



Consulting and Training | Reach New Heights

Course Name

Concrete Durability & Service-Life Solutions

Sector Name

Civil Engineering

Document Type

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Concrete Durability & Service-Life Solutions

Course Introduction

Concrete structures are often designed to satisfy strength requirements, yet many of the costliest problems during their service life are caused not by insufficient initial strength but by progressive deterioration. Chloride exposure, carbonation, moisture movement, aggressive chemicals, temperature conditions, poor detailing, material selection, and construction quality can gradually reduce durability and lead to corrosion, cracking, spalling, increased maintenance, and premature intervention.

Boost Consulting & Training has designed this course to help civil engineers approach concrete durability as a long-term engineering performance challenge. Participants will examine how exposure conditions interact with concrete properties, reinforcement protection, detailing, workmanship, and maintenance decisions. The program emphasizes diagnosing deterioration mechanisms, selecting durability measures appropriate to the environment, evaluating protection and repair options, and making practical decisions that extend useful structural life.

The main concept of this course is to engineer concrete for the environment and service conditions it will face, using durability decisions to protect performance and extend structural life.

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Target Audience

- ✓ Civil and structural engineers
- ✓ Materials and concrete engineers
- ✓ Construction and site engineers
- ✓ Inspection, maintenance, and infrastructure professionals

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Learning Objectives

- ✓ Explain the principal mechanisms that influence concrete durability and long-term performance.
- ✓ Evaluate environmental exposure conditions and their impact on reinforced concrete structures.
- ✓ Identify the causes and progression of reinforcement corrosion and concrete deterioration.
- ✓ Select concrete properties and material solutions appropriate to different exposure conditions.
- ✓ Improve durability through effective detailing, construction practices, and quality control.
- ✓ Evaluate surface protection, corrosion-control, and deterioration-mitigation solutions.
- ✓ Assess service-life implications when selecting maintenance and intervention strategies.
- ✓ Develop practical durability solutions for new and existing concrete structures.

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Concrete Durability & Service-Life Solutions

Course Outline

✓ DAY 1

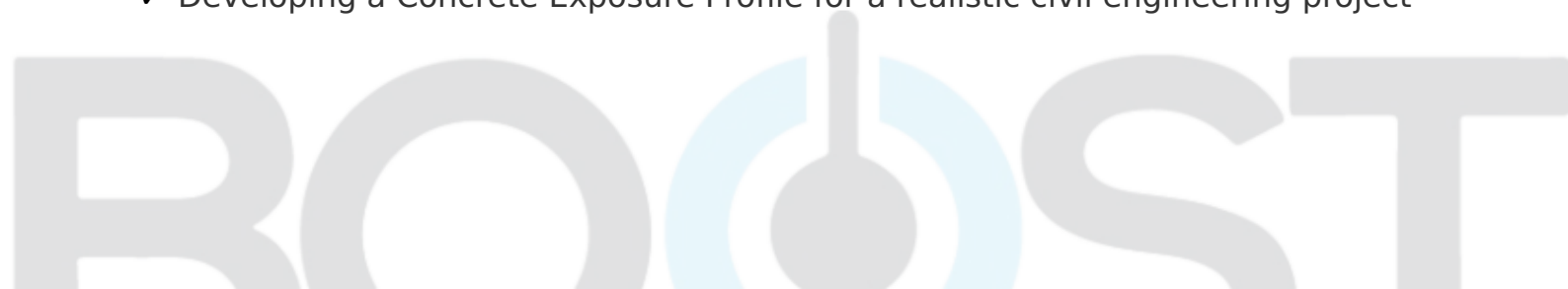
Understanding Concrete Durability in Real Environments

Durability Beyond Concrete Strength

- ✓ Connecting concrete composition, permeability, cracking, workmanship, and exposure to long-term performance
- ✓ Understanding how deterioration can develop while structural strength initially appears satisfactory
- ✓ Distinguishing durability requirements from conventional strength and acceptance criteria

Mapping Environmental Exposure

- ✓ Evaluating marine, chloride, carbonation, chemical, moisture, and temperature-related exposure
- ✓ Identifying structural zones subjected to different levels and combinations of environmental attack
- ✓ Developing a Concrete Exposure Profile for a realistic civil engineering project



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Course Outline

✓ DAY 2

Controlling the Mechanisms of Deterioration

Reinforcement Corrosion and Concrete Damage

- ✓ Understanding chloride ingress, carbonation, moisture, and oxygen conditions associated with corrosion
- ✓ Connecting reinforcement corrosion with cracking, delamination, spalling, and loss of protection
- ✓ Identifying conditions that accelerate deterioration and shorten expected service life

