COURSE OVERVIEW PE1063
DCU Troubleshooting

Course Title
DCU Troubleshooting

H-STK© INCLUDED

Course Date/Venue
Session 1:September 14-18, 2025/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai UAE
Session2: November 30-December04, 2025/ Crowne Meeting Room, Crowne Plaza Al Khobar, an IHG Hotel, Al Khobar, KSA

Course Reference
PE1063

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.

This course is designed to provide participants with a detailed and up-to-date overview of Delayed Coker Unit (DCU) Troubleshooting. It covers the process flow and major equipment, key process parameters and safety and environmental consideration; the feedstock impact on unit performance and heater, furnace, fractionator and troubleshooting; the pump and compressor issues covering cavitation and vibration, mechanical seal failures, NPSH and suction/discharge problems; the overheating and lubrication failures; and faulty level/pressure/temperature readings, alarm and trip calibration control loop tuning issues and instrument impulse lime blockages.

Further, the course will also discuss the coking drum troubleshooting, decoking operations and coke handling system failures; the valve and line plugging, steam and quenching systems, safety interlocks and emergency shutdowns; the delayed coking reaction deviations, temperature profile imbalance and pressure fluctuations and control failures; the hydraulic imbalance in piping network and product quality troubleshooting; the energy efficiency and fouling indicators; and the root cause analysis (RCA) framework, heater tube failure case and drum overpressure incident.

During this interactive course, participants will learn the product quality excursion, pump trip, seal damage and compressor surging case; the proactive maintenance techniques, startup and shutdown troubleshooting and corrosion and erosion mitigation; and the instrumentation and alarm management, operating procedures optimization, performance monitoring and continuous improvement.

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 unit (DCU) troubleshooting
- Identify process flow and major equipment, key process parameters and safety and environmental considerations
- Discuss feedstock impact on unit performance and carryout heater, furnace, fractionator and troubleshooting
- Recognize pump and compressor issues covering cavitation and vibration, mechanical seal failures, NPSH and suction/discharge problems as well as overheating and lubrication failures
- Discuss faulty level/pressure/temperature readings, alarm and trip calibration control loop tuning issues and instrument impulse lime blockages
- Carryout coking drum troubleshooting and decoking operations and identify coke handling system failures
- Determine valve and line plugging, steam and quenching systems and safety interlocks and emergency shutdowns
- Illustrate delayed coking reaction deviations, temperature profile imbalance and pressure fluctuations and control failures
- Discuss hydraulic imbalance in piping network, apply product quality troubleshooting and identify energy efficiency and fouling indicators
- Explain root cause analysis (RCA) framework, heater tube failure case and drum overpressure incident
- Discuss product quality excursion, pump trip and seal damage and compressor surging case
- Apply proactive maintenance techniques, startup and shutdown troubleshooting and corrosion and erosion mitigation
- Carryout instrumentation and alarm management, operating procedures optimization and performance monitoring and continuous improvement

