Corrosion Management and Control in Oil, Gas and Water Systems

29 November – 3 December 2026
Riyadh - KAFD district five-star



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Ref: 140_15052 **Date:** 29 November – 3 December 2026 **Location:** Riyadh - KAFD district five-star **Fees:** 20000 SAR

Introduction:

Corrosion quietly drives leaks, unplanned shutdowns and early replacement of pipelines, vessels, tanks and water networks, often because mechanisms are misidentified and barriers are not monitored. This Core Concept course builds practical corrosion management and control skills for oil, gas and water systems, from CO2, H2S, oxygen and microbial attack to materials selection, coatings, cathodic protection, chemical treatment and monitoring. Participants examine real systems against corrosion control criteria and produce a Corrosion Management Plan with a Corrosion Control Matrix for their own assets.

Course Objectives:

- Identify the corrosion mechanisms active in a given oil, gas or water system from fluid data, operating conditions and failure evidence
- Select carbon steel with corrosion allowance or corrosion resistant alloys for sweet, sour and oxygenated service
- Specify coating, lining and cathodic protection systems and verify their performance through surveys and testing
- Design and adjust corrosion inhibitor, biocide and oxygen scavenger treatment programmes
- Interpret coupon, probe and inspection data to calculate corrosion rates and rank corrosion risk by circuit
- Build a Corrosion Management Plan with barriers, KPIs and review cycles for an operating asset

Target Audience:

- Corrosion engineers responsible for mechanism assessment, treatment programmes and monitoring results
- Integrity engineers responsible for inspection planning, risk ranking and fitness of pipelines, vessels and tanks
- Materials engineers responsible for alloy, coating and lining selection on new and modified equipment
- Operations engineers responsible for running water injection, gas and oil systems within corrosion control limits
- Cathodic protection technicians responsible for rectifier, anode and potential survey records
- Chemical treatment specialists responsible for inhibitor, biocide and scavenger dosing and performance

Course Outline:

Day 1: Corrosion Fundamentals and the Asset Corrosion Baseline

- Electrochemical Corrosion Cell: Anode, Cathode, Electrolyte and Metallic Path
- Galvanic Series and Dissimilar Metal Couples in Wellheads, Pipelines and Water Networks
- Pitting and Crevice Corrosion Morphology from Failed Component Photographs
- Oxygen Corrosion in Water Injection, Seawater Cooling and Potable Water Systems
- Asset Corrosion Baseline: Failure History, Leak Records and Fluid Composition Review

Day 2: Oilfield Corrosion Mechanisms and Materials Selection

- CO2 Sweet Corrosion: Partial Pressure, Temperature, pH and Iron Carbonate Film Effects
- H2S Sour Corrosion, Sulfide Stress Cracking and Hydrogen-Induced Cracking Susceptibility
- Microbiologically Influenced Corrosion: Sulfate-Reducing Bacteria and Biofilm Under-Deposit Attack
- Erosion-Corrosion from Sand Impact, Droplet Impingement and Turbulent Flow
- Materials Selection Diagram: Carbon Steel with Corrosion Allowance Versus Corrosion Resistant Alloys

Day 3: Coatings, Cathodic Protection and Chemical Treatment

- Coating and Lining System Selection: Surface Preparation, Dry Film Thickness and Holiday Testing
- Sacrificial Anode Cathodic Protection Design for Tanks, Vessels and Offshore Structures
- Impressed Current Cathodic Protection with Transformer-Rectifiers and Anode Groundbeds
- Pipe-to-Soil Potential Surveys and Protection Criteria for Buried Pipelines per NACE SP0169
- Corrosion Inhibitor, Biocide and Oxygen Scavenger Dosing Programme Design

Day 4: Corrosion Monitoring, Risk Assessment and Management Systems

- Weight-Loss Coupons, Electrical Resistance and Linear Polarisation Resistance Probes
- Inspection Data Integration: Ultrasonic Wall Thickness, Intelligent Pigging and Corrosion Rate Trending
- Corrosion Risk Assessment Matrix: Likelihood of Failure and Consequence Ranking by Circuit
- Corrosion Management System Structure: Policy, Roles, Barriers and Review Cycle
- Corrosion KPIs: Inhibitor Availability, Cathodic Protection Coverage, Coupon Rates and Leak Frequency

Day 5: Corrosion Control Walkthroughs and the Management Plan

- Inspection Walkthrough: Water Injection System Corrosion Loops and Monitoring Points
- Inspection Walkthrough: Buried Gas Pipeline Test Posts and Rectifier Readings
- Failure Case Review: Under-Deposit and Microbial Leak Root Cause Investigation
- Corrosion Management Plan and Corrosion Control Matrix Drafting
- Corrosion KPI Dashboard Presentation and Peer Challenge Panel

Skills You Will Gain:

- Corrosion Mechanism Diagnosis
- Corrosion Resistant Alloy Selection
- Coating Inspection
- Cathodic Protection Survey Interpretation
- Chemical Treatment Optimisation
- Corrosion Rate Calculation
- Corrosion Risk Ranking
- Corrosion Barrier Management

Why Attend This Course:

- Return with a Corrosion Management Plan and Corrosion Control Matrix built from walkthroughs of water injection and pipeline systems
- Reduce leaks and unplanned shutdowns by recognising sweet, sour, oxygen and microbial attack before wall loss becomes critical
- Spend treatment and cathodic protection budgets where monitoring data shows the highest corrosion risk
- Compare corrosion control practice with engineers from upstream, midstream, refining and water utility operations

Conclusion:

Effective corrosion control depends on naming the right mechanism, choosing materials and barriers that match it and proving through monitoring that those barriers work. The course moves from corrosion fundamentals and the asset baseline, through sweet, sour, oxygen, microbial and erosion-corrosion mechanisms and materials selection, to coatings, cathodic protection, chemical treatment, monitoring, risk ranking and management systems. The final day applies this in system walkthroughs and produces a Corrosion Management Plan ready for asset review.