

ACI 506—A Must-Have Item

ACI 506R, “Guide to Shotcrete,” is a comprehensive document that provides a foundation of information essential for anyone interested in the shotcrete process, such as owners, contractors, suppliers, and consultants. Topics include the history of the shotcrete method of concrete placement, materials and proportions, equipment and manpower, and quality control. There is even an appendix on payment methods for shotcrete construction.

ACI Committee 506, Shotcreting, is chaired by Peter C. Tatnall, Performance Concrete Technologies, with assistance from Vice Chair Larry Totten, Johnson Western Gunite, and

Secretary Dudley R. “Rusty” Morgan, AMEC Earth & Environmental. Twenty-one of the 34 members of the committee are also American Shotcrete Association (ASA) members. The committee has an additional 27 consulting or associate members.

The current version of the report is 40 pages long and was approved in 2005. A subcommittee led by Lars Balck is reviewing content and discussing updates on a continuous basis.

To demonstrate some of the content and test your shotcrete IQ, ASA has created the following quiz based on material in ACI 506-05, “Guide to Shotcrete.”

1. Carl Akeley introduced a double-chambered cement gun in
a. 1899 b. 1910 c. 1919 d. 1925
2. “Gunite” is a term sometimes used for dry-mix shotcrete.
a. True b. False
3. A _____ is used in the dry-mix process to add water to aggregate before mixing to a specified amount, usually 3 to 6%.
4. A “shadow” is
a. A fictitious crime figure
b. A porous area behind an obstacle like reinforcement in hardened shotcrete
c. A term for the assistant nozzleman
5. A benefit of using the dry-mix shotcrete process is instantaneous control over mixed water and consistency of the mixture at the nozzle to meet variable field conditions.
a. True b. False
6. The wet-mix process usually has less dust than the dry-mix process and creates less rebound and waste.
a. True b. False
7. For both dry- and wet-mix processes, shotcrete with more than _____% coarse aggregate has greater rebound, is difficult to finish, and cannot be used for thin layers.
8. In repair work, shotcrete bond to a concrete substrate should develop a minimum tensile bond strength of
a. 50 psi b. 100 psi c. 200 psi
9. Shrinkage is typically less in shotcrete than in conventional concrete mixtures.
a. True b. False
10. _____ and _____ must be carefully matched for satisfactory dry-mix shotcreting as found in Table 3.1.
11. To minimize risks of hose rupture and coupling failure, the shotcreter should use a hose capable of withstanding at least _____ times the working pressure.
a. 2 b. 5 c. 10
12. The assistant nozzleman operates the _____, if one is required, to keep the areas in advance of the shotcrete free of dust and rebound.

Shotcrete Corner

13. The distance of the nozzle from the work should usually be between
a. 1 to 2 ft (0.3 to 0.6 m) b. 2 to 6 ft (0.6 to 1.8 m) c. 6 to 8 ft (1.8 to 2.4 m)
14. In dry-mix shotcreting, to uniformly distribute the shotcrete, the nozzleman should hold the nozzle at a 90-degree angle to the work and distribute the shotcrete in a
a. horizontal pattern b. vertical pattern c. small oval or circular pattern
15. Sufficient shotcrete _____ is more important than high impact velocity when encasing reinforcement.
16. Testing of both dry- and wet-mix shotcrete has shown that mixture composition has more influence on bond than surface preparation.
a. True b. False

This is just a sampling of some of the important information on shotcrete in the ACI 506 committee report. If you do not have a current version, visit the ACI Bookstore at <http://www.concrete.org/bookstorenet/default.aspx>, and order a copy. Every profession and trade has core documents,

journals, and standards. ACI 506R, "Guide to Shotcrete," is one of the key documents for the shotcrete industry. Everyone involved or interested in the shotcrete process should not only have this document, but also be very familiar with its contents.

Answers to the quiz appear on page 46.