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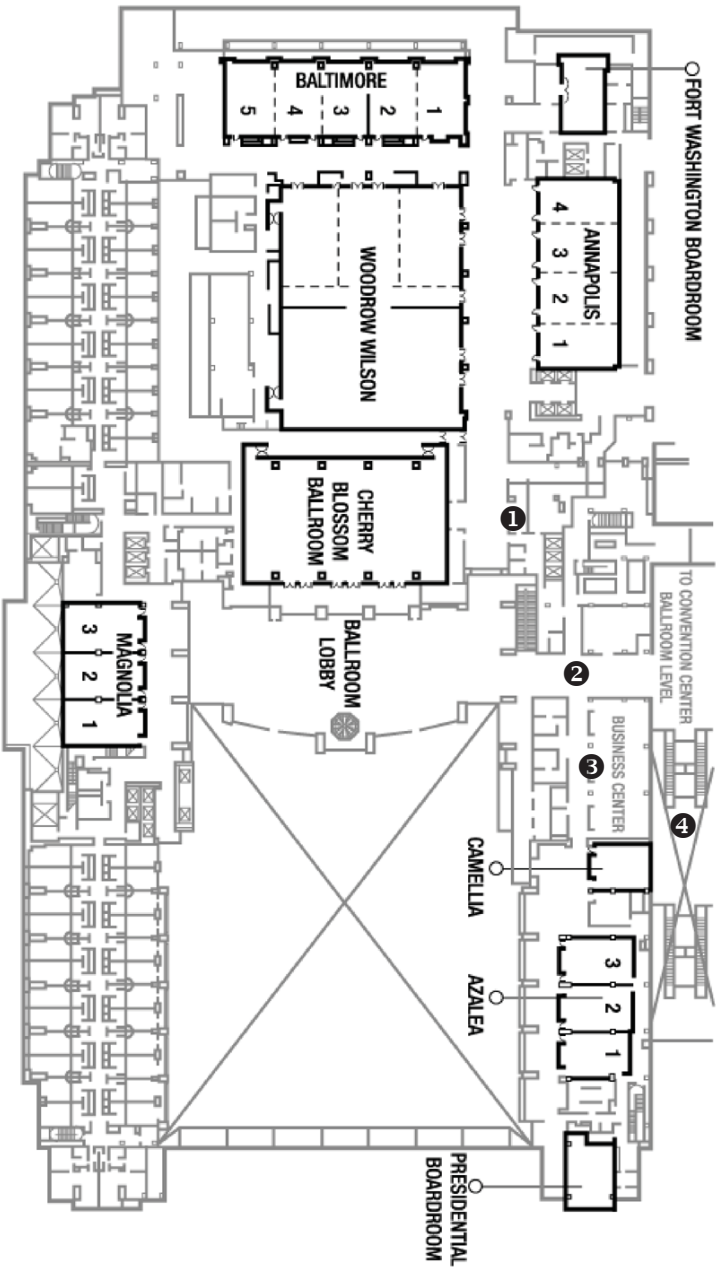

❶ = IBC REGISTRATION DESK
❷ = WALK WAY TO EXHIBIT HALL
❸ = HOTEL BUSINESS CENTER
❹ = ESCALATORS TO EXHIBIT HALL LEVEL

IBC
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IBC

SCHEDULE-AT-A-GLANCE

TIME	SESSION	ROOM
MONDAY, JUNE 11		
8:00–10:00 a.m.	Bridge Asset Management	Annapolis 1/2/3
8:00–10:00 a.m.	Challenges to Delivering a Successful Project	Woodrow A
10:15 a.m.–12:15 p.m.	Keynote Session	Cherry Blossom BR
12:15–2:00 p.m.	Exhibit Hall Luncheon	Prince George Hall A
1:00–5:00 p.m.	W1: Specialized Construction Techniques	Magnolia 1
1:00–5:00 p.m.	W2: Introduction to Strut-and-Tie Modeling	Magnolia 2
2:00–6:00 p.m.	Featured Country Session: China	Cherry Blossom BR
2:00–5:00 p.m.	Proprietary Session	Woodrow A
5:00–6:00 p.m.	International Welcome Reception	Cherry Blossom Foyer
5:00–7:00 p.m.	Exhibit Hall Reception	Prince George Hall A
TUESDAY, JUNE 12		
8:00 a.m.–12:00 noon	Cable Stay / Long Span	Baltimore 3/4/5
8:00 a.m.–12:00 noon	Innovative Contracting	Annapolis 1/2/3
8:00 a.m.–12:00 noon	Design/Analysis, Part 1	Woodrow A
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8:00 a.m.–12:00 noon	W-3: Meeting FHWA Mandates	Magnolia 1
8:00 a.m.–12:00 noon	W-11: China's Bridge Development	Magnolia 2
12:00 noon–2:00 p.m.	Exhibit Hall Luncheon	Prince George Hall A
1:00—5:00 p.m.	Boat Tour	
1:00–5:00 p.m.	W-4: FRP Composite Bridge Materials	Magnolia 1
1:30–5:00 p.m.	Delaware River Turnpike Bridge	Baltimore 3/4/5/

IBC

SCHEDULE-AT-A-GLANCE

TIME	SESSION	ROOM
1:30–5:00 p.m.	Rail / Transit, Part 1	Annapolis 1/2/3
1:30–5:00 p.m.	Inspection / Evaluation	Woodrow A
1:30–5:00 p.m.	Innovation	Woodrow B/C/D
5:30 p.m.	IBC Awards Dinner	Cherry Blossom BR
WEDNESDAY, JUNE 13		
7:30–9:00 a.m.	Exhibit Hall Breakfast	Prince George Hall A
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9:00 a.m.–12:00 noon	Preservation, Part 1	Baltimore 3/4/5
9:00 a.m.–12:00 noon	Instrumentation / Load Testing	Annapolis 1/2/3
9:00 a.m.–12:00 noon	Foundation / Design	Woodrow A
9:00 a.m.–12:00 noon	Construction Engineering	Woodrow B/C/D
12:00 noon–2:00 p.m.	Exhibit Hall Luncheon	Prince George Hall B
1:00–5:00 p.m.	W-7: International Bridge Practices	Magnolia 2
2:00–5:00 p.m.	Preservation, Part 2	Baltimore 3/4/5
2:00–4:30 p.m.	Rail / Transit, Part 2	Annapolis 1/2/3
2:00–5:00 p.m.	Design/Analysis, Part 2	Woodrow A
2:00–5:00 p.m.	ABC, Part 2	Woodrow B/C/D
2:00–5:00 p.m.	W-6: Efficient and Economical Short-Span Steel Bridge Solutions	Magnolia 1
THURSDAY, JUNE 14		
8:00 a.m.–12:00 noon	W-8: Service Life Design	Baltimore 3
8:00 a.m.–12:00 noon	W-9: Future of Bridge Management	Baltimore 4
8:00 a.m.–12:00 noon	W-10: Design of Steel Bridges for Railways	Baltimore 5

CHAIRMAN'S WELCOME

Ronnie Medlock, P.E.

Welcome to the Conference!

It is my honor and privilege to welcome you to the 35th Annual International Bridge Conference (IBC) hosted by the Engineer's Society of Western Pennsylvania. Our conference has become one of the most recognized bridge engineering events in the United States and beyond; this is a testament to the excellent papers and programs that have been published and presented over the years, ever advancing the bridge state-of-the-art and keeping IBC attendees up to date with on the most pertinent bridge topics of the day. This year is no exception, with sessions and papers ranging from bridge asset management and information modeling for bridges to innovative contracting and remarkable featured bridge projects.

Pondering these projects, I am awed by the work that the engineers in our community have accomplished over the years, designing and building structures that withstand the elements for decades, reliably connecting people to their work and play. The public is busy, and folks usually don't give bridges much thought, but this is okay: so often our work is in fact best when it goes unnoticed, crossed thousands of times a day by speeding loads of thousands of pounds. The resiliency of our structures reflects a quiet success, and this is just one more reason to come to the IBC: as we gather, not only will we learn from each other through presentations and dialogue, but also we will celebrate our accomplishments together, recognizing each other's work and acknowledging the most special achievements through awards for bridge projects and bridge engineers. On behalf of the ESWP, I welcome you to the conference, I look forward to celebrating your work, and I look forward to learning from the engineers who come to the IBC to share their thoughts and ideas and help us grow as an engineering community.

See you there!

Ronnie

Ronald D. Medlock, P.E., is Vice President, Technical Services, at High Steel Structures LLC in Lancaster, Pennsylvania and the General Chair of IBC, 2018.

WELCOME

Welcome to the 2018 International Bridge Conference® (IBC), sponsored by the Engineers' Society of Western Pennsylvania (ESWP) — our 35th Anniversary Conference! 2018 marks our return to the Gaylord National Resort and Convention Center for our third year. Located just outside of our nation's capital, this location is ideally suited for the ever-growing IBC, and is located within walking distance of the Woodrow Wilson Bridge along the Potomac River. We are pleased to have the People's Republic of China as our Featured Country to showcase their bridge program. The 2018 IBC is a four-day event with technical content scheduled across all four days of the IBC.

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.national-harbor.com/

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 festivities). 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" presented by many of our co-sponsors and other industry-leading groups on an even wider variety of bridge industry subject matter.

Remember: the Boat Tour, 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 Ballroom Level of the Gaylord Resort and is open:

- Monday: 7:00 a.m.–6:00 p.m.
- Tuesday: 7:00 a.m.–5:00 p.m.
- Wednesday: 7:00 a.m.–5:00 p.m.
- Thursday: 7:00 a.m.–12:00 noon

MEETING INFORMATION

All IBC functions (excluding 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.

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 suggest that you remove your badge when leaving the Conference.

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

THE NEW IBC APP

Be sure to download the IBC APP to tune in to all of the latest news on the conference. The IBC 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.

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 160 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 breakfast, reception and luncheons presented there and open to all registered attendees.

IBC BOAT TOUR

Join us on the afternoon of Tuesday, June 12 to see many of the bridges over the Potomac River and Anacostia River, as well as other local attractions. The boat tour sails from 1:00–5:00 p.m. – advance reservations required. Check with the IBC staff for availability. Some limitations apply.

PRE-PRINTS 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 2 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 35th Anniversary International Bridge Conference® will be available in late Summer 2018.

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.

ABOUT THIS GUIDE

In an attempt to conserve paper, we have made every attempt to print this guide efficiently, including "uneven" page breaks and truncated descriptions where it exceeds our allowed word count. Please refer to our APP or website for full content. Please note the common use of abbreviations throughout this guide, including:

DOT = Department of Transportation

ft or ' = foot m = meters W = Workshop

" = inches ° = degree

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 to ESWP. Official confirmation from the IBC Offices regarding each attendee's eligibility for PDHs will be sent after the Conference. (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 and workshops on the session registry. Registry forms are located at the entrance to any of these sessions. ESWP will not verify your attendance in any session if you do not properly sign this registry!

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 receive a bingo card in their registration packet.

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

- Monday, June 11: 12:00 noon–2:00 p.m. with a strolling luncheon buffet
- Monday, June 11: 5:00–7:00 p.m. with appetizers and bar service
- Tuesday, June 12: 10:00 a.m.–2:00 p.m. with a strolling luncheon buffet
- Wednesday, June 13: 7:30–9:00 a.m. with a continental breakfast
- Wednesday, June 13: 12:00 noon–2:00 p.m. with a strolling luncheon buffet

The IBC will feature a Luncheon Buffet throughout the Exhibit Hall on Monday, Tuesday, and Wednesday; an evening reception on Monday; and breakfast on Wednesday, all open to all registered attendees and registered spouses.

Don't miss the Featured Country Exhibit by China located in the Exhibit Hall, open during the IBC Exhibit Hall hours.

COFFEE STAND

Thanks to the generosity of our sponsors, 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, and IBC Golf Shirts. These items are high quality and feature the popular IBC logo. The gift items are 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 2018 IBC!

IBC SPOUSE PROGRAM

The IBC Spouse Breakfast will be hosted at the Gaylord National Resort and Convention Center on Monday, June 11 at 10:00 AM. This includes a free continental breakfast and a brief presentation from the Gaylord Hotel. 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.

ATTENDEE REGISTRATION LISTS

Conference registrations received prior to May 31 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 Thursday morning of the conference and reflects those attendees who registered after May 31, 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 remember that the IBC never provides email addresses as a courtesy to our registered attendees.

QUESTIONS?

Loads of additional information is available on our website at eswp.com/bridge or you can use our new APP, or visit the IBC website (eswp.com/bridge). Still have questions? Stop at the IBC registration desk, or ask any of the IBC staff, identified in the "Blue Crew" polo shirts.

JOIN US AT THE 2019 IBC!

Join us in 2019 for the International Bridge Conference®, June 10-13, 2019 as we return to the Gaylord National Resort and Conference Center, in National Harbor, MD. If you are interested in presenting a paper or workshop at the 2019 conference, watch for our "Call for Papers / Workshops" open immediately after the 2018 IBC. Also, promote your firm through the many different sponsorship and exhibit opportunities that are available - don't miss out and make your reservation early to take full advantage of all promotions!

GET INVOLVED!

Interested in presenting a paper, workshop, seminar presentation at a future IBC? The IBC Call For Papers will open immediately following the 2018 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, Ronald D. Medlock, P.E., for his leadership in planning this years conference.

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Deep Foundations Institute (DFI) www.dfi.org

National Council of Structural Engineers Association (NCSEA) www.ncsea.com

National Steel Bridge Alliance (NSBA) www.aisc.org/nsba

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IBC

GENERAL INFORMATION

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 2018 IBC Awards of Distinction. The IBC Awards will be presented in a ceremonial dinner on Tuesday, June 12 during the IBC. Check with the IBC Registration Desk for seating availability. Tickets are required at the entrance. The honorees include:

John A. Roebling Medal

Honoring an individual for lifetime achievement in bridge engineering, we are pleased to recognize Dr. Gongyi Xu as the 2018 recipient. Dr. Xu is Deputy Chief Engineer, China Railway Major Bridge Reconnaissance & Design Institute (BRDI). Dr. Xu is recognized as the National Design Master – one of the highest honors in China and had been involved in the design and construction of over 70 major bridges worldwide, including 30 suspension bridges and 20 cable-stayed bridges.

George S. Richardson Medal

Recognizing a single, recent outstanding achievement in bridge engineering, we are pleased to recognize Anhui Transportation Holding Group Co. Ltd., the owner of the Second Wuhu Yangtze River Bridge.

Gustav Lindenthal Medal

Recognizing an outstanding structure that is also aesthetically and environmentally pleasing, we are pleased to recognize, as co-winners, both the Guizhou Highway Engineering Group Co., Ltd. and the Road & Bridge International Co. Ltd., the respective owners of the Beipanjiang First Bridge and the Yachi River Mega Bridge.

Eugene C. Figg, Jr. Medal

Recognizing a single recent outstanding achievement for bridge engineering, which is considered an icon to the community for which it is designed, we are pleased to recognize the Vermont Agency of Transportation, the owner of the Brattleboro Bridge - A Bridge to Nature.

Arthur C. Hayden Medal

Recognizing a single recent outstanding achievement in bridge engineering demonstrating vision and innovation in special use bridges, we are pleased to recognize the Zhangjiajie East-line Tour Development Company, the owner of the Zhangjiajie Grand Canyon Glass Bridge.

Abba G. Lichtenstein Medal

Recognizing a recent outstanding achievement in bridge engineering demonstrating artistic merit and innovation in the restoration and rehabilitation of bridges of historic or engineering significance, we are pleased to recognize Halifax Harbour Bridges, the owner of the Angus L. Macdonald Bridge.

Award of Distinction

The Award of Distinction, recognizing a recent outstanding achievement in bridge engineering for special use, lift structures, is jointly presented to the New Hampshire Department of Transportation and the Maine Department of Transportation, co-owners of the Sarah Mildred Long Bridge - Three Bridge in One - Lift Bridge.

BRIDGE ASSET MANAGEMENT

Monday, June11; 8:00–10:00 a.m.

Room: Annapolis 1/2/3

Chair: David Juntunen, P.E., Consultant, Lansing, MI

This session is a series of 4 talks with a panel discussion at the end to show how 3 DOT's are doing the Bridge portion of their Transportation Asset Management Plans and national perspective about these plans by FHWA.

