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Refer to Page 68 for the full Exhibit Hall schedule for luncheons and receptions.
On behalf of the Engineers’ Society of Western Pennsylvania (ESWP) and the Conference Executive Committee, welcome to the Gaylord National Resort and the 33rd Annual International Bridge Conference®! This year our Conference is making history, as we have moved our venue to the Nation's Capital after over three decades of successful conferences in Pittsburgh, PA. We believe that this new venue will create even more interest and enthusiasm for IBC, which has grown into the preeminent international technical bridge conference and exhibition.

We are excited about the Monumental Move that the International Bridge Conference has made this year. Like Pittsburgh, our nation’s capital boasts of many outstanding bridges, and maintains a proud legacy of bridge building that includes the recently-constructed Woodrow Wilson Bridge over the Potomac River, just minutes from and within easy view of the National Harbor. We are also excited about the opportunity the conference offers our many international participants to visit our capital city. The IBC Magazine this year captures this theme with a photo contest focused on Bridges of Capital Cities.

Our Conference begins on Tuesday June 7 with a variety of activities that include a tour of the Turner Fairbanks Research Center in McLean, VA. The Center houses the Federal Highway Administration’s Office of Research, Development, and Technology, which includes over 20 laboratories dedicated to some of the world’s most innovative bridge research. Our program on Tuesday also includes an International Welcome Reception, as well as an Exhibit Hall Welcome Reception.

We are honored to have the Virginia Department of Transportation (VDOT) as our Feature Agency this year. On Wednesday June 8, VDOT will host a Feature Agency Session focusing on the many bridge projects and recent developments taking place around the State. VDOT will also host a special area on our exhibit floor, and we invite you to stop by and learn more about VDOT and their bridge program.

Our Keynote Session will also take place on Wednesday, and we are excited to be joined this year by Mr. Jian Wei Chen, Vice President of Chongqing Construction and Investment Company, one of the largest bridge construction companies in China. He will share insights into the exciting growth and expansion of bridge construction in his home country. Additionally, US Transportation Secretary Anthony Foxx has
been invited as our keynote speaker, and we look forward to his perspectives on the recently passed transportation funding bill and other developments affecting US infrastructure.

Throughout the four days of IBC, we will be offering a tremendous Technical Program that includes presentations that cover the entire spectrum of bridge engineering. We received a record number of abstracts this year, and the extraordinary level of interest in presenting at IBC is reflected in the outstanding quality of the Technical Program. As in the past, we also are offering a wide variety of workshops throughout the conference. This year, we are happy to partner with the Deep Foundation Institute (DFI), which has helped to sponsor a session dedicated to foundations and geotechnical issues associated with bridges. DFI will also have a dedicated area in our Exhibit Hall – please stop by to thank them for their participation in this year’s technical program.

Our Awards Dinner will take place Thursday, June 9, and again this year our Awards Committee was extremely impressed with the many outstanding projects nominated. The list of IBC award winners this year is second to none, and we are pleased to present Dr. Dennis Mertz of the University of Delaware with the John J. Roebling Lifetime Achievement Award, in recognition for his many years of service to our profession.

The response we have received from exhibitors this year has been outstanding, and we anticipate the Exhibit Hall at our new venue to be filled with booths from across our industry and from all over the globe. This year, our new Exhibit Hall will host all lunches and evening receptions during the conference, while enabling exhibitors to attend our technical sessions.

Please join me in thanking the volunteer Executive Committee members, as well as the ESWP Staff, for their efforts leading up to this conference. The conference is a result of the many hours of hard work and service from these dedicated individuals. As you walk around and enjoy the conference this year, feel free to stop and talk to any of our committee members and provide feedback - we are always looking for ways to make your conference experience the best it can be.

I look forward to meeting you during this year’s monumental International Bridge Conference®

John

John Dietrick, P.E., S.E., is the General Chair of the 2016 International Bridge Conference and a Senior Vice President and National Bridge Practice Director for Michael Baker International.
WELCOME
Welcome to the 2016 International Bridge Conference® (IBC), sponsored by the Engineers’ Society of Western Pennsylvania (ESWP) — our 33rd annual conference! 2016 marks the first time the IBC is being held outside of the City of Bridges, Pittsburgh, PA. It is the same great IBC, but now located in National Harbor, MD, just outside of our nation’s capital. The new location, ideally suited for the ever-growing IBC, is the Gaylord National Resort & Convention Center. The “Gaylord” will host all events of the IBC, and is located within walking distance of the Woodrow Wilson Bridge along the Potomac River. We are pleased to have Virginia Department of Transportation, (VDOT) as our Featured Agency to showcase their bridge program. Remember, the IBC is now a four-day event with many of our workshops scheduled both before and after the conference to enable attendees to take advantage of more conference offerings.

ARRIVING
Getting to/from Gaylord National Resort & Convention Center and downtown Washington, D.C. is very easy. There are three major airports in the area:

- Ronald Regan Washington National (DCA): only 8 miles/15 minutes, we have a dedicated Gaylord shuttle that runs for $18 one way (taxi is about $25)
- Dulles International. (IAD): 35 miles/45 minutes, taxi is about $50
- Baltimore-Washington Int’l. (BWI): 37 miles/50 minutes, taxi is about $60

For those who prefer travel-by-train, there is also DC’s Union Station, which is only 8 miles from the hotel.

The Gaylord also provides a daily shuttle from 8:00 A.M. – 8:00 P.M. which goes to two stops downtown and is $13 one-way or $20 round trip (location stops are Union Station and Ronald Reagan Building/2 blocks from the White House); it is a great way to get downtown and see the sights, or a way to get from Union Station to the Gaylord National Resort.

LOCAL ATTRACTIONS
National Harbor is home to more than 150 diverse shops and boutiques and over 30 dining locations. National Harbor’s vibrant downtown atmosphere will delight you. Learn more about the attractions at http://www.nationalharbor.com/

IBC SPOUSE PROGRAM
The IBC Spouse Breakfast will be hosted at the Gaylord National Resort and Convention Center on Wednesday, June 8 at 10:00 AM. This includes a free continental breakfast and a brief presentation from the Director of Tourism of National Harbor. Also, there will be coupons and brochures offered for spouses to take with them. The IBC Spouse Breakfast is an opportunity for spouses to mingle and learn about the various activities they can explore during their stay.
AMERICANS WITH DISABILITIES ACT
The International Bridge Conference® and ESWP support the Americans with Disabilities Act (ADA), which prohibits discrimination against, and promotes public accessibility for those with disabilities. We ask those requiring specific equipment or services as an attendee to contact the Conference Registration Desk.

BADGE IDENTIFICATION
Please wear your IBC name badge at all times during the conference; it is your passport to all Conference activities. ESWP has authorized Room Monitors on staff to deny access to anyone not wearing the appropriate badge. As a safety consideration, we do suggest that you remove your badge when leaving the Conference.

THE NEW IBC APP
Check out our brand new IBC APP! All of the Conference details at the convenience of your smart phone or tablet. The new APP provides more detail than ever before - full program listing, speakers bios, enhanced exhibitor information, up-to-the-minute announcements, attendee messaging, and much more! Download the APP thru Google Play or the App Store, or use this link https://crowd.cc/s/ dgTy - or scan this QR code...

REGISTRATION
Full Registration at the IBC includes admission to the Keynote Session, Featured Agency Session, all Technical Sessions, Workshops, and Exhibit Hall (including daily Exhibit Hall buffet luncheons & receptions). One- or Two-Day Registration includes all sessions and Exhibit Hall functions corresponding to the day(s) selected.

As always, the heart of the IBC is the quality technical presentations described in detail in this Guide. With so many new events included in the IBC, we hope to provide you with a better understanding of the various offerings for Conference attendees. You will still see the quality technical presentations as offered in all previous IBC’s; these are referred to as “Technical Sessions”, and include papers grouped into sessions of common subject matter. We also offer for your consideration a number of “Workshops” and “Special Interest Sessions” presented by many of our co-sponsors and other industry-leading groups on an even wider variety of bridge industry subject matter.

Remember: tours, the IBC Awards Dinner, and conference proceedings require an additional registration fee. Please visit the Conference Registration Desk for details.
REGISTRATION DESK
The Conference Registration Desk is located on the 2nd Level of the Gaylord Resort. During exhibit hall events, we will also staff an Information Desk near the Prince George Hall E Exhibit Hall. The hours of operation are:
  • Tuesday: 7:00 AM–6:00 PM
  • Wednesday: 7:00 AM–7:00 PM
  • Thursday: 7:00 AM–7:00 PM
  • Friday: 7:00 AM–3:00 PM

EXHIBITS & SPONSORS
The IBC Exhibit Hall is filled with experts in the bridge industry and represents engineering consultants, designers, constructors, special interest groups, service providers and many others. More than 150 booths will offer attendees many more opportunities to extend their learning experience beyond the technical presentations made during the conference. Also, networking in the Exhibit Hall is enhanced by the luncheons and receptions presented there and open to all registered attendees.

TOUR
Tuesday, June 7th 1:00–4:00 PM (Bus to depart at 12:00 Noon) – advance Reservations required. Some limitations apply.

The Turner-Fairbank Highway Research Center (TFHRC) is the Nation’s premier federally owned and operated highway research and development facility. Located in McLean, VA as the research center for the Federal Highway Administration (FHWA), TFHRC coordinates and conducts an ambitious program of innovative highway research and development to address critical needs of the national highway system. Through its three research and development (R&D) offices – Infrastructure, Safety, and Operations – along with the Exploratory Advanced Research Program, FHWA engineers, scientists, and psychologists conduct applied and exploratory advanced research in vehicle-highway interaction, nanotechnology, and a host of other types of transportation research in safety, pavements, highway structures and bridges, human-centered systems, operations and intelligent transportation systems, and materials. With more than 20 laboratories, the center provides a vital resource for advancing the body of knowledge that has been created and developed by our researchers.

MEETING INFORMATION
All IBC functions (exc. tours) are located in the Gaylord National Resort and Convention Center. Please check individual listings throughout this program for specific locations and times for all technical sessions, workshops and social functions. Events which require tickets will identify the specific location for these functions. Any changes in the program schedule will be posted or announced at the Conference Registration Desk, and pushed thru our new APP.
RESERVE & (NEW) PAPERS
Several sessions in this year’s conference include an additional “reserve paper.” These papers may not be presented during the conference, but will be included in the official conference proceedings. Also, some paper numbers may have been updated since earlier IBC publications - these are denoted with (New) in their title.

PRE-PREPRINTS AND IBC MERCHANDISE
Pre-prints for all technical presentations are available at the Merchandise Booth located near the IBC registration Desk. Again this year: purchase a 1 GB flash drive that contains all available pre-prints in .PDF format for only $30.00. Also, you can find copies of previous years’ IBC Proceedings (for $55 per volume).

PROCEEDINGS
Proceedings are an optional order-only purchase and may be ordered in advance or on-site at the IBC for $30.00. Following the conference, proceedings may be ordered for $55.00. The official proceedings of the 33rd Annual International Bridge Conference® will be available in late Summer 2016.

PDH’S
Earn Professional Development Hours (PDHs) by attending the IBC! The Engineers’ Society of Western Pennsylvania (ESWP), sponsor of the IBC, is recognized as a Continuing Education Provider by the New York State Board of Professional Licensure and Florida Board of Professional Engineers, as well as many other state licensing boards. As such, your attendance at the IBC will qualify for continuing education credits in these states.

To obtain verification of attendance at the IBC from the ESWP, you must submit a PDH Request Letter. Official confirmation from the IBC Offices regarding each attendee’s eligibility for PDHs will be mailed after the Conference. PDH Request Letters must be returned to ESWP. (PDH Letters can be obtained at the Conference Registration Desk or website, or by contacting the Engineers’ Society of Western PA, sponsors of the IBC.)

NOTE - For fulfilling continuing education requirements with New York State, attendees are required to sign in-and-out of IBC technical sessions, workshops on the session registry. Registry forms are located at the entrance to any of these sessions. ESWP is unable to verify your attendance in any session if you do not properly sign this registry!

CELL PHONES AND PAGERS
As a courtesy to the Speakers and fellow attendees, the IBC requests that all cell phones and pagers be turned off or switched to silent mode in all Presentation Rooms.
IBC EXHIBIT HALL
One of the main attractions of the Conference is the IBC Exhibit Hall. As you stroll through the many exhibits, you will be able to explore the latest technologies, products and services the bridge industry has to offer. Additionally, don’t forget to participate in our popular “Exhibit Hall Bingo” game for your chance to receive cash prizes, simply by visiting the exhibitors on your bingo card. All registered attendees will have a bingo card in their registration packet.

The IBC Exhibit Hall is located in EXHIBIT HALL E. You will be able to view the exhibits during the following hours:

- Tuesday: 6:00–8:00 PM
- Wednesday: 12:00 Noon–2:00 PM; 5:00–7:00 PM
- Thursday: 11:30 AM–1:30 PM; 5:00–7:00 PM

The IBC will feature a Luncheon Buffet throughout the Exhibit Hall on Wednesday and Thursday and evening receptions on Tuesday, Wednesday and Thursday all open at no additional charge to all conference-registered attendees and registered spouses.

Don’t miss the Featured Agency Exhibit in Baltimore 1& 2, open most hours during the conference (Featured Agency Exhibit may be closed during IBC Exhibit Hall hours.)

COFFEE STAND
Complimentary coffee breaks are available at various times throughout the Conference as noted in your Program Guide.

IBC GIFT ITEMS
Once again at this year’s IBC, you will have the opportunity to purchase the popular IBC neckties, IBC Golf Shirts, and T-shirts. These items are high quality and feature the popular IBC logo. The Gift Item Table is located near the Registration Desk, where you can make your purchases throughout the Conference. Please be sure to stop by and shop and check out our newest styles for the 2016 IBC!

ATTENDEE REGISTRATION LISTS
Conference registrations received prior to May 27 have been compiled in the “IBC PRE-REGISTRATION LIST - PART 1 of 2”, and is available to all registered attendees in .PDF format, available to transfer to your flash drive.

An addendum to the registration list, “PART 2 of 2,” will be available Friday morning of the conference and reflects those attendees who registered after May 27, or on-site during the conference.

An electronic copy, produced in MS Excel, of the entire Attendee Registration List is available for purchase. The cost is $25 for IBC Exhibitors, and $95 for all others, the list will be e-mailed to you following the conference. Please know that the IBC never provides email addresses as a courtesy to our registered attendees.
JOIN US AT THE 2017 IBC!

Join us in 2017 for the International Bridge Conference®, June 4-8, 2017 as we return to the Gaylord National Resort and Conference Center, in National Harbor, MD. Many different sponsorship and exhibit opportunities are available - don’t miss out and make your reservation early to take full advantage of all promotions!

QUESTIONS?

Loads of additional information is available on our website at eswp.com/bridge or you can use our new APP, scan the QR code to access the IBC website. Still have questions? Stop at the IBC registration desk, or ask any of the IBC staff.

LOOKING AHEAD!

Interested in presenting a paper, workshop, seminar presentation at a future IBC? The IBC Call For Papers will open immediately following the 2016 Conference, and everyone is welcome to submit an idea for presentation. Visit www.eswp.com/bridge for more details.
IBC EXECUTIVE COMMITTEE

The IBC is planned through the volunteer efforts of these top industry professionals who make up the IBC Executive Committee. ESWP extends a sincere thank you to the entire Executive Committee (listed below in alphabetical order) for their efforts in planning this year’s conference. A very special thanks goes to the General Chair, John Dietrick, for his leadership in planning this year’s conference.

ELFATIH AHMED, Ph.D., P.E.
Co-Meetings Chair
A&A Consultants Inc.

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AECOM

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FIGG

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Virginia DOT

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Bridge design & engineering

LOUIS J. RUZZI, P.E.
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Pennsylvania DOT

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County of Allegheny – Department of Public Works

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Advanced Rail Management Corporation

JOHN F. GRAHAM, JR., P.E.
Graham Consultant LLC

HERBERT M. MANDEL, P.E.
Consultant

LISLE E. WILLIAMS, P.E., PLS
Consultant

EMERITUS MEMBERS
JOEL ABRAMS, Ph.D.
Consultant

REIDAR BJORHOVDE, Ph.D., P.E.
The Bjorhovde Group

ARTHUR W. HEDGREN, JR., Ph.D., P.E.
Consultant
The International Bridge Conference® (IBC) Executive Committee, in conjunction with Roads and Bridges Magazine, Covestro LLC, Bridge design and engineering Magazine, and TranSystems, Inc. is pleased to announce the recipients of the 2016 IBC Awards of Distinction. The IBC Awards will be presented in a ceremonial dinner on Thursday, June 9 during the IBC. Advance reservations are required. Check with the IBC Registration Desk for seating availability.

