



Corrosion & Materials Selection

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Introduction:

Proper selection of materials and design are most effective in cutting the cost of corrosion and achieving low cost reliability as corrosion can be designed out of the system. It is always easier and cheaper to erase lines on a drawing than to repair or replace failed equipment or components in service. The theme throughout the course will be focused on how to put the right material in the right place in the right way. Practical rules in selection of materials and design guidelines against many forms of corrosion will be presented. Numerous case histories of real-life problems and practical solutions will be discussed. This corrosion course provides an excellent avenue for corrosion practitioners, researchers, designers, technical managers, inspection and maintenance engineers, quality control personnel and those involved in failure analysis to update their appreciation of corrosion prevention through materials selection and design.

Who Should Attend?

Corrosion Control Engineers & Personnel, Process Engineers, Metallurgists, Inspection Personnel, Mechanical Engineers, Material Selection Personnel, Plant Contractors, Operations Engineers, Team Leaders & Supervisors, Maintenance Supervisors, Senior Plant Supervisors, Mechanical Engineers, Corrosion Control & Monitoring Systems Personnel, Oil and Gas Production Facilities Personnel, Chemists, Chemical Engineers, Technicians and Supervisors, New Petroleum Engineers, Asset Management Personnel, Design & Construction Engineers, Team Leaders & Coordinators, Construction Coordinators, Maintenance Engineers, Technologists, Maintenance Team Leaders & Engineers, Personnel who are / will be responsible for detecting, inspecting, monitoring, controlling corrosion in oil and gas piping, pipelines used in production operations and Personnel responsible for metallurgy, corrosion or the prevention of failures in plant and equipment.

Course Objectives:

By the end of this course delegates will be able to:

- Develop and understanding of the nature of corrosion in relation with the environment
- Gain knowledge on the different forms of corrosion
- Set the guidelines for materials selection
- Understand the natural matching of a material with an environment
- Become familiar with the general classification of materials

- Have a good background on metallurgy and ferrous metals
- Gain a deeper understanding of materials and metallurgy including the general characteristics of metals and alloys
- Select materials and designs are most effective in cutting the cost of corrosion
- Know how can different forms of corrosion be designed out of the system

Course Outline:

Basic Concepts in Corrosion

- Terminologies and conventions
- Why do metals corrode
- How do metals corrode

Different Forms of Corrosion: Mechanisms, Recognition & Prevention

- Uniform corrosion
- Galvanic corrosion
- Dealloying and graphitization (graphitic corrosion)
- Intergranular stress corrosion cracking, weld decay and knife-line attack
- Exfoliation
- Crevice corrosion
- Pitting corrosion
- Filiform corrosion
- Microbiologically-Influenced Corrosion (MIC)
- Environment-sensitive cracking

- Hydrogen Damage
- Corrosion fatigue
- Fretting
- Erosion corrosion, impingement attack and cavitation damage
- Stray current corrosion

Materials Selection Overview

- General classification of materials
- The engineering requirements of materials
- Some guidelines for materials selection
- The natural matching of a material with an environment

Corrosion Resistance of Common Metals and Alloys

- Aluminum and Its Alloys
- Copper and Its Alloys
- Zinc and Its Alloys
- Tin and Tinsplate
- Titanium and Its Alloys
- Steels and Cast Irons
- Stainless Steels and Alloys
- Nickel and Its Alloys

Design against Corrosion

- Good design practice for corrosion prevention
- How can different forms of corrosion be designed out of the system or the prevention of failures in plant and equipment