Testing for In-Place Strength

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Outline

- Summary
- Statistical Considerations
  - Pullout Test
  - Probe Penetration
  - Rebound Hammer
- Strength
- Review of Three Methods for In-Place Background
Acceptance criteria

Methods for sampling and testing

Required quality characteristics

Owner specifics

Interested in how results are obtained

Interested in results' less

Owner is interested in results' less

Requirements

Performance-Based
When required by Engineer or Building Official

Assess adequacy of curing

5.6.4

Testing of Field-cured Specimens (ACI 318-08)

- In-place performance is not assessed
- Contractual requirements
- Establishes if concrete as delivered meets
- Sampling at point of delivery (discharge)
- Testing of Standard-cured Specimens

Current Practice
Future Practice

- Durability-related properties for service life
- Strength for structural safety
- Owner's requirements
- Assurance that concrete in structure meets
- Testing for in-place properties
- Testing for contractual agreement with concrete supplier
- Still required for contractual agreement with
- Testing of standard-cured specimens
Field-Cured Specimens

ASTM C31/C31M
Planning and interpretation

Requisite correlation (strength relationship)

Indirect measure of compressive strength

Disadvantages

Inexpensive compared with coring

Strengthen structure

Concentrate on critical portions of concrete

Measure properties of concrete in structure

Advantages

In-place tests
In-Place Test Methods

- Pullout test—ASTM C900
- Probe penetration—ASTM C803/C803M
- Rebound number—ASTM C805/C805M
Measure the rebound of spring-driven mass (hammer) after impact with rod in contact with concrete. Number of Hardened Concrete ASTM C805/C805M Rebound
Result = average of 10 readings
Discard reading > 6 units from average

Near-surface Effects
Drill and test cores

Measure rebound on structure

Alternative 2

Test cylinders in compression

and measure rebound number

Support cylinders in testing machine

At regular strength intervals (2 g)

Cast cylinders

Alternative 1

ACI 228.1R Chapter 4
Correlation Testing
basis for acceptance or rejection of concrete.

5.5 This test method is not suitable as the
account for hammer orientation
moisture condition
texture
accounts for surface conditions
alternative 2 is recognized

ASTM C 805/C805-08
ASTM C803/C803M Penetration Resistance of Hardened Concrete

- Measure depth of penetration of probe or pin driven into concrete.
"Silver" probe for normal density concrete

"Gold" probe for LW and low-strength concrete

Cartridge
Penetration Resistance

- Friction Fracture of mortar
- Fracture of aggregate
**IMPORTANT INSTRUCTIONS**

**WINDSOR PROBE TEST SYSTEM**

**Calibration Table**
Mohs Hardness Scale
"Calibration Table"
Mohs Hardness Scale