Advanced Corrosion Management for Industrial Assets Training Course



21 - 25 Dec 2026

Cape town

4600 € (Per Person)

Ref: #INM2670_277476

Course Introduction / Overview:

Corrosion is a relentless natural process that costs the global economy trillions of dollars annually, posing significant risks to safety, environmental integrity, and operational efficiency. This course provides a comprehensive framework for understanding, managing, and mitigating corrosion in industrial assets. Moving beyond basic principles, this program delves into the practical application of advanced protection strategies and asset integrity management. As detailed by the renowned author Mars G. Fontana in his seminal work, "Corrosion Engineering," a proactive approach to corrosion control is not merely a maintenance task but a critical business function. This training, offered by BIG BEN Training Center, is meticulously designed to equip professionals with the knowledge to diagnose corrosion mechanisms, select appropriate mitigation techniques, and implement robust monitoring programs. Participants will explore everything from electrochemical fundamentals to the development of sophisticated risk-based inspection (RBI) plans. The curriculum integrates international standards and best practices, ensuring that the skills acquired are relevant, current, and directly applicable to extending asset life, enhancing safety, and optimizing operational expenditures in any industrial setting. This is the definitive course for mastering corrosion control from A to Z.

Target Audience / This training course is suitable for:

- Corrosion Engineers and Technicians.
- Asset Integrity Managers.
- Maintenance and Reliability Engineers.
- Inspection and Non-Destructive Testing (NDT) Personnel.
- Plant and Facility Managers.
- Project Engineers.
- Materials and Metallurgical Engineers.
- Operations Supervisors.
- Process Safety Professionals.
- Design Engineers.

Target Sectors and Industries:

- Oil and Gas (Upstream, Midstream, and Downstream).
- Petrochemical and Chemical Processing.
- Power Generation (Conventional and Renewable).
- Marine, Shipping, and Offshore Structures.
- Water and Wastewater Treatment Facilities.
- Mining and Mineral Processing.
- Aerospace and Defense.
- Manufacturing and Industrial Production.
- Infrastructure and Public Works.
- Governmental regulatory bodies and public utilities.

Target Organizations Departments:

- Engineering and Design.
- Maintenance and Reliability.
- Asset Management and Integrity.
- Operations and Production.
- Inspection and Quality Assurance.
- Health, Safety, and Environment (HSE).
- Projects and Capital Works.
- Research and Development.
- Procurement and Supply Chain.

Course Offerings:

By the end of this course, the participants will have able to:

- Analyze the electrochemical principles and various forms of corrosion affecting industrial equipment.
- Select appropriate materials and protective coatings based on environmental and operational conditions.
- Design and evaluate the effectiveness of cathodic and anodic protection systems.
- Implement a range of corrosion monitoring and inspection techniques, including NDT methods.
- Conduct failure analysis to determine the root cause of corrosion-related incidents.
- Develop and implement a comprehensive corrosion management plan aligned with business objectives.
- Apply relevant international standards (e.g., NACE, API, ISO) to corrosion control practices.
- Perform risk-based inspection (RBI) assessments to prioritize maintenance and inspection activities.
- Evaluate the economic impact of corrosion and justify investment in control strategies.

Course Methodology:

The training methodology employed in this course is designed for maximum knowledge retention and practical application. BIG BEN Training Center adopts a highly interactive and participant-centered approach, moving beyond traditional lectures to foster a dynamic learning environment. The program is built upon a foundation of expert-led instruction, where complex theories are broken down into understandable concepts. This is heavily supplemented with real-world case studies of corrosion failures and successful mitigation strategies from various industries, allowing participants to analyze actual scenarios and outcomes. A significant portion of the course is dedicated to collaborative group workshops and problem-solving sessions, where attendees will work together to develop corrosion management plans for hypothetical assets. Interactive discussions, Q&A sessions, and practical demonstrations of inspection techniques will be used throughout the five days to reinforce learning. Participants will receive continuous feedback from the instructor, ensuring they can confidently apply the acquired skills to their specific work challenges upon returning to their organizations. This blended learning approach ensures a comprehensive understanding of both the science and the practical art of corrosion management.

