

# GULF INSTITUTE



WINNER OF THE AWARD FOR THE BEST  
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# Structural Steel Design

## INTRODUCTION

- Steel is the most used construction material in the USA for industrial buildings, high-rise towers, bridges and other structures. It competes with reinforced concrete in the world because of its many favorable characteristics including high strength, high stiffness, ductility and toughness, speed of erection, competitive cost, etc. In the Middle East region, steel is mostly use in industrial plants, offshore structures and warehouses. The speed for construction and its use for building temporary structure make it competitive than concrete.
- The design of steel structures that has been widely based on the Allowable Stress Design (ASD), AISC, BS and EC3 will be discussed. This Structural Steel Design training course will be presented to enable the trainees of design most elements of steel structure in addition to connections.
- The petroleum industry's interest to modify the structure in the on-shore facilities to carry more load or add more machines so the integrity management of change must be considered important. The composite section design and FRP will be presented in this training course. The pushover analysis will be discussed to define the probability of failure for industrial structure.

### This training course will feature:

- Case studies from different industry
- The codes and standard with technical practice in this field
- The new trend of integrity management system will be presented
- The design of most elements of steel structure
- The capability of review the engineering and pitfalls in construction

## OBJECTIVES

### By the end of this training course, participants will be able to:

- Be familiar with the "Steel Structure" design
- Understand the loads applied on the steel structure in oil, gas and petrochemical plant
- Know the modern technique on the risk-based inspection for maintenance plan
- Be familiar with the pipe rack design
- Know the design of the steel structure on machines
- Identify the use of composite section in strength and repair

## TRAINING METHODOLOGY

- This Structural Steel Design training course will utilise a variety of proven adult learning techniques to ensure maximum understanding, comprehension and retention of the information presented. The daily workshops will be highly interactive and participative. The presentation will be aided with videos and photos.

## ORGANISATIONAL IMPACT

- Improve the organization project by enhance the quality of engineering review for steel structure design
- Reduce the operational expense for maintenance by new idea for maintenance scheme
- Reduce cost and have extreme benefit of maintenance by applying Up to date technology to define RBI technique
- Improve organization investment by better design for durable structure along its lifetime

## PERSONAL IMPACT

- Enhance the steel design capability of the trainee
- Increase knowledge of up to date of execution phase
- Increase the skill for maintenance approach
- Increase the skill to enhance quality of all phases of the steel structure projects in oil and gas

## WHO SHOULD ATTEND?

This training course is suitable to a wide range of professionals who are interested in learning about steel design such as:

- Civil Engineers
- Design Structural Engineers
- Construction Engineers
- Supervision Engineer
- Planners
- Steel Fabricator

## Course Outline

### Introduction to Steel Structure

- Advantages and Disadvantages of Steel as Structural Material
- Steel Sections
- Failure of Structures
- Specification and Building Codes
- Computational of Loads for LRFG and ASD
- Methods of Obtaining an Acceptable Level of Safety

## Analysis and Design of Tension Members

- Nominal Strength of Tension Members and Net Area
- Effect of Staggered Holes
- Connecting Elements for Tension Members
- Selection of Sections
- Built-up Tension Members
- Pin-connected Members

## Analysis and Design of Compression Members

- Sections Used for Column
- Euler Formula
- Long, Short, and Intermediate Columns and Column Formulas
- AISC Design Tables
- Column Splice
- Built-up Columns
- Single Angle Compression Member
- Base Plates for Concentrically Loaded Columns

## Design of Beams and Connections

- Introduction to Beams
- Design of Beams and Deflection
- Members Subjected to Bending and Axial Tension
- Design of beam - columns, braced or unbraced
- Tension Loads on Bolted Joints
- Bolts Subjected to Shear and Tension
- Introduction to Welds and Types

## Composite Sections and Steel Buildings

- Composite Constructions
- Moment Capacity of Composite Sections and Deflections
- Design of Concrete Encased Sections
- Axial Design of Composite Columns
- Cover Plated Beams and Flexural Strength
- Composite Floors and Concrete - Pan floors
- Types of Roof Construction
- Exterior Walls and Interior Partitions
- Fireproofing of Structural Steel

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