



COURSE OVERVIEW TM0325 **Advanced Root-Cause Analysis (RCA)**

Course Title

Advanced Root-Cause Analysis (RCA)

Course Date/Venue

December 06-10, 2026/TBA Meeting Room,
Centro Corniche Al Khobar by Rotana, Al
Khobar, KSA or TBA Meeting Room, Elite
Byblos Hotel Al Barsha, Sheikh Zayed Road,
Dubai, UAE

Course Reference

TM0325

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

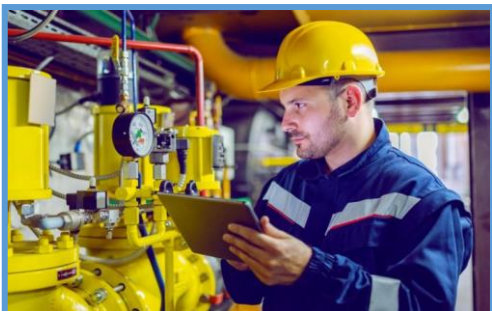
Course Description



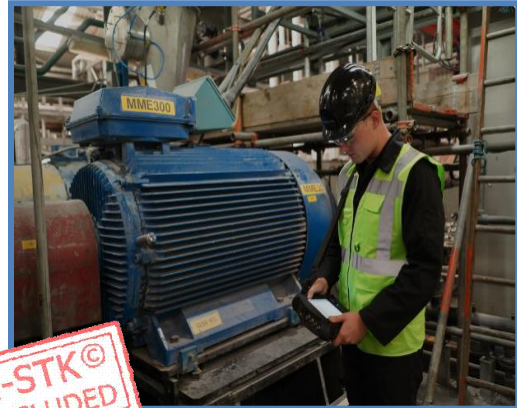
This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.



This course is designed to provide participants with a detailed and up-to-date overview of Advanced Root-Cause Analysis (RCA). It covers the importance of identifying true root causes, reactive versus proactive problem solving and RCA methodologies used in industry; the various types of problems and failures including the principles of effective problem solving, problem definition and scoping; the data collection for root cause analysis, problem description techniques and cause-and-effect analysis; and the 5 whys method, fault tree analysis (FTA) and failure modes and effects analysis (FMEA).



Further, the course will also discuss the barrier analysis, pareto analysis in root cause identification and event and causal factor charting; the change analysis, human factors analysis, equipment failure investigation and process and system analysis; and the data analysis techniques, identifying corrective actions, preventive action strategies and risk assessment in RCA.



During this interactive course, participants will learn the improvement measures, verifying and validating solutions and proper documentation and reporting; integrating RCA with management systems and the advanced RCA tools covering Kepner-Tregoe problem analysis, Apollo root cause analysis methodology, TapRoot system overview and cause mapping techniques; and the feedback loops for improvement, knowledge sharing and best practices, tracking long-term corrective actions and building a culture of prevention.

Course Objectives/Outcomes & Benefits for the Participants

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

- Apply and gain an advanced knowledge on root-cause analysis (RCA)
- Discuss the importance of identifying true root causes, reactive versus proactive problem solving and RCA methodologies used in industry
- Identify the various types of problems and failures including the principles of effective problem solving, problem definition and scoping
- Carryout data collection for root cause analysis, problem description techniques and cause-and-effect analysis
- Employ the 5 whys method, fault tree analysis (FTA) and failure modes and effects analysis (FMEA)
- Apply barrier analysis, pareto analysis in root cause identification and event and causal factor charting
- Implement change analysis, human factors analysis, equipment failure investigation and process and system analysis
- Carryout data analysis techniques, identifying corrective actions, preventive action strategies and risk assessment in RCA
- Implement improvement measures, verify and validate solutions and apply proper documentation and reporting
- Integrate RCA with management systems and apply advanced RCA tools covering Kepner-Tregoe problem analysis, Apollo root cause analysis methodology, TapRoot system overview and cause mapping techniques
- Create feedback loops for improvement and employ knowledge sharing and best practices, tracking long-term corrective actions and building a culture of prevention