Course Agenda (Course Units):

Unit One: Fundamentals of Corrosion Science and Engineering

- Introduction to the economic and safety impacts of corrosion.
- The electrochemistry of corrosion cells and reactions.
- Thermodynamics and kinetics of corrosion (Pourbaix and Evans diagrams).
- Identifying the eight forms of corrosion.
- Uniform and localized corrosion mechanisms (pitting, crevice, galvanic).
- Environmentally-assisted cracking (SCC, HIC, SSC).
- Flow-assisted corrosion and erosion-corrosion.
- Microbiologically influenced corrosion (MIC).

Unit Two: Materials Selection and Protective Coatings

- Principles of materials selection for corrosion resistance.
- Understanding ferrous and non-ferrous alloys.
- Corrosion-resistant alloys (CRAs) and their applications.
- Non-metallic materials (polymers, composites, ceramics).
- Surface preparation standards and techniques for coating application.
- Types of protective coatings (organic, inorganic, metallic).
- Coating application methods and quality control.
- Coating failure analysis and inspection techniques.

Unit Three: Cathodic and Anodic Protection

- Principles of cathodic protection (CP).
- Types of CP systems: Sacrificial Anode (SACP) and Impressed Current (ICCP).
- Design considerations for CP systems in soil and marine environments.
- Criteria for protection and monitoring techniques.
- Stray current corrosion and interference issues.
- Introduction to anodic protection for specific environments.
- Applications and limitations of anodic protection.
- Integration of CP with coating systems.

Unit Four: Corrosion Monitoring, Inspection, and Testing

- Corrosion monitoring objectives and strategies.
- Intrusive techniques (corrosion coupons, electrical resistance probes, LPR).
- Non-intrusive techniques and non-destructive testing (NDT).
- Ultrasonic Testing (UT), Radiography (RT), and Magnetic Particle Inspection (MPI).
- Advanced NDT methods for corrosion detection.
- Corrosion rate calculations and data interpretation.
- Laboratory corrosion testing methods.
- Developing an effective inspection plan.

Unit Five: Integrated Corrosion Management and Life Prediction

- Developing a comprehensive corrosion management system (CMS).
- Risk-Based Inspection (RBI) methodology (API 580/581).
- Corrosion loops and integrity operating windows (IOWs).
- Root cause analysis (RCA) for corrosion failures.
- Application of key standards (API 571, NACE SP0169).
- Corrosion modeling and remaining life assessment.
- Lifecycle costing and economic analysis of corrosion control.
- Case studies and developing a final corrosion control strategy.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

Considering the rise of new materials and digital monitoring technologies, how might the traditional principles of corrosion management evolve over the next decade to address the challenges of sustainable infrastructure?

What unique qualities does this course offer compared to other courses?

This course distinguishes itself by adopting a holistic, business-centric approach to corrosion management rather than treating it as an isolated technical discipline. While many programs focus solely on the scientific principles, this training emphasizes the integration of corrosion control into the broader framework of asset integrity management, risk assessment, and operational economics. We move beyond theory by immersing participants in a curriculum rich with detailed case studies of both catastrophic failures and benchmark successes from a wide array of industries. This practical, consequence-driven learning ensures that participants understand not just the 'how' but the critical 'why' behind every strategy. The curriculum is uniquely structured to build from foundational science to the development of a complete, risk-based corrosion management plan, mirroring the real-world workflow of a corrosion professional. Furthermore, the course places a strong emphasis on the application of key international standards like those from API and NACE, ensuring the skills learned are globally relevant and immediately applicable. The focus is on empowering participants to make informed, data-driven decisions that protect assets, enhance safety, and deliver tangible value to their organizations.