COURSE OVERVIEW PE1067
Delayed Coker Technology Bechtel

Course Title
Delayed Coker Technology Bechtel

Course Date/Venue
Session 1: June 29-July 03, 2025/Crowne Meeting Room, Crowne Plaza Al Khobar, KSA
Session 2: December 07-11, 2025/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE

Course Reference
PE1067

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 Delayed Coker Technology Bechtel. It covers the purpose and advantages of delayed coking, feedstock types and yield expectations; the role of docker in refinery configuration, integration with vacuum distillation unit (VDU), product blending and downstream units; the feedstock characteristics, coking chemistry and reaction mechanisms and delayed coker unit (DCU) process flow diagram (PFD); and the types of coking processes and technologies, coke drums and heater design and operation.

Further, the course will also discuss the fractionator tower design and performance, blowdown, quenching systems, decoking and cutting systems; the instrumentation and control systems, startup and shutdown procedures and coking cycle management; and the common operational challenges, health, safety and environmental concerns and troubleshooting scenarios.

During this interactive course, participants will learn the emergency response procedures, Bechtel design best practices and energy efficiency improvement; the distillate recovery, minimizing gas and coke make, online yield estimation methods and role of antifoam and feed pre-treatment; the coke quality and handling, advanced monitoring and control, mechanical integrity and reliability; the common bottlenecks and solutions, adding drums or upgrading heaters, automation and control system upgrades; and the cost-benefit analysis of revamps.

Course Objectives

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

- Apply and gain an in-depth knowledge on delayed coker technology Bechtel
- Discuss the purpose and advantages of delayed coking, feedstock types and yield expectations
- Identify the role of docker in refinery configuration, integration with vacuum distillation unit (VDU), product blending and downstream units
- Recognize feedstock characteristics, coking chemistry and reaction mechanisms and delayed coker unit (DCU) process flow diagram (PFD)
- Identify the types of coking processes and technologies, coke drums and heater design and operation
- Discuss fractionator tower design and performance, blowdown, quenching systems, decoking and cutting systems
- Recognize instrumentation and control systems and apply startup and shutdown procedures and coking cycle management
- Explain common operational challenges, health, safety and environmental concerns and troubleshooting scenarios
- Carryout emergency response procedures, Bechtel design best practices and energy efficiency improvement
- Maximize distillate recovery, minimize gas and coke make, apply online yield estimation methods and identify the role of antifoam and feed pre-treatment
- Employ coke quality and handling, advanced monitoring and control including mechanical integrity and reliability
- Recognize common bottlenecks and solutions, add drums or upgrade heaters, discuss automation and control system upgrades and apply cost-benefit analysis of revamps

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 delayed coker technology Bechtel for process engineers, operations and maintenance personnel operations and maintenance personnel, project engineers and managers, refinery planners and economists, safety and environmental engineers, inspectors and reliability engineers and other technical staff.

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

Haward's certificates are accredited by the following international accreditation organizations:

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). 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.

- 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.

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. Karl Thanasis PEng, MSc, MBA, BSc, is a **Senior Process & Mechanical Engineer** with over **30 years** of extensive industrial experience within the **Oil & Gas**, **Refinery** and **Petrochemical** industries. His wide expertise includes **Root Cause Analysis**, **Process Equipment & Piping** System, **Rotating Equipment Reliability** Optimization & Continuous Improvement, **Decoking Technology**, **Control Valve** Maintenance & Testing, Advanced **Operational Skills**, Operations & Maintenance for **Gas Processing Plant**, Oil & **Gas Processing Facilities** Operations, **Applied Natural Gas Processing**, Dehydration & Advanced Rotating Equipment, **Gas Processing & Compression**, **Process Equipment** Design & Troubleshooting, **Process Plant** Optimization & Continuous Improvement, **Production Process** Optimization, **Operations Planning** Optimization, **Process Equipment** Design, **Process Plant** Performance & Efficiency, **Process** Integration & Optimization, Root Cause Analysis (**RCA**) Methods, **Material Cataloguing**, **Mechanical & Rotating Equipment** Troubleshooting & Maintenance, **Rotating Equipment** for Process Industry, **Rotating Machinery** Best Practices, **Centrifugal Pumps** Operation, **Positive Displacement Pumps** Repair, **Pump** Maintenance & Troubleshooting, **Heat Exchanger** Maintenance & Repair, **Heat Exchanger** Inspection & Troubleshooting, **Fin-fan Coolers**, Fundamentals of **Engineering Drawings**, **Codes & Standards**, **P&ID Reading Interpretation & Developing**, **Boiler Design**, **Boiler** Inspection & Maintenance, **Boiler** Operation & Control, **Boiler** Troubleshooting & Inspection, **Boiler Instrumentation & Control**, **Steam Boiler** Maintenance, **Boiler & Steam Generation System**, **Boiler** Failure Analysis & Prevention, **Boiler** Burner Management, **Boiler** Water Treatment Technology, **Machinery Failure Analysis**, **Preventive & Predictive Maintenance**, **Condition Monitoring**, Root Cause Analysis (**RCA**), Root Cause Failure Analysis (**RCFA**), Reliability Centred Maintenance (**RCM**), Risk Base Inspection (**RBI**), **Metallurgical Failure Analysis**, **Corrosion Failure Analysis**, **Steam Generation**, **Steam Turbines**, **Power Generator Plants**, **Gas Turbines**, **Combined Cycle Plants**, **Boilers**, **Process Fired Heaters**, Air Preheaters, Induced Draft Fans, All Heaters Piping Work, Refractory Casting, Heater Fabrication, Thermal & Fired Heater Design, Heat Transfer, Coolers, **Pumps**, Turbo-Generator, Turbine **Shaft Alignment**, **Lubrication**, **Mechanical Seals**, **Packing**, **Blowers, Bearings**, **Couplings**, **Clutches** and **Gears**. Further, he is also versed in **Wastewater Treatment Technology**, **Networking System**, **Water Network Design**, **Industrial Water Treatment** in Refineries & Petrochemical Plants, **Piping System**, **Water Movement**, **Water Filtering**, **Mud Pumping**, **Sludge Treatment** and **Drying**, **Aerobic Process** of **Water Treatment** that includes **Aeration**, **Sedimentation** and **Chlorination Tanks**. His strong background also includes **Design** and **Sizing** of all **Waste Water Treatment Plant Associated Equipment** such as **Sludge Pumps**, **Filters**, **Metering Pumps**, **Aerators** and **Sludge Decanters**.

