CORROSION CONTROL MONITORING & PREVENTION

TRAINIT ACADEMY

FMC201 Facility Integrity, Inspection, Metallurgy and Corrosion Engineering

COURSE TITLE

CORROSION CONTROL MONITORING & PREVENTION

COURSE DATE/VENUE

14 - 18 June, 2021

London, UK

COURSE REFERENCE

FMC201

COURSE DURATION

05 Days

DISCIPLINE

Facility Integrity, Inspection, Metallurgy and Corrosion Engineering

COURSE INTRODUCTION

In order to proactively improve and enhance the safety reliability and profitability in chemical plants and oil field related plant and machinery, it is necessary to understand where why and how the corrosion related mechanisms cause damage which eventually lead to sudden failures. Such an understanding of failure mode helps to establish plant reliability and safety at optimal cost.

COURSE OBJECTIVE

This course aims to provide the participants with an understanding of why and how corrosion occurs, the metallurgical and environmental factors influencing corrosion, and practical methods of corrosion control and failure prevention. Participants will be able to grasp the basic concepts related to corrosion, metallurgy and failure analysis, and to apply the state of the art technology in their workplace with an aim to achieve low cost reliability. This course is designed to take a break and learn why problems persist in

different parts and plants and machinery and how to address them by careful on line monitoring

COURSE AUDIENCE

This course provides an excellent avenue for process engineers operations staff, maintenance engineers, inspection and laboratory personnel, and those involved in failure analysis to update their appreciation of corrosion and the awareness of the emerging technologies for corrosion control and failure prevention. The presentation is made in simple style for all levels of engineering staff

COURSE CONTENT

Day 1:

Problems relating to Carbon steel the common metal used in refinery equipment
Manufacture and Physical properties of carbon steel-Trace elements that alter the properties significantly- Grain boundary problem-Types of carbon steel used in refining-Addition of Cr Ni etc and effects –stainless steels
Environment that affects metals
Water and atmosphere- simple non aggressive condition-8 types of corrosion- micro and macro- corrosion in water – velocity and factors- cavitation- erosion-selective leaching-pitting- filliform- MIC- Galvanic Corrosion - Atmospheric Corrosion- Uniform or Localized Loss of Thickness Factors that influence corrosion Stress assisted corrosion-Hydrogen embrittlement-HIC-

Day 2:

Problems relating to input material crude complexity and corrosivity- Water related problems
Produce water-Desalter wash water-Hydro treater waste-Other waste water-a high volume - low toxicity waste. -Water separation and transport- site preparation, pumping, treatment equipment, storage equipment, management of residuals and associated

corrosion problems. All that contains in crude Solids- silt sand carbonates, corrosion products Liquids- oil, condensate, TDS in water, Gases- soluble and insoluble- Oxygen, H2S, CO2 Bacteria-types Flow related problems

Problem related to Treatment Chemical

Hydrate Inhibitor-Water Vapor: Dehydrator- Scale Inhibitor-corrosion Inhibitor-Bactericide-Emulsion Breakers- Flocculants-problem of inhibitors

Produced water separation and disposal problems- pH management and related problems- scale removal and problem of sulphates-waste water and solids Disposal-Environmental issues-salinity and aquatic toxicity

NORM in produced water- radium-226 and radium228-surface, temperature changes and precipitation.

Day 3:

Multiphase problems- temperature, water-oil partitioning, water chemistry and flow patterns-impact on metallurgy of pipe material-type of corrosion products formed on the steel surfaces-, inhibitor ad- sorption on suspended particles-- inhibitor accumulation on gas bubbles, oil/water droplets and emulsions. Flow patterns and types of corrosion

Crude distillation-process related problems

The effect of Chemicals added to crude and water entering desalter

The role of oxygen in presence of chloride, H2S, and CO2

Desalter and mixed crude problems

Over head and heat exchanger problems

Day 4:

On line monitoring of water H2S, amine, combined and alone- hydrocarbon dew point-overhead contactor- cryogenic extractor- NGL separation- molecular sieve control pipe line quality- liquefaction and storage-consumer and product line analysis for moisture and Sulfur-in LNG and LPG-re gasification and recheck H2S- hyd. carbon dew point on vaporization

NDT and lab testing-measuring corrosion

Coupons and probes – what information we get-Sample collection- precautions and methodology-Field testing- simple instruments- Sample collection of oil water and solids-sampling techniques- do's and don'ts Analysis of-Solids- sludge types, deposits-carbonates, Liquids-water –pH –temperature- soluble H2S- CO2-Gase s- CO2

Corrosion control

Day 5

General methods of control- coating- cathodic protection-selection of alternative material and design- inhibitors and chemicals – biocides Use of non metallics- Fiber glass and composites- concrete – rubber –Corrosion Resistant Alloys. corrosion Video- CUI-negligence of timely action Introduction to MIC-Micro and macro organism – fouling-Types of bacteria in crude lines- case study of fouled oil lines- PIM-what is Pipeline Integrity Management- How it is important- Role of laboratory staff

COURSE CERTIFICATE

TRAINIT ACADEMY will award an internationally recognized certificate(s) for each delegate on completion of training.

COURSE FEES

$6,150 per Delegate. This rate includes participant's manual, Hand-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

COURSE METHODOLOGY

The training course will be highly participatory and the course leader will present, guide and facilitate learning, using a range of methods including formal presentation, discussions, sector-specific case studies and exercises. Above all, the course leader will make extensive use of real-life case examples in which he has been personally involved. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice

type will be made available on daily basis to examine the effectiveness of delivering the course.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Case studies & Practical Exercises
- 10% Role Play
- 10% Videos, Software or Simulators (as applicable) & General Discussions