

Corrosion Monitoring and Prevention in Chemical and Petroleum Industries

Introduction

The deleterious effect of corrosion on the plant and equipment life is well known. The harsh environment in the Kingdom seriously shortens the design life of components and reduces the operational efficiency. Corrosion problems hit all industrial sectors but chemical and petroleum industry in hot and humid weather conditions of local industrial areas are particularly detrimental. It is important to know the necessary techniques to monitor and prevent/reduce corrosion in these industrial sectors.

Course Objectives:

This course will provide exposure to monitoring and prevention of corrosion in chemical and petroleum industry. The course combines three important elements, namely, theoretical background, real life case studies and laboratory demonstration/hands on practice. The topics are carefully selected to help practicing engineers and scientists to understand, analyze and solve corrosion related problems. The course will be equally useful for people entering the corrosion field and for professionals looking for a refresher course.

Schedule:

March 26-30, 2005

Sessions will be held from Saturday to Wednesday from 8:30 am to to 4:00 pm with 15 minutes coffee breaks and one hour lunch break from 12:00 noon to 1:00 pm.

Location:

KFUPM Campus, Building 14, Room 111

Language:

English

Who Should Attend:

The short course is intended for those who have had no or some prior exposure to corrosion in the form of an introductory short course, undergraduate class, or practical experience. The course will be useful for new engineers/scientists and for professionals looking for a refresher course.

Course Outline:

- A. Fundamentals and Monitoring of Corrosion
 - i. Mechanism of Corrosion
 - ii. Thermodynamics and Kinetics of Corrosion
 - iii. Mass transfer Limited Corrosion
 - iv. Types of Corrosion.
 - v. Basics of d.c. Measurement of Corrosion
 - vi. Basics of Electrochemical Impedance Technique
 - vii. Environmental Corrosion in Chemical and Petroleum Industries

viii. Corrosion in Reinforced Concrete Structure

B. Prevention of Corrosion

- i. Coatings (Fundamentals, Selection, Monitoring, Failure Mechanism)
- ii. Inhibitors (Fundamentals, Selection and Monitoring)
- iii. Control of Process Parameters
- iv. Materials Selection and Design Considerations
- v. Case Studies from Chemical and Petroleum Industries

C. Laboratory Demonstrations and Hands on Practice

- i. Corrosion Rate Measurement by Linear Polarization
- ii. Corrosion Rate Measurement by Tafel Plots
- iii. Potentiodynamic Scanning
- iv. Electrochemical Impedance Spectroscopy for Coatings and Inhibitors.

Course Fee:

The course fee is SR 4000 per participant. The fee covers tuition, course material, refreshments and lunch. Checks should accompany the application form and should be made payable to *King Fahd University of Petroleum & Minerals*.

Certificate

A certificate will be awarded to participants fulfilling 80% attendance to classes.

Course Instructors:

1. Dr. S. U. Rahman
Associate Professor, Chemical Engineering Department, KFUPM
2. Dr. R. Kahraman
Associate Professor, Chemical Engineering Department, KFUPM
3. Dr. Huseyin Saricimen
Research Institute, Center for Engineering Research-Materials Section, KFUPM
4. Dr. Graham R. Loblely,
Engineering Consultant, SAUDI ARAMCO.

Profiles of Instructors:

Dr. S. U. Rahman:

Dr. Rahman is an Associate Professor of chemical engineering at KFUPM. He received his PhD and MS degrees in chemical engineering from KFUPM and IIT, Bombay, India, respectively. He is specialized in corrosion and electrochemical engineering and directs the Electrochemical Research Group (ERG) at KFUPM. He has taught corrosion to chemical engineering students for several years. He has conducted funded research and published in international journals in corrosion, electrochemical mass transfer and fuel cells. He has over 35 publications and is an active member of the Electrochemical Society Inc. (USA).

Dr. R. Kahraman:

Dr. Ramazan Kahraman is an Associate Professor in the Department of Chemical Engineering at KFUPM. Since September 1993, he has taught many courses at different levels and areas of specialization including "Corrosion", "Materials Evaluation and

Selection”, and “Polymer Technology”. He was nominated for the excellence in teaching award for five years. He has published over 55 papers and is actively involved in many research projects (2 of them currently funded) in the areas of corrosion, materials characterization, and polymer composites. He received the excellence in research award in the academic year 2000/2001. Dr. Kahraman was involved in many working committees at the University, College and Departmental levels.

Dr. Huseyin Saricimen:

Dr. Huseyin Saricimen received his Ph.D. in 1972 in Hydrometallurgy from the Imperial College of London University. He joined the Research Institute of KFUPM in 1980. During 1984-1992 he was the manager of a corrosion project entitled “Corrosion Control and Monitoring at Madinat Al-Jubail Al-Sinaiyah” for the Royal Commission for Jubail and Yanbu. Under this project he conducted more than twenty corrosion and material evaluation studies related to desalination plants, waste water treatment plants, underground pipes, sewage lift stations, and reinforced concrete structures. Since April 1992 he has been managing “Corrosion Research” project for the same client. He has also been involved in several other projects in atmospheric corrosion, pozzolanic concrete, and scaling of pipes. In October 1995 he was assigned as Coordinator of Materials & Building Technology Section in the Division. In October 1996 he was assigned to be Coordinator of Concrete Research Group. He has authored or co-authored more than 75 technical papers, 70 reports, and about 70 proposals on corrosion, concrete durability, and material development.

Dr. Graham R. Lobley:

Dr. Graham Lobley is a Metallurgical Engineering Consultant with Saudi Aramco. He received BSc and PhD degrees in Metallurgy from the University of Leeds, UK. He has 30 years’ industrial experience in engineering metallurgy in the oil, aerospace and automotive industries, complemented by materials consulting with an independent laboratory. His expertise is in metallurgical and corrosion failure analysis, materials selection, project review, standards’ revision, quality assurance and training. He co-presents an internal course on Materials Selection & Failure Analysis at Saudi Aramco. He has authored 13 technical papers (journals and conference proceedings) and made eight presentations at international corrosion and materials’ conferences. His interests include environmental cracking and ageing of high temperature metallic materials.

Application

Please complete the attached application form and return it to the following address as soon as possible but before 16 March 2005.

Deanship of Educational Services,
King Fahd University of Petroleum & Minerals
P.O. Box 5077, Dhahran - 31261
Tel: +966 (03) 860 - 1250/2981
Fax: +966 (03) 860 - 4770
Email: cont-edu@kfupm.edu.sa

Travel and Accommodation:

All participants should make their own travel and accommodation arrangements. KFUPM has special arrangements with following hotels:

Dhahran International Hotel
Gulf Meridian, Al-Khobar

Course coordinator:

Dr. S. U. Rahman
Tel. No. +966-3-860-2219
Fax No. +966-3-860-4234
Email: srahman@kfupm.edu.sa

Website:

http://faculty.kfupm.edu.sa/che/srahman/shortcourse/sh_course.htm

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