



Arabian Institute For Training

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# Concrete Structure Designing for Industrial Projects

## INTRODUCTION

- This Concrete Structure Designing for Industrial Projects training course will fill the gap between the academic knowledge and the professionalism for industrial project design in general, and specifically for Oil & Gas and power generation projects. Reinforced concrete structures are widely used in the industrial sector, especially in the onshore Oil & Gas fields. In industrial projects, the structure design applications are different than normal housing projects taught in educational/engineering institutions.
- The basis of design for concrete structure for strength, serviceability, and robustness is considered in the training course. ACI, BS, UBC, and ASCE codes will also be covered to enable the participants to choose a suitable design method to serve business safety and operability. The probability of failure, specifically in ACI and BS, will be discussed, and the key steps in design and review design will be illustrated. Moreover, the attention will be paid for the practical solution of field problems and challenges considering the secondary loads such as wind loads and seismic forces as well.

### This training course will highlight:

- Review of different codes and standards
- The importance of construction and maintenance
- The dynamic analysis and design for concrete in the industrial plant
- Industry practice in the structure design
- Integration between different disciplines in designing
- Effect of sustainable design to enhance project investment life cycle

## OBJECTIVES

### This training course is intended to provide the participants with the following:

- An overview of modern and effective procedures for the design of reinforced concrete structures in the Oil & Gas industry
  - Knowledge on calculation for reinforced concrete elements used in the Oil & Gas industry
  - Increase the knowledge and assist in using new tools for designing and reviewing the design for a new project or modify the existing one
  - Knowledge on the design of foundation under all types of vibrating equipment, and the blast design of buildings
  - An illustration of real design issues that may assist the designer in providing the concrete structure that is safe, economical, and constructible
  - The rule of thumb to check the concrete design with an associated checklist
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## **ORGANISATIONAL IMPACT**

The impact on the organisation upon attending this training course includes the following benefits:

- Reduce the engineering cost as the employees will be capable of doing engineering in-house
- Reduce cost for repair and maintenance by enhancing the repair methodology
- Improve the organization performance by knowing the up to date design and construction technique its technical practice
- Improve the project cost and time by better controlling the design stage
- Improve the abilities of the organization team to be able to design different elements of Reinforced concrete
- Minimizing the waste of maintenance time and money by improving the ability of the organizations' team to solve the emergence problems by practical solutions

## **PERSONAL IMPACT**

The participants will gain or enhance their understanding and knowledge by the following:

- Improve the geotechnical background, especially with problematic soils
- Increase knowledge of up to date of the execution phase
- Increase the skill for maintenance approach
- Increase the skill to enhance the quality of all phases of the oil and gas projects
- Develop the concepts of designing the foundations considering the suitable foundation's type
- Highlight the first principals of the design which enable to solve the problems by practical solutions

## **WHO SHOULD ATTEND?**

- This Concrete Structure Designing for Industrial Projects training course is intended to provide professionals and engineers to be familiar with the American Concrete Institute Standard (ACI) and British standard (BS) for concrete structure designing.
- It will also be beneficial for junior or senior level civil and structural engineers who need to have in-depth knowledge about the structural engineering activities and how to co-operate in the design phase.

This training course is a suitably wide range of professionals but will significantly benefit:

- Civil engineer
  - Structural Engineer
  - Architectural Engineer
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## Course Outline

### Introduction to Reinforced Concrete

- The Fundamentals of Concrete Technology
- Comparison between ACI and BS for Concrete Design
- Principal, Limitations for different codes in concrete (ACI, BS codes, European Code)
- Codes and Standards Philosophy
- Define the different loads on the building
- Earthquake and Wind Load Effect
- Define Loads of Static and Dynamic Equipment
- Define the loads on the foundation of tanks

### First Principles of structural Reinforced Concrete

- The basic concept of concrete design
- The principal of concrete design and precaution
- Different structure systems
- Different slab types
- Design of slab, beam, and columns
- Loads applied in a horizontal vessel (Separators)
- The effect of thermal loads in heaters
- Design of Heater Foundations
- Design of Foundation Under Tower

### Geotechnical Problems & Design of Foundations

- Soil Investigation
- Shallow Foundation Design Philosophy
- Pile Foundation Design Philosophy
- Anchor Bolt Design
- Foundation under Machines Design
- Checklist to review foundation under rotating equipment
- Precaution in design foundation under vibrating machines

### Design of Special Reinforced Concrete Constructions I

- Design blast resistance building such as control room
  - Control room layout and configuration
  - Pipe Rack Configuration
  - Define loads which affect pipe rack
  - Pipe Rack Design
  - Retaining Walls Design Principals and Checks
  - Load and Forced in Retaining Walls
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## Design of Special Reinforced Concrete Constructions II

- Design for reinforced concrete liquid tanks
- Structure system for concrete tanks
- Circular and rectangular tank
- Ring beam design for the circular tank
- Maintenance and repair in concrete structure
- Integrity and maintenance management system principal



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