

Structural design for concrete and steel

Training program

Introduction

Steel and reinforced concrete structures are the most used in industrial sector special in oil and gas field for onshore and offshore. Therefore, the basis of design for concrete and steel structures will be discussed in scope of codes concept. So ACI, BS, AISC, UBC, ASCE will be discussed in scope of practical wise to use the suitable to serve our business safety and operability.

Design of steel structures has widely been based on the Allowable Stress Design based on the AISC. Many designers and fabricators still use the old allowable stress techniques. The more recent LRFD code of the AISC offer more rational and economical procedures for the design of steel structures so we will be discussed the two methods.

The design steps of reinforced concrete structure elements will be discussed from ACI and BS codes.

All the case studies in workshop will be related to oil and gas business to give the attendees the ability to design and to review the design for reinforced concrete structure and associated work.

The petroleum industry is interesting in modify the structure in case of offshore structures topsides or in the on shore facilities to carry more load or add more machine so the management of change must be considered and important taking into consideration the time and cost of shutdown factor.

Objectives

- This short course is intended to overview modern and effective procedures for the design for steel structures and reinforced concrete structures for oil and gas industry.
- The course will be containing extensive workshop as a hand calculation for reinforced concrete and steel structure element which use in oil and gas industry as pipe rack and frame structures in plant process.
- This course will increase the knowledge and assist in using new tools for designing and reviewing the design for new project or modify the existing one.
- The interaction between concrete and steel will be defined.
The anchor bolts, machine skid design, construction and installation will be discussed theoretically and practically.
- For those engineers with limited practical experience the course will illustration of real design issues that may assist the designer to provide concrete and steel a structural steel that is safe, economical and constructible.
- The rule of thumb to check the concrete and steel structure design with associated check list.
- The course will be started from the basics to ensure the full participation of all attendees.

Who Should Attend?

Civil engineers who are interesting in learning about concrete and steel design may attend the course.

- Design structural engineers
- Supervision engineer
- Planners

Methodology

This interactive Training will be highly interactive, with opportunities to advance your opinions and ideas and will include;

- Lectures
- Workshop & Work Presentation
- Case Studies and Practical Exercise
- Videos and General Discussions

Certificate

BTS attendance certificate will be issued to all attendees completing minimum of 80% of the total course duration

Contents

Day (1):

- Introduction
- The fundamental of concrete technology.
- Fundamental of steel structures
- Basic concept of concrete and steel design.
- Effect of different loads on the building.
- Earthquake , wind load effect
- Ballast load for control buildings
- Loads affect pipe rack, static equipment and tanks foundations.
- Comparison Between different structure systems.
- Principal, limitations for different codes in concrete (ACI, BS codes).
- Define the appraise, select and define step in structure rojects
- Main features for LRFD in concrete ant steel.
- Codes of practice for design, evolution from allowable stress to LRFD and limit state design.
- Codes and standards Philosophy

Day (2):

- Principal of structure analysis method
- Structural analysis method
- Using staad pro or sap in structure analysis
- Finite element method
- Plasticity method
- Push over analysis
- Principal of concrete design and precaution
- Different slab types
- Design of slab, beam and columns
- Basis of design steel tanks ring beam
- Pipeline support design
- Design of foundation under machines
- Precaution in foundation design
- Checklist to review the design
- Selection of suitable structural systems for multistory building

Day (3):

- Selection of steel structural systems
- Rigidly connected frames
- Plane trusses
- Space trusses
- Design of tension members
- Design of compression members.
- Design of Beams

Day 4:

- Design of Beam-Columns
- Case study for design crane track girder
- Bolted connections design
- Welded connections design
- Fabrication and erection of steel connection

Day (5):

- Base plate design
- Anchor bolt design
- New methods for connecting steel to Concrete.