

# 50th Annual CONCRETE CONFERENCE

March 7, 2014

SDSM&T - Rapid City, SD

7:30-8:00 a.m. Registration, Surbeck Center  
8:00-8:15 a.m. Welcoming Address  
SDSM&T President, Heather Wilson  
8:15-9:00 a.m. Control of Cracking in Concrete

Cracks have been a problem for as long as concrete has been used as a construction material, but understanding the factors that lead to cracking allows structures to be designed and constructed with minimum cracking. The causes of settlement and plastic shrinkage cracking in plastic concrete and the role of drying shrinkage, thermal stresses, poor construction practices, and errors in detailing or design on cracking in hardened concrete are described. Steps to minimize cracking in buildings, bridges, and slabs-on-grade are covered along with approaches that will limit cracking in any structure.

9:00-9:45 a.m. Mixture Proportioning, Then and Now  
Peter Taylor, Iowa State University

Relatively few people have ever determined the proportions needed for a concrete mixture. This is mainly because specifications often allow little freedom to adjust things, and many suppliers simply re-use the mix they used last time. In addition, proportioning approaches currently in use were mostly developed before SCMs and chemical admixtures were common, and when computing power was limited. In an age when sustainability is becoming more important, the range of ingredients is becoming more complex and budgets are increasingly constrained, we are being challenged to produce mixtures that achieve required performance more efficiently. This presentation will discuss mixture specifications, proportioning methods, and evaluation approaches.

9:45-10:15 a.m. Networking Break  
10:15-11:00 a.m. Material Behavior of Synthetic Fibers  
for Crack Control

Why does concrete cracking happen? What influences cracking and how are these influences minimized? How can cracking be controlled? We all know concrete and we all know how to interact, talk and listen, so why this presentation? Because we have to guard against the dreaded cracked concrete that can easily challenge everyone's expectations. To reinforce any expectation is to reduce the probability of cracking in concrete. Special tools and techniques, including chemical admixtures and mechanical reinforcing means, are discussed and considered for management of cracking in concrete. The author on several hundred occasions has proven techniques to ensure changing project expectations with Cracked Concrete.

11:00 – 11:45 a.m. Historical perspective of Technical Issues & Solutions Relating to Concrete  
V. Ramakrishnan, SDSM&T retired

Many innovative concrete material developments have happened at SDSM&T. This author has been instrumental influencing the worldwide concrete market. Projects, personal stories, and technical accomplishments will be presented regarding many aspects of concrete technology, including fiber reinforcements, testing, polymer concrete, and bio-concrete.

11:45 a.m. -1:00 p.m. Award Presentation and Lunch

1:00-1:45 p.m. SDSM&T Research and Concrete Activities in Mongolia  
Karen Schaefer and Tony Kulesa  
1:45-2:30 p.m. Historical perspective of Technical Issues & Solutions Relating to Concrete  
Dan Johnston, SDDOT retired

Over the last three decades, changes in concrete materials, design practices, admixtures, placement techniques, economics and applications have resulted in a substantial improvement to infrastructure while creating unexpected consequences from the perspective of concrete durability and performance. As issues have arisen, they have required a deeper understanding of cause and effect with research results being used to develop recommendations for specific changes in all aspects of concrete technology to insure adequate performance from pavements and bridges on a case by case basis. This presentation provides a brief sample of some of the issues that have arisen and the methods employed to mitigate any problems within the limitations of available resources.

2:30-3:00 p.m. Networking Break  
3:00-3:45 p.m. Corrosion Protection for Reinforcing Steel  
David Darwin, University of Kansas

The corrosion of reinforcing steel has a major impact on the durability and cost-effectiveness of concrete structures. Uncoated reinforcing steel loses its natural passive corrosion protection in concrete when exposed to chlorides or reduced pH. Methods to improve the corrosion resistance of reinforcing steel include the use of low permeability concrete, protective membranes, protective coatings, suppression of the electrochemical process, and corrosion-resistant metals. The performance of corrosion inhibitors and epoxy-coated, galvanized, low-carbon chromium, and stainless steel reinforcement is emphasized. These corrosion protection systems are compared based on corrosion losses, life expectancy, and cost-effectiveness, and the role of surface condition. Recommendations on best practices are offered.

3:45-4:30 p.m. The Reorganized ACI 318-14: Benefits, Rationale, and Availability  
Jerzy Z. Zemajtis, ACI

The American Concrete Institute's 318, "Building Code Requirements for Structural Concrete" covers the materials, design and detailing of structural concrete. This reorganization will benefit the entire design and construction community by making the code more intuitive and easier to use, thus providing increased confidence that a design satisfies all code requirements. Join us for an hour presentation titled "The Reorganized ACI 318-14: Benefits, Rationale, and Availability," to better understand how the updated code will benefit you professionally; the rationale behind the improvements; and when it will be available for public comment and purchase. Following the presentation, the ACI Staff Engineer will open the floor for a question and answer portion, during which they will elaborate on certain topics as they pertain to the audience.

4:30 – 5:30 p.m. Q&A and Refreshments/Networking