

**COURSE OVERVIEW TM0790**  
**Certified Reliability Engineer (CRE)**  
**American Society for Quality (ASQ)**  
Exam Preparation Training

**Course Title**

Certified Reliability Engineer (CRE): American Society for Quality (ASQ) - Exam Preparation Training

**Course Date/Venue**

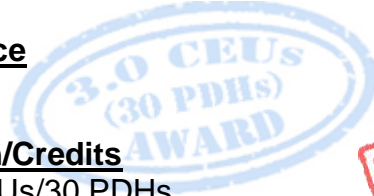
August 12-16, 2024/Boardroom 2, Southern Sun Abu Dhabi Hotel, Abu Dhabi, UAE

**Course Reference**

TM0790

**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.***



Reliability engineers are professionals who understand the principles of performance evaluation and prediction to improve product/systems safety, reliability, and maintainability. This course complies with the Body of Knowledge (BOK) specified for ASQ's Reliability Engineer certification, which includes reliability fundamentals covering leadership foundations and reliability foundations; the benefits of reliability engineering; the supplier reliability assessments and performance monitoring; the basic reliability terminology; the corrective and preventive action, root cause analysis, six sigma methodologies, systems engineering and integration.



During this interactive course, participants will learn the risk management identification, risk management analysis and risk management mitigation; the basic concepts and data management of probability and statistics for reliability; the reliability, planning, testing and modelling; and the lifecycle reliability covering reliability design techniques, parts and system development and maintainability.

### Course Objectives

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

- Prepare for the next ASQ CRE exam and have enough knowledge and skills to pass such exam in order to be certified as a “*Certified Reliability Engineer (CRE)*” from an internationally recognized Accreditation Body (American Society for Quality – ASQ)
- Discuss reliability fundamentals covering leadership foundations and reliability foundations
- Identify the benefits of reliability engineering and carryout supplier reliability assessments and performance monitoring
- Define the basic reliability terminology and perform corrective and preventive action, root cause analysis, six sigma methodologies, systems engineering and integration
- Employ risk management identification, risk management analysis and risk management mitigation
- Recognize the basic concepts and data management of probability and statistics for reliability
- Employ reliability, planning, testing and modelling
- Illustrate lifecycle reliability covering reliability design techniques, parts and system development and maintainability

### 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 is essential for those who desire to reinforce their skills, knowledge and capacity to understand the reliability of the organizational excellence body of knowledge in preparation for taking ASQ certified reliability manager examination. Further, the course is also beneficial for reliability managers, reliability engineers, maintenance managers, maintenance engineers, HSE managers, HSE engineers, safety engineers, quality engineers, quality auditors, process engineers, quality managers, instrumentation & control engineers and those who are primarily involved in implementing reliability, quality and compliance within their organizations.

### **Exam Eligibility & Structure**

- You must have eight years of on-the-job experience in one or more of the areas of the Certified Reliability Engineer Body of Knowledge
- A minimum of three years of this experience must be in a decision-making position. “Decision making” is defined as the authority to define, execute, or control projects/processes and to be responsible for the outcome. This may or may not include management or supervisory positions
- If you are now or were previously certified by ASQ as:-
  - Quality Engineer
  - Quality Auditor
  - Software Quality Engineer
  - Software Quality Professional or,
  - Manager of Quality/Organizational Excellence, experience used to qualify for certification in these fields applies to certification as a Reliability Engineer
- Candidate who have completed a degree from a college, university, or technical school with accreditation accepted by ASQ, part of the eight-year experience requirement will be waived, as follows (only one of these waivers may be claimed):-
  - Diploma from a technical or trade school—one year will be waived
  - Associate’s degree—two years waived
  - Bachelor’s degree—four years waived
  - Master’s or doctorate—five years waived

Degrees or diplomas from educational institutions outside the United States must be equivalent to degrees from U.S. educational institutions

