

U.S. Shotcrete Standards Update

by Peter C. Tatnall

Since the last update on the activities of various shotcrete organizations and committees in the Spring 2005 issue of *Shotcrete*, steady progress has been made with updating the documents these organizations work on. Readers are requested to contact the Editor and author if inaccuracies are found in the following report, or if additional activities should be reported or new activities initiated.

American Concrete Institute (www.concrete.org)

The American Concrete Institute (ACI) Committee 506, Shotcreting, is currently chaired by the author. The Vice Chair is ASA Past President Larry Totten, and ASA President, Rusty Morgan, continues to serve as Secretary. The committee is divided into subcommittees and task groups, each concerned with a specific document or issue. The subcommittees are working on:

- ACI 506.2-95, "Specification for Shotcrete"—Phil Seabrook, Chair, has conducted a successful letter ballot on the structural portion of the specification, and his group will now develop the commentary to go with it, to be reported in late March.
- ACI 506R-05, "Guide to Shotcrete," was published in November 2005 after much work headed up by Past President of ASA Lars Balck, and is now available from ACI.
- ACI 506.1R-98, "Committee Report on Fiber-Reinforced Shotcrete"—The author has taken over as Chair of this subcommittee and is working on revisions to be balloted before the ACI convention this March.
- ACI 506.4R-94, "Guide for the Evaluation of Shotcrete"—ASA member Marc Jolin, Chair, has requested a ballot to reapprove the guide while the subcommittee works on substantial revisions.
- ACI 506.3R-91, "Guide to Certification of Shotcrete Nozzlemen"—This document, as recommended by ACI Committee C 660, Nozzlemen Certification, and as balloted by ACI Committee 506, has been withdrawn by ACI, and should no longer be referenced.

This document has been superseded by ACI CP-60(02).

- A "Guide for Shotcrete for Underground Support"—ASA member Chris Breeds, Chair, is completing the document after a letter ballot for a subsequent committee letter ballot this spring.
- A "Guide to Qualification of Shotcrete Nozzlemen for Specific Projects"—ASA Past President Larry Totten, Chair, has conducted a committee letter ballot, is incorporating the comments received, and is preparing another ballot of the document. This document is expected to fill any possible gaps caused by the withdrawal of ACI 506.3R-91.
- A "Guide on Swimming Pool Construction Practice"—ASA Past President Janice Fisher, Chair, is starting work on this new effort and is looking for assistance on her subcommittee.
- The Task Group 506-CTG—John Pye, Chair, has started work to sort out issues concerning core grading and recommend required actions to the committee.
- New Task Group 506-BATG—ASA President Rusty Morgan, Chair, has formed this task group to study issues concerning the use of boiled absorption and volume of permeable voids (ASTM C 642) for quality control and assurance on projects.

ASA members continue to play a significant role in the leadership of ACI Committee 506, as well as many other ASA members contributing to the subcommittees' efforts. Certainly readers should contact the subcommittee chairs if they have any contributions. Fisher has specifically requested contributions for her document on swimming pool construction.

ASA Member Jean-François Dufour, Chair of ACI Committee C 660, presented an excellent summary of their activities in "Shotcrete Corner," in the Fall 2003 issue of *Shotcrete* (V. 5, No. 4, pp. 28-29). In addition, C 660 has published guidelines for recertification of Shotcrete Nozzlemen whose original certification expired after 5 years.

It should be noted that the only ACI 506 document previously mentioned that can be incorporated by

Shotcrete Corner

reference into project specifications is ACI 506.2-95. If portions of any of the other documents are appropriate for the project specification, the applicable language should be copied into it. ACI Committee 506 and its subcommittees and task groups will meet March 26-28, in Charlotte, NC, during the ACI 2006 Spring Convention.

