Corrosion and Concrete Protection

Principles, Monitoring and Control

28 Apr - 02 May 2019, Dubai
25 - 29 Aug 2019, Dubai
Introduction

Corrosion is a common and a very expensive problem in most industries. It becomes very obvious in concrete structures where the steel reinforcement becomes exposed to the atmosphere and various other chemical species. Examples include aggressive agents such as carbon dioxide, de-icing agents and sea water, etc., that can diffuse into moist concrete where corrosion of the steel reinforcement will eventually result. Corrosion products may start to crack the concrete, leading to more exposure of the steel reinforcement. Hence, an accumulative destructive cycle of concrete and reinforcement degradation is set up, leading to the eventual failure of the structure.

This 5-day intensive GLOMACS Corrosion and Concrete Protection training course provides participants with fundamental principles of corrosion and concrete system corrosion, helping participants recognise problems attributed to corrosion, determine their causes and then select relevant inspection, maintenance and control methods. This is vital for any company hoping to avoid the high maintenance and failure costs associated with corrosion.

Objectives

By the end of this GLOMACS training course, participants will be able to:

- Understand the basic principles of corrosion and its mechanisms
- Identify different types of corrosion with specific attention to concrete systems
- Recognise various aggressive agent and environmental factors affecting concrete systems corrosion
- Understand the application of relevant corrosion protection techniques including cathodic protection and coatings
- Have a knowledge of basic metallurgical considerations and materials of construction
- Understand how to develop and implement corrosion inspection and control programs

Training Methodology

This GLOMACS Corrosion and Concrete Protection training course will utilise a variety of proven adult learning techniques to ensure maximum understanding, comprehension and retention of the information presented. The daily workshops will be highly interactive and participative. This involves regular discussion of applications as well as hands-on exposure to real life examples.

Participants will be provided with comprehensive hard and electronic training course notes and copies of all presentation material. Relevant computer simulations and videos will be utilised to help with the understanding of the various topics.

Who Should Attend?

This GLOMACS training course is suitable to a wide range of professionals but will greatly benefit:

- Maintenance and Inspection Engineers
- Construction Engineers
- Risk Assessment Personnel and Health & Safety Officers
- Facilities Engineers and Operators
- Managers and Supervisors
- Project Planners and Procurement Personnel
- Plant Contractors
Seminar Outline

DAY 1

Fundamental Principles of Corrosion
- Introduction to Principles of Corrosion
- Kinetics of the Corrosion Reaction
- Electrochemical Reactions
- Anodic and Cathodic Reactions
- Galvanic Series
- Corrosion Rates
- Materials of Construction, Types and Properties of Steel

DAY 2

Types of Corrosion relevant to Concrete Systems
- Forms of Corrosion
- Uniform Corrosion
- Bimetallic Corrosion
- Pitting Corrosion
- Concentration Cell Corrosion
- Stress Corrosion Cracking
- Erosion Corrosion
- Corrosion and Fatigue

DAY 3

Corrosion in Concrete Structures and Influencing Factors
- Defects in Concrete Structures
- Corrosion Process in Concrete Structures
- Concrete System Corrosion Timeline
- Influence of the Environment
- Macro-cell Corrosion of Steel Reinforcement
- pH Levels and Alkalinity of Concrete
- Influence of Hydroxides
- Influence of Aggressive Agents and Solutions, Carbon Dioxide, Sea Water, etc.
- Carbonation

DAY 4

Concrete Structures Corrosion Inspection and Monitoring
- Design against Corrosion
- Methods to Control or Prevention
- Cathodic Protection Systems
- Impressed-current Protection
- Sacrificial Concrete Anode Systems and Anode Mesh Systems
- Thermal Spray Anodes
- Reinforced Steel Coatings
- Repair and Rehabilitation of Concrete
- Identify Rehabilitation Alternatives
- Relevant Standards

DAY 5

Inspection and Monitoring of Concrete Structures Corrosion
- Determining Possible Causes of Failure
- Preliminary and Detailed Inspections
- Delamination Survey
- Core Extraction and Testing
- Nondestructive Testing of to Determine Concrete Cracks
- Crack Survey
- Pachometer (Cover) Survey
- Chloride Content Determination
- Moisture Content Determination
- Half-cell Potential
**REGISTRATION DETAILS**

LAST NAME: ___________________________________________
FIRST NAME: ___________________________________________
DESIGNATION: _________________________________________
COMPANY: ___________________________________________
ADDRESS: ___________________________________________
CITY: _________________________________________________
COUNTRY: ___________________________________________
TELEPHONE: __________________________________________
MOBILE: _____________________________________________
FAX: _________________________________________________
EMAIL: _______________________________________________

**AUTHORISATION DETAILS**

AUTHORISED BY: _______________________________________
DESIGNATION: _________________________________________
COMPANY: ___________________________________________
ADDRESS: ___________________________________________
CITY: _________________________________________________
COUNTRY: ___________________________________________
TELEPHONE: __________________________________________
MOBILE: _____________________________________________
FAX: _________________________________________________
EMAIL: _______________________________________________

**PAYMENT DETAILS**

☐ Please invoice my company
☐ Cheque payable to GLOMACS
☐ Please invoice me

**CERTIFICATION**

Successful participants will receive GLOMACS’ Certificate of Completion

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<thead>
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<th>Code</th>
<th>Date</th>
<th>Venue</th>
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<tr>
<td>MC002</td>
<td>28 Apr - 02 May 2019</td>
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**4 WAYS TO REGISTER**

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**TERMS AND CONDITIONS**

- **Fees** - Each fee is inclusive of Documentation, Lunch and refreshments served during the entire seminar.
- **Mode of Payment** - The delegate has the option to pay the course fee directly or request to send an invoice to his/her company/sponsor. Credit card and cheque payments are both acceptable.
- **Cancellation / Substitution** - Request for seminar cancellation must be made in writing & received three (3) weeks prior to the seminar date. A US$ 250.00 processing fee will be charged per delegate for each cancellation. Thereafter, we regret that we are unable to refund any fees due, although in such cases we would be happy to welcome a colleague who would substitute for you.
- **Hotel Accommodation** - is not included in the course fee. A reduced corporate rate and a limited number of rooms may be available for attendees wishing to stay at the hotel venue. Requests for hotel reservations should be made at least three (3) weeks prior to the commencement of the seminar. All hotel accommodation is strictly subject to availability and terms and conditions imposed by the hotel will apply.
- **Attendance Certificate** - a certificate of attendance will only be awarded to those delegates who successfully completed/attended the entire seminar including the awarding of applicable Continuing Professional Education Units/Hours.
- **Force Majeure** - any circumstances beyond the control of the Company may necessitate postponement, change of seminar venue or substitution of assigned Instructor. The Company reserves the right to exercise this clause and implement such amendments.
- **Fair Access / Equal Opportunities** - In the provision of its services as a world-class Training Provider, the Company is committed to provide fair access / equal opportunities throughout the delivery of its courses and assessment leading to the completion of training seminars, or 3rd party qualifications/certifications.

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