



UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD
ENGINEERING & THE BUILT ENVIRONMENT



Repair and Rehabilitation of Concrete Structures

(includes Deterioration and Condition Assessment of Concrete Structures)

In person at UCT 10 – 13 March 2025



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SPES BONA

Introduction



The purpose of the course is to provide participants with a fundamental and practical understanding on condition assessment of concrete structures and concrete repair and service life extension methods.

A large number of concrete structures are deteriorating, often prematurely, and need remedial measures to reinstate their safety and/or serviceability. Consequently, the need for repair and protection has grown considerably in recent years. While costs associated with repair of deteriorating concrete structures can be substantial, costs resulting from poorly designed or executed repairs may be even higher. The technical and economical success of repair projects depends on a range of

factors, including a proper condition assessment of the structure, design and execution of remedial measures, and design and implementation of maintenance strategies.

For reinforced concrete structures, the main durability problem is corrosion of the reinforcement, resulting from the ingress of chloride ions or carbon dioxide and the subsequent depassivation of the steel. Other causes for concrete deterioration and damage include construction defects, structural loading, chemical attack (ASR, sulphate attack, acid attack) and fire damage. At the beginning of any repair project, a systematic condition assessment of the structure needs to be carried out to identify the cause(s) of deterioration and the extent of damage. The course informs about concrete deterioration mechanisms, on-site evaluation techniques, the principles of diagnostic testing (strategies, test methods and interpretation of results), and concrete repair strategies.

Repair methods need to be designed with consideration for the anticipated or desired remaining service life of the structure. A distinction must be made between repairs intended to stop deterioration fully and those merely aimed at slowing down deterioration processes for a limited period of time. During the course relevant repair methods for damaged concrete structures are discussed, focussing on design methods, application principles and limitations. The scope of relevant repair methods includes the application of penetrating corrosion inhibitors and surface coatings, temporary electrochemical techniques, cathodic protection systems, bonded overlays (patch repairs), and crack injection.

Who should attend?

Structural Engineers and Technologists, Agency and Public Sector Asset Managers, Asset Maintenance Managers, Bridge and Infrastructure Inspection Consultants.

Course Topics

1. Concrete deterioration processes and damage to concrete structures

- Reinforcement corrosion
- Chemical and physical attack
- Structural damage
- Fire damage
- Cracking
- Construction defects
- Case studies

2. Condition assessment of concrete structures

- Planning and strategies for condition assessments
- On-site diagnostic testing and visual assessment methods
- Non-destructive testing methods and interpretation of results
- Laboratory-based testing of samples
- Prediction of residual service life
- Structural assessments; prediction of structural capacity
- Case studies

3. Repair and rehabilitation of concrete structures

- Philosophies and strategies for concrete repair and rehabilitation
- Repair methods, materials and systems
- Repair principles for reinforcement corrosion damaged structures
- Concrete surface protection and coatings
- Bonded concrete overlays and patch repair
- Principles, methods and materials for concrete crack repair
- Repair guidelines according to the Eurocode
- Service life extension methods
- The material supplier's perspective
- Retrofitting and strengthening techniques and materials
- Fibre-reinforced polymers (FRP) for the strengthening of RC structures
- External reinforcement and plate bonding for structural rehabilitation
- Case studies

Format

The course will be presented face-to-face through formal lectures, laboratory demonstrations and hands-on exercises, as well as site visits.

Presenters



Prof. Hans Beushausen is a researcher, lecturer, and consultant in the fields of structural engineering, construction material technology, structural condition assessment, and concrete repair technology in the Department of Civil Engineering at the University of Cape Town and Director of the Concrete Materials and Structural Integrity Research Unit (CoMSIRU). He is the Vice-President of RILEM and the former Head of the *fib* National Member Group South Africa.



Prof. Pilate Moyo (PrEng) is Professor of Structural Engineering and Co-Director of the Concrete Materials and Structural Integrity Research Unit (CoMSIRU) in the Department of Civil Engineering at the University of Cape Town. His research and consultancy is on structural health monitoring, condition assessment, structural dynamics, vibration testing, and structural strengthening strategies for civil structures.

Course Overview

Name	Repair and Rehabilitation of Concrete Structures	
Duration	10 – 13 March 2025, 4 days	
Venue	TBC, Cape Town	
CPD	4 CPD points, ECSA Validation No: UCTRRCS25	
Participants	Structural Engineers and Technologists, Agency and Public Sector Asset Managers, Asset Maintenance Managers, Bridge and Infrastructure Inspection Consultants	
Entry requirements	Minimum NQF7 qualification in Engineering, Built environment or relevant sector	
Fees	Standard delegate: R16 300,00	Full-time student: R8 150.00

Registration

Registration and Cancellation

- [Register online](#)
- Registration covers attendance of all sessions of the workshop, teas and lunches, and a set of notes.
- Registrations close one week before the start of the course. Confirmation of acceptance will be sent on receipt of a registration form.
- Cancellations must be received one week before the start of a course, or the full course fee will be charged.
- For more information on application and registration procedures, please visit our [website](#).

Certificates and CPD Points

A digital certificate of attendance will be awarded to CPD participants. Participants need to attend 80% of the lectures to qualify for an attendance certificate. For further information on digital certificates please visit [Digital Certificates at UCT](#)

This course is registered with the Engineering Council of South Africa (ECSA) for the award of 4 CPD points. The ECSA course validation code is: UCTRRCS25

Contact detail

For more information or details on CPD courses, visit our website or contact us.

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