### **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.

### **Training Fee**

**US\$ 5,750** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

### **Exam Fee**

**US\$ 715** per Delegate + **VAT**.

**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 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.

**Accommodation**

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

### 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 Process & Mechanical Engineer** with over **25 years** of extensive experience within the **Oil & Gas, Refinery, Petrochemical & Power** industries. His expertise widely covers in the areas of **Ammonia Manufacturing & Process Troubleshooting, Distillation Towers, Crude Oil Distillation, Fundamentals of Distillation** for Engineers, **Distillation Operation and Troubleshooting, Advanced Distillation Troubleshooting, Distillation Technology, Vacuum Distillation, Ammonia Storage & Loading Systems, Ammonia Plant Operation, Troubleshooting & Optimization, Ammonia Recovery, Ammonia Plant Safety, Hazard of Ammonia Handling, Storage & Shipping, Operational Excellence in Ammonia Plants, Fertilizer Storage Management (Ammonia & Urea), Fertilizer**

**Manufacturing Process Technology, Sulphur Recovery, Phenol Recovery & Extraction, Wax Sweating & Blending, Petrochemical & Fertilizer Plants, Nitrogen Fertilizer Production, Petroleum Industry Process Engineering, Refining Process & Petroleum Products, Refinery Planning & Economics, Safe Refinery Operations, Hydrotreating & Hydro-processing, Separators in Oil & Gas Industry, Gas Testing & Energy Isolations, Gas Liquor Separation, Industrial Liquid Mixing, Wax Bleachers, Extractors, Fractionation, Operation & Control of Distillation, Process of Crude ATM & Vacuum Distillation Unit, Water Purification, Water Transport & Distribution, Steam & Electricity, Flame Arrestors, Coal Processing, Environmental Emission Control, R&D of Wax Blending, Wax Molding/Slabbing, Industrial Drying, Principles, Selection & Design, Certified Process Plant Operations, Control & Troubleshooting, Operator Responsibilities, Storage Tanks Operations & Measurements, Process Plant Troubleshooting & Engineering Problem Solving, Process Plant Performance, Efficiency & Optimization, Continuous Improvement & Benchmarking, Process Troubleshooting Techniques, Oil & Gas Operation/Introduction to Surface Facilities, Pressure Vessel Operation, Process Equipment Performance & Troubleshooting, Plant Startup & Shutdown, Startup & Shutdown the Plant While Handling Abnormal Conditions, Flare & Relief System, Process Gas Plant Start-up, Commissioning & Problem Solving, Process Liquid and Process Handling & Measuring Equipment. Further, he is also well-versed in Reliability Engineering, Probability & Statistics for Reliability, Compressors & Turbines Operation, Maintenance & Troubleshooting, Heat Exchanger Overhaul & Testing Techniques, Balancing of Rotating Machinery (BRM), Pipe Stress Analysis, Valves & Actuators Technology, Inspect & Maintain Safeguarding Vent & Relief System, Certified Inspectors for Vehicle & Equipment, Optimizing Equipment Maintenance & Replacement Decisions, Certified Maintenance Planner (CMP), Certified Planning and Scheduling Professional (AACE-PSP), Tank Design, Construction, Inspection & Maintenance, Material Cataloguing, Specifications, Handling & Storage, Steam Trap Design, Operation, Maintenance & Troubleshooting, Steam Trapping & Control, Column, Pump & Exchangers, Troubleshooting & Design, Rotating Equipment Operation & Troubleshooting, Control & ESD System, Detailed Engineering Drawings, Codes & Standards, Budget Preparation, Allocation & Cost Control, Root Cause Analysis (RCA), Production Optimization, Permit to Work (PTW), Project Engineering, Data Analysis, Process Hazard Analysis (PHA), HAZOP Study, Sampling & Analysis, Training Analysis, Job Analysis Techniques, Storage & Handling of Toxic Chemicals & Hazardous Materials, Hazardous Material Classification & Storage/Disposal, Dangerous Goods, Environmental Management System (EMS), Supply Chain, Purchasing, Procurement, Logistics Management & Transport & Warehousing & Inventory, Risk Management Analysis, Risk Monitoring Authorized Gas Tester (AGT), Confined Space Entry (CSE), Personal Protective Equipment (PPE), Fire & Gas, First Aid and Occupational Health & Safety.**

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.