Mr. Thanasis has acquired his thorough and practical experience as the **Project Manager**, **Plant Manager**, **Area Manager**, **Maintenance Manager**, **Engineering Manager**, **Technical Consultant & Trainer**, **Head of Capital Projects**, **Refractory Specialist**, **Construction Superintendent**, **Maintenance Supervisor**, **Project Engineer**, **Process Engineer**, **Maintenance Engineer** and **Thermal Design Engineer** of various companies worldwide in the **USA**, **Germany**, **England** and **Greece**.

Mr. Thanasis is a **Registered Professional Engineer** in the **USA** and **Greece** and has **Master's** and **Bachelor's** degree in **Mechanical Engineering** with **Honours** from the **Purdue University** and **Southern Illinois University** (**USA**) respectively as well as an **MBA** from the **University of Phoenix** (**USA**). Further, he is a **Certified Instructor/Trainer**, **Certified Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**), a member of the **American Society of Heating, Refrigeration and Air-Conditioning Engineers** and delivered various trainings, courses, seminars and workshops worldwide.

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$ 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 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

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Delayed Coking Technology Bechtel*** *Historical Background & Evolution • Purpose & Advantages of Delayed Coking • Feedstock Types & Yield Expectations • Global Outlook & Bechtel's Project Contributions*
0930 – 0945	*Break*
0945 – 1030	***Overview of Refinery Configuration & Integration*** *Role of the Coker in Refinery Configuration • Integration with Vacuum Distillation Unit (VDU) • Product Blending & Downstream Units • Impact on Refinery Economics*
1030 – 1130	***Feedstock Characteristics*** *Vacuum Resid Properties & Analysis • Metals, Sulfur, Asphaltene Content • Conradson Carbon Residue (CCR) • Feed Quality Impact on Coke & Product Yield*
1130 – 1215	***Coking Chemistry & Reaction Mechanisms*** *Thermal Cracking Reactions • Coke Formation Mechanisms • Hydrocarbon Phase Changes • Free Radical Reaction Pathways*

