Training - Corrosion and Risk Based Inspection

CORBIE-EN-P | Face-to-face only | 5 days

This course provides a practical knowledge of pressure equipment and piping corrosion, and Inspection strategy based on risk analysis

Level
Skilled

Public
Experienced engineers, managers and technical staff involved in safe operation and integrity of pressure equipment installed in refineries, chemical and petrochemical plants

Objectives
Attendees will be able to implement the following skills:

- Identify operating windows beyond which corrosion phenomenon happen
- Describe the RBI methodology for a petrochemical or chemical plant
- Determine the probability and consequence of a failure
- Set up a suitable inspection plan

Pedagogical & technical resources

- Active teaching methods are used to promote a pooling of experience, under the lead of inspection specialist
- Actual accidents in refineries and chemical plants are analyzed to be aware of the risks
- Wide use of samples, videos and pictures to develop practical case studies for pressure equipment such as piping, heat exchanger, reactor, distillation column, boiler, etc

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

CORROSION IN OIL & GAS INDUSTRIES & PETROCHEMICAL PLANTS - API 571 — 1.5 days

Each type of corrosion is studied along with possible prevention for piping, drums, columns, heat exchangers, boilers and furnaces already in service, or during a new plant design.
Specific corrosion occurring in industrial units based on API 571:

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- Metallurgical deterioration: brittle fracture, chromium precipitation, creep, fatigue.
- Hydrogen induced cracking, high temperature hydrogen attack, high temperature sulfur corrosion, oxidation, flue gas corrosion, naphthenic acid corrosion, polythionic acid corrosion, caustic soda stress cracking, amines corrosion, CO2 corrosion.

Corrosion of alloys in chemical industry: corrosion by mineral acids, bases, nitrates, ammonia or chlorine
Many corrosion case studies observed in process industry units: identification of corrosion root cause and mitigation to apply.

CORROSION PREVENTION & INSPECTION - API 510 — 1 day

Material selection and detailed engineering design to avoid corrosion.
Identification of operating windows.
Corrosion control by means of sampling, use of corrosion coupons and probes.
Cathodic protection with sacrificial anodes or imposed current.
Anticorrosion coatings and cladding.
Basic non-destructive testing: PT, MT, RT, UT and advanced non-destructive testing: phased array...

RISK BASED INSPECTION - API 581 — 1 day

Collect Design data and inspection data.
Select Corrosion loops for each PID.
Calculate probability of failure based on damage factor - Quantitative approach using API581 workflow.
Calculate consequence of failure - Quantitative and semi quantitative approach using API581 workflow.
Evaluate the overall risk on API matrix.
Define inspection strategy: mitigations actions or inspection scheduling extension.
Overview of available commercial software “RBEYE”.
Example of industrial RBI strategy implemented.
RBI semi quantitative approach based on simplified Excel spreadsheet.

APPLICATION OF THE RBI METHOD WITH MINI-PROJECTS CASE STUDIES — 1.5 days

Application of API 581 RBI method using mini projects - Case studies as teamwork:

- Select the appropriate corrosion loops and pressure vessels.
- Identify the degradation.
- Apply API 581 workflow to define the probability of failure, the consequence of failure.
- Analyze the risk and propose risk mitigations with more efficient Non Destructive Testing or adjust inspection frequency.

Apply RBI semi quantitative approach based on simplified excel spreadsheet and compare the 2 methods.
Each group presents its RBI analysis and conclusion.

To French entities : IFP Training is referenced to DataDock ; you may contact your OPCO about potential funding.
Please contact our disabled persons referent to check the accessibility of this training program : referent.handicap@ifptraining.com

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