

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

MONDAY DEC 7- 8:00 AM TO 10:00 AM SESSIONS

## GENERAL SESSION

TIME: MONDAY 8:00 AM - 10:00 A.M

ROOM: JAMES L. KNIGHT CENTER

SESSION MODERATOR:

Mal Kerley, NXL Construction Services, Inc.

### WELCOME

**Atorod Azizinamini**, Director ABC-UTC

**Mark Rosenberg**, President of FIU

Moderator, Mal Kerley, NXL Construction Services, Inc.

**Caesar Singh**, Director, University Grants Program, OST - Office of the Assistant Secretary for Research and Technology, U.S. Department of Transportation

**Gus Pego**, District Secretary, Florida Dept. of Transportation

### Keynote Speakers

Congressman **Mario Diaz-Balart**

FHWA Administrator, **Gregory Nadeau**

### RECOGNIZING TRAVEL SCHOLARSHIP CONTRIBUTORS

**Ed Power**, HDR

**Carlos Duarte**, CDR Maguire

### RECOGNIZING BEST ABC PROJECT WINNERS AND ABC PERSON OF THE YEAR

**Carmen Swanwick**, Chair of T-4 Committee, AASHTO

Caltrans embarked on a project which would replace the old pipe culvert, with a new 60-foot long single span Precast Pre-stressed Concrete Voided Slab Bridge. Because of the impending salmon spawning season, it was critical to complete the work within a single season. Adding to the challenge was the fact that the nearest concrete batch plant was located 76 minutes away. Long delivery time would have required the use of retarders which could increase the potential of having to reject some loads delivered to the project, causing an increased risk of cold joints in the superstructure and an overall increase in project cost.

### 11:30 AM - Noon

#### The Value of ABC: A Rural DOT Perspective

*Jennifer Fitch, Vermont Agency of Transportation*

In rural states like Vermont, it can be harder to justify the value ABC where average daily traffic volumes and associated roadway user costs tend to be low leading to higher construction costs as compared to conventional construction. In addition, roadway networks are scarce resulting in lengthy detours making it difficult to garner public support. With Vermont's lengthy and arduous environmental permitting and right-of-way acquisition processes, the use of ABC has substantially reduced the time it takes to deliver bridge rehabilitation and replacement projects ultimately lowering design costs and reducing resource demands.

## G-1: STATE ABC EXPERIENCES I

TIME: MONDAY 10:30 AM – NOON

ROOM: JAMES L. KNIGHT CENTER

### 10:30 AM - 11:00 AM

#### Hartford Vermont Bridge Replacement - SIBC and CMGC Project Delivery

*Kristin Higgins, Vermont Agency of Transportation*

*Tim Davis, PCL Civil Constructors, Inc.*

The Hartford I-91 Bridge replacement project is an example of innovative project delivery in conjunction with accelerated bridge construction as a means to successfully deliver and construct a complicated project with high public expectations for mobility. The Hartford project consists of two complete bridge replacements (bridges 43N and 43S) on Vermont's eastern interstate 91. Through the process of mitigating and eliminating project risk, Slide-in Bridge Construction (SIBC) was determined to be the best solution for this site. As with any new technology there were concerns with embracing SIBC for the first time.

### 11:00 AM - 11:30 AM

#### Fort Goff creek bridge fish passage.

*Dorie Mellon, Caltrans*

## G-4: LATERAL SLIDE CASE STUDIES I

TIME: MONDAY 10:30 AM – NOON

ROOM: ORCHID

### 10:30 AM - 11:00 AM

#### THE LARDO BRIDGE SLIDE

*Brian Byrne, Lochner*

The Lardo Bridge was Idaho Transportation Department's first use of slide-in-bridge-construction technology. The new single-span 155-foot precast concrete girder bridge in the resort town of McCall replaced an existing 5-span bridge carrying SH-55 over the outlet of Payette Lake. In order to minimize the traffic during the peak tourist season, the new superstructure was built to the north of the existing bridge on its permanent abutments while maintaining traffic on the existing bridge. During the Fall of 2014, the existing bridge was demolished and the new 3.5 million pound bridge was slid into place.

### 11:00 AM – 11:30 AM

#### M-100 Superstructure Slide in the City of Potterville, Michigan

*Daniel Broekhuizen, AECOM*

The Michigan Department of Transportation (MDOT) chose the replacement of the single-span steel bridge carrying M-100

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

MONDAY DEC 7- 8:00 AM TO 10:00 AM SESSIONS

over the CN/GTW railroad in Potterville, Michigan, to be designed using slide-in construction. This project was chosen to utilize ABC in order to minimize user delay costs. MDOT selected URS Corporation (now AECOM) to assist with the slide-in design for this project, the first in the state of Michigan performed using steel rollers. The presentation will discuss design and construction issues as well as lessons learned.

**11:30 AM - Noon**

## **Lateral Slide of Historic Bridge in Washington State**

*Kevin Dusenberry, Jacobs*

To shorten construction time and minimize construction costs, an existing truss was moved to become a detour bridge. Moving of the bridge allowed for use of the existing roadway alignment and infrastructure for the permanent construction. Preserving the existing alignment eliminated the need for retaining walls, barrier and sidewalk modifications to the existing SB bridge, new signals and major utility relocation. Elimination of new roadway elements greatly reduced construction time and costs. The presentation will demonstrate how the 371' long, 1.5M pound truss was moved and lessons learned along the way.

proposed in terms of maximum allowable settlement of bridge foundations.

**11:30 AM - Noon**

## **Assessment, Risk Management And Rehabilitation Of Existing Structural Foundations**

*Jerry DiMaggio, Applied Research Associates*

This presentation will address the program, process and project issues associated with the assessment, risk management and rehabilitation (reuse and enhancement) of existing structural foundations (both shallow and deep). The reuse of existing structural foundations, both shallow and deep, is an emerging technical subject which provides significant opportunities (benefits of cost and schedule) as well as risks (compatibility, long term reliability and costs) for the highway engineering and construction community.

## **G-6: RE-USE OF EXISTING SUBSTRUCTURES FOR ABC PROJECTS**

TIME: MONDAY 10:30 AM – NOON

ROOM: JASMINE

**10:30 AM - 11:00 AM**

### **Foundation Characterization and Reuse in ABC Projects**

*Frank Jalinoos, FHWA*

The reuse of bridge foundations in ABC projects is gaining popularity in order to save time and money. However, there are many challenges for the reuse of existing foundations. This paper showcases the use of destructive, nondestructive, wireline logging, and geophysics at the Lake Mary Road Bridge in Arizona. The bridge is located southeast of Flagstaff, Arizona along Lake Mary Road. The three-span bridge is 104-foot long and 34-foot wide and is slated for a rehabilitation project to widen the deck with reusing the existing foundation elements.

**11:00 AM - 11:30 AM**

### **Load Rating of Bridge Foundations Anil Agrawal, The City College of New York**

*Enssan Hoomaan, The City College of New York*

Load rating of bridge superstructures is carried out regularly to determine their permissible load carrying capacity. In the current practice of load rating, the analytical mode of the bridges includes only the superstructure. In this research, an integrated approach to load rate bridges is proposed. In this approach, effect of settlement on the bridge superstructure is investigated to determine the maximum allowable settlement. Load rating criteria for the entire bridge structure are

## **G-11: ABC RESEARCH I**

TIME: MONDAY 10:30 AM – NOON

ROOM: HIBISCUS A

**10:30 AM - 11:00 AM**

### **Slide-in bridge construction cost estimation tool**

*AJ Yates, Michael Baker International*

Michael Baker International and Leidos, Inc. developed a SIBC Cost Estimation Tool for the FHWA as part of the Every Day Counts Initiative to advance innovative techniques. Our team developed an Excel spreadsheet with an accompanying guide manual to assist agencies in evaluating traditional construction alternatives with SIBC alternatives. The tool also aids in estimating a slide construction cost bid item. The presentation will conclude with examples of how the tool can be used on real world projects.

**11:00 AM - 11:30 AM**

### **Precast bridges subjected to very important horizontal loads**

*Luis Javier Sanz, IMAGINA  
Moises Olivares, TITANDOL*

From the first high speed railway line opened, a lot of precast bridges have been built with optimum results. This accumulated experience make possible to introduce those procedures in every kind of precast structure subjected to important horizontal loads, static or dynamic. A recent case is presented. It's a high speed railway bridge with a deck formed by precast elements. The project velocity corresponds to high speed standards, 350 km/h. An alternative procedure of span-by-span methodology was finally developed with optimal results.

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

## MONDAY DEC 7- 8:00 AM TO 10:00 AM SESSIONS

11:30 AM - Noon

**Effect of the interface moisture content on the bond performance between a concrete substrate and a non-shrink cement-based grout**

*Igor De la Varga, SES Group*  
*Jose Munoz, SES Group*  
*Dale Bentz, NIST*  
*Benjamin Graybeal, FHWA*

The use of PBE is one strategy that can meet the objectives of ABC. The Structural Concrete Research Program at the FHWA Turner-Fairbank Highway Research Center has conducted an extensive research program in which the performance of different grout-type materials was evaluated, with special focus on shrinkage performance. As a continuation of that line of investigation, this paper reports on research to assess the bond performance of a grout slab poured on top of a concrete slab.

11:30 AM - Noon

**Innovative Construction Methods to Replace the Division Street Bridge over the North Branch Canal in Chicago, Illinois**

*Eugene Sobecki, Acrow Bridges*  
*Scott Patterson, Acrow Bridges*

The Chicago DOT selected F.H. Paschen, S.N. Nielson & Associates to replace the Division Street Bridge over the North Branch Canal in Chicago, IL in June 2014. The new plan was to demolish a 101-year-old trunnion bascule bridge immediately and replace it with an interim bridge to have it opened no later than October, 2014. The bridge was opened ahead of the scheduled date and the contractor, was subsequently recognized as the Outstanding Bridge Contractor of the Year by the City of Chicago DOT.