8:00 a.m.

IBC 18-1: Utah DOT

Rebecca Nix, Utah DOT

In recent years the Utah Department of Transportation has focused heavily on element level inspections and adapting the inspection mindset to not just address capturing the overall condition and safety of a bridge, but also capturing information necessary to develop a proactive bridge program and metrics for their TAMP.

8:30 a.m.

IBC 18-2: North Carolina DOT

Dustin Thomas, P.E., Minnesota DOT

North Carolina DOT owns and maintains over 95% of the state bridge inventory including all of the NHS and the overwhelming majority of rural routes. The Department has worked with the state legislature to establish bridge programs that can meet the needs of the entire system while reducing the number of Structurally Deficient bridges. NCDOT'S TAMP will detail how the BMS is used for recommend goals, funding levels, and candidates for our various bridge programs.

9:00 a.m.

IBC 18-3: FHWA

Derek Constable, Federal Highway Administration

The overview of TAMP objectives and requirements for bridges, and a look at where we are with national implementation, and where we are going.

9:30 a.m.

IBC 18-4: Pennsylvania DOT

Justin Bruner, Pennsylvania DOT, Harrisburg, PA

Current targets and goals of the TAMP, as well as compliance for lowest life cycle cost through Asset Management processes. This will include a Bridge Asset Management System using extensive deterioration modeling analysis and comprehensive cost modeling.

10:00 a.m. Break

CHALLENGES TO DELIVERING A SUCCESSFUL PROJECT: A PANEL DISCUSSION WITH THE OWNER, DESIGNER, AND CONTRACTOR

Monday, June 11, 8:00–10:00 a.m.

Room: Woodrow Wilson A

Chair: Calvin Boring, Advantage Steel & Construction Co., Saxonburg, PA

This session will discuss four different projects, each featuring a short presentation by the owner, designer, and contractor, followed by a panel discussion with Q&A from the audience.

8:00 a.m.

IBC 18-5: Birmingham Bridge

Louis J. Ruzzi, P.E., Pennsylvania DOT District 11-0, Pittsburgh, PA; Ahmad K. Ahmadi, P.E., Ph.D., SAI Consulting Engineers, Inc., Pittsburgh, PA; Tyson Hicks, Joseph B Fay Co., Pittsburgh, PA

A $29,000,000 bridge preservation project which included hydro demo and latex, full paint, structural steel and concrete repairs and bearing replacement with a highlight on the replacement of the main truss bearings with spherical bearings.

8:30 a.m.

IBC 18-6: PA Turnpike MP 44-48 Allegheny County, PA Reconstruction and Widening

Steve Hrvoich, P.E., Pennsylvania Turnpike Commission, Pittsburgh, PA; Joseph A. Thompson, McCormick Taylor, Pittsburgh, PA; John A. Nemmer, Trumbull Corporation, Pittsburgh, PA

MP 44-48, $79,000,000 full-depth reconstruction and widening project will highlight the temporary shoring challenges.

9:00 a.m.

IBC 18-7: Virginia Success Stories

Michael Gleasman, P.E., Virginia DOT, Fairfax, VA; Pooya Azar, Martins Construction Corp., Falls Church, VA ; John Michels, WSP , Herndon, VA

This team of owner, designer and contractor firms have jointly completed over eight major rehabilitation projects in the past 3 years, incorporating deck hydro-demolition and /LMC-VE overlay, and deck joint elimination. With many of the projects located along the most congested corridors of the National Capital Region (i.e. Interstate I-395, I-495, Dulles Toll Road, etc.), they will be sharing their unique perspective on the challenges faced in each phase of the project lifecycle and how they were overcome.

9:30 a.m.

IBC 18-8: Ironton – Russell Bridge

Chris Pridemore, P.E., Ohio DOT, Chillcothe, OH; Craig Klusman, P.E., AECOM, Louisville, KY; Thomas Hesmond, P.E., Brayman Construction Corp., Saxonburg, PA

An $82,000,000 contract for a new cable stay bridge on a new alignment and removal of the existing functionally obsolete and structurally deficient bridge on the Ohio River connecting Ironton, OH, and Russell, KY.

10:00 a.m. Break

KEYNOTE SESSION

Monday, June 11; 10:15 a.m.–12:15 p.m.

Room: Cherry Blossom Ballroom

Chair: Ronald D. Medlock, P.E., High Steel Structures, Lancaster, PA

The Keynote Session is the official start to the 2018 IBC! Conference Chair "Ronnie" Medlock will host the session. Following welcoming remarks, we are pleased to announce the following presenters:

- John W. Fisher, M.S., Ph.D., Professor Emeritus of Civil Engineering and Director Emeritus of the ATLSS Engineering Research Center, Lehigh University, Bethlehem, PA
- Xigang Zhang, Vice President of China Highway & Transportation Society and Chief Engineer of China Communications construction company Ltd., Beijing, China
- James Whitty, Partner, D'Artagnan Consulting LLP, Portland, OR
- James Ray, Senior Advisor to the Secretary for Infrastructure, U.S. DOT, Washington, DC

IBC EXHIBIT HALL LUNCHEON

Monday, June 11; 12:15 noon–2:00 p.m.

Room: Prince George Exhibit Hall A

Following the conclusion of the Keynote Session, all registered attendees of the IBC are welcomed to enjoy lunch throughout the Exhibit Hall. Enjoy this first opportunity to visit with the exhibitors and network with your fellow attendees.

FEATURED COUNTRY SESSION

Monday, June 11; 2:00–6:00pm

Room: Cherry Blossom Ballroom

Chair: M. Myint Lwin, P.E., S.E., Consultant, Olympia, WA

The People's Republic of China is recognized as the "Featured Country" of the 2018 International Bridge Conference®. This session will feature several presenters on topics, as follows:

2:00 p.m.

Opening Remarks

Xigang Zhang, Vice President of China Highway & Transportation Society and Chief Engineer of China Communications construction company, Ltd., Beijing, China and M. Myint Lwin, P.E., S.E., Consultant, Olympia, WA

2:10 p.m.

New Development of Long Span Composite Structure Bridges in China

Mr. Bin Cui, General Manager's Assistant, CCCC Highway Consultants Co., Ltd., Beijing, China

2:35 p.m.

Recent Developments of High-speed Railway Bridges in China

Dr. Gongyi Xu, Deputy Chief Engineer, China Railway Major Bridge Reconnaissance & Design Institute Co., Ltd., Beijing, China

3:00 p.m.

Technology Development of Long Span Concrete-filled Steel Tube Arch Bridges in China

Mr. Tingmin Mou, Chief Engineer , Sichuan Provincial Transport Department Highway Planning, Survey, Design and Research Institute, China

3:25 p.m.

Highway Bridges National Engineering Research Centre

Mr. Gao Liu, Deputy Director, Chief Expert, CCCC Highway Bridges National Engineering Research Centre Co., Ltd., Beijing, China

3:50 p.m. Break

4:05 p.m.

Technology Innovation of Second Wuhu Yangtze River Bridge

Mr. Zuqiao Ma, Deputy Chief Engineer, Anhui Transportation Holding Group Co., Ltd., China

4:30 p.m.

Technology Innovation of Beipanjiang First Bridge

Mr. Ping Zhou, Deputy Chief Engineer, Guizhou Expressway Group Co., Ltd., China

4:55 p.m.

Technology Innovation of Guizhou Yachi River Mega Bridge

Mr. Yuancheng Peng, Deputy Chief Engineer, CCCC Second Highway Consultant Co. Ltd., Beijing, China

5:20 p.m.

Open Discussion

PROPRIETARY SESSION

Monday, June 11; 2:00–5:00 p.m.

Room: Woodrow A

Chair: W. Jay Rohleder Jr., P.E., S.E., FIGG, West Chester, PA

Listen to innovative strategies owners are using to stretch limited infrastructure funding that generates longer life for existing and new bridge assets. These presentations include accelerated installation of precast arch bridges in New York for the Long Island Railroad, FRP retrofit for Interstate bridges in Arizona, Suspension bridge de-humidification and cable protective wraps in China and a creative method for installing press-in foundation piles at sites in Ohio and Japan with low overhead construction clearances.

2:00 p.m.

IBC 18-9: Replacement of Colonial Road Bridge with a Precast Concrete Arch

Philip Creamer, P.E. and Jim Riseborough, Contech Engineered Solutions, West Chester, OH; Adam Schmit, Railroad Construction Company, Paterson, NJ

This complex Design/Build project incorporated innovative engineering, advanced precast concrete fabrication methods, and Accelerated Bridge Construction to successfully deliver an on-time and on-budget project to Long Island Railroad. The chosen design and construction methods allowed for fewer than allotted weekend shutdowns minimizing disruption to the public. The $25M Colonial Road Improvement Project included the replacement of a 115 year-old structurally deficient bridge, improved drainage at the track level and the extension of the existing pocket track.

2:30 p.m.

IBC 18-10: Arizona DOT Uses CFRP for Bridge Repair, Restoration to Capacity

Mo Ehsani, P.E., Ph.D., S.E., and Tadd Johnson, QuakeWrap, Inc., Tucson, AZ; William Downes, Arizona DOT, Phoenix, AZ

Learn how Carbon Fiber Reinforced Polymer is used to reduce costs and lessen repair times with minimal service interruption for high profile bridge retrofit projects. Recently, the Arizona Department of Transportation (ADOT) used an engineered CFRP design and materials to retrofit the 19th St. and Jefferson St. bridges at Interstate 17. The girders are now strengthened to their original capacity for a small fraction of the cost of replacement, saving ADOT critical resources for other projects.

3:00 p.m.

IBC 18-11: Study on the Corrosion Protection System of Cable in Suspension Bridge

Qinglian Guo, Li Zhentao, and Wang Jing, Zhenjiang Lanbo Technology Inc., Zhenjiang, Jiangsu Province China

The protection of cable has a great influence on the life of bridge. In this paper, to improve the service life of cable and reduce the rate of corrosion, the main materials of cable, the corrosion factors and the main protection system in the service process are discussed and addressed.

3:30 p.m. Break

4:00 p.m.

IBC 18-12: Case Studies on Emergency Bridge Foundation Repair with Pressed-in Piles

Takefumi Takuma, Giken America Corp., Orlando, FL; Takayuki Sakai, Zefiro Corp., Torrance, CA

This paper will highlight two case studies on emergency repair of bridge pier foundations which utilized the Press-in piling method. The projects constructed cofferdams in a low headroom situation with sheet piles and pipe piles to surround the damaged bridge pier foundations in hard gravel-and boulder-mixed soil. Conventional pile driving such as diesel and vibratory hammer methods would have required additional time-consuming and costly auxiliary methods to mitigate the difficult site conditions.

4:30 p.m.

IBC 18-13: Automated & Semi-Automated Drone Inspection of the Delaware Memorial Bridge

David Day, Keystone Aerial Surveys, Philadelphia, PA; Shekhar Scindia, Delaware River & Bay Authority, New Castle, DE

Interested in the possibilities of automation, the Delaware River and Bay Authority (DRBA) contracted WSP and KAS to perform testing on the South Span of the Delaware Memorial Bridge. The work revealed that automation with existing drone technologies is possible and is especially applicable for large structures. This presentation details the tools, methodologies, time spent, results, repeatability of measurements, GIS potential and lessons learned in the course of cable attachment and bearing inspection.

W-1: SPECIALIZED BRIDGE CONSTRUCTION TECHNIQUES: ERECTION, INTERIM CROSSINGS, PERFORMANCE

Monday, June 11; 1:00–5:00 p.m.

Room: Magnolia 1

Non-Standard Temporary Bridge Design

The objective of the workshop is to share project examples and techniques for developing custom temporary bridges with the incorporation of modular elements. The workshop will demonstrate the versatility of the Mabey Universal bridge system for complex geometry and roadway alignments. The workshop will focus on representative projects that highlight these techniques. The workshop will also address innovative ways to launch and erect these non-standard bridges.

Speaker: Douglas Brunot, P.E., S.E., Mabey, Inc., Elkridge, MD

Special Lifting Equipment - Full Span Construction & Deconstruction

Our objective is to educate Contractors, Designers, and Owners on the innovative new means and methods of handling full spans available today because of advances in equipment and engineering analysis.

Speaker: Delynn Burkhalter, Burkhalter Heavy Lift and Transport — Enerpac Burkhalter Rigging, Columbus, MS

Performance and Design of Pretensioned Bent Caps

This workshop will focus on the use of pretensioned bent caps that can be used in accelerated construction of bridge substructures and that provide enhanced performance over reinforced concrete bent caps by eliminating cracking. The workshop will highlight Texas DOT practice that has led to the use of pretensioned bent caps and a recently completed experimental research project. Experimental tests incorporated a modified connection designed for pretensioned bent caps. The results of the full-scale tests, including the use of interior voids for weight reduction, will be shared. Implications of the project findings on design of pretensioned bent caps will be highlighted, along with recommended design procedures. Design examples will highlight how pretensioned bent caps can be used to improve performance and economize substructure design and construction.

Speaker: Anna Birely, Texas A&M University, College Station, TX

W-2: INTRODUCTION TO STRUT-AND-TIE MODELING (STM) FOR CONCRETE STRUCTURES

Monday, June 11; 1:00–5:00 p.m.

Room: Magnolia 2

This will be an abbreviated version of the FHWA/NHI Course No. 130126, Strut-and-Tie Modeling (STM) for Concrete Structures. It covers the relevant issues related to strut-and-tie modeling in concrete bridge structures, including fundamentals, application in bridge design, design procedures, element-level considerations, and serviceability considerations. The course includes nine lessons based on Instructor Led Training (ILT). Information in this course about strut-and-tie modeling for concrete structures is based on the AASHTO LRFD Bridge Design Specifications, 8th Edition (referred to in this course as AASHTO LRFD). The normal course is one and one-half (1½) days in duration.

Speakers: Dr. Oguzhan (Ozzie) Bayrak, P.E., University of Texas; Scott D. Vannoy, P.E., Michael Baker International, Moon Township, PA

INTERNATIONAL ATTENDEES WELCOME RECEPTION

Monday, June 11; 5:00–6:00 p.m.

Room: Baltimore 1/2

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

Please join us for a special "hello" from members of the IBC Executive Committee...open to all international guests!

IBC EXHIBIT HALL RECEPTION

Monday, June 11; 5:00–7:00 p.m.

Room: Prince George Exhibit Hall A

CABLE STAY/LONG SPAN

Tuesday, June 12; 8:00 a.m.–12:00 Noon

Room: Baltimore 3/4/5

Chair: Brian M. Kozy, Ph.D., P.E., FHWA Office of Bridges and Structures, Washington, D.C.

Long-span bridges present unique engineering challenges in design and construction. These iconic structures push boundaries, advance the tools and techniques, and inspire the bridge practice to innovate and "think big." This session will cover a number of recently completed cable supported bridge projects in China and the US, and also provide information on live loads and aerodynamic performance of long-span structures. A project involving redecking of a long-span arch bridge is also covered.

8:00 a.m.

IBC 18-14: The Design of Yangsigang Yangtze River Bridge

Gongyi Xu, Zhang Chengdong, and Tian Daoming, BRDI of China Railway, Wuhan, Hubei, China; Bin Zhu, Wuhan City Investment Corporation, Wuhan, Hubei, China; Xinghua Li, MBEC of China Railway, Wuhan, Hubei, China

The Yangsigang Yangtze River Bridge is a mega suspension bridge with a main span of 1700m and designed with double decks for 12 lanes. The stiffening girder is the Warren truss and orthotropic plate combined structure connected all welded. The wires for the main cable are large-diameter with 6.2mm and super high-strength with 1960 MPa. The foundations for the towers are the round-end caissons while the foundations for the anchorage are the round diaphragm walls.

8:30 a.m.

IBC 18-15: Reliability-Based Live Load Models for Long Span Bridges

Eddie He, Todd Ude, and Martin Furrer, Parsons, Chicago, IL; Zaher Yousif, Windsor Detroit Bridge Authority, Windsor, ON, Canada; Matt Chynoweth, Michigan DOT, Lansing, MI

The load and load factors in current North America bridge codes are calibrated for short to medium span bridges. It is understood that live load for long span bridges is different than that for short to medium spans. This paper discusses the load study for the Gordie Howe International Bridge between Canada and with a span in excess of 800 m, using reliability-based approach with weight-in-motion data from both countries.

