CORROSION CONTROL IN EXPLORATION & PRODUCTION INDUSTRY

Improve Your Working Knowledge of Corrosion Control with Expert Specialist

9th June - 13th June 2014, Kuala Lumpur, Malaysia

Petrosync Lecturer
Yousuf Memon B.E.
Plant Inspection & Corrosion Control Consultant

- Over 35 years of experience in upstream & downstream oil & gas industry
- CEO of Reliance Swift Veritas (Pvt) Ltd.
- Director of Petrosult & Unimart
- Specializing in corrosion & integrity management systems execution and training

Major Corrosion Projects
- Prepared Policies for Corrosion Monitoring Systems & Corrosion Inhibitor Injection System for Total ABK.
- Prepared Corrosion Management System for Jeddah Oil Refinery
- Presented technical paper on Failures in Refinery Overhead of Atmospheric Distillation Column.

Masterclass Overview

In the oil & gas industry, appropriate material selection is the cornerstone of production and piping design, operation and maintenance. Engineers must select materials of construction that provide adequate strength at operating temperatures and pressures, in compliance with applicable construction codes and with regard to their resistance to corrosion and other likely degradation mechanisms, as well as to cost-effectiveness.

All materials have flaws and will degrade in service. The in-service performance of the selected materials is crucial for plant integrity, safety and cost-effective operation. Clear understanding of the degradation mechanisms affecting specific equipment and piping systems is essential so that effective inspection strategies, plans and activities can be implemented to assess their condition and suitability for continued service until the next scheduled shutdown.

The acceptability of materials is controlled by the relevant Codes. The ultimate selection of the correct material is the responsibility of the design or fabrication engineer. By listing the design’s allowable stresses, the Codes do limit the materials that can be chosen.
At the end of the course, participants are able to:

- Identify industrial corrosion problems
- Select appropriate materials to minimize corrosion problems
- Monitor and test for corrosion
- Identify and select corrosion control methods
- Analyze failures and recommend solutions
- Identify corrosion standards and specifications

The course combines sound engineering principles, methods, applicable codes standards and best industry practices. Actual major incidents as well as industry experience are reviewed.

- Participants receive a multicolor course manual.
- All lectures are in colorful Power-Point presentation.
- All lectures are interspersed with interactive discussion.
- All lectures include group discussion, case history and exercises
- Pictures of real incidents and case history are shown.
- Videos on the subject are shown.
Competencies Emphasized
Participants will enhance their competencies in the following areas:

- Engineering materials corrosion properties and prevention methods for specific applications with view to achieving optimum life cycle costs while complying with codes and regulations.

- Corrosion Control methods codes, standards and recommended practices covering anti-corrosion based design of pressure equipment and piping systems.

- Identification and assessment of active degradation mechanisms and the failures they may cause.

- Application of corrosion control and monitoring methods.

Organizational Impact

- The company will achieve improved financial performance through the proper selection of materials of construction based on total life cycle cost principles.

- The company will be able to achieve measurable improvement in mechanical integrity through improved materials performance and reduced likelihood of failures.

- The company will be able to enhance its ability to use risk-based inspection and maintenance resulting in lower life cycle costs while complying with codes and standards, and other regulatory requirement.

Personal Impact

- Participants will be more able to actively contribute towards reducing the probability of serious failures in pressure equipment and piping systems.

- Participants will enhance their competence and productivity thereby enhancing their competence and performance level and making additional value added contributions to their organizations.

WHY YOU SHOULD ATTEND PETROSYNC’S EVENTS

- To ensure that all objectives of the course matches yours, all PetroSync programs are developed after intensive and extensive research within the industry.

- PetroSync programs focus on your immediate working issues to ensure that you are able to apply and deliver immediate results in real work situations.

- Application and implementation of industry knowledge and experience are the drivers for our course design, not theoretical academic lectures.

- PetroSync training focuses on practical interactive learning tools and techniques including case studies, group discussions, scenarios, simulations, practical exercises and knowledge assessments during the course. Invest a small amount of your time to prepare before attending the course to ensure maximum learning.

- PetroSync follows a rigorous selection process to ensure that all expert trainers have first-hand, up-to-date and practical knowledge and are leaders of their respective industrial discipline.
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**Daily Course Coverage**

**DAY 1**

**Introduction to Oil & Gas Operating Equipment**
- Surface Facilities
- Subsea Components
- Wellheads
- X-mas Trees
- Casings
- Tubings
- Columns
- Downhole Completion Tools
- Separation Tanks

**Introduction to Corrosion**
- What is corrosion?
- Dry Corrosion
- Wet Corrosion

**DAY 2**

**Introduction to Metallurgy**
- Metal & Alloys
- Ferrous & Non-ferrous
- Solid Solutions
- Metallic Bonding
- Crystals & Grains

