FIRST INTERNATIONAL INTERACTIVE SYMPOSIUM ON ULTRA HIGH PERFORMANCE CONCRETE

DESMOIRES, IOWA JULY 18-20, 2016
WALO is a family owned business founded in 1917. We employ a total of 2,300 people. Since 1938, the company has specialized in Steep Liner Paving in Dam and Landfill Construction (DLC). In 1954 WALO started Concrete Layer Paving and in 1960 we became active internationally offering our products and services. In 2014, WALO developed an UHPFRC paver and completed the world’s first large machined application of Ductal®. We are successful because of our highly trained staff, mixing plants, logistics, machine design & production.

We completed UHPFRC paving of a total of 4,600 yards or 580,000 sq feet on two parallel interstate highway bridges and achieved a breakthrough in fast UHPFRC Layer Paving under heavy traffic. The overlay of 1.6 inches in most parts and 2.0 inches in the part of the girder close to the piers was completed on each bridge in 30 days. This very fast execution was made possible by the use of a casting machine specially developed for the placement of fresh UHPFRC over varying widths and levels at the correct height, plus the use of a customized on-site mixing plant.

Dumpers, filled at our UHPFRC mixing facility, supplied the machine regularly and just in time with fresh UHPFRC. The UHPFRC had to comply with the requirements of tensile strain hardening material properties. In addition, the fresh UHPFRC had to show thixotropic behavior as it was to be paved on slopes of up to 7%. This led to a fresh UHPFRC mix with low slump flow. Although UHPFRC materials are self-compacting, in the present case, it had to be put in place by vibrating screeds incorporated in the paver. This procedure had the advantage of leading to regular material quality while respecting the required UHPFRC layer thickness very precisely. Non-destructive measurements confirmed the consistency in UHPFRC casting and revealed only a slight preferential fiber orientation in the casting direction.

The whole project was a great success due to the scientific and technical collaboration between WALO®, FEDRO (clients & engineers) MCS (EPFL Prof. Brühwiler), Ductal® (Lafarge Holcim). Our unique selling proposition in teamwork with Ductal® and Scientists are UHPC-Systems based on evaluation, formulation, production on-site, paving and in-process know-how.

WALO US Holdings Inc. concentrates on UHPC and DLC projects and related machine design & production; we are open for discussions of Joint Ventures and creating jobs in the USA.
Dear Colleagues, Friends and Students,

On behalf of the Symposium Organizing Committee, we are excited to welcome all of you to the First International Interactive Symposium on Ultra-High Performance Concrete (UHPC). This is the first UHPC symposium to be held in North America and we are thrilled to host this international UHPC community gathering in Des Moines, Iowa—the state where the first UHPC bridge was built in the United States.

UHPC is seen as one of the major breakthroughs in concrete technology in the last two centuries. This material has attracted the interest of researchers, designers, practitioners, students, agencies, societies, contractors as well as suppliers through its excellent mechanical performance and resistance against environmental degradation. Numerous aspects of UHPC characteristics and performance have been investigated around the world and this effort continues to grow. UHPC not only serves as an innovative technology but it also unites people, disciplines and societies to achieve outcomes of high impact. Those goals are directed towards an enhancement of our safety, health and living conditions by positively impacting our environment, counteracting the degradation of the infrastructure, and providing inspiring, sustainable and cost-efficient solutions to our current problems and to those to come.

The Organizing Committee supported by the International Scientific Advisory Committee has made every effort to make this symposium interactive while providing a platform to share knowledge about material and structural design, application examples and new opportunities, and to identify knowledge gaps. Through this symposium, we aspire to grow the international UHPC family that consists of dedicated individuals who strive to accomplish new advancements. We hope you will actively participate in this symposium and help make it a truly successful and memorable UHPC event!

