COURSE OVERVIEW FE0580
Risk Based Inspection for Static Equipment

Course Title
Risk Based Inspection for Static Equipment

Course Date/Venue
Session 1: January 26-30, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
Session 2: July 28-August 01, 2025/ Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course References
FE0580

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 presents a comprehensive and practical introduction and application of the latest techniques in Risk-Based Inspection (RBI) planning, and Fitness-For-Service (FFS) analysis of inspection results. It discusses practical techniques for the analysis of equipment, piping and pipelines defects and degradation. The focus of the course is on predicting degradation in service, setting optimum inspection intervals (API 580-581), projecting remaining life based on generic data corrected for plant specific conditions, and applying quantitative analysis for degraded conditions to determine whether equipment is fit for continued service or should be repaired or replaced (API 579-1/ASME FFS-1, ASME B31G, etc.).

The course includes a discussion on identification of API RP 571 damage mechanisms, risk management, and risk mitigation strategies. Requirements for input data and information, and the roles of the RBI Assessment Team will be described. Approaches to levels of RBI assessment and basis for implementation will be examined.

The exercise will give Delegates the opportunity to key elements for implementation of an RBI system to a process facility. The course presenters are independent of any commercial organization and the Course Notes are applicable to all commercially available systems.

Course Objectives

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

- Apply systematic techniques in Risk-Based-Inspection (RBI) and Fitness-For-Services (FFS) and identify the various repair practices of pipelines, piping, vessels and tanks in refineries, gas, oil and petrochemical plants
- Practice the analysis of defects and degradation of equipment, piping and pipelines
- Predict degradation in service and set optimum inspection intervals (API-580/581)
- Estimate the remaining life based on generic data corrected for plant specific conditions
- Employ quantitative analysis for degraded conditions to determine whether equipment is fit for continued service or should be repaired or replaced (API 579-1/ASME FFS-1, ASME B31G)

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 a wide understanding and deeper appreciation of risk based inspection, fitness-for-service and repair practices of pipelines, piping, vessels and tanks in refineries, gas, oil and petrochemical facilities in accordance with the international standards. Standard engineers, process, plant, maintenance, inspection and pipeline/piping engineers and inspectors who are responsible for the initial and continued integrity and cost-effective operation of equipment, piping systems and pipelines. Further, this course will interest all younger/graduate inspection engineers, mechanical engineers, graduate corrosion engineers, maintenance personnel and asset managers who are considering or implementing risk based inspection systems.

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 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: -

- 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.

- 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 ontinuing 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.

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.

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. Hesham Moharram, is a **Senior Inspection Engineer** with over **35 years** of industrial experience in the **Oil & Gas**, **Refineries** and **Petrochemical** industries. His expertise includes **Risk-Based** Inspection, **Repair**, **Maintenance**, **Alteration** and **Reconstruction** of **Aboveground Storage Tanks**, **Pressure Vessels**, **Piping** Inspection, Fitness-for-Service (**FFS**), **Asset Integrity** Management, **Plant Inspection & Corrosion Engineering**, **Pipeline Integrity** Assessment, **Integrity** Management, **Pipeline** Rehabilitation & Repair, **Pipeline** Design & Maintenance, **Welding & Cutting Fundamental**, **Advanced Welding**, **Welding Technology & Qualifications**, **Welding Fundamentals**, **Symbols for Welding**, **Welding Techniques and Failure**, **Pipeline Welding Practices**, **Welding Inspection Technology**, **Welding Inspection**, **Resistance Welding**, **Facility Integrity**, **Technical Integrity**, **Repair** of **Pressure Equipment** and **Piping, Process Piping, Valves, Flanges and Fitting Standards**, **Integrated Safety Management Plan**, **Inspection**, **Corrosion Monitoring & Cathodic Protection**, **Pressure & Leak** Testing, **Metallurgy**, **Corrosion & Prevention of Failures**, **Material Selection & Properties**, **Physical Metallurgy of Steel**, **Welding** Technology, **Fabrication & Inspection**, Conventional & Advanced **Non-destructive Testing** (**NDT**), **Process Safety Hazard Analyses** (**PHA**), **Risk** Assessment, **Pigging & Pipe Support** and **Acoustic Emission**. Further, he is also well-versed in Quality Assurance & Quality Control, **HAZOP**, Permit-to-Work, Hazard Identification, Safety Meeting, Accident Investigation, Emergency Response, Task Risk Assessment, Root Cause & Failure Analysis, Fire Fighting, First Aid Basic, CPR, H_2S Awareness, Distillation Units, Preventive Maintenance, FEED, Contract Management, Stress Management, Coaching & Mentoring Skills, Interpersonal Skills and Communication Skills. He is currently the **Senior Inspection Engineer** wherein he is responsible in various inspection works like fitness-for-service, remaining life assessments, risk based inspection, intelligent pigging, problematic pipe supports, non-destructive testing and acoustic emission.

