

# Storage Tank Design, Construction & Maintenance

## INTRODUCTION

- Storage Tank Design, Construction & Maintenance is a course designed to offer the participants an insight of how tank farm storage tanks are designed, constructed, operated, inspected and maintained.
- This Storage Tank Design, Construction & Maintenance training 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.
- This Storage Tank Design, Construction & Maintenance training 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.

## OBJECTIVES

- The aim of this comprehensive Storage Tank Design, Construction & Maintenance training course is to provide the delegates with a sound understanding of the main features of flammable fluids' storage, in above ground storage tanks, that are available in many shapes and sizes and includes: vertical and horizontal, cylindrical; open or closed with or without floating roofs. In addition, you will learn the fundamentals of tank terminal design, construction, operation, maintenance, and inspection.

At the end of this 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

## **TRAINING METHODOLOGY**

- This Storage Tank Design, Construction & Maintenance training course will be conducted along with workshop principles such as formal lectures, computer simulation, videos and interactive worked examples. Relevant case studies will be provided to illustrate the application of each tool in an operations environment. Each learning point will be re-enforced with practical exercises and ample opportunities for discussion and sharing of experiences.

## **ORGANISATIONAL IMPACT**

- Give your organisation the edge in the expanding Storage Tank industry sector and its impact on the world's energy supply chain. Specifically, the organisation will benefit from trained personnel with enhance capability in tank selection design and construction as well as maintenance and inspection.

## **PERSONAL IMPACT**

You will learn the critical aspects of Design & Fabrication of Storage Tank in Accordance with API 650 namely:

- Mastering the fundamentals of storage tank design and construction
- Gaining a greater understanding of ins and outs of API 650
- Seeing real life factually based tank design case studies
- Understanding and focusing the importance of tank maintenance and inspection

## **WHO SHOULD ATTEND?**

- This Storage Tank Design, Construction & Maintenance training course is intended for tank farm and refinery employees or engineers who are required to select and or are involved in tank design, as well as anyone working in crude oil and or product storage facility. It is also intended for, but not limited to, professionals involved in handling, loading, or discharging of oil and gas cargoes.

## **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
- Syndicate Exercise - Tank Layout and Spacing

## 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
- Course Review and Roundup