

Concrete Corrosion: Causes and Prevention

Registration Form

Photocopies of this form may be used for registrations.
You can also register online at www.corrosionclinic.com

Please register the following person(s) for the above course (please TYPE or PRINT clearly):

1. Dr/Mr/Ms _____
Designation _____

2. Dr/Mr/Ms _____
Designation _____

3. Dr/Mr/Ms _____
Designation _____

*delete where inappropriate

Enclosed is a cheque / bank draft No. _____
for S\$ _____ (payable to "WebCorr Corrosion
Consulting Services") being Registration Fee for the
above person(s).

Organization _____
Contact Person _____
Contact Dept _____
Telephone _____ Fax _____
Email _____

Crossed cheques should be made payable to
"WebCorr Corrosion Consulting Services" and
mailed together with the registration form to:

WebCorr Corrosion Consulting Services

Toa Payoh Central, PO Box 225,
Singapore 913108

Tel: (65) 64916456 Mobile: (65) 97110759

Fax: (65) 64916456

Email: webcorr@corrosionclinic.com

<http://www.corrosionclinic.com>

Course Details

Date: TBA
Time: 9:00 am to 5:00 pm
Venue: Spring Singapore
Course Fee: S\$795 (GST not applicable)
Closing Date: 2 weeks before course date
Discount:
Group: (3 or more people): 10%
Early-bird: N% **if paid** "N" months
before the course commencing date

Withdrawal/Refund Policy:

Withdrawal or replacement should be conveyed to the organizer in writing (email or fax). An administration charge of 50% of the course fee will be levied if the withdrawal notice is received less than 7 working days before the course commencing date. No refund will be made for withdrawal notice received 3 working days and less.

Certificates:

Certificate of attendance will be given to participants with at least 75% attendance of the course.

Cancellation:

WebCorr reserves the right to cancel the course and fully refund the participants should unforeseen circumstances necessitate it.

Concrete Corrosion: Causes and Prevention

Conducted by:

Dr. Qiu Jianhai BEng PhD CEng MIM FICorr
NACE Certified Corrosion Specialist

Date
TBA

Venue
Spring Singapore
2 Bukit Merah Central
Singapore 159835

Organized by:



Course Overview:

The corrosion of reinforcing steel in concrete structures such as buildings, car parks, concrete marine structures, road beds, bridge decks and bridge substructures is a world-wide problem and leads to cracking, staining, spalling from the surface and ultimately structural weakness. Repairs to badly deteriorated areas are costly and there is no guarantee that the problem has been solved as the conditions for continuing corrosion may have been built into the structure. This corrosion short course systematically and thoroughly covers the causes of corrosion in buildings and other concrete structures, and the practical prevention methods ranging from coatings and corrosion inhibitors to cathodic protection.

This corrosion short course can be taken as in-house training course, online course and distance learning course worldwide. It can also be customized to meet the specific needs of your organization.

Course Contents

- 1 Corrosion & Society
 - 1.1 The economic, social, political and environmental impacts
 - 1.2 Liabilities due to corrosion
- 2 Basic Concepts in Concrete Corrosion
 - 2.1 Why do metals corrode
 - 2.2 How do metals corrode
 - 2.3 Terminologies and conventions
 - 2.3.1 Corrosion, pH, potential, reference electrode, potential-pH diagram, passivation, anode, cathode, cathodic protection, galvanizing, etc
 - 2.3.2 Effect of Moisture

- 2.3.3 Effect of chloride
- 2.3.4 Effect of carbonation

- 3 Processes in Concrete Corrosion
 - 3.1 Corrosion of steel in aqueous environment
 - 3.2 The nature of concrete environment
 - 3.3 Corrosion of steel in concrete
 - 3.4 Actions from aggressive species chloride, carbon dioxide, sulphate, and soft water
 - 3.5 Potential difference
 - 3.6 Corrosion reactions
 - 3.7 Ionic flow
 - 3.8 Autocatalytic process
- 4 How to Control & Prevent Concrete Corrosion
 - 4.1 Concrete quality porosity, permeability, depth of cover, water/cement ratio, and chloride content
 - 4.2 Patching practices
 - 4.3 Membranes and sealers
 - 4.4 Corrosion inhibitors
 - 4.4 Epoxy coating
 - 4.5 Galvanizing (zinc coating)
 - 4.6 Cathodic protection
- 5 Testing and Monitoring Concrete Corrosion
 - 5.1 Half-cell potential survey
 - 5.2 pH measurement
 - 5.3 Corrosion rate measurement
 - 5.4 Corrosion sensors for concrete structures

Who Should Attend

This course has been structured in such a way that it is particularly suited for the architects, designers, technologists, engineers and QA/QC personnel who are concerned with corrosion of reinforcing steel in buildings and other concrete structures.

Course Lecturer

Dr. Qiu Jianhai *BEng PhD CEng MIM FICorr*

Dr Qiu obtained his BEng and PhD degrees both in the field of corrosion. He has 27 years of industry, university teaching, research and consulting experience in areas of corrosion and its prevention. He has been working closely with both local and overseas companies and has been an active consultant to governmental agencies, multinational companies and private organizations on corrosion and materials related issues such as corrosion design review, materials selection and life prediction, corrosion inspection and condition assessment, plant process optimization, corrosion training, corrosion testing and monitoring, trouble-shooting and corrosion failure analysis. Dr Qiu has recently completed the design of a cathodic protection system for the upcoming Marina Coastal Expressway (MCE) Tunnels. Dr. Qiu is also experienced in providing expert witness and assistance in litigation and arbitration matters related to corrosion and materials. He has authored about 120 technical papers and reports. Dr. Qiu was an invited contributing author to the latest edition of ASM Handbook Vol.13C Corrosion: Environments and Industries. His biographical profile was included in the 7th edition of Marquis Who's Who in Science and Engineering.

Dr. Qiu is a NACE certified Corrosion Specialist (the highest level of certification) and a Fellow Member of the Institute of Corrosion (UK). He is a Chartered Engineer registered with the Engineering Council (UK), a professional member of the Institute of Materials, Minerals and Mining (UK). He is the Singapore representative in the International Corrosion Council (ICC).