

U.S. Shotcrete Standards Update

by Peter C. Tatnall

Much has happened since the last update on the activities of various shotcrete organizations and committees in the Summer 2004 issue of *Shotcrete*. Probably the most important, at least to this author, is that I have retired from full-time employment from SI Concrete Systems and will consult in the industry if anyone will put up with me. I plan to continue my work with the various organizations discussed below. Readers are requested to contact the editor and author if inaccuracies are found or if additional activities should be reported.

American Concrete Institute (ACI)

I currently chair ACI Committee 506, Shotcreting, and ASA Vice President Rusty Morgan continues to serve as Secretary. The committee is divided into subcommittees and task groups: each is concerned with a specific document or issue. The subcommittees are working on:

- ACI 506R-90 (Reapproved 1995), “Guide to Shotcrete”—ASA Past President Lars Balck, Chair, has successfully balloted and submitted revisions to the Technical Activity Committee. The committee has responded to the TAC comments, and the document should be published soon;
- 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 this document to be presented at the ACI convention this spring;
- ACI 506.2R-95, “Specification for Shotcrete”—Phil Seabrook, Chair, has conducted a successful letter ballot this spring on the structural portion of the specification, and his group will now develop the commentary to go with it;
- ACI 506.3R-91, “Guide to Certification of Shotcrete Nozzlemen”—The Committee voted in a letter ballot to withdraw this document as recommended by ACI Committee C 660, Shotcrete Nozzlemen Certification. This document has been superseded by ACI CP60 (02), “Workbook for ACI Certification of Shotcrete Nozzlemen,” and is now creating confusion in the industry. A ballot on withdrawal is currently being circulated. Withdrawal is expected following the Spring 2005 ACI Convention.

- ACI 506.4R-96 (Reapproved 2004), “Guide for Evaluation of Shotcrete”—ASA Member Marc Jolin, Chair. This subcommittee is working on substantial revisions to this recently reapproved document;
- A “Guide for Shotcrete for Underground Support”—ASA Member Harvey Parker, Chair, is completing the document for committee letter ballot.
- A “Guide to Qualification of Shotcrete Nozzlemen for Specific Projects”—ASA President Larry Totten, Chair, has conducted a committee letter ballot, and is incorporating the comments received and 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.
- Rusty Morgan will Chair a new Task Group, which will sort out issues concerning core grading and recommend required actions to the committee.

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

ASA Member J. F. Dufour, Chair of ACI Committee C 660, presented an excellent summary of their activities in “Shotcrete Corner” in the Fall 2003 issue of *Shotcrete* (Vol. 5, No. 4, pp. 28-29). In addition, ACI Committee C 660 has won approval of the Certification Committee and the ACI Board of Direction for their guidelines for recertification of shotcrete nozzlemen whose original certification expired after 5 years.

It should be noted that the only ACI 506 document mentioned previously that can be incorporated by reference into project specifications is ACI 506.2R. If portions of any of the other documents are appropriate in the project specification, the applicable language should be copied into it.

Shotcrete Corner

ASTM International

Subcommittee C09.46, Shotcrete, of Committee C09, Concrete and Aggregates, continues its work on specifications and test methods for shotcrete. The subcommittee will meet in Reno, NV, on June 13, 2005, to work on the latest ballot activities for revising documents and developing new ones. The subcommittee is responsible for the following standards:

- 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.
- C 1141-01, "Specification for Admixtures for Shotcrete,"—Fred Goodwin, Task Group Chair. No action required or taken at this time.
- C 1385/C 1385M-98(2004), "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 dual standard.
- C 1398-98(2004), "Test Method for the Laboratory Determination of the Time of Setting of Hydraulic-Cement Mortars Containing Additives for Shotcrete,"—Peter Tatnall, Group Chair. This test method was also recently reapproved but needs work on a precision and bias (P & B) statement required of all ASTM test methods. The subcommittee is requesting all interested parties to contact the Chair with any information that could be used to develop a P & B statement. Without this data in the near future, the test method may be withdrawn and no longer published. With the withdrawal of C 1102 and C 1117 in the past two years, this lack of interest and action will leave the shotcrete community with no published standard test method for determining time of setting.
- C 1436-99(2004), "Specification for Materials for Shotcrete,"—Peter Tatnall, Task Group Chair. This document successfully passed a recent reapproval ballot without changes.
- C 1480-00, "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 Subcommittee C09.43, Packaging. This standard will be balloted for reapproval in the spring of 2005.
- 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, and is available separate standards from ASTM. 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 determining the length of drilled cores of shotcrete. The method relies on a provisional P & B statement based on 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 Subcommittee C09.42, Fiber-Reinforced Concrete, which has responsibility for C 1550-04, "Test Method for Flexural Toughness of Fiber-Reinforced Concrete (Using Centrally Loaded Round Panel),"—Stefan Bernard, Chair. Since this test method has been used primarily to characterize fiber-reinforced shotcrete to date, there is continuing interest by C09.46, 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.

Readers are encouraged to contact the author or the Chairs listed previously if you have questions or if you are interested in participating in the development of documents concerning the use of shotcrete.

For further information and reference sources for the documents discussed previously and the activities of other shotcrete organizations, please refer to "Shotcrete Corner," *Shotcrete*, Vol. 5, No. 3, Fall 2003, pp. 32-33. This article may be found at 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 Society of Civil Engineers (ASCE) and the American Underground Construction Association (AUA).