### **G-9: ABC CONSTRUCTION SOLUTIONS**

TIME: MONDAY 10:30 AM – NOON

ROOM: HIBISCUS B

10:30 AM - 11:00 AM

**Mechanized ABC of Large-Scale Projects**

*Marco Rosignoli, Dragados USA*

Bridge dimensions govern structural design through technology implications. Design approach and construction technologies are different in small- and large-scale ABC projects. Construction of large-scale projects is accelerated by means of heavy and ultra-heavy bridge units which are prefabricated and set for placement through multiple factory-like production lines, and which are positioned with specialized equipment. With extensive illustrations of international case studies, the presentation examines the different mechanized ABC techniques for large-scale prestressed-concrete bridge projects.

11:00 AM - 11:30 AM

**Is that Bridge Open Yet? ABC lessons from a Contractor's perspective**

*Michael Zicko, HCB, Inc.*

Replacement of existing bridge superstructures with modular units involves the geometric and environmental constraints of the existing structure. The new piece must be able to replace the existing piece in kind and be ready for operation. The author's experience will illustrate how these challenges were met from his perspective as a Contractor and a Fabricator in the early days of ABC. This paper will show how these challenges became opportunities and have led to the widespread implementation of PBES and how they are still being used.

## MONDAY DEC 7- 1:00 PM TO 3:00 PM SESSIONS

### **G-3: EVALUATION AND MONITORING OF ABC BRIDGE MOVES**

TIME: MONDAY 1:00 PM – 3:00 PM

ROOM: JAMES L. KNIGHT CENTER

1:00 PM - 1:30 PM

**Superstructure monitoring during SPMT movement**

*Ryan Drefus, Geocomp Corporation*  
*Jack Salerno, Geocomp Corporation*  
*Thomas Weinmann, Geocomp Corporation*

This Presentation discusses technologies for real time monitoring of transportation induced stresses to ensure that the structural integrity of the superstructure is maintained and that no unanticipated stresses are induced into the structure during the move or subsequent placement. In addition to stresses, the paper will address methodologies used to monitor deflection and rotation during transport. The paper focuses on the replacement of two bridge in Southington, CT which span over I -84. The bridges had a condition rating of 4 (on a scale of zero to nine) and were scheduled for replacement. The superstructures were constructed adjacent to the existing site and moved into place using a SPMT.

1:30 PM - 2:00 PM

**Friction Values for Slide-In Bridge Construction**

**Kristopher Johnson, Utah State University**

*Marvin Halling, Utah State University*  
*Paul Barr, Utah State University*  
*Marc Maguire, Utah State University*

Researchers at Utah State University carried out multiple tests to determine the effects of parameters such as the roughness of the Stainless Steel surface, lubricants used on the surface, pressure applied and sliding speed of the bridge on the CoF during bridge slides. Tests were performed using Type 304 Stainless Steel with three different levels of surface roughness

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

MONDAY DEC 7- 1:00 PM TO 3:00 PM SESSIONS

ranging from rough to smooth. Tests were also conducted using Carbon Steel in order to determine how well the bridge would slide if the girders were placed directly on the PTFE pads. This option would eliminate the need for contractors to purchase and install stainless steel sheets for the sliding surface.

**2:00 PM - 2:30 PM**

## **Structural Response Monitoring to Assess Bridge Condition During Construction**

*Chris Kavars, SENSR LLC  
Shane Boone, SDB Technologies LLC*

An SRM system was installed on the Highway 61 Hastings Bridge that spans the Mississippi River in Hastings, Minnesota during the construction of a new, adjacent bridge. The objective of the installation was to monitor the movement and vibrations of the existing bridge during construction of the new structure. The monitoring system reduced the amount of field surveying necessary and acted as a key indicator for potential movements and subsequent supplement survey demands. Bridge tilt and vibration response was monitored and calibrated against environmental conditions to gauge if the boundary conditions of the bridge were acting as expected.

**2:30 PM - 3:00 PM**

## **Bridge Pier Movement and Forces during Slide-In**

*Upul Attanayake, Western Michigan University  
Abdul Mohammed, Western Michigan University  
Ozan Ridvanoglu, Western Michigan University  
Corey Rogers, Michigan DOT  
Haluk Aktan, Western Michigan University*

In 2014, the Michigan Department of Transportation (MDOT) replaced three bridges using Slide-In method. One of them is a two-span bridge that was slid directly on the bearings. In this case, sliding forces were directly applied to the bridge and the gravity and friction forces were transferred to the substructure. During the slide, movement of the pier on a shallow foundation was monitored. Later, the monitoring data was used to estimate the forces acting on the pier. Further, the stresses developed during bridge slide were calculated by using a refined finite element model. The analytical and numerical investigations required detailed modeling of soil-structure interaction. Yet, elastic settlement of soil was considered due to short-term loading acted on the pier during slide in. The presentation will detail the observations during bridge slide, the bridge pier monitoring, and the analytical and numerical investigation results.

## **G-4: LATERAL SLIDE CASE STUDIES II**

TIME: MONDAY 1:00 PM – 3:00 PM

ROOM: ORCHID

**1:00 PM - 1:30 PM**

**Highway 406 Glendale Avenue Overpasses Rehabilitation: Lateral Slide Rapid Bridge Replacement**

*David Cerullo, MMM Group Limited  
James Sherlock, MMM Group Limited*

Conventional staged construction replacement of the superstructures would have resulted in unacceptable traffic impacts. As a result, a feasibility study on alternate accelerated bridge construction methods was completed and the employment of the jack and lateral slide methodology for superstructure replacement was chosen as the most favorable alternative. The rapid bridge replacement works involved three sets of activities, namely: (i) Pre-Slide, (ii) Closure and (iii) Post-Slide activities. The result is two, three-span continuous superstructures with semi-integral abutments, supported on rehabilitated and modified pre-existing substructures, constructed with minimal disruption to traffic.

**1:30 PM - 2:00 PM**

## **Going the Distance: The Lateral Sliding of Four Railway Bridges at West Toronto Diamond in Toronto.**

*Brent Archibald, Parsons  
Victor Anderson, Parsons  
Tibor Magyarosi, Metrolinx  
John Unsworth, Canadian Pacific*

This paper describes how Accelerated Bridge Construction (ABC) techniques were used for the construction of four railway bridges for the West Toronto Diamond Rail to Rail Grade Separation project in Ontario, Canada. The project consisted of eliminating at-grade diamond crossings of the Metrolinx Kitchener Corridor (corridor formally owned by the Canadian National Railway (CN)) and the Canadian Pacific Railway (CP) tracks in the Junction area of Toronto, an area which takes its name from the confluence of these railways. The project will greatly enhance all affected rail operations and safety at this site, hence having long term continuing economic and social benefits for the lifetime of the project in service.

**2:00 PM - 2:30 PM**

## **Larpenteur avenue bridge**

*Logan Julander, Michael Baker International  
Dan Ferris, Ames Construction Inc.*

The 187' two-span prestressed concrete girder Larpenteur Avenue Bridge was design and constructed as part of the \$98 million I-35E MnPASS design-build project. This presentation will discuss the unique features of the bridge, temporary supports, and analysis and detailing for moving the bridge into place. The presentation will also discuss the construction issues, rapidly developed solutions, and recommendations for future designs to avoid such issues.

**2:30 PM - 3:00 PM**

## **Development of Systematic ABC Program: Consultant's perspective**

*Noopur Jain, AECOM*

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

MONDAY DEC 7- 1:00 PM TO 3:00 PM SESSIONS

## G-10: PBES CONNECTION DETAILS AND MATERIALS

TIME: MONDAY 1:00 PM – 3:00 PM

ROOM: JASMINE

1:00 PM - 1:30 PM

### Evaluation and Design of Resilient Concrete Filled Tube Column-to-Precast Cap Beam Connections

*Max Stephens, University of Washington  
Dawn Lehman, University of Washington  
Charles Roeder, University of Washington*

This research describes an experimental investigation and development of design procedures for 3 different CFT (Concrete Filled Tube) column-to-cap beam connections. Large scale experiments evaluated the seismic performance of these connections. Results from the experimental investigation showed that the three connection types provide excellent ductility under reversed-cyclic loading while mitigating damage to the cap beam.

1:30 PM - 2:00 PM

### Rapid Bridge Deck Joint Repair and Rehabilitation

*James Nelson, Iowa DOT  
Adam Miller, Iowa State University  
Charles Jahren, Iowa State University*

Suggested approaches that resulted from the workshops with subject matter experts from design, construction, maintenance, and materials and other investigations are:  
•Eliminate the requirement to maintain existing rebar. •Remove the smallest amount of concrete possible. •Redesign strip seal anchorages •Investigate hydrodemolition. •Consider the use of polymer concretes for joint headers that cure in as little as 4 hours •Plan for the user of high early strength concrete. This paper describes in greater detail the background, research methodology, findings, and conclusions of this investigation.

2:00 PM - 2:30 PM

### Precast Substructures for ABC— Case Studies in Design & Construction

*Alan Phipps, Figg Engineering  
Dwight Dempsey, Figg Engineering*

Precast substructures are durable, efficient, and offer exceptional speed of construction. They achieve all the benefits of accelerated bridge construction methods: enhancing safety, durability and efficiency; preserving natural resources; and maximizing mobility.

This presentation will include construction materials, methods and connection details from completed, award-winning precast segmental bridges with precast substructures.

2:30 PM - 3:00 PM

### FIELD-CAST CONNECTIONS FOR PREFABRICATED DECK PANELS: Performance of Pre-Bagged Connection Grouts

*Zachary Haber, Professional Service Industries, Inc.  
Benjamin Graybeal, FHWA*

This paper will focus on key points from previous and current research being conducted at the FHWA Turner-Fairbank Highway Research Center on Field-Cast connections for prefabricated bridge deck systems. A series of precast deck panel connection tests were carried out to assess the performance of various pre-bagged grouts in conjunction with different connection details. Decklevel connection assemblies were subjected to three different loading protocols, which included cyclic crack loading, fatigue loading, and monotonic loading until failure. Bond strength between precast concrete and fieldcast grouts was also assessed.