### **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: Monday, 12<sup>th</sup> of August 2024**

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	<b>PRE-TEST</b>
0830 – 0930	<b>Reliability Fundamentals: Leadership Foundation</b> Benefits of Reliability Engineering • Interrelationship of Safety, Quality & Reliability • Reliability Engineer Leadership Responsibilities • Reliability Engineer Role & Responsibilities in the Product Lifecycle • Function of Reliability in Engineering • Ethics in Reliability Engineering • Supplier Reliability Assessments • Performance Monitoring
0930 – 0945	Break
0945 – 1100	<b>Reliability Fundamentals: Reliability Foundations</b> Basic Reliability Terminology • Drivers of Reliability Requirements & Targets • Corrective & Preventive Action • Root Cause Analysis • Product Lifecycle Engineering Stages
1100 – 1230	<b>Reliability Fundamentals: Reliability Foundations (cont'd)</b> Economics of Product Maintainability & Availability • Cost of Poor Reliability • Quality Triangle • Six Sigma Methodologies • Systems Engineering & Integration
1230 – 1245	Break
1245 – 1400	<b>Risk Management Identification</b> Risk Management Techniques • Types of Risk
1400 – 1410	<b>Recap</b>
1410 – 1430	<b>Quiz</b>
1430	Lunch & End of Day One

#### **Day 2: Tuesday, 13<sup>th</sup> of August 2024**

0730 – 0830	Review of Day 1
0830 – 0930	<b>Risk Management Analysis</b> Fault Tree Analysis (FTA) • Failure Modes & Effects Analysis (FMEA) • Common Mode Failure Analysis • Hazard Analysis • Risk Matrix • System Safety
0930 – 0945	Break
0945 – 1100	<b>Risk Management Mitigation</b> Strategies to Minimize Risk • Product Improvement • End of Life Considerations
1100 – 1230	<b>Probability &amp; Statistics for Reliability: Basic Concepts</b> Basic Statistics • Basic Probability Concepts • Probability Distributions • Probability Functions
1230 – 1245	Break
1245 – 1400	<b>Probability &amp; Statistics for Reliability: Basic Concepts (cont'd)</b> Sampling Plans for Statistics & Reliability Testing • Statistical Process Control (SPC) & Process Capability Studies ( $C_p$ , $C_{pk}$ ) • Confidence & Tolerance Intervals
1400 – 1410	<b>Recap</b>
1410 – 1430	<b>Quiz</b>
1430	Lunch & End of Day Two

**Day 3: Wednesday, 14<sup>th</sup> of August 2024**

0730 – 0830	Review of Day 2
0830 – 0930	<b>Probability &amp; Statistics for Reliability: Data Management</b> Sources & Uses of Reliability Data • Types of Data • Data Collection Methods
0930 – 0945	Break
0945 – 1100	<b>Probability &amp; Statistics for Reliability: Data Management (cont'd)</b> Data Summary & Reporting • Failure Analysis Methods • Failure Reporting, Analysis & Corrective Action System (FRACAS)
1100 – 1230	<b>Reliability Planning</b> Reliability Test Strategies • Environmental & Conditions of Use Factors • Failure Consequences • Failure Criteria • Test Environment
1230 – 1245	Break
1245 – 1400	<b>Reliability Testing</b> Testing • Accelerated Life Tests • Stress Screening • Qualification/Demonstration Testing • Degradation • Software Testing
1400 – 1410	<b>Recap</b>
1410 – 1430	<b>Quiz</b>
1430	Lunch & End of Day Three

