COURSE OVERVIEW PE0018(KP4)
H2 Production by Steam Reforming Technology

Course Title
H2 Production by Steam Reforming Technology

Course Date/Venue
Session 1: February 18-22, 2024/Oryx Meeting Room, Doubletree By Hilton Doha-Al Sadd, Doha, Qatar
Session 2: March 03-07, 2024/The Mouna Meeting Room, The H Dubai Hotel, Sheikh Zayed Rd - Trade Centre, Dubai, UAE

Course Reference
PE0018(KP4)

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.

Petroleum refineries are among the largest users of hydrogen in the chemical industry. Hydrogen is used in hydrogenation, desulfurization and denitrogenation processes and a large source of hydrogen in refining operations is the production of aromatic compounds which are used as octane enhancers in gasoline.

The role of the steam reformer for the production of both synthesis gas and steam will be discussed. The basic steam reformer design will be reviewed together with the water and steam systems. Feedstocks and feedstock purification topics will be followed by the steam reforming chemistry and steam reforming catalyst. All aspects of reformer metallurgy will be reviewed including monitoring and dealing with tube failures.

This course will cover all of the many catalysts, absorbents and adsorbents used for hydrogen production. In general, these units have long periods of operation between shutdowns and correct catalyst loading and activation procedures must be followed to avoid unintended outages.

All of the hydrogen purification options viz wash systems, methanation, PSA or membranes are covered in the course. The different designs of steam reformer now in service are covered together with options for up rating.

Course Objectives

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

- Apply and gain in-depth knowledge on hydrogen production by steam reforming
- Discuss steam reformer and identify the reasons behind the change in emphasis
- Recognize refinery hydrogen balance and the role of the steam reformer for the production of both synthesis gas and steam
- Illustrate the basic steam reformer design including the water and steam systems feedstocks
- Apply feedstock purification, steam reforming chemistry and steam reforming catalysts
- Discuss reformer metallurgy as well as monitor and deal with tube failures
- Recognize for catalysts, absorbents and adsorbents used for hydrogen production
- Employ proper shutdown, catalysts loading and activation procedures
- Identify the hydrogen purification options, wash systems and methanation
- Determine PSA, membranes, designs of steam reformer and options for up rating

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 provides an overview of all significant aspects and considerations of hydrogen production by steam performing for those involved in refinery process engineering, unit operations, research and development, sales and refinery technical service. Process engineers from design and construction companies as well as those who provide products and services to the petroleum refining industry will also find the course very useful and informative.

Course Fee

Doha	**US$ 6,000** per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Dubai	**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.

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:

Mr. Mohammad Hamami, is an **International Expert** in **Process Engineering** with **over 40 years** of industrial experience within **Oil**, **Gas**, **Refineries** and **Petrochemical Plants** all over the **Middle East**, the **USA** and **Canada**. He is currently a **Senior Process Engineering Consultant** wherein he expertly conducts various courses on the **different facets** of **Process Engineering** from **concept development** to **hands-on start-up**, **shutdown** and **troubleshooting**.

Mr. Hamami's expertise can be traced back to his vast experiences in the **industrial realm**. He was able to work as the **Senior Plant Manager** for a **Gas Plant** in the **Middle East**. Prior to that, he was the **Plant Manager** for different **Oil Refineries**. His skills were honed fully as he held different positions such as **Refinery Manager**, **Operations Manager**, **Section Head/Superintendent** and **Process Engineer** for **Process Units**, **Utilities & Oil Movement** in various companies. He has been responsible for a number of **technological-driven world-scale hydrocarbon processing projects** from **beginning to successful start-up**.

Mr. Hamami has a **Bachelor** degree in **Chemical Engineering**. He is an **active member** of the **American Institute of Chemical Engineers** (**AIChE**) and has presented **technical papers** at its **several national meetings**. He has largely participated in the **start-up of seven world-scale process plants** which made him an **International Expert** in **Process Plant Start-Up** and **Oil Movement** and a **Certified Instructor/Trainer**.

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

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0900	***Steam Reformer***
0900 – 0930	***Reasons Behind the Change in Emphasis***
0930 – 0945	*Break*
0945 – 1100	***Refinery Hydrogen Balance***
1100 – 1230	***The Role of the Steam Reformer for the Production of Both Synthesis Gas & Steam***
1230 – 1245	*Break*
1245 – 1420	***The Basic Steam Reformer Design***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Water & Steam Systems Feedstocks***
0930 – 0945	*Break*
0945 – 1100	***Feedstock Purification***
1100 – 1230	***Steam Reforming Chemistry***
1230 – 1245	*Break*
1245 – 1400	***Steam Reforming Catalysts***
1400 – 1420	***Reformer Metallurgy***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Monitoring & Dealing with Tube Failures***
0930 – 0945	*Break*
0945 – 1100	***Catalysts, Absorbents & Adsorbents Used for Hydrogen Production***
1100 – 1230	***Shutdowns***
1230 – 1245	*Break*
1245 – 1420	***Catalyst Loading***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0930	***Activation Procedures***
0930 – 0945	*Break*
0945 – 1100	***Hydrogen Purification Options***
1100 – 1230	***Wash Systems***
1230 – 1245	*Break*
1245 – 1420	***Methanation***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0930	***PSA***
0930 – 0945	*Break*
0945 – 1100	***Membranes***
1100 – 1230	***Designs of Steam Reformer***
1230 – 1245	*Break*
1245 – 1345	***Options for Up Rating***
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

Jaryl Castillo, Tel: +974 4423 1327, Email: jaryl@haward.org