



# WHAT AN OWNER SHOULD KNOW ABOUT NONDESTRUCTIVE TESTING—TECHNOTE

**Keywords:** material properties; nondestructive testing (NDT); physical properties.

## Question

What should an owner know about nondestructive testing (NDT) of concrete, and how can an owner get maximum benefit from the testing results?

## Answer

Nondestructive testing (NDT) methods are commonly used to evaluate new and existing structures and elements, and a typical owner may not understand the methods being proposed for use, or how they will benefit from the completion of the testing.

To maximize the benefit from the NDT results, the owner should have:

- a) Knowledge to judge whether an appropriate test method has been proposed
- b) Knowledge about the qualifications of the persons performing the tests
- c) Assurance that properly functioning and calibrated, if appropriate, testing equipment will be used in the testing
- d) An understanding of how results will be validated
- e) An expectation that NDT results will be presented in an understandable manner and will be useful in fulfilling project requirements

This TechNote provides a brief discussion of how these goals can be achieved. For the purposes of this TechNote, an “owner” is a broad term describing the person who is responsible for selecting the entity that will provide NDT services or is the end user of an NDT report.

## Introduction

Nondestructive testing (NDT) methods can be used for a variety of purposes in the evaluation of both new and existing construction. In general, these methods can be divided into two groups: 1) those for estimating the in-place strength of concrete; and 2) those for assessing other characteristics of the structure, such as presence of internal voids or presence of active corrosion. On a typical project, a design professional may recommend NDT as a part of the evaluation process or will include NDT services as a part of the project scope. For an owner unfamiliar with the behavior of concrete structures and the application of NDT methods in the evaluation process, it can be a daunting task to determine the appropriateness of recommended test methods and personnel to perform nondestructive tests. The task will often become more complicated if different groups (such as consultants and testing agencies) use subtly different names for the same method (for example, surface-penetrating radar versus ground-penetrating radar versus impulse radar). Standards are not available for all test methods used in practice.

The goal of this TechNote is to provide information that will help owners make informed decisions when procuring NDT services, and to ensure they receive maximum benefit from those services.

## Discussion

The following sections provide a brief discussion of various factors that an owner should consider when selecting NDT methods and the entities who provide NDT services.

*Test method selection*—A variety of test methods are commonly used on concrete structures. The methods can be used to confirm physical dimensions, assess in-place material properties, evaluate corrosion activity, locate internal defects, or for other purposes. A particular NDT method will typically be proposed to an owner.

Various publications provide information on the principles and capabilities of the test methods. These include [ACI 228.1R](#), [ACI 228.2R](#), and [ICRI 210.4R](#). The two ACI reports provide in-depth descriptions of the basis for each test method, discuss the applicable standards, and provide typical applications. The International Concrete Repair Institute (ICRI) reference provides less detailed explanations of the material presented in the ACI 228 reports, and may be advantageous for an owner who is not interested in comprehensive explanations of the test methods. The owner should be cautious when NDT methods not addressed in the ACI 228 reports are proposed, as those methods may not be sufficiently developed or may not be widely accepted. The following are some of the key questions for the owner to ask when an NDT method is proposed:

- a) In plain language, how does the test method work?