



COURSE OVERVIEW PE0114

Process Plant Troubleshooting & Engineering Problem Solving

Course Title

Process Plant Troubleshooting & Engineering Problem Solving

Course Date/Venue

November 16-20, 2025/Al Aziziya Hall, The Proud Hotel Al Khobar, Al Khobar, KSA

Course Reference

PE0114

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



Course Description



This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.



Modern industrial processes are large, complex and have a high degree of interaction between both dependent and independent variables. This makes problem solving difficult and leads to the “disappearing problem” syndrome. Problems often disappear without being solved only to reappear again. This course deals with a unique approach of combining cause and effect problem solving thinking with formulation of theoretically correct working hypotheses to provide rapid and effective problem-solving techniques for the process industry.



Problem Solving in the process industry is often characterized by either inference based on cause-and-effect relationships or highly involved theoretical approaches. Neither of these approaches is satisfactory in a modern manufacturing environment. The cause/effect inference approach while being expedient often results in solutions that do not eliminate the problem, but in fact make the problem worse. The more sophisticated highly theoretical approach is rarely expedient enough to satisfy time constraints in a production facility. Thus, one of the most frequent industry requests to the academic world is “give us people that can solve problems”.





This course presents an approach that emphasizes the classical problem-solving approach (defining the sequence of events) with the addition of the steps of formulating a theoretically correct working hypothesis, providing a means to test the hypothesis, and providing a foolproof means to eliminate the problem. The initial part of the course focuses on defining the problem that must be solved and obtaining the location, time and quantity-based specifications of the problem. The initial part of the course is suitable for all engineering disciplines as well as non-engineers.

The second part of the course deals with the utilization of chemical engineering fundamentals to develop a technically correct working hypothesis that is the key to successful problem solving. The primary emphasis is on pragmatic calculation techniques that are theoretically correct. These techniques have been developed by the course Instructor in 30+ years of industrial experience. Using these techniques, theoretically correct working hypotheses can be developed in an expedient fashion.

The course includes both sample problems as well as problem working sessions to allow the participants to develop confidence with the approach.

The attendees are encouraged to bring real problems that they are working to use in discussions on the last day of the course. These problems should be of a non-confidential nature that can be discussed without violation of any confidentiality restrictions.

Course Objectives

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

- Apply and gain an in-depth knowledge on process plant troubleshooting and engineering problem solving
- Enumerate the components of plant problem solving as well as the various troubleshooting techniques on engineering problem solving by familiarizing the potential sources
- Specify the limitations to plant problem solving through sources of historical data and explain the daily monitoring system guidelines by setting trigger points
- Apply the methods of risk analysis particularly HAZOP and MSDS in process plant troubleshooting and practice the process of engineering problem solving through sample problems in troubleshooting
- Discuss the scope of applied economics including other valuation forms & methods, and review the guidelines for problem solving temperature, pressure, and level
- Employ the simplified approach in solving compressor problems, distillation, plates & tray stability, discuss clearly the elements of measurements & verifications and carryout sample exercise on kinetics, flow, mechanical and designs
- Recognize the attributes of equivalent piping lengths, commercial correlations and fluids by means of practical exercises
- Discuss the importance of two-phase flow including its attributes and applications and analyze the characteristics of controllers, feedback, feedforward and cascade controls used in process control





- Recognize process control and optimization, process analyzers, distillation multiple control, volume control, condenser control and control project drawback
- Employ heat transfer and various troubleshooting techniques and applications used in process plant
- Implement the procedures on distillation column packing and identify the different forms of hazards to equip them with the QRA procedures and demonstration
- Carryout proper methodology of MSDS and discuss if the needed information is good enough or incomplete

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, sample video clips of the instructor’s actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides a complete and up-to-date overview of the process plant troubleshooting techniques and procedures used to solve engineering problems. Process engineers, plant managers, team leaders, section heads, plant supervisors and other technical staff will definitely benefit from the engineering problem solving approach of the course.

