Rethinking the Assessment of Ageing Concrete Infrastructure

From Code-Based Methods to Alternative Approaches and AI-Enhanced Assessment

Half-Day Hands-On Workshop · **3 June 2026** · School of Architecture, Computing and Engineering, University of East London, Docklands Campus

Workshop Overview

Ageing concrete infrastructure dominates much of the existing built environment, with many structures designed decades ago using earlier design philosophies. Increasing operational demands together with degradation due to environmental factors (which are often accelerated by climate change), mean that traditional code-based assessment methods may no longer provide reliable or transparent estimates of structural capacity or failure modes.

This half-day workshop provides an integrated and practice-oriented perspective on the assessment of ageing reinforced and prestressed concrete structures. It critically examines the limitations of current code-based approaches and introduces alternative mechanics-based methods, notably the **Compressive Force Path Method (CFPM)**, alongside **advanced computational modelling** and **AI-enhanced assessment tools**. Through concise conceptual input, case studies, and hands-on demonstrations using real data, participants will gain a holistic understanding of how engineering judgement, computational analysis, and AI can be combined to support more robust, defensible, and future-proof infrastructure assessment and decision-making.

Importance & Expected Outcomes

- Critically appraise the applicability and limitations of code-based assessment methods for ageing concrete structures
- Apply and evaluate alternative mechanics-based approaches such as CFPM
- Understand the role of nonlinear finite element analysis (NLFEA) in assessing complex or deteriorated RC systems
- Recognise opportunities and constraints associated with AI-driven tools for structural assessment and deterioration prediction
- Integrate multiple assessment approaches into a coherent, transparent evaluation strategy

Half-Day Schedule (4 hours)

Time	Session
13:30–14:00	Introduction, objectives, and context of ageing concrete infrastructure
14:00–15:00	Limitations of code-based assessment and introduction to alternative approaches (CFPM)
15:00–16:15	Solved examples: Validation of assessment predictions using nonlinear finite element analyses and experimental test results.
16:15–17:15	AI-enhanced assessment tools: applications, demonstrations, and critical discussion
17:15–17:30	Integration, key insights, and take-home messages

Presenters – Short Biographies

Dr Demitrios M. Cotsovos – Associate Professor in Structural Engineering at Heriot-Watt University, UK. His expertise lies in the assessment, design and analysis of reinforced and prestressed concrete structures, with particular emphasis on ageing infrastructure, the development and application of alternative assessment and design methods, nonlinear finite element analysis, and AI-assisted structural assessment. His work bridges experimental evidence, theory, and engineering practice to support robust, transparent, and defensible decision-making for existing structures.

Dr Sandhya Patidar – Associate Professor in Statistical Modelling, Data Science and AI, Heriot-Watt University, UK. She specialises in mathematical, statistical and AI-driven modelling, with extensive experience in machine learning, uncertainty analysis and data-intensive applications across engineering, energy and environmental systems. Her work bridges advanced data science with real-world infrastructure and asset-management challenges.

Target Audience

- Structural engineering researchers and academics
- Practising engineers and infrastructure asset owners
- Doctoral and postgraduate students
- Professionals interested in advanced assessment, digitalisation, and AI applications in civil engineering

The workshop is suitable for participants seeking both conceptual understanding and practical, applied insight.

Participant Requirements / Prerequisites

- Basic background in structural or civil engineering
- Access to a laptop with internet connectivity
- Access to a Python environment for AI demonstrations (cloud-based alternatives can be used)

Important Note

- Please note that the workshop will run subject to sufficient registrations.