

## Hot Dip Galvanizing (3 days)

### 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:** TBA  
**Time:** 9:00 am to 5:00 pm  
**Venue:** TBA  
**Course Fee:** S\$2500 (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.

# Hot Dip Galvanizing

- Process, Properties and Applications

Conducted by:

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

Date:  
**TBA**

Venue:  
**TBA**

Organized by:



## **Course Overview:**

This short course systematically and thoroughly covers every aspect of hot dip galvanizing from the process to the properties and applications of galvanized coatings. The course also covers design, specification, painting of galvanic steel surfaces, fabrication methods including bolting and welding, inspection, coating life prediction, maintenance and repair of galvanized products. The course provides a comprehensive manual that doubles as a reference for designers, specifiers, manufacturers and end users.

## **Course Contents**

### **1 Corrosion & The Need for Galvanizing**

- 1.1 The economic, social, political and environmental impacts
- 1.2 Liabilities due to corrosion
- 1.3 History of galvanizing
- 1.4 Basic concepts in corrosion
- 1.5 Terminologies and conventions
- 1.6 Why do metals corrode
- 1.7 How do metals corrode
- 1.9 Corrosion prevention methods
- 1.10 Galvanic corrosion and properties of zinc and steel
- 1.11 Cathodic protection
- 1.12 The need for galvanizing

### **2 Process, Properties and Applications**

- 2.1 Galvanizing fundamentals
  - 2.1.1 The different galvanizing processes
  - 2.1.2 Galvanized coating characteristics
- 2.2 Principles of venting
- 2.3 Basic venting rules
- 2.4 Principles of draining
- 2.5 Basic draining rules
- 2.6 Principles of avoiding distortion
- 2.7 Galvanizing rules to avoid distortion
- 2.8 Basic rules - design for galvanizing
- 2.9 Metallurgy of the galvanizing process
- 2.10 Factors affecting galvanizing quality and service
  - 2.10.1 Steel surface condition
  - 2.10.2 Steel metallurgy
  - 2.10.3 Weld quality
- 2.11 Mechanical properties of galvanized coatings
  - 2.11.1 Strength and ductility
  - 2.11.2 Embrittlement
  - 2.11.3 Fatigue strength
- 2.12 Other metallic zinc coatings for steel

- 2.13 Continuous galvanizing processes
- 2.14 Protective life of zinc coatings
  - 2.14.1 Performance in various environments
  - 2.14.2 Compatibility of galvanized coatings with various media
  - 2.14.3 Transport and storage of galvanized products
  - 2.14.4 Surface (iron) contamination of galvanized products
  - 2.14.5 Protection of cut edges and damaged areas
  - 2.14.6 Corrosion rate of galvanized coatings
- 2.15 Reliability of coatings for steel
- 2.16 Galvanized coatings for buildings and structural steel
- 2.17 Galvanizing of fasteners and small components
- 2.20 Marking for identification

### **3 Design, Specification and Inspection of Galvanized Products**

- 3.1 Size and shape of articles to be galvanized
- 3.2 Materials suitable for galvanizing
- 3.3 Design and fabrication of components for galvanizing
- 3.4 Dimensional stability
- 3.5 Galvanized coatings on threaded parts
- 3.6 Galvanized coatings on moving parts
- 3.7 Design for maximum corrosion protection
- 3.8 Metallurgical aspect of design
- 3.9 Inspection of work before despatch to galvanizer
- 3.10 Standard specification for hot dip galvanized coatings
- 3.11 Standards for galvanized products
- 3.12 Inspection of galvanized products
  - 3.12.1 Hot dip galvanized coating defects: causes and remedies
  - 3.12.2 Steel defects and their effects on galvanized coatings
  - 3.12.3 Defects in paint coatings
- 3.13 Variations in appearance and their relationship to coating quality
- 3.14 Non-destructive testing for coating thickness
- 3.15 Reconditioning damaged galvanized surfaces

### **4 Bolting Galvanized Steel**

- 4.1 Zinc coating for fasteners
- 4.2 Influence of galvanized coatings on design
- 4.3 Slip factors
- 4.4 Structural bolts and bolting technique
- 4.5 Design for bolted structural joints
- 4.6 Applications of high strength bolts
- 4.7 Tightening procedures for high strength bolts
- 4.8 Inspection of high strength bolted joints

### **5 Welding Galvanized Steel**

- 5.1 GMA welding
- 5.2 Manual metal arc welding

- 5.3 GTA welding
- 5.4 Carbon arc welding
- 5.5 Torch welding
- 5.6 Reconditioning weld-damaged surfaces
- 5.7 Welding fumes

### **6 Painting Galvanized Steel**

- 6.1 Painting galvanized steel - duplex coatings
- 6.2 Economics of painting galvanized steel
- 6.3 Synergistic effect of duplex systems
- 6.4 Painting procedures
- 6.5 Adhesion
- 6.6 Preparation of galvanized surfaces for painting
- 6.7 Pretreatment systems
- 6.8 Specialized primers
- 6.9 Finish coats
- 6.10 Painting recommendations

### **7 Glossary of galvanizing terms**

## **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).