- Dr. Dennis Mertz, Newark, DE awarded the John A. Roebling Medal, recognizing an individual for lifetime achievement in bridge engineering.
- Student Award Winner: IBC 16-SP: Integral Connections for Precast-Prestressed Concrete Girders in Seismic Regions. Zhao Cheng and Robert Peggar, Iowa State University, Ames, IA
- Ma-an-shan Yangtze River Bridge, Ma’anshan, Anhui, China awarded the George S. Richardson Medal, presented for a single, recent outstanding achievement in bridge engineering.
- JiaShao Bridge, Shaoxing City, Zhejiang Province, China presented the Gustav Lindenthal Medal, awarded for an outstanding structure that is also aesthetically and environmentally pleasing.
- Hulton Bridge Replacement, Pittsburgh, PA presented the Eugene C. Figg, Jr. Medal, awarded for Signature Bridges, recognizing a single recent outstanding achievement for bridge engineering, which is considered an icon to the community for which it is designed.
- Brookfield Floating Bridge, Brookfield, VT awarded the Arthur G. Hayden Medal, recognizing a single recent outstanding achievement in bridge engineering demonstrating vision and innovation in special use bridges.
- Martin’s Mill Covered Bridge Rehabilitation Project, Antrim Township, Franklin County, PA presented the Abba G. Lichtenstein Medal, awarded for a recent outstanding achievement in bridge engineering demonstrating artistic merit and innovation in the restoration and rehabilitation of bridges of historic or engineering significance.
The IBC Poster Session offers additional opportunities to learn and network! Located on the 2nd Level Foyer near the IBC Registration Desk and Technical Sessions, posters are available for viewing throughout the conference.

IBC POS 16-1: Fully Nonlinear System Capacity and Load Distribution at Ultimate for Composite Steel Girder Bridges  
Fayaz Sofi, S.M. ASCE and Joshua Steelman, Ph.D., P.E., M. ASCE, University of Nebraska-Lincoln, Lincoln, NE

IBC POS 16-2: Australia Ushers in New FRP Solution for Repair of Corroded Culverts  
Mo Ehsani, Ph.D., P.E., S.E., QuakeWrap Inc., Tucson, AZ; Stephen Day, Stephen Day and Associates P/L, Cairns, QLD, Australia; Tony White, QuakeWrap Australia, Brisbane, QLD, Australia

IBC POS 16-3: Bridge Weigh-in-Motion (BWIM)  
Nicole Prete, Sarira Motaref, and Richard Christenson, University of Connecticut, Storrs, CT

IBC POS 16-4: Gillies Creek Bridge  
Sagar Adivarekar and Gary S. Johnson, P.E., RK&K, Richmond, VA

IBC POS 16-5: Route 29 Solutions - Design-Build, Rio Road Intersection  
Chris Vaught and Gary S. Johnson, P.E., RK&K, Richmond, VA

IBC POS 16-6: Route 250 Bypass at McIntire Road  
Behrooz Rad and Gary S. Johnson, P.E., RK&K, Richmond, VA

IBC POS 16-7: I-64-Widening - Design-Build, Replacement Bridges over Little Tuckahoe Creek  
Ashley Johnson and Gary S. Johnson, P.E., RK&K, Richmond, VA
W-01: LRFD FOR CONCRETE HIGHWAY BRIDGE SUPERSTRUCTURES

**Time:** Tuesday, June 7; 8:00 AM–12:00 Noon  
**Room:** Baltimore 3  
**Presented By:** Federal Highway Administration

The main intention of this workshop is to give the participant a sample of the presentations of the recently updated FHWA/NHI Course #130081: LRFD for Highway Bridge Superstructures (Concrete). This updated course describes Load and Resistance Factor Design (LRFD) for concrete highway bridge superstructures. The course includes LRFD theory applied to design examples and illustrates step-by-step LRFD design procedures. The curriculum follows the AASHTO LRFD Bridge Design Specifications, 7th Edition, 2014 (AASHTO LRFD), including the approved 2015 Interims.

The course curriculum materials are comprised of a comprehensive reference manual (FHWA Publication No. FHWA-NHI-15-047), lecture and workshop exercises intended to promote or enhance a working knowledge of AASHTO LRFD, and a participant workbook for lecture notes and exercises.

The curriculum material includes the following major topics:
- General superstructure design considerations; Preliminary design concepts for prestressed concrete superstructures;
- Prestressed concrete I-girder design;
- Spliced prestressed concrete girder bridges

The following topics will be presented in this workshop:
- Preliminary Design Concepts for Prestressed Concrete Superstructures including: Prestressed Loss in Pretensioned Concrete I-Beams.
- Prestressed Concrete I-Girder Design including: Flexure Design at Service Limit State; Flexure Design at Strength Limit State; Shear Design at Strength Limit State; Interface Shear Design at Strength Limit State; and Prestressed Girders Made Continuous

**Speakers:** Brian Kozy, Ph.D., P.E., Team Leader, FHWA; Scott Vannoy, P.E., Project Manager, Michael Baker International; Frank Russo, Ph.D., P.E., Michael Baker International; William Nickas, P.E., Precast/Prestressed Concrete Institute (PCI)

W-02: LOAD RATING AND POSTING OF LOCALLY OWNED BRIDGES

**Time:** Tuesday, June 7; 9:00 AM–12:00 Noon  
**Room:** Baltimore 5  
**Presented By:** Federal Highway Administration

50% of highway bridges in the national inventory are owned by counties, cities or towns. Agencies have been challenged in managing these assets to meet both transportation needs and public safety. The objective of this Workshop is to provide participants with basic information, lessons learned, and available resources. Target audiences are engineers from local, State and federal agencies, and consultants. This Workshop will consist of panel presentations and roundtable discussions from FHWA, State and local agencies.
Tuesday
SESSIONS

Speakers: Lubin Gao, Ph.D., P.E., FHWA; Jonathan C. Mallard, P.E., Load Rating Program Manager, VDOT; Cindy Wang, P.E., Office of Structural Engineering, Ohio DOT; Kevin J. Sabolcik, P.E., Chief of Structural Design Section, Baltimore County Department of Public Works; Alex Pence, P.E., S.E., Bridge Rating Engineer, WisDOT

W-03: ENHANCING PERFORMANCE AND EXTENDING THE SERVICE LIFE OF CONCRETE BRIDGES USING FRP COMPOSITES

Time: Tuesday, June 7; 9:30 AM–12:00 Noon
Room: Magnolia 3
Presented By: American Composites Manufacturers Association

This workshop will educate attendees on recent material and product advancements including new concrete strengthening systems and FRP rebar products that compete with traditional materials, performance of FRP reinforced concrete panels subjected to fire that were also designed to protect against ballistic and blast threats that could be applied to critical bridge structures. In addition, durability of FRP reinforced concrete structures based on an academic – industry study to evaluate the performance of GFRP rebars used on historic bridges and structures after more than ten years in service where evidence shows the GFRP rebars did not experience any degradation or loss of mechanical properties as compared to steel used in these installations.

Attendees will learn about bridge design, construction, performance and testing using innovative FRP materials and products, including: 1) bridges designed in Canada using the highway bridge design code, 2) systems that provide fire and blast protection of concrete bridge structures, and 3) long-term durability of FRP rebar in concrete bridges and structures.

Speakers: Brahim Benmokrane, Ph.D., P. Eng., FACI, FCSCE, FIIFC, FCAE, FEIC, University of Sherbrooke, Sherbrooke, QB, Canada; David White, P.E., Sika Corporation, Lyndhurst, NJ; Scott Reeve, Composite Advantage, Dayton, OH; Thomas Ohnstad, ME, High Impact Technology, LLC, Tigard, OR; Amol Vaidya, Ph.D., Owens Corning Science & Technology LLC, Granville, OH; Alvin C. Ericson, FACI, FPCI, Technical Consultant, Bonita Springs, FL; John P. Busel, FACI, American Composites Manufacturers Association, Arlington, VA

IBC BUS TOUR

Tuesday, June 7th 1:00–4:00 PM (Bus to depart at 12:00 Noon) – advance Reservations required. Some limitations apply. Refer to Page 8 in this Guide for full details.
**W-04: LRFD FOR STEEL HIGHWAY BRIDGE SUPERSTRUCTURES**

*Time: Tuesday, June 7; 1:00–5:00 PM*
*Room: Baltimore 3*

**Presented By:** Federal Highway Administration

The main intention of this workshop is to give the participant a sample of the presentations of the recently updated FHWA/NHI Course #130081: LRFD for Highway Bridge Superstructures (Steel). This updated course describes Load and Resistance Factor Design (LRFD) for steel highway bridge superstructures. The course also includes LRFD theory applied to design examples and illustrates step-by-step LRFD design procedures. The curriculum follows the AASHTO LRFD Bridge Design Specifications, 7th Edition, 2014 (AASHTO LRFD), including the approved 2015 Interims.

The curriculum material of the course includes the following major topics: General superstructure design considerations; Preliminary design concepts for steel I-girder superstructures; and Steel I-girder design.

The following topics will be presented in this workshop: Preliminary Design Concepts for Steel I-Girder Superstructures including: Primary Span and Cross Section Layout Considerations; Primary Framing Plan Layout Considerations; and Primary Girder Type and Size Considerations. Steel I-Girder Design including: LRFD Strength Limit State Design for Flexure and LRFD Service Limit State Design.

**Speakers:**
- Brian Kozy, Ph.D., P.E., Team Leader, FHWA;
- Scott Vannoy, P.E., Project Manager, Michael Baker International;
- Frank Russo, Ph.D., P.E., Michael Baker International;
- Michael Grubb, P.E., M.A. Grubb & Associates, LLC

**W-05: SERVICE LIFE DESIGN AND ENGINEERING OF BRIDGES**

*Time: Tuesday, June 7; 1:00–5:00 PM*
*Room: Baltimore 5*

**Facilitator:** Kelley Severns, WSP | Parsons Brinckerhoff, Nashville, TN

Service Life Design (SLD) and Engineering of bridges strives for 100 year service life or longer through decision making processes leading to more durable and easier to maintain structures. This workshop will examine the factors impacting desired structural service life including: design details, rehab and replacement decision making, material choices, protection systems, construction methods, inspection methods, preservation strategies, and environmental considerations. FHWA / SHRP2 research and implementation on SLD will be highlighted.

An expert panel session will be assembled to include bridge owners, design consultants, contractors, academia, government, and material suppliers.

**Speakers:**
- Patricia Bush, AASHTO, Washington, DC;
- Mike Bartholomew, CH2M, Corvallis, OR; Anne Marie Langlois, COWI, Vancouver, BC, Canada; Iowa DOT, Des Moines, IA; Michael Brown, Virginia DOT, Richmond, VA.

**Panel Discussion Lead:** Barton Newton, WSP | Parsons Brinckerhoff, Sacramento, CA
W-06: LONG TERM BRIDGE PERFORMANCE (LTBP) PROGRAM UPDATE

Time: Tuesday, June 7; 1:00–4:30 PM
Room: Magnolia 1

Presented By: Michael Baker International

This workshop’s objective is to update and engage the bridge community on the Long Term Bridge Performance program. FHWA and their contractors are looking to "spread the word" about the LTBP program. The presentations would center around what they have accomplished, what they plan to accomplish, and to ascertain what the bridge community would like them to accomplish.

Speakers: Hamid Ghasemi, Robert Zobel, Susan Lane, Yamayra Rodriguez, Hoda Azari, FHWA; Richard Dunne, Michael Baker International; Jeff Purdy, Pennoni & Associates

W-07: INTERNATIONAL BRIDGE ENGINEERING PRACTICES

Time: Tuesday, June 7; 1:00–5:00 PM
Room: Magnolia 3

Presented By: M. Myint Lwin, P.E., S.E., QC/QA Consultant

The main objective of this workshop is to provide a forum for bridge engineers from around the world to present and discuss bridge specifications, and practical solutions for solving bridge engineering issues. Six international speakers will share their practices in design and construction specifications, selection of bridge types for long span bridges, preservation of long span bridges, accelerated bridge construction, earthquake resistant designs, use of advanced analysis to determine the optimum construction sequence to meet stringent crack control in concrete, and many more. International bridge engineering practices are quite varied in different parts of the world. There are many good practices and valuable lessons to be learned. Attendees of this IBC workshop will be able to take away ideas and solutions that can be applied to their daily practice of bridge engineering.

Speakers: M. Myint Lwin, P.E., S.E., Bridge Engineering Consultant; Jim McDonnell, USA; Barry Colford, U.K.; Weifeng Zheng, China; Pedro Pacheco, Portugal; Carlos Mendez, Mexico; Tomonobu Tokuchi, Japan

INTERNATIONAL ATTENDEES WELCOME RECEPTION

Time: Tuesday, June 7; 5:00–6:00 PM
Room: Cherry Blossom Ballroom Lobby

Host: Thomas G. Leech, P.E., S.E., Gannett Fleming, Inc., Pittsburgh, PA; M. Myint Lwin, P.E., S.E., Consultant, Olympia, WA

Open to all international attendees, the Executive Committee hosts a gathering for our guests who traveled beyond borders to attend the IBC. The reception is free to international attendees, but tickets are required and can be obtained at the IBC Registration Desk.

IBC EXHIBIT HALL RECEPTION

5:00–7:00 PM in the Prince George Exhibit Hall E
Wednesday
SESSIONS

CABLE-STAYED BRIDGES
Time: Wednesday, June 8; 8:00–10:00 AM
Chair: Kenneth J. Wright, P.E., HDR Engineering, Inc., Pittsburgh, PA

8:00 AM
IBC 16-01: Innovative Structural System for Cable-Stayed Bridge
Thomas Spoth, P.E. and Seth Condell, P.E., PARSONS, New York, NY
The Port Authority of New York and New Jersey is replacing the 1928 Goethals Bridge through a Public Private Partnership. The replacement crossing includes a modern cable-stayed bridge spanning the Arthur Kill between Elizabeth, NJ and Staten Island, NY. Overall, the bridge will consist of a 7,306 feet long elevated structure including the 1,635 feet overall length cable stayed bridge. Consistent with expected growth in the region, the design includes built-in future transit expansion capabilities.

8:30 AM
IBC 16-02: Challenges/Innovation to the Cable Stays for Hybrid Structures
Erik Mellier, Freyssinet, Inc., Rueil Malmaison, France; Andrew Micklus, Jr., Freyssinet, Inc., Sterling, VA
With its innovative design, of 1,408 m long central span and 58 m wide deck carrying 2 x 4 traffic lanes and two railway tracks in its center, the Third Bosphorus Bridge located in Istanbul, Turkey, is considered the widest hybrid suspension/stay cable bridge in the world. The presentation will emphasize the main issues and innovations that were needed for the stay cables to support the construction of this first of a kind bridge.

9:00 AM
IBC 16-03: Numerical Model for Predicting Carbon Fiber Composite Cable Forces in a Cable-Stayed Bridge
Kathryn A. McDonald, B.Eng (Hons), City of Gold Coast, Gold Coast, Queensland, Australia; Andrew J. Goupee, Ph.D., Keith A. Berube, Ph.D., and Roberto Lopez-Anido, Ph.D., P.E., University of Maine, Orono, ME
Carbon Fiber Composite Cables (CFCC) have high tensile strength, low weight and excellent corrosion resistance. As such they provide a viable replacement to traditional steel cables in many cable-stayed bridges, which may increase a structure’s lifespan and reduce maintenance requirements. The Penobscot Narrows Cable-Stayed Bridge offers a unique opportunity to develop these technologies. This paper analyzes continuous CFCC structural health monitoring data, and investigates the relationship between the external ambient air temperature and CFCC forces.
Wednesday
SESSIONS

9:30 AM
IBC 16-04: Design Scheme into the Rail-cum-Road Cable-stayed Bridges with Span Length over 1000m
Zongyu Gao, China Railway Major Bridge
Reconnaissance & Design Institute Co., Ltd., China;
Houxin Wang, Ph.D., CITIC Metal Co., Ltd., Chaoyang District, Beijing, China
The Hutong Yangtze River Bridge is a self-anchored cable-stayed bridge, with the longest span of 1092m in China. In order to meet the functions of such large structures, high performance steels with high strength, good low temperature toughness (≥120J@-40°C), excellent weldability as well as high fracture toughness, are utilized including Q500q, Q420q, and Q370q, etc., which are usually microalloyed by Nb to realize such high comprehensive properties.