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 unit (DCU) troubleshooting for operations personnels, process and chemical engineers, maintenance and inspection staff, health, safety, and environment (HSE) professionals, technical managers and supervisors 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. Robert Harvey, MSc (Cum Laude), BSc is a **Senior Process & Chemical Engineer** with over **30 years** of in-depth industrial experience within the **Oil & Gas**, **Refinery**, **Petrochemical**, **Mining** and **Power** industries. His expertise widely covers in the areas of **Operations Abnormalities & Plant Upset**, **Decoking Operations**, **Fertilizer Manufacturing** Process Technology, **Fertilizer Storage** Management (Ammonia & Urea), **Petrochemical & Fertilizer** Plants, **Nitrogen Fertilizer** Production, **Petroleum Industry Process** Engineering, **Process Equipment** Design & Troubleshooting, **Process Equipment & Piping Systems**, **Fertilizer** Manufacturing Process Technology, **Production** Management, **Process Plant** Optimization & Continuous Improvement, **Production Process** Optimization, **Process Analyzers**, **Process Equipment** Design, Vinyl Chloride Monomer (**VCM**) Manufacturing & Process Troubleshooting, **Cement** Manufacturing Process Technology & Standards, **Process Equipment & Piping** System, **Process Plant** Optimization & Continuous Improvement, **Process Plant** Performance & Efficiency, **Troubleshooting Process Operations**, Modern **Aluminium Production Processes**, **Cement Kiln Process**, **Process Engineer Calculations**, Steel Making Process, **Process Diagrams** Review, Process Hazard Analysis (**PHA**), Process Mapping, Strategical Process Control in Process Industry, **Revamping & Debottlenecking**, **Pressure Vessel** Operation, **Heat Mass Balance**, **Distillation-Column** Operation, & Troubleshooting, **Debottlenecking**, **Unit Performance** Optimization, Real Time Online Optimization, **Operations Planning** Optimization, **Engineering Problem Solving**, **Bag Filters** Operation & Maintenance, Chemical Reaction Engineering Application, **Phosphatic Industry**, **Diammonium Phosphate**, **Monoammonium Phosphate**, **NPK**, Troubleshooting Improvement, **Production** Management, **Distillation-Column** Operation & Troubleshooting, **Monomer** Handling Safety, Complex Operational Troubleshooting, Incident **Root Cause Analysis** & Corrective Action, **Fertilizer** Manufacturing, Continuous Improvement & Benchmarking, **Energy Efficiency** for Process Plants, **Pressure Vessel** Operation, **Reactors & Storage Tanks**, Dehydrating Columns, Heat & Material Balance, **P&ID** Reading & Interpretation, **Detailed Engineering Design**, **HAZOP** Leadership, Project HSE Review (**PHSER**), Safe Handling of **Propylene Oxide & Ethylene Oxide**, Safety in **Process & Industrial Plants**, Environmental Impact Assessment (**EIA**) and Effective **Risk Assessment & HAZOP** Studies. Further, he is also well versed in Feasibility Studies Analysis & Evaluation, Project Gate System Procedures, Change Management Skills, Change Management Strategy, Developing Commercial Contracts, Project Management Skills, Project Scheduling & Cost Control, FIDIC & Other Model Contracts, EPC & EPCM Contracts, Knowledge Management, Job Evaluation, Creative Problems Solving & Innovation Skills, Problem Solving & Decision Making, Strategic Planning & Creative Thinking and Mind Mapping.

During his career life, Mr. Harvey has gained his practical and field experience through his various significant positions and dedication as the **Commercial Director**, **Manufacturing Director**, **Chief Operating Officer**, **Head Projects Division**, **Project Leader**, **Lead Technical Advisor/Consultant** and **Project Consultant** to various international companies such as the Trade and Industrial Policy Strategies (TIPS), PGBI Johannesburg, IDC Green Industries SBU/Arengo 316 Pty Ltd, Ferrum Crescent Limited, CEF Limited, Rio Tinto Alcan, Industrial Development Corporation of SA (IDC) and AECI Limited.

Mr. Harvey has **Master** (**Cum Laude**) and **Bachelor** degrees in **Chemical Engineering**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**) and has delivered various trainings, seminars, conferences, workshops and courses globally.

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	***Overview of DCU Operations*** *Process Flow & Major Equipment • Key Process Parameters • Cycle Overview (Coking, Decoking) • Safety & Environmental Considerations*
0930 – 0945	*Break*
0945 – 1030	***Feedstock Impact on Unit Performance*** *Variability in Crude Quality • Effects on Coke Yield & Properties • Contaminants (Metals, Sulfur, Asphaltenes) • Feed Preheating & Desalting Issues*
1030 – 1130	***Heater & Furnace Troubleshooting*** *Coking in Heater Tubes • Flame Instability & Burner Issues • Tube Metal Overheating • Hot Spots & Fouling Problems*
1130 – 1215	***Fractionator Troubleshooting*** *Tower Flooding or Weeping • Improper Fractionation (Cut Overlap) • Pump-Around Problems • Fouling of Internals & Exchangers*
1215 – 1230	*Break*
1230 – 1330	***Pump & Compressor Issues*** *Cavitation & Vibration • Mechanical Seal Failures • NPSH & Suction/Discharge Problems • Overheating & Lubrication Failures*

