment** & Uncertainty Evaluation. Further, he is also well-versed in **seismic interpretation**, **mapping** & **reservoir modelling tools** like **Petrel** software, **LandMark**, **Seisworks**, **Geoframe**, **Zmap** and has extensive knowledge in MSDos, Unix, **AutoCAD**, MAP, Overlay, Quicksurf, 3DStudio, **Esri ArcGIS**, Visual Lisp, Fortran-77 and Clipper. Moreover, he is a world **expert** in **analysis** and **modelling** of **fractured prospects** and **reservoirs** and a **specialist** and **developer** of **fracture modelling software tools** such as FPDM, FMX and DMX Protocols.

During his career life, Dr. Petrus held significant positions and dedication as the **Executive Director**, **Senior Geoscience Advisor**, **Exploration Manager**, **Project Manager**, **Manager**, **Process Engineer**, **Mechanical Engineer**, **Maintenance Engineer**, **Chief Geologist**, **Chief** of **Exploration**, **Chief** of **Geoscience**, **Senior Geosciences Engineer**, **Senior Explorationist**, **Senior Geologist**, **Geologist**, **Senior Geoscientist**, **Geomodeller**, **Geoscientist**, **CPR Editor**, **Resources Auditor**, **Project Leader**, **Technical Leader**, **Team Leader**, **Scientific Researcher** and **Senior Instructor/Trainer** from various international companies and universities such as the Dragon Oil Holding Plc., ENOC, MENA, ENI Group of Companies, Ocre Geoscience Services (OGS), Burren RPL, Ministry of Oil-Iraq, Eni Corporate University, Standford University, European Universities, European Research Institutes, NorskHydro Oil Company, Oil E&P Companies, just to name a few.

Dr. Petrus has a **PhD** in **Geology** and **Tectonophysics** and **Master** and **Bachelor** degrees in **Earth Sciences** from the **Utrecht University**, **The Netherlands**. Further, he is a **Certified Instructor/Trainer**, a **Certified Trainer/Assessor/Internal Verifier** by the **Institute of Leadership & Management** (**ILM**), a Secretary and Treasurer of Board of Directors of Multicultural Centre, Association Steunfonds SSH/SSR and Founding Member of Sfera Association. He has further published several scientific publications, journals, research papers and books and delivered numerous trainings, workshops, courses, seminars 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$ 6,000** 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:*** ***Sunday, 28th of September 2025***

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

***Day 2:*** ***Monday, 29th of September 2025***

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| *0730 – 0930* | ***Rules of Thumb for Troubleshooting***<br>*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* |

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| 0945 – 1100 | ***Case Study Observation*** |
| 1100 – 1230 | ***Problem Solving Skills***<br>*Developing Awareness of the Problem-Solving Process ● Strategies ● Exploring the "Context": What is the Real Problem?* |
| 1230 – 1245 | *Break* |
| 1245 – 1420 | ***Video*** |
| 1420 – 1430 | ***Recap*** |
| 1430 | *Lunch & End of Day Two* |

***Day 3:*** ***Tuesday, 30th of September 2025***

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

***Day 4:*** ***Wednesday, 01st of October 2025***

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

***Day 5:*** ***Thursday, 02nd of October 2025***

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| 0730 – 0930 | ***Case Studies - Working in Groups (cont'd)***<br>*Case Study Chosen from a List by the Class (cont'd)* |
| 0930 – 0945 | *Break* |
| 0945 – 1145 | ***Case Studies - Working in Groups (cont'd)***<br>*Case Study Chosen from a List by the Class (cont'd)* |
| 1145 – 1230 | ***Case Studies - Working in Groups (cont'd)***<br>*Case Study Chosen from a List by the Class (cont'd)* |
| 1230 – 1245 | *Break* |
| 1245 – 1345 | ***Case Studies - Working in Groups (cont'd)***<br>*Case Study Chosen from a List by the Class (cont'd)* |
| 1345 – 1400 | ***Course Conclusion*** |
| 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:-

- 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

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