



COURSE OVERVIEW FE0580

API-579/580/581: Risk-Based-Inspection (RBI), Fitness-for-Service (FFS) and Repair Practices of Pipelines, Piping, Vessels & Tanks in Refineries, Gas, Oil & Petrochemical Facilities

Course Title

API-579/580/581: Risk-Based-Inspection (RBI), Fitness-for-Service (FFS) & Repair Practices of Pipelines, Piping, Vessels & Tanks in Refineries, Gas, Oil & Petrochemical Facilities

Course Date/Venue

April 06-10, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference

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: -

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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. Luis Manuel is a **Senior Mechanical and Pipeline & Piping Engineer** with over **30 years** of extensive and practical experience within the **Oil, Gas, Petrochemical, Petroleum** and **Power** industries. His expertise includes **Flanges, Hydraulic, Boilers, Pressure Vessels, Tanks, Pipelines, Piping System (ASME B31, API 579 & API 580)** and **ASME Post Construction Code, Inspection Planning**. Further, his wide experience covers **Rotating & Static Equipment** such as **pumps, valves, compressors, turbines, blowers, fans, pipes, piping, pressure vessels** and **heat exchangers, Maintenance & Reliability Management, Offshore Structure Engineering, Risk-Based Inspection (RBI), Integrity Assessment, Forensic Analysis, Structural Analysis, Design & Engineering, Naval Architecture, Regulatory Compliance Inspections, Stress & Fatigue Analysis** using **SACS** or **StruCad** and **Finite Element Analysis**. He was the **Chief Engineer** of a leading international engineering firm where he led all **Piping Engineering** and **Pipeline** Projects for **Total-ELF, Shell, Mobil, Fitness-for-Service (FFS) (API 579), Design, Inspection, Repair, Maintenance, Alteration and Reconstruction of Steel Storage Tanks (API-653), Positive Material Identification (API RP 578), Pressure Equipment and Pressure Vessels (ASME VIII & API-510); Detailed Engineering Drawings, Codes & Standards: P&ID Reading, Interpretation & Developing; the Welding, Design, Fabrication, Manufacturing, Project Management, Installation, Materials Selection, Quality Assurance, Quality Control, Inspection, Repair and Maintenance of Gas Process Trains, Pressure Vessels, Storage Tanks, Pipelines and Process Piping Systems (ASME B31.3 & API-570); ASNT (Non-destructive Testing) Radiographic Testing, Ultrasonic Testing, Magnetic Particle Testing, Liquid Penetrant Testing, and Visual Test.**

During his career life, Mr. Manuel has gained his thorough practical experience in **multiple engineering disciplines** that includes **pipeline/piping** inspection and engineering, **mechanical maintenance**, naval engineering, container cargo lashing, aerospace engineering and offshore structural engineering (oil and gas exploration platforms) through several challenging positions such as the **Senior Pipelines Engineer, Senior Piping Engineer, Senior & Lead Structural Engineer, Staff Engineer, Naval Architect** and **Applications Engineer** for various international companies including **Chevron, ExxonMobil, Addax Petroleum, ZAGOC, NASSCO, DWC, Point Engineering, US ARMY, W.S. & Atkins, Atlas Engineering, Heerema Offshore, Casbarian Engineering Associates (CEA), Textron Marine, Ingalls Shipbuilding and Peck & Hale**. Further, he has been heavily involved in the development of fabrication and erection drawings for offshore structures including installation and rigging as well as in the instruction materials as authorized by EDI (**Engineering Dynamic Incorporated**) for the training of engineers on the **Structural Analysis Computer System (SACS)** software.

Mr. Manuel has a **Bachelor's** degree in **Mechanical Engineering** from the **State University of New York**. Further, he is a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management (ILM)**, a **Certified Instructor/Trainer** and the **author** of the book "**Offshore Platforms Design**" and the "**SACS Software Training Module**".





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 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, 06th of April 2025

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: Monday, 07th of April 2025

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: Tuesday, 08th of April 2025

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: Wednesday, 09th of April 2025

