STORAGE TANK DESIGN INSPECTION & TESTING

MSE123

TRAINIT ACADEMY

COURSE TITLE

STORAGE TANK DESIGN INSPECTION & TESTING

COURSE DATE/VENUE

26th-30th May 25'

London, UK

COURSE REFERENCE

MSE123

COURSE DURATION

05 Days

DISCIPLINE

Marine & Shipping Engineering

COURSE INTRODUCTION

Storage Tanks find applications in different petrochemical plants, refineries, and petroleum facilities. This course is designed to cover different aspects of storage tanks, the design, construction, and methods of inspection to assure the integrity of the new constructed tanks. Tank will experience deterioration after been put in service due to different causes. To assure its integrity in service, tank need to be inspected, thickness measurements must be performed and fitness for service must be applied. To prevent and minimize the deterioration the tank must be protected against corrosion using cathodic protection systems. Safety of storage tanks is also of very essential requirements, especially for those containing hazardous type of material. Tanks must be protected from over pressurization using venting and relieving devices, and most important must be protected from fire.

The above topics will be covered in detail over five days. Discussion and participation from the delegates are encouraged to enrich the course outcomes.

COURSE OBJECTIVE

At the end of the training course, participants will:

- Learn about Tank Design Features and Components
- Have an Understanding of Storage Tank Construction Methods
- Know the Various Materials of Construction Associated with Storage Tank
- Grasp the Relevant Types of Storage Tank and their Associated Terminologies
- Assess Storage Tank Performance
- Appreciate the Governing Equations Associated with Tank Design
- Learn about Tank Safety Issues
- Learn about Tank Standards and Codes
- Appreciate Failure Mechanisms including Corrosion
- Learn about methods of Tank Protection, including Linings and Cathodic Protection
- Have an Understanding of Different Methods of Inspection

COURSE AUDIENCE

Engineers, Inspectors and Technicians responsible for building, operating, maintaining, and controlling storage tanks are the most benefit from this course.

COURSE CONTENT

DAY 1

Design and Construction
- Stress and pressure terms
- Tank wall thickness
- Material, plates
- Design parameters
  - Operating temperature
  - Design pressure
  - Maximum allowable stress for walls
  - Corrosion allowance
  - Lining
- Procedure for designing
  - Tank walls

- Roofs and Bottoms
- Reinforcement of openings

DAY 2

Inspection and Testing

- Inspection of Materials
- Measuring thickness of materials
- Inspection of Welds (radiographic method)
- Hydrostatic and Pneumatic tests
- Proof tests for establishing allowable working pressures
- Test gauges
- Pressure and vacuum-relieving devices
  - Pressure limits
  - Means of venting
  - Liquid relief valves
  - Pressure setting of safety devices

DAY 3

Corrosion Protection

- Corrosion Protection of above ground storage tanks
  - Corrosion mechanisms
    - Stray current corrosion
    - Galvanic corrosion
    - Internal corrosion
  - Cathodic Protection
    - Need for CP
    - New aboveground storage tanks
    - Existing aboveground storage tanks
    - Internal CP vs. External CP
    - Factors affecting CP
  - Methods of Cathodic Protection
    - Galvanic systems
    - Impressed current systems
  - Design of CP systems
    - Internal Cathodic protection system
    - External Cathodic protection system
  - Operation and maintenance of CP systems

DAY 4

Storage Tanks Fitness-for-Service

- Suitability for service
  - Tank roof evaluation
  - Tank shell evaluation
  - Tank bottom evaluation
  - Tank foundation evaluation

- Brittle fracture consideration
  - Assessment procedure
- Inspection
  - Inspection frequency
  - External inspection
  - Internal inspection
  - Determining bottom thickness
  - Non-destructive examinations
- Tank repair and Alteration
  - Removal and replacement of shell plate material
  - Lap-welded patch plates
  - Repair of defective welds
  - Repair of shell penetrations
  - Repair tank bottoms
  - Repair of fixed roofs
  - Repair of floating roofs
  - Repair of floating roof seals

DAY 5

- Safety and fire protection
  - Fire prevention
    - Vapor control
    - Control of ignition sources
    - Tank overfill protection
    - Inspection and maintenance programs
  - Fire extinguishment and control
    - Controlled burn
    - Extinguishing systems for tanks
  - Aboveground petroleum storage tanks
    - Release prevention, leak detection, and air emissions
    - Tank calibration
    - Coating and protection systems
    - Tank alarms
  - Underground storage tank
    - Vapor emissions

COURSE CERTIFICATE

TRAINIT ACADEMY will award an internationally recognized certificate(s) for each delegate on completion of training.

COURSE FEES

£5,500 per Delegate. This rate includes participant's manual, Hand-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

COURSE METHODOLOGY

The training course will be highly participatory and the course leader will present, guide and facilitate learning, using a range of methods including formal presentation, discussions, sector-specific case studies and exercises. Above all, the course leader will make extensive use of real-life case examples in which he has been personally involved. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Case studies & Practical Exercises
- 10% Role Play
- 10% Videos, Software or Simulators (as applicable) & General Discussions