## G-11: ABC RESEARCH II

TIME: MONDAY 1:00 PM – 3:00 PM

ROOM: HIBISCUS A

1:00 PM - 1:30 PM

### SHRP2 ABC Details Lead to a Successful Bridge Replacement in Maine

*Tom Kendrick, McFarland Johnson, Inc.  
David Kull, McFarland Johnson, Inc.  
Leanne Timberlake, Maine DOT*

This project involved the use of ABC techniques to replace an aging single span concrete rigid frame highway overpass structure. Because of local traffic patterns and other nearby bridge replacement projects, a bridge closure period of 30 days was agreed upon by the design team. Attendees will benefit from this presentation by learning how ABC projects with shallow bedrock can be successfully constructed using innovative ABC details. Project challenges and lessons learned from the design, fabrication and construction perspective will be reviewed and discussed.

1:30 PM - 2:00 PM

### Development of prediction model for ultimate flexural and shear capacities of jointed precast deck panels in bulb-tee girder system

*Imad Eldin Khalafalla, Ryerson University  
Khaled Sennah, Ryerson University*

This paper presents analytical study on the findings of a series of experimental tests on full-scale precast deck joints in bulb-tee bridge girder system reinforced with corrosion-resistant glass fiber reinforced polymer (GFRP) bars. Results from tested slabs were analyzed to develop a theoretical model to predict the ultimate load carrying capacity of precast deck joints reinforced with headed-end or L-shaped GFRP bars as a result of (i) flexural failure, (ii) combined flexural-shear failure, and (iii) punching shear failure.

2:00 PM - 2:30 PM

### Data Base of all available ABC projects and research information

*David Garber, FIU*

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

## MONDAY DEC 7- 1:00 PM TO 3:00 PM SESSIONS

In recent years there has been a significant push for more durable bridges that are less expensive and take less time to construct. These desires within the bridge community have led to numerous federal, state, and local agencies encouraging the use of accelerated bridge construction (ABC) practices. This push has led to numerous bridge projects and research studies being undertaken across the United States. In this presentation the development of an interactive database compiling both ABC research efforts and ABC bridge projects will be discussed. This database will prove to be an invaluable tool for both designers and researchers.

**2:30 PM - 3:00 PM**

### **Extending application of Simple for Dead Load and Continuous for Live Load (SDCL) steel bridge system to high seismic areas**

*Ramin Taghinezhad, FIU  
Atorod Azizinamini, FIU*

Recently a new steel bridge system, referred to as "Simple for Dead Load and Continuous for Live Load (SDCL)" has gained popularity in non-seismic areas of the country. The SDCL bridge system advances the bridge construction to elimination of expansion joints and bolted connections. The SDCL system is also best suited for accelerating the construction process. To-date no research studies have been conducted to extend the applicability of SDCL system to seismic regions for ABC. The main objective of this research is to extend the application of SDCL to high seismic areas.

This paper will present the approved changes to the LRFD Specifications related to lightweight concrete and give the background data used to justify the changes. The change to the equation to estimate the modulus of elasticity of concrete, which was approved in 2014, will also be discussed. The effect of the changes will be illustrated with numerical examples.

**2:00 PM - 2:30 PM**

### **Lightweight Aggregate as Geotechnical Fill for ABC Projects**

*Reid Castrodale, Castrodale Engineering Consultants, PC*

This paper presents the properties of structural lightweight aggregate that make it a durable material for geotechnical fill applications. Several examples of projects where lightweight aggregate has been used for bridge projects will be included, including a secured entrance ramp into the Pentagon that had to be constructed very quickly using MSE wall elements after the 9/11 attacks.

**2:30 PM - 3:00 PM**

### **Use of Lightweight Concrete for Bridges Moved into Place**

*Reid Castrodale, Castrodale Engineering Consultants, PC*

This paper presents the properties of lightweight concrete that can be used for bridges that are to be moved into place. An example of the weight reduction possible for a bridge moved by Self-Propelled Modular Transporters (SPMTs) will be given. The reduction of negative moment in the deck of a bridge supported inside the final bearings will also be discussed.

## **G-18: ADVANCED MATERIALS FOR ABC**

TIME: MONDAY 1:00 PM – 3:00 PM

ROOM: HIBISCUS B

**1:00 PM - 1:30 PM**

### **Understanding the applications and Advantages of Calcium Sulfo-Aluminate (CSA) Cement Technology in Accelerated Bridge Construction**

*Chris Davis, CTS Cement Mfg. Corp / Rapid Set Products  
Ken Vallens, CTS Cement Mfg. Corp / Rapid Set Products*

This presentation reviews the fundamentals of Calcium Sulfo-Aluminate (CSA) cement technology and its key performance advantages in Accelerated Bridge Construction. CSA materials can be used to further accelerate traditional ABC designs and allow designers increased flexibility for designing new types of Accelerated Bridge Construction by maximizing early strength gain.

**1:30 PM - 2:00 PM**

### **Recent Changes in AASHTO LRFD Specifications Regarding Lightweight Concrete**

*Gary Greene, Trine University.  
Reid Castrodale, Castrodale Engineering Consultants, PC  
Benjamin Graybeal, FHWA*

## MONDAY DEC 7- 3:30 PM TO 5:30 PM SESSIONS

## **G-1: STATE ABC EXPERIENCES II**

TIME: MONDAY 3:30 PM – 5:30 PM

ROOM: JAMES L. KNIGHT CENTER

**3:30 PM - 4:00 PM**

### **Advances in Accelerated Bridge Construction in Washington State Seismic Regions**

*Bijan Khaleghi, WSDOT*

This paper presents the WSDOT strategic plan for ABC implementation. It provides guidance for ABC impact quantification by calculating the bridge construction index for construction time saving and traffic delay reduction into cost savings. It discusses the ongoing ABC research and construction projects in Washington State. The discussion expands on seismic design issues of ABC and conformity with the LRFD Guide Specifications and the WSDOT Bridge Design manual for ABC.

**4:00 PM – 4:30 PM**

### **Replacement of SR 0581 Twin Bridge Superstructures over Weekends**

*Harivadan Parikh, PennDOT*

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

MONDAY DEC 7- 3:30 PM TO 5:30 PM SESSIONS

In this Presentation, construction details of the twin bridge superstructure built near the old bridges on temporary supports, lifting of the existing superstructures, placement of the new superstructures, contract specified materials and actual material selected by the contractor for the deck closure pour, and latex overlay are discussed. Also, a brief overview of the maintenance and protection of traffic, public outreach program, and lesson learned during design and construction of this project are discussed in this paper.

**4:30 PM - 5:00 PM**

## **Update on PennDOT's Public-Private Partnership (P3) Rapid Bridge Replacement (RBR) project**

*Patricia Kiehl, PennDOT*

PennDOT's Public-Private Partnership (P3) Rapid Bridge Replacement (RBR) project is designed to bolster PennDOT's ongoing effort to address the state's nearly 4,000 Structurally Deficient (SD) bridges. With the P3 approach, PennDOT will replace 558 SD bridges around the state more quickly; achieve efficiencies for taxpayers; and minimize the impact on the traveling public. There are 115 bridges currently scheduled with traffic restrictions less than 35 days. Anticipated Accelerated Bridge Construction includes Precast substructures, Precast deck panels, combined precast/prefab deck and girders, precast culverts, Integral abutments, Bridge bundling, and streamlining of the process.

**5:00 PM - 5:30 PM**

## **Accelerated Bridge Construction studies for Six City of Astoria Bridges**

*Hormoz Seradj, Oregon DOT*

The City of Astoria is located in northwest of the State of Oregon and has a very rich history and is one of the most popular tourism attraction areas of the State of Oregon. The City is in process replacing six structurally deficient bridges which are located in a very corrosive environment. Also, these bridges are located in area that is very popular to tourists and demanded trolley service runs through this area as well. Environmental concern limits in-water work window, in addition to not having impact to trolley service and access to Astoria Riverwalk in tourism season, created a great design and construction challenges. This paper will discuss different design and construction options that were studied.

## **G-14: ABC BRIDGE DECK CASE STUDIES**

TIME: MONDAY 3:30 PM – 5:30 PM

ROOM: ORCHID

**3:30 PM – 4:00 PM**

### **Precast Grid Deck Panels Used to Accelerate Rehabilitation of GADOT I-20 Bridges**

*Mark Kaczinski, BGFMA*  
*Ryan Schade, BGFMA*  
*Phil Gase, BGFMA*

Focus of this paper is how precast grid panels helped an owner keep traffic moving on smaller scale deck replacement project. The Georgia Department of Transportation recently employed precast grid reinforced concrete panels in an accelerated bridge deck replacement project on Interstate 20 over the Alcovy River & Alcovy Watershed in Newton County. Detours were not an option for full closure, but with peak traffic volumes on weekends, the contractor was able to perform the work with single lane closures and partial width construction during the week.

**4:00 PM - 4:30 PM**

### **Route 37 Mathis Bridge Eastbound over the Barnegat Bay - Deck Replacement and Rehabilitation**

*Rama Krishnagiri, Parsons Brinckerhoff*  
*Steven Esposito, Parsons Brinckerhoff*  
*George Kuhn, NJDOT*  
*John Longworth, NJDOT*

The 4,860-foot long, 60-year old Eastbound Mathis Bridge is an important evacuation route, in need of deck replacement. Seasonal work can only be performed between November to May. 176,000 SF of precast Exodermic deck and components including scuppers, railings, lighting bosses, and safetywalks, are prefabricated off-site. The existing steel stringers will be made composite with the deck panels. All 654 bearings will be replaced. Galvanized rebar and HPC is used for the precast deck, with High Early Strength Grout for closure pours and a ¾-inch thick PPC overlay.

