

## 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 2006 issue of *Shotcrete*, these organizations have made steady progress updating their documents. Readers are requested to contact the editor and author if inaccuracies are found in the following report, if additional activities should be reported, or if new activities should be initiated.

### American Concrete Institute (ACI) ([www.concrete.org](http://www.concrete.org))

ACI Committee 506, Shotcreting, is currently chaired by the author. The Vice Chair is American Shotcrete Association (ASA) Past President Larry Totten, and ASA President, Dudley R. “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 506.2R-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 April;
- ACI 506R-05, “Guide to Shotcrete,” published in November 2005 after much work spearheaded by Past President Lars Balck, is available from ACI. The subcommittee is starting to work on revisions to this document;
- 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 Spring 2007 Convention this April;
- ACI 506.4R-96, “Guide for Evaluation of Shotcrete”—ASA member Marc Jolin, Chair, is planning a ballot on proposed revisions for discussion at meetings in April. The present guide has been reapproved while the subcommittee works on substantial revisions;
- ACI 506.3R-91, “Guide to Certification of Shotcrete Nozzlemen”—This document has been withdrawn by ACI, and should no longer be referenced. This document has been superseded by ACI CP-60(02), “Craftsman Workbook—ACI Certification Shotcrete Nozzlemen”;
- A “Guide for Shotcrete for Underground Support”—ASA member Chris Breeds, Chair, is reviewing comments received after a letter ballot in the fall of 2006 for subsequent committee action at the April meetings;
- 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 before the April meetings. This document is expected to fill any possible gaps caused by the withdrawal of ACI 506.3R-91;
- The subcommittee on Swimming Pools has been disbanded as there has been little activity; and
- A task group on Assessment of Shotcrete, with John Pye as Chair, reported its recommendations at the November 2006 meeting, and the various subcommittees have a consensus on direction for their future documents.

ASA members continue to play a significant role in the leadership of ACI Committee 506 and to contribute to the efforts of the subcommittees. Readers should contact the subcommittee Chairs if they have contributions.

ASA Member Jean-François Dufour, Chair of ACI Committee C 660, presented an excellent summary of the committee’s activities in “Shotcrete Corner,” in the Fall 2003 issue of *Shotcrete* (V. 5, No. 4, pp. 28-29). In addition, ACI Committee 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 Committee 506 document previously mentioned that can be incorporated by reference into project specifications is ACI 506.2R-95. If portions of any of the other documents are appropriate for the project specification, the applicable language should be copied into it. ACI Committees 506 and C 660 and subcommittees will meet April 22-25, in Atlanta, GA, during the ACI Spring 2007 Convention.

### ASTM International ([www.astm.org](http://www.astm.org))

ASTM Subcommittee C09.46, Shotcrete, of ASTM Committee C09, Concrete and Aggregates, continues its work on specifications and test

# Shotcrete Corner

methods for shotcrete. The subcommittee will meet in Norfolk, VA, on June 25, 2007, 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 future revisions;
- ASTM C 1141-06, "Specification for Admixtures for Shotcrete"—Fred Goodwin, task group Chair. This specification has been updated to include current test methods;
- ASTM C 1385/C 1385M-98 (2004)<sup>e1</sup>, "Practice for Sampling Materials for Shotcrete"—Peter Tatnall, 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. Minor revisions to this test method were balloted successfully in January 2007. These revisions will allow time to develop a new precision and bias statement and ballot the proposal without the standard being taken off the books;
- ASTM C 1436-99 (2004), "Specification for Materials for Shotcrete"—Peter Tatnall, task group Chair. This document successfully passed a recent reapproval ballot without changes;
- ASTM C 1480/C 1480M-07, "Specification for Packaged, Preblended, 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 ASTM Subcommittee C09.43, Packaging. This specification was revised and published in February 2007 as a combined standard; and
- ASTM C 1604/C 1604M-05, "Test Method for Obtaining and Testing Drilled Cores of Shotcrete"—John Pye, task group Chair. This new standard was published in January 2005. This standard basically replaces C 42/C 42M as the method for obtaining drilled cores from shotcrete and determining compressive or splitting tensile strengths or the lengths 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 ASTM Subcommittee C09.42, Fiber-Reinforced Concrete, where they have responsibility for ASTM C 1550-05, "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 C09.46, ACI Committee 506, and ASA members. This test method has been updated to include an Appendix on preparing round panels for testing.

In addition, ASTM Subcommittee C09.42 has been working on revisions to the 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 used extensively to specify fiber-reinforced shotcrete. ASTM C 1018 will no longer be published, and will no longer be updated. ASTM C 1609/C 1609M should be used in its place.

Readers are encouraged to contact the aforementioned Chairs or the author if you have 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," *Shotcrete*, V. 5, No. 3, Summer 2003, pp. 32-33, for further information and reference sources for the previously discussed documents and other shotcrete organizations' activities. This article may be found at [www.shotcrete.org](http://www.shotcrete.org).



**Peter C. Tatnall**, Principal of Performance Concrete Technologies, is a founding member and Past President of ASA. He is a Fellow of ACI and serves as Chair of ACI Committee 506, Shotcreting. Tatnall is also an Honorary Member of ASTM International Committee C09, Concrete and Concrete Aggregates, and serves as Chair of Subcommittee C09.46, Shotcrete. He is also a member of the American Underground-Construction Association (AUA).