1215 – 1230	Break
1230 – 1330	***Delayed Coker Unit (DCU) Process Flow Diagram (PFD)*** *Major Equipment Blocks & Flow Path • Heater to Coke Drum Sequencing • Fractionator Roles & Internals • Vapor Recovery & Gas Handling*
1330 – 1420	***Types of Coking Processes & Technologies*** *Bechtel/Conocophillips ThruPlus® Technology • Conventional versus Flexicoking • Shot Coke versus Sponge Coke versus Needle Coke • Slurry Coking & Fluid Coking Overview*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Coke Drums*** *Drum Design & Metallurgy • Drum Switching Operations • Thermal Cycles & Stress Analysis • Online versus Offline Inspections*
0830 - 0930	***Heater Design & Operation*** *Furnace Configuration & Firing Schemes • Coking Tendency & Fouling Control • Coil Outlet Temperature (COT) Management • Shock Heating & Residence Time*
0930 – 0945	*Break*
0945 – 1100	***Fractionator Tower Design & Performance*** *Overhead & Wash Sections • Pump-Around Circuits & Quench Zone • Draw Tray Configurations • Antifoam Injection Systems*
1100 – 1215	***Blowdown & Quenching Systems*** *Vapors & Pressure Control • Quench Water & Steam Introduction • System Isolation & Safety Interlocks • Environmental Compliance*
1215 – 1230	*Break*
1230 – 1330	***Decoking & Cutting Systems*** *Hydraulic versus Mechanical Cutting • Top/Bottom Unheading Systems • Coke Pit Operations & Water Handling • Coke Drum Safety Interlocks*
1330 – 1420	***Instrumentation & Control Systems*** *Key Process Control Parameters • Drum Pressure, Temperature & Level Controls • Safety Shutdown Systems (SIS) • Advanced Process Control (APC) Integration*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Startup & Shutdown Procedures*** *Pre-Start Checks & Lineups • Warm-up & Pressure Ramping • Sequence Logic for Drum Cycles • Safe Shutdown Practices*
0830 – 0930	***Coking Cycle Management*** *Coking, Quenching, Draining & Decoking Steps • Heat Balance & Cycle Timing • Automation of Switching Valves • Real-Time Drum Performance Monitoring*
0930 – 0945	*Break*
0945 – 1100	***Common Operational Challenges*** *Hot Spots & Furnace Fouling • Drum Foaming & Carryover • Pressure Surges & Relief Events • Fractionator Flooding & Entrainment*
1100 – 1215	***Health, Safety & Environmental Concerns*** *Personnel Exposure to Hydrocarbons & Heat • Steam & Water Blowout Risks • Flaring Minimization Strategies • Handling of Contaminated Water & Solids*
1215 – 1230	*Break*
1230 – 1330	***Troubleshooting Scenarios*** *Heater Tube Coking • Poor Coke Quality (Density, Hardness) • Loss of Fractionator Separation • Valve Malfunctions in Switching Operations*
1330 – 1420	***Emergency Response Procedures*** *Drum Overpressure • Heater Tube Rupture • Blocked Quench or Drain Lines • Fire & Explosion Hazards*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4

0730 – 0830	***Bechtel Design Best Practices*** *Thruplus® Delayed Coking Process Design • Process Integration with Upstream/Downstream Units • Design for Operability & Maintainability • Modifications & Revamp Strategies*
0830 – 0930	***Energy Efficiency Improvement*** *Heat Integration with VDU & Preheaters • Furnace Energy Optimization • Steam & Quench System Optimization • Minimizing Pressure Drop & Recirculation Losses*
0930 – 0945	*Break*
0945 – 1100	***Product Yield Optimization*** *Maximizing Distillate Recovery • Minimizing Gas & Coke Make • Online Yield Estimation Methods • Role of Antifoam & Feed Pre-Treatment*
1100 – 1215	***Coke Quality & Handling*** *Properties of Sponge, Needle & Shot Coke • Factors Affecting Coke Morphology • Coke Cutting & Dewatering Optimization • Coke Logistics & Handling Issues*
1215 – 1230	*Break*

1230 – 1330	***Advanced Monitoring & Control*** *DCS & SIS System Integration • APC & Optimization Software Tools • Use of AI/ML for Coking Unit Prediction • Predictive Maintenance Tools*
1330 – 1420	***Mechanical Integrity & Reliability*** *Inspection Intervals & NDT Methods • Refractory Maintenance in Heaters • Drum Bulging & Fatigue Cracking • Valve Reliability & Pressure Sealing*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

Day 5

0730 – 0830	***Bechtel Project Case Studies*** *Coker Unit Performance Benchmarking • Design-to-Operation Success Stories • Lessons Learned from Global Deployments • Bechtel Design Optimization Outcomes*
0830 – 0930	***Simulation of Delayed Coking Operations*** *Real-Time Simulation Exercises • Drum Switching Cycle Simulation • Response to Feed & Temperature Variations • Troubleshooting through Simulation*
0930 – 0945	*Break*
0945 – 1030	***Process Optimization Workshop*** *Data-Driven Performance Review • Yield & Energy Efficiency Calculations • Process Control Tuning • Scenario-Based Improvement Analysis*
1030 – 1215	***Interactive Troubleshooting Exercises*** *Group-Based Problem-Solving • Root Cause Analysis • Use of Diagnostic Data from Real Plant Cases • Fault Tree Analysis (FTA)*
1215 – 1230	*Break*
1230 – 1345	***Coking Unit Revamp & Debottlenecking*** *Common Bottlenecks & Solutions • Adding Drums or Upgrading Heaters • Automation & Control System Upgrades • Cost-Benefit Analysis of Revamps*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
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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