COURSE OVERVIEW PE0459
Thermal Cracking Process

Course Title
Thermal Cracking Process

Course Date/Venue
September 29-October 03, 2024/Ras Al Khaimah Meeting Room, The Tower Plaza Hotel, Dubai, UAE

Course Reference
PE0459

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description

This practical and highly-interactive course includes real-life case studies where participants will be engaged in a series of interactive small groups and class workshops.

This course is designed to provide participants with a detailed and up-to-date overview of Thermal Cracking Process. It covers the basics of thermal conversion and thermal cracking processes; the differences between visbreaking, distillate cracking and thermal gasoil units; the configuration and arrangement of thermal conversion units including flow diagrams and process line-ups; the yields and properties of TC-products and equipment; operating the principles of thermal conversion units; the techniques for monitoring thermal conversion units (TCUs); and implementing start-up and shut-down procedures for thermal conversion units.

During this interactive course, participants will learn the decoking processes, troubleshooting techniques and HSE and emergency procedures; designing and operating thermal conversion furnaces, analyzing real-world issues and developing solutions; the properties of feed residue and their impact on processing; the stability theory and its application in thermal conversion; the principles of fuel oil blending and economic analysis of thermal conversion processes; the thermal conversion processes, process flow diagrams and mass balances; the equipment constraints and optimization, economic considerations, fuel oil blending and economics, unit decokes and maintenance; the detailed procedures for decoking units and root causes of issues; and developing practical solutions.

Course Objectives

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

- Apply and gain an in-depth knowledge on thermal cracking process
- Discuss the basics of thermal conversion and thermal cracking processes
- Identify the differences between visbreaking, distillate cracking and thermal gasoil units
- Carryout configuration and arrangement of thermal conversion units including flow diagrams and process line-ups
- Explain the yields and properties of TC-products and equipment as well as operate the principles of thermal conversion units
- Apply techniques for monitoring thermal conversion units (TCUs) as well as implement start-up and shut-down procedures for thermal conversion units
- Employ decoking processes, troubleshooting techniques and HSE and emergency procedures
- Design and operate thermal conversion furnaces, analyze real-world issues and develop solutions
- Explain the properties of feed residue and their impact on processing as well as the stability theory and its application in thermal conversion
- Identify the principles of fuel oil blending and employ economic analysis of thermal conversion processes
- Analyze thermal conversion processes, process flow diagrams and mass balances
- Discuss equipment constraints and optimization, economic considerations, fuel oil blending and economics, unit decokes and maintenance and detailed procedures for decoking units
- Identify root causes of issues and develop practical solutions

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 an overview of all significant aspects and considerations of thermal cracking process for chemical engineers, process engineers, petroleum engineers, industrial chemists, plant operators and technicians, technical managers and supervisors.

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 Fee

US$ 7,500 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 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 over **35 years** of indepth industrial experience within the **Petrochemical**, **Oil & Gas** industries specializing in **Hydrocarbon Process** Equipment, **DOX Unit** Operation & Troubleshooting, **Polyethylene & Polypropylene** Processing, **Oil Movement** Storage & Troubleshooting, **Power Plant Chemistry**, **Fuel Quality** Monitoring System Fundamentals, **Liquid Bulk Cargo Handling**, **Oil Refinery Cost Management**, **Flare & Blowdown** Operation, **Pressure Relief Systems** Maintenance & Troubleshooting, Refinery **SRU**, **Tail Gas** Treating, **Sour Water & Amine Recovery** Units, **Propylene** Compressor and Turbine, **Clean Fuel** Technology & Standards, Principles of **Operations Planning**, **Heat Exchangers & Fired Heaters** Operation & Troubleshooting, **Plastic Extrusion Technology** Operation & Troubleshooting, **Chemical Engineering** for Non-Chemical Engineers, **Process Plant** Troubleshooting, **Process Plant Optimization** Technology, **Engineering Problem Solving**, **Process Plant** Performance & Efficiency, **Process Plant** Start-up & Shutdown, **Process Plant** Commissioning, **Process Plant** Turn-around & Shutdown, **Pumps & Compressors** Troubleshooting, **Fired Heaters & Air Coolers** Maintenance, **Pressure Vessels & Valves** Repair, **Polymers**, **Plastics**, **Polyolefin** & **Catalysts**, **Polymerization**, **Thermal Analysis Techniques**, **Rheology**, **Thermoplastics**, **Thermosets**, **Coating Systems** and **Fibre Reinforced Polymer Matrix Composites**. Further, he is also well-versed in **Water Hydraulic Modelling**, **Efficient** Shutdowns, Turnaround & Outages, **Pump** Selection and Installation, Operation and Maintenance of **Pumps**, **Demand & Supply** Management, **Catalyst Manufacturing Techniques**, **Fuel Systems Management**, **Aviation Fuel**, **Diesel**, **Jet Fuel**, **Petrol** and **IP Octane**, **Cetane Control** and related Logistics, Road, Rail and Pipeline Distribution, **Process Design** and **Optimisation**, **Boiler Feed Water Preparation**, **Flocculation Sedimentation**, **Hot Lime Water Softening Processes**, **Desalination Processes**, **Reverse Osmosis**, **Molecular Sieves**, activated **Sludge Aerobic/Anaerobic**, **Sludge Removal** and **Incineration Process Control**, **Domestic Sewage Plants Optimisation**, **Process Cooling Water System**, **High Pressure** and **Low Pressure Tank Farm Management**, **Hydrocarbon** and **Chemical products** and **GTL** (**Gas to Liquids**).

