

Oil and gas exploration sector's cathodic protection system

Examine, evaluate, and create

Introduction

The worldwide oil and gas business faces a challenge in maintaining its aged infrastructure, which includes subterranean pipes. One of the main factors ageing industrial facilities is corrosion. The operating costs of static equipment and pipes can be significantly decreased by comprehending its mechanism and learning how to control it.

In industry, one of the most used techniques for preventing corrosion is cathodic protection (CP). By using sacrificial anodes or applying an electric current, the Cathodic Protection technique prevents metal from corroding. This method has been around for 160 years and is widely used with excellent results in pipelines, tank farms, and other similar applications. Nevertheless, despite its extensive application and lengthy history, this technology is far too frequently used insufficiently or even incorrectly, leaving structures poorly protected or, worse, negatively impacted.

This five-day course on the Course N Carry Oil and Gas Exploration Sector's Cathodic Protection System will teach you the basic concepts, assessment, and applications of cathodic protection. It will also assist participants in identifying cathodic protection risks, choosing appropriate control measures, and implementing them to safeguard the organization's assets.

Objectives

The following are the objectives of this Course N Carry training course:

- The knowledge and skills required to maintain and operate Cathodic Protection (CP) systems in oil and gas surface production facilities
- Knowledge of galvanic and impressed current CP system applications and fundamentals of corrosion
- Knowledge of the field tools needed to keep an eye on CP systems and their operation
- Knowledge of the different elements influencing these systems' performance
- Discover the fundamentals of CP monitoring to guarantee efficient functioning.
- Knowing how to cut costs associated with costly shutdowns and boost productivity would lower the overall cost of the corrosion control programme.

Training Methodology

- This training programme integrates appropriate standards, techniques, and sound engineering principles.
- There are interactive discussions inserted throughout every presentation.
- Every lecture includes exercises, a case history, and a group discussion.
- Reviewing real major incidents and industry experience
- Each student is given a multicoloured course handbook.
- Images of actual situations as well as case studies are displayed.
- There are videos displayed on the topic.

Organizational impacts

Businesses will gain the most from an enhanced corrosion management system when an effective cathodic protection system based on entire life cycle corrosion economy is implemented.

Personal Impact

As a delegate taking part in this intensely participatory and captivating Course N Carry training session, you will:

- Be better equipped to actively contribute to lowering the likelihood of fewer unanticipated cathodic protection system failures
- Increase productivity and competence to improve your performance and competence in the field of cathodic protection and to offer value to your organisations.

Who should attend?

Personnel working in technical fields linked to materials, integrity, and maintenance who deal directly or indirectly with cathodic protection should take this Course N Carry training course. Among them are:

- Technicians and Engineers for Corrosion
- Personnel for Inspection and Maintenance
- Engineers for Static Equipment
- Safety Employees
- Engineers for Projects
- Supervisors and Group Heads

Course Outline

Day 1

Corrosion and Corrosion Control: Fundamentals and Types

Part I: Importance of Corrosion Management

- The main factor contributing to plant failure is corrosion.
- Financial Impacts
- Impacts on the Environment
- Effects on Safety
- Interventional Strategies for Corrosion Management
- The price of corrosion
- Examining the Situation: Severe Corrosion Mishaps

Part II: Corrosion and Its Management

- Conditions for the Occurrence of Corrosion
- The Metallurgical Elements
- Types of Corrosion
- Methods for Corrosion Control
- Modification of the Environment
- Defending Layers
- Overview of Electrochemical Protection

Day 2

Environment for Corrosion, Material Choice, and Cathodic Protection Components

Part III: Corrosive Environments and Material Construction

- The Atmospheric Conditions
- Oceanic Atmospheres
- Industrial Environments
- Subterranean Environments
- Selection of Materials
- Steel Corrosion Properties
- Concrete Structure Setting

Part IV: Fundamentals of Cathodic Protection Systems

- Series Galvanic
- Widespread Use of Cathodic Protection
- Industry Guidelines & Standards
- The CPS principle
- The Cell for Cathodic Protection
- Techniques for Cathodic Protection Application
- System of Sacrificial Cathodic Protection
- The system of impressed-current cathodic protection

- The drawbacks of SCPS
- Benefits of ICCP
- The drawbacks of ICCP
- CPS Identifying
- Essential Conditions for Cathodic Protection
- Criteria for Cathodic Protection
- Rectifiers for Current and DC Power Source
- Elevated Resistance Voltmeter
- Half Cell Reference Cells Citation Cells
- NACE Standard that Applies to Cathodic Protection Systems

Day 3

Design and Coating Issues with Cathodic Protection Systems

Part V: Design of Cathodic Protection System

- Design Elements
- Survey of Electrolyte Resistivity
- pH Survey of Electrolytes
- Electrolyte Potential Survey vs Structure
- Present Need
- Coating Resistance
- Need for Protective Current
- Design of Sacrifice Anode (Galvanic) Cathodic Protection
- Design of the Impressed Current Cathodic Protection System
- The Resistance of Soil
- Test of Current Requirements
- Common Design Parameters for CPS

Part VI: Systems and Coatings for Cathodic Protection

- Protective Coating's Function in CPS
- Factors of Selection
- Coating Impurities
- Coating Effectiveness
- Overvoltage
- Cathodic Breaking Off
- Coating that is frequently used in conjunction with CPS

Day 4

Construction of Anodes for Cathodic Protection

Part VII: Rectifiers and Anodes

- Choose Your Anode
- Types of Anode Materials: aluminium, magnesium, zinc, etc.
- Present Output
- Motivating Possibilities
- Life of an Anode
- Anode Dimensions and Shape
- Anode Performance
- Types of Galvanic Anodes
- Current ICCP System Requirements
- Materials for the ICCP Anode
- Backfilling of Anodes
- Putting in Place Sacrificial Anodes
- Impressive Anode Beds for Current
- Rectifiers with Impressed Current and DC Power Source
- CP Formulas
- Examples of Solved CP Calculations

Part VIII: Cathodic Protection System Construction and Practice

- Cathodic Protection System Components
- Crucial Elements
- Separating Joints
- Junction Boxes
- Test Stations: vouchers and measurement points
- Welding Thermite
- Earthing Mechanisms
- Measurement of Line Current
- Pipe Casings and Sleeves
- Tanks & Cathodic Protection Vessels Tanks and Internal Vessels
- Tanks for Chemical Storage
- Systems for Circulating Water
- Heat exchangers: shell and tube
- Case Study: Cathodic Protection System Construction

Day 5

Safety and Corrosion Comics, Inspection of Lines and Coatings

Part IX: Examining Pipeline and Coating Defects

- Surveys from Pearson
- Method of Close Interval Potential Survey (CIPS)
- The technique of Direct Current Voltage Gradient (DCVG)
- Survey of Signal Attenuation Coating (SAC)
- Typical Issues with Impressed Current Rectifiers
- Holiday Inspection for the Trench Pipe Overhead

Part X: Safety and Instrumentation Aspects

- Alkalinity
- Evolution of Hydrogen
- Evolution of Chloride
- Beside Telecommunication Services Installation
- Installation Next to Railway Protection & Signal Circuits
- Interaction in Cathodically Protected Structures at Discontinuities
- Setting up at Jetties & Ships
- Risk of Electroshock
- Artworks on Submerged Structures
- Installing Systems for Plant Interior Protection
- Fault Situations in Power Systems for Electricity
- Current Stray Corrosion

Part XI: Systems for Corrosion Management

- Financial Aspects
- Key Performance Indicators (KPIs) for Corrosion
- Asset Protection and Corrosion Control
- Data Management for Corrosion