ENGINEERING TRAINER

The 8 Forms of Corrosion

This course on industrial corrosion explains eight corrosion and cracking mechanisms found in refining, chemical and power-generation equipment. It connects corrosion science and operating conditions with diagnosis, mitigation and lessons from industrial failures. This self-paced online course includes video lectures and a completion certificate with PDH credits.

Buy This Course

Request a Quote or Invoice

ONLINE	SELF-PACED	1-YEAR ACCESS
8 MODULES	13 PDH	13 HOURS

TRUSTED BY ENGINEERING TEAMS WORLDWIDE

ENGINEERING TRAINER

The 8 Forms of Corrosion

What you'll learn

The cost of industrial corrosion is estimated to be more than $2 trillion per year globally (NACE study). There have also been several major failures and industrial incidents within the Refining, Chemical & Power Generation sectors. It is important that key staff working within these industries have a fundamental appreciation of corrosion types: their threats, diagnosis, and mitigation.

This self-paced learning path will introduce students to the material degradation, corrosion, and cracking mechanisms found within the refining, chemical, and power-generation sectors. The learning path breaks these mechanism types down into 8 main courses. Each of these modules explains the scientific principles involved and shows real-world examples. Industrial safety incident videos are also presented and the lessons to be learned from each of these are discussed by the instructor.

This introductory learning path to corrosion contains 8 online courses, which in total are 13 hours of video content. All training content is provided through your EngineeringTrainer account.

Skills you'll gain

- ✓ have an awareness of the main forms of corrosion found within the refining, chemical and power generation industries.
- ✓ understand the basic principles of corrosion science for these damage mechanisms.
- ✓ have an appreciation of the process systems, design features and operating conditions that are the main drivers of corrosion.
- ✓ have learned how various types of corrosion can be diagnosed.
- ✓ have seen a wide range of corrosion failure examples from the processing industry.
- ✓ have been taken through a selection of process safety cases illustrating corrosion failures, and have gained an appreciation of the lessons learned.
- ✓ understand the mitigation options available to avoid these corrosion issues.

ENGINEERING TRAINER

The 8 Forms of Corrosion

About the Instructor

Christian Lewis

Christian Lewis is an Integrity Services Manager and trainer whose work focuses on corrosion, materials and integrity management. His experience covers corrosion mechanisms, refinery corrosion loops, crude and vacuum distillation, damage recognition and mitigation.

Who this course is for

- ✓ Early-career materials engineers
- ✓ Early-career corrosion engineers
- ✓ Mechanical engineers who need to recognize corrosion mechanisms
- ✓ Design engineers who account for corrosion risks
- ✓ Process engineers who connect operating conditions with corrosion
- ✓ Inspection engineers who diagnose corrosion damage
- ✓ Operations and maintenance personnel responsible for equipment condition or failure follow-up

ENGINEERING TRAINER

The 8 Forms of Corrosion

Course content

Module 1 - Stress Corrosion Cracking (SCC)

- Course Introduction
- Most Common SCC types
- Earliest reports of SCC
- History of SCC
- SCC mitigation by design & operation
- Some industrial systems susceptible to SCC
- Scientific overview

Module 2 - Crevice Corrosion

- The most common crevice corrosion environments
- Typical process systems susceptible to crevice corrosion
- Scientific overview
- Crevice corrosion mitigation

Module 3 - Hydrogen Damage

- The main forms of hydrogen damage
- Some industrial systems susceptible to hydrogen damage
- Scientific overview
- Hydrogen damage mitigation

Module 4 - Pitting & Localised Corrosion

- Localised corrosion types
- Pit shape & growth
- Autocatalytic nature of pitting
- Initiation & meta-stable pitting
- Solution composition, metallurgical variables, velocity & diffusion effects
- Mitigation measures

Module 5 - Intergranular Corrosion (IGC)

- Stainless steels
- Scientific principles of IGC
- Weld decay
- Forms of IGC found in industry
- Stainless-steel IGC mitigation
- Knife-line attack
- IGC of other alloys

Module 6 - Erosion, Erosion-Corrosion & Flow Accelerated Corrosion (FAC)

- Mechanical Erosion
- Erosion-corrosion
- FAC
- Erosion-Corrosion parameters
- Case Study
- Mitigation measures

Module 7 - Galvanic Corrosion

- Galvanic series
- Area effect
- Distance effect
- Residual elements
- Environmental effects
- Prevention
- Mitigation measures

Module 8 - Selective Leaching

- Dezincification characteristics
- Dezincification mechanism
- Mitigation measures
- Graphitic corrosion
- Other alloy systems
- High temperatures