Research Pay Off Webinar

Ultra-High-Performance Concrete for Bridges

U.S. Department of Transportation
Federal Highway Administration

NEBRASKA
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DEPARTMENT OF TRANSPORTATION

This presentation will provide Professional Development Hours (PDHs)

About the Speaker

George Morcous

Dr. George Morcous is a professor at Durham School of Architectural Engineering and Construction at the University of Nebraska-Lincoln since 2005. He is a registered professional engineer in the State of Nebraska and Province of Nova Scotia. Dr. Morcous teaching interests include design of reinforced concrete, precast/prestressed concrete, formwork systems, and concrete bridges. His current research interests include ultra-high-performance concrete, self-consolidating concrete, and precast concrete systems and connections. Dr. Morcous is a fellow of the Precast/Prestressed Concrete Institute and member of ACI, ASCE, and TRB. He has three patents and over 150 refereed publications.

Current research includes:
- Design and Construction of Reinforced and Prestressed Concrete
- Bridge Engineering
- Infrastructure Management
- Self-Consolidating Concrete (SCC) and Ultra-High-Performance Concrete (UHPC)

Presentation Abstract: According to Federal Highway Administration (FHWA), Ultra-High-Performance Concrete (UHPC) is a cementitious composite material composed of an optimized gradation of granular constituents, a water-to-cementitious materials ratio less than 0.25, and a high percentage of discontinuous internal fiber reinforcement. The superior workability, durability, and mechanical properties of UHPC make it an excellent material for bridges. This webinar presents the various NDOT sponsored research projects in the last 6 years for developing non-proprietary UHPC mixtures and implementing them in bridge construction. This includes developing an innovative superstructure system that uses UHPC Decked I-beam and UHPC joints/connections for accelerated construction of medium and long span bridges. It also includes repair and/or strengthening of deteriorated/damaged girder ends and bridge piers; and protecting new and existing bridge decks using UHPC overlays. The challenges associated with the production, placement, and testing of UHPC are discussed. Examples of current and future implementation projects are also demonstrated.

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