INSPECTION/EVALUATION
Time: Wednesday, June 8; 8:00–10:00 AM
Room: Annapolis 1,2,3 - sponsored by PARSONS
Chair: M. Myint Lwin, P.E., S.E., QC/QA Consultant, Olympia, WA
8:00 AM
IBC 16-05: Applications of Modern Imaging Technologies in Bridge Asset Management
Y. Edward Zhou, AECOM, Germantown, MD; Mark Guzda, AECOM, Hunt Valley, MD; Christopher Higgins, Oregon State University, Corvallis, OR
With the availability of high definition digital cameras and advanced digital image processing techniques, a procedure has been developed that documents and monitors concrete surface cracks in an efficient, complete, objective, and accurate manner. This paper discusses such procedure, as well as its applications for collection and processing of digital images of superstructure and substructure elements of concrete bridges. Based on these digital images, monitoring for condition changes over time can become a standardized and efficient process as part of the bridge management system for asset management purposes.

8:30 AM
IBC 16-06: SHRP2 Advancement in Nondestructive Testing for Concrete Bridge Decks
Yajai Tinkey, Olson Engineering, Wheat Ridge, CO; Matthew DeMarco, FHWA Resource Center, Lakewood, CO; Larry Olson, Olson Engineering, Haymarket, VA
Federal transportation funding under the current MAP-21 authorization requires state DOTs to assess the condition of bridge decks and plan for life-cycle maintenance expenditures per accepted asset management practices. To assist bridge owners, the SHRP2 program sponsored research into emerging non-destructive (NDT) scanning technologies to quickly assess the condition of concrete bridge decks – rapidly identifying
bridge deterioration mechanisms and evaluating the effectiveness of deck preservation techniques. Under the SHRP2 Implementation Assistance Program, eight state DOTs were awarded funding to supplement traditional method with the latest NDT technologies for improved condition assessment. This paper overviews each of the NDT technologies evaluated; highlights the broad array of deployment efforts underway across the IAP states; and emphasizes how NDT scanning data are to be effectively used within DOT inspection, maintenance and asset management programs.

9:00 AM
IBC 16-07: Comprehensive Testing and Evaluation of the James River Bridge in Virginia - How to Chain Drag a Four and a Half Mile Bridge in One Night
Deanna Nevling and Philip Quillin, Michael Baker International, Virginia Beach, VA; Christopher Eggleston, VDOT, Suffolk, VA; Vihad Ganji, Michael Baker International, Hamilton, NJ
The 4.4 mile long James River Bridge in southeastern Virginia underwent a thorough field evaluation to develop repair recommendations and estimate maintenance costs. Ground Penetrating Radar and Laser Crack Measurement Scans were performed on the entire bridge to locate deficient deck areas. Rebar cover measurement, sounding, half-cell potential, chloride profile sampling, and petrographic analysis tests were conducted on a small sample of decks for comparison. Similar tests were conducted in a small sample of beams.

9:30 AM
IBC 16-08: A user friendly rating tool for Complex Bridge
Pamela Yuen, P.E., Shaoyun Sun, Ph.D., P.E., and Eddie He, Ph.D., P.E., S.E., PARSONS, Chicago, IL; Yihong Gao, P.E., MnDOT Bridge Office, Oakdale, MN
NBIS requires all highway bridges on public roads must be rated. Commercially available software has been developed for the load rating of typical bridges; however, software for rating of complex bridges is not available. Typical methods for permit evaluation either require further advanced engineering analysis or complicated and time consuming procedures. A rating tool is developed that customized for the individual bridge and owner’s rating criteria to easily and efficiently rate the bridge for standard legal loads as well as any wheel load configuration of permit vehicle. This paper will present the development of the rating tool along with MnDOT processes and practice in using this tool.
WEDNESDAY

REHABILITATION 1

Time: Wednesday, June 8; 8:00–10:00 AM
Chair: W. Jay Rohleder Jr., P.E., S.E., FIGG, West Chester, PA

8:00 AM
IBC 16-09: Maryland’s Bay Bridge - The First Main Cable Dehumidification Project in North America
Shane Beabes, AECOM, Baltimore, MD; Philip Waldvogel, Amman & Whitney, New York, NY; Mark Bulmer, AECOM, Leeds, UK

Since the Akashi-Kaikyo Bridge was built in 1998, eight new bridges and fifteen existing suspension bridges are known to have been dehumidified across Asia and Europe. In 2013, main cable dehumidification work began on the William Preston Lane, Jr. Memorial (Bay) Bridge in Maryland, USA – the first cable dehumidification project in North America. The presentation will provide an overview of the project including construction, system commissioning, and initial results obtained from the data acquisition system.

8:30 AM
IBC 16-10: Retrofit and Reconstruction of the Century Old Historic Georgia Street Arch Bridge
Nathan Johnson and Ebrahim Amirihormozaki, Kleinfelder, San Diego, CA

Constructed 100 years ago as "The Gateway to eastern San Diego", the Georgia Street Bridge is a three-hinge arch with a 700 foot long grade separation. The structures are badly deteriorated with poor seismic detailing. The entire superstructure and spandrels will be replaced and arch-ribs will be retrofitted using hydro-demolition and self-consolidating fiber reinforced concrete mix. Walls will be stabilized using ground anchors and new facing. The bridge rehabilitation/reconstruction will preserve the historic resource for future generations.

9:00 AM
IBC 16-11: Route 37 EB Mathis Bridge Rehabilitation
Rama Krishnagiri and Steve Esposito, WSP | Parsons Brinckerhoff, Lawrenceville, NJ; Maria Yap, Milos Kivich, and Mark Soryal, Hardesty & Hanover, LLP, West Trenton, NJ; George Kuhn and John Longworth, New Jersey DOT, Trenton, NJ

NJ 37, an evacuation route, links the mainland to beach communities in Seaside Heights, NJ. Three Eastbound lanes are carried by the 4,860-foot long, 66-span, 60-year old, double leaf bascule bridge. The deteriorated deck, bearings and substandard or obsolete mechanical/electrical components needed replacement. The $60-million rehabilitation preserves the existing structure, replaces the deck and bearings, improves traffic lanes and safety features, and includes customized resistance barrier gates, warning gates, substructure repairs and a major Electrical/Mechanical overhaul.
9:30 AM

IBC 16-12: I-64 Dunlap Creek Bridge Deck Rehabilitation - Jointless Bridges, Deck Overlays, and Concrete Materials
Celik Ozyildirim and Gail Moruza, VDOT, Charlottesville, VA; Rex Pearce and Ikhyeon Kim VDOT, Staunton, VA

Two Virginia interstate bridges (550 feet) built in 1966 were rehabilitated to prolong lifespan by preventing chloride leakage into joints and concrete cracks. Work performed was: milling/dry-hydror demolition, deck extension, retrofitting "Micro Virginia abutment", shotcrete substructure repair, and general rehabilitations. Joints were replaced with closure pours using innovative fiber reinforced concretes. Shrinkage reducing admixtures or lightweight concretes were used for overlay installation. A project as such will provide benefit towards upcoming interstate bridge rehabilitation projects.

IBC 16-Reserve: Rehabilitation 1: Corrosion Evaluation/ Mitigation of 15 Bridges Along I-395 in VA
Alireza Hedayati, WSP | Parsons Brinckerhoff, Herndon, VA; Siva Venugopalan, Siva Corrosion Services, Inc., West Chester, PA

Parsons Brinckerhoff team has provided corrosion evaluation studies and plans for 15 bridges for VDOT, including deck and substructure corrosion evaluation for 15 bridges along I-395 corridor. Corrosion evaluation was performed on the King Street Bridge over I-395 to determine the current condition of the deck and substructures. The purpose of the corrosion evaluation was to calculate the remaining service life of the structure and to provide recommendations on cost effective life extension.

CONSTRUCTION/FABRICATION

Time: Wednesday, June 8, 8:00–10:00 AM
Room: Baltimore 3,4,5 - sponsored by HDR Engineering, Inc.
Chair: Gerald J. Pitzer, P.E., Consultant, Pittsburgh, PA

8:00 AM

IBC 16-13: Almonte Viaduct Construction Process
David Arribas, Pedro Cavero, Pablo Bernal, and David Carnero, FCC Construccion, Madrid, Spain; Pablo Jimenez, Adif Alta Velocidad, Caceres, Spain

The Almonte Viaduct is located in the south west of Spain into the high speed railway line Madrid-Extremadura. It is 996m (3,268 feet) long with a concrete arch in the main span of 384m (1260 feet) long. It is the world's largest high speed rail arch and the world's third-largest concrete arch taking into account also road bridges. The construction of the bridge has been a challenging process.
Wednesday
SESSIONS

8:30 AM
IBC 16-14: Construction of John Greenleaf Whittier Memorial Replacement Bridge
David Rogowski and Lisa Briggs, Genesis Structures, Kansas City, MO; Chris Daigle, Walsh Construction, Canton, MA
With daily tide cycles of 9 feet and with areas inaccessible by cranes, an erection method utilizing two launched girders supporting overhead gantry cranes was implemented. This unique method was used to erect the approach spans, the arch floor system and a 200 ton crane which traversed the arch floor system to erect the upper arch. The launch girders were moved and will be reused to remove the existing bridge and erect the SB bridge.

9:00 AM
IBC 16-15: Field Erection of Large Girder Assemblies for Tappan Zee Bridge
Tom Zieman, Zieman Engineering, LLC, Stamford, CT; Bill Batzel, Tappan Zee Constructors, LLC, Tarrytown, NY
The new Tappan Zee bridge consists of over two miles of plate girder approaches, which are being built in pre-assemblies up to 420 feet long and weighing up to 2200 kips, and are set using a 1700-ton capacity floating shear leg crane. This presentation will describe the process of erection, the hydraulically adjustable lifting frame used to set the girders, stability and deflections of the girders, and connection of crossframes between the assemblies.

9:30 AM
IBC 16-16: The Influence of Cold Cambering on the Toughness of Rolled I-beams
Michael Bresch, II and Ronnie Medlock, High Steel Structures, LLC, Lancaster, PA; Y. Frank Chen, Ph.D., Penn State University, Middletown, PA
The practice of cambering steel I-shaped beams by a cold bending process is becoming increasingly popular. However, the impact of cold bending on the toughness and ductility of the steel has raised concern among some engineers. This research investigates these concerns by performing cold cambering tests. Specimens are taken from areas with the highest deformation and areas with no deformation. Charpy V-notch tests and tensile tests are performed and the results are presented and discussed.

IBC 16-Reserve: Construction/Fabrication: Northwest Corridor Design-Build, Pier Construction
Ali Ghalib, PARSONS, Baltimore, MD; Alan Kite and Ahmad Khashan, PARSONS, Washington, DC
The Northwest Corridor project is located in an urban area with numerous construction, geometry and traffic challenges. An innovative design and construction solution was utilized to mitigate these issues on two project bridges. To minimize disturbance to an environmentally sensitive stream area with limited access, precast hammerhead pier caps will be fabricated on-site, transported to the pier location and erected from the shoulder embankment. To minimize traffic disruptions at a second site, a precast inverted tee straddle bent pier cap will be erected.
Wednesday
SESSIONS

IBC KEYNOTE SESSION
Time: Wednesday, June 8; 10:30 AM–12:00 Noon
Room: Cherry Blossom Ballroom
Chair: John C. Dietrick, P.E., S.E., Michael Baker International, 2016 IBC General Chair
Be sure to be in your seats for the start of the IBC Keynote Session, as we will feature a special Color Guard presentation of the US Flag. The IBC Keynote Session includes special presentations by:

- Featured Agency – Virginia Department of Transportation; Aubrey L. Layne, Jr., Secretary of Transportation, Commonwealth of Virginia on “Project Prioritization and Public-Private Partnerships: The Virginia Experience”
- Mr. Jianwei Chen - Chairman of the Board, ChongQing City Construction Investment (Group) Co., Ltd. (CCCIC), on the “Bridges in Chongqing, the Past, the Present and the Future”
- The Honorable Anthony Foxx, Secretary of Transportation, US Department of Transportation (Invited)
- James D. Cooper Award Winner, presented to Zhao Cheng and Robert Peggar, Iowa State University for the paper: “Integral Connections for Precast-Prestressed Concrete Girders in Seismic Regions.”

IBC EXHIBIT HALL LUNCHEON
12:00 Noon–2:00 PM in the Prince George Exhibit Hall E

Powerful Infrastructure Management Solutions
- asset management software
- nondestructive tools
- structural health monitoring systems
www.advitam-group.com
Wednesday

SESSIONS

PROPRIETARY

Time: Wednesday, June 8; 2:00–4:30 PM
Chair: Rachel Stiffler, Vector Corrosion Technologies, McMurray, PA

2:00 PM

IBC 16-17: Jacking of Bridges/Underpasses, Under Active Railroad Tracks
Riccardo Castracani, Petrucco USA LLC, Miami Beach, FL
The need for safer Railroad Crossings is becoming very apparent during the recent years, due to increased train and vehicular traffic, making existing at grade crossings obsolete. The problem associated with going from an at grade crossing to an underpass, or an overhead bridge, is the oftentimes impossibility to stop the train traffic, or the cost involved in doing so. Petrucco has patented a very safe system that can temporarily support the railroad tracks, while a pre-cast underpass, or bridge, is jacked under this support system, therefore never needing to detour trains, interrupt the service, or stop them at all. The solution results in a safe, economical methodology to replace at grade crossings with underpasses, while eliminating the need to detour or stop trains. This methodology has been used very successfully all over Europe, and we have recently introduced the system in North America.

2:30 PM

IBC 16-18: Recent Applications of Seismic Isolation and Energy Dissipation Solutions in Latin America
Carlos Mendez Galindo, mageba Mexico, Benito Juarez, Mexico City, Mexico; Gianni Moor, mageba USA, New York, NY; Borja Bailles, mageba International, New York, NY
The design of critical structures to withstand earthquakes continues to gain importance in Latin America. This paper presents some recent applications of such seismic protection in Mexico, Venezuela, Ecuador and Peru. All these countries are located in areas with strong earthquakes. The case studies presented are evidence of the increasing interest of designers, contractors and owners in ensuring safer, efficient structures, which above all ensure the safety of the population and mitigate structural damage.

3:00 PM

IBC 16-19: Repair of Bridge Piles in a Crocodile-Infested River
Stephen Day, Stephen Day and Associates P/L, Cairns, Queensland, Australia; Mo Ehsani, Quakewrap, Inc, Tucson, AR; Tony White, Quakewrap Australia, Yeronga, Queensland, Australia
Octagonal PSC piles in a bridge over the crocodile-infested Barron River in Cairns in north Queensland, Australia, experienced severe ASR cracking and required remediation to protect against corrosion damage.
Forty piles were repaired underwater by encasing in a protective jacket consisting of thin glass FRP laminate sheets wrapped around the piles to create a seamless, impervious, cylindrical shell and subsequently filled with a low viscosity resin that sealed the concrete and filled any voids and cracks.

3:30 PM
IBC 16-20: Accelerated Bridge Construction: 3 Methods
Pedro Pacheco, Hugo Coelho, André Resende, and Igor Soares, BERD, S.A., Matosinhos, Porto, Portugal
Different factors of productivity in industrialized concrete deck construction are discussed, considering 3 different construction methods used in 3 projects with 3 different contexts. An introduction of an Organic Prestressing System is presented - an actively controlled prestressing system that increases structural efficiency and safety, confirming a positive impact in productivity.

4:00 PM
IBC 16-21: Folded Steel Plate Girder System – Applications in Accelerated Bridge Construction
Matthew Macey, CDR Bridge Systems, LLC, Pittsburgh, PA
The Folded Steel Plate Girder (FSPG) System is the culmination of over ten (10) years of research, development, and testing resulting in a short span steel alternative to concrete bridges. In this paper, the FSPG System’s use as an accelerated bridge construction technique will be presented. The presentation will include the FSPG System design features, fabrication, and construction.
Wednesday
SESSIONS

VDOT FEATURED AGENCY SESSION

Time: Wednesday, June 8; 2:00–5:00 PM
Room: Cherry Blossom Room

Introduction and Opening Remarks
Garrett Moore, P.E., Chief Engineer

Bridges in Virginia
Kendal Walus, P.E., State Structure and Bridge Engineer
VDOT maintains and inspects 19,482 of Virginia’s 21,113 highway bridges and large culverts. Virginia is required to inspect only the 13,499 structures that are part of the National Bridge Inventory (NBI), but, as a critical component of a proactive safety policy, Virginia inspects an additional 7,614 structures that are not large enough to be included in the NBI. Many of Virginia’s bridges are approaching a critical age. About 63% percent of the bridges in the inventory are over 40 years old and thus approaching their anticipated 50 year service life. In order to meet the challenge, VDOT has adopted an asset management approach that emphasizes system preservation and maximum life-cycle value for every dollar spent. VDOT insists on durability for new and existing bridges, and requires materials and construction techniques that provide long life with minimal maintenance, which will reduce the maintenance burden for future generations of taxpayers. Some examples of this philosophy include: corrosion-resistant reinforcement, high-performance concrete in all bridge elements, jointless construction, and a detailed program for preventive maintenance. In some cases these treatments and materials have a slightly higher initial cost, but their true value will be realized in future years though reduced repair and maintenance costs.

