COURSE OVERVIEW HE0250
Assessment of Process Hazards, Risk & Appropriate Protection Systems

Course Title
Assessment of Process Hazards, Risk & Appropriate Protection Systems

Course Date/Venue
August 04-08, 2024/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
HE0250

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

3.0 CEUs (30 PDHs) AWARD

H-STK© INCLUDED

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.

The escape of toxic methyl isocyanate vapour from the Union Carbide India Limited plant at Bhopal in India on December 1984 was the most serious process plant incident in history, causing thousands of deaths and many tens of thousands of severe injuries, many of them causing permanent incapacity. This and the explosion at the Phillips Petroleum polyethylene plant at Pasadena on 23 October 1989, which killed 23 people and injured hundreds more, alerted management and governments to the need for much more than traditional occupational safety and health programs to provide safety for those working in, or living around, process plants.

Loss prevention is not only concerned with incidents that cause injury to people. It covers all forms of loss, including damage to the environment and property, and interruption to production caused by major failures of a plant, even when there is no injury to people or damage to the surroundings. Avoidance or minimization of the risks of all these types of incident is embraced by the field of Industrial Plant Risk and Reliability Management.

There are many reasons why organizations may be concerned with managing their risks. These range from avoidance of injury or the cost of replacing damaged equipment, to such matters as maintaining a good public image or avoiding legal claims or prosecution of senior managers for negligence.

This course is designed to cover the latest techniques in risk management (the systematic approach to identifying hazards, assessing the risks from each, and targeting resources to prevent accidents), and reliability management in process plants, and production facilities.

Course Objectives

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

- Apply and gain an in-depth knowledge on risk and reliability management as well as the loss prevention in the process plants and production facilities
- Employ proper methodology on hazard identification with various types of process plant incidents
- Identify the steps of ranking and short-listing of risks using pareto methodology and by estimation of the magnitude of the consequences or the frequency of operational losses
- Identify several risk and reliability criteria by calculating and displaying the risks of potential losses and carryout the assessment of the severity of the consequences of hazardous incidents related to fires, BLEVEs, toxic gas escapes and other explosions
- Discuss the process of assessing the frequency of likelihood of potential hazardous incidents or losses through analysis of causes of incidents using fault trees and availability and modeling the production capability of a plant
- Determine the applications of hazard analysis and risk management through scope of quantitative risk assessment related to computer modeling, uses in setting buffer zones, strengths and limitations uses and abuses
- Implement several systematic approaches to risk reduction in connection to transferring the risk and reducing fire risks in process plants and improve knowledge in safety, reliability and environmental specification through management of risk and reliability of new plants
- List different designs of a program for routine monitoring of process risk and reliability associated to management of risk and reliability of existing plants and operations
- Explain the components of software or human factor including safety culture, safety climate, and human error by being aware of the various effects of software standards on quantitative risk assessment
- Demonstrate several roles of risk and reliability manager in accordance with performance authority and responsibility

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 managing risk, reliability and loss prevention in production operations for all design, safety and reliability managers, engineers and those in-charge of risk, reliability, loss prevention and safe of process plants and production facilities.

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: -

- 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.

- 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. Raymond Tegman is a **Senior HSE Consultant** with extensive experience within the **Oil & Gas**, **Petrochemical** and **Refinery** industries. His broad expertise widely covers in the areas of **Rigging** Safety Rules, Machinery & Hydraulic **Lifting Equipment**, Handling **Hazardous Chemicals**, Spill Containment, **Fire** Protection, **Fire** Precautions, **Incidents & Accidents** Reporting, **HSEQ** Audits & Inspection, **HSEQ** Procedures, **Environmental** Awareness, **Waste** Management Monitoring, **Emergency Planning**, **Emergency** Management, **Working at Heights**, **Root Cause Analysis**, **HSE** Rules & Regulations, Process Safety Management (**PSM**), Process Hazard Analysis (**PHA**), Techniques, **HAZOP**, **HSE** Risk, **Pre-Start-up Safety** Reviews, **HSE Risk** Identification, Assessments & Audit, **HSE Risk** Assessment & Management Concepts, **HSE Management** Policy & Standards, **HSSE Emergency Response & Crisis Management** Operations, **Confined Space Entry**, **Quantitative Risk Assessment** (**QRA**), Hazardous Materials & Chemicals Handling, Safety Precaution & Response Action Plan, **Hazard & Risk** Assessment, Task Risk Assessment (**TRA**), **Incident Command**, **Accident & Incident Investigation**, **Emergency Response Procedures**, Job Safety Analysis (**JSA**), Behavioural Based Safety (**BBS**), **Fall Protection**, **Work Permit & First Aid**, Lock-out/Tag-out (**LOTO**), **Emergency Response**, **Construction** Supervision, **Scaffolding** Inspection, **HAZCHEM**, Manual Material Handling, **Road Traffic** Supervision, ISO 9001 and OHSAS 18001.

During his career life, Mr. Tegman has gained his practical and field experience through his various significant positions and dedication as the **Operations Manager**, **Safety & Maintenance Manager**, **Safety Manager**, **Road/Traffic Supervisor**, **Assessor/Moderator**, **Safety Consultant**, **Safety Advisor**, **Safety Officer** and **Liaison Officer** from Zero Harm, SHRA Training & Services (Health & Safety), Road Crete, Balwin Property Development, DEME International, Gladstone Australia, Godavari Gas Pipeline and New Castle NCIG.

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.