**4:30 PM - 5:00 PM**

### **Application of New Surfacing to the George Washington Bridge using Pre-Paved, Pre-Fabricated Panels and Conventional Techniques with Plant Mix Modified Asphalt Materials**

*Geoffrey Rowe, Abatech*  
*Allison Ezequelle, Chase Corporation*  
*Maribeth Taylor, Chase Corporation*

Recently the George Washing Bridge, has had the entire asphalt surfacing replaced on the upper deck as part of a major renovation project. This paper will discuss both the paving on the deck with the plant mix modified materials and how the panels were paved in a factory setting. The PMM modified hot mix asphalt has sufficient stiffness at high temperatures that the bridge can be trafficked shortly after completion. A detailed paving plan was prepared and implemented for both bridge and factory paving.

**5:00 PM - 5:30 PM**

### **Rigid End Floorbeam/Cross Girder Replacement on the Pulaski Skyway Rehabilitation Project**

*Scott Thorn, New Jersey Department of Transportation Miguel Santiago, Parsons Brinckerhoff*  
*Joseph Solis, Hardesty & Hanover, LLP*  
*Gerard Sova, Hardesty & Hanover, LLP*

The Skyway is currently undergoing a comprehensive rehabilitation. One million square feet of deck will be replaced

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

MONDAY DEC 7- 3:30 PM TO 5:30 PM SESSIONS

over a 24 month time period: • Removal of existing deck • Girders jacked from temporary supports and cross frame connections removed • Removal of both existing End Floorbeams/Cross Girders • Installation of two new hot dipped galvanized End Floorbeams/Cross Girders • Install deck joint if applicable • Installation of temporary roadway plates where required • Pour proposed deck closure pour. This paper explores in detail the Cross Girder/Floorbeam replacements.

## G-15: ABC APPLICATION FOR RETROFIT

TIME: MONDAY 3:30 PM – 5:30 PM

ROOM: JASMINE

3:30 PM - 4:00 PM

### Long key bridge v-piers rehabilitation

*Luis Vargas, URS Corporation*

The Long Key Bridge is a 12,152 ft. long precast segmental concrete box girder, designed and constructed between the late 1970's and early 1980's. This presentation discusses the design and construction of the V-Piers replacement of the Long Key Bridge. The challenges of this project include accelerating construction during V-Pier replacement, maintaining uninterrupted traffic through the bridge and working within the Florida Keys National Marine Sanctuary. The V-Pier replacement is currently the largest rehabilitation project in South Florida.

4:00 PM - 4:30 PM

### ABC Techniques for Pier Repairs and the Repositioning of the Cumberland River Swing Bridge

*Duncan Paterson, HDR Inc.*

The movable bridge crossing the Cumberland River in Nashville, TN has an overall length of 695ft with a center swing span that is 275ft out-to-out. Two fixed spans on each side of the swing span are 206ft from center-to-center of bearings. Included in the presentation are an overview of the bridge history, the sources of the span movement, the collaborative effort of the project team, and the accelerated construction techniques used to rehabilitate the pier and reposition the span.

4:30 PM - 5:00 PM

### Hybrid Precast Bridge Widening Pulls It All Together to Save Time and Money

*John Lange, Stanley Consultants Inc.  
Brian Davis, Stanley Consultants Inc.*

This presentation will show the widening of the existing cast-in-place post-tensioned concrete box girder superstructure using a post-tensioned combination of precast/pre-tensioned and CIP concrete elements. The selected method combined AASHTO girders post-tensioned with CIP concrete pier tables to mimic the structural behavior of the existing bridge and eliminated the need for falsework over US60. Using conventional, locally available, precast concrete elements eliminated large amounts of falsework that would have been necessary with traditional CIP construction.

5:00 PM - 5:30 PM

### Innovative and new UHPC products and details for accelerating bridge retrofit

*Atorod Azizinamini, FIU*

Significant activities at FIU, under supervision of Dr. Azizinamini, is aiming at developing innovative and cost effective solutions for construction of new bridges and retrofitting existing aging bridges. Among the new developments are easy to construct connection details for connecting columns to pre-fabricated cap beam, without utilizing couplers with very large tolerances, well defined location for development of plastic hinges and without complexities associated with other approaches. This presentation will include introducing, for first time, new approaches that utilizes UHPC for retrofitting aging bridges, especially in the coastal areas.

## G-11: ABC RESEARCH III

TIME: MONDAY 3:30 PM - 5:30 PM

ROOM: HIBISCUS A

3:30 PM - 4:00 PM

### Tools to estimate the total cost of ABC projects versus conventional methods of construction

*Mohammad Hadi, FIU  
Wallied Orabi, FIU  
Ali Mostafavi, FIU*

This presentation discusses a framework is to support the selection of Accelerated Bridge Construction (ABC) versus conventional bridge construction methods and other associated decisions such as selecting the specific type of ABC construction, management of construction, and management of transportation operations. The decisions will need to be based various criteria that have to be weighted based on the priorities for each project. The criteria can be categorized in four different categories: Initial construction costs, recurrent costs, user costs, and revenue loss (for toll facilities). Results from the first phase of an effort to produce a comprehensive decision support environment will be presented including estimates of the user costs and construction costs for a case study. Next steps of developing the decision support environment will be also outlined.

4:00 PM - 4:30 PM

### Laboratory Investigation of Integral Abutment Connection Details for ABC Projects

*Travis Hosteng, Bridge Engineering Center, ISU  
Sam Redd, Bridge Engineering Center, ISU  
Brent Phares, Bridge Engineering Center, ISU  
Lowell Greimann, Bridge Engineering Center, ISU*

The development of an integral abutment design which can facilitate the ABC process has the potential to make bridges constructed using ABC techniques more efficient, economical, and increase service life by eliminating expansion joints. One potential design option utilizes grouted rebar couplers

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

MONDAY DEC 7- 3:30 PM TO 5:30 PM SESSIONS

to develop the integral abutment connection. The focus of this project is to expand on work currently ongoing to further understand the constructability, strength, and durability characteristics of grouted couplers for use in ABC projects, specifically, integral abutments for ABC projects.

**4:30 PM - 5:00 PM**

## **Accelerated Bridge Construction (ABC) Toolkit for Georgia City and County Roads**

*Junsuk Kang, Georgia Southern University*  
*Mike Jackson, Georgia Southern University*  
*Gustavo Maldonado, Georgia Southern University*  
*Peter Rogers, Georgia Southern University*  
*Marcel Maghiar, Georgia Southern University*  
*David Jared, Georgia DOT*  
*Gretel Sims, Georgia DOT*

The GDOT is funding a research project aimed at introducing ABC design and construction to Georgia cities and counties through the use of a toolkit. The research focuses specifically on short span bridges. This paper presents the process used in developing the toolkit and its primary features. The first phase of the project involved the creation and completion of a survey which was distributed to several DOTs. The toolkit itself contains construction, design, risk analysis, and cost estimate components.

**5:00 PM - 5:30 PM**

## **Renewing America's Infrastructure – SHRP2 at Work**

*Matthew DeMarco, FHWA*  
*Sherry Conway Appel, CH2M Hill*

This paper presents a brief description of seven SHRP2 products currently being deployed across 46 state DOT projects related to structure design, construction and condition assessment. States currently deploying each product are listed, and SHRP2 contact information and application links are provided for Round 7 of the final Implementation Assistance Program, offering approximately 12 products in April 2016.

## **G-20: SHRP2 R04 RELATED PROJECTS**

TIME: MONDAY 3:30 PM – 5:30 PM

ROOM: HIBISCUS B

**3:30 PM - 4:00 PM**

### **Innovative Bridge Designs for Rapid Renewal, SHRP2 R04, Lessons Learned**

*Finn Hubbard, Fish & Associates Inc.*  
*Mathew DeMarco, FHWA*

Innovative Bridge Designs for Rapid Renewal, SHRP2 R04, and Lessons Learned the SHRP2 project on Rapid Renewal of Bridges (Innovative Bridge Designs for Rapid Renewal, R04) is coming to a successful close and has produced several positive outcomes and products that can be used by all transportation agencies. This paper presents a compilation of the lessons learned during the SHRP2 Innovative Bridge

Designs project with an emphasis on the experiences and observations of the transportation agencies as they move into the accelerated bridge construction world.

**4:00 PM - 4:30 PM**

### **Contextually Appropriate ABC Policy, Adding to WSDOT's Bridge Design Manual**

*Patrick Gallagher, Washington State DOT*

This presentation is the story of how the Washington State Department of Transportation (WSDOT) added to its Bridge Design Manual to include policy for Accelerated and Innovative Bridge Construction. It's a description of how WSDOT is writing policy that encourages change amidst a culture of concern. WSDOT has a way of doing business that has been established for decades and a way of putting together projects that has served the citizens of Washington well for a long time. Our Bridge Design Manual is intended to educate, explain, direct, and provide standard details.

**4:30 PM - 5:00 PM**

### **Accelerated bridge construction, Sacaton, Az Gila river Indian community**

*Greg Harasha, FNF Construction, Inc.*

This presentation will discuss the challenging boundary conditions, problems and solutions that the Gila River Indian Community Department of Transportation, Federal Highway Administration, FNF Construction and AZTEC Engineering encountered while transforming the original "traditional" bridge replacement design for Sacaton Road Bridge over the Gila River into an FHWA Demonstration Project for the SHRP 2 ABC Toolkit. It will include details of the techniques chosen to accelerate the construction of the bridge and reduce the originally-planned, months-long impact on travelers to just days.

**5:00 PM - 5:30 PM**

### **Implementing the SHRP2 R04 Research Results**

*Bala Sivakumar, HNTB*

This presentation will discuss the key ABC technologies from the R04 projects and their ongoing application to ABC project nationally to reduce impacts to mobility, including challenges in transferring ABC research results to practice. Examples will be used to highlight success stories and lessons learned.

