

Nondestructive Evaluation of Concrete Structures.

To ensure the safety and reliability of a component in any structural element, the mechanical properties of the material which can be anisotropic and the number, size and distribution of cracks must be tested. Non-destructive evaluation (NDE) techniques are used to assess the conditions of concrete structures, predict future performance, and provide quality control during construction.

Existing NDE methods for assessing reinforced and post-tensioned concrete structures include surface hardness methods, acoustic methods, radiography, electromagnetic methods, resistivity measurements.

In practice, the established acceptance criteria for a particular concrete structure must be transferred into terms understandable for NDE measurements. Specific testing requirements must be developed with definition target flaws, detection sensitivity, characterization and sizing ability, demands for accuracy and reliability. In general, the target for NDE testing will include concrete physical-mechanical properties, corrosion in embedded metal components, bond properties between concrete and reinforcement, level of post-tensioning force, cracks and porosity in concrete. Evaluation of NDE methods must be done against the specific testing requirements so that NDE results can be used to decide if the structure performs as expected.

This paper presents a systematic approach for the different NDE methods that can be used in evaluating concrete structures and will emphasize the importance of NDE since destructive evaluation methods such as sample extraction and jacket removal would pose a danger of structural collapse, and therefore there is a need for an effective non-destructive evaluation technique for assessing and quantifying interior damages.