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# The Newly Launched ACI Shotcrete Inspector Certification Program

By Randle Emmrich, Charles Hanskat, and Marc Jolin

**T**he Shotcrete Inspector Certification program began out of the need in the industry to have knowledgeable individuals inspecting shotcrete projects. Shotcrete contractors often find themselves having to educate project inspectors on the details needed for quality shotcrete placement. Shotcrete is a superior placement option in many cases, yet unfortunately, the expertise in evaluating the work is often non-existent. Many contractors and specifiers are faced with situations on jobsites where the lack of shotcrete-specific knowledge from the inspector has either limited the use of shotcrete or created potential litigious situations. The industry needs a knowledgeable on-site inspector, not necessarily an expert in contract documents or even a laboratory tester. As is the case with form-and-pour concrete, an inspector who has demonstrated basic shotcrete knowledge will be in a much better position to promote high-quality work.

## BACKGROUND

ACI Committee C660, Shotcrete Nozzleman Certification, identified the need for Shotcrete Inspectors and presented this to the ACI Certification Programs Committee. A focus study was conducted, and the results confirmed the industry need to proceed with the development of an Inspector Certification program. The objective of the Shotcrete Inspector Certification program is to verify a Shotcrete Inspector possesses the basic knowledge in both dry-mix and wet-mix shotcrete to:

- Recognize key details essential for quality shotcrete placement (surface preparation, placement, reinforcement encapsulation, rebound and overspray control, curing, finishing, and protection);
- Knowledgeably observe preconstruction and material panel preparation and handling (panel size, curing, protection, transportation, coring, and sawing); and
- Judiciously sign off on the acceptance of the final shotcrete work.

## REQUIREMENTS

Because certification as a Shotcrete Inspector requires more than simply being knowledgeable about shotcrete,

general concrete knowledge is also stipulated. Prerequisites for becoming a Shotcrete Inspector includes:

- The successful completion of a written examination (an open book exam pulling from the complete ACI 506 library, ASTM Standards, CCS-4, ASA's Safety Guidelines, and ACI hot- and cold-weather concreting documents);
- Certification as an ACI Concrete Field Testing Technician – Grade I (currently or previously with a successful completion within 1 year of the Shotcrete Inspector exam); and
- Demonstrated satisfactory education and work experience.

The education and work experience required for Shotcrete Inspector certification is 3 years of satisfactory work experience in at least one of the following areas:

- Testing, inspection, and quality control of shotcrete;
- Supervision of shotcrete construction work; and
- Design of shotcrete structures.

The scope of the Shotcrete Inspector Certification is broad and encompasses a vast amount of information. For more information, visit [www.concrete.org/certification](http://www.concrete.org/certification).

An understanding of the following are some examples of the types of knowledge required to achieve certification:

- What is structural shotcrete placement;
- The characteristics of the wet- and dry-processes;
- The purpose of preconstruction testing;
- The QA and QC requirements as required by the contract documents;
- The different types of shotcrete panels and their purposes;
- The objectives of a specific test program for a particular project;
- The differences in testing shotcrete versus form-and-pour concrete;
- The different tests for fresh properties of dry- versus wet-mix shotcrete;
- The relationship between equipment, material, nozzleman skills, and shotcrete quality;
- How shotcrete test specimens are obtained; and
- How environmental conditions affect shotcrete placement.

## SUCCESSFUL PILOT SESSION

A pilot session was conducted this fall where both the full-day ASA Shotcrete Inspector Education seminar and the ACI Shotcrete Inspector Certification exam were offered, along with the newly compiled CP-61Pack – Shotcrete Inspector Reference Package (now available for the open book exam). Valuable feedback was garnered from the pilot attendees, and with that feedback, the final product was ready for launch at The ACI Concrete Convention and Exposition – Fall 2019 in Cincinnati, OH.