## **G-1: STATE ABC EXPERIENCES III**

TIME: TUESDAY 8:00 AM – 10:00AM

ROOM: JAMES L. KNIGHT CENTER

**8:00 AM - 8:30 AM**

### **New Development in Accelerated Bridge and Culvert Construction in Washington State**

*Bijan Khaleghi, WSDOT*

This paper summarize the development of new Washington State Department of Transportation (WSDOT) wide flange

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

TUESDAY DEC 8 - 8:00 AM TO 10:00 AM SESSIONS

deck girder system for long span bridges and accelerated bridge construction. Ultra-high performance concrete (UHPC) in lieu of the welded ties and grouted keys is considered for connection between girders to improve the performance of the connection between girders. The recent WDSOT projects utilizing the ABC techniques such as lateral sliding of bridge superstructure are presented, and the use of geosynthetic reinforced soil with integrated bridge system (GRS-IBS) has been discussed.

**8:30 AM - 9:00 AM**

## **Evolution of Design Details for Iowa DOT Modular Bridge Construction: Case Study of Little Silver Creek Accelerated Bridge Construction Project**

*Curtis Carter, Iowa DOT  
Dean Bierwagen, Iowa DOT  
Ahmad Abu-Hawash, Iowa DOT*

Applying the learning outcomes from the SHRP2 demonstration project, Iowa DOT has developed a subsequent ABC project incorporating second-generation PBES details. The new project will consist of a 3-span, 20 degree skew, and 234' x 44' modular rolled steel beam bridge, constructed under an accelerated schedule (21 day road closure). This structure will serve as a replacement to the existing structurally deficient, 150' X 28' continuous concrete beam bridge, located on IA 92 over Little Silver Creek, in Pottawattamie County, Iowa.

**9:00 AM - 9:30 AM**

## **TDOT CM/GC Experience with ABC – Fast Fix 8 in Downtown Nashville, Tennessee**

*Lia Obaid TDOT  
Terry Mackie, TDOT  
Ted Kniazewycz, TDOT  
Marc Rothwell, TDOT  
David Paris, TDOT*

The Tennessee Department of Transportation (TDOT) has embraced the Accelerated Bridge Construction and alternate delivery philosophies in the delivery of several diverse projects. The Department is now embarking on a new delivery method, Construction Manager / General Contractor on a high-profile project in downtown Nashville where four bridges and two miles of urban interstate will be rehabilitated in 13 weekends.

**9:30 AM - 10:00 AM**

## **Accelerated Bridge Construction in Alaska**

*Leslie Daugherty, Alaska DOT & PF*

This paper provides a past, present, and future overview of ABC methods in Alaska. Early examples of ABC methods in Alaska are the use of prefabricated bridge elements (PBE) beginning around the 1970s. Due to high seismic regions in most of the state, DOT&PF has sponsored research projects to investigate the seismic performance of precast elements. Lastly, cost savings is typically a component of time savings for ABC projects, but even circumstances with slightly higher costs have been justified by various user groups in Alaska.

## **G-7: ADVANCING SEISMIC RESEARCH FOR ABC I**

TIME: TUESDAY 8:00 AM – 10:00AM

ROOM: ORCHID

**8:00 AM - 8:30 AM**

### **A Class of V-Connectors for Deck-Pier or Pier-Footing Joints with Combined Advantages of Integrated Design and Seismic Isolation while Enabling ABC**

*Su Hao, ACII, Inc.*

The state of the art for seismic-resistant bridge design can be represented by the two philosophies: integrated design and seismic isolation. The integrated design focusses on the robustness of integrated structural frame system while seismic isolation design applies specially devices at the pivot locations for the main load path of earthquake-induced inertia force flow in a bridge. This study introduces a class of innovative devices, termed V-connectors, which is able to have the combined advantages of the aforementioned two design philosophies while minimize their drawbacks.

**8:30 AM - 9:00 AM**

### **Grouted Splice Sleeve Connections for Bridge Piers in Seismic Regions: Experiments and Analysis**

*M.J. Ameli, University of Utah  
Joel Parks, University of Utah  
Dylan Brown, Michael Baker International  
Chris Pantelides, University of Utah*

Reinforcing bar couplers are used in conjunction with prefabricated bridge elements and systems for Accelerated Bridge Construction. Grouted Splice Sleeve (GSS) connectors have found more applications for connections in bridge substructures because of the good construction tolerances they offer. In this research, GSS connectors were used in various configurations to connect half-scale precast columns to footings. Both Experimental and analytical studies were conducted to simulate the response of each specimen under lateral cyclic loading.

**9:00 AM - 9:30 AM**

### **Seismic Repair of Damaged Precast RC Bridge Columns Connected with Grouted Splice Sleeves**

*Joel Parks, University of Utah  
Dylan Brown, Michael Baker International  
M.J. Ameli, University of Utah  
Chris Pantelides, University of Utah*

This study presents a repair technique for damaged precast reinforced concrete bridge columns with grouted splice sleeve connections that utilizes a carbon fiber-reinforced polymer shell and epoxy anchored headed mild steel bars to relocate the column plastic hinge. The repair method successfully relocated the plastic hinge to the original column section adjacent to the repair and was capable of restoring the diminished load and displacement capacity. The method is a viable and cost-effective technique for rapid seismic repair of precast bridge assemblies.

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

TUESDAY DEC 8 - 8:00 AM TO 10:00 AM SESSIONS

9:30 AM - 10:00 AM

## Innovative ABC columns with copper-based SMA and ECC for seismically active regions

*Sebastian Varela, University of Nevada, Reno*  
*Saiid Saiidi, University of Nevada, Reno*

This study will address concerns about the performance of ABC members and their connections under lateral seismic loads, and uncertainties about whether or not bridges with these elements are capable of performing well under an earthquake. Both extensive experimental and analytical studies were carried out at the University of Nevada, Reno in order to develop novel ABC column details that are able to resist extreme earthquake loading without the functionality shortcomings of CIP construction.

## G-13: ABC CASE STUDIES I

TIME: TUESDAY 8:00 AM - 10:00AM

ROOM: JASMINE

8:00 AM – 8:30 AM

### ABC of bridge no. 465 Rhode island i-195 ramp (Dr-2) over warren avenue

*Aboud J. Alzaim, Louis Berger*  
*Phineas N. Fowler, Louis Berger*  
*John J. Fitzgerald, Louis Berger*  
*Daniel J. O'Keefe, Louis Berger*

This project constructed Warren Avenue Bridge No. 465 which is the on-ramp to Interstate 195 westbound, which carries Veterans Memorial Boulevard over Warren Avenue in East Providence, Rhode Island. This paper describes a variety of Accelerated Bridge Construction (ABC) techniques, Systems and Structure Erection Techniques that was implemented to minimize the construction time to 22 days. The superstructure consisted of two Prefabricated Superstructure Modular Units (SMUs). The substructure consisted of prefabricated footings, abutment and wingwall stems and backwalls connected using grouted splice couplers.

8:30 AM - 9:00 AM

### 12-Day Bridge Replacement Project in Vermont with a 47 Mile Detour

*David Kull, McFarland Johnson, Inc.*  
*Tom Kendrick, McFarland Johnson, Inc.*  
*Robert Young, Vermont Agency of Transportation*

Due to a lengthy detour route this Accelerated Bridge Construction (ABC) project utilized prefabricated bridge elements to replace a structurally deficient bridge in only 12 days, 2 days ahead of schedule. This presentation presents how the hinged integral abutment detail, along with other project innovations and design details allowed for successful completion of this project. Project challenges and lessons learned from the design, fabrication and construction perspective will be also reviewed and discussed.

9:00 AM - 9:30 AM

## Sellwood Bridge Diversion Alignment and Bridge Translation

*Scott Nettleton, T.Y. Lin International*

Multnomah County's Sellwood Bridge is a member of the iconic collection of Bridges crossing the Willamette River in Portland, and is the busiest two lane bridge in the state of Oregon, serving over 30,000 vehicles per day. This presentation will discuss some of the unique design and construction elements of this temporary detour and an overview of the two-stage jacking process and closure schedule. The presentation will conclude with some lessons learned.

9:30 AM - 10:00 AM

## Bent cap design for IH-635 Managed Lanes Project

*Ignacio Navarro, Ferrovial Agroman US Corp*  
*Jesus Gonzalez, Ferrovial Agroman US Corp*

This project includes a full reconstruction of IH-635 general purpose lanes from IH-35E to US-75 and new construction of six managed lanes in a depressed section for a total length of nine miles. The fact that the new managed lanes must be built within the existing facility and keeping the existing traffic poses significant challenges from the view point of maintenance of traffic, construction phasing and schedule. This presentation will discuss project challenges and lessons learned from the design, fabrication and construction perspectives.

## G-17: PROMOTING ABC

TIME: TUESDAY 8:00 AM - 10:00AM

ROOM: HIBISCUS A

8:00 AM - 8:30 AM

### Latest development in steel bridge design and construction with focus on ABC

*Bill McEleney, NSBA*

This presentation will provide the latest development in the steel bridge industry with emphasis on ABC

8:30 AM - 9:00 AM

### Latest development in concrete bridge design and construction with focus on ABC

*William Nickas, PCI*

This presentation will provide the latest development in the concrete bridge industry with emphasis on ABC

9:00 AM - 9:30 AM

### Social Media for ABC: State of Practice and Workshop for ABC Project Owners

*Eliza Partington, Figg Engineering*

Cutting-edge bridge design and construction deserves cutting edge communication. Social media can inform your

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

## TUESDAY DEC 8 - 8:00 AM TO 10:00 AM SESSIONS

customers and engage them with excitement for your ABC project and support for your agency. ABC provides challenges and opportunities for bridge owners that can be overcome and capitalized on through strategic and comprehensive communications. This presentation will give you an overview of the state of the practice of social media by bridge owner agencies; an introduction to social media tools; and tips and ideas you can implement immediately.

