An Advanced Course
in Concrete Durability

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
webcorr@corrosionclinic.com
http://www.corrosionclinic.com

Course Details

Date: TBA

Time: 9:00 am to 5:00 pm

Venue: PUB WaterHub

Course Fee: S$3500 (GST not applicable)

A group discount of 10% will be given to companies registering 3 or more participants.

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 4 working days before the course commencing date. No refund will be made for withdrawal notice received 2 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.

An Advanced Course in Concrete Durability

Conducted by:
Dr. Qiu Jianhai *BEng PhD CEng MIM FICorr*
NACE Certified Corrosion Specialist

Date:
TBA

Venue:
PUB WaterHub
80 Toh Guan Road East
Singapore 608575

Organized by:

WebCorr
CORROSION CONSULTING
SERVICES

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. This advanced course thoroughly and systematically covers the concrete durability issues: the causes of reinforcement corrosion, common control and prevention methods for both old and new structures, surveying and diagnosing techniques for condition assessment, the conventional and some promising emerging technologies for repair and rehabilitation of concrete structures. Participants will gain essential knowledge and skills in managing corrosion in concrete structures. Engineers, architects and designers will grasp the theories and practices of corrosion control and prevention which would lead to corrosion-proof designs and low cost durability. Participants will also learn the principles and applications of advanced corrosion sensors and monitoring systems for life prediction, repair and rehabilitation, surveying, diagnosis and condition assessment. Facility owners will benefit from increased durability, enhanced safety and reduced maintenance costs.

Course Contents

1. Corrosion and concrete durability
   - 1.1 Impact of corrosion on society
   - 1.2 Factors influencing concrete durability
2. Terminology and conventions
3. Why & How does rebar corrode in concrete?
4. How to control and prevent concrete corrosion
   - 4.1 concrete quality, porosity, permeability, depth of cover, water/cement ratio, chloride content
   - 4.2 patching practices
   - 4.3 membranes and sealers
   - 4.4 corrosion inhibitors
   - 4.5 epoxy coating
   - 4.6 galvanizing (zinc coating)
   - 4.7 cathodic protection
5. Surveying and diagnosing
   - 5.1 Introduction: the need for survey and diagnosis
   - 5.2 Non-destructive structural surveys
   - 5.3 Depth of carbonation
   - 5.4 Chloride contents
6. Testing and Monitoring
   - 6.2 The Nature of Corrosion Process in Concrete Structures
   - 6.3 Indirect Methods for Corrosion Testing and Monitoring
   - 6.4 Direct Methods for Corrosion Testing and Monitoring
   - 6.5 Design of Corrosion Sensors in Concrete Structures
7. Repair and Rehabilitation
   - 7.1 Corrosion and concrete durability
   - 7.2 Factors influencing corrosion of reinforcement in concrete structures
   - 7.3 Conventional methods of concrete repair/rehabilitation
   - 7.4 Innovative Cathodic Protection Systems for Concrete Repair and Rehabilitation
   - 7.5 Chloride Extraction For Concrete Repair and Rehabilitation
   - 7.6 Electrochemical Realkalisation For Concrete Repair and Rehabilitation
   - 7.7 Conductive Concrete
   - 7.8 Stainless Steels and Alloys Reinforcements
   - 7.9 Ranking Of The Emerging Technologies For Corrosion Control In Concrete Structures
   - 7.10 Techniques to monitor the effectiveness of repair/rehab strategies

Who Should Attend

This course has been structured in such a way that it is particularly suited for the architects, designers, technologists, engineers, technical service and maintenance personnel who deal with design, maintenance, repair and rehabilitation of 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).