

Concrete Research Council Announces High-Strength Steel Research Product

The ACI Foundation's Concrete Research Council (CRC) is pleased to announce a new research product. Results for the research were published into two parts: Low-Cycle Fatigue Performance of High-Strength Steel Reinforcing Bars (Part 1) and Defining Structurally Acceptable Properties of High-Strength Steel Bars through Material and Column Testing (Part 2). This study was conducted to help define both feasible and structurally acceptable mechanical properties of high-strength steel reinforcing bars (HSRB). The study was sponsored by the Charles Pankow Foundation, the Concrete Reinforcing Steel Institute, and the CRC. Wassim Ghannoum, University of Texas at San Antonio, served as the primary investigator.

The study focused particularly on the seismic behavior and applications of HSRB, namely Grade 80 steel bars. HSRB have the potential to reduce bar congestion in seismic designs and can provide economic and environmental benefits. Grade 80 steel can be produced by several mills across the United States, making it readily available. Despite the availability and benefits presented by Grade 80 steel, its application has been hindered by current code limits on the strength of reinforcing steel and a lack of knowledge on the effects of higher-strength steel on the performance of concrete members.

Part 1 of the study was completed in 2015. It quantified the mechanical properties—particularly the low-cycle life of the HSRB under development in the United States. Part 2 was completed in 2016. It consisted of a targeted structural testing program aimed at uncovering any major issues in the performance of HSRB in concrete members, and it provided data needed to set material specifications for HSRB.

Part 1 results indicated significant departures between the fatigue performance of high-strength and regular-strength bars. The report identified possible adjustments in the manufacturing processes for HSRB, and it provided data for the creation of material specifications for a seismic grade of HSRB. Part 2 demonstrated that reinforcing steel bars with higher values of the tensile-to-yield ratio are preferred in seismic applications. Columns with HSRB were found to dissipate less energy than members of equivalent strength reinforced with Grade 60 bars. Data was mixed on whether the ductility of concrete members with HSRB was reduced compared to those with Grade 60 bars.

For more information about this and all CRC-sponsored research, visit www.concreteresearchcouncil.org.

Recap of SDC Technology Forum #41

The latest Strategic Development Council (SDC) Technology Forum #41, held February 23-24, 2017, in Dallas, TX, brought more than 70 attendees together to consider new

technologies with the potential to advance the industry. Some of the speakers and their topics are highlighted herein.

James Toscas, Portland Cement Association, related the latest developments in a comprehensive marketing platform designed to provide a robust and unified public positioning program for the concrete industry. The platform is to capture long-term goals and opportunities despite challenges from other industries.

ACI President Mike Schneider, Baker Concrete Construction, discussed ACI's Excellence in Concrete Awards program, which recognizes concrete projects at the forefront of innovation and technology and showcases them to inspire excellence in concrete design and construction. As he reviewed some of the projects in greater detail, Schneider noted that: "Concrete design and construction projects must integrate creative techniques and technologies to keep up with ever-evolving economic, environmental, and aesthetic demands. This is something members of SDC can understand and appreciate."

John Wallace, University of California, Los Angeles, discussed the National Science Foundation, Science Across Virtual Institutes (NSF SAVI) International Institute. The Institute's goals include integrating research projects and identifying research gaps in the performance of reinforced concrete wall systems. An international and collaborative approach is being used to create databases, educational programs, and state-of-the-art reports on topics such as biaxial loading.

Mike Mota, Concrete Reinforcing Steel Institute, provided updates on the integration of HSRB into the ACI 318 Code.

Konstantin Sobolev, University of Wisconsin-Milwaukee, discussed current and future applications of nanotechnology, a developing capability that offers numerous ways to improve the characteristics of concrete.

Amit Varma, Purdue University, discussed the challenges, opportunities, and potential strategies for ensuring the success of concrete in nuclear construction.

Several technologies were also showcased at the forum, including:

- ARDEX Concrete Management System™, a new, patented way to finish concrete relevant to those building sectors that require stringent flatness/levelness tolerances, fast-track construction, and moisture-sensitive flooring;
- ARIDUS® Rapid Drying Concrete technology from US Concrete for preventing moisture-related floor covering failures;
- PT Plug, an innovative way to provide efficient means for sealing post-tensioning anchor pockets;
- CellTech, LLC, a technology to entrain protective air voids into concrete by use of carbon dioxide (CO₂). These advances in technology optimize CO₂ for sustainable

- environmental impact and a consistent and stable air-void system;
- The Super Air Meter (SAM), a relatively recently developed piece of equipment and test method that is now an AASHTO standard that provides early information about the quality of the air-void system in concrete—a tool to improve the efficiency of assessing quality and durability of concrete; and
 - The presentation “Parametrizing Construction Scheduling with Artificial Intelligence” outlined an effective way to optimize construction scheduling.

Recap of Concrete 2029 Roadmapping Workshop

Concrete 2029 held its second roadmapping workshop prior to SDC Technology Forum #41. Over the course of this and previous 2029 meetings and workshops, participants have honed in on six foci for ensuring the future of the concrete construction industry:

1. Quality of Work Performed by Contractors;
2. Workforce Supply;
3. Long-Term Durability of Concrete;
4. Contractor Productivity;
5. Concrete Industry/Product Image; and
6. Building Standards/Code.

The primary thrust at the most recent workshop was on long-term durability and building standards. Experts in durability issues explored the integration of concrete durability into U.S. building codes. The presentations were geared to show how Australian, Japanese, Canadian, European, and Chinese codes and standards are moving to unify and harmonize durability, safety, serviceability, and restorability using a blend of prescriptive and performance requirements.

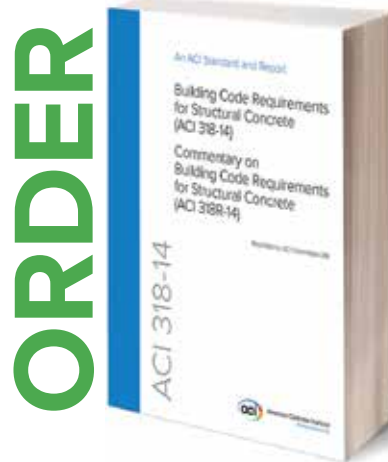
For more information or to get in touch with any of the forum or workshop speakers, contact Ann Daugherty, ann.daugherty@acifoundation.org.

Save the date for SDC Technology

Forum #42 in Reston, VA, from September 6-7, 2017. Attendees will learn from excellent presentations on

new technologies and will have the opportunity to tour the Turner-Fairbank Highway Research Center Facility.


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