Yours sincerely,

Sri Sritharan   Benjamin Graybeal   Kay Willie  
Co-Chair   Co-Chair   Co-Chair  
Iowa State University   Federal Highway Administration   University of Connecticut
Sunday, July 17, 2016

4:30 - 7:00 pm  Symposium Registration, 3rd Floor
5:00 - 7:00 pm  Welcome Reception, Hall of Cities, 3rd Floor

Marriott Downtown Des Moines

Dinner on your own

Monday, July 18, 2016

7:30 am  Symposium Registration Opens, 3rd Floor
7:30 am  Continental Breakfast and Technical Posters go up, Des Moines Exhibit Hall, 3rd Floor
8:30 am  Welcome, Hall of Cities, 3rd Floor
Sri Sritharan, Symposium Co-Chair, Iowa State University, Ames, IA
Mayor Frank Cownie, City of Des Moines, Des Moines, IA
Johnathan Wickert, Senior Vice President and Provost, Iowa State University, Ames, IA
Paul Trombino III, Director, Iowa Department of Transportation, Ames, IA

Keynote Address, Hall of Cities, 3rd Floor
“Structural UHPFRC”: Welcome to the Post-Concrete Era!
Eugen Brühwiler, Professor at École Polytechnique Fédérale, Lausanne, Switzerland
Moderator: Ben Graybeal, Symposium Co-Chair, Federal Highway Administration, McLean, VA

9:25 - 9:30 am  Setting the Stage for Sessions & Interactive Panels; Rules, Objectives and Deliverables
Hall of Cities, 3rd Floor
Tess Ahlborn, Scientific Committee Chair, Michigan Technological University, Houghton, MI

9:30 - 10:20 am  Session 1: UHPC 101, Hall of Cities, 3rd Floor
Ben Graybeal, Federal Highway Administration

9:30 - 10:20 am  Student Poster Session, Des Moines Exhibit Hall, 3rd Floor

10:20 am  Networking Break & Student Posters Open for Viewing, Des Moines Exhibit Hall, 3rd Floor

Morning Sessions and Interactive Panels
10:50 am - 12:30 pm

Session Materials I, Davenport Room
Green Ultra-High Performance Glass Concrete, Arezki Tagnit-Hamou, Nancy Soliman, Ahmed Omran
Development of UHPC Using a Ternary Blend of Ultra-Fine Class F Fly Ash, Meta-kaolin and Portland Cement
Prasad Rao Rangaraju, Zhengqi Li
Analyzing Effects of Varied Silica Fume Sources within Baseline UHPC
Jedadiah F. Burroughs, Todd S. Rushing, Dylan A. Scott, Brett A. Williams
The Applications of Mine Tailings to Develop Low Cost UHPC, Sukhoon Pyo, Million Tafesse, Hyeong-Ki Kim
Ultra-High Performance Concrete Compression and Fracture Response Parameters for Lattice Discrete Particle Model Simulations, Rafic El-Helou, Erol Lale, Gianluca Cusatis, Cristopher Moen
Morning Sessions (cont.)
10:50 am - 12:30 pm

Session Material Behavior I, Dubuque Room
Behavior of Ultra-High-Performance Concrete at Early age: Experiments and Simulations
Gianluca Cusatis, Lin Wan, Roman Wendner

Influence of Cement Type and Type of Aggregate on the Fresh and Hardened Properties of UHPC & HPC
Philipp Hadl, Hoang Kim, Nguyen Viet Tue

Fiber Reinforcement Influence on the Tensile Response of UHPFRC
Igor De la Varga, Luis Felipe Maya Duque, Benjamin Graybeal

Experimental Investigations on the Scattering in the Post Cracking Tensile Behaviour of UHPFRC
Philipp Hadl, Hoang Kim, Nguyen Viet Tue


Session Bridges I, Sioux City Room
An Innovative Technology for Accelerated Bridges - The Owner-Designer Dilemma, Dominique Corvez, Vic Perry
Design and Construction of Illinois’s First Precast Deck Panel Bridge with UHPC Joints, David Liu, Jayme Schiff
Utilization of Ultra-High Performance Concrete (UHPC) in New York, Mathew Royce
Application of Ultra High Performance Concrete in Expediting the Replacement and Rehabilitation of Highway Bridges, Ataur Rahman, Tyler McQuacker

Overlay Ductal®: a durable solution for bridges retrofitting, Sébastien Bernardi, Damien Jacomo, Frédéric Boudry

10:50 am - Interactive Panel 1: Structural Design, Cedar Rapids/Council Bluffs Room
12:30 pm Design of UHPC Members and Codification, Des Moines Exhibit Hall
Chair: Sri Sritharan, Iowa State University
This interactive panel begins with an overview of UHPC bridges in Iowa, and includes additional structural design topics such as UHPC piles, UHPC wind turbine towers, design for blast loading, and ends with a discussion on design code issues.

