

Targeted NDT for Reuse of Structural Concrete Elements

Identification of Critical Inspection Zones through Numerical Modelling for Targeted Non-Destructive Testing (NDT)

What is the project about?

The Targeted NDT project aims to develop a more efficient approach for assessing whether existing structural concrete elements can be safely reused in new construction. Non-destructive testing (NDT) methods provide information on the condition of concrete elements, enabling assessment of their reusability without causing damage. However, the most advanced methods often require considerable time and effort. This project investigates how advanced inspections can be targeted to the areas where they provide the greatest value.

Why is this important?

Reusing structural concrete elements can reduce construction waste, save raw materials, and lower CO₂ emissions. However, current assessment methods often require extensive inspections, which can be time-consuming and costly. Improving the efficiency of these assessments without compromising structural safety can help make reuse a more practical and widely adopted solution.

How does it work?

The work combines numerical modelling, non-destructive testing, and experimental validation. Numerical models will identify the regions within structural concrete elements where internal defects or reinforcement irregularities have the greatest influence on load-bearing capacity. This knowledge will form the basis for a strategy that prioritises advanced NDT investigations in these critical regions rather than across the entire element. The strategy will then be validated through full-scale testing of reclaimed concrete columns.

Who is behind the project?

The 30-month project is carried out by researchers at the Technical University of Denmark (DTU), within the Section for Construction Materials and Durability at the Department of Environmental and Resource Engineering (DTU Sustain), in collaboration with COWI.

What happens next?

The project will deliver a practical strategy to help practitioners decide where to focus advanced inspections during reusability assessments. By making inspections more efficient without compromising structural safety, the project can support the broader reuse of structural concrete elements and contribute to a more circular use of existing construction materials.