Assessment and Repair of Concrete Structures

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Dubai (UAE)

UK Traininig
PARTNER



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Introduction

Existing concrete structures are continuously exposed to environmental, operational, and structural conditions that may lead to deterioration, cracking, corrosion, loss of durability, and reduction in structural performance. Effective assessment and timely repair are therefore essential to maintain structural safety, functionality, and service life.

This comprehensive one-week training course provides Civil and Structural Engineers with a practical and systematic approach to the inspection, assessment, diagnosis, repair, rehabilitation, and strengthening of existing concrete structures.

Throughout the training, participants will explore common deterioration mechanisms, structural defects, inspection procedures, Non-Destructive Testing NDT, reinforcement corrosion, concrete condition assessment, repair materials, repair techniques, and strengthening methods. The course emphasizes the relationship between inspection, diagnosis, and the selection of appropriate repair solutions.

The course combines technical knowledge with practical examples, case studies, defect identification exercises, and repair strategy development to support participants in making sound engineering decisions.

Course Objectives

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

- Understand the principles of assessment and repair of existing concrete structures.
- Identify common types and causes of concrete deterioration.
- Conduct systematic visual inspections and document structural defects.
- Assess cracks, spalling, delamination, carbonation, chloride attack, and reinforcement corrosion.
- Understand the principles and applications of Non-Destructive Testing NDT.
- Evaluate the condition of concrete and reinforcement.
- Diagnose the causes and severity of structural deterioration.
- Select appropriate repair materials and techniques.
- Develop suitable repair and rehabilitation strategies.
- Understand structural strengthening methods and their applications.
- Apply assessment and repair principles through practical case studies.



Course Outlines

Day One: Introduction to Concrete Structure Assessment and Inspection

1. Principles of assessment of existing concrete structures.
2. Stages and methodology of structural condition assessment.
3. Visual inspection techniques and defect documentation.
4. Identification and classification of cracks, spalling, delamination, and surface defects.
5. Evaluation of structural condition, severity, and potential risks.

Day Two: Concrete Deterioration and Damage Diagnosis

1. Mechanisms and causes of concrete deterioration.
2. Carbonation, chloride penetration, chemical attack, and environmental exposure.
3. Reinforcement corrosion and its impact on reinforced concrete.
4. Construction defects, material deficiencies, and design-related problems.
5. Diagnosis of deterioration mechanisms and identification of root causes.

Day Three: Testing and Evaluation of Existing Concrete Structures

1. Principles and applications of Non-Destructive Testing NDT.
2. Rebound Hammer and Ultrasonic Pulse Velocity testing.
3. Reinforcement detection and condition assessment.
4. Core testing and semi-destructive testing methods.
5. Interpretation of inspection and testing results.

Day Four: Concrete Repair Materials and Techniques

1. Selection and properties of concrete repair materials.
2. Crack repair, injection, patching, and surface treatment.
3. Repair of reinforcement corrosion and damaged concrete.
4. Protective coatings and corrosion protection systems.
5. Selection of appropriate repair techniques according to defect type and structural condition.

Day Five: Rehabilitation, Strengthening and Practical Case Studies

1. Development of repair and rehabilitation strategies.
2. Structural strengthening techniques and their applications.
3. Repair prioritization, durability, and service-life considerations.
4. Practical case studies: inspection, diagnosis, and repair selection.
5. Integrated workshop and final review: developing a concrete repair strategy.



Why Attend This Course? Wins & Losses!

Wins

- Develop practical skills in assessing existing concrete structures.
- Improve the identification and diagnosis of structural defects.
- Understand commonly used inspection and NDT techniques.
- Select appropriate repair materials and techniques.
- Improve engineering decision-making for repair and rehabilitation.
- Enhance understanding of structural strengthening methods.
- Apply assessment and repair principles to real-world engineering situations.

Losses

- Increased risk of incorrect diagnosis of structural defects.
- Inappropriate selection of repair materials or techniques.
- Premature deterioration or failure of repair works.
- Increased maintenance and rehabilitation costs.
- Difficulty in determining the actual condition of existing structures.
- Reduced ability to develop effective rehabilitation strategies.

Conclusion

By the end of this training course, participants will have developed a structured understanding of the assessment, diagnosis, repair, rehabilitation, and strengthening of existing concrete structures.

The course provides Civil and Structural Engineers with practical knowledge that can support better inspection decisions, accurate diagnosis of deterioration, appropriate repair selection, and improved long-term structural performance.

Frequently Asked Questions FAQ

1. Who should attend this course?

Civil Engineers, Structural Engineers, Construction Engineers, Site Engineers, Maintenance Engineers, Inspectors, and professionals involved in concrete structure assessment and rehabilitation.

2. Is the course theoretical or practical?

The course combines technical concepts with practical examples, case studies, inspection scenarios, and problem-solving activities.



3. Does the course cover NDT?

Yes. The course introduces important NDT techniques used for evaluating existing concrete structures.

4. Does the course cover reinforcement corrosion?

Yes. Reinforcement corrosion, its causes, effects, assessment, and repair approaches are covered.

5. Will concrete repair techniques be discussed?

Yes. The course covers crack repair, injection, patching, surface treatment, protective systems, and other repair approaches.

6. Can the entire course be delivered by one trainer?

Yes. The complete one-week programme is designed to be delivered by one specialized Civil/Structural Engineering trainer to ensure continuity between assessment, diagnosis, repair, and rehabilitation.

