

Course No. 1276

Corrosion Management & Control Training Course

CORROSION, INSPECTION & NDT
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The Corrosion Management & Control Training Course provides a comprehensive and practical framework for managing corrosion risks across industrial assets, equipment, infrastructure, and operating systems. The course develops the technical understanding required to identify corrosion mechanisms, evaluate degradation risks, select appropriate control measures, and establish effective corrosion monitoring and inspection practices. It connects corrosion engineering principles with asset integrity, maintenance, reliability, inspection, materials selection, and operational decision-making.

Corrosion can progressively reduce the reliability, safety, service life, and performance of industrial assets when degradation mechanisms are not properly identified and controlled. Effective corrosion management therefore requires a systematic approach that considers materials, process conditions, environmental exposure, equipment design, operating practices, inspection findings, and maintenance requirements. This course provides participants with the knowledge and tools required to move from reactive corrosion treatment toward structured prevention, monitoring, and risk-based control.

The program examines major forms of industrial corrosion, including uniform corrosion, galvanic corrosion, pitting, crevice corrosion, erosion-corrosion, corrosion under insulation, stress corrosion cracking, hydrogen-related degradation, and microbiologically influenced corrosion. Participants will also explore practical approaches to corrosion risk assessment, corrosion rate evaluation, inspection planning, non-destructive testing, corrosion monitoring, protective coatings, cathodic protection, corrosion inhibitors, material selection, and process control.

The course also emphasizes the integration of corrosion management with broader asset integrity and maintenance strategies. Participants will learn how to evaluate inspection information, identify corrosion threats, prioritize critical assets, develop appropriate mitigation strategies, and support engineering and maintenance decisions. The overall approach is designed to strengthen organizational control of corrosion-related risks while supporting asset reliability, operational continuity, lifecycle performance, and informed maintenance planning.

Objectives

- Analyze the fundamental electrochemical principles of corrosion and relate them to common industrial degradation mechanisms during the course.
- Identify and classify major corrosion mechanisms affecting industrial equipment, pipelines, tanks, structures, and process systems using practical engineering criteria.
- Evaluate the influence of material properties, process conditions, temperature, pressure, fluid characteristics, and environmental exposure on corrosion development.
- Assess corrosion threats and determine their potential impact on asset integrity, reliability, maintenance requirements, and operational performance.
- Apply structured corrosion risk assessment techniques to evaluate asset condition, degradation probability, consequences, and control priorities.
- Evaluate appropriate corrosion inspection and monitoring methods based on asset type, degradation mechanism, operating environment, and criticality.
- Design practical corrosion prevention and control strategies using materials selection, coatings, inhibitors, cathodic protection, and process control.
- Interpret corrosion inspection and monitoring information to identify deterioration trends, abnormal conditions, and areas requiring corrective action.
- Improve corrosion management practices by integrating inspection, maintenance, engineering, operations, reliability, and asset integrity requirements.
- Develop practical recommendations for addressing recurring corrosion problems through root cause analysis, mitigation, monitoring, and maintenance planning.
- Implement a structured corrosion management improvement plan that defines priorities, responsibilities, monitoring requirements, and corrective actions by the end of the course.

Who Should Attend

The Corrosion Management & Control Training Course is designed for engineering, inspection, maintenance, reliability, asset integrity, and operations professionals who are responsible for protecting industrial assets against corrosion-related degradation. It is particularly suitable for corrosion engineers, materials engineers, mechanical engineers, chemical engineers, metallurgical engineers, inspection engineers, integrity engineers, reliability engineers, maintenance engineers, NDT specialists, coating specialists, and technical professionals involved in corrosion prevention and control.

The course is also appropriate for maintenance managers, engineering managers, inspection managers, asset integrity managers, reliability managers, plant managers, operations managers, project managers, technical authorities, and quality professionals who participate in decisions concerning equipment condition, inspection priorities, maintenance strategies, materials selection, and asset performance. Professionals working with pressure equipment, pipelines, storage tanks, process systems, industrial structures, utilities, manufacturing facilities, power systems, and infrastructure can apply the principles covered throughout the program.

Senior managers, executives, asset owners, project decision makers, and department heads will benefit from the course's focus on corrosion risk, asset integrity, lifecycle performance, maintenance priorities, and organizational coordination. It is particularly relevant for organizations seeking to strengthen collaboration between engineering, inspection, maintenance, operations, reliability, and management functions when controlling corrosion-related risks.