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\$ 5,500 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 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 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. Adel Abdallah is a **Senior Water & Process Engineer** with almost **25 years** of extensive experience within the **Power & Water Utilities** and **other Energy** sectors. His expertise widely covers in the areas of **Municipal Wastewater Treatment Facility Operation, Water Network Design & Hydraulic Modelling, Water Utility Industry, Sewage & Industrial Waste Water Treatment, Water Reservoir, Water Storage Reservoir, Water Reservoirs & Pumping Stations, Water Pumping Station, , Water Distribution Systems & Pumping Stations, Reservoirs & Pumping Stations Design & Operation, Pumping Systems, Interconnecting Pipelines, Pump Houses & Booster Pumping Stations, Water Pipes & Fittings, Water Hydraulic Modelling, Water Network Hydraulic Simulation Modelling, Water Balance Modelling, Water Pipelines Materials & Fittings, Water Distribution System, Water Distribution Network, Water Network System Design, Water Network System Analysis, Water Network System Extension, Water Network System Replacement & Upgrade, Water Networks Optimization, Water Tanks, Water Forecasts Demand, Waste Water Effluent Treating Facilities, Effluent Treatment & Slurry Handling, Oily Water Treatment Technology, Water Equipment Selection & Inspection, Water Testing & Commissioning Techniques, Wastewater Treatment, Water Supply Design, Potable Water Transmission, Districts Meters Areas (DMAs), Water Supply & Desalination Plants Rehabilitation, Water Supply & Distribution Systems Efficiency & Effectiveness, Water Treatment Technology, Reverse Osmosis, MSF Plants, Extended Activated Sludge Treatment, MBBR, Water Quality Analysis, Steam Boiler, Hydro-Treating Technology and Water Storage Tanks.** Further, he is also well-versed in **Chemical Reactors Design, Operation and Control, Fundamentals of Process Operations, Crude Oil & Refinery Products, Sampling & Feed/Product Quality, Process Troubleshooting & Problem Solving, Hydro-Treating Technology, Catalysts, Distillation Column, Process Heaters/Furnaces, Reboilers, Condensers, Process Troubleshooting, Distillation Towers, Fundamentals of Distillation for Engineers, Distillation Operation and Troubleshooting, Process Equipment Design, Applied Process Engineering Elements, Process Plant Optimization, Revamping & Debottlenecking, Process Plant Troubleshooting & Engineering Problem Solving, Process Plant Monitoring and Catalyst Selection & Production Optimization.**

During Mr. Abdallah's career life, he has handled challenging positions wherein he has acquired his wide technical and practical experience such as the **Water Engineer, Project Site Engineer, Water & Wastewater Treatment System Plant Engineer, Senior Water & Wastewater Plant Engineer, Production Supervisor, Process Engineer, Technical Engineer, Chemical Engineer and Senior Instructor/Consultant** for various companies such as the Water Authority of Jordan, Metito Overseas, Al-Hassan Industrial Estate, UIP-FCEC JV Design and Build Company, Degussa MBT, Al-Mas Resin Factory, Jordanian Tunisian Chemicals Co. and National Chlorine Company.

Mr. Abdallah has a **Bachelor's degree in Chemical Engineering.** Further, he is a **Certified Instructor/Trainer** and delivered numerous courses, trainings, conferences, seminars and workshops 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: Sunday, 16th of November 2025

0730 – 0800	<i>Registration & Coffee</i>
0800 – 0815	<i>Welcome & Introduction</i>
0815 – 0830	PRE-TEST
0830 – 0845	Troubleshooting
0845 – 0900	Definition, Potential Sources
0900 – 0915	Engineering Problem Solving
0915 – 0930	Course Approach
0930 – 0945	<i>Break</i>
0945 – 1015	Components of Plant Problem Solving
1015 – 1045	Limitations to Plant Problem Solving
1045 – 1115	Sources of Historical Data
1115 – 1145	Daily Monitoring System Guidelines
1145 – 1215	Setting Trigger Points
1215 – 1230	<i>Break</i>
1230 – 1300	Disciplined Learned Problem-Solving Approach
1300 – 1330	Step 1 to Step 6 - Considerations
1330 – 1400	Risk Analysis - HAZOP - MSDS
1400 – 1420	Troubleshooting Manual: Sample Problems
1420 – 1430	Recap
1430	<i>Lunch & End of Day One</i>

Day 2: Monday, 17th of November 2025

0730 – 0815	Applied Economics
0815 – 0900	Valuation Principles & Methods
0900 – 0930	Other Valuation Principle & Methods
0930 – 0945	<i>Break</i>
0945 – 1030	Compressor - Compressor Problems - Simplified Approach
1030 – 1130	Distillation, Plates, Tray Stability
1130 – 1215	Guidelines for Problem Solving Temperature, Pressure, Level
1215 – 1230	<i>Break</i>
1230 – 1330	Measurements, Verification
1330 – 1420	Sample Exercise Kinetics, Flow, Mechanical, Design
1420 – 1430	Recap
1430	<i>Lunch & End of Day Two</i>

Day 3: Tuesday, 18th of November 2025

0730 – 0745	Fluid Overview - Basic Principles
0745 – 0800	Fluid Overview - Head Definition
0800 – 0830	Equivalent Piping Lengths
0830 – 0900	Commercial Correlations
0900 – 0915	Practical Exercises
0915 – 0930	<i>Break</i>





0930 – 1000	<i>Two Phase Flow/Theory & Applications</i>
1000 – 1015	<i>Practical Exercises</i>
1015 – 1045	<i>Process Control – Introduction; PID</i>
1045 – 1115	<i>Controllers, Feedback, Feedforward & Cascade Controls</i>
1115 – 1145	<i>Advanced Control; Multi-loop</i>
1145 – 1200	<i>Break</i>
1200 – 1230	<i>Controllers; Process Control & Optimization</i>
1230 – 1300	<i>On Line Optimization; Process Analysers</i>
1300 – 1330	<i>Distillation Multiple Control; Volume Control</i>
1330 – 1400	<i>Condenser Control, Practical Considerations, Advanced</i>
1400 – 1420	<i>Control Project Drawback</i>
1420 – 1430	<i>Recap</i>
1430	<i>Lunch & End of Day Three</i>