Construction of the Route 460 Connector Bridge
Gary Lester, P.E., Bristol District Structure and Bridge Engineer, and Mark W. Hirsch, P.E., Vice President, RS&H, Inc.
VDOT’s design-build contract for the Route 460 Connector Phase I in Buchanan County was completed mid-September 2015. The project included design and construction of twin high-level bridges, 1700 linear feet in length, located over Conaway Road (Route 610) and Grassy Creek, now the tallest in Virginia; a 0.8-mile four-lane divided highway (US Route 460) starting at the Kentucky State Line; an access ramp to Route 80, improving access to Breaks Interstate Park; and secondary connections to Routes 609 and 693 from Route 80.

The Gilmerton Vertical Lift Bridge:
A Project Risk Management Approach
The replacement of the Gilmerton Bridge included several significant construction challenges which were compounded by an access restrictive site. The full re-
placement of the existing bridge was completed over top of the existing, active bridge and was constrained on either side by an existing rail bridge and existing businesses. Additionally, the project included the float-in of a new 5,200,000-LB lift span through the Port of Hampton Roads. In order to address these challenges, the project participated in a full stakeholder/joint risk management program to provide a collaborative, project-focused process to resolve problems. This program resulted in the successful completion of the project and some unexpected solutions to our problems.

Replacement of Bridge Decks on Route 360
Chris Lowe, P.E., Central Office Structure and Bridge Division.
The US 360 bridges over the Chickahominy River endures frequent high-water levels and a low roadway profile. Conventional voided slab bridges would normally tend to develop longitudinal “reflective cracking” due to failed or inadequate transverse connections in the adjacent voided slab beams. VDOT has developed an innovative bridge superstructure design using optimized inverted T prestressed concrete beams. VDOT Engineers adapted a design based on concepts of the “Poutre-Dalle” pioneered in France and variations that had been evaluated in Minnesota. Virginia’s enhancement strove to reduce the propensity for cracking and to increase the ease of fabrication and placement.

Preservation of PT Tendons in the Varina Enon Bridge
Michael Sprinkel, P.E., Associate Director, Virginia Transportation Research Council.
The Varina Enon (VE) Bridge, which carries I-295 over the James River, was opened to traffic in 1990. One of the most significant bridges in Virginia the superstructure was constructed with precast post tensioned box sections, two sets of cable stays and 480 grouted external tendons. During a routine inspection in 2007 one of the tendons was found to have failed. Evaluations resulted in the replacement of 2 tendons, monitoring of several tendons, injection of four tendons with a corrosion inhibitor and ongoing discussions on how best to preserve the tendons over a 75 to 100 year life.

Structural Retrofit & Rehabilitation of I-64 Delta-Frames over the Maury River
Rex Pearce, P.E., Staunton District Structure and Bridge Engineer.
The Interstate 64 bridges over the Maury River and Kerrs Creek in Rockbridge County were designed in 1969 in built in 1976. These two bridges carry eastbound and westbound traffic on I-64 in the Lexington area. The bridges have a steel frame support and are called delta frame bridges. This project will rehabilitate the two bridges by repairing the structural steel frames, and replacing the deck, reconstructing abutments and providing slope work protection. Each bridge is 845-feet long and 43-feet wide. Roadway width is 39 feet. The existing bridges
are structurally deficient with steel fatigue cracks along with deck, joint and abutment problems plus slope erosion. This project has earned $15.5 million in federal grants under the Transportation Investment Generating Economic Recovery (TIGER) program.

State Force Small Bridge Program
Teresa Gothard, P.E., Culpeper District Structure and Bridge Engineer.

The State Force Small Bridge Program targets small bridges for replacement by state bridge crews. Small bridges eligible for the program are generally 60 feet or less in length, usually in rural areas, and in poor condition. Employing state bridge crews to replace a proportion of these bridges at low expense is a high-payoff way of using resources and funding because it reserves more resources for more difficult projects that must be performed by contractors.
Wednesday
SESSIONS

W-E: LEGAL & ETHICAL IMPACTS OF CONTRACT DELIVERY MECHANISMS

Time: Wednesday, June 8; 2:00–3:00 PM
Room: Magnolia 1
Presented By: Varela, Lee, Metz & Guarino (VLMG)
• Traditional design-build and protections afforded to design professionals by the "economic loss doctrine" and "betterment defense"
• Design-Build and its potential curtailment on these defenses
• To whom are you loyal? In design-build is your duty to the contractor or the owner – how do you balance the inherent tension?
Speaker: Kirk Niemi, Esq., Partner; Varela, Lee, Metz & Guarino, LLP

SIS-1: INTEGRATED GEOMETRY, DESIGN, AND ANALYSIS OF BRIDGES FOLLOWING A BRIM WORKFLOW

Time: Wednesday, June 8; 2:00–3:00 PM
Room: Magnolia 2
Presented By: Bentley Systems
Presenting Open Bridge Modeler from Bentley Systems that will streamline the design and production of deliverables and generate a 3D model for construction and inspection. Open Bridge Modeler empowers the engineer to take full advantage of the roadway geometry and terrain information in order to study the best alternatives for a bridge location and type. Then, a direct connection to Bentley’s analytical software allows for design calculations of the structure.
Speaker: Alexander Mabrich, P.E., Msc, Bentley BrIM, Sunrise, FL

SIS 2: EXTRACTION OF BRIDGE MEASUREMENTS, FEATURES AND 3D MODELS FROM POINT CLOUD DATA

Time: Wednesday, June 8; 2:00–4:00 PM
Room: Magnolia 3
Presented By: Certainty 3D
The objective of this workshop will be the introduction of a comprehensive workflow designed to effectively extract information from laser scanning data within the context of bridge planning, design, engineering and construction operations. Techniques for managing point cloud data sets will demonstrate how to organize and access point cloud data and images regardless of size. An intuitive, easy and well-documented procedure and associated software tools for assessing data quality will be introduced. Numerous tools and techniques for extracting valuable information, measurements and 3D models from the data will be demonstrated. Finally techniques for integrating point cloud data with virtual design models will be presented.
Speaker: Ted Knaak, Certainty 3D, Orlando, FL

IBC EXHIBIT HALL RECEPTION

5:00–7:00 PM in the Prince George Exhibit Hall E
MOBILE NIGHT AT THE IBC!

**Bridging Urban America: The Story of Ralph Modjeski**

*Time: Wednesday, June 8; 7:30–9:30 PM*

*Room: Cherry Blossom Ballroom*

*Sponsored By: National Steel Bridge Alliance*

Free to all registered attendees! BRIDGING URBAN AMERICA celebrates one of America’s greatest bridge designers and some of the most significant bridges of the 20th century, transforming American landscapes through innovation and ingenuity. View the magnificent San Francisco - Oakland Bay Bridge, the expansion of the Huey P. Long in New Orleans, the Quebec Bridge in Canada and Modjeski’s masterpiece Ben Franklin in Philadelphia.

Riveting interviews with award-winning authors, historians, engineers, and cultural figures, such as Henry Petroski of Duke, Piotr Moncarz of Stanford, Richard Campanella of Tulane and photographer Dave Plowden, offer a deeper look into the scientific mind of a master engineer and artistic soul of a Polish-born, Paris-trained immigrant who contributed to the building of a modern America.

"Experiencing Modjeski’s bridges first-hand was mind-blowing! The sheer size, complexity and skill and how many people were a part of it overwhelmed us. Erecting one such bridge was enough for the entire lifetime of an engineer. Yet Modjeski designed and constructed over 40 such structures and almost all of them are still serving us today." – Filmmaker Basia Myszynski

A film for bridge enthusiasts, history buffs, entrepreneurs and those interested in Science + Art and the power to influence the progress of a nation.

BRIDGING URBAN AMERICA brings awareness to the critical role engineering plays in the advancement of our society as future generations face urban challenges of their own and look to build sustainable cities.

Join us for a cinematic journey across America!

For information or upcoming screenings, please follow the movie’s Facebook page: www.facebook.com/bridgingurbana-merica or contact Basia at bridginguamerica@solareye.biz

View Movie Trailer website: www.bridginguamericafilm.com

Produced and Created by Basia + Leonard Myszynski, sOlar eye communications and co-produced by Eric Wintemute
Established in 1915, WRA is a nationally recognized engineering, architectural and environmental firm. Our bridge engineering services include:

- Accelerated Bridge Construction
- Bridge Design and Rehabilitation
- Design-Build
- Fender and Dolphin Evaluation and Design
- Field and Structural Investigations
- Geotechnical Analysis and Foundation Design
- Heat Straightening
- Innovative Technologies
- NBIS Bridge Inspections
Thursday
SESSIONS

LONG SPAN

Time: Thursday, June 9; 8:00–11:30 AM
Chair: Gary Runco, P.E., Virginia DOT, Fairfax, VA

8:00 AM
IBC 16-22: The New Hulton Bridge – Elegance and Efficiency
Christopher Vollmer, Eric Veydt, and Thomas Leech, P.E., S.E., Gannett Fleming, Inc., Pittsburgh, PA; Lou Ruzzi, Pennsylvania DOT, Bridgeville, PA
The new Hulton Bridge represents a close collaboration between the owner and community resulting in an elegant and efficient structure. The structure lines and pier detailing are unique resulting in a bridge which will become both a gathering point and an icon to the community. The structure was designed with hybrid girders for optimal efficiency. The 500 feet main span was erected using strand jacking, the first application for a plate girder bridge in Pennsylvania.

8:30 AM
IBC 16-23: I-64 Daniel Boone Bridge over the Missouri River
Michael Carroll and Kevin Eisenbeis, Burns & McDonnell Engineering Company, Kansas City, MO
The new 2,615 feet Daniel Boone Bridge was constructed using an innovative design-build delivery solution. The design included the longest parallel flange, steel plate girder span on the Missouri River at 510 feet. Foundations include drilled shafts up to 11 feet in diameter, designed to resist large seismic and vessel collision loads. Unique ground treatment was utilized to mitigate soil liquefaction concerns. The Spirit of Saint Louis overpass was raised 24 inches to correct a low vertical clearance problem.

9:00 AM
IBC 16-24: Design and Construction of the Queensferry Crossing
Carson Carney, American Bridge Company, Coraopolis, PA
Once constructed, the Queensferry Crossing will be the longest spanning composite deck and multi towered cable stayed bridge in the world. Its unique crossing stays form and record length will assure it a place among the globe’s elite structures. The Queensferry Crossing paper will provide an in depth review of the design and build process for a world class structure that has been delivered within the client’s budget, their time schedule and the stakeholder’s expectations.

9:30 AM COFFEE BREAK
10:00 AM

IBC 16-25: Construction of the Ohio River Bridges East End Crossing Cable-stayed Bridge
Marcos Loizias, Jacobs, Morristown, NJ
Procured under a public private partnership contract (P3) and currently under construction with estimated completion at the end of 2016, the main river spans of the Ohio River Bridges East End Crossing feature a 2,280 feet long three-span steel composite cable-stayed bridge with a center span of 1,250 feet and convex curve diamond towers. To fast-track construction, the cable-stayed bridge is being constructed using a combination of several construction methods. The Indiana side span is incrementally launched while the Kentucky side span is stick-build on falsework, allowing for simultaneous construction of the superstructure steel grillage of the two side spans while the diamond towers are constructed. Upon completion of the towers, the center span is constructed by balanced cantilever. The paper will discuss the methods of construction for the substructure and superstructure of the cable-stayed bridge.

10:30 AM

IBC 16-26: Design of John Greenleaf Whittier Memorial Replacement Bridge
Gregor Wollmann, HNTB, Blacksburg, VA; Savas Kiriakidis, MassDOT, Boston, MA
The John Greenleaf Whittier Memorial Bridge carries Interstate I-95 across the Merrimack River between Newburyport and Amesbury, Massachusetts. Constructed in 1951, it has reached the end of its useful life. Replacement of the Whittier Bridge is the signature project of MassDOT’s three-billion dollar Accelerated Bridge Construction program. This paper explains the exceptional resiliency of the network tied arch structural system selected for the main span and presents some of the details developed to arrive at an efficient and durable structure.

11:00 AM

IBC 16-27: Chesapeake Bay Bridge Dehumidification Design
Marwan Nader, George Baker, James Duxbury, Carol Choi, T.Y. Lin International, San Francisco, CA
The Chesapeake Bay (William Preston Lane) Bridge in Maryland, USA, is the first cable dehumidification project in North America, one that will prevent future corrosion and extend the service life of the bridges. This paper presents a theory for maintaining air flow for timely cable dry-out and guidelines for effective sealing, optimal placement of injection and exhaust points, calibrated instrumentation, and effective mechanical, monitoring and control systems.
Thursday
SESSIONS

DESIGN 1
Time: Thursday, June 9; 8:00–11:30 AM
Chair: Donald W. Herbert, P.E., Pennsylvania DOT, Uniontown, PA

8:00 AM
IBC 16-28: Steel Girder Cross-Frames - Design, Fabrication & Erection
Shane Beabes, P.E., and Patrick Holinda, AECOM, Baltimore, MD; Ronald Medlock, P.E., High Steel Structures, Lancaster, PA
Fabricated steel girder bridges constitute a significant part of the U.S. bridge inventory, and on a typical bridge it is not uncommon for the fabricated costs of the cross-frames to exceed that of the girders. Therefore, there are strong merits to evaluating the design, fabrication and erection of cross-frames to promote satisfactory performance and an economical design. The presentation couples a designer and fabricator’s discussion on contemporary issues while using a recent project as a backdrop.

8:30 AM
IBC 16-29: History Matters: Compatible Bridge Design in Historic Districts
Michael Cuddy, P.E., TranSystems, Philadelphia, PA; Peter Berg, Pennsylvania DOT, King of Prussia, PA
Bridges are not mere conduits for transportation, but play important roles in shaping the identity of a place. What happens when a bridge located in a historic district need to be replaced? How do you design a new bridge compatible with the setting? This paper will explore the issues and offer insight into appropriate designs. Highlights include understanding history; decoration versus preservation; overshadowing history with applied decoration; and effective design principles.

9:00 AM
IBC 16-30: Conceptual Design of Earthquake Resisting Bridge Structures: a Practical Approach
Alejandro Perez Caldentey, FHECOR North America, Falls Church, VA; Hugo Corres Peiretti, Jose Romo Marin, Javier Torrico Liz, FHECOR Consulting Engineers, Madrid, Spain
Bridge design must always begin with a good conceptual design which analyzes and compares different possible solutions which fit a given set of constraints. One major constraint can be the location of the structure in a seismic area. In such cases, different strategies can be adopted for design, from ductile behavior to damping and seismic isolation. This paper presents a practical approach to decide the best strategy. The methodology is illustrated by focusing on a specific case study.
Thursday
SESSIONS

9:30 AM  COFFEE BREAK

10:00 AM
IBC 16-31: Design of a Modern Concrete Arch Bridge at the University of California, San Diego
Anthony Sanchez, Ph.D., P.E. and Gernot Komar, P.E., Moffatt & Nichol, San Diego, CA; Garrett Dekker, P.E., Moffatt & Nichol, Walnut Creek, CA

Bridges on California freeways have become so standardized that it's difficult to tell one from the next. This project will break that paradigm and provide a visually interesting bridge across the busy I-5 corridor. An elegant and modern concrete arch will clear-span the freeway and unite the UCSD campus. Caltrans-style cast-in-place construction methods will keep the cost reasonable. The structure will provide a visual cue to motorists, and become a landmark for the University.

10:30 AM
IBC 16-32: Seismic Design of Steel Girder Bridges over Two Western Kentucky Lakes
Brad Robson, Ph.D., P.E. and David Rust, P.E., Palmer Engineering Company, Winchester, KY; Kyle McLemore, P.E., Palmer Engineering Company, Nashville, TN

The Kentucky Transportation Cabinet is constructing new bridges over Kentucky Lake and Lake Barkley in the heart of the New Madrid Seismic Zone. More than a mile of steel girder approach spans were designed to remain functional after a large earthquake. Extensive field testing along with site-specific hazard and soil response analyses provided comprehensive input for structural design. Nonlinear time history analyses allowed accurate representation of soil-structure interaction and seismic damper performance.

