Refinery and Petrochemical Industry Materials Selection and Corrosion Control

Potential PDH: 32

Description:

A four-day course to assist engineers, designers, inspection and maintenance personnel in their understanding of basic corrosion and metallurgical concepts, deterioration mechanisms, as well as recognition and evaluation techniques to avoid failures and costly downtime. For the experienced designer, engineer and materials engineer, this course will be a review of the established principles of design and application as well as an update of the new materials that are used in the Chemical and Petrochemical Industries. For inspection and maintenance personnel, the course will offer background information that can be used to recognize and evaluate corrosion in the plant and that can be used to plan effective inspection programs. For less experienced personnel, the course will offer a unique introduction to the problems that are encountered in operating plants and some of the techniques that can be used to control corrosion and degradation.

Outline:

This course will introduce the basic corrosion and metallurgical concepts that are needed to understand the types of corrosion and damage that occur in Refinery, Chemical and Petrochemical Plants. The basic concepts of electrochemistry and how this is applied to control corrosion in process plants will be covered. Recognizing the types of corrosion will be covered from both a theory viewpoint and from inspection of failures specimens that have come from operating plants throughout the world. Laboratory corrosion testing techniques and plant corrosion monitoring methods and will be reviewed. The control of external corrosion will be discussed.

- Basics of Corrosion and CorrosionElectrochemistry
- Forms of Corrosion
- Stainless Steels
- Recognition of Corrosion
- Workshop
- Case Study
- Failure Modes

- Control of Corrosion by Process Modification
- High Temperature Corrosion
- Workshop Construction of High TemperaturePhase Diagram
- Metal Dusting
- Hydrogen
- Cathodic Protection
- Materials Selection and Workshop
- Calculation of pH - by estimation
- Process Modifications and Control
- Case Studies

The course goal is to develop the proper understanding of corrosion so that the student will be able to forecast the type of processes that produce corrosion and how the corrosion can be controlled. The selection of materials will be covered with emphasis on selection based upon "soft" failures – failures that only produce minor leaks that are easy to control. Metals, plastics, and coatings that are often used in process plants will be covered with emphasis on construction details and maintainability. The key role of the Corrosion Engineer in Mechanical Integrity Assessments will be reviewed. Course notes will be provided.

Subject Matter Expert (SME):

Mr. Tony Scribner, PE was Principal Engineer and Corporate Technology Steward for Union Carbide for 31 years. After retiring from Union Carbide, he was a marketing specialist for Special Metals before joining Becht Engineering. He has also been an Associate Director of the Materials Technology Institute. At Union Carbide, he led the selection of materials for capital projects for many years, worked in the plants as a field engineer, and also worked in the laboratory doing both failure analysis and corrosion testing. He was also involved in process modifications to allow continued use of existing metals even though significant process changes were made. While at Union Carbide, he was the Manual Manager for the Materials Engineering, Painting, Internal Coatings, Cathodic Protection and Insulation technology areas. Mr. Scribner has a degree in Metallurgical Engineering from the University of Florida and has been an active member of NACE for 45 years. Further, Mr. Scribner was the Chairman for 6 years of NACE Research Committee and has been active on the various technical committees involved in Materials Selection in the Process Industry.