

REGISTRATION FORM

Name 1: _____

Course/Exam: _____

Name 2: _____

Course/Exam: _____

Name 3: _____

Course/Exam: _____

Company: _____

Company Address: _____

Contact Person : _____

Email : _____

Telephone: _____

Fax : _____

Please fill in the registration form and fax to 6566 7718, or e-mail to wonglk@setsco.com 27 February 2012.

All cheques should be made payable to "SETSCO Services Pte Ltd" together with the completed registration form to: SETSCO Services Pte Ltd, 18 Teban Garden Crescent, Singapore 608925 (Attention: Ms Wong Li Kien)

For more information, please contact

Dr Arvind at 6895 0633

e-mail: arvind@setsco.com

Or

Ms Wong at 6895 0626

e-mail: wonglk@setsco.com

ABOUT THE COURSE ORGANISER

SETSCO is one of Singapore's largest testing & inspection companies accredited by the Singapore Accreditation Council (SAC). It offers a comprehensive range of testing, calibration, inspection, consultancy & training services to a wide spectrum of industries.

SUITABLE FOR

This certification course is highly suitable for all personnel who deal with application and inspection of Metallic Coatings. This certification course is designed for persons interested in broadening their theoretical and practical knowledge about Metallic Coatings including Industrial and Marine applications. This certification course particularly is of interest to Plant Maintenance Personnel, Engineers, Coating Applicators, Coating Inspectors, Architects and Sales & Marketing personnel working in Metal Fabrication, Oil Refinery, Petrochemical, Offshore Maintenance, Shipbuilding, Ship Repair and Building Construction Industries.

This course is also useful for beginners who wish to acquire knowledge on Metallic Coatings. Most of the participants will find the training course to be a time saving means to broaden and update their knowledge of Metallic Coatings. The course is designed to provide practical solutions to overcome problems associated with Metallic Coating.

All the participants will receive a copy of the course notes which is full of useful information as well as a Certificate of Attendance issued by Setsco Services Pte Ltd.

CERTIFIED METALLIC COATING INSPECTOR



Training Course:

5th, 6th, 7th & 8th March 2012

Time: 8:30am – 5:30pm

SWS ICAS Certification Examination:

9th & 10th March 2012

Time: 8:30am – 5:30pm

Venue: Setsco Training Centre

18 Teban Gardens Crescent

Singapore 608925

Training Course Fees:

S\$ 800 + 7% GST per pax

(Fee is inclusive of tea / coffee, snacks & course material)

SWS ICAS Certification Examination Fees:

Level I SWS ICAS Examination: \$400 + 7% GST

Level II SWS ICAS Examination: \$300 + 7% GST

COURSE BACKGROUND

Metallic Coating is one of the most common methods of protecting metallic surfaces. There are several methods of applying Metallic Coatings on metal substrates. The selection and application of Metallic Coatings is most critical for their long-term durability. Therefore, trained personnel are needed to decide proper selection as well as supervise the application procedures.

Some of the important metallic coatings are:

- a. Zinc coatings: The deposition of zinc coatings is called galvanisation. Such coatings are applied by electrolytic method, hot dip method and also by thermal spraying.
- b. Aluminum coatings: They are applied by hot dipping, anodisation and thermal spraying.
- c. Ni, Cr, Sn and Cd coatings: They are mainly deposited by electrolytic methods.

COURSE CONTENT

1. Corrosion Fundamentals

Significance, cause and criteria of corrosion; methods to prevent corrosion; material selection; metallic coatings; inhibitors; cathodic and anodic protection.

2. Introduction to Metallic Coatings

Important metals used for coatings; anodic and cathodic coatings; specific applications where these coatings are used

3. Principle of various Metallic Coating Techniques

Electro-deposition; electroless-deposition; hot dip method, thermal spraying, and physical vapor deposition (PVD) and chemical vapour deposition (CVD).

4. **Surface Cleanliness & Surface Preparation**
Surface pre-cleaning methods, degreasing, acid/alkali wash, etching and solvent cleaning; blast cleaning

5. Electro-Deposition and Electroless-Deposition Coatings

Ni, Cr, Cu, Zn bath and their compositions; effects of various parameters on the coating.

6. Hot Dip Galvanisation

Principle; surface preparation, caustic cleaning, pickling, continuous process; batch process; zinc bath composition; effects of Ni, Fe and Al, effect of temperature.

7. Coating Thickness

Factors influencing coating thickness, surface condition of steel, effect of steel composition on growth of Zn coating.

