Corrosion Management in Petroleum Refining
Modules 1 & 2
(PEP10)

PETROCONSULT
ENERGY CO. (UK) LTD.

Oil & Gas
Consultancy Services & Technical Training Providers

Enhancing business through knowledge

Corrosion Management in Petroleum Refining
Modules 1 & 2
(PEP10)

Introduction

The Petroleum industry encounters corrosion related problems in its operations possibly more than any other industry. The petrochemical aspect of the industry of which the refinery is key, is perhaps has more elaborate incidences of corrosion.

Corrosion leads to refinery equipment failures, creating safety hazards & interruptions in operations.

From minimization to total prevention of corrosion, the industry is a critical factor in overall refinery economics.

In petroleum refinery, corrosion can be either low Temperature corrosion or High Temperature corrosion, and both or either can be experienced in the various process units of a refinery.

This course provides adequate understanding of corrosion chemistry, types of corrosion, corrosion rates & polarisation, corrosive environments in process units & how to mitigate them.

It is a two modular course of five days per module. The two modules are presented in classroom settings by seasoned technical experts with relevant industry experience, using varied schematics, sketches, video clips and diagrams that enable adequate learning by attendees.

Module 1 Content:

1. **Introduction:**
   - (i) Corrosion Chemistry
   - (ii) Low & High Temperature Refinery Corrosion
   - (iii) Corrosive Elements & Agents in Refinery Process Units
   - (iv) Corrosion Damages in Refining Process.

2. **Refinery Metallurgical Properties & Failures:**
   - (i) Ductility, Toughness, Strain, stress & microstructural changes.
   - (ii) Gain Growth, Graphitization Hardening, sigma phase embrittlement (including Liquid Metal embrittlement), Carburization & Decarburization, Leaking.
   - (iii) Mechanical Failures: Defective Materials, Fatigue, Cavitations Damage, overloading, overpressuring , Fracture , Stress

3. **Corrosion From Boiler Feed Water, Steam Condensate, Cooling Water & Fuel Ash.**
   - What they are & how to control these other forms of corrosion.

4. Crude Distillation & Desalting & Corrosion in Crude Distillation Units

(i) Crude Oil Types & Composition
(ii) Why Crude oil Pre-treatment .
(iii) Desalting Methods
(iv) Separation Process of Liquid & Vapours in Atmospheric Distillation Columns.
(v) Discussion of processes & importance of:
- Reflux & Distillation
- Primary Flash column & their destinations
- Stripper & Vapour – Liquid stream separation

(vi) Vacuum Distillation Column & Products
(vii) Corrosion Problem in Crude Distillation Units
(viii) Crude Unit Equipment & Piping Materials Selection for Corrosion Control Purposes.
(ix) Corrosion Control in Crude Processing Unit Overhead Circuit.
(x) General Corrosion Control Program for Crude Distillation & Desalting Unit.

5. Corrosion Control in Fluid catalytic Cracking (FFC) Units

(i) Overview of Fluid catalytic cracking
(ii) The FCC Reactor vessel
(iii) The Regenerator in FCC
(iv) Role of Flue Gas System & Fractionators
(v) Corrosion Risks & Corrosion Control in FCC Reactors
(vi) H2S Damage to FCC Equipments: Inspection & Corrosion Prevention
(vii) Corrosion Prevention in Regenerators & Flue Gas Systems.

Module 2 Content:

1. Corrosion Control in Cracked Light Ends Recovery Units (CLER)

(i) Overview of CLER Process
(ii) Overview of CLER Equipment Materials Selection
(iii) CLER Units corrosive Agents & Corrosion Control Methods.

2. Corrosion Monitoring & control in Hydrofluoric Acid Alkylation Units.

(i) Overview of Hydrofluoric Acid Alkylation Units
- Major Sections
- The Processes
- Process Parameters causing Corrosion.

(ii) Equipment Degradation and Degradation Mitigation Methods.
(iii) Corrosion Monitoring Methods in Hydrofluoric Acid Alkylation Units
(iv) Corrosion Control Methods in Hydrofluoric Acids

3. Sulphuric Acid Alkylation Units

(i) Overview of Sulphuric Acid (as Catalyst) in Refinery Alkylation
- The Major Sections : Reaction Treating, Fractionation
- Reactor Design & Refrigeration Methods

(ii) Alkylation Units Materials Selection for Equipment Manufacture & Procurement.
- Corrosion Allowance for Towers, Bends
- Corrosion at Carbon Steel Welds (Gas Tungsten Arc Welding. GTAW)
- Use of Alloys for Valves, Pumps Internals, Mixing & Injection Nozzles. (e.g Austenitic Alloys: Alloy 20. Alloy B-2- For Low corrosive Environment, Alloy C-4, Alloy C-276 etc.)

(iii) Corrosion Problems in Sulphuric Acid Alkylation Units.
(iv) Corrosion Monitoring Methods (Including Probe & Purposes. Locations)
(v) Inspection Techniques & Corrosion Control in Sulphuric Acid Alkylation Units including:
- Reboiler Corrosion & Fouling Control
- Acid Tanks: Design, Fabrication & Inspection for Concentrated Sulphuric Acid & Oleum Storage (NACESP0294) for Corrosion Prevention.

(vi) Corrosion Control at Unit Shutdowns.

4. Corrosion Control in Hydroprocessing Units

(i) Overview of Hydoprocessing Units
(ii) Process Conditions causing corrosion in Hydroprocessing Units.
(iii) Corrosion Types in Hydroprocessing Units
(iv) Critical Areas Prone to Corrosion in Hydroprocessing Units
(v) Corrosion Prevention Methods.

5. Corrosion & Corrosion Control in Catalytic Reforming Units

(i) What is the catalytic Reforming Unit?
(ii) Type of catalytic reforming processes
(iii) Preferred Feedstock for Catalytic Reformation & Why.
(iv) Difference between Motor octane No (MON) and Research octane No (RON)
(v) The Reforming catalyst
(vi) Coldshell & Hotshell Reactor Design & Implications for Corrosion in Refinery Catalytic Reforming Units.
(vii) Effects of Steam Composition, Temperature & Pressure in Corrosion in Catalytic Reforming Units.
(viii) Corrosion Monitoring & Control in Catalytic Reforming Units including Water Washed Equipment like
- Effluent Coolers
- Recycle Compressors
- Strippers & Associated Piping
- Separations or Flash Drums.

Venue:
Please visit our website or contact us for details.

Tuition:
Module 1: £3,450+VAT
Module 2: £3,750+VAT