Managing Chemical and Physical Deterioration

- ✓ Examining sulfate attack, aggressive environments, leaching, and other chemical deterioration mechanisms
- ✓ Understanding freeze-thaw, abrasion, erosion, thermal effects, and repeated wetting and drying where applicable
- ✓ Completing a Deterioration Mechanism Diagnosis using different exposure and damage scenarios

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Course Outline

✓ DAY 3

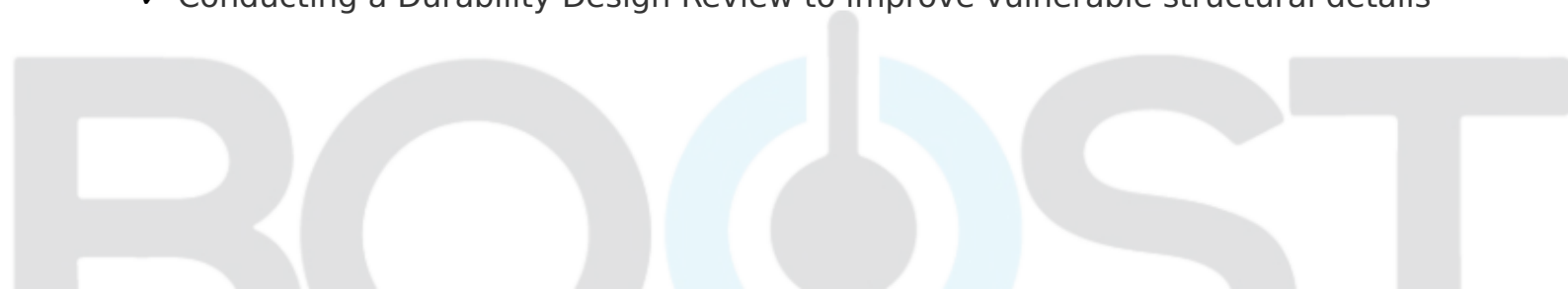
Designing Concrete for Longer Service

Material and Mix Decisions for Durability

- ✓ Selecting concrete characteristics according to exposure rather than relying on strength alone
- ✓ Evaluating water-binder ratio, supplementary cementitious materials, permeability, and curing requirements
- ✓ Balancing durability, constructability, material availability, and project requirements

Detailing Against Premature Deterioration

- ✓ Managing cover, crack control, joints, drainage, geometry, and water-shedding details
- ✓ Identifying detailed decisions that create areas of persistent moisture or aggressive exposure
- ✓ Conducting a Durability Design Review to improve vulnerable structural details



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Course Outline

✓ DAY 4

Protecting Existing Concrete Structures

Selecting Protection and Mitigation Solutions

- ✓ Comparing coatings, sealers, membranes, corrosion-control measures, and other protective approaches
- ✓ Matching protection systems to the deterioration mechanism and existing substrate condition
- ✓ Recognizing situations where surface treatment alone cannot address the underlying problem

Planning Effective Durability Interventions

- ✓ Determining whether the appropriate response is protection, localized repair, broader rehabilitation, or continued observation
- ✓ Considering compatibility and durability when selecting repair materials and intervention methods
- ✓ Completing a Durability Solution Selection Challenge for several deteriorated concrete cases

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Course Outline

✓ DAY 5

Managing Concrete for Service-Life Performance

Making Service Life Decisions

- ✓ Connecting exposure severity, deterioration progression, protection measures, and maintenance with expected structural life
- ✓ Comparing early preventive intervention with delayed corrective repair
- ✓ Using service-life thinking to support technically and economically sound engineering choices

Developing a Long-Term Durability Strategy

- ✓ Establishing inspection and maintenance priorities for concrete exposed to aggressive conditions
- ✓ Linking deterioration evidence with timing of protection, repair, and future reassessment
- ✓ Developing a Concrete Durability & Service-Life Plan for a selected structure

Concrete Durability & Service-Life Solutions

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
Dec. 7, 2026	Dec. 11, 2026	5 days	4250.00 \$	UAE , Dubai
Jan. 31, 2027	Feb. 4, 2027	5 days	4250.00 \$	Bahrain , Manama
May 31, 2027	June 4, 2027	5 days	4950.00 \$	England , London
Sept. 6, 2027	Sept. 10, 2027	5 days	4250.00 \$	UAE , Abu Dhabi

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