

## Modern Techniques for Corrosion Testing and Monitoring in Concrete Structures

### Registration Form

Photocopies of this form may be used for registrations.  
You can also register online at [www.corrosionclinic.com](http://www.corrosionclinic.com)

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

1. \_\_\_\_\_  
Designation \_\_\_\_\_
2. \_\_\_\_\_  
Designation \_\_\_\_\_
3. \_\_\_\_\_  
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](mailto:webcorr@corrosionclinic.com)

<http://www.corrosionclinic.com>

## Course Details

**Date:** 27-28 March 2008  
**Time:** 9:00 am to 5:00 pm  
**Venue:** TBA  
**Course Fee:** S\$1095 (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.

## Modern Techniques for Corrosion Testing and Monitoring in Concrete Structures

*Conducted by*

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

*Date*

**27-28 March 2008**

*Venue*

**TBA**

*Organized by:*



## Course Overview:

This one-day short course thoroughly and systematically covers the principles and applications of a wide range of the latest techniques for corrosion testing and monitoring in concrete structures. These modern techniques can provide rapid and sensitive measurements and detection of corrosion in concrete structures. An optional one-day practical will enable the participants to gain hands on experience in using the state-of-the-art equipment for corrosion testing and monitoring in concrete structures.

This 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. The Need for Corrosion Testing and Monitoring in Concrete Structures
  - 1.1 Assessment of the Extent of Corrosion Damage
  - 1.2 Determining the Rate of Corrosion Damage
  - 1.3 Early Warning - Monitoring the Rate of Corrosion Damage
  - 1.4 Evaluating the Effectiveness of Repair/Rehabilitation
2. The Nature of Corrosion Process in Concrete Structures
  - 2.1 Concrete Corrosion: What it is
  - 2.2 Physical Changes Due to Corrosion
  - 2.3 Chemical Changes Due to Corrosion
  - 2.4 Corrosion Rate and Current Density
3. Indirect Methods for Corrosion Testing and Monitoring

- 3.1 Depth of carbonation
- 3.2 Depth of chloride penetration
- 3.3 Electrical resistance (ER probe)
- 3.4 Concrete resistivity
- 3.5 Half-cell potential mapping (ASTM standard C876)
- 3.6 pH, Temperature
- 3.7 Moisture
4. Direct Methods for Corrosion Testing and Monitoring
  - 4.1 Linear polarisation resistance measurement
  - 4.2 Potentiodynamic polarization
  - 4.3 AC Impedance measurement
  - 4.4 Electrochemical noise measurement
5. Design of Corrosion Sensors in Concrete Structures
  - 5.1 Overview of sensor designs
  - 5.2 Interfaces with sensors
  - 5.3 Advantages and limitations
  - 5.4 Cost considerations
6. Practical Sessions (optional 1-day)  
Actual concrete cubes will be used for the following measurements:
  - 6.1 Half-cell potential mapping
  - 6.2 pH & carbonation
  - 6.3 Linear polarization resistance measurement
  - 6.4 Potentiodynamic polarization
  - 6.5 AC Impedance measurement

## 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, repair and rehabilitation of concrete structures.

## Course Lecturer

**Dr. Qiu Jianhai** *BEng PhD CEng MIM FICorr*

Dr Qiu has 25 years industrial, teaching, research and consulting experience in the field of corrosion. 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 condition assessment, process optimization, quality control, corrosion testing and monitoring, life predictions, trouble-shooting and corrosion failure analysis. 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 Vice Chairman of the Corrosion Association of Singapore, and the Singapore representative in the International Corrosion Council (ICC).