**Corrosion Fundamentals**
- Promoting Factors for Corrosion
- Electrical Concepts of Corrosion
- Corrosion Current
- Corrosion Reactions in Electrochemical Cells
- Corrosion Rate

**DAY 3**

**Oil & Gas Production Fluids**
- Crude Oil
- Natural Gas
- Seawater
- Atmospheric Environment
- Fresh Water
- H2S
- Carbon Dioxide
- Multi Phase Flow in the Pipeline

**Oil & Gas Production Material of Construction**
- Carbon Steels
- Alloy Steels

**Sulfur Recovery Units (ATU)**
- Copper Alloys
- Nickel Alloys
- Corrosion Resistant Alloys

**DAY 4**

**Common Corrosion Types**
- Uniform Corrosion
- Pitting Corrosion
- Crevice Corrosion
- Galvanic Corrosion
- Erosion Corrosion
- Selective Corrosion
- Fatigue Corrosion
- Fretting Corrosion
- Intergranular Corrosion
- Stress Corrosion Cracking
- Hydrogen Embrittlement
- Microbiological Corrosion
- High-Temperature Corrosion

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**IN-HOUSE SOLUTIONS**

**SAVE COST • IMPROVE PERFORMANCE • REDUCE RISK**

PetroSync understands that in current economic climate, getting an excellent return on your training investment is critical for all our clients. This excellent training can be conducted exclusively for your organization. The training can be tailored to meet your specific needs at your preferred location and time. We will meet you anywhere around the globe.

If you like to know more about this excellent program, please contact on +65 6415 4500 or email general@petrosync.com
Oil & Gas Production Corrosion

- Role of O2, CO2, H2S, Dissolved Salts, Microorganism, Fouling
- Significant Corrosion Oil & Gas Corrosion Factors
- Oxygen Based Corrosion
- Sweet/H2S Corrosion
- Sour/CO2 Corrosion
- Top of Line Corrosion
- Hydrogen Embrittlement
- Sulfide Stress Cracking (SSC)
- Hydrogen Induced Cracking (HIC)
- Bacterial Corrosion

Corrosion Monitoring & Detection

- Corrosion Monitoring Locations
- Corrosion Coupons (Weight Loss)
- Electrical Resistance (ER)
- Physical Metal Loss
- Electrochemical Properties
- Process Parameters and Chemical Analysis

Detection, Inspection & Testing (NDT) of Corrosion

- Ultrasonic Testing (UT)
- Liquid (Dye) Penetrant method
- Magnetic Particle Testing (MPT)
- Eddy Current Testing
- Radiography Testing (RT)
- Calipers
- Intelligent Pigging

Corrosion Prevention & Control Techniques

- Removal of Corrosive Agents
- Design Considerations
- Corrosion Allowance
- Material Selection
- Corrosion Inhibitors & Biocide Injection

International Standards for Corrosion Monitoring & Detection

- NACE
- API

Petrosync Quality

Limited Attendees
The course has limited seats to ensure maximum learning and experience for all delegates.

Certificate of Attendance
You will receive a Certificate of Attendance bearing the signatures of the Trainer upon successful completion of the course. This certificate is proof of your continuing professional development.

Interactive Training
You will be attending training designed to share both the latest knowledge and practical experience through interactive sessions. This will provide you with a deeper and more long-term understanding of your current issues.

High Quality Course Materials
Printed course manual will provide you with working materials throughout the course and will be an invaluable source of reference for you and your colleagues afterward. You can follow course progress on your laptop with soft copies provided.

Program Schedule

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00 – 09:00</td>
<td>Registration (Day 1)</td>
</tr>
<tr>
<td>09:00 – 11:00</td>
<td>Session I</td>
</tr>
<tr>
<td>11:00 – 11:15</td>
<td>Refreshment &amp; Networking Session I</td>
</tr>
<tr>
<td>11:15 – 13:00</td>
<td>Session II</td>
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<tr>
<td>13:00 – 14:00</td>
<td>Lunch</td>
</tr>
<tr>
<td>14:00 – 15:30</td>
<td>Session III</td>
</tr>
<tr>
<td>15:30 – 15:45</td>
<td>Refreshment &amp; Networking Session II</td>
</tr>
<tr>
<td>15:45 – 17:00</td>
<td>Session IV</td>
</tr>
<tr>
<td>17:00</td>
<td>End of Day</td>
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</tbody>
</table>
Yousuf Memon is the CEO of Reliance Swift Veritas (Pvt) Ltd. with over 35 years of experience in upstream & downstream oil & gas industry, specialized in corrosion & integrity management systems execution and training. Yousuf Memon has been working for national & international oil & gas exploration, petroleum refineries, petrochemical plants, chemical plants, fertilizer plants, power plants and desalination plants for several years. Different areas of Mechanical Integrity remained his areas of expertise such as; API Plant, Risk-Based Inspection, Failure Analysis, Fitness-For-Services, Non Destructive Testing (Conventional & Advanced), Corrosion Monitoring, Corrosion Inhibitor Injection, Material Selection, Protective Coatings, Material Performance Evaluation, Cathodic Protection System. He also delivers in-house, public training courses, and distant learning courses on Corrosion Control, Plant Inspection & Mechanical Integrity to local and international upstream, midstream, and downstream oil and gas industries.