9:00 a.m.

IBC 18-16: CSVT River Bridge – Steel Superstructure Design and Optimization

Jarid Antonio, P.E., Ryan Jenkins, Ph.D., Craig Broadbent, P.E., and Ahmad Ahmadi, Ph.D., P.E., SAI Consulting Engineers, Inc., Pittsburgh, PA

The CSVT River Bridge in Pennsylvania is a six-lane, 15-span, 7/8-mile-long, multi-girder structure comprised of three independent units. Three-dimensional modeling was performed, including all superstructure elements, using extensive loading scenarios under final and temporary conditions and partial-width redecking. Design optimization included consideration of potential girder arrangements, variable hybrid girders, efficient lateral

wind bracing, and a consistent design process for diaphragms. Optimization and expediency were further achieved using consistent detailing and close coordination with the fabricator.

9:30 a.m. Break

10:00 a.m.

IBC 18-17: Study On The Load Decrease Measures Of Six Tracks Railway Bridge

Ai Zongliang and Yan Yong, China Railway Eryuan Engineering Group Co. LTD, Chengdu, Sichuan, China

The New Bai ShaTuo Six Lines Changjiang River Bridge of Chongqing-Guiyang Railway is six lines railway bridge. On the upper bridge deck, 6cm thickness epoxy asphalt concrete flexible waterproof layer system was selected to provide a lighter selfweight; The longitudinal and transverse beam system was adopt on the lower deck, the concrete slab was a part of the composite girder, and also used as the ballast tank; On the others parts of the deck, The other dead Load Decrease Measures was considered such as the ge of steel ballast wall, steel cable slot and cancelling the protection layer on the outside deck of the ballast wall. Through the load decrease measures, the dead load of New Bai Sha Tuo Changjiang River Bridge is reduced from 107t/m to 97.5t/m, which saved engineering investment and gained impressive economic benefits.

10:30 a.m.

IBC 18-18: The First Major Cable-Stayed Bridge in New York City

Hans Hutton, P.E., S.E., HNTB, Kansas City, MO

HNTB was the engineer of record on the Skanska-Kiewit-ECCO III design-build team responsible for the final design of the first major cable-stayed bridge in New York City. This project featured a two span, 1000-ft, asymmetric cable-stayed unit over the navigable waterway Newtown Creek just off the East River. Significant challenges to this project included a highly constrained urban location, avoidance of aeroelastic instability, demanding design criteria and an aggressive schedule.

11:00 a.m.

IBC 18-19: Redecking of Minnesota DOT's Smith Avenue Bridge (High Bridge), a Multi-Span Tied Steel Arch

Jonathan Eberle, Soham Mukherjee, and Wagdy Wassef, AECOM, Mechanicsburg, PA; Kevin Anderson, AECOM, Minneapolis, MN; Paul Kettleson, Minnesota DOT, Oakdale, MN

Deck replacement of the High Bridge, a long span continuous tied steel arch bridge, was planned as part of a rehabilitation project. The replacement required sequential de-tensioning and re-tensioning of the post tensioned ties to prevent overstressing the arch ribs when the deck is removed. This paper discusses the developed sequence highlighting the point that although not typically anticipated, re-decking of a complex bridge can actually present a critical loading condition.

11:30 a.m.

IBC 18-20: Numerical Simulation of Wave Loads on Sea-Crossing Bridge Cofferdam During Typhoons

Bo Xu, Kai Wei, Zilong Ti, Department of Bridge Engineering, Southwest Jiaotong University, Chengdu, Sichuan, China; Shunquan Qin, China Railway Major Bridge Reconnaissance & Design Institute Co., Ltd., Wuhan, Hubei, China

A numerical calculation method of wave loads on the construction cofferdam for sea-crossing bridge was developed and given in this case study. A boxed cofferdam used for construction of piers of Pingtan Strait Bridge located at Fujian in China was taken as the example. The wave conditions and the wave forces acted on the outer wall of the cofferdam were measured during Typhoon Meranti to verify the numerical approach. It can be concluded through the comparison among numerical, experimental and theoretical results that, the results of the developed method agree well with both measured and theoretical results.

INNOVATIVE CONTRACTING

Tuesday, June 12; 8:00 a.m.–12:00 Noon

Room: Annapolis 1/2/3

Chair: Kevin Duris, P.E., Trumbull Corporation, Pittsburgh, PA

Learn the success of innovating contracting. Project delivery included design-build procurement as it provides cost reduction, quality, constructability, innovative approaches, and increased speed of project delivery. Also included is the use of design-build ABC techniques. P-3 was also used that included Design-Build-Finance-Operate-Maintain (DBFOM). Another project delivery used is CMGC (Construction Manager, General Contractor). Also discussed is public-private partnerships funding. Projects consist of new, reconstructed bridges and the sustainable use of existing infrastructure.

8:00 a.m.

IBC 18-21: Queensferry Crossing - quality and value in design-build

Matthew Carter, Arup, New York, NY; Richard Hornby, Arup, Leeds, United Kingdom; Naeem Hussain, Arup, Kowloon Tong, Hong Kong, China; Iain Murray, Jacobs, Edinburgh, United Kingdom

The Queensferry Crossing in Scotland was recently opened at an outturn cost of $1.8Bn, compared to the original forecast of $4.4Bn. The 1.6 mile long cable stayed bridge, with back to back main spans of 2,130ft each, is highly acclaimed as being of outstanding quality and will stand alongside two historic bridges. Key decisions in the procurement, including up-front investment by the owner, led to price certainty, value for money and high quality architecture.

8:30 a.m.

IBC 18-22: Bonner Bridge - Innovation, Economy, Durability in a Challenging Environment

Domenic Coletti, P.E., Elizabeth Howey, LG, P.E., and John Jamison, AICP, HDR, Raleigh, NC; R. Dominick Amico, P.E., HDR, Charlotte, NC; Nicholas Burdette, P.E., HDR, Pittsburgh, PA; Phil Dompe, P.E., INTERA, Inc., St. Augustine, FL; Mohit Garg, P.E., HDR, Tampa, FL

The design-build replacement of the Herbert C. Bonner Bridge, which carries NC Highway 12 over Oregon Inlet, required a 100-year service life, design for up to 84′ of scour, and minimal environmental impacts. The associated design and construction challenges provided opportunities for innovation and creativity. The resulting 2.8 mile long bridge features extensive use of precast concrete for quality, durability, economy, and constructability, a first-of-its-kind driven pile foundation verification method, and innovative, environmentally-sensitive construction approaches.

9:00 a.m.

IBC 18-23: Design-Build Rehabilitation of Route 8 in Connecticut using ABC

Michael Abrahams, P.E., WSP, New York, NY; Benjamin Szymanski, P.E., WSP, Glastonbury, CT

The Route 8 Project utilized accelerated bridge construction on Connecticut DOT's first design-build project, which consisted of replacing four bridge superstructures, new retaining walls, bin wall reconstruction, intersection improvements and paving 8 lanes. The scope focused on installing precast skewed steel bridge superstructures in two fourteen-day closure periods, making geometry control a challenge. The FHWA's 'Every Day Counts' Initiatives including design-build procurement method, alternative technical concepts, prefabricated bridge elements, and accelerated bridge construction, were used.

9:30 a.m. Break

10:00 a.m.

IBC 18-24: Texas State Highway 288 Toll Lanes P3 Project

William Amrhein, P.E., S.E., DBIA, and Sam King, Stantec, Lexington, KY; Elizabeth Gilbert, P.E., Stantec, Houston, TX; Lucas Kau, Annus Ahmed, and Karthik Ramanathan, Stantec, Dallas, TX; Bradley Shuey, Huitt-Zollars, Austin, TX; Christian Wiederholz, Stantec, New York, NY

Major, complex limited-access $850M reconstruction project in Houston, Texas containing three multi-level interchanges, 41 miles of tolled lanes, and 53 bridges. Project focus on accelerated bridge construction via: maximized use of standardized design groupings/details, monoshaft foundations, and precast concrete elements (beams, caps, and deck panels); and creative shoring tower placement for steel girder erection. Other features: post-tensioned pier-caps/columns; telescoping columns; hollow tall columns; sharply-curved, structural steel I-girder bridges; and overcoming challenging multi-discipline constraints.

Tuesday
SESSIONS

10:30 a.m.

IBC 18-25: Bridge and Viaduct Construction for a New Transit Corridor in San Diego

Nathan Johnson and Ebrahim Amiri, WSP, San Diego, CA; Pooya Haddadi and Jim Liao, WSP, Orange, CA

The Mid-Coast Corridor Transit Project, in San Diego, California will extend light-rail service from downtown San Diego to the UC San Diego community, eleven miles to the north. The $2.2B project includes adjacent structure-centered projects, 12 bridge and viaduct structures, five aerial station structures, several unique wall structures, and geo-structural improvement below the track. It is being constructed using a CMGC approach, encompassing four other major structure-centered projects. Construction is underway and began in 2016.

11:00 a.m.

IBC 18-26: The Benefits and Drawbacks of Public Private Partnerships

Howard Swanson, P.E., S.E., Norfolk Southern Corporation, Atlanta, GA

Public-Private partnership offer benefits and drawbacks in terms of cost, time and environmental permitting for a private firm. Criteria to consider by Private Firms before entering into a public-private partnership will be examined. Norfolk Southern Railroad participated in a public-private partnership to replace its bridge over the Genesee River at Portageville, New York. The Public-Private partnership included a number of conditions that had both positive and negative consequences on the project.

11:30 a.m.

IBC 18-27: CMGC

Michael Culmo, CME Engineering, East Hartford, CT

Use of CMGC to facilitate bridge project innovations in a variety of areas, including accelerated bridge construction, new construction technologies and practices, and improved project delivery, such as information modeling for bridges.

DESIGN/ANALYSIS, PART 1

Tuesday, June 12; 8:00 a.m.–12:00 Noon
Room: Woodrow A
Chair: Shane R. Beabes, P.E., AECOM, Wilmington, DE

There is nothing simple when it comes to these bridges. Come learn about visually striking and innovatively constructed bridges from across the country – from bascule spans and spliced-girder designs to inclined arch spans and network tied arches floated into place, to asymmetric cable stayed spans. The session is a testimony to pushing conventional design and leveraging innovation.

8:00 a.m.

IBC 18-28: The New Johnson Street Bridge - A Unique Bridge in a Unique Project

Keith Griesing, P.E. and Brian Mileo, P.E., Hardesty & Hanover, New York, NY

The new Johnson Street Bridge was developed to be visually striking and maintain the character of the existing iconic and beloved "Blue Bridge", a critical link to the business center of Victoria Canada. The new bridge employs a unique span support and operating machinery systems, and with a new iconic design will have a legacy all its own. The uniqueness of design was combined with a specially developed project delivery model. This paper will discuss the design features of this new structure and summarize the project procurement, and construction process.

8:30 a.m.

IBC 18-29: Flying Over Vegas; Project Neon HOV Flyover

Daniel Baker, P.E. and William Johnson, HDR, Inc., Boise, ID; Craig Smart, P.E. and Nick Eggen, EIT, HDR, Las Vegas, NV

Included in the 600 million dollar Neon Design-Build project, the HOV Connector Bridge comes in at 18 spans for a total length of 2,600 feet. The bridge design capitalized on conventional design elements which were optimized and combined in a way that leveraged individual efficiencies to produce an efficient system design. These included use of precast wide flange girders, partial depth precast deck panels, grade 75 reinforcement, large diameter drilled shafts, and post-tensioned substructure elements.

9:00 a.m.

IBC 18-30: Replacement of the Rockingham Bridges Using Precast Spliced Girders

Chester Werts, P.E., S.E. HDR, Olympia, WA

HDR partnered with contractor Reed & Reed to develop dual four-span continuous, post-tensioned precast spliced girder bridges to replace the Rockingham Bridges 24N and 24S in Vermont. Each bridge will be approximately 860 feet long with a maximum span length of 245 feet. Upon project completion in late 2019, these will be the longest spliced girder bridges in New England. This presentation will cover structural design constraints, construction challenges and innovations on these unique structures.

9:30 a.m. Break

10:00 a.m.

IBC 18-31: Broadway Bridge Tied Arches

Natalie McCombs, P.E., S.E. and Sarah Larson, P.E., HNTB, Kansas City, MO; Rick Ellis, P.E., Arkansas DOT, Little Rock, AK

Arkansas Department of Transportation has replaced the Broadway bridge over the Arkansas River along the existing alignment in downtown Little Rock, Arkansas. The bridge was closed to traffic for 5 months, one month less than anticipated, to allow construction of the approach spans and to float the new arches into place. This presentation will discuss the design considerations of the two basket-handled 440 foot tied network arch bridges over the Arkansas River.

10:30 a.m.

IBC 18-32: From Contracting to Construction: The Cumberland Flyover Project Reflective

Johann Aakre, P.E., S.E., Irsilia Colletti, P.E., and Mary Lou Kutska, P.E., S.E. HNTB, Chicago, IL;

Exceeding 850' in length with a 656' horizontal radius and four continuous steel girder spans built in stages, the Cumberland Flyover proved to be a worthy structural design challenge. The curved and super elevated superstructure required close attention to cross frame design and unbalanced wheel loading from centrifugal effects. When complete in late 2018, the Cumberland flyover will alleviate congestion near Chicago's busiest airport and will benefit multiple agencies.

11:00 a.m.

IBC 18-33: 41st Street Steel Arch Pedestrian Bridge – Chicago, IL

Dipal Vimawala and Jixing He, AECOM, Chicago, IL; Daniel Burke, Chicago DOT, Chicago, IL

The pedestrian bridge spanning over Lake Shore Drive & several Railroads, is comprised of 240' long twin inclined arch spans supporting a 20' wide curved concrete deck. Both arches are inclined in opposite directions to create an elegant "S" curve. The Project possesses many challenges such as, shipping and erection over extremely active RR tracks (263 daily trains), a major highway and need for a temporary bridge to allow erection of main spans.

11:30 a.m.

IBC 18-34: Cable-Stayed Bridge Anchor Box Design using Mixed Material Modeling

Samantha Kevern, P.E., S.E. and Hans Hutton, P.E., S.E., HNTB Corporation, Kansas City, MO

The new Kosciuszko Bridge in New York City is an asymmetric cable stayed bridge. Asymmetric spans resulted in large unbalanced horizontal loads in the pylon. A 3D finite element model (FEM) using mixed material models was created for each anchor box to analyze the load transfer between the box and the pylon. This presentation explains how mixed material modeling was used to analyze the load transfer between the steel anchor boxes and the concrete pylon.

ACCELERATED BRIDGE CONSTRUCTION, PART 1

Tuesday, June 12; 8:00 a.m.–12:00 Noon

Room: Woodrow B/C/D

Chair: Matthew A. Bunner, P.E., HDR, Inc., Weirton, WV

As described by the FHWA, "ABC is bridge construction that uses innovative planning, design, materials and construction methods in a safe and cost-effective manner to reduce onsite construction time." One of the most obvious reasons to employ ABC is to minimize traffic impacts and thereby improve safety for the travelling public. All of the projects in this session are excellent examples of the use of ABC for this purpose. These success stories describe how relief was provided to thousands who use these structures which are a part of major thoroughfares and critical links in our transportation system.

8:00 a.m.

IBC 18-35: Accelerated Superstructure Replacement for the Hoboken Viaduct

Thomas Zink and Edgar Restrepo, P.E., Gannett Fleming, Inc., Marlton, NJ

This project was initiated by the New Jersey Department of Transportation to rehabilitate the aging Hoboken Viaduct in Jersey City, NJ. Located between the Pulaski Skyway and the Holland Tunnel, this 220-span, 3,200-foot-long viaduct was initially slated for a staged deck replacement. A Smart Solutions Study led to an ABC scheme that changed the scope to a full superstructure replacement project while saving $35 million in initial costs and reducing construction duration by 12 months.

8:30 a.m.

