Advanced Materials for Construction & Repair of Concrete

Presented by: Dr. Mohamed El-Reedy

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 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 troubleshooting of material related problems.

OBJECTIVES

The objectives of this course are as follows:

- Provide participants with required information about the newly developed reinforced concrete materials.
- Help them understand the different test methods for various materials and interpret their test results.
- Assist participants to effectively consult the technical specifications of these materials.
- Provide them with troubleshooting methods for material-related problem

DAILY OUTLINE

DAY ONE

Introduction and Overview

- Conventional Concrete Materials Limitations and Problems
- High Strength Concrete and High Performance Concrete
- Special Constituent materials and Admixtures

Construction Practices for Concrete in the Gulf

- Specifics of Gulf Environment
- Definition of hot weather for concreting processes
- Precautions for different concreting operations in the hot weather of Gulf region

Non-Traditional Types of Reinforcement Used in Concrete Structures

- Galvanized and epoxy coated bars
- Prestressing steel
- Fiber Reinforced Plastic (FRP) reinforcement for concrete

DAY TWO

High Strength Concrete: General

- Importance and Economy
- Durability Improvement
- Structural Improvement
- Concerns

High Strength Concrete: Materials

- Slag (GGBS)
- Fly Ash
- Silica

High Strength Concrete: Production

- Batching and Mixing High Strength Concrete
- Placing and Compacting High Strength Concrete
- Finishing and Curing High Strength Concrete

DAY THREE

High Performance Concrete

- Definition
- Importance and Economy
- Performance Improvement
- Concerns

Standard Test Methods for Non-Conventional Concretes and Reinforcement

- Standard test methods for fresh and Hardened Special concretes
- Standard specifications for epoxy coated bars
- Standard specifications for steel wires and strands for pre-stressed concrete
- Standard test methods for properties of FRP rods

Technical Specifications for Concrete and Reinforcement

- Specification definition and specified qualifications
- Specification types, features and format
- Sample concrete and reinforcement specifications

DAY FOUR

Latex Modified Concrete: Introduction & Materials

- Background
- Standard Specifications and Guides
- Materials

Latex Modified Concrete: Production

- Mix Proportioning
- Mixing and Placing
- Finishing and Curing

Latex Modified Concrete: Properties and Applications

- Properties of Fresh LMC
- Properties of Hardened LMC
- Durability of LMC
- Applications and Recent Development

DAY FIVE

Repair Materials for Concrete Structures

- Required properties in repair materials
- Types of repair materials
- Repair methods and techniques
- Sample technical specifications for repair works

Advanced Concrete Materials: Problems and Solutions

- Dosage and Over Dosage
- Workability

- Setting and Finishing
- Long Term Performance
- FRP versus steel reinforcement

PRESENTER

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Dr. El-Reedy obtained his Ph.D. degree in Structural Engineering from Cairo University in Egypt and had attended various international training courses in the U.S.A.

He published papers for different conferences and his main area of researches is reliability of steel and concrete structure. He also published Arabic language books in AutoCAD, management quality, economic management and many others.

He is consultant for different oil and gas industries in Egypt with international companies such as Ieoc and BpMOCO. Moreover, he provides different steel structure design package for warehouses and telecommunication towers. Reliability, Inspection and maintenance strategy for offshore steel structure platforms is performed for many platforms in Gulf of Suez.