

API 653

Preparation Course for ABOVE GROUND STORAGE TANK INSPECTOR Certification

COURSE OBJECTIVE

The main emphasis of this program is to provide a **comprehensive understanding of the design, inspection and maintenance of aboveground storage tanks based on API 653 standards**. Above ground storage tanks are one of the critical production assets in process industry. How to adopt code rules for your plant's storage tanks and various service conditions will be illustrated with numerous case studies. Important codes will be reviewed and discussed so as to address the difficulties and ambiguities you might have encountered during working.

BENEFITS OF ATTENDING THIS COURSE

- 1** Knowledge of **API publications and other international standards** which include:
 - **API 650**, Welded Tanks for Oil Storage
 - **API 653**, Tank Inspection, Repair, Alteration and Reconstruction
 - **API RP 576**, Inspection of Pressure-relieving Devices
 - **API RP 575**, Inspection of Atmospheric and Low-Pressure Storage Tanks
 - **API RP 651**, Cathodic Protection of Aboveground petroleum Storage Tanks
 - **API RP 652**, Lining Aboveground Petroleum Storage Tanks Bottoms
 - **API RP 571**, Damage Mechanisms (related to storage tank)
 - **API RP 577**, Welding Inspection and Metallurgy
 - **ASME Sect 5**, Nondestructive Examination
 - **ASME Sect 9**, Welding Qualifications
- 2** Knowledge and expertise that are required for **maintenance, rating, inspection, repair and alteration of in-service storage tank**
- 3** Information of **API Individual Certification Program** and **API 653 Inspector certification process**.
- 4** The **trainer is a practitioner** with in-depth knowledge and experience about the industry that will benefit participants to learn about **knowledge applications in real work**.

THE COURSE IS DESIGNED FOR

Engineers, Supervisors, Managers and personnel in **Storage Tank Inspection, QA/QC, Engineering Design, Mechanical, Operation and Maintenance**. This course will also be beneficial to Inspectors / Engineers who are preparing themselves for the API 653 certification examination.



COURSE METHODOLOGY

The course will use various tools such as Group Discussion, Case Studies, Practical Exercise, Video, and Quiz to reinforce the understanding.

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COURSE CONTENT

DAY 1

- Introduction, Publications, Course Outline & Body of Knowledge
- API 575, Inspection of Atmospheric and Low- Pressure Storage Tanks
 - Introduction to types of storage tanks
 - Causes for deterioration
 - Inspection frequency and scheduling
 - Methods of inspection
 - Leak testing
 - Integrity of repairs and alterations
- API 650, Welded Tanks for Oil Storage
 - Scope and definitions
 - Design requirements

DAY 2

- API 650, Welded Tanks for Oil Storage (Cont'd)
 - Materials specifications and limitations
 - Fabrication and erection requirements
- API 653, Tank Inspection, Repair, Alteration and Reconstruction
 - Scope and definitions
 - Inspection requirements
 - Suitability of service
 - Tank repair and alteration

DAY 3

- API 653, Tank Inspection, Repair, alteration and Reconstruction (Cont'd)
 - Materials and welding requirements
 - Design considerations for reconstructed tanks
 - Dismantling and reconstruction
 - Brittle fracture and considerations
 - Examination and testing
 - Marking and recordkeeping
- API RP 651, Cathodic Protection of Aboveground Petroleum Storage Tanks
 - Scope and definitions
 - Corrosion of above ground steel storage tanks
 - Methods of cathodic protection for corrosion control
 - Criteria for cathodic protection
 - Operation and maintenance of cathodic protection system
- API RP 652, Lining of Aboveground Petroleum Storage Tank Bottoms
 - Scope and definitions
 - Corrosion mechanism