IBC 18-36: Pennsylvania Turnpike's First ABC Projects

Steve Sadofsky, P.E., STV Incorporated, Douglassville, PA; Theresa Davies and Jim Takacs, STV Incorporated, Lawrenceville, NJ

In 2017 STV provided CM/CI services to the PA Turnpike Commission for replacing 5 existing bridges utilizing ABC, which was their first time using this method. The September project replaced twin, 150' long, two-span bridge structures over Brush Creek on I-76 in Beaver County, PA. The October replacement project, located in Lehigh County replaced, a 60 year-old, three-span, 131' structure along the Northeast Extension (I-476) at Crackersport Road. Both were replaced in within 55 hours.

9:00 a.m.

IBC 18-37: I-70 over SR 121 Bridge Slide

Kevin Gorak, American Structurepoint Inc., Indianapolis, IN; Will Banik, Walsh Construction, Crown Point, IN

Accelerated Bridge Construction is becoming more prevalent in order to limit time that major roadways are closed. A bridge replacement that took only eight days on I-70, a major interstate in Indiana carrying 35,000 vehicles daily, will be discussed. Walsh Construction and American Structurepoint will explain construction methods used to demolish the existing bridge and slide the new bridge into place in a fast, cost-effective manner.

9:30 a.m. Break

10:00 a.m.

IBC 18-38: Modular Accelerated Deck Replacement & Rehabilitation of the 89 Year Old Liberty Bridge

Nick Burdette, P.E., HDR, Pittsburgh, PA; Jason Zang, P.E., Pennsylvania DOT District 11-0, Pittsburgh, PA

The Liberty Bridge is a 2,600' truss in downtown Pittsburgh, built in 1928. After 85 years of service, the bridge was in poor condition. Deck patch tests were performed to assess performance of possible overlay replacements. Following test patch evaluation, complete deck replacement using Exodermic grid deck panels was determined the best option. Modular precast construction with these panels limited traffic impacts while 170,000 SF of deck was successfully replaced in this $80M rehabilitation.

10:30 a.m.

IBC 18-39: The Decision Process in the Selection of Accelerated Bridge Construction Techniques for the Replacement of I-64 EB and WB Bridges over Route 156 in Virginia

Michael Murdock, P.E., and Daniel Davis, Prime AE, Richmond, VA; Jeffrey Hill, Virginia DOT, Colonial Heights, VA; Austin Clark, TranSystems, Richmond, VA

A detailed walk-through of the decision making process in selecting Accelerated Bridge Construction techniques for the replacement of I-64 EB and WB bridges over Route 156 in Virginia. Including discussions on cost and schedule analysis, construction methods, and non-standard detailing.

11:00 a.m.

IBC 18-41: Refined Load Ratings of Steel Curved Girder Bridges

"Leon" Lug-Yang Lai, Ph.D., P.E., S.E. and Brian LoCicero, Specialty Engineering, Inc., Bristol, PA; Din Abazi, P.E., PennDOT, King of Prussia, PA

Eleven (11) existing horizontally curved steel girder bridges and two (2) curve aligned bridges with steel kinked girders were analyzed for load ratings using 3-D refined analyses. The bridges contain complicated geometries, compound horizontal curves, variable roadway widths, and combined straight and curved girders in the same span. This paper discusses the modelling and rating complexities encountered when performing refined analyses of those bridges and provides useful guidelines for refined analyses/ratings of complex bridges.

W-3: MEETING FHWA MANDATES: BRIDGE INSPECTION, EVALUATION AND ASSET MANAGEMENT

Tuesday, June 12; 8:00 a.m.–12:00 Noon

Room: Magnolia 1

Back to Basics: An Introduction to Bridge Load Rating and Posting

Section 650.313 of the National Bridge Inspection Standards stipulates each bridge be load rated in accordance with the AASHTO Manual for Bridge Evaluation (MBE). Bridge load rating also serves as basis for making important bridge management and operational decisions. To meet the regulatory and operational needs and to ensure the safety of bridges and traveling public, States must maintain an effective and efficient bridge load rating program. The objective of this Workshop is to provide awareness to bridge engineers/load raters about the regulatory requirements, and the fundamentals of bridge load rating and posting.

Speaker: Gao, Lubin, FHWA, Washington, DC

Asset Management and BIM for Bridges

State DOTs are required to develop a risk-based asset management plan for the National Highway System (NHS) to improve or preserve the condition of the assets and the performance of the transportation system. Assets may be valued by different means. Depending on the accounting method used by, bridges may represent 20 to 45% of the transportation agency's assets. To manage their assets some DOT's have decided to do a "big plan" strategic plan approach. These include for example: the setting of strategic vision, gap assessments to best practices, and other measures of asset management organizational fitness. The results of these exercises can be voluminous. Other DOT's and transportation have put more focus on "small, focused plans", believing these to be more digestible and actionable. These states have often rather focused on actually "doing" transportation asset management. That is, typically through the setup and use of transportation asset management application software. These approaches looking ahead increasingly include BIM - or, BIM applied to bridges (BrIM). Three key advantages of this are: 1) most agencies are not able to best digest large strategic planning exercises, 2) agencies learn best by seeing and doing, and 3) the asset management implementation risk is reduced by using a proven vendor who brings a proven implementation methodology, a library of detioration curves and a track record of detailed implementation examples and project success. However, options for implementing bridge asset management have been fairly limited, until recently. This paper provides evaluation of: 1) the 'small plan' v 'big plan 'approach, 2) criteria for bridge management systems, and 3) an overview of the alternative bridge management software that is currently available.

Speaker: Simon Lewis, AECOM, Philadelphia, PA; Ed Zhou, P.E., Ph.D., AECOM, Germantown, MD

W-11: CHINA'S BRIDGE DEVELOPMENT AND OUTSTANDING OUTCOMES IN BRIDGE ENGINEERING

Tuesday, June 12; 8:00 a.m.–12:00 noon

Room: Cherry Blossom Ballroom

8:00a.m.

Technology Innovation of Zhangjiajie Grand Canyon Multifunction Heteromorphosis Suspension Bridge

Tianbao Wan, Deputy Chief Engineer, China Railway Major Bridge Reconnaissance & Design Institute Co., Ltd.

8:25 a.m.

China Bridge Construction Technology's Development and Perspective

Yongtao Zhang, Deputy Chief Engineer, CCCC Second Harbor Engineering Company Ltd., Beijing, China

8:50 a.m.

China Bridges' Safety Monitoring and Detection Technology's Development and Perspective

Hui Li, Professor, Harbin Institute of Technology

9:15 a.m.

Report on Development of China Bridges' Maintenance and Management Technology

Liangping Feng, Deputy Chief Engineer, CCCC Highway Consultants Co., Ltd., Beijing, China

10:00 a.m.

High Performance Materials' Development and Innovative Application for China Bridges

Jingquan Wang, Dean, School of Civil Engineering, Southeast University

10:25 a.m.

Some Recent Development in the Research of Bridge Vibration Reduction Technologies in China

Zhengxing Wang, Deputy General Manager, China Railway Bridge Science Research Institute, Ltd.

10:50 a.m.

Technology Innovation of Hong Kong-Zhuhai-Macao Bridge

Quanke Su, Chief Engineer, Hong Kong-Zhuhai-Macao Bridge Authority

11:15 a.m.

Representative Bridges in Hubei Province (as Main Bridge of Yichang Xiangxi Yangtze River Highway Bridge)

Jianhui Zhan, Chairman, Hubei Provincial Communications Planning and Design Institute

11:40 a.m.

Free Discussion

IBC EXHIBIT HALL LUNCHEON

Tuesday, June 12; 12:00 noon–2:00 p.m.

Room: Prince George Exhibit Hall A

EMERGENCY REPAIR TO THE DELAWARE RIVER TURNPIKE BRIDGE

Tuesday, June 12; 1:30–5:00 p.m.

Room: Baltimore 3/4/5

Co-Chairs: James L. Stump, P.E., Pennsylvania Turnpike Commission, Harrisburg, PA; William Wilson, New Jersey Turnpike Authority, Woodbridge, NJ

On January 20, 2017, a full-depth fracture was discovered in the top chord of the Delaware River Turnpike Bridge forcing the immediate closure of this critical river crossing connecting Pennsylvania Turnpike to the New Jersey Turnpike. The fracture occurred in the four-span continuous deck truss unit of this 6571' bridge. Both Turnpike Agencies, contractors and various consultants worked together in the procurement of services and materials to ensure these repairs were completed in a timely manner. This session will cover the many concurrent tasks associated with the repair to include material evaluation, non-destructive testing, 3D modeling and hands-on inspection.

1:30 p.m.

IBC 18-42: Delaware River Turnpike Bridge Fracture Repair

Richard Schaefer, P.E., Xin Li, and Martha Bogle, HNTB, Parsippany, NJ; Frank Corso, New Jersey Turnpike Authority, Woodbridge, NJ

On January 20, 2017, a total fracture was discovered in a deck truss bridge carrying I-276 over the Delaware River. This presentation details the investigation of the cause of the fracture and the design of the repair. The restoration of the truss was executed in only 48 days using a never before attempted method of vertically jacking the deformed truss to correct geometry and then horizontally post tensioning the broken chord back to original loading.

2:00 p.m.

IBC 18-43: Delaware River Bridge Emergency Repairs CM/CI

Francis Carroll, P.E., STV Inc., Lawrenceville, NJ

On January 20, 2017 a fractured truss member was discovered at the Delaware River Turnpike Bridge, leading to immediate closure of the bridge. Foundations and temporary jacking towers were constructed to vertically jack the displaced truss to its original configuration. Once vertically jacked, the fractured member was replaced and post -tensioned to obtain its original load. After the repairs were completed the bridge was live load tested and reopened to traffic on March 9, 2017.

2:30 p.m.

IBC 18-44: Emergency Structural Inspection and Laser Scanning to Assess Condition of Fractured Deck Truss

Gregory Johnson, P.E., Greenman Pedersen, Inc., Lebanon, NJ

On January 20, 2017, a fracture was identified in the top (tension) chord of the heaviest load carrying member on the Delaware River Bridge connecting the New Jersey and Pennsylvania Turnpikes requiring immediate 100% hands-on prioritized inspection of all deck truss spans. Three dimensional models were developed using data collected by laser survey scanning and were used in conjunction with structural modeling and inspection findings to assess damage and design/construct repairs.

3:00 p.m. Break

3:30 p.m.

IBC 18-45: Nondestructive Testing and Analysis of the PA / NJ Turnpike Connector Bridge

Francesco Russo, Ph.D., P.E., Michael Baker International, Philadelphia, PA

Following the fracture of a top chord in a continuous deck truss due to the presence of an unknown plug weld near a gusset plate connection, an emergency response program consisting of stabilization, repair, and partial replacement of the top chord was carried out. Additionally, several hundred other connections were examined using NDT to determine if the bridge could be safely returned to service following the repair. This paper discusses the NDT and material sampling program and its findings.

4:00 p.m.

IBC 18-46: Material Testing and Forensic Investigation of the Full-Depth Truss Chord Fracture in the Delaware River Turnpike Toll Bridge

Frank Artmont, Ph.D., Andrew Adams, Thomas Murphy, and Travis Hopper, Modejski and Masters, Mechanicsburg, PA; Robert Connor, Purdue University, West Lafayette, IN

In January 2017, a full-depth fracture was discovered in the top chord of the Delaware River Turnpike Toll Bridge. Material and forensic studies were performed to determine the cause of the failure and assess the bridge's ability to remain open following repairs. In this presentation, the results of these studies will be presented, the contributing factors that led to the fracture will be explored, and recommendations for addressing similar future failures will be discussed.

4:30 p.m.

IBC 18-47: Instrumentation and Load Testing for Delaware River Turnpike Bridge Emergency Repairs

David Rue, P.E., Andrew Foden, Ph.D., P.E., and Christopher Gentz, P.E., WSP, Inc., Lawrenceville, NJ; Zachary Van Brunt, WSP, Inc., Raleigh, NC

On January 20, 2017, a complete fracture of a top chord was discovered on the Delaware River Turnpike Bridge, which substantially altered the forces carried by the structural members. Structural monitoring and load testing was used throughout the emergency repair process to evaluate the restoration of the forces in the structure and its ability to safely carry traffic loads so that the structure could be re-opened to traffic in less than seven weeks.

RAIL/TRANSIT, PART 1

Tuesday, June 12; 1:30–5:00 p.m.

Room: Annapolis 1/2/3

Chair: Elliott D. Mandel, P.E., AECOM, Arlington, VA

This session highlights the latest knowledge and developing expertise for rail structures. Featured are a broad range of cutting edge topics for rail bridges that will interest owners, analysts, designers and constructors. Presentations include: emerging technologies for High Speed Rail consisting of dynamic analyses, new seismic isolation systems and aerodynamics. Also covered are railroad bridge design, fabrication, construction and inspection efforts. Projects span the globe, from China to California, New York and Maryland.

1:30 p.m.

IBC 18-48: Analysis and Design of a Complex Nonstandard Bridge for California High-Speed Rail Requirements

Ebadollah Honarvar, Ph.D., P.E., Arjuna Ranasinghe, Suhail Albhaisi, and Hadi Al-Khateeb, Jacobs, New York, NY

Analysis and design of an elevated deck slab structure, known as pergola, for high-speed rail (HSR) is a challenging task due to the complex superstructure system in combination with track-structure interaction (TSI) and seismic requirements. This paper presents findings of a systematic approach employed to successfully conclude various analyses and to satisfy stringent design requirements for a pergola structure used in the California HSR project using a detailed nonlinear finite-element model (FEM) of the bridge.

2:00 p.m.

IBC 18-50: High Speed Rail Bridge Design - Tule River Viaduct

Andrew Kimmle, Carlos Matos, John Finke, and Mike Cronin, Jacobs Engineering, St. Louis, MO

The California High Speed Rail Program is working towards a dedicated passenger route from L.A. to San Francisco. Near Corcoran, the Tule River Viaduct is a 3,500 foot concrete bridge designed to carry the 250 mph train over Poplar Ave., CA SR 43, BNSF, and the Tule River. Primary elements include post-tensioned box girders, straddle bents, and a pergola structure. Discussion includes design, modelling, rail structure interaction, seismic details, dynamic impact, and passenger comfort checks.

2:30 p.m.

IBC 18-49: Shaking Table Tests of an Innovative Steel Damping Bearing for Railway Bridges

Cong Liu, Ph.D., Ri Gao, Junqing Lei, Jiwang Zhan, Yanmei Cao, Meng Ma, Xiaojing Sun, Junqing Lei, and Wenliang Lu, Beijing Jiaotong University, Haidian, Beijing, China

To mitigate the seismic responses of the railway bridge, an innovative steel damping bearing, based on the conceptions of "function separation", is developed. A 1:7 scale railway bridge model was tested on the shaking table under 5 ground motions with different PGAs to evaluate the performance of the steel damping bearings. The test results reveal that the steel damping

bearing can mitigate the seismic responses of the bridge greatly without leading to large relative displacement.

3:00 p.m. Break

3:30 p.m.

IBC 18-51: Inspection and Construction Challenges of The New Portageville Railroad Bridge

Ray Momsen, Bureau Veritas North America, Inc., Pittsburgh, PA; Carmen Garozzo, Bergmann Associates, Buffalo, NY

The Portageville Bridge was a single track structure built in 1875. Due to speed restrictions and inability to carry modern rail car loadings of 286k a decision was made to replace the structure. The bridge was replaced by a 483 foot 2 hinged spandrel-braced arch bridge. Including approaches, total length is 963 feet. This paper will explore the structure fabrication and construction challenges which were found and their resolution during the replacement of the structure.

4:00 p.m.

IBC 18-52: Aerodynamic Characteristics of the High-speed Train Running on the Long Span Rail-cum-Road Bridge

Ming Wang, Xiao-Zhen Li, Ph.D., Hai-Qing Sha, and Jun Xiao, Southwest Jiaotong University, Chengdu, Sichuan, China

With the increased tendency for higher speed of the high-speed trains, aerodynamic environment around the train becomes a more essential factor than wheel-rail system. Truss bridge, as the main construct style of large span rail-cum-road bridge, has the complex wind environment, which can significantly affect train's aerodynamic characteristics. A three-dimensional CFD model is established with the train model moving. It focuses on interpreting the intermittent excitation effect of truss bridge on the train's aerodynamic characteristics.

4:30 p.m.