12:30 - 2:00 pm Lunch (on your own) & Student Posters open for viewing,

Afternoon Sessions and Interactive Panels
2:00 - 3:40 pm

Session Architectural, Davenport Room
Elimination of Positive Pattern Production in Geometrically Complex UHPC Forms
Kelly Henry, Tristan Al-Haddad, Matthew Swarts

Prestressed Sandwich Beams with UHPC Layers, Alexander Stark, Martin Classen

Development of Stay-in-Place Formwork Using GFRP Reinforced UHPC Elements
Weina Meng, Kamal Henri Khayat

UHP-FRC for Architectural Structural Columns with Non-Euclidean Geometries, Shih-Ho Chao, Venkatesh Babu Kaka, Christopher Laskoski, Bradley Bell

New UHPFRC for the Realization of Complex Elements
Sébastien Bernardi, Fabien Perez, Espérance Fenzy
Monday, July 18, 2016 (cont.)

Afternoon Sessions and Interactive Panels
2:00 - 3:40 pm

Session Material Behavior II, Dubuque Room
Effect of Extreme Temperatures on the Coefficient of Thermal Expansion for Ultra-High Performance Concrete, Husam Hussein, Kenneth Walsh, Shad Sargand, Eric Steinberg

Effect of Different Curing Regimes on Strength and Transport Properties of UHPC Containing Recycled Steel Wire as Micro Steel Fibers, Jamil Kasaei, Jamshid Esmaeili

Effects of Silica Powder and Cement Type on Durability of Ultra-High Performance Concrete (UHPC), Mouhamed Alkaysi, Sherif El-Tawil, Zichao Liu, Will Hansen

Material Property Evaluation of Different Commercially-Available UHPC-Class Materials, Igor De la Varga, Zachary Haber, Jiqiu Yuan, Benjamin Graybeal

UHPC and FRC in Severe Environmental Conditions, Resistance Against Freeze-thaw Cycles, Aggressive Chemical Agents and Dynamic Loading, Stanislav Rehacek, Ivo Simunek, Jiri Kolisko, David Citek

Session Structures I, Sioux City Room
Product and Design Standards for UHPFRC in France, François Toutlemonde, Grégory Généreux, Michel Delort, Jacques Resplendino

Probabilistic Numerical Model of Cracking in Ultra-High Performance Fibre Reinforced Concrete (UHPFRC) Beams Subjected to Shear Loading, Pierre Rossi, Dominic Daviau-Desnoyers, Jean-Louis Talhan

Role of Force Resultant Interaction on Ultra-High Performance Concrete, Kevin R. Mackie, Jun Xia, Titchenda Chan

Three Dimensional Fracture Material Model for Ultra-High Performance Fiber Reinforced Concrete under Tensile Loading, Man Xu, Kay Wille

2:00 - 3:40 pm Interactive Panel 2: UHPC for Bridges Part 1 - UHPC for ABC Connections, Cedar Rapids/Council Bluffs Room
Chair: Ben Graybeal, FHWA
Beginning with an overview of UHPC connections used in accelerated bridge construction, this panel will host experts from Federal Highway Administration, NYSDOT, contractors and consultants to discuss experiences and define the status of field-cast UHPC connections for bridge construction and other applications.

3:40 - 4:00 pm Networking Break & Technical Posters Open for Viewing
Des Moines Exhibit Hall, 3rd Floor

Afternoon Sessions and Interactive Panels
4:00 - 5:40 pm

Session Materials II, Davenport Room
A New Mix Design Method for UHPC based on Stepwise Optimization of Particle Packing Density, Kim Huy Hoang, Philipp Hadi, Nguyen Viet Tue

Influence of Steel Fibres and Matrix Composition on the Properties of UHPFRC, Kim Huy Hoang, Philipp Hadi, Nguyen Viet Tue

Material Efficiency in the Design of UHPC Paste, Rui Zhong, Kay Wille

Characterization of High Strength Cement Paste with Pristine Graphite and Heptane-Graphite Emulsion, Aileen Vandenberg, Daniel Massucci, Steven Woltonist, Douglas Adamson, Kay Wille
Afternoon Sessions and Interactive Panels (cont.)