DAY 4

- API RP 652, Lining of Aboveground Petroleum Storage Tank Bottoms (Cont'd)
 - Determination of need for tank bottom lining
 - Tank bottom lining selection
 - Surface preparation
 - Quality control inspection
 - Evaluation and repair of existing linings
- API RP 571, Damage Mechanisms (related to storage tanks in general)
 - Brittle Fracture
 - Mechanical Fatigue
 - Atmospheric Corrosion
 - Corrosion Under Insulation (CUI)
 - Microbiologically Included Corrosion (MIC)
 - Soil Corrosion
 - Caustic Corrosion
 - Chloride Stress Corrosion Cracking (Cl-SCC)
 - Caustic Stress Corrosion Cracking (Caustic Embrittlement)
 - Sour Water Corrosion (Acidic)
 - Sulfuric Acid Corrosion
- ASME Section 5
 - Article 1, General Requirements
 - Article 2, Radiographic Examination
 - Article 6, Liquid Penetrant Examination
 - Article 7, Magnetic Particle Examination
 - Article 23, Section SE-797,Ultrasonic Standards
- ASME Section 9
 - Article 1, Welding General Requirements
 - Article 2, Welding Procedure Qualifications
 - Article 3, Welding Performance Qualifications
 - Article 4, Welding Data

DAY 5

- API RP 577, Welding Inspection and Metallurgy
 - Definitions
 - Welding inspection, processes, procedure, materials
 - Welder qualifications
 - Non-destructive examination
 - Metallurgy
 - Refinery and Petrochemical Plant Welding Issues
- API 653 Practice examination, Open and Closed Book

Exercises :

A number of short exercises will be used to reinforce key topics

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COURSE FACILITATOR

ABOUT THE FACILITATOR

B.L. HO is an **active consultant and professional in Singapore**. He has more than **18 years of experience** in the international oil and gas (onshore and offshore), marine, shipbuilding and repair industries providing engineering consultancy, asset integrity, materials/corrosion expertise, welding and failure investigations. He had previously held positions as Principal Consultant with DNV, and as Corrosion/Inspection Manager in Shell Seraya Singapore. He also had stationed in Vietnam where he provides and set-up asset integrity management services and systems for BP and Petrovietnam's offshore and onshore facilities.

ACADEMIC QUALIFICATION

- **Master of Science** National University of Singapore, Materials Science & Engineering, 2001
- **Bachelor of Engineering with Honours**, Nanyang Technological University, Mechanical Engineering, 1995

PROFESSIONAL EXPERIENCE

- Asset Integrity & Risk Management Services (AIMS)
- Plant Maintenance and Engineering
- Materials Selection
- Risk-based Inspection (RBI)
- Failure Analysis
- Six Sigma (Green Belt)
- Metallurgy and Chemical Analysis
- Corrosion Assessment, Protection & Material Selection
- Condition Assessment Of Structures & Components
- Welding Consultancy/Inspection/Witnessing
- Non-destructive Testing (MT,PT,UT,RT & ET)
- Fiberscopic Inspection
- Calibration & Mechanical Testing

FIELD EXPERIENCE

Oil & Gas (offshore and onshore), Chemical & Petrochemical, Refineries, Marine, Shipbuilding & Repair, Automobile and Aerospace.

PROFESSIONAL ATTAINMENT

- API 653 Aboveground Storage Tank Inspector Certification (Cert No. 31253)
- API 570 Piping Inspection Certification Program (Cert No. 24410)
- API 510 Pressure Vessel Inspection Certification Program (Cert No. 29563)
- Risk Based Inspection (RBI)
- AWS Certification of Welding Inspectors
- ASNT Level II for MT
- ASNT Level II for PT
- Quality Assurance Level III
- Pipeline Integrity Management Course (DNV)
- Modern Energy Technology (Offshore and Onshore)
- Project Management 1
- Project Management 2
- L281 Storage Tank Maintenance and Inspection
- M123 Safety in Process Design Course
- Hazards & Effects Management Process - Layer of Protection Analysis (HEMP-LOPA)
- Asset Dependability Green Belt Training
- Corrosion Control by Protective Paint
- Assessment of acceptability of flaws by Fracture Mechanics

TEACHING EXPERIENCE

- **Lecturer for API 510, API 570 and API 653** international courses for Petronas, Chevron Indonesia, Shell, BP and Sinopec.
- **RBI Trainer** for public training for Singapore plants such as Celanese, Lonza, PCS, SRC, and for NCSP (Vietnam), Dung Quat Refinery (Vietnam), PIC (Oman), KOC (Kuwait), Malaysia, Indonesia, Philippines and China .
- Lecturer for courses held between year 1999 to 2004. Courses included **Principles of Failure Analysis, Stainless Steels, Corrosion Causes & Prevention, Heat Treatment of Steels, Mechanical Testing of Metals, Principles of Metallography and Thermal Spray Technology**.