8. Relevant Standards & Specifications for Coating Inspection and Testing

Coating thickness measurement; coating appearance; visual inspection.

9. Safety Requirements During Galvanising

10. Thermal Spray Coatings

Principle of thermal spraying.

11. Thermal Spray Equipments

Flame, Arc, Plasma and HVOF spraying methods.

12. Types of Substrates & Coating Materials

Steel, Aluminum, Zinc and their alloy substrates.

13. Application of Thermal Spray Coatings (TSC)

Room-temperature applications; high temperature applications; wear and friction; corrosion protection.

14. Testing of TSC Samples

Thickness; porosity, hardness; bond strength; tensile and bend test; durability tests, salt spray, humidity and atmospheric exposure.

15. Inspection Standards

SSPC-CS 23 – Procedures of TSC
SSPC –VIS 1 –Degree of cleanliness
ASTM D 4417 – Determination of anchor profile
SSPC –AB-1 – Selection of abrasives
ASTM D 4541 – Bond strength of coatings

16. Safety Aspects in Thermal Spray

Heat exposure; fumes and gas exposure
Metal dust; high pressure; high voltage, electric shocks.

SPEAKER'S PROFILE

Dr Anand S Khanna, from the Indian Institute of Technology (IIT), Mumbai, has more than 30 years of experience in corrosion and corrosion protection by coatings. He is a dedicated teacher with detailed knowledge of various metal coating techniques with immense practical knowledge. Dr Khanna is an advisor to many industries, including oil & gas, refineries, power plants, process industries etc, He is a Fellow of NACE International as well as Fellow of ASM. He has conducted more than 80 training courses on paint coatings, thermal spraying, and other topics related to metallic corrosion and its protection. He is the author of two books, Introduction to High Temperature Corrosion (ASM publication) and High Performance Coatings (Woodhead Publication, U.K).

ABOUT THE INTERNATIONAL COATING APPROVAL SCHEME (ICAS)

The ICAS, jointly developed in 2008 with Waugh Technical Services (UK), is a certification scheme of the Singapore Welding Society (SWS). The scheme is governed by the rules presented in the ICAS Requirements Document and advised by the ICAS Coatings Technical & Training Committee (CTTC) comprising internationally recognised coatings and corrosion experts. The Requirements Document and the CTTC Constitution & Terms of Reference can be viewed at the SWS web site, www.sws.org.sg

The objectives of the ICAS are:

- To qualify coating inspectors and coating operatives in the industrial and marine industries to a standard recognized and accepted by national and international oil, gas and civil engineering companies worldwide.
- To train and test by examination candidates who can (i) carry out inspection procedures competently, (ii) keep records in accordance with clients' requirements, and (iii) demonstrate a sound theoretical knowledge of the subject at the various levels of the ICAS.
- To establish a worldwide network of Authorised Training Organisations (ATO) for ICAS training courses and examinations.

The ICAS will provide the following certification programmes from time to time as they are made available:

Coating Inspector Modules

- SWS ICAS Coating Inspector Level 1
- SWS ICAS Coating Inspector Level 2
- SWS ICAS Coating Inspector Level 3

Additional Modules (for those who are at least Coating Inspector Level 1)

- SWS ICAS Pipeline Coating Inspector
- SWS ICAS Corrosion/Coating Surveyor
- SWS ICAS Critical Coating Inspector
- SWS ICAS Fireproofing Coating Inspector
- SWS ICAS Insulation Inspector

Operatives Modules (no entry restriction)

- SWS ICAS Blaster/Preparation Operative
- SWS ICAS Painter/Sprayer Operative
- SWS ICAS Coating Supervisor

With maturity over time, the ICAS will be able to offer advantages such as worldwide network of ATO at strategic locations and affordable certification fees set by the ATO of different cities or countries with different operating costs and varying levels of industrial, economic and human resource development.

Note:

An increasing number of persons are certified at different levels (See SWS website).

SWS ICAS CERTIFICATION DETAILS

Level 1 Inspector

Theory Examination:

2 hrs – Theory exam (40 Multiple Choice Questions) (2.5 marks each, 100 marks)

Practical Examination:

Practical exam based on calibration and use of equipment (100 marks)

Level 2 Inspector

Theory Examination 1:

1 hr – Theory exam (20 Multiple Choice Questions) (1 mark each, 20 marks)

Theory Examination 2:

3 hrs – Theory exam (16 Narrative Questions) (5 marks each, 80 marks)

Oral Examination:

25 verbal questions (100 marks)