

DETERMINATION ON CONCRETE QUALITY IN A STRUCTURE USING NON-DESTRUCTIVE AND DESTRUCTIVE METHODS

Goal of the project

The in-situ characteristics of concrete may be obtained by using non-destructive and destructive tests methods. Scope of the investigation in this project was to evaluate the design compressive strength of reinforced concrete walls and columns by combination of these methods.

Short description of the project

The load bearing capacity of reinforced concrete structural elements as walls, columns, beams and slabs are in a function of the reinforcement and concrete quality. In some situations, when there is doubt about the reliability of control and compliance results, or they are unavailable results, or these results are inappropriate, as well as the structure is damaged or deteriorated, in-situ tests are performed. There are two available test methods. The non-destructive methods are used because they are not impairing the performance of the elements or members under test, and when are applied are cause localized surface zone damage. The most common procedures are using surface hardness method by Schmidt rebound hammer and the ultrasonic pulse velocity method. The destructive methods require sample extraction, most commonly in the form of cores drilled from the concrete, which may be used in the laboratory for strength and other physical tests. The method and the number of determinations, the position of these and the investigated parameters were established previously together with the beneficiary and were correlated with the available norms and codes. The results of these tests are in the of form of reports, containing bulletins.



Project implemented by

VOX TECHNOLOGY PARK S.R.L.
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Implementation period

12.05.2017 - 12.07.2017

Main activities

- Establishing the required number of investigations, the test methods and positions for determinations, together with the beneficiary and correlated with the available norms and codes
- Non-destructive testing using combined method of Schmidt

rebound hammer and the ultrasonic pulse velocity more than 120 zones.

- Extraction of concrete core samples in more than 11 positions.
- Preparation of core samples, by cutting to the right length and correcting using resins
- Experimental testing of the core specimens.
- Elaboration of research report and the corresponding test bulletins.

Results

The most relevant result consists in:

- obtaining of the characteristic compressive strength of concrete elements with Schmidt rebound hammer and ultrasonic pulse velocity, as well as with combined method.
- obtaining characteristic compressive strength of concrete core specimens, as well as data resulting from visual inspection related to the type, size and distribution of the aggregates, holes, defects, cracks and material compaction.

Applicability and transferability of the results

The experimental results obtained within the project are introduced in an advanced calculation model for structural assessment, considering the real behavior of concrete material. Results could be used to improve design and construction practice.

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Research Centre

Research Centre for Retrofitting of Constructions – RECO,
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