Storage Tank Design, Construction & Maintenance Overview

Introduction:

This course is designed to offer the participants an insight of how tank farm storage tanks are designed, constructed, operated, inspected and maintained. This course provides a comprehensive detailed overview of the American Petroleum Institute API-650, API 620 and API 2610 specifications as well as the API 653 inspection standard.

Storage tanks are containers that hold flammable liquids, or compressed flammable gases for short, medium or long-term storage. Crude oil or crude product storage tank design and construction, as used in industries such as petroleum production, refinery tank farms, intermediate product storage including LPG, and product transfer operations, petrochemicals, as well as other industries consuming or producing flammable liquids, will be covered. The course will highlight the most recent revisions and upcoming changes in the aforementioned standards and will in addition include essential storage tank technology not covered by these standards.

Who Should Attend?

Mechanical Engineers, General Supervisors, Consulting Engineers, Design Engineers, Foremen, Supervisors, Technicians, Maintenance Personnel, Engineers of all disciplines, Supervisors, Team Leaders and Professionals in Maintenance, Engineering and Production Managers, Maintenance Personnel, Heads of Maintenance and Operation, Chemical Engineers, Equipment Specialists, Technical Engineers, Operation Engineers, Planning Engineers, Process Engineers, Reliability Specialists, Boiler Plant Construction Managers, Consulting Engineers, Design Engineers, Insurance Company Inspectors, Operation, Maintenance, Inspection and Repair Managers, Supervisors and Engineers, Plant Engineers, Senior Boiler Plant Operators, Repairers and Installers, tank farm and refinery employees or engineers who are required to select and or are involved in tank design, anyone working in crude oil and or product storage facility, professionals involved in handling, loading, or discharging of oil and gas cargoes

Course Objectives:

By the end of this course delegates will be able to:

- Assess storage tank performance
- Appreciate the governing equations associated with tank design
- Learn about tank safety issues
- Learn about tank standards and codes
- Learn about tank design features and components
- Have an understanding of storage tank construction methods
- Know the various materials of construction associated with storage tanks
- Grasp the relevant types of storage tanks and their associated terminology
- 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 Outline:

Storage Tanks Introduction

- Review of Energy Production and Consumption
- Basic properties and characteristics of petroleum and products in storage
- Storage of flammable liquids - safety & risk
- Fire Fighting & Fire Protection
- Handling oils spills and other emergencies
- Introduction and uses of Storage Tanks

Tank Design Standards and Codes

- API Standard 650 Design and construction of new storage tanks
- API Standard 620 Design and Construction of Large, Welded, Low-Pressure Storage Tanks
- API Standard 2610 Design, Construction, Operation, Maintenance and Inspection of Terminal & Tank Facilities
- Types of tanks, Bolted, Welded, etc.
- Tank Components, fittings and Equipment
- Tank Roofs, Fixed, Floating, Roof Supports etc.
- Tank Rim and Seals
- Tank Vents & Vacuum brakers
- Tank Drainage and water Separation
- Design, Sample Problem of a Heated Tank

Tank Selection and Design

- Tank Selection Criteria
- Tank capacity & Volume Calculations
- Cylindrical and spherical tanks
- Tank Piping Systems, mixers and BS&W Control
- Double Wall Storage Tank
- Foundations construction basics

Tank Construction Engineering Considerations

- Materials selection
- Welding and welding inspection

- Design Loading and Selected Tank Equations
- Tank Coatings
- Tank Manufacturing and assembly
- Tank Damage
- Corrosion protection, Cathodic protection, etc.

Inspection and Maintenance

- API Standard 653: Tank Inspection, Repair, Alteration and Reconstruction
- Nondestructive inspections
- Tank Failure Case Studies
- Tank Inventory System (TIS)
- Level Measurement Sensors, techniques and control