4:00 - 5:40 pm
Formulating Constitutive Stress-Strain Relations for Flexural Design of Ultra High-Performance Fiber-Reinforced Concrete, Shih-Ho Chao, Venkatesh Babu Kaka, Jinsup Kim

Session Structures II, Story City Room
The First North American Broad Based Structural Design Guide on UHPC - ACI 239C
Vic Perry, Paul White, Theresa (Tess) Ahlborn
Small-Scale Shear Connectors in HSC/UHPC, Martin Classen, Martin Herbrand, Alexander Stark, Josef Hegger
Investigation into Flexural Bond Strength Test Method to Evaluate Influence of Surface Roughness on Bond Characteristics of UHPC with Precast Concrete, Prasad Rao Rangaraju, Zhengqi Li
Development Length of Reinforcing Bars in UHPC: An experimental and analytical investigation
Vidyasagar Ronanki, Daniel Bridi Valentim, Sriram Aaleti
Delamination Assessment of an Ultra-High Performance Concrete Deck Overlay Using Infrared Imaging
Hartanto Wibowo, Richard Wood, Sri Sridharan

4:00 - 5:40 pm
Interactive Panel 2 (cont): UHPC for Bridges
Part 2 - The Future of UHPC for Bridges, Cedar Rapids/Council Bluffs Room
Chair: Ben Graybeal, Federal Highway Administration
An international perspective on UHPC bridges will be provided, with experts from Korea, France, PCI, and Iowa DOT leading the discussion. Participants will gain an understanding of the global approach to implementing UHPC for bridges.

4:00 - 5:40 pm
Interactive Panel 3: Architectural Design, Dubuque Room
Co-Chairs: Kelly Henry, LafargeHolcim; and Larry Rowland, Lehigh White Cement Co.
Topics for engagement with expert panelists include Architectural UHPC, the designer’s and prescaster’s perspectives on complex architectural elements, European production techniques and North American building requirements.

5:40 pm
End of technical sessions

6:30 - 8:30 pm
Reception, Des Moines Embassy Club, across 7th Street, top floor (Dinner on your own)

Tuesday, July 19, 2016

7:05 am -
UHPC Symposium Tours (see page 11 for details), Chair: Michael McDonagh
Tour 1: The Bridges of Wapello County - Load at 7:20 am (box breakfast provided)
Tour 2: The Bridges of Wapello County plus ISU Research Lab - Load at 7:50 am (box breakfast provided)
Tour 3: ISU Research Lab & UHPC Symposium Student Competition - Load at 8:50 am (note: this competition runs parallel to the tours)
Tour 4: Bridges of Wapello & Buchanan Counties - Load at 7:05 am (box breakfast provided)

Lunch on your own (Boxed lunches provided on tours only)

5:50 - 6:50 pm
Shuttles to the Iowa State Historical Building every 10 minutes,
Board busses at Marriott’s 7th Street entrance

6:00 - 7:00 pm
UHPC Reception, with hors d’oeuvres, cash bar, and entertainment,
Self-guided tour of The Iowa State Historical Museum
Tuesday, July 19, 2016 (cont.)

7:00 - 8:30 pm  UHPC Banquet & Awards Program, Iowa State Historical Building
8:30 - 9:30 pm  Busses return to Marriott Downtown Des Moines every 10 minutes

Wednesday, July 20, 2016

7:45 am  Symposium Registration Open & Continental Breakfast, 3rd Floor
8:15 - 8:50 am  Keynote Address, Hall of Cities, 3rd Floor
   *The FHWA Role in Innovation*
   Joseph Hartmann, Director, FHWA Office of Bridges and Structures, Washington, DC
   Moderator: Sri Sritharan, Symposium Co-Chair

Morning Sessions and Interactive Panels
9:00 - 10:20 am

Session Structures III, Davenport Room
Field Investigation of Ultra-High Performance Concrete Piles, Kam Ng, Jessica Gardner, Sri Sritharan
Pier Repair/Retrofit Using UHPC – Examples of Completed Projects in North America, Gaston Doiron
Cost and Ecological Feasibility of Using UHPC in Bridge Piers, Mohamed Moustafa, Christopher Joe
Experimental and Analytical Investigation of UHPC Pile-to-Abutment Connections, Sriram Aaleti, Sri Sritharan

Session Bridges II, Dubuque Room
Design Optimization of Bridge Decks with Precast UHPC Waffle Panels
Ebadollah Honarvar, Sri Sritharan, Jon Rouse, Sriram Aaleti
Development of a Sustainable UHPC Deck for Movable Bridges
Fatmir Menkulasi, Jacob Parker, Carlos Montes, Hadi Baghi, Jean-Paul Sandrock, Sergio Gomez
Structural Behavior of Lap-Spliced Joints in UHPC Bridge Deck Slabs
Sung Yong Park, Hoon-Hee Hwang, Keun-Hee Cho, Sung-Tae Kim, Hyo-Jeong Yun
Behavior of Ultra-High Performance Concrete Bridge Deck Panels Compared to Conventional Stay-in-Place Deck Panels
Valter Gora Venancio, John Myers