11:00 AM
IBC 16-33: Updating the AASHTO LRFD Wind Load Provisions
Wagdy Wassef, AECOM, Mechanicsburg, PA; Jon Raggett, West Wind Laboratory, Monterey, CA

Traditionally, wind load provisions in AASHTO Bridge Design Specifications were based on the fastest-mile measure of wind speed. Modern wind codes are all based on constant averaging time. AASHTO adopted new wind load provisions using the 3-second gusts and new wind maps to be in line with the current practices of the National Weather Service and the ASCE 7 and to provide uniform reliability. This paper introduces the research and the new provisions.
SPECIAL PURPOSE BRIDGES
Time: Thursday, June 9; 8:00–11:30 AM
Room: Annapolis 1,2,3 - sponsored by PARSONS
Chair: Jonathan Moses, P.E., Pennsylvania DOT, Bridgeville, PA

8:00 AM
IBC 16-34: The First Arch Supported Stress Ribbon Bridge in the U.S.
John Dewar, P.E., Freese and Nichols, Inc., Fort Worth, TX; Miguel Rosales, Rosales + Partners, Boston, MA; Michael Stein, schlaich bergermann partner, New York, NY
Completed in 2012, the Phyllis J. Tilley Memorial Pedestrian Bridge is the first arch-supported stress ribbon bridge in the United States. This bridge has a central steel arch supporting a stressed ribbon at midspan, thus reducing the ribbon sag and counteracting the high ribbon anchorage forces with offsetting arch thrust reactions. This results in an extremely slender, elegant profile, with spans of up to 160 feet with only a 10 inch deck depth.

8:30 AM
IBC 16-35: Capital Cascades Connector Bridge
Jeff M. Walters, P.E., FIGG, Tallahassee, FL; Gary Phillips, Blueprint 2000 Intergovernmental Agency, Tallahassee, FL
The new Capital Cascades Connector Bridge is part of the Capital Cascades Trail located just south of the Capital Building in Tallahassee, FL. This 163 feet -2 inches long signature pedestrian bridge consists of a 13 feet - 10 inches wide precast post-tensioned concrete span over the heavily traveled Monroe Street. Features include solar canopies capturing the sun’s energy to power light displays at night and provide shade for pedestrians. The presentation will highlight the bridge and trail construction recently completed.

9:00 AM
IBC 16-36: Parkside Pedestrian Bridge Design Challenges
Steven Paulovich, CH2M, Herndon, VA; C. Todd Springer, VDOT, Richmond, VA; Ravindra Ganvir, DDOT, Washington, DC
DDOT’s Parkside Pedestrian Project features challenges and complexities which drove the design towards prefabrication and construction techniques that will decrease interfaces and impacts with railroad and utility facilities. Innovative inter-agency agreements were also developed to facilitate the work. The signature bridge spans have a length of approximately 400 feet. It crosses over DC 295, CSXT and WMATA tracks and right-of-way and under PEPCO’s overhead power transmission lines which represents a significant utility conflict.

9:30 AM COFFEE BREAK
Thursday
SESSIONS

10:00 AM
IBC 16-37: Fort Street Bridge over the Rouge River
Jeffrey Routson, P.E., S.E., FASCE, Hardesty & Hanover, Okemos, MI; Jose Garcia, P.E., Michigan DOT, Lansing, MI
The Fort Street Bridge over the Rouge River is the second largest bascule leaf in the world, by deck area. It is 86 feet wide by 176 feet long and weighs over 8,000,000 pounds. Due to the efficient rolling-lift design, it requires minimal power to operate the bascule normally. Two 150-HP motors will move the bascule against the design ice and wind loads. Stringers, floorbeams, and two 13 feet deep pony trusses support the steel grid-reinforced concrete deck.

10:30 AM
IBC 16-38: A New Bascule Bridge Over the Gut - South Bristol, Maine
Peter Roody, P.E., Hardesty & Hanover, LLC, New York, NY; Joyce Taylor, P.E., Maine DOT, Augusta, ME
A new Cable Stayed Bascule Bridge is being constructed across the Gut in South Bristol, Maine. The final bridge concept was developed with the local community’s input. The project includes the bridge replacement (including foundations), construction of an operator’s house, new traffic warning systems, approach work and a temporary runaround. Key challenges included a highly congested worksite, bedrock with no overburden, heavy year round navigation (over 8000 openings per year), and traffic maintained throughout construction.

11:00 AM
IBC 16-39: Unique Design Challenges Associated with a 643’ Wide Steel Plate Girder Bridge
Clayton VanVerth, Pennoni, Uniontown, PA; James Pezzotti, Pennoni, Philadelphia, PA
The rehabilitation of seven adjacent bridges over the Vine Expressway (Interstate-676) in Philadelphia, PA, included combining two adjacent bridges to create a 643 feet wide bridge in order to expand Shakespeare Park. Designing for the unusually high seismic forces as well as the extreme transverse thermal movements associated with such an uncharacteristically wide bridge presented one of several unique design challenges that will be addressed as part of this presentation.
Thursday SESSIONS

RAIL

Time: Thursday, June 9; 8:00–11:30 AM
Room: Baltimore 3,4,5 - sponsored by HDR Engineering, Inc.
Chair: Carl Angeloff, P.E., MSCE, Con-Serv Inc., Georgetown, SC

8:00 AM

IBC 16-40: Construction of Precast Concrete Simple-Supported Box Beams on Changsha Maglev Line, China
Guo-rong Chen, Ph.D. and Gong-lian Dai, Central South University, Changsha, Hunan China; Y. Frank Chen, Penn State University, Harrisburg, PA
Changsha maglev line, completely developed in China, is 18.54km long, connecting between the city’s main railway station and the international airport. This maglev line is predominantly composed of simple-supported bridges (80%). All simple-supported beams were prefabricated in a factory and assembled in place. The whole construction took only fifteen months to complete. This paper will describe and discuss the rapid construction method and the mechanical properties the maglev simple-supported beams.

8:30 AM

IBC 16-41: Honolulu Rail Transit Project – Precast Segmental Solution for Success
Jose Rodriguez, FIGG, Exton, PA
The Honolulu Rail Transit Project (HRTP) in Honolulu, Hawaii is a twenty-mile elevated light rail line being constructed by the Honolulu Authority for Rapid Transit (HART) that will connect West Oahu with downtown Honolulu. Precast segmental construction was selected for speed and quality of construction and long term durability. Most of the aerial guideway structure is being constructed down the median of existing roadways while maintaining traffic on these important links in the local roadway network.

9:00 AM

IBC 16-42: Design Challenges of the Light Rail Transit Overhead Crossing Seismic Fault Zones
Sami Megally, Ph.D., P.E., S.E., Fatemeh Kavianpour, P.E., and Keith Gazaway, P.E., Kleinfelder, San Diego, CA
The Light Rail Transit Overhead, San Diego, California, is a 12-span bridge crossing over an active heavy railroad. The project has significant geometric, constructability, traffic, and seismic design challenges. The most significant challenge is the bridge crossing of a major seismic fault with substantial ground movements. The bridge is designed and detailed to accommodate these severe conditions. This paper focuses on the design of bridges for such extreme conditions using this bridge as a case study.

9:30 AM COFFEE BREAK
Thursday
SESSIONS

10:00 AM

IBC 16-43: Dallas Streetcar - Rehabilitation of the Houston Street Viaduct
Greg Kochersperger and John Quintero, HDR Engineering, Inc., Dallas, TX
The City of Dallas secured a TIGER grant in 2011 to construct a modern streetcar line between downtown and Oak Cliff across the Trinity River. The line would utilize the historic Houston Street Viaduct, a 100 year old concrete arch bridge, for this critical link. This paper will highlight the specific challenges and techniques used to rehabilitate and repurpose the bridge for streetcar use.

10:30 AM

IBC 16-44: Construction and Span Replacement for CSX Bridge over Potomac River
John Boschert, Genesis Structures, Kansas City, MO; Matt Struemph, OCCI, Fulton, MO
CSX Bridge 64 is a double-track bridge near Cumberland, Maryland and consists of three-150 feet spans. The bridge was successfully replaced during a multi-phased project, highlighted by the main span replacement during a 34-hour closure. Following erection of the new 900-ton bridge spans adjacent to the existing bridge on temporary falsework supports, accelerated bridge construction techniques were executed using independent sliding systems for removal of the existing bridge and for installation of the new DPG spans.

11:00 AM

IBC 16-45: Rail Structure Interaction Analysis - Fundamentals and Modeling Considerations
Douglas Heath, P.E., Paul Kim, Latif Ebrahimnejad, Ph.D., and Firooz Panah, P.E., AECOM, Boston, MA
This presentation summarizes rail-structure-interaction (RSI) analysis experience gained from a major light rail project in the Middle East. The project involved nearly 20km (12.4 miles) of viaduct connected to continuously welded rail using direct fixation fasteners. The presentation highlights structural modeling details which are useful for RSI analyses. Further, it provides perspective on the effect of different bridge characteristics (e.g. geometry and boundary conditions) on structural behavior.

IBC 16-Reserve Rail: Experimental Study on the Dynamic Response of Continuous Slab Tracks and Simply Supported Bridges
Lvjun Long, Gong-lian Dai, and Guorong Chen, Ph.D., Central South University, Changsha, Hunan, China; Y. Frank Chen, Penn State University, Middletown, PA
Continuous slab track (CST) is widely used in China. In order to analyze the dynamic characteristics of a track and bridge system when the train travels at a high speed, a dynamic response experiment was carried out on a passenger dedicated line. Through the field experiments and data analysis, the natural frequency and damping ratio of the beam can be obtained. The vertical and transverse accelerations and displacements of each layer structure are measured too.

IBC EXHIBIT HALL LUNCHEON
11:30 AM–1:30 PM in the Prince George Exhibit Hall E
**DESIGN 2**

**Time:** Thursday, June 10; 1:30–5:00 PM  
**Room:** Woodrow Wilson B,C,D - sponsored by Whitman, Requardt & Associates, LLP  
**Chair:** Ronald D. Medlock, P.E., High Steel Structures, Lancaster, PA

### 1:30 PM

**IBC 16-46: Reconstructing the I-55 and Lake Shore Drive Interchange**  
*Christopher Stine, AECOM, Chicago, IL*

The I-55 and Lake Shore Drive Interchange is located two miles south of downtown Chicago and joins the north end of I-55 to U.S. Route 41 (Lake Shore Drive). Replacing a highly deteriorated interchange with more durable structures was hampered by the desire to provide additional lanes during construction and eliminate two planned detours. This project was IDOT’s first large-scale use of thermal-spraying (metalizing) that was used to protect over 7,500 tons of structural steel.

### 2:00 PM

**IBC 16-47: Bridge over the Vistula River in Kamięń**  
*Adam Igielski and Wojciech Jarominiak, CH2M, Warsaw, Masovian, Poland*

The presentation will raise issues concerning the design and construction of a bridge over the Vistula River in Kamięń. It is one of the longest bridges in Poland and is situated in a protected area of ecological importance in the EU. The bridge is 1039.9 m long and has ten spans (2x80m + 8x108m). The superstructure is a steel orthotropic box compositely working with a fiber reinforced concrete slab.

### 2:30 PM

**IBC 16-48: VDOT Staff Designs the 1,910 ft. Continuous Bridge on Route 340 over South Fork Shenandoah River**  
*Junyi Meng, VDOT, Richmond, VA; Eulogio Javier, II and Ashraf Antonius, VDOT, Staunton, VA; Mohamed Ali, VDOT, Suffolk, VA*

The existing Route 340 steel deck truss bridge was built in 1941. The new continuous 1,910 feet. Steel plate girder bridge will feature six travel lanes with bike and pedestrian facilities. This will be the longest jointless bridge in Virginia. The unique Virginia Abutment was employed to accommodate significant thermal movements. VDOT engineers were engaged to design this bridge, utilizing multiple materials and technologies to achieve an aesthetically pleasing and sustainable low maintenance structure.

### 3:00 PM  COFFEE BREAK
Thursday
SESSIONS

3:30 PM

IBC 16-49: Route 72 Manahawkin Bay Bridges Project, New Parallel Bridge

Steve Esposito, Joseph Mumber, and David Rue, WSP
Parsons Brinckerhoff, Lawrenceville, NJ; Pankesh Patel, NJDOT, Trenton, NJ

Route 72 in Ocean County, NJ is the only connection to Long Beach Island and is critical for hurricane evacuation. To increase redundancy, a new 17-span, 2,400 feet long parallel bridge is designed to withstand a 2,500 year earthquake and support critical utilities. The structure’s piers are founded on six-foot diameter drilled shafts and support 79 inches deep prestressed beams with 150 feet maximum span length and a 55-foot vertical clearance over the Atlantic Intracoastal Waterway.

4:00 PM

IBC 16-50: Calibration of Service Limit States for Concrete in AASHTO LRFD Bridge Design Specifications

Wagdy Wassef, AECOM, Mechanicsburg, PA; Hani Nassif, Rutgers University, Piscataway, NJ; John Kulicki, Modjeski and Masters, Mechanicsburg, PA; Dennis Mertz, Ph.D., University of Delaware, Newark, DE

The strength, or ultimate, limit states (ULS) of the AASHTO LRFD were calibrated through structural-reliability theory to achieve a certain level of safety. Exceeding the strength limit state results in a collapse or failure. Unlike strength limit states, the consequences of exceeding the service limit states are not well defined and these limit states were not statistically-calibrated. This paper presents the work performed to statistically calibrate the service limit states for concrete.

4:30 PM

IBC 16-51: Experimental Performance Assessment of Spliced Continuous Prestressed Concrete Girder Bridges

Reza Baie, Mary Beth Hueste, and John Mander, Texas A&M University, College Station, TX

This paper presents a competitive design approach for bridges spanning between 200 to 300 feet. In-span splicing technique is adapted along with taking advantage of a load balancing design approach to propose an economical spliced concrete girder bridge. Based on experimental observations and measurements on a full scale specimen, as well as meticulous numerical modelling, recommendations for design, construction sequence, and splice detailing will be presented.
Thursday
SESSIONS

FOUNDATIONS

Time: Thursday, June 10; 1:30–5:00 PM
Room: Baltimore 3,4,5 - sponsored by HDR Engineering, Inc.
Chair: Richard L. Connors, P.E., PMP, County of Allegheny, DPW, Pittsburgh, PA

1:30 PM

IBC 16-52: Lateral Resistance of Abutment Piles Near Mechanically Stabilized Earth Walls
Kyle Rollins, Ryan Budd, and Andrew Luna, Brigham Young University, Provo, UT; Robert Gladstone, Association for Metallically Stabilized Earth, Reston, VA

Pile foundations at bridge abutments often resist lateral loads produced by earthquakes and thermal change. When a mechanically stabilized earth (MSE) wall is used at an abutment, little guidance is available in designing for lateral load. In this study 16 lateral load tests were performed on piles at different distances behind a 20 feet high MSE wall. P-multipliers were developed to account for reduced lateral resistance and equations were developed to predict increased reinforcement tensile force.

2:00 PM

IBC 16-53: Sellwood Bridge: Foundation Engineering to Optimize Construction
Paul Axtell, P.E., DGE, Dan Brown and Associates, Overland Park, KS; Nathan Glinski, EI, Dan Brown and Associates, Knoxville, TN; Mike Lopez, P.E., S.E., CH2M, Portland, OR

Foundations for the Sellwood Bridge in Portland include groups of large drilled shafts designed to bear 20 feet into hard basalt bedrock. At places, this resulted in shafts over 200 feet deep. The design didn’t rely on base resistance until a embedment of 20 feet into the bedrock. Post-award, the contractor proposed a Value Engineering study to reduce the length and mitigate construction risks. The VE was accepted so long as the proper QA was performed during construction by the foundation engineer.

2:30 PM

IBC 16-54: Foundation Design of the Abraham Lincoln Bridge in the Design-Build Realm
Dan Yang, COWI North America (Formerly Buckland & Taylor Ltd.), North Vancouver, BC, Canada; Yu Zhang and Sam Christie, COWI North America, Seattle, WA

This paper will focus on how structural and geotechnical designers work together with the contractor to address the design needs for the cable-stayed bridge foundations. In the design-build realm, this will encompass both bidding efforts and final design solutions using the state-of-the-art testing technologies, and resolving on-going construction issues, including retrofitting a defective 12-foot diameter drilled shaft supporting the tower. This paper emphasizes the collaboration between the contractors and the designers under the design-build environment.
3:00 PM COFFEE BREAK

3:30 PM
IBC 16-55: The Virginia Route 340 Bridges: Challenges for Foundations in Karst Terrain and the Importance of Coordination During Design and Construction
Jim Sheahan, HDR Engineering, Inc., Pittsburgh, PA; Chaz Weaver, VDOT, Staunton, VA; Michael Mo, HDR Engineering, Inc., Norfolk, VA

What does it take to successfully complete a bridge project? While the technical capabilities and experience of those involved in design and construction are clearly important, the inter-discipline communication during design and construction can also be critical to a successful project. Case studies for two bridges in Virginia using micropile and H-pile foundations with karst-related, variable conditions will illustrate how coordination between geotechnical engineers, structural engineers and the construction staff resulted in a successful project.