IBC 18-53: Challenges Associated with a Multitude of Design Constraints and Stakeholders

Gregor Fahrendorf, P.E., Stantec Consulting Services, Laurel, MD

This case study presents the challenges involving the design of a Bridge Replacement Project in Baltimore, MD. The existing concrete arch structure carries Edmondson Avenue over the CSX railroad, Gwynns Falls and a hiker/biker trail. The proposed bridge is designed as a shared use bridge to carry roadway and light rail traffic. The multitude of constraints and stakeholders include the historic nature of the existing bridge, staged construction, two railroads, wetlands, parklands, and numerous utilities.

INSPECTION/EVALUATION

Tuesday, June 12; 1:30–5:00 p.m.

Room: Woodrow A

Chair: Stephen G. Shanley, P.E., County of Allegheny Department of Public Works, Pittsburgh, PA

From Anchorage cracks on the Delaware Memorable Bridge to Fatigue cracking during construction on the New Port Viaduct, New Castle County in Delaware. This session also includes Automated Load Rating and Evaluation Tool (ALERT) to help simplify load rating on complex bridges and the inspection and load ratings of the LA 47 bridge over the Gulf Intercoastal Waterway, Orleans Parish, Louisiana. Rope access and unmanned aerial system (UAS) solutions will also be covered in a case study on the William H. Natcher Cable Stayed Bridge Inspection. We will wrap up this session with some of the fundamental process activities involved with shop fabrication processes, fabrication and challenges.

1:30 p.m.

IBC 18-54: Anchorage Crack Investigation for Delaware Memorial Bridge

Gregor Wollmann, Ph.D., HNTB, Blacksburg, VA; Shekhar Scindia and Brian Lutes, Delaware River and Bay Authority, New Castle, DE; Steven Richards, HNTB, Neward, NJ

The Delaware Memorial Bridge with its sister suspension bridges represents a vital traffic link carrying I 295 over the Delaware River. Due to concerns about the stability of diagonal cracks in the gravity concrete blocks anchoring the main suspension cables, an instrumentation program and anchorage assessment was initiated. This paper describes the findings of the instrumentation program, the analysis approach to verify stability of the anchorages, and repairs which were completed successfully during Summer 2017.

2:00 p.m.

IBC 18-55: Combined Access Systems — UAS, A Powerful Tool for Enhancing Rope Access to Improve Efficiency, Worker Safety

John Zuleger, P.E., and Jeffrey Sams, Michael Baker International, Louisville, KY

Michael Baker International performed a routine and fracture critical inspection of the William H. Natcher Bridge in May 2017. The cable-stayed structure was inspected utilizing a combined access solution of hands-on rope access techniques and UAS scanning. UAS detection capabilities were verified by inspectors rappelling a sample of cables. The UAS also increased safety by minimizing man-at-risk hours. The collaborative effort led to one new major deficiency finding along the length of a cable.

2:30 p.m.

IBC 18-56: Low-Cycle Fatigue Cracking of DelDOT BR 1-501: A Case Study

James Bellenoit, P.E., Daniel Radle, Jr., P.E., and Neil Shemo, P.E., AECOM Technical Services, Mechanicsburg, PA

Rehabilitation of the Newport Viaduct began in 2010 and complete in 2015. Various construction stages temporarily shifted traffic onto the outside shoulders during that period. In March 2015, fatigue cracks were discovered

in the diaphragms of the steel tub fascia girders at interior piers at the tops of internal plate diaphragms and external connection plates. Metallurgical examination indicated the cracks propagated at high growth rates indicative of high amplitude stress cycles. The cause was investigated.

3:00 p.m. Break

3:30 p.m.

IBC 18-57: Complex Bridge Load Rating: Automated Load Rating and Evaluation Tool (ALERT)

Jason Stith, Ph.D., P.E., S.E. and Chou-Yu Yong, P.E., S.E., ENV-SP, Michael Baker International, Louisville, KY; Parker Thompson, Michael Baker International, Chicago, IL

For the most complex bridges, such as cable-stayed and arches, commercially available load rating software cannot be used to directly rate the bridges. This presents a challenge when a bridge rating needs to be updated due to section loss overload permitting. Michael Baker International has developed an Automated Load Evaluation & Rating Tool (ALERT) which is Excel-based proprietary software that integrates the live load analysis with specification checking, and subsequently provides the load rating.

4:00 p.m.

IBC 18-58: Load Rating of the LA 47 Bridge over Gulf Intracoastal Waterway

Durk Krone, John Richard, P.E., and Dong Wang, Ph.D., TRC Engineers Inc., Baton Rouge, LA; William Metcalf, Jr., P.E., Louisiana DOT, Baton Rouge, LA; Xianzhi "Sage" Liu, P.E., TRC Engineers Inc., Austin, TX

The LA 47 Bridge over the Gulf Intracoastal Waterway is located in the eastern portion of Orleans Parish, Louisiana. The bridge extends an overall length of 6,622 feet, with 69 spans. The three main spans consist of an anchored-cantilever and tied-arch suspended truss. TRC conducted a load rating that was validated by FEM modeling of framing complexities associated with the tied arch, including other structural segments, of the bridge to certify the final BrR models.

4:30 p.m.

IBC 18-59: Steel Fabrication For Bridge Construction - A Primer for the Technical Professionals

Richard Bogovich, P.E., Bureau Veritas North America Inc, Pittsburgh, PA

Fabrication of structural steel requires various technical professionals. This paper will provide an overview of fundamental process activities and examples of challenges encountered requiring involvement of these professionals, including a fabrication process life cycle, the role of Quality Control and Quality Assurance, and implications of the QA/QC strategy selected by the owners. Manufacturing processes will be reviewed and examples of issues and problems that have complicated the fabrication process that could have been prevented.

INNOVATION

Tuesday, June 12; 1:30–5:00 p.m.

Room: Woodrow B/C/D

Chair: Gary Runco, P.E., Virginia Department of Transportation, Fairfax, VA

This session on Innovation is a collection of varied subjects from historic rehabilitations to new seismic isolation utilizing new dissipation devices. Also included is as study on cost effective design-build for a major cable stayed bridge and the use of 3D modeling and visualization. Whether assessing old bridges, or developing and presenting concepts for new bridges, this session has a little something for everyone.

1:30 p.m.

IBC 18-60: Dehumidification Breathes New Life into the Suspension Cables on the Delaware Memorial Bridges

Joshua Pudleiner and Barry Colford, BSc, C.Eng, FICE, AECOM, Philadelphia, PA; Shane R. Beabes, P.E., AECOM, Wilmington, DE; Shekhar Scindia and Shoukry Elnahal, P.E., Delaware River and Bay Authority, New Castle, DE

The dehumidification of the main cables of the twin suspension bridges of the Delaware Memorial Bridge involves injecting dry air into the cables to remove water and sustain relative humidity below a threshold where corrosion ceases. The project is a complex blend of structural, mechanical, electrical and controls engineering. It is only the second of its kind in the US and will extend the service life of these critical elements of the bridges.

2:00 p.m.

IBC 18-61: Smithland Bridge - Virtual Navigation Modeling Drives Design

Tony Hunley, P.E., Ph.D., S.E., and Taylor Perkins, Stantec Consulting Services Inc., Lexington, KY; Chris Kuntz, Kentucky Transportation Cabinet, Paducah, KY

The US 60 Bridge at Smithland KY crosses a serpentine S-curved stretch of the Cumberland River. Early in the project, an innovative approach to addressing navigation industry impacts and expediting the Coast Guard approval process saved significant project re-design time and costs. Navigation modeling performed by experienced barge captains using realistic 3-D virtual environment simulation methods were utilized. The resulting span length requirement and pier placement impacts to navigation were surprising.

2:30 p.m.

IBC 18-62: Fatigue Behavior and Field Performance of Press-Brake-Formed Steel Tub Girder Superstructures

Karl Barth, Ph.D., West Virginia University, Morgantown, WV; Greg Michaelson, Ph.D., Marshall University, Huntington, WV

This paper and presentation are focused on the assessment of modular shallow trapezoidal boxes fabricated from cold-bent structural steel plate using standard mill plate widths and thicknesses. A technical working group within the Steel Market Development Institute's Short Span Steel Bridge Alliance (SSSBA), led by the current authors, was charged with the development of this concept. Previous research efforts have focused on characterizing the system's flexural bending capacity. This paper will provide an overview of

experimental investigations into the system's fatigue performance as well as a discussion of two field implementations, each with unique deck options.

3:00 p.m. Break

3:30 p.m.

IBC 18-63: Shear and Flexural Strengthening of Reinforced Concrete Bridges Using Titanium Alloy Bars

Christopher Higgins, Ph.D., P.E., Oregon State University, Corvallis, OR

Titanium alloy bars (TiABs) were developed to strengthen deficient reinforced concrete (RC) bridges. TiABs provide high strength, ductility, durability, and the ability to fabricate mechanical anchorages at the ends. Laboratory experiments on full-size RC bridge girders with TiABs, in both shear and flexural failure modes, showed increased strength, significant visual distress prior to failure, nonductile failure modes shifted to ductile modes, and design approaches conservatively predicted strength using the TiABs yield strength.

4:00 p.m.

IBC 18-64: Investigation into the Behavior of an Open Web Steel Joist Bridge

Zahra Andalib and William Collins, The University of Kansas, Lawrence, KS; Piero Caputo, Sattar Dorafshan, and Marc Maguire, Utah State University, Logan, UT

Open web steel joists (OWSJ) are lighter than comparable rolled steel shapes, allowing for faster and less costly construction, as well as reduction in material cost. There is currently a lack of understanding in shear behavior, composite action, and live load distribution for OWSJ bridge systems. This study includes FE modeling as well as field testing measuring service strains and deflections. Finally, a cost analysis will compare bridges fabricated with OWSJ to the other systems

4:30 p.m.

IBC 18-65: AASHTO T-19 Subcommittee Update on BIM for Bridges and Structures

Jason Hastings, M.C.E., P.E., Delaware DOT, Dover, DE

This presentation will provide an update on recent activities of the AASHTO T-19 Subcommittee on Software. The primary focus of T-19 is to move forward Building Information Models (BIM) for Bridges and Structures. The overview will include recent activities completed and the path forward and will highlight work with the associated pooled fund study and pilot projects in progress.

W-4: FRP COMPOSITE BRIDGE MATERIALS: DESIGN, BUILD, STRENGTHEN

Tuesday, June 12; 1:00 –5:00 p.m.
Room: Magnolia 1

1:00 – 4:30 p.m.

Part I: Using FRP Composites to Design, Build and Strengthen Bridges for a More Resilient Infrastructure

Presented by: American Composites Manufacturers Association

FRP composites are a proven innovative and durable material that has been used in over 500 bridges in North America for over 20 years. Composites are faster to install and require minimal disruption while in service to extend the service life of bridge structures. Composites features such as lightweight and prefabrication have reduced assembly and installation time resulting in lower installation costs and delivery for new construction. Standards and specification development provide civil/structural engineers with much needed tools to design and specify with composites. However, it is becoming very important to build bridge structures that are more resilient to natural and man-made disasters. Attendees will learn about:

1. Changes to the AASHTO bridge design specifications for GFRP rebar
2. Recent advancements in the delivery of FRP composites infrastructure by Florida DOT and their strategy for adoption of uniform standards
3. Design and construction of lightweight bridge wind fairings
4. Using FRP composite systems to rehabilitate critical bridge structures
5. Highlighting projects where FRP systems have been used to provide resiliency on bridges, allowing them to recover rapidly from disruptive events.

Speakers: Scott Reeve, Composite Advantage, Dayton, OH; Steven Nolan, Florida DOT, Tallahassee, FL; Mo Ehsani, Quakewrap Inc., Tucson, AZ; Gangarao Hota, P.E., and Ray Liang, Ph.D., West Virginia University, Morgantown, WV

4:30 – 5:00 p.m.

Part II: Eliminating Corrosion in Small to Medium Road Bridges with Composite Materials

Presented by: Wagners Composite Fibre Technologies

Between 2005 to 2010 Wagners CFT Manufacturing supplied five bridge superstructures into the USA Road Network. This Work Shop will open up discussions an investigate those and other installations, in the USA and Australia covering the in-field performance of these Innovative bridges over the thirteen year period since the first installation. These bridges are constructed using corrosion resistant materials to offer long maintenance free lives, with principal structural elements made from Fibre Composites. In addition the Work Shop will seek to summarize the current state of the art of Composite Fibre Bridge Construction in Australia and conclude with lessons observed and documented over a 15 year period in the design, development and implementation of Fibre Composite Road Bridges.

Speakers: Michael Kemp, Wagners Composite Fibre Technologies, Wellcamp, Queensland, Australia

Tuesday
SESSIONS

IBC BOAT TOUR

Tuesday, June 12; 1:00–5:00 p.m.

ALL ABOARD! The IBC presents a unique opportunity to set sail aboard the Miss Malory of the Potomac Boat Company. Join us to see many of the bridges over the Potomac River and Anacostia River, as well as, other local attractions, with commentary by local experts from DDOT. A separate ticket is required, and advance reservations can be made (space permitting) at the IBC Registration Desk. Check with the IBC staff should you have any questions. Some limitations apply.

IBC AWARDS DINNER

Tuesday, June 12; 5:30 –7:30 p.m.

Room: Cherry Blossom Ballroom

Host: Thomas G. Leech, P.E., S.E., Gannett Fleming, Inc., Pittsburgh, PA

Each year the IBC Executive Committee recognizes excellence in bridge design and engineering through the IBC Awards Program. This special dinner is held to honor those selected for the 2018 awards. Advance reservations are required for this ticketed dinner – please check with the IBC Registration Desk for availability.

IBC EXHIBIT HALL BREAKFAST

Wednesday, June 13; 7:30 a.m.–9:00 a.m.

Room: Prince George Exhibit Hall A

Start your Wednesday off right with a visit to the IBC Exhibit Hall for our continental breakfast and coffee break! Open to all attendees! Wednesday morning sessions start at 9:00 a.m., giving all attendees an early opportunity to visit the Exhibit Hall.

PRESERVATION, PART 1

Wednesday, June 13; 9:00 a.m.–12:00 Noon

Room: Baltimore 3/4/5

Chair: M. Myint Lwin, P.E., S.E., Consultant, Olympia, WA

Bridge owners and engineers from around the world are facing an aging bridge population and shortage of funds for bridge replacement. An effective bridge preservation program, which includes preventive maintenance strategies and rehabilitation techniques, is of utmost importance for extending the useful life of bridges while avoiding costly replacement. Presenters in this session will address the maintenance and rehabilitation strategies and practices successfully used in historic bridges, older arches, trusses, expressways, masonry structures and others.

9:00 a.m.

IBC 18-66: Bridge Replacement and Abutment Rehabilitation on the Vine St. Expressway from 22nd to 18th Streets in Philadelphia, PA

David Whitmore, Vector Corrosion Technologies; Henry Berman, Ph.D., P.E., Pennsylvania DOT, King of Prussia, PA

This bridge replacement and abutment rehabilitation project was completed on seven bridges which span across the western end of the Vine Expressway from 22nd to 18th Streets. The bridge work for this project included the replacement of the existing two-span, noncomposite, pre-stressed concrete adjacent box beam superstructures with single span superstructures while maintaining and retrofitting the existing reinforced concrete abutments. The bridge superstructures were replaced and the highly chloride contaminated reinforced concrete abutments, which had widespread concrete damage and active reinforcing steel corrosion, were rehabilitated. Field corrosion evaluation testing of the substructures was done to ensure that the service life of the substructures could be increased to match the desired service life of the new superstructures. Electrochemical Chloride Extraction (ECE) was selected as the most appropriate long term repair solution as it facilitated the desired project schedule by allowing the existing abutments to be rehabilitated and re-used for the new superstructures. Our technical paper will discuss the investigation, rehabilitation and repair of the existing abutments using the ECE process as it progressed from initial concept to construction.

9:30 a.m.

IBC 18-67: Historic Truss Rehabilitation: The Max and Min

William Koller, P.E. and Ken Sanoski, P.E., Pennsylvania DOT - District 1, Oil City, PA

This paper details a truss that was totally rehabilitated for a 100-year life (Max) and one that was rehabilitated to correct deficiencies that made it poor – a minimal rehabilitation (Min). Both are unique in that the maximum rehabilitation included disassembling the truss and galvanizing the members and the minimal rehabilitation consisted of abutment reinforcement and floorbeam repairs only. There are many lessons learned from the dismantling, cleaning, galvanizing and reassembling the truss.