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 advanced root-cause analysis (RCA) for maintenance, reliability and asset management engineers, quality assurance and quality control professionals, HSE and incident investigation personnel, operations and production supervisors, process and manufacturing engineers, continuous improvement and operational excellence teams, project engineers and technical specialists, maintenance planners and technical coordinators 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 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 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. Andrew Ladwig is a **Senior Mechanical & Maintenance Engineer** with over **25 years** of extensive experience within the **Oil & Gas, Refinery, Petrochemical & Power** industries. His expertise widely covers in the areas of **Maintenance Optimization & Best Practices, Process Plant Shutdown & Turnaround, Maintenance Auditing & Benchmarking, Reliability Management, Reliability Centered Maintenance Principles & Application, Efficient Shutdowns, Machinery Lubrication, Maintenance Planning & Scheduling, Coupling & Shaft Alignment Techniques, Maintenance Auditing & Benchmarking, Reliability Management, Reliability Centered Maintenance Principles & Application, Efficient Shutdowns, Machinery Lubrication, Maintenance Planning & Scheduling, Coupling & Shaft Alignment Techniques, Reliability, Availability & Maintainability (RAM), Root Cause Analysis, Maintenance Process, Reliability-Centered Maintenance (RCM), Reliability Engineering Analysis (RE), Root Cause Analysis (RCA), Asset Integrity Management (AIM), Reactive & Proactive Maintenance, Pressure Safety Relief Valve Repair & Recalibration, PSV/PRV Troubleshooting, PRV Testing & Repair, Valve Testing & Inspection, Valve Sealing, Valve Calibration, Control Valves & Actuators, Boiler Inspection & Maintenance, Boiler Systems, Boiler instrumentation & Controls, Boiler Start-up & Shutdown, Boiler Operation & Steam System Management, Boiler Water Chemistry & Treatment, Boiler Efficiency & Waste Heat Recovery, Boiler Inspection & Testing, Boiler Maintenance, Boiler Troubleshooting & Safety, Boiler Emissions & Pollution Control, Combustion Analysis & Tuning Procedures, Water Treatment Technology, Heat Recovery Steam Generating (HRSG), Impulse Tube Installation & Inspection, Parker Compression Fittings, Pipes & Fittings, PSV Inspection, Root Cause Failure Analysis, Tank Design & Engineering, Tank Shell, Tanks & Tank Farms, Vacuum Tanks, Gas Turbine Operating & Maintenance, Reciprocating & Centrifugal Compressors, Screw Compressor, Compressor Control & Protection, Gas & Steam Turbines, Turbine Operations, Gas Turbine Technology, Valves, Process Control Valves, Bearings & Lubrication and Advanced Machinery Dynamics.**

During his career life, Mr. Ladwig has gained his practical experience through his various significant positions and dedication as the **Mechanical Engineer, Project Engineer, Reliability & Maintenance Engineer, Maintenance Support Engineer, Process Engineer, HSE Supervisor, Warehouse Manager, Quality Manager, Business Analyst, Senior Process Controller, Process Controller, Safety Officer, Mechanical Technician, Senior Lecturer and Senior Consultant/Trainer** for various companies such as the Sasol Ltd., Sasol Wax, Sasol Synfuels, just to name a few.

Mr. Ladwig has a **Bachelor's** degree in **Chemical Engineering** and a **Diploma in Mechanical 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, workshops, seminars, courses and conferences internationally.

Training Methodology

Our courses employ an interactive, learner-centred methodology that integrates theoretical knowledge with practical application. The training is delivered through a suitable combination of some or all of the following methods, selected according to the course content and learning objectives:

- Instructor-led presentations and facilitated discussions
- Practical workshops and participant presentations
- Hands-on exercises and real-world case studies
- Equipment demonstrations and technical drawings
- Hardware- and software-based simulations
- Gamification & Role Play in soft-skills courses only
- Virtual Reality (VR) and Augmented Reality (AR)
- Instructional videos and other relevant training resources

This blended approach encourages active participation, strengthens practical skills and supports the effective application of acquired knowledge in the workplace.

