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On the role of corrosion (knowledge) management for a better materials selection

Corrosion is thermodynamically favoured, unstoppable chemical reaction that has very serious adverse economical and ecological impacts. There are five methods by which corrosion can be treated: (1) use of chemicals such as corrosion inhibitors and biocides, (2) implementation of cathodic/anodic protection, (3) application of coatings, (4) modification of the design of the part to make it less vulnerable to the corrosive environment and (5) materials selection in the sense that materials with better corrosion resistance will take the place of more susceptible ones.

There are basically two parallel approaches to deal with corrosion: One approach which is known as Corrosion Management (CM) deals with the risk of corrosion in purely technical and engineering terms while Corrosion Knowledge Management (CKM) is a management approach to be implemented by decision making managers. While all the five methods to manage corrosion are more or less costly, materials selection is without doubt the most expensive of the five because it often involves replacing the cheaper material with lower corrosion resistance with the one that is very expensive owing to its improved mechanical and chemical properties. The difference in the cost could be so huge that the overall cost of the project could become doubled or tripled in terms of CAPEX (Capital expenditure). Increasing the CAPEX of a project is not an easy issue to handle unless the project management is educated and assured that the OPEX (operation expenditure) will be low

during the life cycle of the part. This is often a management decision rather than a purely engineering ratification act and for that a CKM mentality about the engineering risk of corrosion in terms of its “Risk” and “Cost” must exist.

A company in which the top management is aware of the risk of corrosion (in engineering terms) and cost of corrosion (in managerial terms) will be more prone to accept the risk of a higher CAPEX project in terms of materials selection to minimise the consequent OPEX than a company that is considering corrosion something that “can be handled anyway” down the line of the life cycle of the asset. In this presentation, after a quick review of some economical and environmental aspects of corrosion, the main framework of CKM and its four principles will be introduced and discussed.

Speaker Biography

Reza Javaherdashti holds a double degree in Materials Science and Metallurgical Engineering. In addition to being an internationally renowned expert on microbial corrosion, He has several internationally referenced books and papers on the subject. He has over 20 years of field and academic experience as both a consultant and a researcher. He is the first scientist who has applied Fuzzy logic in predicting the risk of microbial corrosion successfully. While as an engineer corrosion is his passion, as a manager he has grown interest in studies related to the cost of corrosion. He theorised and formulated Corrosion Knowledge Management (CKM) for managers and was the first who applied Future Studies to present a futuristic model for managers that had corrosion as its integral element.

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