**Day 4: Thursday, 15<sup>th</sup> of August 2024**

0730 – 0830	Review of Day 3
0830 – 0930	<b>Reliability Modeling</b> Reliability Block Diagrams & Models • Physics of Failure (Pof) & Failure Mechanisms • Failure Models
0930 – 0945	Break
0945 – 1100	<b>Reliability Modeling (cont'd)</b> Reliability Prediction Methods • Design Prototyping
1100 – 1230	<b>Lifecycle Reliability: Reliability Design Techniques</b> Design Evaluation Techniques (Validation & Verification) • Stress-Strength Analysis • Design of Experiments (DOE) • Reliability Optimization
1230 – 1245	Break
1245 – 1400	<b>Lifecycle Reliability: Reliability Design Techniques (cont'd)</b> Human Factors • Design for X (DFX) • Design for Reliability (DfR)
1400 – 1410	<b>Recap</b>
1410 – 1430	<b>Quiz</b>
1430	Lunch & End of Day Four

**Day 5: Friday, 16<sup>th</sup> of August 2024**

0730 – 0800	Review of Day 4
0800 – 0930	<b>Lifecycle Reliability: Parts &amp; Systems Development</b> Materials & Components Selection Techniques
0930 – 0945	Break
0945 – 1100	<b>Lifecycle Reliability: Parts &amp; Systems Development (cont'd)</b> Parts Standardization & System Simplification
1100 – 1230	<b>Lifecycle Reliability: Maintainability</b> Maintenance Strategies • Preventive Maintenance (PM) Analysis
1230 – 1245	Break

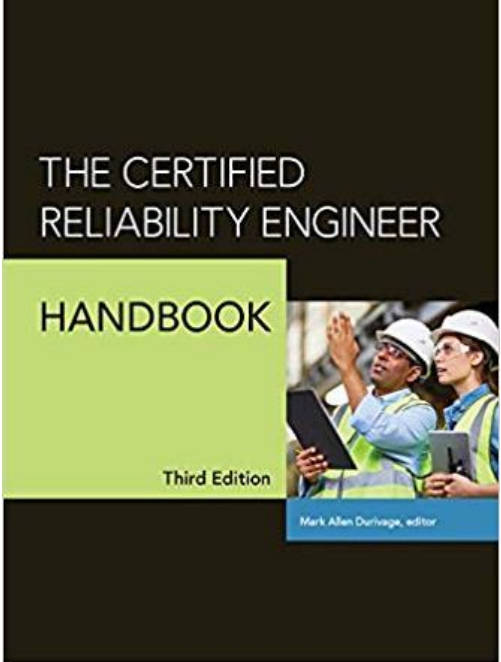
1245 – 1345	<b>Lifecycle Reliability: Maintainability (cont'd)</b> <i>Corrective Maintenance Analysis</i>
1345 – 1400	<b>Course Conclusion</b>
1400 – 1415	<b>POST-TEST</b>
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch &amp; End of Course</i>

**MOCK Exam**

Upon the completion of the course, participants have to sit for a MOCK Examination similar to the exam of the Certification Body through Haward’s Portal. Each participant will be given a username and password to log in Haward’s Portal for the MOCK exam during the 7 days following the course completion. Each participant has only one trial for the MOCK exam within this 7-day examination window. Hence, you have to prepare yourself very well before starting your MOCK exam as this exam is a simulation to the one of the Certification Body.

**Book(s)**

As part of the course kit, the following e-book will be given to all participants:-

	<p><b>Title</b> : The Certified Reliability Engineer Handbook  <b>ISBN</b> : 9788174890580  <b>Author</b> : Mark Allen Durivage  <b>Publisher</b> : ASQ Quality Press</p>
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**Practical Sessions**

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



**Course Coordinator**

Mari Nakintu, Tel: +971 2 30 91 714, Email: [mari1@haward.org](mailto:mari1@haward.org)