## ASA SHOTCRETE INSPECTOR EDUCATION

Though the ASA Shotcrete Inspector Education is not a required component of the ACI Shotcrete Inspector Certification program, it is a recognized educational alternative, fulfilling 1 year of the 3-year required work experience identified in the program. This is a great learning opportunity for both seasoned and novices in the field, providing substantive content to reinforce the material covered in the written ACI Shotcrete Inspector Certification exam. The Education seminar is also beneficial to engineers, specifiers, building

officials, general contractors, supervisors, project managers, and others who would benefit from a better understanding of how to recognize quality shotcrete application. If you are interested in the education or certification, more information and scheduled events can be found at [www.shotcrete.org/pages/education-certification/shotcrete-inspector-program.htm](http://www.shotcrete.org/pages/education-certification/shotcrete-inspector-program.htm). If you are interested in hosting or coordinating an event near you, please contact ASA ([info@shotcrete.org](mailto:info@shotcrete.org)).

## SUMMARY

ASA acknowledges the hard work of ACI Subcommittee C660-I and ACI Certification staff who put this comprehensive program together. Though there are many inspectors with a thorough knowledge of concrete construction, few know the details required for quality structural shotcrete placement. This program is a valuable addition to extend the knowledge of existing concrete inspectors. Better knowledge of shotcrete on our concrete construction projects will let us further promote the safe and beneficial use of shotcrete and increase its recognition as an equal or superior to the more conventional form-and-pour placement method in more diverse applications.



**Randle Emmrich** is Vice President for Coastal Gunitite Construction Company, Bradenton, FL. She received her BS in civil engineering from Bucknell University, Lewisburg, PA. In her 20 years in the shotcrete business, she has overseen many projects, including the rehabilitation of bridges, piers, manholes, aqueducts, and sewers. Her projects have served various clients, such as the U.S. Army Corps of Engineers, ESSO Inter-America, the Maryland Transportation Authority, the Virginia Department of Transportation, the City of Atlanta, and the City of Indianapolis. Emmrich serves as Secretary of the ASA Membership Committee. She is also a member of ASCE; Chair of ACI Committee C660, Shotcrete Nozzleman Certification; and ACI Subcommittee C601-I, Shotcrete Inspector Certification; and a member of ACI Committee 506, Shotcreting.



**Charles Hanskat** is the current ASA Executive Director. He received his BS and MS in civil engineering from the University of Florida, Gainesville, FL. Hanskat is a licensed professional engineer in several states. He has been involved in the design, construction, and evaluation of environmental concrete and shotcrete structures for over 35 years. Hanskat is also a member of ACI Committees 301, Specifications for Structural Concrete; 350, Environmental Engineering Concrete Structures; 371, Elevated Tanks with Concrete Pedestals; 372, Tanks Wrapped with Wire or Strand; 376, Concrete Structures for Refrigerated Liquefied Gas Containment; 506, Shotcreting; and Joint ACI-ASCE Committee 334, Concrete Shell Design and Construction.

Hanskat's service to the American Society of Civil Engineers (ASCE), the National Society of Professional Engineers (NSPE), and the Florida Engineering Society (FES) in over 50 committee and officer positions at the national, state, and local levels was highlighted when he served as State President of FES and then as National Director of NSPE. He served as a District Director of Tau Beta Pi from 1977 to 2002. He is a Fellow of ACI, ASCE, and FES and a member of ACI, NSPE, ASTM International, AREMA, ICRI, and ASCC.



**Marc Jolin**, FACI, is a Full Professor in the Department of Civil and Water Engineering at Laval University, Quebec, QC, Canada. He received his PhD from the University of British Columbia, Vancouver, BC, Canada, in 1999. An active member of Centre de Recherche sur les Infrastructures en Béton (CRIB), he is currently involved in projects on automated placement of shotcrete, modeling of rebound, equipment optimization, and shotcrete rheology. Jolin is an ASA member; an ACI Examiner for Shotcrete Nozzleman Certification (wet- and dry-mix processes); Chair of ACI Committee 506, Shotcreting; Secretary of C601-I, Shotcrete Inspector Certification; and a member of ACI Committee C660, Shotcrete Nozzleman Certification.