Throughout his career life, Mr. Hesham has provided significant contributions to the companies he has worked with, having filled key positions such as being the **Senior Inspection Engineer**, **Inspection Engineer**, **Production Engineer**, **API Instructor**, **QA/QC** and **Supervisor** for international companies such as Abu Dhabi Company for Onshore Oil Operations (**ADCO**), Suez Oil Company (**SUCO**), Cairo Oil Refining Company (**CORC**) Refinery, DURA Refinery, State Company for Oil Projects (**SCOP-IRAQ**) and **Iron & Steel**.

Mr. Moharram has a **Bachelor's** degree in **Metallurgical Engineering**, from the Suez Canal University. Further, he is a **Certified Instructor/Trainer**, a **Certified Pressure Vessel Inspector** (**API-510**), **Certified Piping Inspector** (**API-570**), **Certified Aboveground Storage Tanks Inspector** (**API-653**), **Certified Risk Based Inspector** (**API-580**), an **ASNT Certified Level II** in **UT**, **RT**, **MT**, **PT** and **Eddy Current Testing**.

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 – 0915	***Overview of Codes & Standards API & ASME***
0915 – 1000	***Latest Developments in Integrity & Fitness-For-Service***
1000 – 1015	*Break*
1015 – 1100	***Overview of Material Strength & Toughness***
1100 – 1145	***Overview of Design Rules***
1145 – 1230	***Overview of Corrosion & Degradation Mechanisms***
1230 – 1245	*Break*
1245 – 1330	***Corrosion***
1330 – 1420	***Design Margins & Corrosion Allowance***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0800	***Evaluation of Inspection Results***
0800 – 0830	***Flaw Assessment: A Practical Approach***
0830 – 0915	***Fitness-For-Service Overview API 579-1/ASME FFS-1***
0915 – 0945	***Brittle Fracture Analysis***
0945 – 1000	*Break*
1000 – 1045	***General Metal Loss Analysis***
1045 – 1130	***Analysis of Wall Thinning & Remaining Life***
1130 – 1215	***Team Exercise: Wall Thinning Analysis***
1215 – 1230	*Break*
1230 – 1315	***Calculate Initial Strength of Component***
1315 – 1400	***Calculate Remaining Strength of Corroded Equipment or Pipeline***
1400 – 1420	***Predict Remaining Life & Failure Mode***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Local Metal Loss Analysis***
0830 – 0930	***Pitting Corrosion Analysis***
0930 – 0945	*Break*
0945 – 1100	***Blisters & Laminations Analysis***
1100 – 1215	***Team Exercise: Local Metal Loss Analysis***
1215 – 1230	*Break*
1230 – 1330	***Analyze Remaining Strength of Component with Local Corrosion***
1330 – 1420	***Compare ASME B31G & API 579-1/ASME FFS-1 Results***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

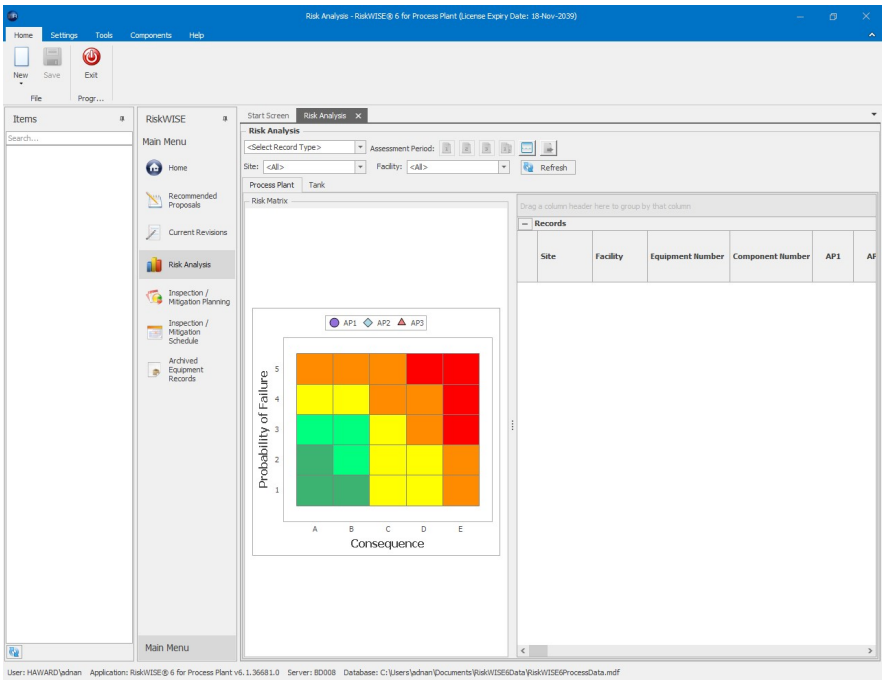
0730 – 0830	***Distortions, Dents & Gouges Analysis***
0830 – 0930	***Introduction to Fracture Mechanics***
0930 – 0945	*Break*
0945 – 1215	***Crack Flaws Analysis & Fracture Mechanics***
1215 – 1230	*Break*
1230 – 1330	***Fatigue Analysis & Remaining Life***
1330 – 1420	***Introduction to Risk-Based-Inspection API 580-581***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