10:00 a.m.

IBC 18-68: Longfellow Bridge Rehabilitation

Mark Ennis, STV Incorporated, Boston, MA; Michael Drew, Massachusetts DOT, Boston, MA; Robert Collari, J.F. White Contracting Company, Cambridge, MA

The Longfellow Bridge is a well-known Boston landmark. The structure, which carries both roadway traffic and rail, is being rehabilitated through a $255m Design Build Contract. The presentation will be given by representatives of MassDOT, the Contractor and Designer. The presentation will address efforts made to preserve the historic character of the bridge, seismic upgrades, and the staging of the work to facilitate Red Line rail operations.

10:30 a.m. Break

11:00 a.m.

IBC 18-69: Tale of Two Arches

William Koller, P.E., and Matthew Antrilli, Pennsylvania DOT- District 1, Oil City, PA

Penn DOT has a unique type of bridge located in NW Pennsylvania. This bridge type was built in the transition period from trusses to multi-girder bridges for medium spans. They were built by the same engineer, both span Oil Creek and were innovative bridge types for the period - bowstring or tied-arch. The history and rehabilitation of these two sister bridges is detailed in this paper along with several innovations to upgrade the bridges.

11:30 a.m.

IBC 18-70: Frankford Avenue Bridge: Rehabilitation of the Oldest Bridge in the United States

Margaret Sherman, P.E., TranSystems, Philadelphia, PA; Henry Berman, Ph.D., P.E. and Monica Harrower, Pennsylvania DOT District 6-0, King of Prussia, PA

The Frankford Avenue Bridge, built in 1697, is the oldest continuously-used roadway bridge in the United States. It is a stone masonry arch bridge over Pennypack Creek in Philadelphia, Pennsylvania. The paper will discuss the inspection, analysis and rehabilitation of the bridge, as well as identify the character defining features which make it historic. Sympathetic means to reconstruct stone masonry and rebuild the cantilevered sidewalks will be discussed.

INSTRUMENTATION/LOAD TESTING

Wednesday, June 13; 9:00 a.m.–12:00 Noon

Room: Annapolis 1/2/3

Chair: Raymond A. Hartle, P.E., GAI Consultants, Inc., Cranberry Township, PA

This session provides a cross section of examples showcasing current practices in evaluating actual bridge member forces in the interest of maximizing service performance and improving asset management. Your understanding of NDE will be broadened with a review of Phased Array UT (PAUT) inspection of welds and an innovative study of Thermoelastic Stress Analysis of fatigue prone details. State-of-the-art instrumentation and load testing will be highlighted with presentations of SHM on the Tappan Zee Bridge and Delaware's Indian River Inlet Bridge, and the systematic destruction and strain monitoring of a decommissioned slab-on-steel beam bridge.

9:00 a.m.

IBC 18-71: Structural Health Monitoring System for the New Tappan Zee Bridge

Thomas Weinman, Geocomp, Buffalo Grove, IL; Rob Nyren and Kris Armstrong, Geocomp, Acton, MA

A comprehensive Structural Health Monitoring System (SHMS) can aid in focusing long-term maintenance that enhances the overall asset management program for the structure. Of primary importance is the management and ready-review of the data collected for timely decisions. This presentation will provide an overview of how this data is processed and culled to enable ready review of data for timely decisions, using the Tappan Zee Bridge as a case study.

9:30 p.m.

IBC 18-72: Structural Health Monitoring of Delaware's Indian River Inlet Bridge

Harry Shenton, Michael Chajes, P.E., Hadi Al-Khateeb, and Gary Wenczel, University of Delaware, Newark, DE; Jason Arndt, Delaware DOT, Dover, DE

Delaware's Indian River Inlet Bridge is a 533-meter long cable stayed bridge that was completed in 2012. The University of Delaware, working with DelDOT and the design-build team of AECOM and Skanska, designed and installed a comprehensive structural health monitoring (SHM) system on the bridge during construction. The system continuously monitors the bridge's performance and this paper provides an overview of the SHM system and highlights results from the first five years of service.

10:00 a.m.

IBC 18-73: Lessons Learned From Destructive Tests of a Slab-On-Steel Girder Bridge

Asmaa Abo Alouk, Jennifer McConnell, Michael Chajes, and Harry Shenton, University of Delaware, Newark, DE; Brent Van Lith, Delaware River and Bay Authority, New Castle, DE

The paper will describe the results of destructive load tests of a bridge owned by the Delaware River and Bay Authority. Tests of the 60 year old, slab-on-steel-girder bridge, which carried a high volume of traffic throughout its life

will provide a unique opportunity to (1) measure the actual capacity of a common bridge that was designed according to established standards, and (2) observe the behavior of the bridge to induced damage.

10:30 a.m. Break

11:00 a.m.

IBC 18-74: Phased Array Ultrasonic Testing for Nondestructive Evaluation of Welded Orthotropic Steel Box Girders of the Hong Kong-Zhuhai-Macao Bridge

Jie Sun, Min Zhao, and Wen Sun, Jiangsu Fasten Material Analysis & Testing Co., Ltd., Jiangyin, Jiangsu, China; Qiang Jing, Hong Kong-Zhuhai-Macau Bridge Administration, China

Phased array ultrasonic testing (PAUT) has advantages over the conventional single-beam ultrasonic testing (UT) method as a nondestructive evaluation (NDE) technique for detecting nonvisible defects in welds or steel plates. This paper discusses application of PAUT for NDE of welded orthotropic steel box girders during construction of the Hong Kong-Zhuhai-Macao Bridge in China. PAUT procedures and acceptance standards were established. Test results demonstrated PAUT to be a reliable NDE method for ensuring steel fabrication quality.

11:30 p.m.

IBC 18-75: Thermoelastic Stress Analysis of Fatigue Prone Details

Steven Chase, University of Virginia, Palmyra, VA; Chad Anderson, University of Virginia, Charlottesville, VA; Paul Fuchs, Thermastare, Leesburg, VA

A novel approach for in-situ evaluation of stress fields in the vicinity of fatigue prone details on highway bridges has been developed using a low cost micro-bolometer thermal imager. and a battery powered field computer. The approach is based on the well proven theory of thermoelasticity. Thermoelasticity is the generation of temperature changes in matter due to elastic strain. The theory and the results of laboratory and field testing are presented.

FOUNDATION/DESIGN

Wednesday, June 13; 9:00 a.m.–12:00 Noon

Room: Woodrow A

Chair: Rex L. Pearce, P.E., Virginia DOT, Staunton, VA

Bridge foundations must dig deep and this IBC session explores best design / construction practices in this current age of ever-increasing load conditions, traffic counts, and environmental constraints countered by reduced construction time frames and funding resources. Innovation, efficiency, advanced technology and methods have never been more crucial. Bridge foundation planning, design and sustainability topics include; Caissons, Geotechnical Challenges, Seismic design, Re-purposed Foundations, Substructure Analysis and Design, Accelerated Bridge Construction and FHWA Foundation Characterization Program.

9:00 a.m.

IBC 18-76: Herrington Lake Bridge - Lowering of a 200-ft Caisson

Josh Crain, P.E., S.E. and David Rogowski, P.E., Genesis Structures, Inc., Kansas City, MO; Doug VanSlambrook, Walsh Construction, Irving, TX; Kevin Buch, P.E., Walsh Construction, Harrodsburg, KY

Construction of an 830-ft, three-span bridge over Herrington Lake in central Kentucky presented a unique set of engineering and construction challenges. One challenge was the selection of means and methods for erection of 350-ft plate girder spans without falsework in the 700-ft wide lake. The second challenge was developing a method of construction of the center pier, located in the deepest part of the popular recreational lake where depths exceed 200 feet.

9:30 a.m.

IBC 18-77: New Champlain Bridge – Geotechnical Challenges and Solutions

Thaleia Travasarou and Jose Ugalde, Fugro, Walnut Creek, CA

The new St. Lawrence River Champlain bridge is 3.4 km long featuring 38 approach spans and a 500-meter cable-stayed main span. Geotechnical design challenges include optimizing the main span tower drilled shaft foundations design using site-specific foundation testing, designing the main span tower for liquefaction and vessel impact, design of a permanent berm against liquefaction demands. Construction quality assurance challenges included remote observation and verification of submerged marine excavations during foundation construction.

10:00 a.m.

IBC 18-78: Reuse of Foundations of Existing Bridges

Anil Agrawal and Ehssan Hoomaan, The City College of New York, New York, NY; Nathan Davis and Masoud Sanayei, Tufts University, Medford, MA; Frank Jalinoos, Federal Highway Administration, McLean, VA

Reuse of foundations of existing bridges during reconstruction or major rehabilitation of bridges can result in major savings in costs and time. The best practice manual on bridge foundation reuse addresses critical issues

encountered during decision-making on foundation reuse, assessment of existing foundations for structural integrity, durability and load carrying capacity, repair and strengthening of foundations; and design of new foundations for potential future reuse. The manual includes case examples showing detailed of reuse process.

10:30 a.m. Break

11:00 a.m.

IBC 18-79: CSVT River Bridge - Advanced Substructure Analysis and Design

Ryan Jenkins, Kyle Smiach, and Ahmad Ahmadi, SAI Consulting Engineers, Inc., Pittsburgh, PA

The CSVT River Bridge in Pennsylvania is a six-lane, 15-span, 7/8-mile-long, multi-girder structure comprised of three independent units. The bridge features tall, slender piers with significantly varying stiffness and consecutively fixed bearings. To optimize the design and capture realistic behavior, system substructure interaction was modeled using second-order analyses with non-linear material properties. In addition, a seismic analysis was performed to optimize the bearings, and strut-and-tie analyses were performed on certain substructure elements.

11:30 a.m.

IBC 18-80: Prefabricated Superstructure Units and other ABC Methods for Bridge Replacement: NJDOT Route 18 over Route 1

Gregory Ricks, P.E., and Holtisa Jovani, HNTB, Parsippany, NJ

This superstructure replacement utilized ABC techniques during 10 weekends of condensed construction, including concrete moveable barrier curb, prefabricated superstructure units, polyester polymer concrete deck closure pours, precast concrete approach slab panels, and various ABC techniques for temporary deck support, bearing installation, and deck joint installation. These techniques allowed for minimal disruption at the congested NJ Route 18 over Route 1 interchange (120,000 VPD). The widened substructure was supported on micropiles due to work zone constraints.

CONSTRUCTION ENGINEERING USING ADVANCED METHODS

Wednesday, June 13; 9:00 a.m.–12:00 Noon

Room: Woodrow B/C/D

Chair: John C. Dietrick, P.E., S.E., Michael Baker International, Cleveland, OH

Engineers and contractors are increasingly utilizing advanced techniques to facilitate the improved construction, demolition and repair of bridges. In this session, our presenters will demonstrate how innovative methods like heat strengthening and state-of-the art computer modeling have provided great value to the construction of major bridges around the world. This session will give particular emphasis to the increased use of 3D computer modeling and the advances it promises to provide to bridge designers and contractors.

9:00 a.m.

IBC 18-81: Erection Engineering for the Eastbound Cable-Stayed Spans of the Kosciuszko Bridge

Allison Halpern, P.E., Ph.D., O. Murat Hamutcuoglu, and John Bryson, HNTB Corporation, New York, NY

HNTB served as the Erection Engineer of the eastbound cable-stayed spans constructed during Phase I of the Kosciuszko Bridge Replacement Project. A 3D finite element model was developed to perform staged construction analyses; the model was continually calibrated to reflect changes in construction sequence and load placement by using survey data to capture as-built geometry and stress conditions. Analysis results informed stay cable installation forces and composite stay cable adjustments to provide geometry control measures.

9:30 a.m.

IBC 18-82: Construction of the Mockingbird Pedestrian Bridge

Steve Eads, Jr., P.E., John Boschert, and Dave Byers, Genesis Structures, Kansas City, MO; Mark Gaines and Evan McCoppin, Rebcon Inc, Dallas, TX

The Mockingbird Pedestrian Bridge is a four-span, cable-stayed pedestrian bridge carrying the Katy Trail pedestrian path over Mockingbird Lane in Dallas, Texas. Located in a congested urban setting adjacent to a popular shopping center and directly above the Dallas Area Rapid Transit line, this unique structure was erected using a carefully planned sequence that minimized the impact on the transit structures below, while maintaining public access during construction.

10:00 a.m.

IBC 18-83: Demolition of the Broadway Bridge over the Arkansas River

Ben Pendergrass, P.E., Ph.D., and John Boschert, Genesis Structures, Kansas City, MO; Andy Shorten, Greg Bair Track Hoe, Overland Park, KS

This paper details the demolition of the 93-year-old Broadway Bridge over the Arkansas River. The bridge comprised of 37 concrete-girder spans, three concrete-arch spans, and a single steel-arch span. Demolition activities occurred simultaneously with new construction over a short duration, requiring multiple machines to operate on the bridge at once for deck and girder

removal. Following deck removal, explosive demolition techniques were utilized for removal of the concrete arch spans and steel arch span.

10:30 a.m. Break

11:00 a.m.

IBC 18-84: Johnson Drive over I-435 Emergency Bridge Repairs

Samantha Kevern, P.E., S.E., HNTB Corporation, Kansas City, MO; Don Whisler, Kansas Department of Transportation, Topeka, KS

On April 10th, 2016, a SUV lost control and struck a steel pier column supporting the Johnson Drive bridge. The vehicle struck a column 10 feet above the bearing, ripping the bearing apart and causing 5.13 feet of displacement. Heat straightening was used to repair the column and connecting elements. This presentation details the damage the bridge sustained, describes the repair process, and explains the engineering required to return the bridge to its original function.

11:30 a.m.

IBC 18-85: Digital Submittal – What We Want 3D Modeling to do for the Bridge Industry

Thomas Cooper, WSP, Denver, CO; Matti-Esko Järvenpää, WSP FINLAND, Helsinki, Finland

In the U.S., development of BIM models for use in bridge design has been proceeding at a plodding pace. In this paper, the practice, process, outcomes and short-falls of current projects where BIM has been used outside the U.S. to develop electronic deliverables will be examined through the lenses of the changes required in project team organization and the technical challenges and benefits of designing a bridge using 3D models.

W-5: ACCELERATED BRIDGE CONSTRUCTION TECHNOLOGY APPLIED IN THE SEISMIC REGION

Wednesday, June 13; 8:00 a.m.–12:00 Noon

Room: Magnolia 1

This workshop provides an opportunity for exchange of the latest information in research and implementation of ABC in seismic regions. Devising connections that can accommodate inelastic cyclic deformations and are readily constructible is the primary challenge for ABC in seismic regions. Ductile behavior is desirable under earthquake loadings for both the longitudinal and transverse directions of the bridge. The work- shop demonstrates technologies for delivering bridge construction projects in weeks, rather than months, for reducing congestion, improving safety and increasing the quality of highway bridges in seismic regions.

Speaker: Phillip Yen, International Association of Bridge Earthquake Engineering, Centerville, VA; Pinar Okumus, University of Buffalo, Buffalo, NY; Dr. Atorod Azizinamini, Florida International University, Miami, FL

IBC EXHIBIT HALL LUNCHEON

Wednesday, June 13; 12 noon–2:00 p.m.

Room: Prince George Exhibit Hall A

Join us for lunch and a final opportunity to visit with the exhibitors of IBC!

PRESERVATION, PART 2

Wednesday, June 13; 2:00–5:00 p.m.

Room: Baltimore 3/4/5

Chair: Rachel Stiffler, Vector Corrosion Technologies, McMurray, PA

The papers presented in this session include discussions on extending service life for concrete and steel bridge structures. Methods used are accelerated bridge construction, using first ever completed pier precasting, along with completing SSI (soil structure interaction) using analytical processes to do pier redesign. These projects used concrete testing of the structures, corrosion evaluation, which will also be discussed, along with concrete sampling, to determine the needs. Steel structure discussions will include fatigue prone delta frame repairs along with eliminating deck joints and safety upgrades.

2:00 p.m.