4:00 PM
IBC 16-56: TDOT Loudon Bridge No. 3 VEAC Design to Construction
Timothy Siegel, Dan Brown and Associates, PC, Knoxville, TN; Mark Madgett, Seaboard Foundations, Inc., Blountville, TN

The State of Tennessee designed a new bridge over the Tellico Canal in Loudon County, Tennessee. As is typical for many State projects of this type, the bridge was to be constructed on rock-bearing spread foundations that would involve challenging techniques in a karstic geology. Furthermore, it would require rock excavation and likely blasting near the existing bridge. At the request of the general contractor for the project Charles Blalock & Sons, the team of Seaboard Foundations, Inc., Dan Brown and Associates, PC, and Bittner-Shen Consulting Engineers, prepared an alternate design consisting of rock-socketed drilled shafts. An innovative aspect was the use of concrete forms that were lifted in placed and then temporarily anchored using the drilled shafts. For each bent, the concrete form was lowered to the rock surface, dewatered, and then used as the base for installation of the cap. The alternate achieved its purpose by saving time and helping to minimize problems at a site with numerous challenges.

4:30 PM
IBC 16-57: Augered Cast-in-place Piles for Bridge Foundation Support
Morgan NeSmith, DFI ACIP Pile Committee, Atlanta, GA

Although Augered, Cast-in-place (ACIP) piles are commonly used in highway construction for embankment, soundwall and MSE wall support, there remains a reluctance among state agencies to approve the technology for support of bridge foundations. FHWA Geotechnical Circular 8, The Design and Construction of CFA Piles, was developed to provide a framework for the inclusion of these piles in state-level highway foundation support.
The author will present three relatively recent case-histories where ACIP piles were used for bridge-approach support, temporary support of a tower-crane for bridge construction, and the direct support of an elevated roadway in an urban area, respectively. Additionally, the author will present recent developments in the areas of automated installation monitoring and non-destructive testing that can provide a level of certainty regarding the integrity of constructed ACIP piles to allow their inclusion as foundation support for all aspects of transportation projects.

SEGMENTAL

Time: Thursday, June 10: 1:30–5:00 PM
Room: Annapolis 1,2,3 - sponsored by PARSONS

1:30 PM

IBC 16-58: I-90 Dresbach Bridge Over the Mississippi River
John Dvorak, Figg Bridge Inspection, Inc., Winona, MN; Eric Breitsprecher, MnDOT, Winona, MN

The new Interstate 90 Dresbach Bridge over the Mississippi River between La Crescent, Minnesota and La Crosse, Wisconsin will be a highly utilized river crossing serving as a gateway for regional and interstate needs and as a local connection for the adjacent communities. MnDOT is replacing the deficient I-90 structure with a new, modern, and ecologically conscious four-lane concrete bridge. The design inspiration for the new river bridge comes from the natural, picturesque landscape of the surrounding area.

2:00 PM

IBC 16-59: Design of Riyadh Metro System Segmental Viaducts, Lines 1 and 2
Firooz Panah, P.E., Latif Ebrahimnejad, Ph.D., and Paul Kim, P.E., AECOM, Boston, MA; Brian Guzas, P.E., AECOM, Providence, RI; Ahmad Abdel-Karim, P.E., AECOM, Sacramento, CA

The Riyadh Metro Project is commissioned and supervised by Arriyadh Development Authority (ADA), the executive arm of the high Commission for the Development of Arriyadh. Designed by AECOM, BACS consortium (consisting of Bechtel, Almabani, CCC, and Siemens) is constructing over 21 km of precast segmental viaducts for Lines 1 and 2 of the project. The approach that the design-build team took to create this world class transit system is discussed and presented in this paper.
2:30 PM

IBC 16-60: Lesner Bridge - A New Signature Bridge for the City of Virginia Beach
Christopher Ursery, P.E., FIGG, Tallahassee, FL
The City of Virginia Beach’s new Lesner Bridge has created excitement for both the local community and the thousands of tourists who visit Coastal Virginia each year. The new signature bridge, designed by FIGG, crosses the Lynnhaven Inlet along the Atlantic Coast and features two 1575-foot-long twin precast segmental concrete bridges. This paper highlights the innovative design solutions and construction methods used to build the new signature bridge.

3:00 PM COFFEE BREAK

3:30 PM

IBC 16-61: Temporary Support of Balanced Cantilever on Bearings
David Konz, P.E., S.E., Atkins, Tampa, FL
The River Dee and River Don Crossings are sister CIP Segmental structures (394 feet mainspan) within the Aberdeen Western Peripheral Road PPP. The 91 feet wide, single-cell boxes will be erected with balanced cantilevers resting on the permanent bearings. The temporary props consist of two, post-tensioned concrete columns (63 inch square), each designed to carry cyclical compression and tensile loads from the erection moments. The props were placed just 16 feet away from the column on top of the permanent footings.

4:00 PM

IBC 16-62: Detection of Voids, Soft Grout and Tendon Corrosion in Internal Bridge Post Tensioning Ducts
Paul Fisk and Benson Armitage, NDT Corporation, Sterling, MA
NDT Corporation has successfully used nondestructive testing methods to identify specific locations within internal post tensioning ducts where grout voids and soft grout exist. Nondestructive testing results are verified by drilling a small hole to the duct, opening the duct with tools designed for this task, and verifying grout condition with probing and documenting tendon corrosion with video bore scope imaging. The results of these investigations are used to determine appropriate repair methods and prepare repair bid documents.

4:30 PM

IBC 16-63: Winona Bridge over the Mississippi River - MnDOT’s First CMGC Project
John Dvorak, Figg Bridge Inspection, Inc., Winona, MN; Eric Breitsprecher, MnDOT, Winona, MN
The historic Winona Bridge carries Highway 43 over the Mississippi River at Winona, Minnesota. A new 2,300 feet long bridge is being constructed with a 450 feet concrete segmental main span that will eventually carry two southbound lanes, shoulders and a pedestrian path. After rehabilitation, the existing bridge will carry
two northbound lanes. To accelerate the project, MnDOT utilized the Construction Manager/General Contractor (CMGC) method of project procurement for the first time. This allowed construction to move forward while under design and saved approximately one year in the overall project schedule.

REHABILITATION 2

Time: Thursday, June 10; 1:30–5:00 PM
Chair: Jane-Ann Patton,
LOCHNER, Pittsburgh, PA

1:30 PM
IBC 16-64: Rehabilitation of the Historic Richland Avenue Bridge, Athens, Ohio
William Vermes, Jones-Stuckey, A Division of Pennoni, Akron, OH
The project began as a deck replacement of an 80-year old bridge, but research quickly identified it as one of the first continuous steel girder bridges in the United States. With encouragement from the owner, the rehabilitation economically preserved elements of the bridge’s historic fabric, including reuse of the original cast-in-place concrete rails, which typically would have destroyed. Additionally, the bridge closure was limited to a tight closure window to accommodate the adjacent Ohio University academic calendar.

2:00 PM
IBC 16-65: Cable Replacement Work on Multiple-Span Cable-Stayed Bridge: Nhat Tan Bridge in Vietnam
Tomonobu Tokuchi, Kenji Matsuno, Naoya Taki, and Victor Maina, IHI Infrastructure systems Co., Ltd., Sakai, Osaka, Japan
The stay cable replacement work processes with various locations in height and length for Nhat Tan Bridge which is located in Hanoi, Vietnam, are described. The work was performed and completed just prior to the public opening. Five out of 220 stay cables for a six span continuous cable-stayed bridge were replaced in 40 days at the site. This replacement method can be applied to existing cable stay bridge rehabilitation works.

2:30 PM
IBC 16-66: Methodologies Used in the Rehabilitation of Piers for Two Virginia Bridges
Hari Aamidala, Alpha Corporation, Dulles, VA; Edmund Okerchiri, VDOT, Fairfax, VA
As part of VDOT’s bridge preventive maintenance and rehabilitation efforts, two Bridge Maintenance and Rehabilitation projects with Piers with similar levels of deterioration were identified for repair with cathodic protection systems. Strengthening of the Pier Caps is achieved using FRP System at one bridge, while con-
crete encasement with additional reinforcing bars was used at the other bridge, which would allow us to observe relative performance over the years.

3:00 PM  COFFEE BREAK

3:30 PM  IBC 16-67: Rehabilitation and Seismic Retrofit of the North Torrey Pines Road Bridge  
Keith Gazaway, Nathan Johnson, and Mark Creveling, Kleinfelder, Inc., San Diego, CA  
The historic and structurally deficient North Torrey Pines Road Bridge in San Diego County required extensive seismic upgrades and significant repairs to corrosion. This coastal project navigated complex political, engineering, economic, and environmental constraints in an effort to preserve the visual character of a landmark bridge. Ultimately, a nonlinear time history seismic analysis combined with creative construction techniques led to successful implementation of a unique and elegant retrofit and rehabilitation strategy.

4:00 PM  IBC 16-68: Bridge within a Bridge - A Practical Approach for Stone Masonry and Concrete Arch Preservation  
Joseph Spadea, Pennoni, Newark, DE; William Cameron, Pennoni, Mechanicsburg, PA; Gregory D. Burkhart, P.E., J.D. Eckman Inc., Atglen, PA  
How do you rehabilitate a 100 year old stone masonry and concrete arch bridge without impacting its natural aesthetic? Factor in that the bridge is the only access point for a prominent Philadelphia family, relatives of renowned architect Frank Furness. The Furness Bridge is a 100 feet. Crossing spanning Ridley Creek in Media, PA. With one of the bridge’s three arch spans partially collapsed, Pennoni proposed a unique design – construct a new bridge within the existing.

4:30 PM  IBC 16-69: Fracture Behavior of Damaged Steel Bridge Members Repaired through Heat-Straightening  
Kaiyuan Liu, PARSONS, Seattle, WA; David Mukai, Ph.D., University of Wyoming, Laramie, WY  
This paper discusses the fracture behavior of heat-straightened steel plates with strain ratios up to 200, while the current limiting strain ratio for heat-straightening is 100. Unprecedentedly, the crack resistance curve (or the J-R curve) is applied to describe the stable crack growth rate and crack length of heat-straightened steel. Some findings on fatigue resistances are discussed as well. The conclusion is that heat-straightening of a damaged steel bridge member may not be recommended under some circumstances.
IBC 16-Reserve-Rehabilitation 2: Major Retrofit of a Houston Tollway Bridge prior to Widening

Nestor Rubiano and Alberto King, HNTB Corporation, Houston, TX; Quinton Alberto and Matthew Kainer, Harris County Toll Road Authority, Houston, TX

A major 30-year-old 24-span-long railroad overpass bridge along the Hardy Toll Road in Houston was evaluated prior to widening it for increased traffic demand. Significant structural deficiencies affecting the bridge strength and stability were found. Although precast prestressed concrete beams generally had adequate service and ultimate capacity, a significant number of columns and foundations were inadequate for the proposed widening. Extensive substructure retrofit was successfully implemented before widening the bridge using a variety of retrofit solutions.

IBC EXHIBIT HALL RECEPTION
5:00–7:00 PM in the Prince George Exhibit Hall E

IBC AWARDS DINNER

Time: Thursday, June 9; 7:00–9:00 PM
Room: Cherry Blossom Ballroom
Host: Thomas G. Leech, P.E., S.E., Gannett Fleming, Inc., Pittsburgh, PA

Each year, the IBC recognizes award recipients in several categories over a special dinner in their honor. Join us for a special evening of celebration and commemoration. A separate ticketed registration is required (check the IBC Registration Desk for availability). This year’s honorees are:

Dr. Dennis Mertz, Newark, DE awarded the John A. Roebling Medal, recognizing an individual for lifetime achievement in bridge engineering.

Student Award Winner: Integral Connections for Precast-Prestressed Concrete Girders in Seismic Regions. Zhao Cheng and Robert Peggar, Iowa State University, Ames, IA.

Ma-an-shan Yangtze River Bridge, Ma’anshan, Anhui, China awarded the George S. Richardson Medal.

JiaShao Bridge, Shaoting City, Zhejiang Province, China presented the Gustav Lindenthal Medal.

Hulton Bridge Replacement, Pittsburgh, PA presented the Eugene C. Figg, Jr. Medal.

Brookfield Floating Bridge, Brookfield, VT awarded the Arthur G. Hayden Medal.

Martin’s Mill Covered Bridge Rehabilitation Project, Antrim Township, Franklin County, PA presented the Abba G. Lichtenstein Medal.

See Page 15 of this Guide for a full description of the IBC Award Medals.
WSP | Parsons Brinckerhoff provides a full range of services for bridges, ranging from feasibility studies and environmental permitting, through preliminary and final design, to construction management, inspections and rehabilitation.

For a comprehensive approach to bridges, choose WSP | Parsons Brinckerhoff.
Friday
SESSIONS

INNOVATION
Time: Friday, June 10; 8:00 AM–12:00 Noon
Room: Annapolis 1,2,3 - sponsored by PARSONS
Chair: John C. Dietrick, P.E., S.E.,
Michael Baker International, Cleveland, OH

8:00 AM
IBC 16-70: Unique Pi Girder Design offers Functional Solution for Multimodal Bridge Structure
Rebekah Gaudreau and Keith Donington, WSP | Parsons Brinckerhoff, Manchester, NH
Bridge 1 over the Piscataqua River provides vehicular, rail, and pedestrian access to the Portsmouth Naval Shipyard. The original 300 feet long, 4-span bridge consisted of steel through girders and cantilevered side-walks. Innovative steel plate girders shaped like the Greek letter Pi were used to address the heavy rail loading and structural depth limitations. This unique design improved the functionality of the structure by moving the entire support system below deck, creating an open concept solution.

8:30 AM
IBC 16-71 (New): A signature Bridge on the Fast Track
Christopher Vanek, WSP | Parsons Brinckerhoff, Seattle, WA; Adrian Moon and Matthew Durshimer, WSP | Parsons Brinckerhoff, Tampa, FL
Signature bridges are inherently complex and unique to their specific application and require detailed consideration into construction techniques. The inherent high cost of the non-traditional designs tends to significantly increase the cost of the project, sometimes rendering it unfeasible. During the development of a Signature Bridge project for the Veterans Memorial Bridge in Volusia County, Fl. the application of Accelerated Bridge Construction technologies were seen as essential to delivering the project. The proposed bridge is composed of a pure concrete open spandrel arch bridge with a main span through-deck arch over the Halifax river. This paper will describe the engineering design process beginning with conceptualization that satisfies the owner’s specific objectives and ending with the structural elements and erection techniques that minimizes cost and construction duration.

9:00 AM
IBC 16-72 (New): Extradosed Prestressed Bridge Proportioning and Design Considerations
Steven Stroh, AECOM, Tampa, FL
An extradosed prestressed bridge is a girder bridge that is externally prestressed, using stay cables over a portion of the span. Propositioning guidelines are presented for efficient span layouts, deck depth, tower height, efficient span ranges, and stay layouts. Strength and fatigue design guidelines for the stay cables specific to the extradosed bridge type are presented. The results of these guidelines are demonstrated with respect to the design for the Pearl Harbor Memorial Bridge.
Friday
SESSIONS

9:30 AM

IBC 16-73: Advances in FRP Composites in Transportation Infrastructure
Jerome O’Connor, P.E., Institute of Bridge Engineering, Buffalo, NY; Wayne Frankhauser, Jr., P.E., Maine DOT, Augusta, ME

A scan team consisting of seven state DOT engineers scanned the U.S. in 2015 to identify the most prevalent uses of fiber reinforced polymer (FRP) composites in highway infrastructure. The presentation will summarize the applications identified as being mature and ready for widespread use. In mature applications, the FRP’s behavior is well understood and documented as a result of research and development; mathematical models have been validated by laboratory testing under controlled conditions; design and construction guidelines have been vetted by experts and users in the field; trial applications have been undertaken and evaluated; and the performance is being monitored under service conditions. Less common uses will also be discussed, citing knowledge gaps and other factors that may be hindering use by the civil engineers.

10:00 AM COFFEE BREAK

10:30 AM

IBC 16-74: Artful Bridges: VDOT/Arlington County Artwork Collaboration for the Route 50/Courthoue Road/10th Street Interchange, Arlington, Virginia
Angela Adams, Arlington Public Art, Arlington, VA; Calvin Britt, P.E., VDOT, Fairfax, VA; Michael Jelen, P.E. and Elliott Mandel, P.E., AECOM, Arlington, VA; Vicki Scuri, Vicki Scuri SiteWorks, Lake Forest Park, WA

A unique collaboration between agencies and artist Vicki Scuri led to the transformation of a bridge project into the first large-scale, integrated public art project attempted by VDOT. The interchange features bridge and wall structures that incorporate striking artwork. The approach promotes community identity, environmental awareness and aesthetics, transforming infrastructure into creative places. The project demonstrates that bridges can serve as a forum for the integration of public art, transforming their function into a multi-faceted transportation project.

