



SC019: Concrete Structural Design, Maintenance & Reliability Analysis for Industrial Projects & Process Facilities

Training Description:

Reinforced concrete structures are widely used in 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. This 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.

The basis of design for concrete structure for strength, serviceability and robustness is considered in the course. ACI, BS, UBC and ASCE codes will also be covered to enable the participants choose 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.

This training course will feature:

- 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

Training Objectives:

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

- ✓ Gain information about the modern and effective procedures for the design of reinforced concrete structures in the Oil & Gas industry
- ✓ Have 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 new project or modify the existing one
- ✓ Increase the knowledge on the design of foundation under all types of vibrating equipment, and the blast design of buildings
- ✓ Illustrate the real design issues that may assist the designer to provide concrete structure that is safe, economical and constructible
- ✓ Familiarize with the rule of thumb to check the concrete design with associated check list

Training Designed for:

This course is intended to provide professionals and Engineers to be familiar with American Concrete Institute Standard (ACI) and British standard (BS) for concrete structure designing.

The training course will also be beneficial for junior or senior level civil and structure engineers who need to have in-depth knowledge about the structural engineering activities and how to co-operate in the design phase.

Training Requirement:

“Hand’s on practical sessions, equipment and software will be applied during the course if required and as per the client’s request.”

Contents can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Program:

DAY ONE:

- ❖ PRE-TEST
- ❖ Introduction
- ❖ **Competency Description:** As a structural engineer, you need to know the differences between codes and project life cycle.
- ❖ **Key behaviours:**
 - Understand the codes design approach
 - Understand the behaviour of different loads on the structure
 - Understand the main concept of concrete structure design
- ❖ **Topics to be covered:**
 - The fundamentals of concrete technology
 - Basic concept of concrete design
 - Main features for ACI and BS for concrete design
 - Effects of different loads on the building
 - Earthquake, wind load effect
 - Loads affect pipe rack, static equipment and tanks foundations
 - Principal, limitations for different codes in concrete (ACI, BS codes, European Code)
 - Codes and standards Philosophy

DAY TWO:

- ❖ **Competency Description:** As a structural engineer, you need to know the differences between various equipment in the plant, and the associated loads.
- ❖ **Key behaviours:**
 - Design foundation under horizontal vessel
 - Design ring beam tank foundation
 - Understand the pipeline supports design
 - Design foundation under the heater
- ❖ **Topics to be covered:**
 - Principal of concrete design and precaution
 - Different structure systems
 - Different slab types
 - The way to use the suitable structure system
 - Design of slab, beam and columns
 - Loads applied in horizontal vessel (Separators)
 - Design of vessel foundation
 - Loads applied in heaters
 - Design of heater foundations
 - Ring beam design for circular tank
 - Design of foundation under tower
 - Pipeline support design

- Checklist to review the design

DAY THREE:

- ❖ **Competency Description:** As a structural engineer, you need to know the methods of soil investigation and design of pile foundation.
- ❖ **Key behaviours:**
 - Understand the methods of soil investigation
 - Understand the dynamic load characteristic
 - Understand the main design of control room
 - Understand the characteristic of blast design building
- ❖ **Topics to be covered:**
 - 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 blast resistance building such as control room
 - Control room layout and configuration

DAY FOUR:

- ❖ **Competency Description:** As a structural engineer in oil & gas plant you need to know the design of pipe-rack.
- ❖ **Key behaviours:**
 - Understand the data required from different discipline
 - Understand the retaining wall design
 - Understand the main pipe rack configuration and design
- ❖ **Topics to be covered:**
 - Pipe rack configuration
 - Pipe rack design
 - Retaining walls design principals
 - Load and forced in retaining walls
 - Retaining walls design checks

DAY FIVE:

- ❖ **Competency Description:** As a structural engineer, you need to know the methods of concrete tank design and maintenance approach.
- ❖ **Key behaviours:**
 - Understand the sustainable design approach
 - Understand the integrity management system
 - Understand the relation between maintenance and reliable design
- ❖ **Topics to be covered:**
 - Design for reinforced concrete liquid tanks
 - Structure system for concrete tanks
 - Circular and rectangular tank

- Maintenance and repair in concrete structure
- Integrity and maintenance management system principal
- ❖ **Course Conclusion**
- ❖ **POST-TEST and EVALUATION**

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Gamification, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

CMCT Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

TBA as per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:00	Recess (Prayer Break & Lunch)
13:00 - 14:00	Last Session

For training registrations or in-house enquiries, please contact:

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