# Advanced Materials & Technology in Concrete Industry Training program

## Introduction:

Concrete is used throughout the world for a wide range of applications. In order to improve the properties of concrete, recent advances in material science introduce new materials or admixtures to be added to or replace conventional concrete materials. Such materials could be used in new concrete construction and/or in repairing new or existing structures.

These materials could cause more harm than benefit or at least be ineffective if not properly used. This five-day Advanced Materials & Technology in Concrete Industry course will introduce newly developed concrete materials as well as the repair materials utilized in most repair works in concrete structures either for those needed during construction or for rehabilitation of existing structures. The course will also cover test methods and technical specifications for such materials as well as troubleshooting for their most common problems. At the end of this course, participants will know the necessary information about the different advanced concrete materials, what tests should be performed and how to interpret their results, what to look for in specifications and define the advantage and disadvantages for each new material.

## This course will feature:

- Advanced construction method to have a sustainable structure
- Advanced materials and technique for concrete repair
- CFRP in concrete structure repair and strengthening
- Advanced technique in codes and standard
- Advanced materials in concrete construction
- New materials to increase concrete durability
- Corrosion protection up to date ways

## Who Should Attend?

Construction Engineers, Senior Construction Engineers, Construction Supervisors, Construction General Supervisors, Construction Project Managers, Engineering Technologists, Supervision Engineer, Inspection Engineers, Civil Inspectors, Foremen, Design Structural Engineers, Planners, Structural Engineers, Material Specialists, Quality Control and Quality Assurance Experts, Architects, Supervision Engineers, Team Leaders, Site Officers and Managers, Mechanical Engineers, Technical Professionals, Field Production Supervisor,Operation Engineers, Clients Representatives, Project Engineers, Project Managers, Engineering Managers and Construction Managers

## Course Objectives:

**By the end of this course, delegates will be able to:**

- Be familiar with advanced method s of construction
- Be familiar with HPC, HSC and SCC
- Be familiar new project management approach for brown field project
- Know new design methods and differentiates between codes and standard
- Familiar with new materials in concrete industry
- Be familiar with all up to date materials and method of repair

## Course Outline:

### Introduction to Advanced Materials

- Conventional Concrete Materials Limitations and Problems
- Concrete quality control
- Concrete design mix
- High Strength Concrete and High Performance Concrete
- Special Constituent materials and Admixtures
- Construction Practices for Concrete in the Gulf area
- Specifics of Gulf Environment
- Definition of hot weather for concreting processes
- Precautions for different concreting operations in the hot weather of Gulf region
- Standard Test Methods for Non-Conventional Concretes and Reinforcement
- Total Quality management system

### HSC and UHPC Characteristic

- High Strength Concrete
- Importance and Economy
- Durability Improvement
- Structural Improvement
- High Strength Concrete: Materials
- Slag (GGBS), Fly Ash, and Silica fume
- High Strength Concrete: Production
- Batching and Mixing High Strength Concrete
- Placing and Compacting High Strength Concrete
- Corrosion phenomena in steel bars
- Chloride cause corrosion
- Carbonation process

### Corrosion and Advanced Technique and Materials for Protection

- Standard test methods for properties of FRP rods
- Technical Specifications for Concrete and Reinforcement
- Sample concrete and reinforcement specifications

- Protecting steel reinforcement from corrosion by advanced materials
- Non-Traditional Types of Reinforcement Used in Concrete Structures
- Galvanized and epoxy coated bars
- Fiber Reinforced Plastic (FRP) reinforcement for concrete
- Anodic inhibitor
- Cathodic protection system
- Standard test methods for fresh and Hardened Special concretes
- Standard specifications for epoxy coated bars

### Advanced Materials and Technique for Concrete Repair

- Rubber concrete
- Light weight concrete
- Concrete with fiber
- Evaluating the existing structure
- Define repair procedure
- Convention repair methods to slab and beam
- Foundation repair by new materials
- Using steel section to repair Latex Modified Concrete
- Standard Specifications and Guides
- Latex Modified Concrete: Production
- Mix Proportioning
- Mixing and Placing
- Finishing and Curing
- Latex Modified Concrete: Properties and Applications
- Applications and Recent Development

### Using CFRP for Repair

- Repair technique by using CFRP
- Design of the CFRP philosophy
- Selecting the reasonable materials.
- Execution of the CFRP
- Advanced programs for inspection and repair