**9:30 AM - 10:00 AM**

### **ABC national update and overview**

*Ben Beerman, FHWA*

This presentation will provide the latest development and planned future FHWA activities for promoting and advancing the cause of ABC

transportation agency can use to implement risk and life-cycle cost factors in decision making.

**9:30 AM - 10:00 AM**

### **Robotic Construction in ABC Projects**

*Alireza ValiKhani, FIU Atorod Azizinamini, FIU*

Although automation has advanced in manufacturing, the growth of automation in construction has been slow. Conventional methods of manufacturing automation do not lend themselves to the construction of large structures with internal features, and bridge construction is no exception. The objective of this project is to attempt to automate bridge construction by utilizing robots. ABC can provide great potential for the automated construction of components and for the subsistence of bridge.

## **G-19: MISCELLANEOUS I**

TIME: TUESDAY 8:00 AM - 10:00AM

ROOM: HIBISCUS B

**8:00 AM - 8:30 AM**

### **The Future of Bridge Design**

*Barbara Day, Bentley Systems*

Sharing information in an information-rich 3D model increases data quality, collaboration and asset management, and reduces overall costs for the entire ecosystem involved. This presentation will provide an overview of how powerful new software interoperates with civil design and collaboration tools, providing engineers with a fresh approach to bridge projects of all sizes.

**8:30 AM - 9:00 AM**

### **Accelerated Bridge Construction - Huey P. Long Bridge Truss Lift Monitoring to Mitigate Risk**

*Thomas Weinmann, Geocomp Consulting*

The Huey P. Long Bridge is a four-span steel truss bridge over the Mississippi River. The rationale behind the decision for making the choice of pre-building the truss sections on shore, barging and lifting into place vs. stick building trusses on the bridge for this project, will be presented with the development and implementation of the truss monitoring system.

**9:00 AM - 9:30 AM**

### **Decision Criteria for Deploying Accelerated Bridge Construction**

*Gordana Herning, Rutgers University*

This paper presents an investigation of various cost and risk factors that impact decision making for repair and replacement of structurally deficient bridges using prefabricated elements and advanced materials as part of ABC technologies. The study seeks to create an ABC resource database that a

## TUESDAY DEC 8 - 10:30 AM TO NOON SESSIONS

## **G-2: ABC PROJECTS WITH GRS-IBC**

TIME: TUESDAY 10:30 AM - NOON

ROOM: JAMES L. KNIGHT CENTER

**10:30 AM - 11:00 AM**

### **Phased Accelerated Bridge Construction with GRS/IBS Abutments**

*Ralph Verrastro, Bridging Solutions, LLC  
Rolando Corsa, Bridging Solutions, LLC  
Robbie Powell, Wright Construction Group*

This presentation describes the design and construction of a bridge replacement project that included phased construction and the use of Geosynthetic Reinforced Soil Integrated Bridge System (GRS/IBS) for the abutments. This presentation provides some lessons learned regarding the design and construction of a GRS/IBS abutment on a phased accelerated bridge replacement project. This project involved the replacement of the Rock Ridge Road Bridge over the Gator Canal in Polk County, Florida under a design-build contract with FDOT.

**11:00 AM - 11:30 AM**

### **First-Ever Innovative Application of GRS-IBS in the Garden State**

*Ahmad Faqiri, Pennoni Associates Inc.*

In the Gloucester County Bridge the existing reinforced concrete arch culvert featured reinforced concrete headwalls and an 84 inch diameter corrugated metal pipe that were failed, forcing Gloucester County to close the road. Pennoni provided design and permitting of the replacement bridge/culvert and associated roadway utilizing an unconventional concept never before attempted in the State of New Jersey: Geosynthetic Reinforced Soil-Integrated Bridge System (GRS-IBS). Pennoni designed the new bridge using prestressed concrete slab beams with a composite reinforced concrete deck supported on GRS-IBS substructure.

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

TUESDAY DEC 8 - 10:30 AM TO NOON SESSIONS

**11:30 AM - Noon**

## **Implementation and Research Case Study on a GRS-IBS Project**

*Bob Gilbert, Bartlett & West  
Todd Kempker, Bartlett & West*

This project utilizes the Geosynthetic Reinforced Soil (GRS) Integrated Bridge System (IBS). This is an accelerated bridge construction technique where the substructure consists of layers of geotextile fabric and aggregate. This structure type can be constructed in a few days, and the lack of pile driving or other advance construction methods lends itself to something that small contractors or local government staff can build themselves. By removing any concrete in the substructure, all curing time is eliminated, and girders can be set immediately after construction.

## **G-8: ABC PROJECT USING SPMT**

TIME: TUESDAY 10:30 AM - 12:00 PM

ROOM: ORCHID

**10:30 AM - 11:00 AM**

### **SPMT for Accelerated Bridge Construction – High-grove Underpass**

*Paul Chung, Caltrans*

In 2014, California Department of Transportation (Caltrans), in cooperation with San Bernardino Associated Governments (SANBAG) and Riverside County Transportation Commission (RCTC), widened a portion of Inter-State Route 215 (I-215) by adding high-occupancy vehicle (HOV) lanes in the median. The improvements completed a regional HOV network to provide continuous HOV lanes from San Bernardino to Los Angeles along the I-215/SR-91 corridor. Under the scope of work; widening several highway bridges, replace Newport Ave.

**11:00 AM - 11:30 AM**

### **The 123's of SPMT's for ABC**

*Charles Neth, Siefert Associates, LLC  
Engberg John, Barnhart Crane & Rigging*

This paper presents the technical specifications of the most common SPMT manufacturer, details how SPMT's operate and explores projects from throughout the Northeast to illustrate the operational limits of SPMT's and how they apply to ABC. In particular, an in-depth study on how to establish a global stability triangle through hydraulic zoning of an SPMT unveils the two most critical operation limits for SPMT's: tilting and overload; this leads to an examination of the effect that bridge geometry and weight have on these thresholds.

**11:30 AM - Noon**

### **Rehabilitation of the Park Avenue and Watchung Avenue Bridge for New Jersey Transit utilizing Self-Propelled Modular Transporters**

*David Mykulak, HNTB Corporation*

The Park Avenue and Watchung Avenue Bridges each carry the two tracks of New Jersey Transit's Raritan Valley Line (a busy commuter line) over two congested local streets in downtown Plainfield, New Jersey. Given the age and condition of the superstructures and the low underclearance with frequent vehicle impacts, New Jersey Transit decided that both bridges were in need of significant rehabilitation. HNTB's main objectives for this project are to replace the superstructure with minimal impact to rail operations while increasing the underclearance without changing the profile of the tracks. Additionally, substructure repairs at the abutments and piers are also included.

## **G-13: ABC CASE STUDIES II**

TIME: TUESDAY 10:30 AM - 12:00 PM

ROOM: JASMINE

**10:30 AM - 11:00 AM**

### **Reconstruction of the Willis Avenue Bridge with Implementation of ABC Technology**

*Wei Wang, UrbanTech Consulting Engineering, PC*

The main span of the new Willis Ave. Bridge is a 350' steel truss swing bridge connecting Manhattan and Bronx. It is a major highway over navigable water in the heart of New York City, carrying over 62,000 vehicles a day. This paper will discuss the construction procedures and engineering challenges that the construction engineering teams faced during the planning and construction phases of the project. Structural and Naval Architectural engineering related issues will be discussed.

**11:00 AM - 11:30 AM**

### **NJ Route 18 Bridge over US Route 1 Superstructure Replacement and Widening utilizing Prefabricated Superstructure Units**

*Gregory Ricks, HNTB Corporation*

NJ Route 18 and US Route 1 interchange in New Brunswick, Middlesex County New Jersey is one of the most congested in the State as it involves traffic from 2 high volume State highways and is a major connector to the NJ Turnpike. Due to these heavy traffic conditions, HNTB developed an innovative staging scheme that combined ABC elements, such as PSUs, movable barrier curb and median crossovers with the use of a contraflow lane and 57-hour weekend construction windows to minimize impacts to motorists.

**11:30 AM - Noon**

### **Salmon river bridges**

*Lee Wegner, Hanson Structural Precast  
Ken Clausen, Idaho DOT*

This paper will describe lessons learned from constructing 2 bridges in a remote, environmentally sensitive area in

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

TUESDAY DEC 8 - 10:30 AM TO NOON SESSIONS

central Idaho. The project site is located in Central Idaho on SR 75 connecting the communities of Challis, Idaho and Ketchum, Idaho over the Salmon River. The lessons includes considerations that should be taken into account when designing and constructing pre-fabricated elements in a remote, environmentally area including construction limitations, shipping limitations as well as design considerations and crane capacities.

## G-11: ABC RESEARCH IV

TIME: TUESDAY 10:30 AM - 12:00 PM

ROOM: HIBISCUS A

10:30 AM - 11:00 AM

### Innovative ABC solutions using UHPC

*Mohamadreza Shafieifar, FIU*  
*Mahsa Farzad, FIU*  
*Atorod Azizinamini, FIU*

One of the most challengeable issues in prefabricated construction is concern about the durability, behavior and structural integrity of the joints between elements. This presentation illustrates a new UHPC connection between cap beam and column for Accelerated Bridge Construction (ABC), with desired plastic hinge location and behavior. This research concentrates on developing suitable details for joining cap beam to column and includes numerical analysis and experimental test to validity the results.

11:00 AM - 11:30 AM

### ABC Connections with UHPC

*Benjamin Graybeal, FHWA*

Ultra-high performance concrete allows for the rapid construction of simple, robust connections. UHPC materials, design concepts, and common details will be presented.

11:30 AM - Noon

### Construction of UHPC Connections

*Benjamin Graybeal, FHWA*

UHPC is an emerging technology that is being deployed in accelerated bridge construction projects across the U.S. Construction considerations and related topics will be presented.

