COURSE OVERVIEW PE0114
Process Plant Troubleshooting & Engineering Problem Solving

Course Title
Process Plant Troubleshooting & Engineering Problem Solving

Course Date/Venu
February 04-08, 2024/Kizkulesi, Crown Plaza Istanbul Asia Hotels & Convention Center, Istanbul, Turkey

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

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.

Accommodation

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

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.

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:-

- 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.

- 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. Henry Beer is a **Senior Process Engineer** with **35 years** of in-depth industrial experience within the **Petrochemical**, **Oil & Gas** and **Refinery** industries. His wide expertise covers in the areas of **Process Systems** Foundations, **Gas Processing Plant** Operations & Control, **Gas Processing** Monitoring & Troubleshooting, **Chemical Engineering**, **Process Equipment Design & Troubleshooting**, **Polymers & Polymerization**, Applied **Process Engineering**, **Process Plant** Optimization, **Process Plant** Troubleshooting & Engineering Problem Solving, **Process** Plant Performance & Efficiency, **Flare Blowdown & Pressure Relief Systems**, **Polypropylene** Manufacturing, **Polyethylene** & Process Troubleshooting, **Process Operation Troubleshooting**, **Fluidized Bed Reactor**, **Oil Movement & Storage**, **Power Plant Chemistry**, **Catalyst** Manufacturing Techniques, **Fuel Systems** Management, **Process Design & Optimization**, **Aviation Fuel**, **Diesel Engine**, **Jet Fuel**, **Petrol**, IP Octane, Cetane Control, **Pipeline Distribution**, **Boiler** Fundamental Preparation, Flocculation Sedimentation, Hotline Water Softening Processes, **Desalination Processes**, **Reverse Osmosis**, **Molecular Sieves**, Loop Water Management System, **Sludge Removal**, **Cooling Water System**, **Tank Farms** and **Hydrocarbons**. Currently, he is the **Director** and **Senior Technical Consultant** wherein he is deeply involved in developing new industrial process and designing new process plants and equipment.

During his career life, Mr. Beer has gained his practical and field experience through his various significant positions and dedications as the **Global Commissioning Manager**, **Senior Business Analyst**, **Process Engineer**, **Chemical Engineer**, **Technical Sales Engineer**, **Senior Technician**, **Entrepreneur**, **Financial Consultant**, **Business Analyst**, **Business Financial Planner**, **Independent Financial Planner**, **Investment Independent Financial Advisor**, **Financial Broker**, **Trainer/Instructor** and **Technical Consultant** for various international companies such as the Sasol, TAG Solvents, Virgin Solvent Products, RFS Financial Services (Pty) Ltd, FNB and GHC Trading.

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, 04th of February 2024***
0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0845	***Troubleshooting***
0845 – 0900	***Definition, Potential Sources***
0900 – 0915	***Engineering Problem Solving***
0915 – 0930	***Course Approach***
0930 – 0945	*Break*
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	*Break*
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	*Lunch & End of Day One*

Day 2:	***Monday, 05th of February 2024***
0730 – 0815	***Applied Economics***
0815 – 0900	***Valuation Principles & Methods***
0900 – 0930	***Other Valuation Principle & Methods***
0930 – 0945	*Break*
0945 – 1030	***Compressor – Compressor Problems – Simplified Approach***
1030 – 1130	***Distillation, Plates, Tray Stability***
1130 – 1215	***Guidelines for Problem Solving Temperature, Pressure, Level***
1215 – 1230	*Break*
1230 – 1330	***Measurements, Verification***
1330 – 1420	***Sample Exercise Kinetics, Flow, Mechanical, Design***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3:	***Tuesday, 06th of February 2024***
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	Break
0930 – 1000	**Two Phase Flow/Theory & Applications**
1000 – 1015	**Practical Exercises**
1015 – 1045	**Process Control – Introduction; PID**
1045 – 1115	**Controllers, Feedback, Feedforward & Cascade Controls**
1115 – 1145	**Advanced Control; Multi-loop**
1145 – 1200	Break
1200 – 1230	**Controllers; Process Control & Optimization**
1230 – 1300	**On Line Optimization; Process Analyzers**
1300 – 1330	**Distillation Multiple Control; Volume Control**
1330 – 1400	**Condenser Control, Practical Considerations, Advanced**
1400 – 1420	**Control Project Drawback**
1420 – 1430	**Recap**
1430	Lunch & End of Day Three

Day 4: Wednesday, 07th of February 2024

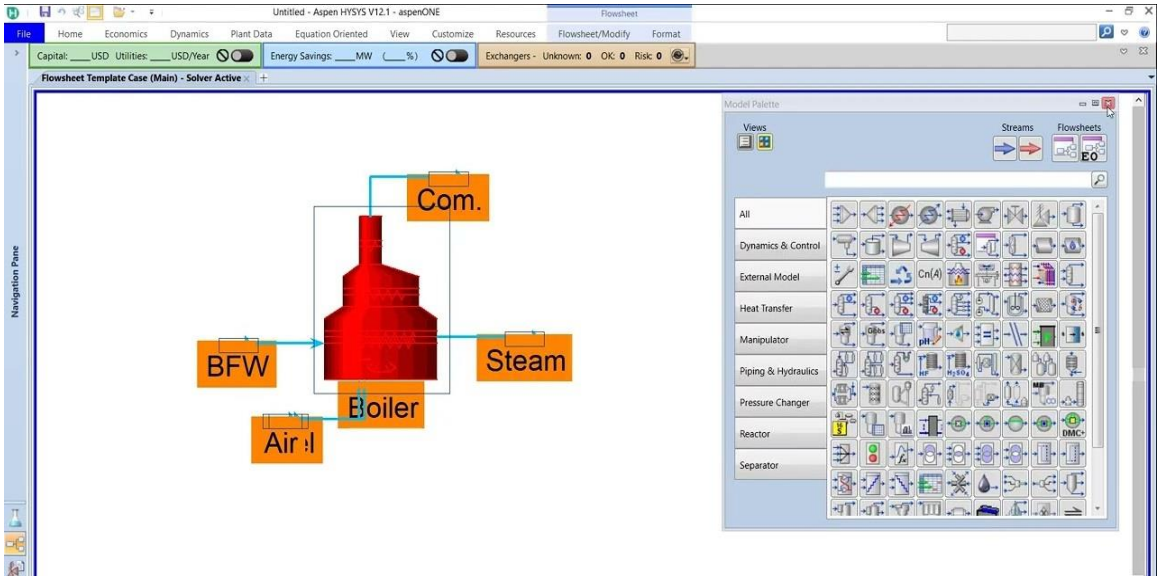
0730 – 0930	**Heat Transfer Overview**
0930 – 0945	Break
0945 – 1115	**Troubleshooting Techniques/Applications**
1115 – 1145	**Practical Exercises**
1145 – 1200	Break
1200 – 1400	**Distillation Column Packing**
1400 – 1420	**Practical Exercises**
1420 – 1430	**Recap**
1430	Lunch & End of Day Four

Day 5: Thursday, 08th of February 2024

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

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.



ASPEN HYSYS V12.1 Simulator

Course Coordinator

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