



المركز العالمي للتدريب والتطوير  
International Centre For Training & Development



# CC025

## Advanced Materials for Construction and Repair of Concrete



**ACTVET**  
Abu Dhabi Centre for  
Technical and Vocational  
Education and Training  
مركز أبوظبي  
للتعليم والتدريب  
التقني والمهني

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## Course Introduction:

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This 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. Concrete repair is a complex process, presenting unique challenges very different from those experienced in the field of new concrete construction. The course will also cover test methods and technical specifications for such materials as well as troubleshooting for their most common problems. The participants of this course 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.

## Course Objectives:

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**Upon successful completion of this course, the delegates will be able to:**

- Identify and gain knowledge on advanced materials for construction and concrete repair as well as the conventional concrete materials limitations and problems
- Differentiate between high strength concrete and high performance concrete
- Recognize the special constituent materials and admixtures
- Perform construction practices for concrete and identify the non-traditional types of reinforcement in concrete structures such as galvanized and epoxy coated bars, pre-stressing steel and FRP
- Classify the different types of high strength concrete that includes general, materials and production
- Discuss high performance concrete and apply the standard test methods for non-conventional concretes and reinforcement
- Enumerate the technical specifications for concrete and reinforcement and identify the materials, production, properties and applications of latex modified concrete
- Carryout the repair of materials for concrete structures
- Examine the problem and execute the proper solution on advanced concrete materials

# Who Should Attend?

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This course is intended for design engineers, architects, supervision engineers and inspectors from public agencies and private sector, contractors, project engineers and other construction staff.

## Course Outline:

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### Day 1:

#### **Introduction to Offshore Field Development Activities**

- Background and Trends in Offshore Production
- Review of Developments using Fixed Platforms and Floating Production Systems
- Steps in the Field Development Process and the Range of Vessels which support those activities

#### **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

### Day 2:

#### **Non-Traditional Types of Reinforcement Used in Concrete Structures**

- Galvanized and Epoxy Coated Bars
- Pre-stressing Steel
- Fiber Reinforced Plastic (FRP) Reinforcement for Concrete

#### **High Strength Concrete: General**

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

## **High Strength Concrete: Materials**

- Slag (GGBS)
- Fly Ash
- Silica

### **Day 3:**

## **High Strength Concrete: Production**

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

## **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

### **Day 4:**

## **Technical Specifications for Concrete and Reinforcement**

- Specification Definition and Specified Qualifications
- Specification Types, Features and Format
- Sample Concrete and Reinforcement Specifications

## **Latex Modified Concrete: Introduction & Materials**

- Background
- Standard Specifications and Guides
- Materials

## **Latex Modified Concrete: Production**

- Mix Proportioning
- Mixing and Placing
- Finishing and Curing

## **Day 5:**

### **Latex Modified Concrete: Properties and Applications**

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

### **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

## **Course Methodology:**

**A variety of methodologies will be used during the course that includes:**

- (30%) Based on Case Studies
- (30%) Techniques
- (30%) Role Play
- (10%) Concepts
- Pre-test and Post-test
- Variety of Learning Methods
- Lectures
- Case Studies and Self Questionnaires
- Group Work
- Discussion
- Presentation

## Course Certificate:

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**International Center for Training & Development (ICTD)** will award an internationally recognized certificate(s) for each delegate on completion of training.

## Course Fees:

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**To be advised as per course location.** This rate includes participant's manual, Hand-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

## Course Timings:

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### Daily Course Timings:

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|---------------|----------------------------|
| 08:00 - 08:20 | Morning Coffee / Tea       |
| 08:20 - 10:00 | First Session              |
| 10:00 - 10:20 | Coffee / Tea / Snacks      |
| 10:20 - 12:20 | Second Session             |
| 12:20 - 13:30 | Lunch Break & Prayer Break |
| 13:30 - 15:00 | Last Session               |