## G-19: MISCELLANEOUS II

TIME: TUESDAY 10:30 AM - 12:00 PM

ROOM: HIBISCUS B

10:30 AM - 11:00 AM

### 200+ Years of Accelerated Bridge Construction in America

*John Hillman, HCB, Inc.*

This presentation will focus on an overview of two centuries of historical and patented innovations that ushered in the origins of ABC dating back to the infancy of our country. The discussion will demonstrate the catalysts that have continually driven bridge engineers to advance the state of our industry.

11:00 AM - 11:30 AM

### Seismic behavior of precast hollow-core columns for accelerated bridge construction

*Mohamed ElGawady,*  
*Missouri University of Science and Technology*

*Omar Abdelkarim,*  
*Missouri University of Science and Technology*

*Ahmed Gheni,*  
*Missouri University of Science and Technology*

*Sujith Anumolu,*  
*Missouri University of Science and Technology*

This paper presents the seismic behavior of precast hollow-core fiber reinforced polymer-concrete-steel columns (HC-FCS) for accelerated bridge construction. This represents significant savings in construction material quantities and freight costs. Two large-scale columns including a conventionally reinforced concrete (RC) column having solid cross section and a HC-FCS column were investigated during this study.

11:30 AM - 12:00 AM

### Safety Indices(Bvalues) for a full depth Precast Concrete Deck Panel connected with Accelerated Bridge Construction (ABC)

*Chandrasekhar Putcha,*  
*California State University, Fullerton*

*Florentino Ostorva,*  
*California State University, Fullerton*

This paper calculates safety indices ( $\beta$  values) for a full depth Precast Concrete Deck Panel as related to Accelerated Bridge construction (ABC). The report by FHA (FHA, 2011) is used as a reference. This paper studies this report from probabilistic point of view and calculates the actual safety margins through probabilities.

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

TUESDAY DEC 8 - 1:30 PM TO 4:00 PM SESSIONS

## G-1: STATE ABC EXPERIENCES IV

TIME: TUESDAY 1:30 PM - 4:00 PM

ROOM: JAMES L. KNIGHT CENTER

1:30 PM - 2:00 PM

### Connecticut Department of Transportation State Project No. 131-194/195 I-84 over Marion Avenue, Southington Bridge Superstructure Replacement using Self-Propelled Modular Transporters (SPMTs)

*Mary Baker, ConnDOT*  
*Timothy Fields, ConnDOT*

The superstructures of Bridge Nos. 01235 and 01236, which carry Interstate 84 eastbound and westbound over Marion Avenue in the town of Southington were rated in poor condition. Each bridge carries three lanes of I-84 and due to the volume of traffic, stage construction was not an option. New bridge superstructures were built in staging areas adjacent to I-84 in order to minimize the impact to the traveling public. The DOT's contractor, Northern Construction Service LLC, successfully replaced the superstructures of these bridges using SPMTs during the weekend.

2:00 PM - 2:30 PM

### FDOT Precast Bent Cap Development and Implementation

*Steven Nolan, FDOT*

This paper presents an overview of the development of a PBES-ABC Precast Intermediate Bent Cap standard based on a recent demonstration pilot project presented at the 2014 National ABC Conference. A new FDOT Developmental Design Standard provides connection details refined during this project, initially based on NCHRP 681 and considered the Standard ABC Plans developed under the SHRP2 project R04. A modified version of the FDOT's Pile Bent Mathcad program has also been developed as a design tool to assist in completing the necessary Contract Documents for streamlining implementation on Department projects.

2:30 PM - 3:00 PM

### Wisconsin DOT's Development of Standardized and Interchangeable PBES - Piers

*William Oliva, WisDOT*

This presentation illustrates WisDOT approach and experience in the development of policy, standards, details, and provisions for Precast Piers as a sub-set of Prefabricated Bridge Elements and Systems (PBES). WisDOT has employed a systematic process of research, pilot projects, debriefings, lessons learned, and cyclical updates to details and specification. The results of this systematic approach represent progressively improved generations of PBES/ABC technologies that better achieve project goals. This presentation will present specific challenges and solutions that WisDOT has faced in the implementation of our precast pier elements.

3:00 PM - 3:30 PM

### ABC in Alabama

*Paul Froede*  
*David Tomley, Thompson Engineering*  
*Timothy McInnis, McInnis Constructs*

Following an FHWA sponsored peer-to-peer exchange on ABC, a project on the Ross Clark Circle, Dothan, AL, that had been evading an engineered solution was recognized as a prime opportunity for a bridge slide. RCC provides a corridor for US-231 which originally intended to carry less than 5000 ADT, it currently hosts a 40,000+ ADT with a 20 year projection of nearly 73,000 vehicles. The objective for the project is to meet the traffic need through increased capacity and subsequently reduce traffic congestion and travel time.

3:30 PM - 4:00 PM

### Utah's Experiences with ABC

*Carmen Swanwick, UDOT*

Over the past several years the Utah Department of Transportation (UDOT) has aggressively pursued bridge construction strategies that limit impacts to Utah's roadway users. The public has given broad approval to the Department for recognizing their desire to build quality highways efficiently and with little impact to traffic as possible. This fundamental change in the way UDOT builds bridges required a very focused and intense deployment strategy. The initial stages of deployment required educating engineers, UDOT personnel, general contractors and suppliers. Progress was realized through the development of standard details for many bridge elements, workshops to assess and evaluate areas of concern with the bridge community, targeted research projects and the development of evaluation tools and policies to help project teams utilize accelerated bridge construction efficiently.

## G-7: ADVANCING SEISMIC RESEARCH FOR ABC II

TIME: TUESDAY 1:30 PM - 4:00 PM

ROOM: ORCHID

1:30 PM - 2:00 PM

### Seismic Accelerated Bridge Construction with Low-Damage Segmental Bridge Columns incorporating Damage-Resistant Joints

*Mohammad Nikoukalam, University of Colorado - Boulder*  
*Petros Sideris, University of Colorado - Boulder*

This study introduces a novel low-damage bridge column design for accelerated bridge construction (ABC) in seismic areas. The low-damage systems provide significantly reduced post-earthquake downtime and repair costs. The proposed design incorporates internal unbonded post-tensioning, flexible damage-resistant joints at the column ends, replaceable stiffness links and replaceable energy dissipating links. The performance of these designs is assessed in terms of lateral strength and deformation capacity, self-centering properties, energy dissipation capabilities, and damage.

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

TUESDAY DEC 8 - 1:30 PM TO 4:00 PM SESSIONS

2:00 PM - 2:30 PM

## Seismic Evaluation of a Precast PT/UHPC Bridge Column with Pocket Connection and Precast Footing

*Alireza Mohebbi, University of Nevada, Reno*  
*M. Saïid Saïidi, University of Nevada, Reno*  
*Ahmad Itani, University of Nevada, Reno*

This study focuses on pocket connection types as a means to connect prefabricated bridge columns to footings. The main objectives of this paper are: (1) to evaluate the seismic performance of pocket connections for square columns, (2) determine the feasibility of using ultra-high performance concrete (UHPC) in the plastic hinge zone to minimize column damage, and (3) investigate effectiveness of unbonded carbon fiber reinforced polymer (CFRP) tendons in recentering columns under strong earthquakes.

2:30 PM - 3:00 PM

## The Seismic Ductility Device

*Stephen Fitz, Structural Component Systems, Inc.*  
*George Ghusn, B/JG Architecture & Engineering*

Precast columns are the most difficult component to properly connect for seismic loads in Accelerated Bridge Construction. Most existing solutions are versions of cast-in-place configurations of rebar and grout which attempt to reproduce the cast in place methods of seismic survivability. In this study, the Seismic Ductility Device (SDD) developed by Structural Component Systems, Inc. is presented. SDD uses innovative materials to provide stiffness reduction and hysteresis in the plastic hinge region of the column.

3:00 PM - 3:30 PM

## Shaking Table Performance of a New Precast Bridge Bent System with Pre-Tensioned, Rocking Columns

*Travis Thonstad, University of Washington*  
*Islam Mantawy, University of Nevada, Reno*  
*John Stanton, University of Washington*  
*Marc Eberhard, University of Washington*  
*David Sander, University of Nevada, Reno*

This study presents a new precast bridge bent system that has been developed to accelerate on-site construction, minimize residual displacements even after large seismic events and reduce post-earthquake damage. The system reduces on-site construction time by using prefabricated concrete components that are shipped to site and assembled there. The connections between these components are designed to provide generous construction tolerances and are both simple and quick to complete on-site.

3:30 PM - 4:00 PM

## Achieving Caltrans' Strategic Goals through Accelerated Bridge Construction

*Tom Ostrom, Caltrans*

In an effort to keep pace with ever increasing traffic demands, the California Department of Transportation (Caltrans) must look beyond well-established practices to meet the need of the traveling public. Minimizing mobility impacts as well as reducing the exposure of workers and the traveling public to the work zone are two of Caltrans top strategic objectives. To accomplish these objectives, Caltrans has spent over \$3 million in research to develop accelerated bridge components and details that meet Caltrans seismic performance requirements. This presentation (paper) summarizes the research results, planned research, and the application of our research findings to several recent multi-span accelerated bridge pilot projects in California.