**Professional Affiliations**
- National Association of Corrosion Engineers (NACE)
- The American Society of Mechanical Engineers (ASME)
- American Society of Quality (ASQ)
- American Educational Society of Surface Finishing (AESF)
- American Institute of Chemical Engineers (A.I.Ch.E.)
- Pakistan Engineering Council (PEC)

**Skill & Expertise**
- Piping
- Inspection
- Oil & Gas
- Refinery
- NDT
- Metal Fabrication
- Power Plants
- Plant Inspection
- Risk Based Inspection
- API 510
- API 570
- Desalination Plants
- Boilers
- Petroleum Refinery
- Natural Gas
- Petrochemicals
- Material Selection
- Metallurgy
- Corrosion Control
- Protective Coatings
- Damage Mechanisms
- Fertilizers
- Chemical Engineering
- Petroleum
- API 653
- API 580
- API 571
- Pressure Vessels
- QA/QC
- ASME
- EPC
- Petroleum Engineering

**Client List**
- BP
- UEP
- ADCO
- GASCO
- ZADCO
- QP
- PSO
- PAPCO
- PARCO
- Asia Petroleum
- TUV NORD
- DEWA
- DPL
- HUBCO
- FODCO
- Fauji Power
- Engro Powergen
- FFC
- OMIFCO
- Engro Fertilizer
- Engro Polymers
- DUBAL
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INVESTMENT PACKAGES

Please checklist the package that you are attending!

<table>
<thead>
<tr>
<th>Investment Package</th>
<th>Deadline</th>
<th>Course Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Price</td>
<td>6th Jun 2014</td>
<td>SGD $2,995</td>
</tr>
<tr>
<td>Early Bird Offer</td>
<td>9th May 2014</td>
<td>SGD $2,795</td>
</tr>
<tr>
<td>Group Discount (3 or more delegates)</td>
<td>6th Jun 2014</td>
<td>10% discounts for group of 3 registering from the same organization at the same time</td>
</tr>
</tbody>
</table>

Get a free gift when you register and pay for the full Standard Price 5 days masterclass before early bird deadline!

* To enjoy the promotion & discount offer, payment must be made before deadline
* For 5 or more delegates, please inquire for more attractive package.
* Prices include lunches, refreshments and materials. Promotion & discount cannot be combined with other promotional offers.
* Important: Please note that registration without payment will incur a SGD 200 administration fee.

DELEGATES DETAILS

1st Delegate Name: ________________________________ Mr. □ Mrs. □ Ms. □ Dr. □ Others □
Direct Line Number: ________________________________ Email: ________________________________
Job Title: ________________________________ Department: ________________________________
Head of Department: ________________________________

2nd Delegate Name: ________________________________ Mr. □ Mrs. □ Ms. □ Dr. □ Others □
Direct Line Number: ________________________________ Email: ________________________________
Job Title: ________________________________ Department: ________________________________
Head of Department: ________________________________

3rd Delegate Name: ________________________________ Mr. □ Mrs. □ Ms. □ Dr. □ Others □
Direct Line Number: ________________________________ Email: ________________________________
Job Title: ________________________________ Department: ________________________________
Head of Department: ________________________________

INVOICE DETAILS

Attention Invoice to: ________________________________ Fax: ________________________________
Company: ________________________________ Industry: ________________________________
Address: ________________________________ Postcode: ________________________________
Country: ________________________________ Email: ________________________________

Please note:
- Indicate if you have already registered by Phone □ Fax □ Email □ Web □
- If you have not received an acknowledgement before the training, please call us to confirm your booking.

PAYMENT METHODS

□ By Credit Card
   - Please debit my credit card: □ Visa □ MasterCard □ AMEX
   - Security Code: ________________________________
   - Expiry Date: ________________________________
   - Card Number: ________________________________

□ By Direct Transfer: Please quote invoice number(s) on remittance advice
   PetroSync LLP Bank details:
   Account Name: PetroSync LLP
   Bank Number: 7144 • Branch Code: 001 • Account No: 010-2255-105
   Name of Correspondent Bank: Standard Chartered Bank, 6 Battery Road,
   Singapore 049909
   SWIFT Code of Correspondent Bank: SCBLSGSGXXX
   All bank charges to be borne by payer. Please ensure that PetroSync LLP receives the full invoiced amount.

Confirmation

I agree to PetroSync’s terms & conditions, payment terms and cancellation policy.

Authorized Signature: ________________________________

PAYMENT TERMS: Payment is due in full at the time of registration. Full payment is mandatory for event attendance.