FERTILIZER ACADEMY

Knowledge hub for the Fertilizer industry

Course title:

Corrosion Failure Modes and Fouling Aspects in Cooling Water Systems

Introduction:

This course will contribute to a better understanding in the cause of corrosion and fouling problems in cooling water systems. Recommendations are presented how to mitigate these problems by means of appropriate cooling water treatment programs. All relevant parameters are elaborated. Alternative materials of construction with specific failure modes are discussed. The problems are described and explained on the basis of case histories

Duration 3 hours

Course outline:

Module 1

1. Introduction.
2. Important aspects in cooling water chemistry.
3. Problems associated with cooling water systems:
    a) Corrosion.
    b) Scale formation.
    c) Fouling.
    d) Biological contamination.
4. Mechanism and forms of corrosion at carbon steel (tubes) of coolers.
5. Relevant parameters influencing problems in cooling water Systems.
6. Preventive measures:
    a. Cooling water treatment programs (Inhibitor systems).
    b. Testing of inhibitor systems.

Author(s) / Trainer(s):

Giel Notten

Materials & Corrosion Engineer,

Giel Notten is a materials and corrosion expert who, spent thirty-eight years working with DSM in The Netherlands. After gaining his Chemical Engineering degree he joined DSM's Materials and Corrosion Department and was heading this Department as Managing Senior Corrosion Engineer. In this job he was involved in a broad range of consultancy activities for numerous (petro-)chemical plants. For Stamicarbon, a previous subsidiary company of DSM, and licensing DSM's know-how, he set up programs for lifetime assessment studies, based on RBI philosophy, in numerous urea and ammonia plants and supervised these studies. Giel was also involved in the development of Safurex®, the super-duplex stainless steel grade (developed by Sandvik in cooperation with Stamicarbon) for application in Stamicarbon urea plants.
He was a board member of NACE Benelux and a member of the Contact Group Corrosion of the Dutch Chemical Process Industry.

Since his retirement from DSM, Giel started his own company NTT Consultancy in 2006 and has remained active as a materials and corrosion engineering consultant for many companies all over the world. He has devoted much of his time to passing on his knowledge and experience on the topic of corrosion engineering to a new generation of engineers in corrosion courses and trainings; numerous trainings have been presented. In cooperation with UreaKnowHow (in-house) training sessions have been organized and presented to more than 1000 urea engineers, managers, (shift-) supervisors and operators from all over the world. Several workshops have been presented in cooperation with UreaKnowHow for CRU in Nitrogen & Syngas Conferences.

Giel published many technical papers in reputable industry magazines and collected his knowledge and experience, illustrated with numerous cases of corrosion, in a book entitled Corrosion Engineering Guide.

Module 2

1. Alternative materials of construction for coolers with typical failure modes:
    a. Carbon steel.
    b. Stainless steels (austenitic and duplex).
    c. Titanium.
2. Monitoring and inspection based on RBI philosophy of cooling water systems.
3. Case histories of corrosion in cooling water systems:
    a. Stress corrosion cracking in stainless steel tubes of CO2 compressor coolers.
    b. Failure of fan blade of cooling tower.
4. Conclusions and recommendations.

Learning outcomes:

By the end of this training course you will understand:

- The cause of the corrosion and fouling problems in cooling water systems.
- The parameters which influence this corrosion and fouling phenomena.
- How to mitigate these problems by implementing adequate cooling water treatment programs.
- Which alternative materials of construction (with description of restrictions) to be used for coolers.

Who will benefit:

Employees who are responsible for, or share responsibility, with respect to a proper functioning of utility systems like cooling water systems: process, mechanical, maintenance, corrosion and inspection engineers employed in (petro-) chemical plants handling cooling water.

Course materials:

- Hand-out presentation slides in PDF format.

Price:

€350.00

Discounts:

- 2 places – 10% discount
- 3 places – 15% discount

- 4 or more places – 20% discount.

In-company training:

This course is also available as an in-company course (face-to-face or online) where content can be customised to meet your organisation's specific needs and delivered on a date/location that suits your requirements.

Contact us for more information.

Training code: MAT05

On request the electronic (recently revised) version of the Corrosion Engineering Guide (> 800 pages) is available for additional costs of **€95.00**