Concrete Craftsman Series

Shotcrete For The Craftsman

CCS-4(20)

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Shotcrete For The Craftsman

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This education document for the shotcrete craftsman was prepared by ACI Committee E703, Concrete Construction Practices, with substantial input from ACI Committee C660, Shotcrete Nozzleman Certification, and is based on the previous booklet prepared by Jean-François Dufour, Marc Jolin, Lars Balck, Steven Gebler, Merlyn Isaak, Dudley Morgan, and Philip Seabrook. Review of this education document was performed by the above-mentioned original authors and additional ACI C660 members including Charles Hanskat, Raymond Schallom, Oscar Duckworth, and Randle Emmrich, who were all key in the improvement and support of this new document.

The authors would like to both recognize and thank all ACI C660 members for their dedication to the improvement of shotcrete practices throughout the industry, with thanks to Merlyn Isaak who was C660 Chair during development and launch of the ACI Shotcrete Nozzleman Certification Program in 2001. Special recognition goes to Theodore Crom who was the inspiration for Shotcrete Nozzlemen Certification.

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Concrete Craftsman Series:
CCS-4 Shotcrete For The Craftsman
ISBN 978-1-64195-113-5

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First Printing: October 2020
Printed in Eau Claire, Wisconsin.

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PREFACE

The purpose of this document is to provide the nozzleman an understanding of basic concrete technology and describe and illustrate how to properly place quality shotcrete.

Information in this workbook should be used as a guide to good practice. ACI 506.2, “Specification for Shotcrete,” and ACI 506R, “Guide to Shotcrete,” should also be consulted. Above all, the plans and specifications for a specific construction project must be followed.

CHAPTER 1—WHAT IS SHOTCRETE?

Shotcrete is concrete conveyed through a hose and pneumatically projected at high velocity onto a surface to achieve compaction. It is a method of placing concrete used primarily in vertical and overhead surfaces. Shotcrete allows construction of walls and other structures with no form or only a one-sided form. It is often more economical than form-and-pour concrete because of its versatility and substantially reduced formwork. Tanks, swimming pools, tunnels, mines, sculptured rocks, structural walls, high-rise basements, erosion control embankments, retaining walls, and shear walls are all examples of new concrete structures commonly built using shotcrete. In addition, a wide variety of concrete repairs also employ shotcrete.

Shotcrete can be placed at various thicknesses against one-sided forms (or existing concrete or masonry structures and rock, earth, or other surfaces). Thickness of the material placed varies depending on several parameters, further described in Chapter 8, Shotcrete Placement Principles and Techniques.

The nozzleman is the craftsman that physically directs the shotcrete placement of the concrete. The nozzleman has final responsibility for the quality of the placed shotcrete and is an extremely important member of the shotcrete crew. The nozzleman should have an understanding of the materials, equipment, safety procedures, and the proper placement techniques to produce high-quality, durable concrete.

Although this document is directed to the nozzleman, they are not the only important person involved in a shotcrete project. The owner, engineer, contractor, job superintendent, foreman, and shotcrete crew are all important. Only with the cooperation and dedication of everyone involved will a project be successful.

1.1—Introduction

The two shotcrete processes are dry-mix and wet-mix.

1.1.1. Dry-mix shotcrete

Dry-mix shotcrete is the process where a dry mixture of concrete materials is conveyed pneumatically (with air flow) through a delivery hose to the nozzle where water is added (Fig. 1.1.1).

In dry mix, all the concrete ingredients, except liquids, are thoroughly mixed together and then fed into a mechanical feeder or gun. The dry concrete material is then carried by compressed air flowing through the delivery hose to a