1330 – 1420	***Instrumentation & Control Challenges*** *Faulty Level/Pressure/Temperature Readings • Alarm & Trip Calibration • Control Loop Tuning Issues • Instrument Impulse Line Blockages*
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	***Coking Drum Troubleshooting*** *Uneven Temperature Distribution • Overpressure in Drums • Foaming & Carryover • Drum Switching Delays & Interlocks*
0830 - 0930	***Decoking Operations*** *Cutting Tool Malfunction • Water Jet Pump Problems • Drum Overhead Vapor Handling • Cutting Water Contamination & Disposal*
0930 – 0945	*Break*
0945 – 1100	***Coke Handling System Failures*** *Conveyor System Malfunctions • Crusher & Vibrating Screen Issues • Blockage in Chute or Bins • Dust Control & Emissions*
1100 – 1215	***Valve & Line Plugging*** *Transfer Line Plugging • Switching Valve Failures • Valve Erosion & Sticking • Flushing System Malfunction*
1215 – 1230	*Break*
1230 – 1330	***Steam & Quenching Systems*** *Steam Purging Failure • Quench Water Pump Issues • Thermal Shock & Drum Stress • Excessive Steam Carryover*
1330 – 1420	***Safety Interlocks & Emergency Shutdowns*** *ESD & Trip Activation Causes • Manual versus Automated Switchovers • Safety Valve Lifting • Fire & Explosion Risks*
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	***Delayed Coking Reaction Deviations*** *Coke Morphology Changes • High Volatile Content in Coke • Hard versus Soft Coke Issues • Unreacted Feed Detection*
0830 – 0930	***Temperature Profile Imbalance*** *Non-Uniform Heating in Furnace • Temperature Drop During Switching • Thermocouple Malfunction • Feed Temperature Deviation*
0930 – 0945	*Break*
0945 – 1100	***Pressure Fluctuations & Control Failures*** *Drum Overpressure • Fractionator Pressure Swings • Vacuum Loss in Heater • Vapor Recovery Compressor Issues*
1100 – 1215	***Hydraulic Imbalance in Piping Network*** *Flow Maldistribution • Pressure Drop Across Lines • Line Erosion or Blockage • Piping Vibration & Resonance*
1215 – 1230	*Break*

1230 – 1330	***Product Quality Troubleshooting*** *Unstable Naphtha or Gas Oil Quality • Off-Spec Petroleum Coke • Sulfur or Metals in Products • Water Contamination*
1330 – 1420	***Energy Efficiency & Fouling Indicators*** *Heat Exchanger Fouling • Furnace Efficiency Drop • Increased Fuel Consumption • CO Emission Monitoring*
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	***Root Cause Analysis (RCA) Framework*** *Steps of RCA in DCU • Common Data Collection Methods • Cause & Effect Diagrams •Using 5 Whys & Fishbone Tools*
0830 – 0930	***Heater Tube Failure Case*** *Metallurgy & Inspection Findings • Process Condition History • Burner Flame Pattern Analysis • Preventive Actions Implemented*
0930 – 0945	*Break*
0945 – 1100	***Drum Overpressure Incident*** *Sequence of Events Analysis • Instrumentation Fault Tracing • Safety Relief Operation • Recommendations & MOC*
1100 – 1215	***Product Quality Excursion*** *Fractionator Tray Performance • Change in Feed Quality • Heat Balance Check • Blending or Rerun Strategies*
1215 – 1230	*Break*
1230 – 1330	***Pump Trip & Seal Damage*** *Vibration Data Evaluation • Lube Oil Analysis • Suction Pressure Trends • Mechanical Overhaul Outcome*
1330 – 1420	***Compressor Surging Case*** *Surge Protection System Review • Performance Curve Plotting • Anti-Surge Control Tuning • Lessons Learned*
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	***Proactive Maintenance Techniques*** *Predictive Diagnostics (Vibration, IR) • Routine Inspection Checklists • Spare Parts & PM Planning • Lubrication & Alignment Practices*
0830 – 0930	***Startup & Shutdown Troubleshooting*** *Pre-Startup Checklist Validation • Warm-up & Cool-Down Sequences • Common Startup Errors • Safe & Optimized Shutdown Steps*
0930 – 0945	*Break*
0945 – 1100	***Corrosion & Erosion Mitigation*** *Corrosion Mapping & Inspection • Erosion-Prone Areas & Material Selection • Anti-Fouling & Coating Strategies • Injection Points & Chemical Treatment*

1100 – 1215	***Instrumentation & Alarm Management*** *Critical Loop Checks & Calibrations • HART/Fieldbus Diagnostics • Alarm Prioritization • DCS/PLC Logic Troubleshooting*
1215 – 1230	*Break*
1230 – 1300	***Operating Procedures Optimization*** *SOP Review & Updates • Communication During Drum Switching • Emergency Handling Drills • Operator Feedback Incorporation*
1300 - 1345	***Performance Monitoring & Continuous Improvement*** *KPI Tracking (Yield, Coke Quality, OEE) • Benchmarking with Industry Data • Troubleshooting Logbooks • Digital Tools & Troubleshooting Aids*
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*

Simulator (Hands-on Practical Sessions)

This practical and highly-interactive course includes real-life case studies and exercises:-

Course Coordinator

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