Learning Design & Customization

This course can be customized to the exact requirements of clients. Haward Technology is so proud of our huge capabilities in tailoring our courses to the training needs of our valued clients.

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

Day 1: Sunday, 06th of December 2026

0730 – 0800	<i>Registration & Coffee</i>
0800 – 0815	<i>Welcome & Introduction</i>
0815 – 0830	PRE-TEST
0830 – 0930	Introduction to Root-Cause Analysis <i>Definition and Objectives of RCA • Importance of Identifying True Root Causes • Reactive versus Proactive Problem Solving • Overview of RCA Methodologies Used in Industry</i>
0930 – 0945	<i>Break</i>
0945 – 1030	Types of Problems & Failures <i>Human-Related Failures • Process and System Failures • Equipment and Technical Failures • Organizational and Management Failures</i>
1030 – 1130	Principles of Effective Problem Solving <i>Structured Problem-Solving Approaches • Systems Thinking in Problem Analysis • Importance of Evidence-Based Investigation • Avoiding Assumptions and Biases</i>
1130 – 1215	Problem Definition & Scoping <i>Writing Clear Problem Statements • Identifying Symptoms versus Root Causes • Defining Boundaries of Analysis • Establishing Investigation Objectives</i>
1215 – 1230	<i>Break</i>

1230 – 1330	Data Collection for Root Cause Analysis <i>Identifying Required Data Sources • Techniques for Gathering Reliable Information • Interviews and Witness Statements • Documentation and Record Analysis</i>
1330 – 1420	Problem Description Techniques <i>Is / Is Not Analysis • Timeline Development • Event Sequence Diagrams • Process Flow Mapping</i>
1420 – 1430	Recap <i>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</i>
1430	<i>Lunch & End of Day One</i>

Day 2: Monday, 07th of December 2026

0730 – 0830	Cause-&-Effect Analysis <i>Fishbone (Ishikawa) Diagram Construction • Categorizing Potential Causes • Brainstorming Techniques for Cause Identification • Prioritizing Potential Causes</i>
0830 – 0930	The 5 Whys Method <i>Principles of Iterative Questioning • Proper Application of the Technique • Avoiding Superficial Answers • Linking Answers to Evidence</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Fault Tree Analysis (FTA) <i>Understanding Fault Tree Structure • Logical Gates (AND/OR) in Fault Trees • Identifying Basic Events • Applications in Safety and Reliability Analysis</i>
1100 – 1215	Failure Modes & Effects Analysis (FMEA) <i>Identifying Failure Modes • Assessing Severity, Occurrence, and Detection • Risk Priority Number (RPN) Calculation • Prioritizing Corrective Actions</i>
1215 – 1230	<i>Break</i>
1230 – 1330	Barrier Analysis <i>Identifying Failed or Missing Barriers • Types of Protective Barriers • Evaluating Barrier Effectiveness • Strengthening Preventive Controls</i>
1330 – 1420	Pareto Analysis in Root Cause Identification <i>Applying the 80/20 Principle • Data Classification and Categorization • Constructing Pareto Charts • Identifying the Most Significant Causes</i>
1420 – 1430	Recap <i>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</i>
1430	<i>Lunch & End of Day Two</i>

Day 3: Tuesday, 08th of December 2026

0730 – 0830	Event & Causal Factor Charting <i>Developing Event Timelines • Identifying Causal Relationships • Linking Causes to Consequences • Visualizing Complex Failure Sequences</i>
0830 – 0930	Change Analysis <i>Identifying Deviations from Normal Operations • Comparing Current versus Previous Conditions • Determining Potential Impacts of Changes • Identifying Triggers for Failures</i>

