



Oil, Gas and Chemical

Corrosion Inspection, Diagnosis, Failure Analysis & Condition Assessment

Course Introduction

Corrosion Problems have always presented a Severe Challenge to all Industrial Field Operations. Operators plan for long periods of continuous production with maintenance schedules for the prescribed shutdown periods. Unfortunately, corrosion does not always respect these schedules, resulting in severe economic penalties due to loss of production. In addition, the risk of pollution and hazards to safety are other important reasons for adequate Corrosion Engineering.

Fracture mechanics.

All industrial problems which confronts the engineers, few can be economically more important than the prevention of metallic corrosion and mechanical failure. The corrosion failure of metallic materials causes billions of dollars globally every year. This seminar combines two major aspects of industrial and governmental problems. These are corrosion and fracture mechanics. The lack of understanding will not only cost a lot of money it will also cost human life.

Preventing or reducing the corrosion mechanism will increase the productivity and efficiency of any plant. The course considers external protection using corrosion resistant materials, coatings, and cathodic protection. The importance of internal corrosion and its prevention will be examined with emphasis on material selection, coatings and use of corrosion inhibitors. Also it is structured in order to train people in the fundamental understanding of corrosion and fracture mechanics. The course also highlights protection methods and fracture prevention methods. Alloy selection and material design is also considered from a practical angle.

Target Audience

- Process design
- Unit Operator
- Environmental
- Process safety engineer
- Gasoline blender engineer

- Lab supervisor
- Supply chain engineer
- Distillates analyst
- Models engineer
- Chemical Operator
- Chemical Plant Operator
- Chemical Process Technician
- Control Room Supervisor
- Gas Plant Process Operator
- Gas Production Operator
- Gas Terminal Operations and Storage
- Gathering Pipeline engineer
- Oil Terminal / Storage engineer
- Pipeline Maintenance / Equipment / Compliance / Repair
- Pipeline Testing / Technician / Supervisor / Safety
- Plant Equipment Operator
- Plant Operations Technician
- Plant Shutdown
- Plant Supervisor
- Power Distribution
- Power Plant Manager
- Process Supervisor
- Refinery Operations Technician / Manager
- Terminal Operator / Manager
- Utilities Operator

Learning Objectives

- To understand the Principles of Oxidation, Corrosion Mechanism and Fracture Mechanics.
- Learn how to apply Non-Destructive Test (NDT) Methods of Inspection and metallurgy of corrosion and fracture of metallic alloys.
- Understanding Mechanism of Failure Mode of Industrial Components and Corrosion Protection Methods.
- Learn how to apply Modern Technology Development of Corrosion Protection Alloys.

- Apply Quality Control Methods in Corrosion Protection and Also High Temperature Corrosion and Oxidation Principles for demanding Industrial Applications.
- Understand the Fracture Mechanism and Failure Modes of Engineering Components from a Practical Angle.
- Understanding of Corrosion Engineering in Industrials involving the Various Methods available for Corrosion Control, regulatory and safety matters, and the contribution of an integrated monitoring and inspection program.

Course Outline

• 01 Day One

Module (01) Introduction to Corrosion

- 1.1 Corrosion Theory
- 1.2 Corrosion Identification
- 1.3 Types of Corrosion
- 1.4 Causes of Corrosion
- 1.5 Losses due to Corrosion
- 1.6 Electrochemical Aspects of Corrosion
- 1.7 Thermodynamics of Corrosion
- 1.8 Kinetics of Corrosion Processes

• 02 Day Two

Module (02) Forms of Corrosion

- 2.1 Uniform Attack
- 2.2 Galvanic Corrosion
- 2.3 Crevice Corrosion
- 2.4 Pitting Corrosion
- 2.5 Selective Leaching
- 2.6 Erosion Corrosion
- 2.7 Corrosion Cracking
- 2.8 Inter-granular Corrosion

• 03 Day Three

Module (03) Economic Factors Affect in Design

- 3.1 The Approach to Design
- 3.2 Choice of Materials
- 3.3 Environmental Factor
- 3.4 Geometric Factor

Module (04) High Temperature Corrosion

- 5.1 Oxidation and Corrosion of Stainless Steels
- 5.2 Metallurgical Evaluation Ni base Metal Corrosion
- 5.3 Metallurgical Nature of Co base Alloy Corrosion
- 5.4 Hot Gas Atmosphere for Hot Corrosion
- 5.5 Industrial Examples of High Temperature Corrosions
- 5.6 Failure Initiation from Hot Corrosion (Creep/Fatigue)

• 04 Day Four

Module (05) Corrosion Monitoring Techniques

- 5.1 Corrosion Monitoring
- 5.2 Corrosion Rate Measurements
- 5.3 Materials Choice
- 5.4 Corrosion Control Methods
- 5.5 Management of Corrosion Control

Module (06) Corrosion Prevention & Control

- 6.1 Types of Corrosion Inhibitors
- 6.2 Dose Optimization
- 6.3 Effectiveness Monitoring
- 6.4 Control of Process Parameters
- 6.5 Materials Selection and Design
- 6.6 Coatings (Selection, Monitoring)

• 05 Day Five

Module (07) Laboratory Demonstration

- 7.1 Corrosion Rate Measurements
- 7.2 Linear Polarization & Tafel Plots
- 7.3 Potentio-Dynamic Scanning
- 7.4 Electrochemical Impedance Spectroscopy

Module (08) Failure Investigation

- 8.1 Failure Mechanism and Metallography
- 8.2 Cost of Failure and Industrial Examples
- 8.3 Structural Design against Fracture and Failure
- 8.4 Wear (Adhesive/Abrasive/Fettering)
- 8.5 Surface Structure of Materials
- 8.6 Surface Hardening by Carburizing
- 8.7 Hard Facing Technology
- 8.8 Alloy Selection for the Right Applications
- 8.9 Correct Welding and Joining Practices

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
May 26, 2025	May 30, 2025	5 days	4250.00 \$	UAE - Dubai
Sept. 22, 2025	Sept. 26, 2025	5 days	5950.00 \$	USA - Los Angeles
Dec. 29, 2025	Jan. 2, 2026	5 days	4250.00 \$	UAE - Dubai
Feb. 3, 2025	Feb. 7, 2025	5 days	4250.00 \$	UAE - Abu Dhabi
Sept. 30, 2024	Oct. 4, 2024	5 days	4250.00 \$	UAE - Abu Dhabi