Session Materials Behavior III, Sioux City Room
Investigaiion of Crack Speed in Ultra-High Performance Concrete (UHPC) under High Speed Loading Rates
Mouhamed Alkaysi, Sukhoon Pyo, Sherif El-Tawil
Challenges in Assessing the Precision of High Strain Rate Testing for UHPC, Andrew Groeneveld, Theresa (Tess) Ahlborn
Influence of Steel Fiber Size and Shape on Quasi-Static Mechanical Properties and Dynamic Impact Properties of UHPC
Dylan A. Scott, Wendy R. Long, Robert D. Moser, Brian H. Green, James L. O’Daniel, Brett A. Williams
Effect of Design Parameters on the Blast Response of Ultra-High Performance Concrete Columns
Hassan Aoude, Sarah De Carufel, Frederic Dagenais, Christain Melançon

9:00 - 10:20 am  Interactive Panel 4: Materials Characterization, Cedar Rapids/Council Bluffs Room
Co-chairs: Kay Wille, University of Connecticut, & Robert Moser, USACE-ERDC
This panel will focus on the hot topic of UHPC Tensile Characterization and include experts in direct tension loading, flow and casting effects, and code implementation.
10:20 - 10:50 am Networking Refreshment Break & Student Posters open for viewing
Des Moines Exhibit Hall, 3rd Floor

**Morning Sessions and Interactive Panels**

10:50 am - 12:30 pm

**Session Materials III, Davenport Room**

Effect of Steel Fibers on Behavior of Ultra High Performance Concrete  
Heba Mohamed, Hamdy Shehab El-Din, Mahmoud Abd El-Hak Khater, Sayed Ahmed

On the Steel Fiber Efficiency of UHPC Beams subjected to pure Torsion, Mohammed Ismail, Ekkehard Fehling

Thermal Processing and Alloy Selection to Modify Steel Fiber Performance in Ultra-High Performance Concrete  
Paola Rivera-Soto, Robert Moser, Zackery McClelland, Brett Williams, Sarah Williams

Evaluation of Bond of Reinforcing Steel in UHPC: Design Parameters and Material Property Characterization  
Jiqiu Yuan, Benjamin Graybeal

**Session Bridges III, Dubuque Room**

The First Large Application of UHPC in the Czech Republic, Robert Coufal, Jan Vitek, Milan Kalny

Application of Ultra-High Performance Concrete in Bridge Engineering in China  
Qing-wei Huang, Bao-chun Chen, Ming-zhe An, Hwai-Chung Wu, Wen-Jin Huang, Qiu Zhao

Structural design for the Quickway System, Johannes Oppeneder, Lutz Sparowitz, Philipp Hadi, Viet Tue Nguyen

Benefits of Ultra-High Performance Concrete for the Rehabilitation of the Pulaski Skyway  
Michael McDonagh, Andrew Foden

KICT’s Application of UHPC to the First UHPC Cable Stayed Roadway Bridge  
Jongbum Park, Byung-Suk Kim, Changbin Joh, Sung Yong Park, Gyung-Taek Koh, Kihyon Kwon

**Session Material Behavior IV, Sioux City Room**

Seismic Behavior of Ultra-High-Performance Fiber-Reinforced Concrete Moment Frame Members, Shih-Ho Chao, Venkatesh Kakä, Guillermo Palacios, Jinsup Kim, Young-Jae Choi, Parham Aghdasi, Alireze Nojavan, Arturo Schultz

Effect of Transverse Reinforcement Detailing on the Axial Load Response of UHPC Columns  
Hassan Aoude, Milad M. Hosinieh, William Cook, Denis Mitchell

Blast Behaviour of One-Way Panel Components Constructed with UHPC  
Hassan Aoude, Sarah DeCarufel, Christian Melancon

Post-Blast Residual Loading Capacity of Ultra-High Performance Concrete Columns, Chengqing Wu, Jun Li, Hong Hao

Influences of the Fiber Reinforcement on the Dynamic Behavior of UHPC, Anne Kleemann, Oliver Milon, Alexander Stolz

10:50 am - 12:30 pm

**Interactive Panel 5: Rehabilitation & Retrofitting**

**Part 1 - Construction Procedures, Cedar Rapids/Council Bluffs Room**

Co-chairs: Vic Perry, ViConsult, Inc., and Gaston Doiron, LafargeHolcim

This two part series encourages participants and panelists to discuss and summarize the procedures, applications, and potential markets for UHPC in rehabilitation and retrofit projects. Experts are available to discuss various perspectives on pumping, spray-on applications, surface preparation and equipment needs.