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: ***Sunday, 04th of August 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction*** *Management of Hazards ● The Benefits of Risk Management ● Scope of Process Risk and Reliability Management ● Steps in Risk Management of a Process Plant*
0930 – 0945	*Break*
0945 – 1100	***Hazard Identification*** *Types of Impact ● Typical Types of Incident Leading to the Impact ● Types of Process Plant Incidents ● Approaches to Systematic Identification of Hazards and Risks*
1100 – 1230	***Ranking & Short-Listing of Risks*** *The Pareto Principle ● Two Classes of Risks for Attention ● Ranking the Hazards and the Associated Risk Scenarios ● Examples of Scoring Systems for Use in Rapid Ranking*
1230 – 1245	*Break*
1245 – 1420	***Ranking & Short-Listing of Risks (cont'd)*** *Estimation of the Magnitude of the Consequences or the Frequency, of Operational Losses ● Case Studies ● Risk Management Without Numbers ● Identifying the Questions to be Answered in the Risk Assessment*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: ***Monday, 05th of August 2024***

0730 – 0930	***Risk & Reliability Criteria*** *The Problem with "Acceptable Risk" ● Some Everyday Risks ● Risks to Members of the Public From New Plant ● Risks to Employees ● Economic Factors in Risk Criteria ● Regulatory Approaches to Setting Risk Criteria ● Calculating and Displaying the Risks of Potential Losses*
0930 – 0945	*Break*

0945 – 1100	***Assessment of the Severity of the Consequences of Hazardous Incidents*** *Fires ● Bleves ● Vapor Cloud Explosions ● Other Explosions ● Toxic Gas Escapes ● Environmentally Damaging Escapes ● Assessment of Probability of Fatality using Probit Mathematics*
1100 – 1230	***Assessing the Frequency of Likelihood of Potential Hazardous Incidents or Losses*** *Analysis of Causes of Incidents using Fault Trees ● Introduction to Reliability Mathematics ● Quantifying Incident Frequency on Fault Trees ● Alternative Approach to Assessing the Failure Frequency of a System: the Cutset Approach*
1230 – 1245	*Break*
1245 – 1420	***Assessing the Frequency of Likelihood of Potential Hazardous Incidents or Losses (cont'd)*** *Assessing the Probabilities of Various Outcomes using Event Trees ● Calculation of Reliability of Units with Installed Spares ● Availability and Modelling the Production Capability of a Plant ● Methods of Improving Reliability of Control and Protective Systems ● Sources of Failure Data*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: ***Tuesday, 06th of August 2024***

0730 – 0930	***Quantitative Risk Assessment: Computer Modelling, Uses in Setting Buffer Zones, Strengths & Limitations, Uses & Abuses*** *Modelling the Risk ● Separation Distances (or Buffer Zones) ● Some Experiences with Quantitative Risk Assessment ● Summary of the Strengths and Limitations of Quantitative Risk Assessment ● Applications of Hazard Analysis and Risk Assessment ● Faults in the Application of Hazard Analysis and Risk Assessment*
0930 – 0945	*Break*
0945 – 1100	***A Systematic Approach to Risk Reduction*** *Transferring the Risk ● Reducing Fire Risks in Process Plants ● Steps in Design of a New Plant to Maximize Fire Safety ● Case Study: Upgrading a Firefighting Water System ● Principles of Firefighting ● Reducing the Risks in Warehouse Operations*
1100 – 1230	***A Systematic Approach to Risk Reduction (cont'd)*** *Reduction of Risks in Transport of Hazardous Materials ● Reduction of BLEVE Risks ● Reduction of Vapour Cloud Explosion Risks ● Reduction of Toxic Gas Risks ● Reduction of Environmental Risks of Reduction of the Risk of Loss of Reliability ● Design for Reliability of Control and Protective Systems ● Equipment Design for Reliability and Safety in the Oil and Gas Industry in Particular*
1230 – 1245	*Break*
1245 – 1420	***Management of Risk & Reliability of New Plants*** *Safety, Reliability and Environmental Specification ● Safety, Reliability and Environmental Review ● Hazard and Operability Study (HAZOP) ● Construction Quality Assurance and Audit ● Precommissioning Safety Inspection ● Post-Startup Hazop Studies*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4:	Wednesday, 07th of August 2024
0730 – 0930	***Management of Risk & Reliability of Existing Plants & Operations*** *Some Principles for Good Management of Process Safety and Reliability ● Ongoing Monitoring and Auditing of Process Safety and Reliability ● Some Approaches to Assurance of Effective Process Risk Management ● Design of a Program for Routine Monitoring of Process Risk and Reliability*
0930 – 0945	*Break*
0915 – 1100	***Management of Risk & Reliability of Existing Plants & Operations (cont'd)*** *Auditing ● Critically Important Procedures ● Learning from Accidents and "Near Misses"*
1100 – 1230	***Introduction to "Software" or the "Human Factor": Including Safety Culture, Safety Climate, & Human Error*** *Components of "Software" ● Measuring the Standard Software ● Effect of Software Standards on Quantitative Risk Assessments ● "Safety Culture" and "Safety Climate"*
1230 – 1245	*Break*
1245 – 1420	***Introduction to "Software" or the "Human Factor": Including Safety Culture, Safety Climate, & Human Error (cont'd)*** *Senior Management Role in Safety Climate and Culture ● Measuring the Climate and the Culture ● Human Error*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5:	Thursday, 08th of August 2024
0730 - 0930	***Role of the Risk & Reliability Manager*** *Elements of Management ● Authority and Responsibility for Performance ● Some Management Situations and Tactics*
0930 – 0945	*Break*
0945– 1100	***Role of the Risk & Reliability Manager (cont'd)*** *Line of Inquiry for a Risk and Reliability Manager ● Dealing with the Public ● The Precautionary Principle*
1100 – 1230	***Lessons from Incidents***
1230 – 1245	*Break*
1245 – 1345	***Case Studies & Worked Examples***
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

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