0930 – 0945	Break
0945 – 1100	Human Factors Analysis <i>Human Error Classification • Performance Shaping Factors • Workplace Environment Influences • Organizational Culture Effects</i>
1100 – 1215	Equipment Failure Investigation <i>Mechanical Failure Analysis • Electrical System Failures • Maintenance History Evaluation • Reliability and Condition Monitoring</i>
1215 – 1230	Break
1230 – 1330	Process & System Analysis <i>Mapping Operational Processes • Identifying Process Bottlenecks • Detecting Process Variations • Process Control Evaluation</i>
1330 – 1420	Data Analysis Techniques <i>Statistical Analysis Basics • Trend Analysis and Pattern Recognition • Control Charts and Variation Analysis • Data Validation and Interpretation</i>
1420 – 1430	Recap <i>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</i>
1430	Lunch & End of Day Three

Day 4: Wednesday, 09th of December 2026

0730 – 0830	Identifying Corrective Actions <i>Linking Actions to Root Causes • Developing Realistic Solutions • Prioritizing Corrective Measures • Evaluating Feasibility and Effectiveness</i>
0830 – 0930	Preventive Action Strategies <i>Eliminating Root Causes Permanently • Designing Error-Proof Systems • Implementing Preventive Maintenance • Strengthening Operational Controls</i>
0930 – 0945	Break
0945 – 1100	Risk Assessment in RCA <i>Risk Identification and Evaluation • Risk Ranking and Prioritization • Mitigation Planning • Integrating Risk Management with RCA</i>
1100 – 1215	Implementation of Improvement Measures <i>Action Planning and Scheduling • Resource Allocation • Responsibility Assignment • Monitoring Implementation Progress</i>
1215 – 1230	Break
1230 – 1330	Verification & Validation of Solutions <i>Testing Corrective Actions • Monitoring Performance Indicators • Ensuring Effectiveness of Implemented Solutions • Preventing Recurrence of Problems</i>
1330 – 1420	Documentation & Reporting <i>Preparing RCA Investigation Reports • Documenting Analysis Findings • Presenting Conclusions and Recommendations • Communicating Results to Stakeholders</i>
1420 – 1430	Recap <i>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</i>
1430	Lunch & End of Day Four