ASTM International (www.astm.org)

ASTM Subcommittee C09.46, Shotcrete, of ASTM Committee C09, Concrete and Concrete Aggregates, continues its work on specifications and test methods for shotcrete. The subcommittee will meet next in Toronto, Ontario, Canada, on June 12, 2006, to work on the latest ballot activities for revising documents and developing new ones. The subcommittee is responsible for the following standards:

- ASTM C 1140-03a, “Practice for Preparing and Testing Specimens from Shotcrete Test Panels”—John Pye, Task Group Chair. The group

is considering conditioning requirements and possible future revisions.

- ASTM C 1141-01, “Specification for Admixtures for Shotcrete”—Fred Goodwin, Task Group Chair. No action required or being taken at this time.
 - ASTM C 1385/C 1385M-98(2004)^{e1}, “Practice for Sampling Materials for Shotcrete”—Rick First, Task Group Chair. This document was reapproved with some editorial comments in 2004 and is now a combined standard.
 - ASTM C 1398-98(2004), “Test Method for the Laboratory Determination of the Time of Setting of Hydraulic-Cement Mortars Containing Additives for Shotcrete”—Mark Lukkarila and Frank Gay, Task Group Chairs. This test method was also recently reapproved, but needs work on a precision and bias statement required of all ASTM test methods. The subcommittee is requesting all interested parties to contact the Chairs with any information that could be used to develop a precision and bias statement. Without this data in the near future, the
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test method may be withdrawn and no longer published. With the withdrawal of ASTM C 1102 and ASTM C 1117 in the past 2 years, this lack of interest and action will leave the shotcrete community with no published standard test method for determining time of setting.

- ASTM C 1436-99(2004), "Specification for Materials for Shotcrete"—Pete Tatnall, Task Group Chair. This document successfully passed a recent reapproval ballot without changes.
- ASTM C 1480-00 (Reapproved 2005)^{e1}, "Specification for Packaged, Pre-blended, Dry, Combined Materials for Use in Wet or Dry Shotcrete Applications"—"Nick" Nicholson, Task Group Chair. This standard is controlled by the Shotcrete subcommittee in cooperation with the ASTM Subcommittee C 09.43, Packaging. This standard was balloted for reapproval in the spring of 2005 with only editorial changes.
- ASTM C 1604/C1604M-05, "Test Method for Obtaining and Testing Drilled Cores of Shotcrete"—John Pye, Task Group Chair. This new standard was published in January 2005 and is available as a separate document from ASTM International. This standard basically replaces ASTM C 42/C 42M as the method for obtaining drilled cores from shotcrete and determining compressive or splitting tensile strengths or determining the length of drilled shotcrete cores. The method relies on a provisional precision and bias (P&B) statement based on ASTM C 42/C 42M. The subcommittee must develop a P&B statement based on an inter-laboratory study and will be soliciting help from the industry.

Many members of the shotcrete subcommittee are also members of the fiber-reinforced concrete subcommittee, C 09.42, where they have responsibility for ASTM C 1550-04, "Test Method for Flexural Toughness of Fiber-Reinforced Concrete (Using Centrally Loaded Round Panel)"—Stefan Bernard, Task Group Chair. Because this test method has been used primarily to characterize fiber-reinforced shotcrete to date, there is continuing interest by ASTM Subcommittee C 09.46, ACI Committee 506, and ASA members. This task group is also developing a practice for fabricating the test panels for both cast and shotcrete specimens, which will be balloted this spring.

In addition, ASTM Subcommittee C 09.42 has recently successfully passed a new flexural beam Test Method, ASTM C 1609/C 1609M-05, which was published in January 2006. This new method simplifies the analysis of the flexural load-deflection curve and is intended to replace ASTM C 1018, which is currently used extensively to specify fiber-reinforced shotcrete. ASTM C 1018 has not been updated and will no longer be published.

Readers are encouraged to contact the aforementioned Chairs or the author if you have any questions, or if you are interested in participating in the development of documents concerning the use of shotcrete. It is recommended readers refer to "Shotcrete Corner" in V. 5, No. 3, Fall 2003, *Shotcrete*, pp. 32-33, for further information and reference sources for the documents discussed previously and for other shotcrete organizations' activities. This article may be found at www.shotcrete.org.



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