COURSE OVERVIEW FE0580-4D

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

Course Title

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

Course Reference

FE0580-4D

Course Duration/Credits

Four days/2.4 CEUs/24 PDHs

Course Date/Venue

Session(s)	Date	Venue
1	January 22-25, 2024	Business Center, Concorde Hotel Doha, Doha, Qatar
2	Febuary 12-15, 2024	Hermitage Meeting Room, Radisson Blu Hotel, Istanbul Sisli, Turkey
3	March 04-07, 2024	Jubail Hall, Signature Al Khobar Hotel, Al Khobar, KSA
4	March 04-07, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
5	June 24-27, 2024	Ajman Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
6	September 16-19, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

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.

Accommodation

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

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 Fee

Doha	**US$ 5,500** per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Istanbul	**US$ 5,000** per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Al Khobar	**US$ 4,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Dubai	**US$ 4,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Abu Dhabi	**US$ 4,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Dubai	**US$ 4,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course 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 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 **2.4 CEUs** (Continuing Education Units) or **24 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. 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 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 – 1130	***Overview of Design Rules***
1130 – 1200	***Overview of Corrosion & Degradation Mechanisms***
1200 – 1230	***Corrosion***
1230 – 1245	*Break*
1245 – 1315	***Design Margins & Corrosion Allowance***
1315 – 1345	***Evaluation of Inspection Results***
1345 - 1420	***Flaw Assessment: A Practical Approach***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

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

Day 3

0730 – 0800	***Blisters & Laminations Analysis***
0800 – 0830	***Team Exercise: Local Metal Loss Analysis***
0830 – 0900	***Analyze Remaining Strength of Component with Local Corrosion***
0900 - 0930	***Compare ASME B31G & API 579-1/ASME FFS-1 Results***

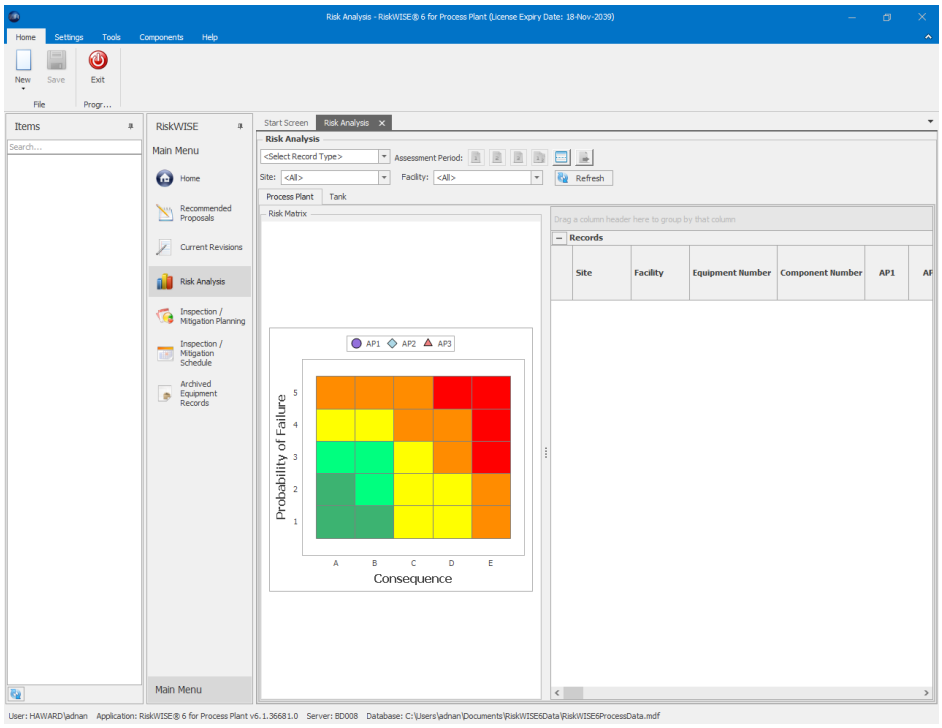
0930 – 0945	Break
0945 – 1100	***Distortions, Dents & Gouges Analysis***
1100 – 1215	***Introduction to Fracture Mechanics***
1215 – 1230	Break
1230 – 1300	***Crack Flaws Analysis & Fracture Mechanics***
1300 – 1330	***Fatigue Analysis & Remaining Life***
1300 - 1420	***Introduction to Risk-Based-Inspection API 580-581***
1420 – 1430	***Recap***
1430	Lunch & End of Day Three

