

## Corrosion Control & Prevention for Conservators & Curators

### 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. 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](mailto:webcorr@corrosionclinic.com)

<http://www.corrosionclinic.com>

## Course Details

**Date:** 4-5 December 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.

## Corrosion Control & Prevention for Conservators & Curators

*Conducted by*

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

*Date*

**4-5 December 2008**

*Venue*

**TBA**

*Organized by:*



## Course Overview:

This course systematically and thoroughly covers the basic theory of corrosion and the practice of corrosion control and prevention for conservators and curators.

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 & Cultural Heritage

- 1.1 Corrosion: What it is
- 1.2 Corrosion: its impacts on cultural heritage
- 1.3 Basic concepts related to corrosion
- 1.4 Why does a metal corrode
- 1.5 How does a metal corrode

### 2 Forms of Corrosion: recognition, mechanisms and prevention

- 2.1 uniform corrosion
- 2.2 galvanic corrosion
- 2.3 crevice corrosion
- 2.4 pitting corrosion
- 2.5 intergranular corrosion
- 2.6 stress corrosion cracking
- 2.7 hydrogen damage

### 3 The effect of environment on the rate and form of corrosion

- 3.1 relative humidity
- 3.2 air pollutants
- 3.3 temperature
- 3.4 water chemistry

### 4 Practical session

- 4.1 visual identification of common metals & alloys
- 4.2 measurement of corrosion potentials of common metals
- 4.3 construction of galvanic series
- 4.4 visual identification of corrosion processes:

- 4.4.1 the anode and cathode in a corrosion cell
- 4.4.2 stress cell due to cold working
- 4.5 principle of galvanic corrosion and cathodic protection
- 5 Common corrosion problems associated with gold, silver, copper, bronze, lead, aluminum, iron and steel artefacts
  - 5.1 when they are exposed to atmosphere
  - 5.2 buried in soil
  - 5.3 immersed in water
- 6 Effects of hot- & cold-working on the corrosion resistance of artefacts
  - 6.1 introduction to metal casting, brazing and soldering
  - 6.2 metallurgical factors and their influence on corrosion
  - 6.3 induced stress within artefacts and the impact on corrosion resistance
- 7 The nature and protective properties of corrosion products (layers) found on artefacts
  - 7.1 protective layers
  - 7.2 detrimental layers
  - 7.3 general guidelines for cleaning & removing corrosion products
- 8 Corrosion control and prevention - modification of the local environment
  - 8.1 use of corrosion inhibitors
  - 8.2 use of metallic and organic coatings
  - 8.3 cathodic protection
- 9 Corrosion testing and monitoring
  - 9.1 unit of expression for corrosion rate
  - 9.2 common methods for corrosion testing:
    - Oddy Test, Iodide-Azide Test, Beilstein Test, Phloroglucinol Hydrochloric Acid Test, Chromotropic Acid Test, Iodide-Iodate Test,
  - 9.3 electrochemical methods for corrosion testing and monitoring

## Who Should Attend

This course has been structured in such a way that it is particularly suited for conservators,

curators and anyone who is interested in conservation and preservation of historical and cultural heritage.

## 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 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 (USA) 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), and a member of ASM International (USA). He is the Vice Chairman of the Corrosion Association of Singapore, and the Singapore representative in the International Corrosion Council (ICC).