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SI

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# Guide for the Evaluation of Shotcrete

Reported by ACI Committee 506

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## Guide for the Evaluation of Shotcrete

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## Guide for the Evaluation of Shotcrete

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*This document provides information on the evaluation of both dry-mix and wet-mix shotcrete. It is assumed throughout the document that shotcrete is a method of placing concrete. However, for the sake of readability, the word “shotcrete” is often used either to identify the shotcrete process (method) or the shotcrete mixture (product) in the present document.*

*Evaluation of in-place shotcrete requires experience, education, and engineering judgment. This document serves as a guide for engineers, inspectors, contractors, and others involved in accepting, rejecting, or evaluating in-place dry- or wet-mix shotcrete.*

**Keywords:** absorption and voids test; beam test; bond pullout test; density; drilled core test; end-beam tester; in-place density; mockup panel; nailing guns method; needle penetrometer; nondestructive testing; penetrating probe method; round panel test; soil penetrometer.

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### CONTENTS

#### CHAPTER 1—INTRODUCTION AND SCOPE, p. 2

1.1—Introduction, p. 2

1.2—Scope, p. 2

#### CHAPTER 2—DEFINITIONS, p. 2

#### CHAPTER 3—PLANNING TESTING PROGRAM, p. 2

3.1—General, p. 2

3.2—Standards, p. 3

3.3—Planning, p. 3

#### CHAPTER 4—EVALUATION OF FRESHLY MIXED SHOTCRETE, p. 3

4.1—General, p. 3

4.2—Shotcrete mixture proportions, p. 3

4.3—Tests applicable for wet-mix shotcrete, p. 3

4.4—Tests applicable for dry-mix shotcrete, p. 3

4.5—Frequency and relevance, p. 3

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**CHAPTER 5—TEST PANEL PRODUCTION AND TEST SPECIMEN SAMPLING, p. 4**

- 5.1—General, p. 4
- 5.2—Test panels, p. 4
- 5.3—Materials, p. 5
- 5.4—Procedure, p. 5
- 5.5—Curing, p. 5
- 5.6—Obtaining specimens from panels, p. 5
- 5.7—Reporting test panel data, p. 5

**CHAPTER 6—EVALUATION OF EARLY-AGE STRENGTH, p. 5**

- 6.1—General, p. 5
- 6.2—Field test methods, p. 6
- 6.3—Frequency, p. 7

**CHAPTER 7—STRENGTH, p. 7**

- 7.1—General, p. 7
- 7.2—Destructive testing, p. 7
- 7.3—Nondestructive testing, p. 8
- 7.4—Frequency, p. 8
- 7.5—Relevance, p. 9

**CHAPTER 8—VOIDS AND BOND, p. 9**

- 8.1—General, p. 9
- 8.2—Sounding, p. 9
- 8.3—Wetting, p. 9
- 8.4—Bond pulloff testing, p. 9
- 8.5—Nondestructive test methods, p. 10
- 8.6—Frequency, p. 10
- 8.7—Relevance, p. 10

**CHAPTER 9—POROSITY AND PERMEABILITY, p. 10**

- 9.1—General, p. 10
- 9.2—Density, absorption, and voids in hardened concrete, p. 10
- 9.3—Permeability tests, p. 10
- 9.4—Concrete's ability to resist chloride ion penetration, p. 10
- 9.5—Density, p. 11
- 9.6—Frequency, p. 11
- 9.7—Relevance, p. 11

**CHAPTER 10—ACCEPTANCE CRITERIA FOR SHOTCRETE, p. 11**

- 10.1—General, p. 11
- 10.2—Application difficulty levels, p. 11
- 10.3—Acceptance criteria for defects and reinforcement encapsulation quality in shotcrete, p. 12
- 10.4—Examples for specification of acceptance criteria for shotcrete, p. 13

**CHAPTER 11—PRECONSTRUCTION TESTING, p. 13**

- 11.1—General, p. 13
- 11.2—Preconstruction approaches, p. 14
- 11.3—Procedure outline, p. 14
- 11.4—Details, p. 14

**CHAPTER 12— EVALUATION OF IN-PLACE SHOTCRETE, p. 15**

- 12.1—General, p. 15
- 12.2—Preliminary investigations, p. 15
- 12.3—Detailed investigations, p. 15

**CHAPTER 13—REFERENCES, p. 16**

- Authored documents, p. 17

**APPENDIX A—QUALITY ASSURANCE FLOWCHART, p. 17****CHAPTER 1—INTRODUCTION AND SCOPE****1.1—Introduction**

The purpose of this guide is to present procedures that can be used to evaluate the quality and properties of the shotcrete mixture and in-place shotcrete. Considerable literature is available on procedures for testing fresh concrete, concrete specimens, and in-place concrete. Many procedures for the production and testing of concrete are covered in various ACI documents and ASTM standards. Many of these documents and procedures can be directly applied to shotcrete.

**1.2—Scope**

The scope of this guide is to present the most relevant test methods applicable to shotcrete along with recommendations for selecting the most appropriate methods and interpreting tests results.

This guide is divided into 12 chapters, ranging in content from the determination of mixture proportions to the evaluation of hardened shotcrete through compressive strength tests or nondestructive tests methods. Each section can be read independently, making this guide suitable for learning about a specific topic. Efforts have been made not only to present the testing methods available, but also to guide the reader on the relevance of each method for a testing program. The document has been written to flow sequentially; following some discussion regarding the planning of a testing program (Chapter 3), the reader will learn about testing for mixture proportions and freshly mixed shotcrete (Chapter 4). Chapters 5 through 9 are devoted to the testing of hardened shotcrete, while Chapter 10 offers insight into acceptance criteria for shotcrete. Chapters 11 and 12, respectively, offer brief introductions to preconstruction trials and the evaluation of in-place shotcrete. Pertinent references are compiled in Chapter 13.

**CHAPTER 2—DEFINITIONS**

Please refer to the latest version of ACI Concrete Terminology for a comprehensive list of definitions.

**CHAPTER 3—PLANNING TESTING PROGRAM****3.1—General**

To make effective use of testing, all parties involved should have a clear understanding of the purpose, use of the results, and final acceptance criteria. Testing programs can