



THE CHEMICAL ENGINEERING MAJOR

Corrosion Control in the Oil and Gas Industry

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Corrosion Control in the Oil and Gas Industry

Introduction:

The effect of corrosion in the oil industry leads to the failure of parts. This failure results in shutting down the plant to clean the facility. The annual cost of corrosion to the oil and gas industry in the United States alone is estimated at \$27 billion (According to NACE International) leading some to estimate the global annual cost to the oil and gas industry as exceeding \$60 billion. An essential resource for all those who are involved in the corrosion management of oil and gas infrastructure, corrosion control in the oil and gas industry provides engineers and designers with the tools and methods to design and implement comprehensive corrosion-management programs for oil and gas infrastructures. This course has been designed for professionals who are working in the field of oil and gas. You will explore principles and protection strategies. The course will maximize the learning process and your understanding of the subject. This course is geared to provide enough knowledge on the basics of implementing, monitoring, and maintaining an internal corrosion control program as part of an overall integrity management program. The course aims to deliver an engineering knowledge of oilfield corrosion. It introduces corrosion processes, the selection of engineering materials, chemical treatment and corrosion management, with particular emphasis on the corrosion design of production facilities.

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 Engineers, Maintenance Supervisors, Senior Plant Supervisors, Mechanical Engineers, Corrosion Control & Monitoring Systems Personnel, Equipment Engineers, Maintenance Engineers and Planners, Team Leaders, Managers & Coordinators, Construction Coordinators, Technologists, Safety Officers, Maintenance Team Leaders & Engineers, Design Engineers, Service Company Representatives, Oil and Gas Production Facilities Personnel, Chemists, Chemical Engineers, Inspectors and Inspection Engineers & Supervisors, Technicians and Supervisors, Environmental Specialists, New Petroleum Engineers, Asset Management Personnel, Construction Engineers, Refinery Chemists, Chemical 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:

- Understand of corrosion ramifications in oil production operations
- Recognize the various forms of corrosion attack
- Carry out a corrosion failure analysis
- Utilize the most appropriate method for corrosion control

- Adopt the most appropriate monitoring techniques
- Utilize the information sources

Course Outline:

- Overview
- Economics
- Corrosion fundamentals
- Basic corrosion principles
- The importance of oil and gas production
- Oil and gas sources
- Forms of corrosion
- Corrosion aspects – oxygen, hydrogen sulphide, carbon dioxide, bacterial
- Corrosion control – design, cathodic protection, materials selection, coatings and linings
- Corrosion management
- Corrosion failure analysis
- Activities in the oil and gas industry, including drilling, production, and transportation
- Oilfield equipment and processes
- Common classes of materials used in oil and gas production
- Types and causes of corrosion encountered in the oil and gas industry
- Factors influencing O₂ related corrosion
- CO₂ corrosion processes in fluid environments
- The chemical and physical variables that impact upon CO₂ corrosion

- H₂S corrosion processes in fluid environments
- The chemical and physical variables that impact upon H₂S corrosion
- Corrosion of corrosion resistant alloys
- Types and effects of fluid flow (single and multi- phase), including erosion mechanisms
- Factors influencing microbiologically influenced corrosion
- The formation of deposits, waxes, and scales
- Classifications of corrosion inhibitor
- The mechanisms of corrosion inhibition in acid solutions
- The mechanisms of corrosion inhibition in near neutral solutions
- Factors affecting corrosion inhibitor performance
- Commonly used corrosion inhibitors
- The practical application of corrosion inhibitors
- Approaches to control of oilfield corrosion
- The use of standards and specifications in materials selection
- Chemical treatment methods for control of corrosion and deposits
- Field requirements for corrosion inhibitors
- Corrosion inhibitor selection procedures
- Performance tests for corrosion inhibitors
- Field deployment of corrosion inhibitors
- Approaches to external corrosion control
- Most appropriate approaches for corrosion control
- The basis of predictive models for oilfield corrosion
- Potential for corrosion using predictive models
- Management of corrosion
- Methods available for collecting corrosion monitoring data
- Methods available for collecting corrosion inspection data
- Principles of risk based inspection

- Practical application of risk based inspection
- Approaches to oilfield failure analysis
- Principles of analytical techniques employed in oilfield failure analysis, including x-ray diffraction
- X-ray diffraction experiment
- Data collected during failure analysis
- Water chemistry
- Quality assurance
- Corrosion samples
- Corrosion under insulation
- Pipelines and risers
- Oil refining
- Corrosion films