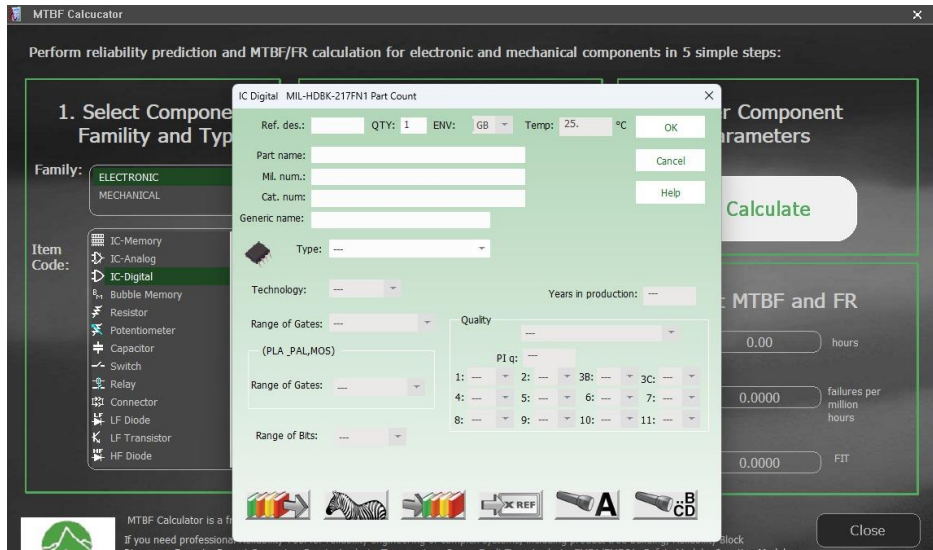
Day 5: Thursday, 10th of December 2026

0730 – 0830	Integrating RCA with Management Systems RCA within Quality Management Systems • Integration with Safety Management Systems • Continuous Improvement Frameworks • Organizational Learning from Failures
0830 – 0930	Advanced RCA Tools Kepner-Tregoe Problem Analysis • Apollo Root Cause Analysis Methodology • TapRooT® System Overview • Cause Mapping Techniques
0930 – 0945	Break
0945 – 1100	RCA in Different Industries Manufacturing and Industrial Applications • Oil & Gas and Energy Sector Investigations • Healthcare Incident Analysis • Construction and Infrastructure Failures
1100 – 1230	Facilitating RCA Workshops Leading Investigation Teams • Effective Brainstorming Sessions • Managing Team Dynamics • Ensuring Objective Analysis
1230 – 1245	Break
1245 – 1300	Case Study Analysis Real-World Incident Investigations • Step-by-Step RCA Application • Identifying Lessons Learned • Developing Improvement Strategies
1300 – 1345	Continuous Improvement & Organizational Learning Creating Feedback Loops for Improvement • Knowledge Sharing and Best Practices • Tracking Long-Term Corrective Actions • Building a Culture of Prevention
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

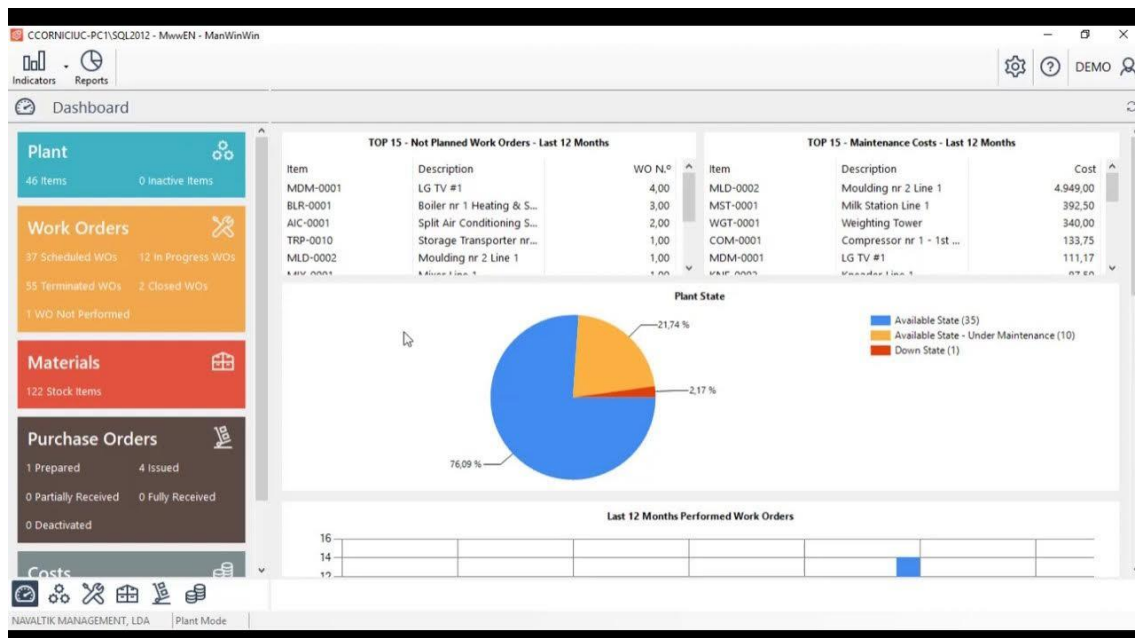


Simulator (Hands-on Practical Sessions)

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 the state-of-the-art simulator “MTBF Calculator” and “ManWinWin Express CMMS Software”.



MTBF Calculator



ManWinWin Express CMMS Software

Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org