During his career life, Mr. Beer holds significant key positions such as the **Director**, **Global Commissioning Manager**, **Process Engineering Manager**, **Senior Business Analyst**, **Process Engineer**, **Chemical Engineer**, **Senior Technician**, **Technical Sales Engineer**, **Entrepreneur**, **Financial Consultant**, **Business Analyst**, **Business Financial Planner** and **Independent Financial Planner** to various international companies such as the **Sasol**, **SASOLChem**, **TAG Solvents**, **Virgin Solvent Products**, **SARS** & **SAPIA** (**South African Petroleum Industry Association**) and **RFS Financial Services** (**Pty**) **Ltd**.

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 workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: ***Sunday, 29th of September 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Basics of Thermal Conversion*** *Introduction to Thermal Cracking Processes • Differences Between Visbreaking, Distillate Cracking, & Thermal Gasoil Units • Overview of Process Chemistry & Reactions*
0930 – 0945	*Break*
0945 – 1030	***Line-Ups of Thermal Conversion Units*** *Configuration & Arrangement of Thermal Conversion Units • Flow Diagrams & Process Line-Ups • Key Components & Their Functions*
1030 – 1130	***Yields & Properties of TC-Products*** *Yields of Various Thermal Cracking Products • Properties & Characteristics of Products • Factors Influencing Product Yields & Properties*
1130 – 1215	***Exercise 1: Analyzing TC-Product Yields*** *Practical Exercise on Calculating & Analyzing Product Yields • Group Discussions & Problem-Solving*
1215 – 1230	*Break*
1230 – 1330	***TC-Equipment*** *Overview of Thermal Conversion Equipment • Design & Operation of Key Equipment • Maintenance & Troubleshooting of TC-Equipment*
1330 – 1420	***Unit Operation & Control*** *Operating Principles of Thermal Conversion Units • Control Systems & Instrumentation • Best Practices for Efficient Operation*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: Monday, 30th of September 2024

0730 – 0830	***Monitoring of TCUs*** *Techniques for Monitoring Thermal Conversion Units • Key Performance Indicators & Parameters • Data Analysis & Interpretation*
0830 – 0930	***Start-Up & Shut-Down Procedures*** *Detailed Procedures for Starting Up Thermal Conversion Units • Shut-Down Protocols & Safety Measures • Case Studies on Start-Up & Shut-Down Scenarios*
0930 – 0945	*Break*
0945 – 1100	***Decoking Processes*** *Importance of Decoking in Thermal Conversion Units • Decoking Methods & Techniques • Scheduling & Planning for Decoking Operations*
1100 – 1215	***Exercise 2: Troubleshooting TCUs*** *Practical Exercise on Troubleshooting Common Issues • Group Discussions & Problem-Solving*
1215 – 1230	*Break*
1230 – 1330	***Troubleshooting Techniques*** *Identifying & Diagnosing Operational Problems • Root Cause Analysis & Corrective Actions • Tools & Techniques for Effective Troubleshooting*
1330 – 1420	***HSE & Emergency Procedures*** *Health, Safety & Environmental Considerations • Emergency Response Planning & Drills • Best Practices for Ensuring Safe Operations*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: Tuesday, 01st of October 2024

0730 – 0830	***Thermal Conversion Furnaces*** *Design & Operation of Thermal Conversion Furnaces • Heat Transfer & Combustion in Furnaces • Maintenance & Optimization of Furnace Performance*
0830 – 0930	***Exercise 3: Furnace Performance Analysis*** *Practical Exercise on Analyzing Furnace Performance • Group Discussions & Problem-Solving*
0930 – 0945	*Break*
0945 – 1100	***TC Open Clinic*** *Interactive Session for Discussing Specific Challenges • Analyzing Real-World Issues & Developing Solutions • Sharing Experiences & Best Practices*
1100 – 1215	***Feed Residue & Product Stability*** *Properties of Feed Residue & their Impact on Processing • Stability Theory & Its Application in Thermal Conversion • Techniques for Improving Product Stability*
1215 – 1230	*Break*
1230 – 1330	***Fuel Oil Blending*** *Principles of Fuel Oil Blending • Factors Influencing Blending Quality • Economic Considerations in Fuel Oil Blending*
1330 – 1420	***Process Economics*** *Economic Analysis of Thermal Conversion Processes • Cost-Benefit Analysis & Optimization • Case Studies on Process Economics*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4: Wednesday, 02nd of October 2024

