Cathodic Protection Design, Installation and Monitoring Course: Sacrificial and Impressed Current

12 – 16 April 2027
London - Central London four-star



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Ref: 1639_25947 **Date:** 12 – 16 April 2027 **Location:** London - Central London four-star **Fees:** 23000 SAR

Introduction:

Cathodic protection design, installation and monitoring, covering sacrificial anode and impressed current systems, is a 1-week course for corrosion, pipeline, tank-farm, marine and utility engineers, ending with a Cathodic Protection Design and Monitoring Plan for a case facility. Undersized anode beds, poorly placed groundbeds, unchecked stray current and survey data nobody interprets leave buried and immersed steel corroding while records show it as protected. Nominees already specify, install or read cathodic protection systems and work through case studies on real soil data, survey logs and test-post readings. CoreConcept Training Center delivers this cathodic protection course.

Course Objectives:

- Apply potential-based protection criteria and IR drop correction to judge whether a buried or immersed structure is protected
- Calculate current requirement, anode mass, anode resistance and design life for galvanic anode installations on pipelines, tanks and jetties
- Design impressed current groundbeds and size the transformer-rectifier output for pipeline, tank-bottom and reinforced concrete duty
- Plan installation, energising and commissioning checks, including native potential baselines, test posts and isolating joints
- Assess DC and AC stray current interference and select bonds, drainage or earthing measures to control it
- Interpret close interval, DCVG and remote monitoring data to locate underprotection and coating defects and set remedial priorities

Target Audience:

- Corrosion engineers responsible for cathodic protection criteria, design calculations and system performance
- Pipeline engineers responsible for external corrosion protection of buried transmission and distribution lines
- Tank-farm and terminal engineers responsible for protecting tank bottoms, buried piping and plant earthing interfaces
- Marine and port engineers responsible for jetty piles, sheet piling, mooring structures and seawater intakes
- Water and utility engineers responsible for buried mains, reservoirs and reinforced concrete structures
- Cathodic protection technicians responsible for test-post readings, rectifier logs and field surveys

Course Outline:

Day 1: Corrosion Cell Electrochemistry and Protection Criteria

- Electrochemical Cell and Polarisation Behaviour of Steel in Soil
- Copper Sulfate and Silver Chloride Reference Electrode Selection
- NACE SP0169 Potential and Polarisation Shift Criteria Applied
- Instant-Off Measurement and IR Drop Correction Practice
- Baseline Native Potential Survey and Soil Resistivity Records

Day 2: Current Requirement and Galvanic Anode System Design

- Coating Breakdown Factors and Bare Steel Current Density Selection
- Current Drain Test for Existing Pipeline Current Requirement
- Magnesium, Zinc and Aluminium Anode Selection by Electrolyte
- Anode Mass, Utilisation Factor and Design Life Calculation
- Dwight Resistance Formula and Galvanic Anode Spacing Layout

Day 3: Impressed Current Groundbeds, Rectifier Duty and Structure Applications

- Mixed Metal Oxide and High Silicon Iron Anode Choice
- Deep Well Versus Shallow Horizontal Groundbed Design Comparison
- Transformer-Rectifier Voltage and Current Rating From Circuit Resistance
- Tank Bottom Grid Anodes and Jetty Pile Protection Layouts
- ISO 12696 Anode Zones for Reinforced Concrete Structures

Day 4: Installation, Commissioning, Interference and Above-Ground Surveys

- Test Post, Isolating Joint and Casing Installation Checks
- Energising Sequence and Commissioning Potential Survey Records
- EN 50162 DC Stray Current Testing and Bond Design
- AC Interference Risk Assessment and Decoupler Earthing Measures
- Close Interval Potential Survey and DCVG Defect Location

Day 5: Case Study Work and Design and Monitoring Plan Build

- Case Facility Data Pack With Soil and Survey Logs
- Current Requirement and Anode Bed Sizing for Case Pipeline
- Interference Findings Review and Mitigation Choice for Case Site
- Monitoring Schedule With Coupons and Remote Monitoring Units
- Cathodic Protection Design and Monitoring Plan Completion and Review

Skills You Will Gain:

- Protection Criteria Assessment
- Current Requirement Calculation
- Galvanic Anode Sizing
- Groundbed Layout Design
- Rectifier Output Rating
- Stray Current Mitigation
- Potential Survey Interpretation
- Coating Defect Location

Why Attend This Course:

- Produce a Cathodic Protection Design and Monitoring Plan for a case facility, ready for the asset integrity manager or corrosion lead to approve
- Decide whether a structure needs more anodes, a new groundbed, a rectifier adjustment or interference bonding, using survey evidence
- Avoid premature leaks, overprotection damage and wasted survey budgets caused by misread potentials or mis-sized anode beds
- Brief technicians and contractors on test-post readings, instant-off surveys and commissioning records so field data is usable

Conclusion:

Back at work, the participant presents the Cathodic Protection Design and Monitoring Plan to the asset integrity manager, the corrosion lead or the operations engineer who owns the structure. The unit uses it to approve anode and groundbed changes, rectifier settings, interference bonds and the survey and monitoring schedule for the coming operating period. After the first full survey round, the team should compare measured instant-off potentials, rectifier outputs and defect findings with the plan, then revise current requirement assumptions, test-post coverage and monitoring intervals where the readings disagree with the design.

Frequently Asked Questions FAQ:

What should participants know before a cathodic protection design, installation and monitoring course?

Participants should already work with buried, immersed or concrete steel and be familiar with basic electrical measurements. No electrochemistry background is expected. Bringing anonymised soil resistivity data, test-post readings or rectifier logs makes the case work more useful.

How does cathodic protection design, installation and monitoring differ from a general corrosion management course?

It concentrates on one barrier in depth: criteria, current requirement, anode and groundbed design, rectifier rating, interference and surveys. General corrosion management courses cover many mechanisms, materials, inhibitors and coatings, giving cathodic protection a single session rather than a full design method.

Why does IR drop matter in cathodic protection monitoring?

IR drop is the voltage error caused by current flowing through soil or water between the reference electrode and the steel. Readings taken with current on can look protected when the structure is not, so instant-off measurements or coupons are used to judge polarised potential correctly.

What do participants take back from the cathodic protection design, installation and monitoring course?

Participants take back a Cathodic Protection Design and Monitoring Plan for a case facility, covering current requirement, anode or groundbed sizing, rectifier rating, interference measures and a survey schedule ready to adapt to their own pipelines, tanks, jetties or concrete structures.