COURSE OVERVIEW PE0912
Advanced Refinery Operations, Plants Process & Troubleshooting

Course Title
Advanced Refinery Operations, Plants Process & Troubleshooting

Course Date/Venue
November 17-21, 2024/Club B Meeting Room, Ramada Plaza by Wyndham Istanbul City Center, Istanbul, Turkey

Course Reference
PE0912

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.

Refinery 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 refinery operations is one of the most valuable skills operations personnel can possess.

Typical refineries operate about 26 days of the month to cover costs. The remaining days in the month they operate to make a profit. If the process is down for five days, then the company cannot cover costs and no profit has been made. Engineers must quickly and successfully solve any troublesome problems that occur. Sometimes the problems occur during startup; sometimes, just after a maintenance turn-around; and sometimes unexpectedly during usual operation. A troubleshooting problem is one where something occurs that is unexpected to such an extent that it is perceived that some corrective action may be needed. The trouble usually occurs somewhere in a system that consists of various pieces of interacting equipment run by people.

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 refinery problems are initiated by human error – a never-ending source of surprise.

Most Refinery troubles have a simple origin. However, this simple origin is clouded by false data, misconceptions, superficial observations, and third-hand reports. The error that most engineers often make is that they develop a theory, usually with process computer simulations, as to the cause of the malfunction. The theory is then reviewed with management and other technical personnel at a large meeting. If no one objects to the theory, it is accepted as the solution to the problem. Technical training is one tool that should be taken into the field to reveal the underlying problem, but confining the investigation to technical areas only will severely limit the chances of success.

Course Objectives

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

- Apply and gain an in-depth knowledge on advanced refinery operations, plants process and troubleshooting

- Discuss petroleum refinery process including crude processing, desalting, atmospheric distillation and vacuum distillation

- Explain heavy oils processing and bottom of the barrel upgrading covering the cocking and thermal processes, delayed coking, fluid coking, flexicoking and visbreaking

- Carryout process of production that covers the fluid catalytic cracking, hydrocracking, cat cracking, isomerization, alkylation, hydrotreating and catalytic reforming

- Review process operations key operational conditions and factors as well as discuss blending for product specifications, hydrogen production, refinery gas plants and acid gas treating

- Identify process troubleshooting including troubleshooting concepts and techniques, troubleshooting tools, typical problems, flooding and its detection

- Determine refinery economics comprising of residue reduction, asphalt and residual fuel, refinery complexity and netback

Who Should Attend

This course provides a basic overview of all significant aspects and considerations of advanced refinery operations plants process and troubleshooting for process engineers, process technical staff, plant managers, team leaders, section heads, production managers, production engineers, operations managers, operations engineers, refinery managers, engineers, superintendents, supervisors, shift superintendents and foremen, plant supervisors, operators, lead operators, area superintendents and technical staff to improve their knowledge on refinery process unit operation and equipments used in operation and handling of process and equipments during any problem and emergency.

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.

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:

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, **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 Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

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, 17th of November 2024**

0730 – 0745	*Registration & Coffee*
0745 – 0800	*Welcome & Introduction*
0800 – 0815	**PRE-TEST**
0815 – 0800	**Petroleum Refinery Process**
0800 – 0930	**Crude Processing**
0930 – 0945	*Break*
0945 – 1100	**Desalting**
1100 – 1130	**Atmospheric Distillation**
1130 – 1215	**Vacuum Distillation**
1215 – 1230	**Heavy Oils Processing/Bottom of the Barrel Upgrading (Cocking & Thermal Processes, Delayed Coking, Fluid Coking, Flexicoking, Visbreaking)**
1230 – 1245	*Break*
1245 – 1315	**Process of Production**
1315 – 1420	**Case Study – Example**
1420 – 1430	**Recap**
1430	*Lunch & End of Day One*

Day 2:   **Monday, 18th of November 2024**

0730 – 0830	**Fluid Catalytic Cracking**
0830 – 0930	**Hydrocracking**
0930 – 0945	*Break*
0945 – 1100	**Cat Cracking**
1100 – 1130	**Isomerization**
1130 – 1200	**Alkylation**
1200 – 1230	**Hydrotreating**

1230 – 1330	Break
1330 – 1400	**Catalytic Reforming**
1400 – 1420	**Case Study – Example**
1420 – 1430	**Recap**
1430	Lunch & End of Day Two

Day 3:   **Tuesday, 19th of November 2024**

0730 – 0830	**Process Key Operational Conditions & Factors**
0830 – 0930	**Blending for Product Specifications**
0930 – 0945	Break
0945 – 1100	**Hydrogen Production**
1100 – 1130	**Refinery Gas Plants**
1130 – 1200	**Acid Gas Treating**
1200 – 1230	**Utilities**
1230 – 1330	Break
1330 – 1400	**Sulfur Recovery Plants**
1400 – 1420	**Case Study – Example**
1420 – 1430	**Recap**
1430	Lunch & End of Day Three

Day 4:   **Wednesday, 20th of November 2024**

0730 – 0830	**Utilities**
0830 – 0930	**Oil & Gas Measurement & Control**
0930 – 0945	Break
0945 – 1100	**Process Troubleshooting Concepts & Techniques**
1100 – 1130	**Troubleshooting Tools**
1130 – 1200	**Typical Problems**
1200 – 1230	**Flooding & its Detection**
1230 – 1330	Break
1330 – 1400	**Interaction of Process & Equipment**
1400 – 1420	**Case Study – Example**
1420 – 1430	**Recap**
1430	Lunch & End of Day Four

Day 5:   **Thursday, 21st of November 2024**

0730 – 0830	**Saltation & Entrapment**
0830 – 0930	**Tower Scan & Inspection**
0930 – 0945	Break
0945 – 1100	**Refinery Economics**
1100 – 1130	**Residue Reduction**
1130 – 1145	**Asphalt & Residual Fuel**
1145 – 1215	**Refinery Complexity & Netback**
1215 – 1230	**Economic Evaluation**
1230 – 1245	Break
1245 – 1315	**Cost Estimation**
1315 – 1345	**Case Study – Example**
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:-

Course Coordinator

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