## G-5: ABC SUBSTRUCTURES SOLUTIONS

TIME: TUESDAY 1:30 PM - 4:00 PM

ROOM: JASMINE

1:30 PM - 2:00 PM

### Experimental Study on Precast Segmental Bridge Columns with Semi-rigid Connections

*Yu-Chi Sung, Hsiao-Hui*

*Hsiao-Hui Hung,*  
*National Center for Research on Earthquake Engineering*

*Kuan-Chen Lin,*  
*University of Technology, Department of Civil Engineering*

*Kuo-Chun Chang,*  
*National Taiwan University, Department of Civil Engineering*

*Chi-Rung Jiang,*  
*National Center for Research on Earthquake Engineering*

By extracting the concept of human spinal column, a semi-rigid connection for the precast segmental bridge pier system was proposed in this study. The proposed connection between segments is a hybrid connection contains bonded bar reinforcement that is spliced by bar couplers and shear keys to provide shear resistance between neighboring segments. In this study, two types of connection between each prefabricated element, i.e., steel dowel shear key and RC shear key, were proposed and tested at the National Center for Research on Earthquake Engineering (NCREE) in Taiwan. From the experimental results and construction practices of the developed system, the high seismic resistance and the satisfactory constructability of the proposed pier was confirmed.

2:00 PM - 2:30 PM

### Reconstruction of the First Single Point Urban Interchange Bridge In Michigan Utilizing Prefabricated Substructure Elements

*Ihab Darwish, alfred benesch & Co.*  
*Ali Mahdavi, Michigan DOT*

This project involved the reconstruction and reconfiguration of the existing full cloverleaf interchange to a single point urban interchange (SPUI). Due to the complex geometry

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

TUESDAY DEC 8 - 1:30 PM TO 4:00 PM SESSIONS

of the bridge, tight tolerances were specified in order to ensure the proper fit between the different precast elements. The erection of precast pier and precast abutments were completed in 3 days per construction stage, which reduced the total construction schedule by 6 weeks compared to cast-in-place construction.

**2:30 PM - 3:00 PM**

## **Precast Pier Construction on Northwest Corridor**

*Ali Ghalib, Parsons*

*Alan Kite, Parsons*

*Tim Williams, Northwest Express Roadbuilders*

The presentation will highlight the design and construction of piers on the 3,500' long, 25 span I-75 mainline bridge over Hope Creek. I-75 runs north-south approximately parallel and adjacent to Hope Creek on a fill embankment supported by a retaining MSE wall. The presentation will also demonstrate the savings in construction time and expense with this accelerated bridge construction alternate compared to the standard construction method adopted on other segments of the project.

**3:00 PM - 3:30 PM**

## **Post-Tensioned Precast Pier Caps for the Honolulu Rapid Transit Project**

*Joseph Krajewski, HNTB*

My presentation will focus on the design and construction of Precast Post-Tensioned concrete pier caps to meet the challenges of an accelerated construction schedule, limited roadway closure windows, supporting station construction, and AASHTO LRFD Seismic Zone C Pier Cap to Column Connection requirements. My presentation will discuss Accelerated Bridge Design consisting of modularization of components, re-use of QA/QC'd designs, and selection of the sufficient level of analysis complexity.

**3:30 PM - 4:00 PM**

## **Substructure Considerations for Successful Accelerated Bridge Replacement Projects**

*David Whitmore*

In order to realize the full benefit of Accelerated Bridge Replacement, serious consideration must be given to the existing substructure. This paper discusses substructure considerations for successful Rapid Bridge Replacement projects and will present several Rapid Bridge Replacement case studies completed by DOTs in the United States and Canada. The presentation will show pre-replacement condition, rehabilitation and construction details of each project and will include a Rapid Bridge Replacement project video summary.

## **G-16: DESIGN OF ABC PROJECTS FOR SERVICE LIFE**

TIME: TUESDAY 1:30 PM - 4:00 PM

ROOM: HIBISCUS A

**1:30 PM - 2:00 PM**

### **Galvanizing your Bridge for Corrosion Protection**

*Kevin Irving, AZZ Galvanizing Services*

The purpose of this seminar is to inform and educate DOT's, engineers, Toll Authorities and other specifiers about hot-dip galvanized/metallized steel our bridges and how it can address the growing corrosion problem throughout North America. Upon completion of this seminar, you will be able to: Recognize the corrosion issues confronting North America. Describe how zinc coatings, specifically hot-dip galvanizing, can protect against steel corrosion. Incorporate sound corrosion protection into the design of steel products that can significantly reduce maintenance costs over the life of a project.

**2:00 PM - 2:30 PM**

### **Modern non-bituminous flexible plug expansion joints – minimizing noise, maximizing driver comfort and accelerating bridge maintenance**

*Gianni Moor, Mageba USA*

*Robert Bradley, Mageba USA*

*Colm O'Suilleabhain, Mageba USA*

Flexible plug expansion joints, which create a completely closed, absolutely flat driving surface right across a structure's movement gap, offer a number of benefits over other small-movement expansion joint types. And minor damage to an existing polyurethane joint can be repaired simply by pouring fresh material, which bonds securely to the existing joint thanks to the chemical reactivation of the previously cured polyurethane material. For these reasons and more, this modern plug-type expansion joint is likely to be increasingly used in years to come, in both bridge construction and bridge maintenance.

**2:30 PM - 3:00 PM**

### **Service Life Extension of Existing Bridge Substructures**

*Jason Chodachek, Vector Corrosion Technologies, Inc.*

*Eliseo Conciatori, Vector Corrosion Technologies, Inc.*

*Tore Arnesen, Vector Corrosion Technologies, Inc.*

In order to reduce costs and speed up construction on accelerated bridge construction projects, the new bridge deck system is often placed on existing reinforced concrete substructures, such as piers and abutments. Therefore to extend the service life of the substructure, it is necessary to repair any existing concrete damage and/or reinforcing steel section loss. The most positive long term solution to meet these objectives is to use electro-chemical methods, such as galvanic corrosion protection, impressed current cathodic protection, or chloride extraction. This presentation shall describe these electro-chemical corrosion mitigation and life extension methods.

# DETAILED DESCRIPTIONS OF THE PRESENTATIONS

TUESDAY DEC 8 - 1:30 PM TO 4:00 PM SESSIONS

3:00 PM - 3:30 PM

## Experimental testing of UHPC joints of precast concrete bridge deck

David Citek, CTU in Prague - Klokner Institut  
Jan Vitek, Metrostav and CTU in Prague  
Jiri Kolisko, CTU in Prague - Klokner Institut  
Robert Coufal, TBG Metrostav s.r.o

In this research, Bond between reinforcing steel and prestressing strands in UHPC was tested experimentally in concrete of different age and under variable environmental conditions. Different diameters of the steel bars and different anchorage lengths were investigated in a large series of pullout tests. The experimental program was focused on testing of UHPC joints subjected to bending as well as on the joints between the steel beam and the precast concrete deck subjected to transversal bending and shear.

3:30 PM - 4:00 PM

## Customized Manual for Design of ABC Projects for Service Life

Atorod Azizinamini, FIU  
Azadeh Jaber, FIU  
Morgan Dickinson, FIU

The main objective of this project is to develop a manual that can be used to evaluate service life of ABC details and practices and to develop solutions for eliminating negative impacts of ABC on the service life performance. As development of the document progresses, the focus has been on 3 fronts. One is looking at non-destructive testing, such as impulse response testing, to study how the response varies across differing types of discontinuities such as cracks and corroded reinforcing. The second focus is on the development of fault trees analysis, and the third is to develop a comprehensive life cycle cost analysis tool that includes construction, maintenance and user cost factors. The manual will be flexible and accommodating to addition of new information as it becomes available.

## G-12: ADVANCEMENT OF PREFABRICATED BRIDGE ELEMENTS

TIME: TUESDAY 1:30 PM - 4:00 PM

ROOM: HIBISCUS B

1:30 PM - 2:00 PM

### Bridge in a Box

Kenneth Sweeney, AIT Bridge Systems

This paper will introduce a modularized, prefabricated bridge system that utilizes advanced materials that can be assembled quickly by semi-skilled labor without heavy equipment. The standard components of this system are: arch tubes, decking, and headwalls. The system can be shipped as a kit that includes the complete bridge superstructure in a standard container.

2:00 PM - 2:30 PM

## Experimental study of A Precast Barrier Wall System performance for Bridge Decks

Zhangzhen Wei, Department of Bridge Engineering, Tongji University, Shanghai, China

Zhiqiang Wang, Department of Bridge Engineering, Tongji University, Shanghai, China

Hongyi Wei, Department of Bridge Engineering, Tongji University, Shanghai, China

This paper presents a kind of barrier-to-deck connection detail of the precast concrete barrier wall. It is more suitable for new bridge construction and can be used for repair, rehabilitation, or represent of aging bridges combined with post-installed rebar. Experimental studies were conducted to compare the new kind of precast barrier wall with those cast-in-place traditionally.

2:30 PM - 3:00 PM

## Construction of the Second Generation of Precast Concrete Deck System NUDECK

Fouad Jaber, NDOR

This paper presents the implementation of the second generation of NUDECK in the Kearney East Bypass Bridge project, Kearney, NE. The fabrication of ten NU1800 precast/prestressed concrete girders and twenty eight precast concrete deck panels is presented. Also, the experience of erecting these components along with conducted post-tensioning and grouting operations are summarized.

3:00 PM - 3:30 PM

## ABC Construction with an Innovative and Cost-Effective Full Depth Precast Deck Solution

Eddie He, AccelBridge

FHWA Everyday Counts program is sponsoring Louisiana Department of Transportation and Development (LADOTD)'s implementation of Accelerated Bridge for the Bayou Lafourche Bridge. The construction started in April 2015. This paper presents the construction aspects of the Bayou Lafourche Bridge, including unique details such as deck match-casting operation, penal erection, geometry controls, deck compression method, and deck stability.

3:30 PM - 4:00 PM

## Sustainable precast concrete segmental bridges achieved using ABC

Linda Figg, Figg Bridge Engineers  
Tom DeHaven, Figg Bridge Engineers

This presentation will include a number of case studies while highlighting construction methods, details, and an in-depth discussion on precast concrete segments sustainability. These case studies come from recently-completed and current award-winning precast segmental bridges across America, including the New I-35W Bridge, the JFK AirTrain, Selmon Expressway, the South Norfolk Jordan Bridge, various cable-stayed bridges, and many others.