

Corrosion Control Oil and Gas Exploration Industry Training

Description

Introduction

The annual losses due to corrosion and the cost of rectification run to several billion dollars in oil & gas exploration industries around the world. High production under aggressive and extreme operational conditions necessitates the development of new materials which also have peculiar failure behaviors. Thus the industry operators are on continuous perusal with different corrosion management strategies. Yet unforeseen failures of top-side, sub-surface and sub-sea infrastructure due to corrosion not only entails in loss of production but loss of life as well. Prediction of failure behaviors, remaining useful life, corrosion preventive measures are all approaches in corrosion management for safe and economic operation of production wells and other facilities. The Successful corrosion management influences the economic outcome of the company by ensuring cost effective selection of materials, chemical treatments, coatings, cathodic protection systems and appropriate designs.

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Objectives

This course is designed for engineers and operators engaged in oil and gas exploration industry requiring an understanding of corrosion fundamentals: the causes and control of corrosion in oil and gas production and processing. This course will provide an overview of what corrosion is and what the major corrosion issues are in upstream oil and gas operations. The focus will be on understanding how materials corrode, what techniques are used to monitor corrosion and some basic corrosion control fundamentals. The participants will be introduced to inhibitors and how they work, corrosion monitoring in field applications and cathodic protection. The course content is presented from a practical production operations viewpoint and provides participants with the basic skills and understanding to control and solve corrosion issues.

The Content

Oil & Gas Production Fluid

- Origin and Production of Oil & Gas
- Chemical Compositions of Production Fluids

- Oilfield Equipment
- Overview of Oilfield Processes & Operations

Metallurgy

- Chemical Properties of Metals
- Mechanical Properties
- Alloying Elements
- Cooling of Metals
- Crystalline Forms of Metals
- Metal Defects
- UNS Numbers
- Properties of Common Oilfield Metals & Alloys
- Metallurgy of Oilfield Equipment

Corrosion Damage

- Corrosion Fundamentals
- Common Forms of Corrosion
- Corrosion Monitoring in Plant and Facilities
- Non-Destructive Testing (NDT)
- Corrosion Failure & Root Cause analysis
- Group Discussion- Applicable Standard Study for Corrosion Monitoring

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Oilfield-Specific Corrosion

- Internal Corrosion
- Water Corrosion
- Sour Corrosion
- Sweet Corrosion
- Oxygen Corrosion
- Top of Line Corrosion (TLC)
- Microbiologically Induced Corrosion (MIC)
- Sand Erosion
- External Corrosion
- Atmospheric (Marine) Corrosion
- Corrosion Under Insulation (CUI)
- Corrosion of Pipe Flanges
- Underground Corrosion
- Stray Current Corrosion
- Seawater Corrosion
- Oilfield Equipment Corrosion
- Case Study-Plant Aging and Life Extension Program

Corrosion Prevention & Control Measures

- Corrosion Control by Operations
- Corrosion Control by Processes

- Corrosion Control Design
- Corrosion Control by Material Selection
- Group Discussion-NACE MR0175/ISO 15156-1 H2S Corrosion Resistant Materials

Cathodic Protection (CPS) Systems

- Cathodic Protection Fundamentals
- Galvanic Anodes CPS
- Impressed Current CPS
- CPS System Maintenance

Barrier Film (Coatings and Lining)

- Coating Fundamentals
- Performance Characteristics of Industrial Coatings
- Types of Coating Systems
- Surface Preparations
- Coating Applications
- Coating Defects

Chemical Treatment

- Corrosion inhibitors
- Performance Evaluation of Corrosion Inhibitor
- Application of Corrosion Inhibitors

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Biocide Treatment

- Microbiologically Influenced Corrosion (MIC)
- Sulphate-Reducing Bacteria
- Biocide Selection & Treatment

Non-Metallic Materials

- Polymers
- Composite Materials

Corrosion Management Strategy (CMS)

- Corrosion Management of Oilfield Equipment
- Corrosion Economy
- Corrosion Key Performance Indicators (KPIs)
- Asset Integrity and Corrosion Management
- Codes & Standards
- Corrosion Data Management
- Case Study-Catastrophic Corrosion Failure