IBC 18-86: Seismic Rehabilitation of The Pulaski Skyway: an Engineering Challenge

Ruben Gajer, P.E., Matt Tchorz, and Prabhakar Casuba, Arora and Associates, P.C., New York, NY; Glenn Deppert, Reilly Thompson, and Colleen O'Neil, Arora and Associates, P.C., Bethlehem, PA

The Rehabilitation of the Pulaski Skyway calls for independent concrete shells cast around the existing pier columns. The shells will be supported on deep foundations (drilled shafts and/or micropiles), built next to the remaining concrete caissons. New reinforced concrete caps will span over the existing caissons and around the existing columns. Soil-Structure-Interaction analysis demonstrated the influence of kinematic effects on the seismic response and the subsequent design of piers, foundations, and rehabilitation of the trusses.

2:30 p.m.

IBC 18-87: Restoring History: The Beaverkill Covered Bridge

Andrew Schwingel, EIT, Erdman Anthony, Rochester, NY

In 2012, Erdman Anthony was selected by the New York State Department of Transportation to design the rehabilitation of the 153-year-old Town lattice truss Beaverkill Covered Bridge. The project included timber rehabilitation, stone abutment regeneration and complex hydraulic challenges. This structure represents the importance of infrastructure to the surrounding community and the powerful influences the public can have on the rehabilitation of historic structures. The bridge was completed and opened to traffic in June 2017.

3:00 p.m.

IBC 18-88: Developing a Corrosion Mitigation Strategy for Service Life Extension Hampton Roads & Bridge Tunnel – Approach Bridges

Ali Akbar Sohanghpurwala, CONCORR, Inc., Sterling, VA; Adam Matteo, P.E., Virginia DOT, Richmond, VA; Rex Gilley, P.E., WSP, Virginia Beach, VA

The Hampton Roads Bridge Tunnel (HRBT) facility carries I-64 traffic across the navigational channel from Hampton Roads to Willoughby, Virginia. Originally constructed in 1957 it consisted of two approach bridge structures, one on the north and one on the south with a tunnel in between. Later in 1974, another two approach bridges and tunnel were added. The old

structure carries westbound traffic, whereas, the newer structure carries eastbound traffic. The HRBT is considered the most vital road infrastructure in the State of Virginia. Its average daily traffic (ADT) is reported to be 80,000 and peaks during the tourist season to 100,000.The bridge structures are exposed to an extreme marine environment and almost of reinforced concrete elements are exhibiting corrosion induced damage. An in-depth corrosion condition evaluation of these structures was conducted. Based on the findings a strategy to maintain and extend the service life of these bridges for another 30 to 50 years is been developed. The condition evaluation utilized newer testing protocols, service life modeling, and life cycle cost analysis to identify optimal solutions for repair and rehabilitation. The results of the condition evaluation and the strategy developed are discussed.

3:30 p.m. Break

4:00 p.m.

IBC 18-89: Interstate Delta Frames: Structural Steel Retrofit and Restoration to Essentially Infinite Fatigue - Part II Structural Response under Service Loading Condition and Rehabilitation Monitoring

Loai El-Gazairly, P.E., Ph.D., Whitman, Requardt and Associates, Richmond, VA; Rex L. Pearce, P.E., Virginia DOT, Staunton, VA

The delta frame bridges that carry I-64 over the Maury River within VDOT, Staunton District were constructed in the mid-1970s and have experienced fatigue cracking that caused deficiency in the bridges inventory rating. A structural retrofit was designed and rehabilitation is completed for infinite fatigue life. A thermo-elastic stress analysis system (companion paper) is used to scrutinize fatigue-prone locations. Conclusions are attained for the adequacy of the retrofit procedure and the current structural response.

4:30 p.m.

IBC 18-90: Rehabilitation of the SR 0837-A13 Glenwood Interchange

Benjamin Allis, GAI Consultants, Inc., Homestead, PA

The SR 0837-A13 Glenwood Interchange Rehabilitation is located in Pittsburgh, Pennsylvania and is owned by Pennsylvania DOT District 11-0. GAI Consultants performed an in-depth hands-on inspection and final design to rehabilitate four interconnected steel bridges. We employed strategies to extend the service life of the structures while also minimizing future maintenance and inspection costs. Some of these strategies included joint eliminations, fracture critical pier cap replacements, bearing replacements, and safety feature upgrades throughout the interchange.

RAIL/TRANSIT, PART 2

Wednesday, June 13; 2:00–4:30 p.m.
Room: Annapolis 1/2/3
Chair: Carl Angeloff, P.E., MSCE, Con-Serv Inc., Aliquippa, PA

The re-birth of a global rail infrastructure continues to expand opportunities for Designers, Contractors and Owners of transit and freight hauling systems. This session provides innovative design solutions for steel and concrete arch railroad bridges. In active earthquake regions, seismic design considerations and fortification measures are utilized to evaluate structural seismic performance. Lastly, improving the fatigue life estimations of older riveted railroad bridges is examined. Most of these bridges were not explicitly designed against fatigue, but are now asked to carry heavier service loads.

2:00 p.m.

IBC 18-91: Design of the New Portageville Railroad Bridge

Daniel Irwin, P.E. and Kevin Johns, Modjeski and Masters, Inc., Mechanicsburg, PA

The Portageville Railroad Bridge is a vital link for Norfolk Southern in New York. The existing structure was at the end of its useful life, requiring replacement. The new bridge consists of a 483-ft 2-hinged spandrel-braced arch flanked by girder spans. Spandrel-braced arches are well-suited for railroad loading, but this structure type is rarely viable, making the new bridge unique in modern history. The solutions to overcome the design challenges for this structure are presented.

2:30 p.m.

IBC 18-92: Working Out of a Corner: Route 5 Bridge Replacement

Eric Thornton and Scott Fisher, Virginia DOT, Midlothian, VA

The engineering, communication, and coordination strategies used during the development and construction of the historical Route 5 Bridge in Richmond, Virginia can be employed by leadership teams to successfully complete even the most complicated projects. The historical nature, strict timeframes, and restrictive project site generated strategic design and replacement techniques. Working around, over, and under railroads, utilities, and adjacent projects, the team was able to work out of a corner and meet the unique challenges.

3:00 p.m.

IBC 18-93: The Staggered Arch Bridge for California High Speed Rail Over State Route 99 Highway (SR99)

Shaoyun Sun, P.E., Ph.D., Eddie He, Kishor Patel, and Pam Yuen, Parsons, Chicago, IL

A staggered arch bridge with total length of 437 ft, have been designed for the new California high speed railway line over the State Route 99 highway. The superstructure includes two stand-alone vertical hanger arch planes with horizontal floor system spanning between them. Each arch plane consists a 3-span continues prestressed concrete edge tie girder and two concrete arch ribs on top of the two longer spans. Lead-rubber Isolation bearings with fuse assembly were selected to meet the stringent displacement limitation required for track serviceability and the California seismic ductility design requirement.

3:30 p.m. Break

4:00 p.m.

IBC 18-94: Seismic Design of a Long-Span Concrete-Filled Steel Tube Through- Arch Railway Bridge

Shengyong Dai, Huawan Hu, Kejian Chen, and Jianfeng Chen, China Rail Way Eryuan Engineering Group Co., Chengdu, Sichuan, China

The seismic design of a 430m span concrete-filled steel tube half-through arch railway bridge Using the capacity protected member design method to shrink secondary members and protect primary members; Using dampers and isolated bearings to reduce bridge earthquake responses. The bridge analysis used the finite element method in combination with a non-linear time history method to evaluate the structural seismic performance with various seismic fortification measures.

DESIGN/ANALYSIS, PART 2

Wednesday, June 13; 2:00–5:00 p.m.

Room: Woodrow A

Chair: Kenneth J. Wright, P.E., HDR Engineering, Inc., Pittsburgh, PA

This session highlights practical design innovations – from a VE redesign that incorporated materials already ordered for the original bridge design, to using segmental construction on a new lift bridge, to a bridge carrying an LNG pipeline subjected to hurricanes, to demonstrating how strut and tie modeling was used to design critical knuckle details on a tied arch structure, to discussion of simplified rebar details in acute corners of the deck for skewed bridges.

2:00 p.m.

IBC 18-96: Specialized Bridge Structure for Liquid Natural Gas (LNG) Project Located on the Hurricane Prone Gulf Coast

Michael Whitney, Ph.D., P.E. and Jason Richards, P.E., Bechtel Corporation, Houston, TX; J. Marcus Cherundolo, P.E., Bechtel, Reston, Virginia

The Corpus Christi Liquefaction project on the Texas coast will liquefy natural gas for export. To move LNG from the plant to the ships, and transport equipment and personnel to the loading berths, two bridges are under construction. The designs incorporate standard concrete girder bridge principles, adapted for the specialized purpose. These bridges are designed for hurricane conditions, heavy construction loading, and fluid "hammer" loads applied by moving LNG through 30 inch diameter pipes.

2:30 p.m.

IBC 18-97: A Simplified Reinforcement Detail for the Deck Acute Corner in Skewed Bridges

Jodi Greene, E.I.T. and Masoud Mehr, Ph.D., P.E., WSP, Glastonbury, CT; Arash Zaghi, Ph.D., P.E., S.E., and Sarira Motaref, Ph.D., P.E., University of Connecticut, Storrs, CT; Michael Culmo, P.E., CME Associates, East Hartford, CT

In modern transportation projects, the demand for skewed bridges is increasing. The current reinforcement detail for the acute corner of decks is insufficient due to short development lengths. Through this study, a modified reinforcing detail is proposed. Follow up analyses demonstrated that the proposed detail significantly improves the efficiency of the reinforcement. This practical detail minimizes cost and labor for deck construction at acute corners, yet improves the structural performance of the slab.

3:00 p.m.

IBC 18-98: Value Engineering Redesign of the Replacement of the City Island Road Bridge over Eastchester Bay

Greg Fisher, P.E., and Mohammad Shams, Henningson, Durham & Richardson Architecture and Engineering, P.C., New York, NY; Cagri Ozgur, Henningson, Durham & Richardson Architecture and Engineering, P.C., Albany, NY

Following community concerns after the start of the project, HDR redesigned the replacement of the City Island Road Bridge (CIB) under value engineering (VE) provisions. This paper will present the challenges/solutions regarding the hydrodynamic modeling/scour analysis, superstructure/substructure design and the 3D FEA steel erection analyses. It will also provide insight on how the designer and contractor worked in a design-build manner to deliver a VE redesign that met the owner's requirements.

3:30 p.m. Break

4:00 p.m.

IBC 18-99: Application of Strut and Tie Modeling to the Design of Concrete Arch-Rib and Tie-Girder Intersections

Lawrence Rolwes, Jr., HNTB Corporation, St. Louis, MO; Natalie McCombs and Jeremy McNutt, HNTB Corporation, Kansas City, MO

A strut and tie modeling approach was developed for the design of concrete arch-rib and tie-girder intersections (knuckles) where normal beam theory approaches are not applicable. The complex three-dimensional problem was decomposed in such a way that two-dimensional strut and tie models could be used. The approach proved instrumental in successfully visualizing and designing the force paths through the knuckles for the various loading conditions.

4:30 p.m.

IBC 18-100: The Construction of the Sarah Mildred Long Bridge

Rebecca Frein, Ben Hawthorne, P.E., S.E., and John Gimblette, Hardesty & Hanover, LLC, New York, NY

Construction of the Sarah Mildred Long Lift Bridge presented many challenges that were overcome through thoughtful design and innovative construction techniques. This paper addresses many of the key challenges, including:

construction of concrete piers with large diameter drilled shafts within a high flow tidal zone; construction of precast concrete segments for the lift span tower, which is a first of its kind application; fabrication and float-in of lift span; and commissioning mechanical and electrical systems.

ACCELERATED BRIDGE CONSTRUCTION, PART 2

Wednesday, June 13; 2:00–5:00 p.m.

Room: Woodrow B/C/D

Chair: Pat Kane, P.E., Greenman-Pederson, Inc., Pittsburgh, PA

One of the latest trends in construction, Accelerated Bridge Construction, minimizes disruptions and accelerates projects to completion. From projects for the Pennsylvania Turnpike Commission, the Delaware Department of Transportation, and the Florida Department of Transportation, this session will present techniques for slide in bridge construction, all precast twin V-piers, construction engineering services for a contractor, design of temporary structures, evaluating lateral bridge slide technology, FHWA's detail for the UHPC shear key, and an Ultra High Performance Concrete (UHPC) overlay.

2:00 p.m.

IBC 18-101: Pennsylvania Turnpike Bridge WB-224B - Sliding Into the Future of Transportation

Eric Hayes, P.E., Sucevic, Piccolomini, & Kuchar Engineering, Inc., Uniontown, PA; Lisa Hoeke, P.E., Tunstall Engineering Group, Cranberry Twp, PA; Calvin Boring, Advantage Steel and Construction, Saxonburg, PA

The Pennsylvania Turnpike Bridge WB-224B project was the superstructure replacement of existing dual two-span PS concrete non-composite adjacent box beam bridges which carry the Pennsylvania Turnpike mainline over Brush Creek in Beaver County, PA. The superstructures were replaced using the Accelerated Bridge Construction (ABC) method known as Slide-In-Bridge-Construction during a 55-hour closure of the Turnpike. It was the first bridge to be constructed using ABC methods on the Pennsylvania Turnpike.

2:30 p.m.

IBC 18-102: Precasting the Pensacola Bay Bridge Replacement

Christopher Vanek, P.E., WSP, Seattle, WA; Charles Rudie and Victor Ryzhikov, WSP, Tampa, FL

As the largest single transportation project in the Northwest Florida region, the 400-million-dollar twin 3-mile bridge replacement project over Pensacola Bay Bridge includes extensive aesthetic enhancements, unique application of Accelerated Bridge Construction (ABC) techniques, advanced dynamic soil-structure interaction modeling and an aggressive schedule requiring 1,500 square feet of bridge construction per contract day. The DB team of WSP/Skanska selected a separated 375' pedestrian wishbone tied arch for the main feature of the crossing along with architectural shade structures, twin V-piers, color-changing LED lighting, and decorative railings which complement the enhanced aesthetics. To meet the project schedule to construct the 106 spans out of 23.6 million pounds of steel and 162,000

cubic yards of concrete, ABC techniques were essential, with nearly 4,000 precast elements fabricated at an onsite casting facility and no cast in place piers. Precast elements include the first use of complete precast V-Pier (footing/cap/column), a 11'-4" wide pedestrian pre-stressed concrete pi-girder with integral parapet, modified thickened bulb tee girders and bathtub forms. This paper will outline the modeling and details of these unique solutions including mockup test requirements, use of 3D modeling for visualization and product development and a complex dynamic soil structure interaction approach for wave and ship impact loading.

3:00 p.m.

IBC 18-103: Four ABC Bridge Projects on the PA Turnpike Northeast Extension

Mark Pavlick, HDR Engineering, Inc., Pittsburgh, PA; David Leaf, HDR Engineering, Inc., Plymouth Meeting, PA

In 2014, HDR began preliminary design on four bridges on the Pennsylvania Turnpike Northeast Extension near Allentown, Pennsylvania. The project involves the deck and/or superstructure replacement or a complete replacement of these bridges using accelerated bridge construction (ABC). The NB-355 Bridge over Crackersport Road was replaced over a weekend closure in October 2017. The design details and construction will be presented as well as the status of the design for the other three structures.

3:30 p.m. Break

4:00 p.m.

IBC 18-104: The Big Slide: Replacing Dual Bridges in One Weekend

Quentin Rissler, P.E., Larson Design Group, Lititz, PA; Phil Carper, Road-Con, Inc, West Chester, PA

Dual interstate bridges were replaced in Lehigh County, PA with a single weekend closure for the Pennsylvania Turnpike Commission by the contractor / engineering team of Road-Con, Inc and Larson Design Group. After the team evaluated multiple lateral slide systems, an innovative lateral sliding procedure – a first for the Turnpike and one of the few in Pennsylvania – was developed with a focus on incorporating contingencies and streamlining the process to avoid stiff liquidated damages.

4:30 p.m.

IBC 18-105: Accelerated Bridge Construction Methods for Bridge 1-438 Replacement

Nicholas Dean, P.E., Craig Stevens, and Jason Hastings, Delaware DOT, Dover, DE

This paper presents the design and implementation of Accelerated Bridge Construction (ABC) techniques for Bridge 1-438 on Blackbird Station Road over Blackbird Creek. The 50'-0" single span bridge acts as Delaware's first all precast bridge and incorporates the nation's second UHPC overlay. It illustrates pros, cons, and lessons learned from using ABC techniques for the replacement of Bridge 1-438. It will also discuss collaborative efforts between federal and state agencies in producing specifications and plans.

