COURSE OVERVIEW PE0922
Root Cause Analysis (RCA) of Upset in Process Plant

Course Title
Root Cause Analysis (RCA) of Upset in Process Plant

Course Date/Venue
Session 1: July 26-30, 2026/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
Session 2: September 27-October 01, 2026/Crowne Meeting Room, Crowne Plaza Al Khobar, an IHG Hotel, Al Khobar, KSA

Course Reference
PE0922

Course Duration/Credits
Five days/3.0 CEUs/30.0 PDHs

Course Description

This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

This course is designed to provide participants with a detailed and up-to-date overview on Root Cause Analysis (RCA) of upset in process plant. It covers the operational principles and why plants get upset; finding effective solutions to event-based problems in process plant; collecting operational data like carryover, slippage, facilities, bottleneck, excess flaring, etc. and comparing with the PFDs, heart and material balance docs, data sheets and design info and PAT reports; identifying bottlenecks of facilities, instruments errors and human errors; reviewing and verifying operational reports to develop a method to solve the problems; defining the problem; and the characteristics of a troubleshooting problem and the process used to solve troubleshooting problems.

During this interactive course, participants will learn the mental problem solving process; the overall summary of major skills and a worksheet; the practical example using the troubleshooter's worksheet; selecting valid diagnostic actions; the complex operational troubleshooting; the fundamentals of root cause analysis; using root cause analysis techniques; the cause and effect principle; the framework of RCA including why-why analysis, breakthrough, DMAIC and RCA tools; and RCA candidate selection process; using the DMAIC process; effective interviewing and finding creative solutions and effective solutions; utilizing process engineering software for identifying root cause and troubleshooting; measuring equipment/facility performance and identifying deviations from the optimum design; developing solution to the issue; the lateral learning; and facilitating a workshop.

Course Objectives

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

- Apply an in-depth knowledge and skills on Root Cause Analysis (RCA) of upset in process plant
- Acquire knowledge and skills necessary to find effective solutions to event-based problems in process plant
- Know the fundamentals of root cause analysis, define the problem and discuss cause and effect principle and effective interviewing
- Find creative solutions, effective solutions, understand software, solve practical examples and facilitate a workshop
- Identify the operational principles and identify why plant get upset
- Collect operational data like the carryover, slippage, facilities bottleneck, excess flaring etc.
- Compare with PFDs, heat and material balance docs, data sheets, design info and PAT reports
- Identify bottlenecks of facilities, instruments errors and human errors
- Review and verify operational reports to develop a method to solve the problems
- Describe the characteristics of a troubleshooting problem and the process used to solve troubleshooting problems
- Illustrate the mental problem-solving process including the overall summary of major skills and a worksheet
- Implement the use of the trouble-shooter's worksheet and select valid diagnostic actions
- Explain the complex operational troubleshooting and use root cause analysis techniques
- Illustrate the framework of RCA including the why-why analysis, breakthrough and DMAIC
- Identify RCA tools and implement RCA candidate selection process using the DMAIC process
- Utilize process engineering software for identifying root cause and troubleshooting
- Measure equipment, facility performance and identify deviations from the optimum/design
- Develop solution to the issue and apply lateral learning

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 Root Cause Analysis (RCA) of upset in process plant for senior process engineers and process engineers.

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 Engineer** with over **30 years** of practical experience within the **Oil**, **Gas**, **Refinery** and **Petrochemical** industries. His wide expertise includes **Process Plant** Optimization Technology & Continuous Improvement, **Process Engineering Calculations**, **Process Plant** Start Up & Commissioning, Applied **Process Engineering** Elements**, Coke Cooler**, **Process Plant** Start-up & Commissioning, **Process Plant** Troubleshooting, **Operations Abnormalities & Plant Upset**, **Process Equipment** Applications & Troubleshooting, **Process Plant Performance & Efficiency**, **Gas Sweetening & Sulphur Recovery**, **Distillation-Column** Control & Troubleshooting, **Oil Movement & Troubleshooting**, **Process Plant Operations & Control**, **Process Equipment** Operation, **Fired Heaters & Air Coolers** Maintenance, **Heat Exchangers**, **Pumps & Compressors**, **Crude Desalter**, **Pressure Vessels & Valves**, **Steam Trapping & Control**, **Pumps & Valve** Maintenance & Troubleshooting, **Turbomachinery**, **Mechanical Alignment**, **Rotating Equipments**, **Diesel Generators**, **Lubrication** Technology, **Bearing**, **Predictive & Preventive** Maintenance, **Root Cause Analysis**, **Boilers**, **Oil Field** Operation, **Production** Operation, Plant Operation & Commissioning, **Crude Oil De Salting** Process, **Gas Conditioning**, **NGL Recovery & NGL Fractionation**, **Flare** System, **Storage Tanks**, **Oil Recovery** System and **Chemical Injection**.

Mr. Thanasis has acquired his thorough and practical experience as the **Project Manager**, **Plant Manager**, **Area Manager - Equipment Construction**, **Construction Superintendent**, **Project Engineer** and **Design Engineer**. His duties covered **Plant Preliminary Design**, **Plant Operation**, **Write-up** of **Capital Proposal**, **Investment Approval**, **Bid Evaluation**, **Technical Contract Write-up**, **Construction** and **Sub-contractor Follow up**, **Lab Analysis**, **Sludge Drying** and **Management** of **Sludge Odor** and **Removal**. He has worked in various companies worldwide in the **USA**, **Germany**, **England** and **Greece**.

Mr. Thanasis is a **Registered Professional Engineer** in the **USA** and **Greece** and has a **Master** and **Bachelor** degrees in **Mechanical Engineering** with **Honours** from the **Purdue University** and **SIU** in **USA** respectively as well as an **MBA** from the **University of Phoenix** in **USA**. Further, he is a **Certified Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**) and a **Certified Instructor/Trainer**.