Day 4

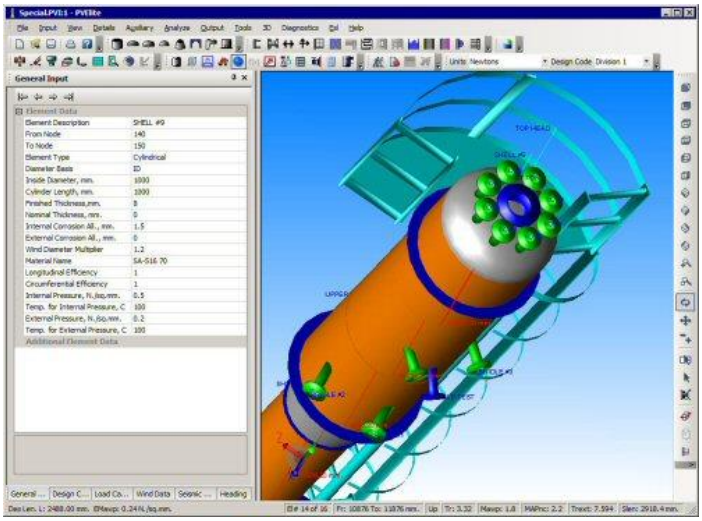
0730 – 0815	***API 581 Failure Likelihood Analysis***
0815 – 0845	***Corrosion Loops & Failure Margins***
0845 – 0915	***API 581 Failure Consequence Analysis***
0915 – 0930	Break
0930 – 1015	***Preparation of Inspection Matrix***
1015 – 1130	***Examples of Plant RBIs***
1130 – 1215	***Team Exercise: 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)

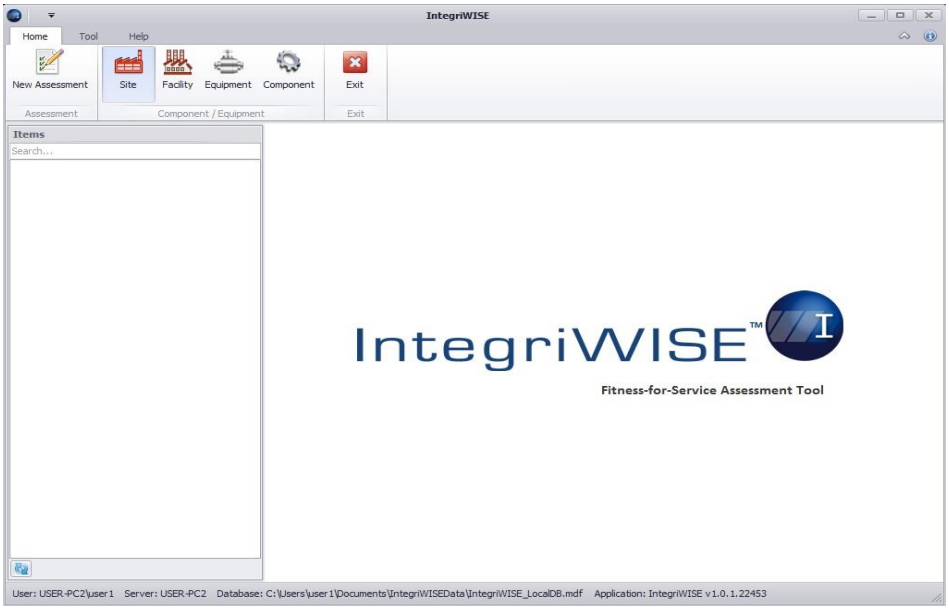
Practical session will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the state-of-the-art simulators. “RiskWISE”, “PV-Elite” and “IntegriWISE™”.

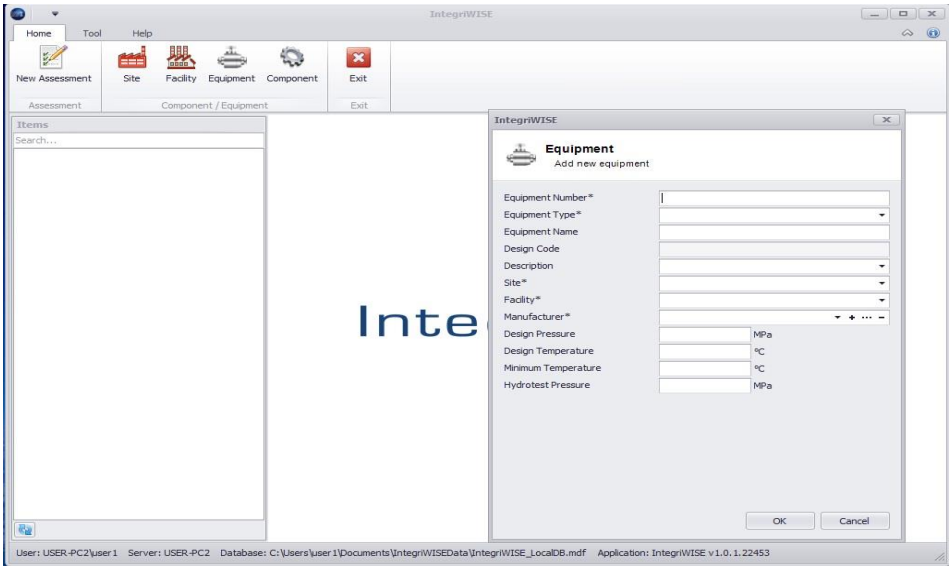


RiskWISE Simulator



PV-Elite Simulator





IntegriWISE™

Course Coordinator

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