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

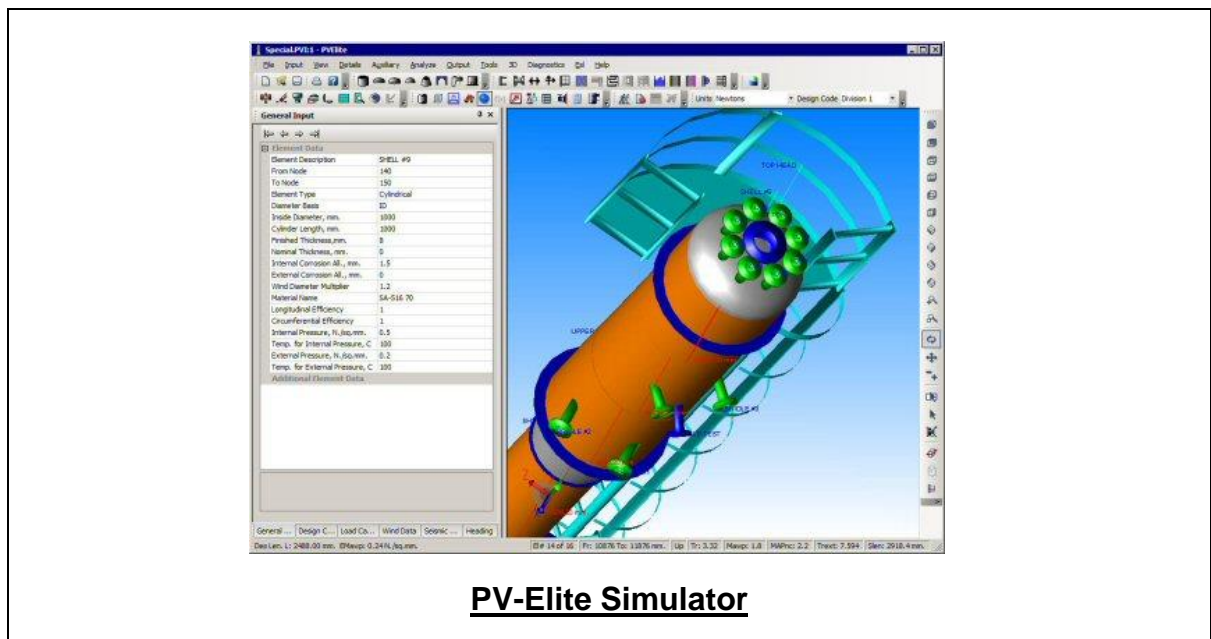
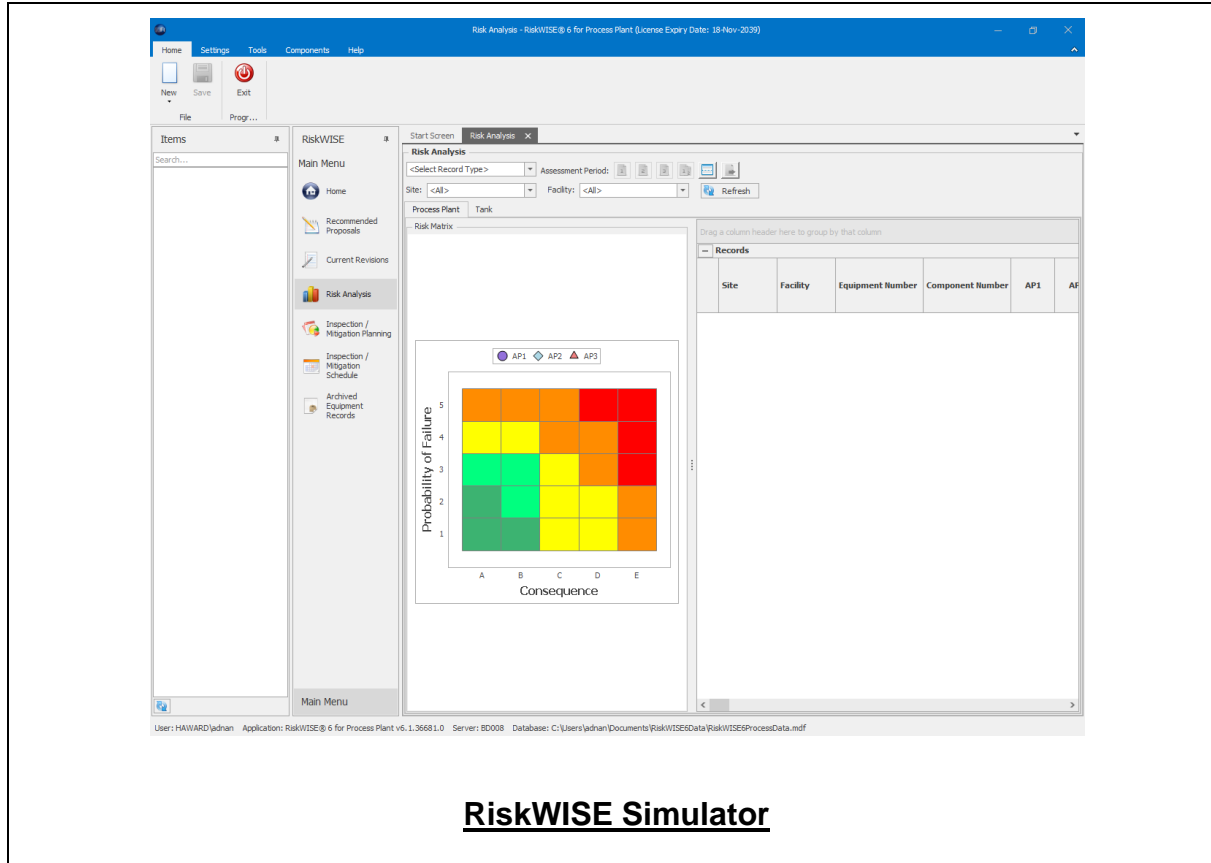
Day 5: Thursday, 10th of April 2025

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



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™”.





The image displays two screenshots of the IntegriWISE software. The top screenshot shows the main application window with a menu bar (Home, Tool, Help) and a toolbar with icons for 'New Assessment', 'Site', 'Facility', 'Equipment', 'Component', and 'Exit'. Below the toolbar is a search bar labeled 'Items' and a large central area displaying the 'IntegriWISE™ Fitness-for-Service Assessment Tool' logo. The bottom status bar shows user and server information. The bottom screenshot shows the same main window but with an 'Equipment' dialog box open. The dialog box is titled 'IntegriWISE Equipment' and contains a form for adding new equipment with fields for 'Equipment Number*', 'Equipment Type*', 'Equipment Name', 'Design Code', 'Description', 'Site*', 'Facility*', 'Manufacturer*', 'Design Pressure' (MPa), 'Design Temperature' (°C), 'Minimum Temperature' (°C), and 'Hydrotest Pressure' (MPa). It includes 'OK' and 'Cancel' buttons at the bottom.

IntegriWISE™

Course Coordinator

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