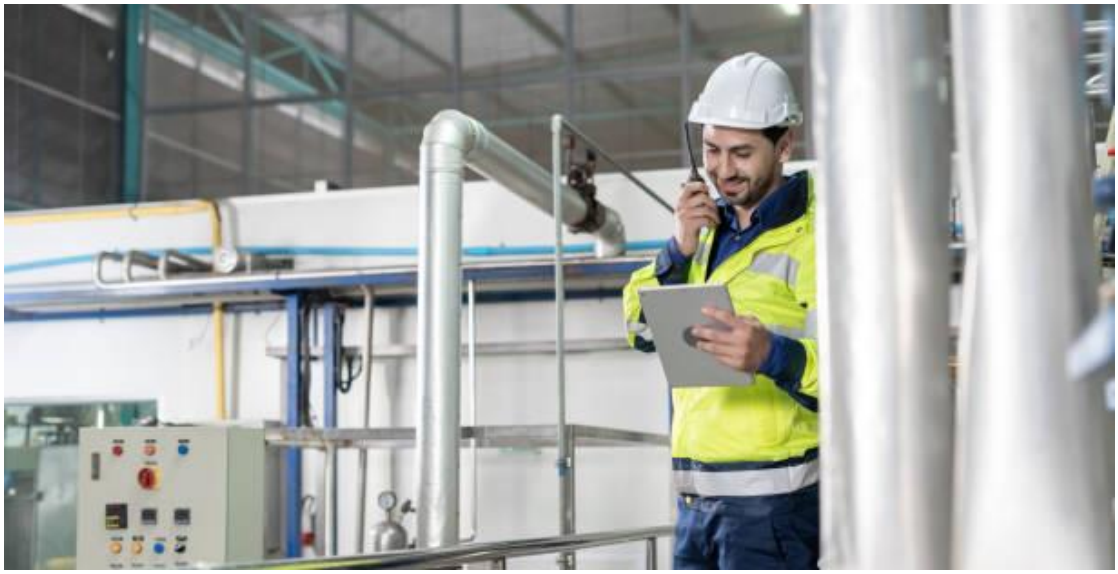
0730 – 0830	***Detailed Process Analysis*** *In-Depth Analysis of Thermal Conversion Processes • Process Flow Diagrams & Mass Balances • Key Operational Parameters & their Impact*
0830 – 0930	***Equipment Constraints & Optimization*** *Understanding Equipment Limitations • Techniques for Optimizing Equipment Performance • Case Studies on Overcoming Constraints*
0930 – 0945	*Break*
0945 – 1100	***Economic Considerations*** *Cost Factors in Thermal Conversion • Strategies for Reducing Operational Costs • Economic Evaluation of Process Improvements*
1100 – 1215	***Fuel Oil Blending & Economics*** *Advanced Blending Techniques • Impact of Blending on Product Quality & Economics • Practical Exercises on Fuel Oil Blending*
1215 – 1230	*Break*
1230 – 1330	***Unit Decokes & Maintenance*** *Detailed Procedures for Decoking Units • Scheduling & Planning for Maintenance •Best Practices for Maintaining Unit Efficiency*
1330 – 1420	***Review & Preparation for Clinic Workshop*** *Review of Key Concepts & Topics • Preparation for the Clinic Workshop • Q&A Session for Clarifying Doubts*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5: Thursday, 03rd of October 2024

0730 – 0930	***Clinic Workshop*** *Objectives & Structure of the Workshop • Overview of Issues to be Discussed*
0930 – 0945	*Break*
0945 – 1100	***Case Studies & Real-World Challenges*** *Presentation of Case Studies by Participants • Analysis & Discussion of Real-World Challenges • Group Brainstorming & Problem-Solving*
1100 – 1230	***Developing Solutions & Best Practices*** *Identifying Root Causes of Issues • Developing Practical Solutions • Sharing Best Practices & Experiences*
1230 – 1245	*Break*
1245 – 1345	***Feedback & Evaluation*** *Review of Workshop Outcomes • Participant Feedback & Evaluation • Discussion on Future Improvements & Training Needs*
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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