12:30 pm - 2:00 pm Lunch on your own & Student Posters open for viewing
Wednesday, July 20, 2016 (cont.)

Afternoon Sessions and Interactive Panels
2:00 - 3:40 pm

Session Structures IV, Davenport Room

The Effect of Casting Flow Defects on the Flexural Behavior of 2-way UHPFRC Slabs Investigated by Digital Image Correlation and Magnetic Assessment, Luca Sorelli, Marc-Antoine Baril, Julien Réthoré, Florent Baby, François Toutlemonde, Liberato Ferrara, Marco Faifer, Sébastien Bernardi

Mechanical Behavior of UHPFRC Thin Plate Reinforced with Externally Bonded CFRP Sheet
Jun Xia, Yishen Li, Xiang Wang

Flexural Failure Modes of Ribbed Triangular UHPFRC Plates: Experimental and Numerical Investigation
François Toutlemonde, Thomas Guénet, Florent Baby, Pierre Marchand, Luca Sorelli, Sebastien Bernardi

Performance of UHPFRC Plates under Repeated Impact Load
Hesham Othman, Hesham Marzouk

Flexural Design Procedures for UHPC Beams and Slabs
Barzin Mobasher, Yiming Yao, Xinmeng Wang

Session Bridges IV, Sioux City Room

UHPF Connection of Precast Bridge Deck, David Citek, Jan L. Vitek, Jiri Kolisko, Stanislav Rehacek, Robert Coufal

Implementing Ultra High Performance Concrete (UHPC) with Dowel Bars in Longitudinal Joints (Shear Key) in an Adjacent Box Beam Bridge, Ali A. Semendary, Eric P. Steinberg, Kenneth K. Walsh

Bond between Ultra-High Performance Concrete and Steel Bars, Mouhamed Alkaysi, Sherif El-Tawil

UHPC in Non-Prestressed Reinforced Concrete (RC) Continuous Girder Sections for Bridge Elements
John Myers, Saipavan Rallabhandhi

Performance of Different UHPC-Class Materials in Prefabricated Bridge Deck Connections
Zachary Haber, Benjamin Graybeal

2:00 - 3:40 pm Interactive Panel 5: Rehabilitation & Retrofitting, Part 2 - Project Examples, Cedar Rapids/Council Bluffs Room

Co-chairs: Vic Perry, V.iConsult, Inc., and Gaston Doiron, LafargeHolcim

R&R project experiences will be summarized for pier jacketing, link slab and head joint connections, overlays, apron repairs and canal lock repair.

2:00 - 3:40 pm Interactive Panel 6: Mixture Proportioning & Formulating, Dubuque Room

Co-chairs: Kay Wille, University of Connecticut, and Brian Green, USACE-ERDC

Principles for mixture proportioning and formulating with raw materials, optimization, QA/QC, materials storage and batching, and mixture validation will be discussed with panelists and audience participation to summarize the current state of practice.

3:40 - 4:00 pm Network Break & Student Posters can be Removed, Des Moines Exhibit Hall, 3rd Floor

4:00 - 4:30 pm Closing Session, Hall of Cities, 3rd Floor

Report-backs from the 6 Interactive Panels and Wrap-up
Kay Wille, Symposium Co-Chair, University of Connecticut

4:30 pm Safe travels home!

Join us for our next International Interactive Symposium on UHPC in North America!
Keynote Speakers

Dr. Eugen Brühwiler
Monday, July 18, 8:30 a.m.
“Structural UHPFRC”: Welcome to the Post-Concrete Era!
Professor, École Polytechnique Fédérale, Lausanne, Switzerland

Eugen Brühwiler is a Full Professor at the École Polytechnique Fédérale in Lausanne, Switzerland. He received his doctoral degree from the Swiss Federal Institute of Technology in 1988 and his Civil Engineering diploma (university degree) from the Swiss Federal Institute of Technology in Zurich in 1983. His fields of expertise include structural and material engineering; existing civil structures in particular bridges of high cultural value; fatigue, dynamics and structural behavior of bridges; ultra-high performance fiber reinforced concrete and composite UHPFRC-RC structures. The activities as a Professor at the Swiss Federal Institute of Technology (EPFL) (since 1995) are motivated by the following vision: Methods for the examination of existing structures (Examineering) must be developed with the ultimate goal to limit construction intervention (and thus the client’s expenditure) to a strict minimum. If interventions are necessary then their objective is to improve the structure (not just to repair it). This goal is in agreement with the principles of sustainable development.