11:00 AM

IBC 16-75: Utilizing Unmanned Aerial Systems (UAS) for Bridge Inspections
Jennifer Zink, Minnesota DOT, Oakdale, MN; Barritt Lovelace, Collins Engineers, St. Paul, MN; Tara Kalar, Minnesota DOT, St. Paul, MN

The Minnesota Department of Transportation and Collins Engineers have been researching the use of Unmanned Aerial Systems (UAS) as a tool for bridge inspections. Phase I of an implementation study has been completed and a Phase II study is underway. These research studies look at current FAA regulations and are evaluating the advantages and challenges of using UAS for bridge inspections with promising results.
Friday
SESSIONS

11:30 AM

IBC 16-76: GRS-IBS Design and Construction:
27th Street Bridge over Broad Branch Stream, Washington, DC
Zahra Dorriz, P.E., District DOT, Washington, DC; Michael Jelen, P.E., and Elliott Mandel, P.E., AECOM, Arlington, VA

Replacement of the 27th Street Bridge is the District of Columbia’s first use of the Geosynthetic Reinforced Soil-Integrated Bridge System (GRS-IBS). This simplified construction approach resulted in higher durability, a shortened schedule, reduced costs and an ability to be built by general labor trades. The design used recommendations from the FHWA/Turner-Fairbanks Highway Research Center. This project provides further understanding of GRS-IBS leading to wider implementation of the technique in Washington, DC and across the country.

DESIGN 3

Time: Friday, June 10; 8:00 AM–12:00 Noon
Chair: Matthew A. Bunner, P.E., HDR Engineering, Inc., Pittsburgh, PA

8:00 AM

IBC 16-77: University Drive over I-75: Design-Build Spawns Innovation
Mario Quagliata and Matthew Wagner, Bergmann Associates, Lansing, MI

The University Drive over I-75 design-build bridge replacement project in Auburn Hills, Michigan included construction of the first Diverging Diamond Interchange in the state of Michigan. Innovations and unique cost saving measures that were developed in collaboration between the designers and the contractor to reduce construction costs will be discussed. These included significantly reducing the bridge skew and realigning the interchange to avoid deposits of soft organic soils near the existing abutments.

8:30 AM

IBC 16-78: Ultimate and Fatigue Responses of UHPFRC-Filled, Transverse Angle-Joint in Full-Depth, GFRP-Reinforced, Precast Bridge Deck Panels
Mahmoud Sayed Ahmed, Ryerson University, Toronto, ON, Canada; Khaled Sennah, Ryerson University, Toronto, ON, Canada

The laterally restrained precast full depth deck panel (FDDP) was constructed with transvers joint resting over steel twin girders. The 200-mm thick precast FDDP is made of normal strength concrete and reinforced with GFRP-bars. The transverse angle-joint has 175-mm of projected GFRP bars, female shear key, bottom tongue, and joint-filled with Ultra High Performance Reinforced Concrete UHPFRC). Ultimate monotonic load, constant fatigue and variable fatigue loading were performed under truck wheel footprint showed good results.
**Friday**

**SESSIONS**

**9:00 AM**


Vincent Liang, Brian McFadden, and Scott Johnsen, GPI (Greenman-Pedersen, Inc.), Lebanon, NJ

This paper is based on AASHTO design specifications; available research papers/reports; and GPI’s past project experience, and provides guidance on how to properly address out-of-plumb issues for skewed and curved steel I-girder bridges. Aspects covered include: theory and analysis, out-of-plumb tolerances, techniques to minimize girder differential deflection, cross-frames detailing methods, design considerations for cross-frames, understanding thermal behavior and determining bearing fixity layout and guided bearing orientation, design consideration for deck joints, and connection detailing.

**9:30 AM**

**IBC 16-80: Innovative Use of Precast Concrete Girder in Urban Grade Crossing**

Yuling Teo, City of Seattle DOT, Seattle, WA; Hong Guan and Mark Johnson, CH2M, Bellevue, WA

The highly unusual Y-shaped geometry of the East Marginal Way Grade Separation and tight vertical clearance over railroad tracks called for an innovative solution that enables accelerated bridge construction, minimum construction impacts to railroad operations, and an economical and low lifecycle cost bridge. The solution was a creative use of precast concrete girders by pre-cambering method. The project has to-date one of the largest pre-cambered geometry of precast/prestressed I-girders in the State of Washington.

**10:00 AM COFFEE BREAK**

**10:30 AM**

**IBC 16-81: I-49 Lafayette Connector**

Kenneth Butler, AECOM, Glen Allen, VA; Zhengzheng “Jenny” Fu, LADOTD, Baton Rouge, LA

The I-49 Lafayette Connector project consists of a significant amount of structure and bridge including: 3.5-miles of elevated mainline viaduct; a signature arch or cable stayed bridge; 20 ramp connectors; 3-level interchange; 3 railroad bridges; and a bridge over the Vermillion River. The total bridge deck area is approximately 2,900,000 square feet. A major element of the project is evaluating life cycle costs for the mainline viaduct including steel box girders; prestressed concrete u-girders and precast segmental box girders. Additionally, context sensitive solutions are being developed based on community input. The focal point of the project will be a signature arch or cable stayed bridge. The presentation will focus on the early design development of the project and how the community is being engaged.
11:00 AM
IBC 16-82: Finite Element Analysis of the Andy Warhol Self-Anchored Suspension Bridge
Aaron Colorito, P.E. and Richard Schoedel, P.E., Michael Baker International, Moon Township, PA
The Andy Warhol Bridge is an eyebar-chain, self-anchored suspension bridge carrying Seventh Street over the Allegheny River in the city of Pittsburgh, PA. This bridge is one of the “Three Sisters” bridges constructed from 1924 to 1928 which comprise the only trio of identical, side-by-side bridges in the world and the first self-anchored bridges constructed in the United States. A three-dimensional finite-element analysis is carried out to identify rehabilitation needs of this unique structure.

11:30 AM
IBC 16-83: Ship & Barge Collisions with Highway Bridges – Risk Analysis Refinements
Michael Knott, Moffatt & Nichol, Richmond, VA; Mikele Winters, Moffatt & Nichol, Raleigh, NC
Recent decades have demonstrated the potential vulnerability of major highway bridges to catastrophic collapse due to extreme event loads. The paper will discuss ship and barge collision with bridges over navigable waterways using lessons learned from historical accidents; analysis procedures in the AASHTO Vessel Collision Design of Highway Bridges, 2nd Edition 2009 for both new and existing bridges; and application of AASHTO risk analysis procedures to complex navigation channel geometries near bridges, water elevations and scour for risk analysis, consideration of bow crushing in the development of bridge substructure and protection, and risk analysis protection factors.

REHABILITATION 3
Time: Friday, June 10; 8:00 AM–12:00 Noon
Chair: M. Patrick Kane, P.E., A&A Consultants Inc., Pittsburgh, PA

8:00 AM
IBC 16-84: Bronx Whitestone Bridge: Approach Widening
Roger Haight, WSP | Parsons Brinckerhoff, New York, NY; Ronald Paproski, WSP | Parsons Brinckerhoff, Briarcliff Manor, NY; Christopher Saladino, MTA Bridges and Tunnels, Bronx, NY
The TBTA widened both approaches on New York’s Bronx Whitestone Bridge. The new approach structures provide six AASHTO standard traffic lanes, full-width standard shoulders and a median barrier, with expansion capacity for an additional lane in each direction for future demand. The widened structures comprise cast-in-place concrete piers; redundant, multi-span continuous roadway girders; and a composite cast-in-place concrete roadway. Ancillary features of the projects include a neighborhood park, a new maintenance shop, and noise walls.

**Friday Sessions**

**8:30 AM**

**IBC 16-85: Repair of Truck Impacted/Damaged Steel Beams, I-66 over Route 29, Fairfax County, Virginia**

John Michels and Alireza Hedayati, WSP | Parsons Brinckerhoff, Herndon, VA; Edmund Okerchiri, VDOT, Fairfax, VA

The presentation will discuss the evaluation process and repair details for steel beam truck impact/collision damage to the NBL I-66 Bridge over Route 29. The discussion will include selecting a repair type, identifying repair challenges and achieving the desired service life for the owner. Repair methods to be discussed include: strengthening of bent girder flanges, temporary support for partial beam replacement, beam strengthening, bolted cover plates, diaphragm replacement, and cover plate weld inspection.

**9:00 AM**

**IBC 16-86: Rehabilitation of the Passyunk Avenue Bascule Bridge**

Colin Drager, P.E. and Leon Lung-Yang Lai, Ph.D., P.E., S.E., Specialty Engineering, Inc., Bristol, PA; Timothy Gresham, P.E., Gresham Consulting, LLC, Chalfont, PA; Gregory Off, P.E., AECOM, Conshohocken, PA

The Passyunk Avenue Bridge is a double-leaf dual-structure bascule in the City of Philadelphia. Major rehabilitation of the bridge is underway. The key and unique design items include heat-straightening of the damaged fracture-critical girders, replacement/redesign of the non-functioning center locks, new FRP bike lane decks, installation of a debris shielding system under the open-grid deck, and installation of a new wireless controlling system to replace the existing under-channel electric cable system.

**9:30 AM**

**IBC 16-87: Iowa DOT Bridge Deck Expansion Joint Maintenance Program and Research Overview**

James Nelson, Iowa DOT, Ames, IA; Charles Jahren, Iowa State University, Ames, IA

In 2012, the Iowa DOT began an aggressive contract maintenance program to repair and replace bridge deck expansion joints. In order to more effectively implement the contract maintenance repair program, research was sponsored including rapid expansion joint replacement investigation, modified strip seal expansion joint termination detail investigation and an effort to standardize details for semi-integral abutments for bridge joint retrofits. This paper presents an overview of the contract maintenance program, and associated research results.

**10:00 AM COFFEE BREAK**
10:30 AM
IBC 16-88: Interstate Delta Frames: Structural Steel Retrofit, & Restoration to Essentially Infinite Fatigue Life
Loai El-Gazairly, Whitman, Requardt and Associates, LLP, Richmond, VA; Rex Pearce and Park Thompson, VDOT, Staunton, VA; Jose Gomez, VDOT VTRC, Charlottesville, VA
For the last 20 years the Delta Frames of the I-64 bridges over Maury River experienced fatigue cracking causing noticeable structural deterioration and continuous deficiency in the bridge inventory rating. Analytical investigation showed that the bridge could achieve infinite fatigue life by introducing two directional composite behavior with the deck. The deck is replaced using lightweight concrete and a sophisticated computer model was developed to monitor its construction sequence. An experimental program was also implemented.

11:00 AM
IBC 16-89: Rehabilitation of Three Parallel Bridges Adjacent to the Lewiston Pump-Generating Plant
Mark Horschel, P.E., Bergmann Associates, Rochester, NY; John C. (Cort) Baker, P.E., Oakgrove Construction, Elma, NY
This $41.3 million bridge rehabilitation project included the staged superstructure replacement of three adjacent 813 feet. Long bridges carrying I-190 NB & SB and the NY Route 265 Bridges over the New York Power Authority reservoir in Niagara County, NY. The project included removal of the existing 12 span post-tensioned concrete I-girder superstructure for each bridge and replacement with three sets of 4-span continuous galvanized steel multi-girder superstructures. Pre-engineered platforms were used for debris containment.

11:30 AM
IBC 16-90: Developing a Corrosion Mitigation Strategy for Service Life Extension
Rex Gilley, WSP | Parsons Brinckerhoff, Virginia Beach, VA; Ali Akbar Sohangpurwala, CONCORR, Inc., Sterling, VA; Christopher Eggleston, VDOT, Suffolk, VA
Many states and federal entities are interested in extending the service life of aging infrastructure facilities. The Hampton Roads Bridge Tunnel approach trestles are exposed to an extreme marine environment and are exhibiting corrosion induced damage. Condition evaluations utilizing the latest testing protocols, service life modeling, and life cycle cost analyses produced optimal solutions for rehabilitation. The presentation will discuss the techniques used for evaluating and repairing existing structures, minimizing the need for costly replacement.
**Friday Sessions**

**ABC**

*Time: Friday, June 10; 8:00 AM–12:00 Noon*

*Room: Baltimore 3,4,5 - sponsored by HDR Engineering, Inc.*

*Chair: Stephen G. Shanley, P.E., Allegheny County DPW, Pittsburgh, PA*

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### 8:00 AM

**IBC 16-91: 50 Day Complete Bridge Replacement**

Adam Stockin, Keith Donington, and Karie-An James, WSP | Parsons Brinckerhoff, Manchester, NH

This bridge project used accelerated construction techniques to construct a 120 feet precast prestressed buttressed box beam span to provide an economical and efficient solution within 50 days. This span alleviated the need for a pier in the river, thereby reducing construction time and future maintenance. Several unique details were developed to accommodate this 45 degree skewed bridge and lessons were learned that will benefit engineers in the increasing demand to build bridges within short closures.

### 8:30 AM


Amir Ahmad Hedayati, PARSONS, Washington, DC

This presentation includes the alternative analysis and innovative design solutions to resolve the construction complications and alleviate the existing site constraints for the Monroe Street Bridge NE in Washington, DC over Brookland-CUA Metro Station, Washington Metropolitan Area Transit Authority (WMATA) tracks and tracks operated by CSX Transportation. Final recommendation is provided based on the life-cycle and cost-benefit analyses of the following alternatives: i) complete rehabilitation, ii) superstructure replacement and substructure retrofit iii) new single-span structure.

### 9:00 AM

**IBC 16-93: Substructure Considerations for Successful Accelerated Bridge Replacement Projects**

David Whitmore, Vector Corrosion Technologies, Winnipeg, MB, Canada; Brian Paines, Vector Corrosion Services, Wesley Chapel, FL; Tore Arnesen, Vector Corrosion Technologies, Inc., Boomfield, CO; Rachel Stiffler, McMurray, PA

This paper discusses substructure considerations for successful accelerated bridge replacement (ABR) projects and will present several ABR case studies completed by DOT’s in the USA and Canada. The presentation will include pre replacement condition, rehabilitation and construction details of each project. In order to realize the full benefit of ABR, serious consideration must be given to the existing substructure. Items to be considered are its structural capacity, its existing condition, and the options available to repair and/or extend its service life. The full benefit of ABR can be achieved if the exist-
ing substructure can be rehabilitated or otherwise modified to provide a service life which meets or exceeds a service life of the new bridge deck or substructure.

9:30 AM

IBC 16-94: Low-Cost Bridge Solutions for Local Owners - GRS-IBS Abutment Bridges
Bryan Dietrich, P.E., RETTEW, Pittsburgh, PA; Dave Hoglund, P.E., RETTEW, Lancaster, PA

GRS-IBS abutment bridges are a cost-effective solution for local governments since they can be constructed by public works staff with assistance from the design engineer. This paper will discuss the various challenges encountered and solutions developed for three distinctive GRS-IBS bridge abutment projects. Notable challenges include: design/construction windows less than 6-months, skewed abutments, GRS construction inside existing abutments and wings, in-field adjustments to correct as-built errors, first-time construction by maintenance forces and limited access construction.

10:00 AM COFFEE BREAK

10:30 AM

IBC 16-95: Evaluation of Modular Press-Brake-Formed Steel Tub Girders for Short Span Bridge Applications
Gregory Michaelson, Marshall University, Huntington, WV; Karl Barth, West Virginia University, Morgantown, WV; Michael Barker, University of Wyoming, Laramie, WY; Daniel Snyder, Steel Market Development Institute, Washington, DC

This paper and presentation is focused on the development of modular shallow trapezoidal boxes fabricated from cold-bent structural steel plate using standard mill plate widths and thicknesses. This concept was developed by a technical working group within the Steel Market Development Institute's Short Span Steel Bridge Alliance (SSSBA), led by the current authors. This paper will provide an overview of experimental testing and parametric studies focused on assessing the system's behavior and performance.