Learning Outcomes

- Explain the electrochemical principles that govern corrosion and connect them to practical industrial degradation scenarios.
- Distinguish between common corrosion mechanisms and determine the operating conditions that may promote each mechanism.
- Assess how materials, process conditions, environmental factors, and operating practices influence corrosion behavior.
- Identify corrosion threats associated with pipelines, pressure equipment, tanks, process systems, structures, and industrial components.
- Interpret corrosion inspection results, thickness measurements, monitoring data, and corrosion trends to support asset condition assessment.
- Select appropriate inspection and corrosion monitoring techniques based on degradation mechanisms, asset criticality, and operating conditions.
- Evaluate the suitability of protective coatings, cathodic protection, corrosion inhibitors, material upgrades, and process controls for specific applications.
- Develop corrosion control strategies that integrate prevention, monitoring, inspection, mitigation, and maintenance activities.
- Prioritize corrosion-related risks and recommend appropriate corrective actions based on asset criticality and potential consequences.
- Assess recurring corrosion problems using structured root cause analysis and develop

technically appropriate mitigation measures.

- Integrate corrosion management requirements into asset integrity, reliability, inspection, and maintenance planning.
- Prepare a practical corrosion management action plan covering corrosion threats, inspection requirements, mitigation measures, responsibilities, and improvement priorities.

Course Outline

DAY 01

Fundamentals of Corrosion and Industrial Corrosion Mechanisms

- Principles of corrosion science and electrochemical corrosion
- Anodic and cathodic reactions, corrosion cells, and corrosion potential
- Factors affecting corrosion rates and material degradation
- Relationship between metallurgy, material properties, and corrosion resistance
- Uniform corrosion, galvanic corrosion, pitting corrosion, and crevice corrosion
- Erosion-corrosion, fretting corrosion, and corrosion fatigue
- Stress corrosion cracking and hydrogen-related degradation
- Microbiologically influenced corrosion and environmentally assisted corrosion
- Corrosion under insulation and corrosion in difficult operating environments

PRACTICAL APPLICATION

Identify and classify corrosion mechanisms using industrial case studies

DAY 02

Corrosion Risk Assessment, Materials Selection, and Prevention

- Principles of corrosion risk management and asset integrity
- Identification of corrosion threats and degradation mechanisms
- Corrosion risk assessment and prioritization of critical assets
- Evaluation of likelihood, consequences, and corrosion-related failure scenarios

DAY 02 — CONTINUED

- Materials selection for corrosion-resistant applications
- Carbon steel, stainless steel, alloy steel, and corrosion-resistant materials
- Material compatibility and galvanic corrosion considerations
- Design principles for corrosion prevention
- Influence of process chemistry and operating conditions on corrosion
- Corrosion control considerations during engineering design and project development

PRACTICAL APPLICATION

Conduct a corrosion risk assessment and materials selection exercise

DAY 03

Corrosion Inspection, Monitoring, and Condition Assessment

- Principles of corrosion inspection and monitoring programs
- Developing inspection strategies based on corrosion mechanisms and asset criticality
- Visual inspection and thickness measurement techniques
- Ultrasonic thickness measurement and corrosion rate evaluation
- Non-destructive testing methods applicable to corrosion detection
- Inspection considerations for pipelines, tanks, pressure equipment, and industrial structures
- Corrosion monitoring devices and data collection methods
- Corrosion coupons, probes, sensors, and online monitoring concepts
- Establishing corrosion rates and evaluating degradation trends
- Interpretation of inspection findings and identification of abnormal deterioration

PRACTICAL APPLICATION

Review corrosion inspection data and develop a monitoring strategy

DAY 04

Corrosion Control, Protection, and Mitigation Technologies

- Principles of corrosion prevention and mitigation
- Protective coatings and industrial coating systems
- Surface preparation, coating selection, application, and performance considerations
- Cathodic protection principles and applications
- Sacrificial anode and impressed current cathodic protection systems
- Corrosion inhibitors and chemical corrosion control
- Process control and operational measures for reducing corrosion
- Material upgrades and design modifications for corrosion mitigation
- Corrosion control for pipelines, tanks, process equipment, and industrial structures
- Managing corrosion under insulation and other concealed corrosion threats
- Integrating corrosion control with maintenance and reliability programs

PRACTICAL APPLICATION

Select and justify an appropriate corrosion mitigation strategy for a critical asset

DAY 05

Corrosion Management Programs and Asset Integrity Implementation

- Developing an effective corrosion management framework
- Integrating corrosion management with asset integrity management
- Establishing corrosion loops, degradation mechanisms, and monitoring requirements
- Defining corrosion control limits and performance indicators
- Linking inspection, corrosion monitoring, maintenance, engineering, and operations
- Corrosion data management, documentation, reporting, and trend analysis
- Root cause analysis of recurring corrosion failures
- Maintenance prioritization based on corrosion condition and asset criticality
- Developing corrosion prevention and mitigation improvement programs
- Managing corrosion risks throughout the asset lifecycle

DAY 05 — CONTINUED

- Establishing responsibilities, controls, escalation processes, and continuous improvement practices

FINAL WORKSHOP

Develop a comprehensive Corrosion Management & Control action plan for a selected industrial asset, including corrosion threats, risk priorities, inspection requirements, mitigation measures, monitoring activities, responsibilities, and implementation actions

Register or Request More Information

Course page: <https://quest-training.com/courses/corrosion-management-control-training-course>

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