Voices of the Concrete Sector

Industry leaders share their thoughts on concrete mixes, codes and industry advances to deliver improved performance systems, address workforce issues and prepare for anticipated material shortages.

What are the most prevalent challenges you are currently seeing within the sector?

Julie Buffenbarger, Former Chair, Committee 130, Sustainability of Concrete, American Concrete Institute (ACI), and Senior Scientist and Sustainability Principal, Betón Consulting Engineers: Our narrow view of sustainability. It is important on a national and global scale that the industry recognizes and adopts sustainability in a much larger fashion. Sustainability is about more than CO_2—it is also about the resilience of structures and the balance of our communities, the climate, the environment and economics. In the United States, ACI recently formed the ACI 318-19: Building Code Requirements for Structural Concrete and Commentary Sustainable Subcommittee. This subcommittee is an opportunity to influence comprehensive sustainable code development on a national and global scale and create steps similar to those taken by the International Federation for Structural Concrete's (fib) forthcoming Model Code 2020, which is an excellent example of a building code based on sustainability.

Brad Wucherpfining, President, Baker Construction Enterprises: Safety continues to be a primary emphasis, but labor availability is the number-one challenge. It is important for the industry to step up internal training initiatives and work closely with trade schools, colleges and even high schools to advance curriculums, raise awareness and create opportunity.

Dr. Larry Sutter, Assistant Dean, Research and External Relations, College of Engineering, Michigan Technological University, and Director, Transportation Materials Research Center, Michigan Dept. of Transportation: Three areas are of highest concern and necessity: 1) more sustainable cements with equal or higher performance to replace portland cement, 2) mitigating the occurrence of alkali-silica reactions and 3) alternative supplementary cementitious materials (SCMs) to replace fly ash. The first two are getting considerable attention, particularly in the research and testing space, such as the work done by the ACI Innovation Task Group 10.

However, I do not think there is enough attention placed on finding alternative SCMs to replace fly ash, which used to be affordable, plentiful and improved the quality of concrete. Over the past decade, the amount of fly ash produced has been cut in half, resulting in spot shortages around the country. As an alternative, some programs have focused on harvested fly ash drawn from landfills, but some users are concerned if harvested fly ash will perform the same as conventional fly ash. Natural pozzolans sourced from mineral and volcanic deposits are also drawing interest, as these siliceous materials can be used as a cement substitute and have high alkali-silica resistance.

Do you have any advice for the sector moving forward?

Sutter: If we want to make a difference in the construction space as it relates to cement and concrete, the development of manufactured SCMs is one place to start.

Wucherpfining: We are continually looking at new equipment, improved processes, innovative prefabrication, ways to leverage technology, and automated solutions to improve productivity and quality. For instance, we often preform concrete systems in the yard because it is a controlled environment that allows us to utilize different technologies that facilitate speed and enhances productivity, while also providing an even safer environment for our crews. Continuous improvement should be every organization's main focus right now.

Buffenbarger: As a sector, we must now collectively embrace the use of performance specifications over prescriptive counterparts. Unlike a prescriptive specification where the design community defines or restricts a concrete mixture in terms of its constituents and proportions (e.g., minimum cement content, limits on SCMs, maximum water-cementitious materials (w/cm) ratio, limits on the grading of aggregates or type used, brand of admixture and required dosage), a performance specification allows optimization of a concrete mixture to meet a defined set of clear, measurable, and enforceable instructions for application-specific functional performance criteria in terms of plastic and hardened properties (e.g., strength, durability to exposure class conditions, drying shrinkage, permeability).

Instead of the detailed list of mixture ingredients that is typical of submittals for a prescriptive specification, the submittals for a performance specification would be certification that the concrete mixture will meet the specification requirements and prequalification test results. Performance specification encourages collaboration within the construction team and can lead to innovative design, products and construction methods, resulting in more sustainable and superior projects and, ultimately, more satisfied customers. ◆