W-6: EFFICIENT AND ECONOMICAL SHORT-SPAN STEEL BRIDGE SOLUTIONS

Wednesday, June 13; 1:00–5:00 p.m.

Room: Magnolia 1

The focus of this workshop is to provide essential information to bridge owners and designers on the use of short span bridges (i.e., installations up to 140 feet in length), including case studies, standardized designs and details, and modular solutions. The superstructure solutions discussed will range from conventional short-span steel bridges (such as those incorporating rolled beam and plate girders) to more innovative options, such as buried bridges and press-brake-formed steel tub girders. The workshop would include an overview the development and implementation of eSPAN140, a complimentary web-based tool, which can be rapidly employed by engineers to generate customized steel solutions for the short-span range. Also, the workshop will provide attendees with detailed information on the research and development of more modern systems, including experimental testing and analytical studies of innovative solutions. Finally, the workshop will give attendees an understanding of the overall economy of short-span steel bridges, including an overview of initial cost comparisons as well as life-cycle cost analysis using real-world data and projects.

Speaker: Gregory Michaelson, Ph.D., Marshall University, Huntington, WV

W-7: INTERNATIONAL BRIDGE ENGINEERING PRACTICES

Wednesday, June 13; 1:00–5:00 p.m.

Room: Magnolia 2

Organizer: M. Myint Lwin, Consultant, Olympia, WA

The main objective of this workshop is to provide a forum for participants to present and discuss innovative bridge design, construction, inspection, maintenance and preservation practices from around the world, sharing lessons-learned and recommendations for sound and practical solutions. There will be time for attendees to ask questions after each presentation. After all the presentations are completed, there will be an "Open Forum" for general discussion of topics presented and other issues of interest to the participants. 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.

1:00 p.m.

FHWA Recommended Practice on Design & Evaluation of Steel Bridges for Fatigue & Fracture

Brian M. Kozy, Ph.D., P.E., FHWA, Washington, DC

1:35 p.m.

Canadian Practice on Bridge Code Development, Quality Assurance and Extended Service Life

Neil Cumming, COWI North America, Vancouver, Canada

2:10 p.m.

Bridge Earthquake Engineering Practices Around the World

W. Phillip Yen, International Association of Bridge Earthquake Engineering, Centreville, VA

2:45 p.m. Break

3:00 p.m.

Introduction to China's Unified Standard for Reliability of Bridge Engineering Structures

Junli Zhao, CCCC 1st Highway Consultants Co. Ltd, Beijing, China; Dong Xu, Professor at Tongji U, Shanghai, China

3:35 p.m.

Specifications and Applications of Composite Materials in Bridge Infrastructure in Australia

Michael Kemp, Wagners CFT, Queensland, Australia

4:10 p.m.

Applications of New Technology in Bridge Inspection, Monitoring & Evaluation in China

Yufeng Zhang, Vice Chief Engineer, JSTI, Nanking, China

4:45 p.m.

Open Forum – General Discussion

All Attendees

W-8: SERVICE LIFE DESIGN - WORKED DESIGN EXAMPLE

Thursday, June 14; 8:00 a.m.–12:00 Noon

Room: Baltimore 3

Service Life Design is still an emerging technology in the US. The SHRP2 R19A project aims to assist public agencies with the implementation of service life design on bridge projects. Engineers participating in the SHRP2 R19A project have indicated a desire to see the step-by-step process of performing a service life design. This workshop will identify the process for a concrete bridge project in a chloride environment. The workshop will be split into multiple focused modules all centered around the example bridge project. Specific presentations will include how to identify and use existing codes and standards for service life design, determine environmental loading parameters, select different design methodologies (deemed-to-satisfy, avoidance of deterioration, full-probabilistic deterioration modeling, partial factor method), perform mathematical deterioration modeling to select concrete durability resistance properties and required cover, specify concrete and reinforcing steel durability resistance, identify specialized material tests required, and how to document the process.

Speaker: Michael Bartholomew, P.E., Jacobs, Corvallis, OH

W-9: FUTURE OF BRIDGE MANAGEMENT: PROGRAM MODELING, INSPECTIONS, DESIGN & DELIVERY

Thursday, June 14; 8:00 a.m.–12:00 Noon

Room: Baltimore 4

Demonstrating BIM for Bridges - Moving to Digital Delivery

The object of the workshop will be to disseminate information on digital bridge design delivery; data exchange platforms and standards for data delivery from design software to construction and fabrication, and highlight DOT case study and demonstration projects in Bridge Information Modeling (BIM/BrIM). Feedback from the participants will also be solicited specifically to help develop standard contract language to facilitate digital delivery, as well hear feedback on the ease of use of the data exchange platforms and how they can be developed to benefit bridge owners.

Speaker: Joe Brenner, P.E., WSP USA, Ephrata, PA

Technology Applications (Software and Drones) for Bridge 3D Modeling, Design, Construction and Inspection

Present the software and hardware (drones) solutions available at Bentley Systems for 3D bridge modeling, design, construction and inspection.

Speaker: Alexander Mabrich, Bentley Systems, Sunrise, FL

Digital Fast Track: Parametric Modeling of Automated People Mover Rail Structure

Digital tools are increasingly allowing structural engineers to develop efficient workflows to design and model structural elements. These digital

workflows were instrumental in the planning and delivery for the design of a 3-mile long automated people-mover rail structure. Due to the scope of the project and its construction above an existing and active major airport, coordination with roadways, buildings, utilities, and airport operations posed a significant challenge. Therefore, it was of paramount importance to make BIM and analysis models sufficiently agile to address alignment and structural changes rapidly as the design team and airport evaluated different solutions. Using a variety of different software packages, the structural team parametrically modeled the miles of track and resulting structural geometry based on allowable column locations and the current railway alignment profile. This allowed for quick turnaround after design changes and rapid quantity take-off and cost estimation information to assist the client in the decision-making process. This presentation will demonstrate to attendees the value and efficiency of parametric modeling, which will be crucial to the future of the industry.

Speaker: Scott Kinney, Eileen Phan and Greg Stevenson, Walter P Moore, Washington, DC

W-10: DESIGN OF STEEL BRIDGES FOR RAILWAYS

Thursday, June 14; 8:00 a.m.–12:00 Noon

Room: Baltimore 5

The workshop will introduce attendees to the history and development of steel railroad bridges, discuss modern railway design loads, demonstrate the different aspects of steel bridge analysis for railroad bridges, and address the design of various members and connections. It will cover a portion of the topics presented in Design and Construction of Modern Steel Railway Bridges by John Unsworth. The main objective of the workshop will be for attendees to develop an understanding of American Railway Engineering and Maintenance-of-Way Association (AREMA) Design Guide Chapter 15 for Steel Structures and learn how to apply it.

Speaker: Steve Lorek, P.E., HDR, Inc., Cincinnati, OH

Exhibit Hall

PRINCE GEORGE HALL A, LOWER LEVEL

The IBC Exhibit Hall is the place to be for attendees and exhibitors! The IBC Exhibit Hall is located in Prince George Hall A of the Gaylord's Convention Center, on the lower level. Thanks to all of our returning and new exhibitors for making the exhibit hall a "sold out" event! In addition to the many vendor exhibits, the IBC Exhibit Hall hosts the luncheons during the conference on Monday, Tuesday, and Wednesday, and Monday evening reception, as well as coffee & danish breakfast on Wednesday. (NO exhibit hall hours on 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:

- Monday, June 11: 12:00 noon-2:00 p.m. with a strolling luncheon buffet.
- Monday, June 11: 5:00-7:00 p.m. with appetizers and bar service.
- Tuesday, June 12: 10:00 a.m.-2:00 p.m. with a strolling luncheon buffet.
- Wednesday, June 13: 7:30-9:00 a.m. with a continental breakfast.
- Wednesday, June 13: 12:00 noon-2:00 p.m. with a strolling luncheon buffet.

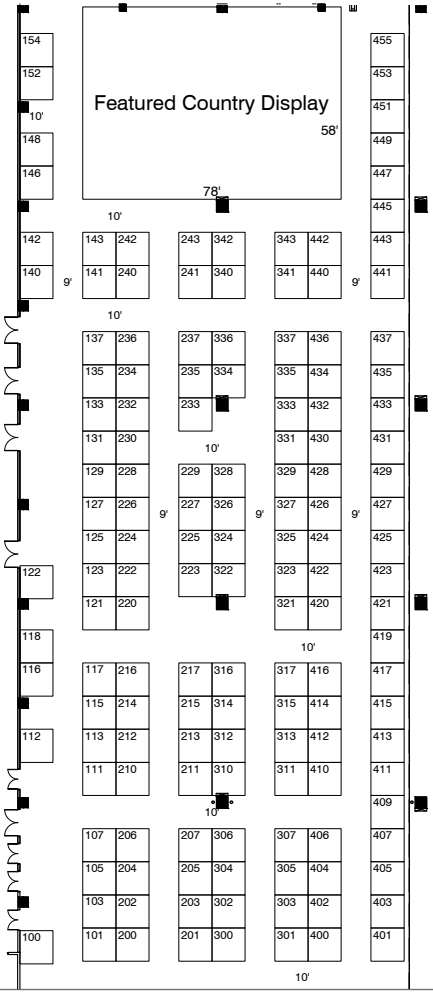

Exhibit Hall

PRINCE GEORGE HALL A, LOWER LEVEL

Below, you will find a numerical listing by booth number of all exhibitors, followed by an alphabetical listing with contact information and company description (NOTE: Where company description is truncated, you can view the full content on the IBC APP.) This listing contains all exhibitors as of May 29, 2018.

Center Rear of Hall: Featured Country: China Display
100 WireCo WorldGroup
101/200 CBSI
103 Euclid Chemical Company
105 MISTRAS Group, Inc
107 Precast/Prestressed Concrete Institute
111 NANOKOTE North America, Inc.
112 Bridge Grid Flooring Manufacturers Association (BGFMA)
113 Klaas Coatings (North America) LLC
115 Marine Solutions
116 V&S Galvanizing
117 Laser-View Technologies, Inc. dba DIMETIX USA
118 Buzzi Unicem USA
121 Williams Form Engineering Corp.
122 Campbell Scientific
123 BDI - Infrasense
125 OpenBrIM
127 Kenway Composites
129 Terex Bid-Well
133/232 Emseal Joint Systems
135 Keystone Aerial Surveys, Inc.
137 Perryman Company
140/142 F&M MAFCO
141 Armtec LP
143 BERD
146 SOFiSTiK AG
148 SGS North America Inc.
152 Whitney Bailey Cox & Magnani
201/203 Michael Baker International
202 HRV Conformance Verification Associates, Inc.
204 KCI Technologies, Inc.
205 AZZ Metal Coatings
206 Vector Corrosion Technologies
207 Hilman Rollers
210 TRC Engineers Inc.
211 D.S. Brown
212 AUR, Inc.
213 National Steel Bridge Alliance (NSBA)
214 Anderson Hydra Platforms, Inc.
215 American Segmental Bridge Institute (ASBI)
216 Evonik Corporation

Exhibit Hall

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217 LUSAS
220 Viathor, Inc.
222 Short Span Steel Bridge Alliance (SSSBA)
223 MMFX Technologies, A Commercial Metals Company
224 Berkel & Company Contractors, Inc.
225/227/229/324/326/328 BrandSafway
226 Carl Stahl DecorCable
228 Allen Engineering Corporation
233 Mabey, Inc.
234 United Steel and Fasteners
235 Informed Infrastructure
236 Pharos Marine Automatic Power, Inc.
237 U.S. Bridge
240 STV
241 A. Morton Thomas and Associates, Inc.
242 Bentley Systems, Inc.
243 Wagners Composite Fibre Technologies
300 Acrow Bridge
301 R.J. Watson, Inc.
302 Bureau Veritas North America
303/305 Computers & Structures, Inc.
304 Big R Bridge
306 STALITE
307 Greenman-Pedersen, Inc.
310 MDX Software
311 Mageba USA
312 Echem Consultants LLC
313 Manufacturier Jenik inc. / 9323-3229 Québec Inc.
314 St. Louis Screw & Bolt
315 WSP USA
316 Eriksson Technologies, Inc.
317 LARSA, Inc.
321 International Road Dynamics, Inc.
322 Contractors Materials Company
323 Roads & Bridges
325 Sea Safety/Sealite
327 Olson Engineering, Inc.
329 Epoxy Interest Group of CRSI
331 Washington State DOT
333 US Minerals
334 Hydro-Technologies/Modified Concrete Suppliers
335/337 BDB Bridge Precast Steel
336 New Millennium Building Systems
340 UHPC Solutions
341/440 Spider By BrandSafway
342 DYWIDAG-Systems International

Exhibit Hall

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343 Quinn Consulting Services, Inc.
400 Harcon Corporation
401 Sika Corporation
402 CTS Cement Manufacturing Corporation
403/405 American Composites Manufacturers Association (ACMA)
404 Pennoni
406 Figg Bridge Engineers, Inc.
407 Scougal Rubber Corporation
409 ChemCo Systems
410 Freyssinet, Inc.
411 Reinforced Earth Company, The
412 Sixense, Inc.
413 UCC SteelWork Connections
414 Stronghold Coating Systems, Ltd.
415 Watson Bowman Acme
416 Salit Specailty Rebar LLC
417 N.E. Bridge Contractors, Inc.
419 Action Corrosion USA
420 AECOM
421 Bridge design & engineering
422 Contech Engineered Solutionsl
423 All Access Rigging Co.
424/426 Tideland Signal Corporation
425 Interbuna, S.L.
427 Redi-Rock International
429 Mueser Rutledge Consulting Engineers
430 Norchem, Inc.
431 American Piledriving Equipment
433 Pile Dynamics, Inc./GRL Engineers
434 Deep Foundations Institute (DFI)
435/437 FATZER AG Structural Ropes
436 Fugro Loadtest
441 Bridon-Bekaert Ropes Group
442 Foundation Technologies Inc.
443 Resensys LLC
445 Skyline Steel
447 Hayward Baker
449 Infrastructure Preservation Corporation
451 Dynamic Isolation Systems
453 Coastal Precast Systems
455 Post-Tensioning Institute

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Exhibitors
ALPHABETICAL LISTING

A. Morton Thomas and Associates, Inc.
Booth #: 241
Contact: Khossrow Babaei, PE, SE
Phone: 571-353-0631
E-mail: kbabaei@amtengineering.com
Website: www.amtengineering.com
AMT is a multi-disciplinary firm, providing wide-ranging engineering design and related services. With over 500 employees, AMT offers specific services, including: 1) bridge and structures design, assessment, rehabilitation, replacement and widening; 2) roadway design such as widening and intersection improvements; 3) traffic analyses and traffic control device design; 4) utility design, coordination, and relocation; 5) drainage, stormwater management and erosion/sediment control planning; 6) surveying; 7) landscape architecture; and 8) construction inspection and management services.

Acrow Bridge
Booth #: 300
Contact: Eugene Sobecki
Phone: 973-244-0080
Fax: 973-244-0085
E-mail: esobecki@acrow.com
Website: www.acrow.com
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Action Corrosion USA
Booth #: 419
Contact: Josh Burton
Phone: +61 414 533 960
E-mail: josh@actioncorrosion.com.au
Website: www.actioncorrosion.com
Our proprietary Roller Rehab Bridge Bearing Service rehabilitates bearings instead of replacing them. This rail approved process is cost effective with no road or track shut down and has a minimal impact to the environment.

AECOM
Booth #: 420
Contact: Shane Beabes
Phone: 410-375-2183
Fax: 410-375-2183
E-mail: shane.beabes@aecom.com
Website: www.aecom.com
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All Access Rigging Co.
Booth #: 423
Contact: Amy Guzma
Phone: 412-877-9660
Fax: 866-491-2140
E-mail: amy@allaccessrigging.com
Website: www.allaccessrigging.com
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Allen Engineering Corporation
Booth #: 228
Contact: Mark Conte
Phone: 216-469-0005
E-mail: mark.conte@alleneng.com
Website: www.alleneng.com
Manufacturer of Bridge, