



SC022: Structural Analysis and Design for Concrete Buildings

Training Description:

Concrete is everywhere! In pavements, building structures, foundations, motorways/roads, overpasses, parking structures, brick/block walls and bases for gates, fences poles and many more. Concrete is used more than any other man-made material on the planet. It has been said that instead of naming our era "The Nuclear Age" it Should be named "The Concrete Age" as almost all of our modern lifestyle and constructions Depend on this material.

This five-day course covers the manufacturing, designing and maintaining of concrete. It includes the details about ingredients and its quality, quantity and effect on the final product of concrete. Concrete designing, its Specifications, standards and codes and the concrete mix design is discussed in detail along with various procedures and precautions on field manufacturing of concrete. The defects, investigations and the remedial measures and repairs are covered in detail and the modern concepts like ready mix concrete, precast and prestressed concrete and their applications are also reviewed.

The basics from ingredients of concrete to repair and maintenance is covered throughout the course and would be very useful to every technician who works with concrete. The methods of design are discussed here which can help the engineers, architects and designers to design the most effective final product of concrete.

Training Objectives:

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

- ✓ Understand what concrete is and why it is used everywhere for construction
- ✓ Learn the ingredients of concrete and their importance in quality control of concrete
- ✓ Learn the chemistry of concrete
- ✓ Do simple concrete mix designs
- ✓ Learn everything about concrete manufacturing
- ✓ Know about testing, inspection and quality control of concrete
- ✓ Understand the defects which can occur in concrete at different stages or shortcoming and their remedies
- ✓ Learn the modern concepts like ready mix concrete, precast and prestressed concrete
- ✓ Learn the methods of protection and maintenance of concrete
- ✓ Know the safety precautions to be taken while working with concrete
- ✓ Understand the concrete prepared for special purposes and the admixtures which can affect the properties of concrete

Training Designed for:

This course is intended for those who are currently working as Maintenance Engineers and Supervisors, Operators and Senior Operators, Plant Engineers, power generation and other utilities, performance management specialists, continuous improvement specialists, equipment professionals and Supervisors.

Further this course is also suitable for engineers involved in plant operating reliability and availability management, for personnel from process industries such as refining, petrochemical, as well as very beneficial to those involved in the procurement of new and replacement equipment, and production for upstream sectors in oil and gas offshore and onshore.

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
- ❖ Understanding Concrete
 - The history of concrete
 - Main constituents of concrete and their characteristics
 - Cements
 - Aggregates and mineral additions
 - Water
 - Chemistry of concrete
 - Cement chemical properties
 - Hydration of cement
 - Characteristics of concrete
 - Strength
 - Durability
 - Workability
 - Permeability
 - What makes concrete develop strength?
 - What makes concrete durable?
 - Deterioration common reasons
 - Related to ingredients chlorides, sulphates and aggregate-alkali reaction
 - Related to climate – temperature (hot/cold) and humidity
 - Related to manufacturing and workmanship mixing, transportation, compaction, cold joints and large mass
- ❖ Design of Concrete with Requisite Strength
 - Standard specifications, codes and guidelines
 - Concrete mix design the fundamentals
 - Target strength
 - Cement content
 - Aggregate sizing
 - Water cement ratio
 - Mix design procedures
 - Specification development
 - Mandatory requirements

- Durability parameters
- Investigating defects

DAY TWO:

❖ Concrete Manufacturing

- Raw material storage and handling
- Concrete mixing and production
- Transportation of concrete
- Dealing with temperature
- Formwork and its influence on durability
- Placement of fresh concrete
- Treatment to joints
- Consolidation and compaction procedures
- Curing and care of green concrete

❖ Testing, Inspection and Quality Assurance

- Laboratory and full-scale trial mixes
- Quality assurance
- Processes
- Acceptance criteria
- Sampling and testing of ingredients
- Sampling of concrete
- Tests on hardened concrete
- Analysis of concrete
- Non-destructive testing methods for concrete

DAY THREE:

❖ Ready Mixed Concrete

- Advantages
- Types of RMC
- Specifications and tolerances
- Quality assurance
- Production and transportation

❖ Concrete Admixtures

- Benefits of admixtures
- Types of admixtures
- Water reducing admixtures
- Plasticisers
- Accelerator
- Retarder
- Air entraining agents
- Property enhancing admixtures
- Water proofing agents

DAY FOUR:

❖ Concrete – Shortcomings

- Cracking
- Cracking and shrinkage
- Creep

❖ Protection of Concrete Abrasion, Corrosion and Chemical Attack

- Designing a protection strategy
- Surface preparation
- Improving abrasion and wear resistance
- Design and construction techniques
- Hardeners
- Coatings and toppings
- Protection against corrosive environments
- Sealers and coatings
- Toppings and linings
- Cathodic protection and metallizing
- Preventive maintenance and monitoring

DAY FIVE:

❖ Concrete Repair

- Inspection and investigation
- Procedures of repair or replacement
- Pressure grouting
- Shot Crete
- Encasing
- Demolition of old concrete
- Repair of delaminated structure

❖ Special Purpose Concrete

- High strength concrete
- Fiber reinforced concrete
- Cellular concrete
- Polymer concrete

❖ 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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