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.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

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 – 0930	***Operational Principles & Why Plants Get Upset***
0930 – 0945	*Break*
0945 – 1030	***How to Find Effective Solutions to Event-Based Problems in Process Plant***
1030 – 1100	***Collecting Operational Data such as Carryover, Slippage, Facilities Bottleneck, Excess Flaring etc, & Compare with PFDs, Heat & Material Balance Docs, Data Sheets & Design Info & PAT Reports***
1100 – 1130	***Identify Bottlenecks of Facilities, Instruments Errors & Human Errors***
1215 – 1230	*Break*
1230 – 1300	***Review & Verify Operational Reports to Develop a Method to Solve the Problems***
1300 – 1345	***Define the Problem***
1345 – 1420	***Characteristics of a Trouble-Shooting Problem***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Characteristics of the Process Used to Solve Trouble-Shooting Problems***
0930 – 0945	*Break*
0945 – 1030	***The Mental Problem-Solving Process***
1030 – 1100	***Overall Summary of Major Skills & a Worksheet***
1100 – 1130	***Practical Example: Use of the Trouble-shooter's Worksheet***
1215 – 1230	*Break*
1230 – 1300	***How to Select Valid Diagnostic Actions***
1300 – 1345	***Complex Operational Troubleshooting***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Fundamentals of Root Cause Analysis***
0930 – 0945	*Break*
0945 – 1030	***Use Root Cause Analysis Technique***
1030 – 1100	***Cause & Effect Principle***
1100 – 1130	***Framework of RCA***
1215 – 1230	*Break*
1230 – 1300	***Level A: Why-Why Analysis***
1300 – 1345	***Level B: Breakthrough***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 4

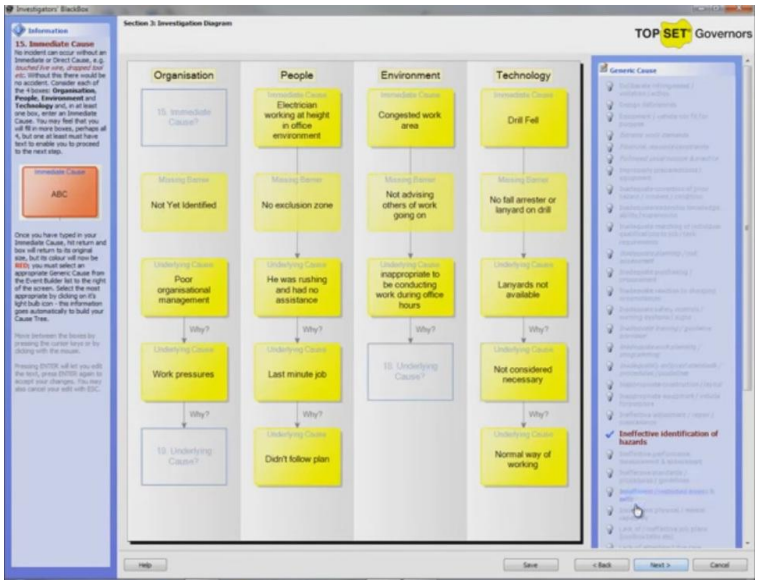
0730 – 0930	***Level C: DMAIC***
0930 – 0945	*Break*
0945 – 1030	***RCA Tools***
1030 – 1100	***RCA Candidate Selection Process***
1100 – 1130	***Using the DMAIC Process***
1215 – 1230	*Break*
1230 – 1300	***Effective Interviewing***
1300 – 1345	***Find Creative Solutions***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

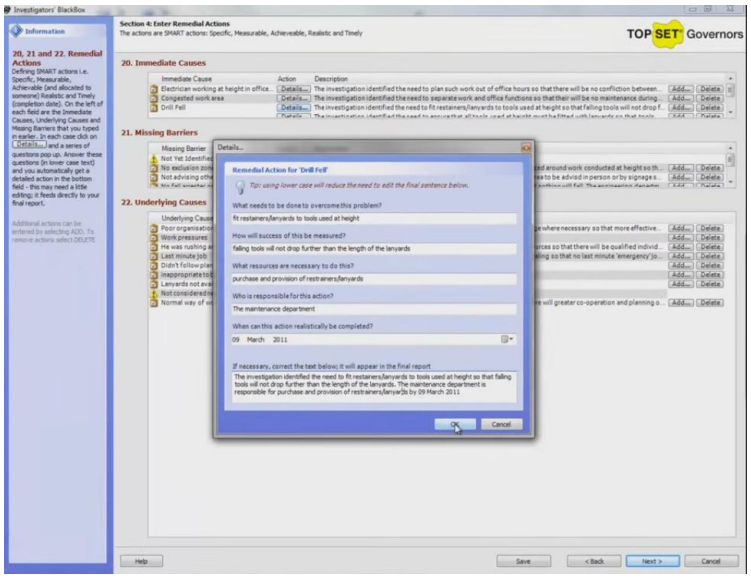
Day 5

0730 – 0800	***Find Effective Solutions***
0800 – 0830	***Utilizing Process Engineering Software for Identifying Root Cause & Troubleshooting***
0930 – 0945	*Break*
0945 – 1030	***Measure Equipment/Facility Performance & Identify Deviations from the Optimum/Design***
1030 – 1130	***Develop Solution to the Issue***
1130 – 1215	***Lateral Learning***
1215 – 1230	*Break*
1230 – 1300	***Facilitate a Workshop***
1300 – 1315	***Course Conclusion***
1315 – 1415	***COMPETENCY EXAM***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art BlackBox simulator.





BlackBox Software Tool

Course Coordinator

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