

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

September 01-05, 2024/Jubail Hall, Signature Al Khobar 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, heat 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 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.

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:-


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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 **30.0 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.

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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 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. Mike Poulos, MSc, BSc, is a Senior Process Engineer with over 35 years of industrial experience within the Utilities, Refinery, Petrochemical and Oil & Gas industries. His expertise lies extensively in the areas of Process Equipment Design & Troubleshooting, Petroleum Processing, Process Design Specifications, Process Calculation Methods, Equipment Sizing & Selection, Piping, Pumps, Compressors, Heat Exchangers, Air Coolers, Direct-Fired Heaters, Process Vessels, Fractionator Columns, Reactors, Ancillary Equipment, Mechanical & Safety Aspects, Cost Estimation, Commissioning & Start-Up, Production & Cost Reduction, Reactor Building Ventilation System, PVC Initiators Storage Bunkers, PVC Modernization & Expansion, PVC Reactor, PVC Plant Reactors Pre-Heating, PVC Plant Start-Up & Commissioning, PVC Plant Shutdown, PVC Driers Automation, VCM Recovery, VCM Sphere Flooding System, VCM Storage Tanks, Steam Tripping Facilities, Solvents Plant Automation Commissioning & Start-Up and Inferential Properties System. Further, he is also well-versed in Advanced Process Control Technology, Designing Process Plant Fail-Safe Systems, Quantitative Risk Assessment, On-Line Statistical Process Control, Principles and Techniques of Contemporary Management, Rosemount RS3, Polymer Additives, Polymer Reaction Engineering, Polymer Rheology and Processing, GRID Management and Batch Process Engineering.

During his career life, Mr. Poulos held significant positions as the **Chemical Plants Technology Engineer, PVC Plant Production Engineer, PVC Plant Shutdown Coordinator, PVC Plant/CC Solvents Plants Acting Section Head and Chemical Distribution Section Head** from Hellenic Petroleum, wherein he was responsible for the development of integrated system.

Mr. Poulos has **Master's and Bachelor's** degrees in **Chemical Engineering** from the **University of Massachusetts** and **Thessaloniki Polytechnic** respectively. Further, he is a **Certified Instructor/Trainer**, a and a **member of the Greek Society of Chemical Engineers and Greek Society of Engineers.**

Training Methodology

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Workshops & Work Presentations
- 30% Case Studies & Practical Exercises
- 20% Software, Simulators & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

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.

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: Sunday, 01st of September 2024

0730 – 0800	<i>Registration & Coffee</i>
0800 – 0815	<i>Welcome & Introduction</i>
0815 – 0830	PRE-TEST
0830 – 0930	Operational Principles & Why Plants Get Upset
0930 – 0945	<i>Break</i>
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	<i>Break</i>
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	<i>Lunch & End of Day One</i>

Day 2: Monday, 02nd of September 2024

0730 – 0930	Characteristics of the Process Used to Solve Trouble-Shooting Problems
0930 – 0945	<i>Break</i>
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	<i>Break</i>
1230 – 1300	How to Select Valid Diagnostic Actions
1300 – 1345	Complex Operational Troubleshooting
1420 – 1430	Recap
1430	<i>Lunch & End of Day Two</i>

Day 3: Tuesday, 03rd of September 2024

0730 – 0930	Fundamentals of Root Cause Analysis
0930 – 0945	<i>Break</i>
0945 – 1030	Use Root Cause Analysis Technique



1030 - 1100	<i>Cause & Effect Principle</i>
1100 - 1130	<i>Framework of RCA</i>
1215 - 1230	<i>Break</i>
1230 - 1300	<i>Level A: Why-Why Analysis</i>
1300 - 1345	<i>Level B: Breakthrough</i>
1420 - 1430	<i>Recap</i>
1430	<i>Lunch & End of Day Two</i>

Day 4: Wednesday, 04th of September 2024

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

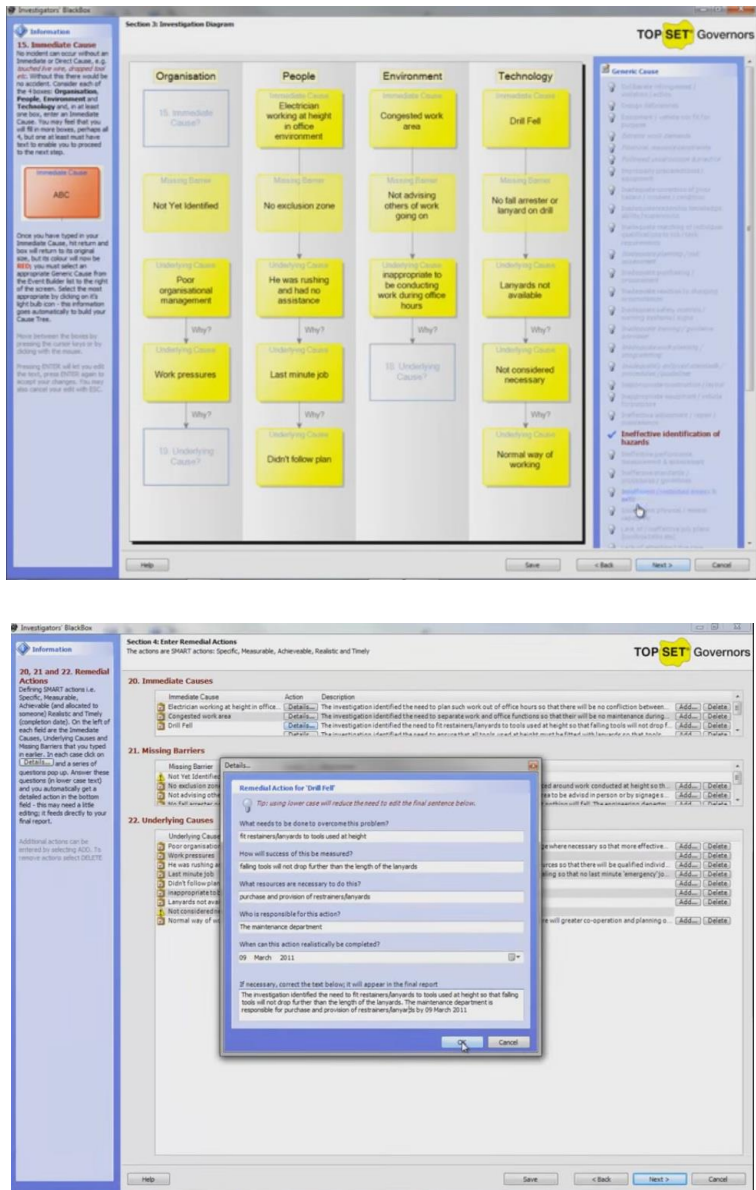
Day 5: Thursday, 05th of September 2024

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



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.



The image displays two screenshots of the BlackBox software tool. The top screenshot shows a flowchart titled 'Investigation Diagram' with columns for Organisation, People, Environment, and Technology. It details causes such as 'Congested work area', 'Drill Fall', and 'Lanyards not available'. The bottom screenshot shows 'Remedial Actions' for 'Drill Fall', including actions like 'Fit restrainers/lanyards to tools used at height' and 'Purchase and provision of restrainers/lanyards'.

BlackBox Software Tool

Course Coordinator

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