11:00 AM

IBC 16-96: Superstructure Replacement of U.S. Route 9 Southbound over Green Street Utilizing Accelerated Bridge Construction
Brian Atkinson, Laura Coley, and David Hicks, Dewberry, Bloomfield, NJ

Dewberry recently completed a $6,000,000 NJDOT project utilizing ABC techniques in a heavily congested section of U.S. Route 9 in Woodbridge, NJ. Initially identified for deck slab replacement, it became evident that conventional staged construction would cause major traffic disruptions. To shorten the construction duration, a superstructure replacement was recommended. Modular construction, coupled with a viable detour route and a complete weekend closure of Route 9 southbound, accelerated the schedule to achieve the project objectives.
11:30 AM

**IBC 16-97: Large Scale, High Production Preassembly of Girder Units for the New Tappan Zee Bridge**

Tom Zieman, Zieman Engineering, LLC, Stamford, CT; Neil Napolitano, Tappan Zee Constructors, Tarrytown, NY

The new Tappan Zee Bridge consists of over two miles of plate girder approaches that are being built off-site in 135 preassemblies, which are up to 420 feet long and weigh up to 2200 kips. This presentation will focus on the yard where the units are being assembled and loaded on to barges at a rate of over 3,000,000 lbs. of steel per week. Various custom equipment which constitutes an assembly line will be described.

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**W-08: CREATING A WORLD CLASS SAFETY CULTURE**

*Time: Friday, June 10; 1:00–2:30 PM*

*Room: Annapolis 1*

*Presented By: Atema*

Want to lower your costs, increase your profits and improve your productivity? We'll show you how a culture in which safety is the shared value of every employee accomplishes that — and how you can implement one in your organization. You'll learn how to lead and implement a safety culture, involve employees in recognizing and identifying hazards, use measurement tools to quantify the effectiveness of your safety culture, and apply continuous improvement methods to evaluate and improve your safety efforts. You'll be able to watch your business thrive by incorporating safety into the foundation of every strategy, decision, operation and action.

*Speaker: Tim Neubauer, Atema, Chicago, IL*

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**W-09: DESIGN & CONSTRUCTION OF BRIDGE COLUMNS INCORPORATING MECHANICAL BAR SPLICES IN PLASTIC HINGE REGIONS**

*Time: Friday, June 10; 1:00–2:00 PM*

*Room: Annapolis 2*

*Presented By: South Dakota State University*

The main objectives of this workshop are to (1) introduce suitable couplers for bridges, (2) discuss the performance of couplers, (3) discuss the seismic performance of columns incorporating mechanical bar splices in the plastic hinge region, (4) present constructability and speed of construction for mechanically spliced columns, (5) introduce a generic material model for couplers, (6) present simple design equations including a modified plastic hinge length, and (7) present design examples.

*Speaker: Mostafa Tazarv, Ph.D., South Dakota State University, Brookings, SD*
W-10: THE REHABILITATION OF THE WICHITA US-54 CBD VIADUCT

Time: Friday, June 10; 1:00–2:00 PM
Room: Annapolis 3

Presented By: WSP | Parsons Brinckerhoff

The objective of the workshop is to demonstrate the innovative nondestructive testing and modern techniques of preserving a $70 million structure at a critical juncture of the structural life of the bridge. Highly developed post-tension inspection and repair technologies were employed to meet the unique and difficult repairs of a highly sensitive PT system. Bridge preservation was accomplished by means of in-depth partnering with Academia through advanced research and collaborating with construction industry national experts in PT systems.

Speakers: Abdul Hamada, P.E. and Nichole Witushynsky, P.E., WSP | Parsons Brinckerhoff, Wichita, KS

W-11: BRIDGE INSPECTION AND EVALUATION TECHNOLOGIES AND APPLICATIONS

Time: Friday, June 10; 1:00–3:00 PM
Room: Annapolis 4

Presented By: M. Myint Lwin, P.E., S.E., QC/QA Consultant

The main objective of this workshop is to present and discuss recent developments in techniques, equipment, and applications in bridge inspection and evaluation, including underwater bridge inspection. Applications in meeting the MAP-21 requirements for collecting and reporting bridge element inspection data will be discussed. The attendees will gain a good understanding of the inspection equipment, methods and techniques that can provide quality information on the conditions of the bridge elements, including the portions under water. Quality information is essential for making sound and cost-effective decisions on safety, repair, rehabilitation and replacement.

Speakers: M. Myint Lwin, P.E., S.E., QC/QA Consultant; Derek Constable, FHWA; Claude Napier, VADOT; Edward Zhou, AECOM; John Loftus, Industry

W-12: PRACTICAL APPLICATION OF DRONES IN THE BRIDGE INDUSTRY

Time: Friday, June 10; 1:00–3:00 PM
Room: Prince George’s Exhibit Hall E

Presented By: UAV - US AERIAL VIDEO

Based in Pittsburgh, PA, US Aerial Video (UAV) specializes in aerial data collection, HD imagery & video, photogrammetry and magnetic field detection. As one of the first drone companies in the United States and commercially approved by the FAA, UAV can provide detailed visual inspections, mapping, modeling, marketing & promotional material and a range of other services. UAV’s custom built aerial platforms are specifically designed for each individual mission. We pride ourselves in dedication, ingenuity and safety. During this workshop you’ll see a few of the drones in person with a short video to highlight bridge inspection using drones. A flight demonstration is tentatively scheduled.

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In addition to the many vendor exhibits, the IBC Exhibit Hall hosts the reception during the conference on Tuesday, Wednesday, and Thursday, and luncheons on Wednesday and Thursday. All registered attendees are welcome to enjoy these events during the IBC. Please stop by and visit with our many exhibitors while enjoying your lunch and receptions.

The IBC Exhibit Hall is open:

- **Tuesday:** 6:00–8:00 PM, reception with appetizers and drinks!
- **Wednesday:** 12:00 Noon–2:00 PM, featuring lunch starting at 12:00 Noon; and 5:00–7:00 PM reception with appetizers and drinks!
- **Thursday:** 11:30 AM–1:30 PM, featuring lunch starting at 11:30 AM; and 5:00–7:00 PM reception with appetizers and drinks!

Below, you will find a numerical listing of all exhibitors, followed by an alphabetical listing with full contact information and company description. This listing contains all Exhibitors as of May 23, 2016.
214 StructurAlert™ by MISTRAS
215 Lusas
218 Moog USA, Inc.
219 Sofis Company Inc.
220 HRV Conformance Verification Associates, Inc.
221 Marine Solutions, Inc.
222 Bridge Preservation LLC
223 Computers & Structures, Inc.
224 Wirerope Works Inc.
225 STV
226 Evonik Corp.
227 Dimetix USA
230 Emseal Joint Systems
231 Viathor, Inc.
232 Flagger Force Traffic Control Services
233 Salt Specialty Rebar
234 Armtect LP
235 Kamatics RWG
237 P. Joseph Lehman, Inc., Consulting Engineers
238 Mabey Inc.
239 Carl Stahl DecorCable
243 V&S Galvanizing
244 New Millennium Building Systems
245 Contractors Materials Company
246 Bridge design & engineering
247 Headed Reinforcement Corporation (HRC)
248 Volkert, Inc.
249 Wassar Coatings
250 International Road Dynamics Inc.
251 Hydro-Technologies / Modified Concrete Suppliers
252 Phanos Marine Automatic Power
300/302 Acrow Corporation of America
301 R.J. Watson, Inc.
303 Hillman Rollers
307 Stalite
308 All Access Rigging Co.
309 Scougal Rubber Corp.
310 St. Louis Screw & Bolt
311 WSP | Parsons Brinckerhoff
312 American Segmental Bridge Institute (ASBI)
313 Big R Bridge
314 AZZ Galvanizing Services
315 Larsa, Inc.
319 L.B. Foster
320 The Neel Company
321 Wire Rope Industries
322 Resensys LLC
323 CONCOR, Inc.
324 Intelligent Infrastructure Systems
325/327/424/426 Safway Services
326 Penmoni
331 Central Atlantic Bridge Associates
332/334 BYA Hydraulics
333 Lealeune Bolt Company
335 BERD, S.A.
336 A. Morton Thomas and Associates
337 Whitlock Brothers Inc.
338 I&I Sling
339 BDB Bridges/Precaststeel
343 Bentley Systems, Inc.
345 GHD Limited
346 Bureau Veritas North America, Inc.
347 ChemCo Systems
348 HAKS Engineers, Inc.
349 District DOT - 2017 IBC F.A.
350 Jenik
351 IMMF Steel Corporation
352 Coastal Precast Systems
400 Harcon Corp.
401 Sika Corporation
402 FlIGG
403/405 American Composites Manufacturers Association (ACMA)
406 Reinforced Earth Company, The
407 CTS Cement Manufacturing Corporation
408 Advitam Inc.
409 TRC Engineers, Inc.
410 Freyssinet, Inc.
412 Vector Corrosion Technologies
414 Greenman-Pedersen, Inc.
418 AECOM
420 ConTech Engineered Solutions
422 Nickel Institute
432 Terex BidWell
434 Pickering, Corts & Summerson
435 Redaelli Engineering Division
437 T.Y. Lin international
438 Phoenix National Laboratories
439 Short Span Steel Bridge Alliance
441 Watson Bowman Acme
443 DBi Services
444 RK&K
446/448/450 Spider
452 Danbro Distributors

Exhibit Hall
PRINCE GEORGE HALL E, LOWER LEVEL

JUNE 6-10, 2016, NATIONAL HARBOR, MD

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A. Morton Thomas and Associates, Inc.
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E-mail: kbabaei@amtengineering.com
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Contact: Scott Carroll
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**Bureau Veritas North America, Inc.**

Booth #: 346  
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Website: www.buzziunicemusa.com
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Phone: 816-891-6390
Fax: 816-891-6599
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Website: www.bvahydraulics.com
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Fax: 312-474-1789
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Phone: 713-675-1180
Fax: 713-675-1140
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Website: www.cbsiusa.com

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Central Atlantic Bridge Associates

Booth #: 331
Contact: Monica Schultes
Phone: 302-222-1385
E-mail: info@caba-bridges.org
Website: www.caba-bridges.org

Central Atlantic Bridge Associates (CABA) represents precast/prestressed concrete bridge manufacturers in NJ, PA, DE, MD, VA, WV, DC. CABA's mission is to advance the prestressed concrete industry and promote precast concrete as the material of choice for the region. It disseminates knowledge and information relating to the composition and use of precast concrete. It stimulates and encourages more extensive research relative to the manufacture and use of prestressed concrete. It promotes and educates on behalf of PCI the Precast Concrete Institute.

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Fax: 407-641-9062
E-mail: info@certainty3d.com
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Website: www.cianbro.com
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Fax: 757-545-6296
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Contact: Atif Habibullah
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Fax: 510-649-2299
E-mail: sales@csiamerica.com
Website: www.csiamerica.com
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CONCORR, Inc.
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Contact: Ali Akbar Sohangpurwala
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Fax: 571-434-1851
E-mail: ali@concorr.com
Website: www.concorr.com
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<tr>
<td>Contech Engineered Solutions</td>
<td>420</td>
<td>David Corr</td>
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<tr>
<td>E-mail: <a href="mailto:dcorr@conteches.com">dcorr@conteches.com</a></td>
<td>Phone: 513-645-7130</td>
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Website: www.dfi.org

Deep Foundations Institute® was incorporated in 1976 in the State of New Jersey as a 501(c)(6) non-profit association. DFI is an international association of contractors, engineers, suppliers, academics and owners in the deep foundations industry. Our multi-disciplinary membership creates a consensus voice and a common vision for continual improvement in the planning, design and construction of deep foundations and excavations. DFI brings together members through networking, education, communication and collaboration.

Dimetix USA

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District DOT - 2017 IBC Featured Agency.

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Fax: 202-671-4710
E-mail: richard.kenney@dc.gov
Website: www.ddot.dc.gov

The District Department of Transportation (DDOT) manages a transportation system serving the people who live, work and visit Washington, DC. The Department strives to achieve a multi-modal transportation system that makes the city more livable, sustainable, prosperous and attractive, offering everyone in the District
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E-mail: richard@e-chem.net  
Website: www.e-chem.net

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Website: www.lrfd.com

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Foundation Technologies Inc.

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Freyssinet, Inc.

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Jenik
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LUSAS Bridge software is used for cost-effective analysis, design and load rating of all bridge types. Use LUSAS for fundamental frequency, seismic, dynamic, nonlinear, buckling, fatigue, staged construction modelling, concrete creep and shrinkage, heat of hydration, and prestress / post-tensioning, cable tuning analysis, traffic load optimisation to AASHTO and other design codes, geotechnical and soil-structure interaction analysis; and rail track-structure interaction modelling. LUSAS is used on major projects worldwide (and on small-scale structural integrity jobs).

Mabey Inc.
Booth #: 238
Contact: Jim Porreca
Phone: 412-475-6087
Fax: 410-379-2801
E-mail: j.porreca@mabey.com
Website: www.mabey.com
Mabey carries a broad range of products for temporary bridges, permanent bridges, excavation and trench shoring, structural shoring and temporary roadways. From PE certified engineered plans to on-site support, Mabey carries what you need to complete your project on time and on budget.

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Contact: Gianni Moor
Phone: 212-644-3335
Fax: 212-644-3339
E-mail: info@magebausa.com
Website: www.magebausa.com
Mageba USA is a leading global manufacturer and supplier of bridge bearings, expansion joints, seismic protection devices and monitoring systems, which in recent years has contributed to the construction of major North American landmarks such as the Verrazano Narrows, Bayonne, Tappan Zee, Port Mann, Golden Ears and St. Lawrence Bridge. Mageba USA is certified as per AISC and has its own production facilities in USA, Europe and Asia. Who we are, what we do and where we are located can be found on our website at www.magebausa.com
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Booth #: 221
Contact: Noelle Ziobro
Phone: 443-484-2394
Fax: 859-554-4100
E-mail: nziobro@msimarinesolutions.com
Website: www.msimarinesolutions.com
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Contact: Lisa Albertson
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Fax: 540-423-1110
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McCrossin Foundations
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Contact: James B. Pease, P.E.
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Fax: 717-298-1874
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Website: www.mccrossinfoundations.com
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**E-mail:** cwatson@moogusa.com  
**Website:** www.moogusa.com

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**Phone:** 844-855-3345  
**Fax:** 469-420-5378  
**E-mail:** info@nanokote.com  
**Website:** www.nanokote.com.au

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Booth #: 209
Contact: Matt Shergalis
Phone: 312-363-8218
E-mail: shergalis@aisc.org
Website: www.steelbridges.org
The National Steel Bridge Alliance, a division of the American Institute of Steel Construction (AISC), is a national, not-for-profit organization dedicated to advancing steel bridge design and construction. We are a unified industry organization of businesses and agencies interested in the development, construction and promotion of cost-effective steel bridges.

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E-mail: jlewis@neelco.com
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Website: www.newmill.com
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Contact: Frank Smith
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Fax: 613-544-4181
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Contact: Marty Malone
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Contact: Jennifer Laning
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Fax: 713-228-3717
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Contact: Stevan A. Hall
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Fax: 904-215-2977
E-mail: steve@piledrivers.org
Website: www.piledrivers.org
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Contact: Timothy McTigue
Phone: 856-740-0606
E-mail: tmctigue@portadam.com
Website: www.portadam.com
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Website: www.rjwatson.com  

R. J. Watson manufactures high load multi-rotational disc bearings, seismic isolation bearings, bridge expansion joints, waterproofing membranes, and FRP Composite Systems for strengthening and rehabilitation.

**Redaelli Engineering Division**

Booth #: 436  
Contact: David Ward  
Phone: +44 1302 378327  
E-mail: david.ward@redaelli.com  
Website: www.redaelli.com  

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Booth #: 406  
Contact: Alicia Inthirath  
Phone: 703-547-8797  
E-mail: ainthirath@reinforcedearth.com  
Website: www.reinforcedearth.com  

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Contact: Mehdi Kalantari
Phone: 301-395-3892
E-mail: mehdi@resensys.com
Website: www.resensys.com
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Website: www.rkk.com
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Website: www.shortspansteelbridges.org
The SSSBA is a group of bridge and buried soil structure industry leaders who have joined together to provide educational information on the design and construction of short span steel bridges in installations up to 140 feet in length.

Sika Corporation
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Website: www.usa.sika.com
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Contact: Bill Sofis
Phone: 724-378-2670
Fax: 724-378-3719
E-mail: wsofis@sofiscompany.com
Website: www.sofiscompany.com
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Phone: 937-746-7632  
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Contact: Terry Tamutus  
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Fax: 609-716-0706  
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Terex BidWell
Booth #: 432
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Tideland Signal Corporation
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Website: www.tidelandsignal.com

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TRC Engineers, Inc.
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Website: www.trcsolutions.com; www.trcbridgedesignsoftware.com

TRC is a national engineering, consulting and construction management firm providing integrated services to the energy, environmental and infrastructure markets to both public and private
sector clients. TRC also markets, maintains and supports several bridge design software programs for many bridge structure types and offers training and workshops to consultants and public agencies. These software programs provide the necessary tools to model, analyze and design bridge components.

V&S Galvanizing

Booth #: 243
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Volkert, Inc.
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