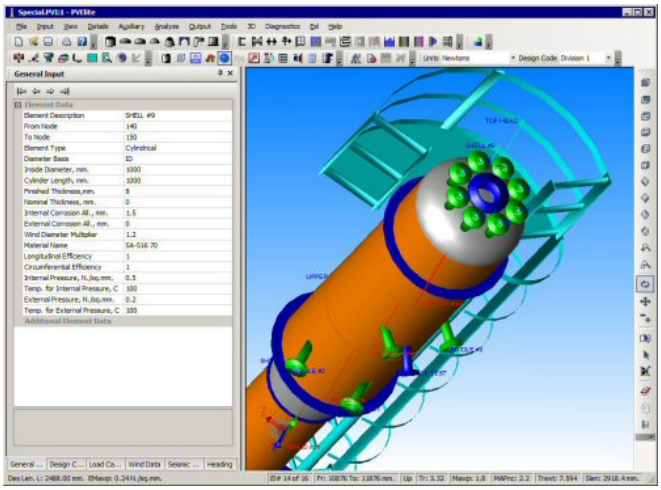
0730 – 0815	***API 581 Failure Likelihood Analysis***
0815 – 0845	***Corrosion Loops & Failure Margins***
0845 – 0915	***API 581 Failure Consequence Analysis***
0915 – 0930	*Break*
0930 – 1015	***Preparation of Inspection Matrix***
1015 – 1130	***Examples of Plant RBIs***
1130 – 1215	***Team exercise: Risk-BASED Ranking***
1215 – 1230	*Break*
1230 – 1245	***Determine Corrosion Rate***
1245 – 1315	***Calculate Likelihood & Consequence of Failure***
1315 – 1345	***Rank Systems & Equipment for Inspection***
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

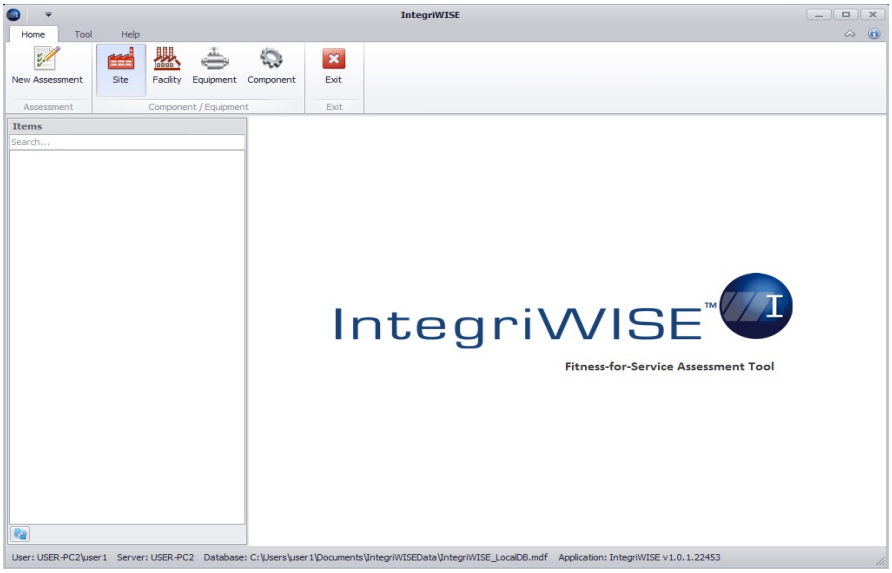
Practical session will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the state-of-the-art simulators. “RiskWISE”, “PV-Elite” and “IntegriWISE™”.

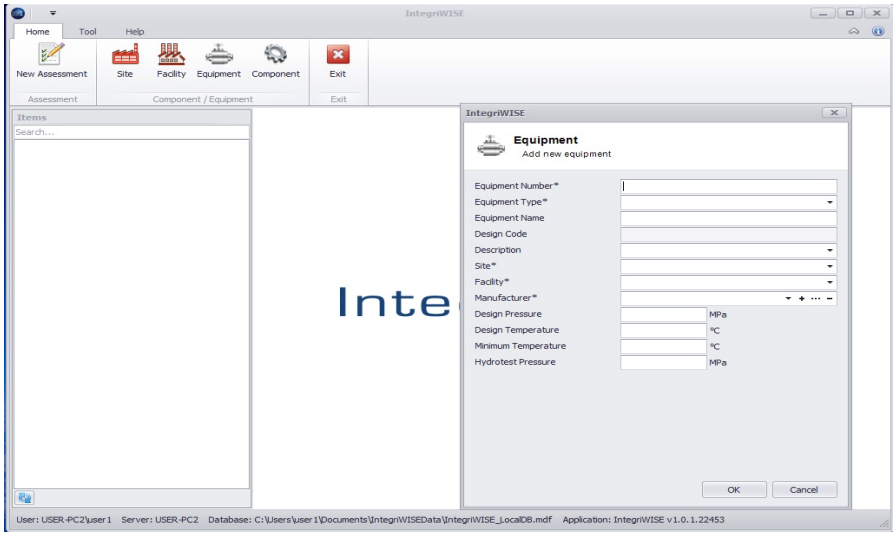


RiskWISE Simulator



PV-Elite Simulator





IntegriWISE™

Course Coordinator

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