Day 4: Wednesday, 19th of November 2025

0730 – 0930	<i>Heat Transfer Overview</i>
0930 – 0945	<i>Break</i>
0945 – 1115	<i>Troubleshooting Techniques/Applications</i>
1115 – 1145	<i>Practical Exercises</i>
1145 – 1200	<i>Break</i>
1200 – 1400	<i>Distillation Column Packing</i>
1400 – 1420	<i>Practical Exercises</i>
1420 – 1430	<i>Recap</i>
1430	<i>Lunch & End of Day Four</i>

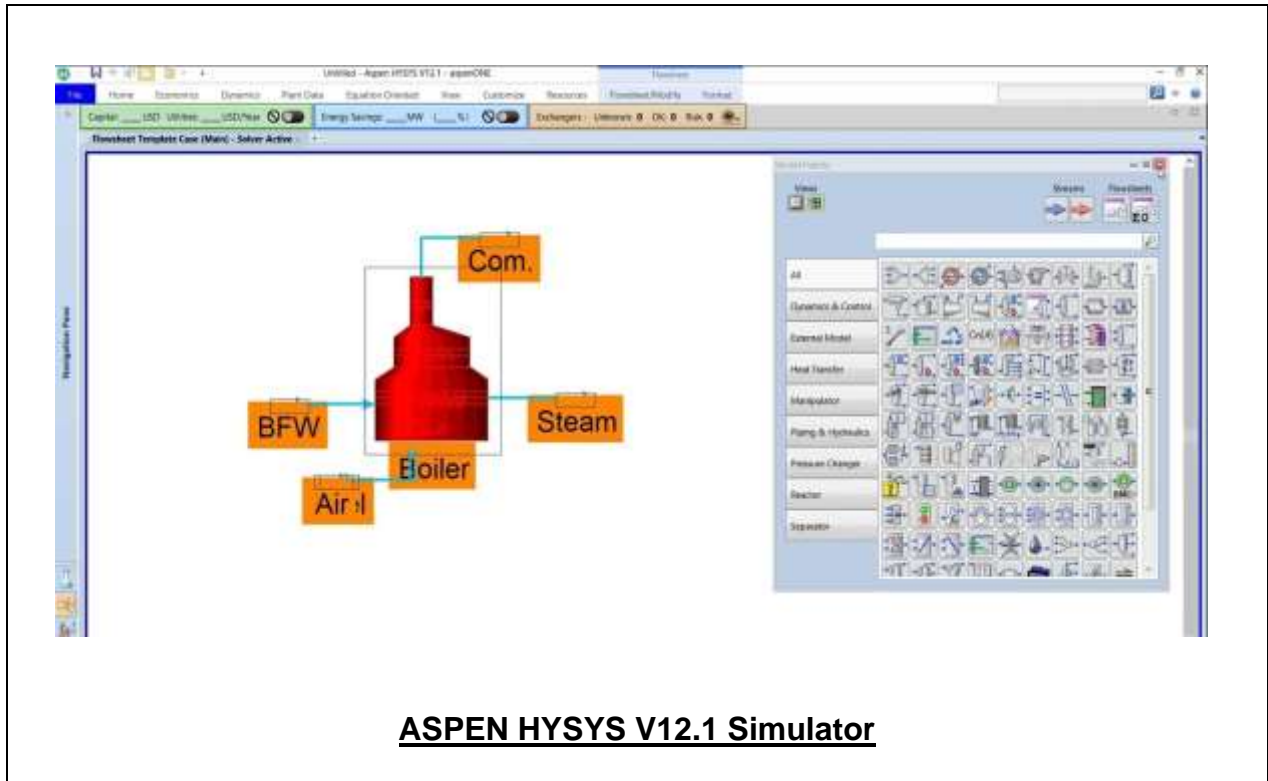
Day 5: Thursday, 20th of November 2025

0730 – 0815	<i>Hazards</i>
0815 – 0900	<i>Demonstration</i>
0900 – 0945	QRA <i>“Ishikawa” Diagrams • Exercises</i>
0945 – 1000	<i>Break</i>
1000 – 1045	MSDS
1045 – 1130	<i>Needed Information, Is it Good Enough?</i>
1130 – 1215	<i>Incomplete?</i>
1215 – 1230	<i>Break</i>
1230 – 1300	Accidents
1300 – 1330	FLIXBOROUGH ACCIDENT
1330 – 1345	<i>Lessons learned, General Information</i>
1345 – 1400	<i>Course Conclusion</i>
1400 – 1415	POST-TEST
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>



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 “ASPEN HYSYS” simulator.



Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org