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Course Name

# Damage Assessment and Rehabilitation Of Concrete Structures

**Sector Name**
Civil Engineering

**Document Type**
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# Damage Assessment and Rehabilitation Of Concrete Structures

## Course Introduction

As cities grow older, they inherit a wealth of buildings that have economic, functional, and heritage values, and yet their uses may need to change. Human knowledge is enhanced, and thus their vulnerability to extreme events is better understood, and sometimes changes may need to be made in their structure to adapt to new uses. In all of these cases, structural engineers are called upon to make an assessment of the current condition of the structure and to advise on what type of intervention is needed to ensure safety, functionality, and economy of such alterations.

The purpose of the course is to provide participants with a fundamental and practical understanding of the condition assessment of concrete structures and concrete repair and strengthening methods

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## Target Audience

✓ Civil engineers.
✓ Experienced Civil Engineers Seeking Professional Development
✓ Architects and Urban Planners
✓ Entrepreneurs in the Construction Industry
✓ Project Managers in the Construction Industry

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## Damage Assessment and Rehabilitation Of Concrete Structures

# Learning Objectives

- ✓ Have an overview of the types of motivations for evaluation of existing concrete structures, and outline the processes to be followed to make such evaluations. Such motivations range from the need to change use or re-plan to the situation where signs of distress in those buildings are detected
- ✓ Learn that evaluations of existing structures start with understanding the new criteria which the structure is to be measured against and is then followed by testing of the existing properties, which in turn is followed by analysis to determine whether the set criteria are met.
- ✓ Gain solutions using traditional materials, such as steel and concrete, are discussed.
- ✓ Testing and inspection techniques of engineering materials
- ✓ The workmanship in building construction
- ✓ The critical characteristics of a given structure
- ✓ The types and causes of common deficiencies (even failures) of structures
- ✓ How to explain methods of observation, instrumentation, and testing
- ✓ The workout preventive measures to counteract the deterioration of structures
- ✓ How to comprehend workable temporary and permanent repairs for any particular structure

✓ Non – destructive evaluation (NDE) for the steel and welding

✓ The capability to inspect the finishing work activity

✓ Testing and inspection for road construction

✓ The ways and skills for the inspector

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## Course Outline

### ✓ DAY 01

**Structural evaluation of buildings for:**

- ✓ For the purposes of a change in use
- ✓ For the addition of floors or other structural changes
- ✓ Due to apparent signs of distress
- ✓ Cracks in the building.
- ✓ Types of cracks, early thermal shrinkage, drying shrinkage, and thermal cracks
- ✓ Inspection and diagnosis
- ✓ Repair of cracks, material, and system • Monitoring of cracks

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## Course Outline

### ✓ Day 02

**Seismic rehabilitation of existing buildings**

- ✓ Seismic vulnerability of buildings
- ✓ Seismic strengthening of existing buildings
- ✓ Cost, functional, and aesthetic considerations
- ✓ Retrofitting of the structural system by enhancing strength and continuity
- ✓ Decreasing demand for an existing system
- ✓ Rehabilitation of nonstructural elements

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## Course Outline

### ✓ Day 03

**Retrofitting using steel and concrete**

- ✓ Use of plates with bolts and/or epoxy fixing
- ✓ Jacketing of columns
- ✓ Use of new
- ✓ technologies such as carbon fibers and resin
- ✓ Application to enhance flexure and shear
- ✓ Use as column confinement
- ✓ ACI requirements for the evaluation of existing structures
- ✓ Analysis of buildings using available information
- ✓ Report writing

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## Course Outline

### ✓ Day 04

**Foundation movement inspection and interpretation**

- ✓ Options for intervention: direct and indirect
- ✓ Underpinning of building structures
- ✓ Chemical attacks
- ✓ Chloride attack
- ✓ Sulfate attack
- ✓ Carbonation
- ✓ Mechanism, perpetuation, mitigation, and repair
- ✓ Marin environment
- ✓ Durability of concrete as influenced by the used material and systems

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## Course Outline

### ✓ Day 05

**Repair of historic and heritage buildings**

- ✓ High level of uncertainty
- ✓ Constraints on available retrofitting systems: reversibility is a must
- ✓ Changed use of a building
- ✓ New and more stringent snow load requirement
- ✓ Archeological site

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# Damage Assessment and Rehabilitation Of Concrete Structures

## Confirmed Sessions

| FROM | TO | DURATION | FEES | LOCATION |
|---|---|---|---|---|
| May 10, 2027 | May 14, 2027 | 5 days | 4250.00 $ | UAE , Dubai |
| Sept. 13, 2027 | Sept. 17, 2027 | 5 days | 4950.00 $ | Italy , Milan |
| Dec. 28, 2026 | Jan. 1, 2027 | 5 days | 4250.00 $ | UAE , Dubai |
| March 14, 2027 | March 18, 2027 | 5 days | 4250.00 $ | KSA , Riyadh |

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