Dr. Joseph Hartmann
Wednesday, July 20, 8:15 a.m.
The FHWA Role in Innovation
Director of the FHWA Office of Bridges and Structures

Dr. Joseph (Joey) Hartmann is currently the Director of the FHWA Office of Bridges and Structures and is responsible for the development and implementation of Federal regulations, policy and technical guidance that support bridge and tunnel programs to improve safety and design practice at the national level. His office has statutory, regulator and delegated authorities for bridge and tunnel design on the Interstate System, implementation and oversight of the National Bridge and Tunnel Inspection Standards, maintaining the National Bridge and Tunnel Inventories and implementation of Federal floodplain regulations. In addition, his office provides leadership and direction in structural, geotechnical and hydraulic engineering aspects of all FHWA programs, and coordinates those activities with FHWA field offices, other Federal agencies, State Departments of Transportation (DOTs), local agencies, academia and with various other partners and customers. Since 2005, Dr. Hartmann has been an Affiliate Professor of Civil Engineering at George Mason University. He holds Bachelor of Science, Master of Science and Doctorate Degrees all in Civil Engineering from the University of Maryland.
The tour begins with a stop at the Town Engineering Building on the Iowa State University campus in Ames, Iowa. Hosted by Sri Sritharan, professor of Civil, Construction, and Environmental Engineering and author of numerous research papers on ultra-high performance concrete, attendees will be presented with information about on-going research and then taken on a tour of the structural engineering research laboratory to view several on-going UHPC research projects. Research topics that attendees will be exposed to include using UHPC for wind turbines, thin bonded bridge overlays, bridge elements, and field-cast connections.

The tour then departs for the Wapello County Engineer’s Office where Brian Moore, County Engineer, will present a mock-up of the UHPC waffle deck used on the Little Cedar Creek Bridge. From there, Brian Moore, the Wapello County Engineer, will take attendees on a guided visit of the actual Little Cedar Creek Bridge. Next, attendees will visit the Mars Hill Bridge, famous for its cutting edge use of UHPC bulb tee girders. After one last stop at the County Engineer’s office, the tour returns to Des Moines.

Box breakfasts and lunches will be provided for all attendees. Attire suitable for walking around and under bridges, including areas with possibly loose footing, along with closed toed shoes are recommended. Please note that the tour includes approximately 1.5 hours of driving each way between Des Moines and Wapello County. Information on the bridges will be presented on the bus during part of this time. Wi-Fi and power outlets at the seats will be available on the bus.

The Bridges of Wapello County plus Iowa State University Research Lab

Bus loads at 7:50 a.m. and returns at 5 p.m. (duration approximately 9 hours)

The tour begins with a stop at the Town Engineering Building on the Iowa State University campus in Ames, Iowa. Hosted by Sri Sritharan, professor of Civil, Construction, and Environmental Engineering and author of numerous research papers on ultra-high performance concrete, attendees will be presented with information about on-going research and then taken on a tour of the structural engineering research laboratory to view several on-going UHPC research projects. Research topics that attendees will be exposed to include using UHPC for wind turbines, thin bonded bridge overlays, bridge elements, and field-cast connections.

The tour then departs for the Wapello County Engineer’s Office where Brian Moore, County Engineer, will present a mock-up of the UHPC waffle deck used on the Little Cedar Creek Bridge. Brian will then take attendees on a tour of the actual Little Cedar Creek Bridge followed by the Mars Hill Bridge with its UHPC bulb tee girders.

Box breakfasts and lunches will be provided for all attendees. Attire suitable for walking around and under bridges, including areas with possibly loose footing, along with closed toed shoes are recommended. Please note that the tour includes approximately 45 minutes of driving between Des Moines and Ames (ISU), 2 hours of driving between Ames and Wapello County, and finally 1.5 hours of driving back to Des Moines. Information on the bridges will be presented on the bus during part of this time. Wi-Fi and power outlets at the seats will be available on the bus.
Tour 3

Iowa State University Research Lab & UHPC Symposium Student Competition

The tour takes place entirely on the Iowa State University Campus in Ames, Iowa. It begins with a one-hour presentation and tour of the structural research engineering laboratory in the Town Engineering Building, hosted by Sri Sritharan, Professor of Civil, Construction, and Environmental Engineering and author of numerous research papers on ultra-high performance concrete. Attendees will learn about on-going research on the use of UHPC for wind turbines, thin bonded bridge overlays, bridge elements, and field-cast connections, and tour the laboratory.

Attendees will also have an opportunity to observe some of the laboratory testing of the entries for the UHPC Symposium Student Competition. The winners of the competition will be announced at the evening’s Symposium Awards Banquet. Finally, attendees will have about an hour for a self-guided tour of the ISU campus before returning to Des Moines.

Box lunches will be provided for all attendees. Attendees will need to wear closed toed shoes for the laboratory tour. Please note that the tour includes approximately 45 minutes of driving each way between Des Moines and Ames. Wi-Fi with internet access and power outlets at the seats will be available on the bus.

Tour 4

The Bridges of Wapello County & Buchanan Counties

Bus loads at 8:50 a.m. and returns at 2:00 p.m. (duration approximately 5 hours)

This tour provides the opportunity to see the most in-service UHPC bridges. The tour begins in Buchanan County at the Jakway Park Bridge, which uses UHPC Pi girders to span Buffalo Creek. The next stop will be the Mud Creek Bridge, the first North American implementation of a UHPC thin bonded overlay, completed in May 2016.

The tour then proceeds to Wapello County, where attendees will visit the Little Cedar Creek Bridge with its UHPC waffle deck, followed by the Mars Hill Bridge and its UHPC bulb tee girders. Brian Moore, the Wapello County Engineer, will be at the bridge sites to provide detailed information and answer any questions.

Box breakfasts and lunches will be provided for all attendees. Attire suitable for walking around and under bridges, including areas with possibly loose footing, along with closed toed shoes are recommended. Please note that the tour includes significant drive time, including approximately 2.5 hours between Des Moines and Buchanan County, 2 hours between Buchanan and Wapello Counties, and 2 hours between Wapello County and Des Moines.
Lehigh White Cement Company

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THE FIRST INTERNATIONAL INTERACTIVE SYMPOSIUM ON UHPC

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As part of the FIRST INTERNATIONAL INTERACTIVE SYMPOSIUM ON ULTRA-HIGH PERFORMANCE CONCRETE (UHPC), a companion student competition will be held to grow interest in the area of UHPC amongst engineering and architecture students. The basic premise of the competition will be the design of an aesthetically pleasing and structurally efficient flexural beam made out of UHPC (proprietary or self-developed mix designs) that will be evaluated in two phases – 1) a written report and 2) onsite testing at the Symposium. Student teams will display their beams in The Des Moines Exhibit Hall on Monday, July 18.

Tuesday, July 19
8:30 a.m.  Bus loads from Marriott 7th Street entrance
10 a.m. - 4:30 p.m.  Testing and Tours
4:30 p.m.  Bus loads for return to Marriott

Teams include:
Iowa State University
Missouri University of Science & Technology
State University of New York, Buffalo
University of Alabama, Tuscaloosa
University of Nebraska, Lincoln
University of Ottawa
University of Texas, Arlington
Xi’an Jiaotong-Liverpool University

INTERACT!

This is the FIRST INTERNATIONAL INTERACTIVE SYMPOSIUM ON ULTRA-HIGH PERFORMANCE CONCRETE (UHPC) so we want you to interact! Participate in panel questions and polls by downloading the Sli.do App on your smart phone or tablet (search for “sli.do”). Enter the Event Code #2016 to submit questions to the speakers or respond to UHPC Symposium polls.
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As a pioneer in the global development, testing and commercialization of ultra-high performance concrete solutions, LafargeHolcim’s Ductal® UHPC has been used for two decades on some of the most innovative and challenging structural and architectural projects in the world. Thanks to its unique material matrix and superior properties, our Ductal® products ensure high durability and resiliency as well as unprecedented design flexibility. With excellent resistance to abrasion, impact, chemicals, freeze-thaw, carbonation and chloride ion penetration, your creation will last much longer than a lifetime. Thanks to our customers and collaborators, we are making history together.

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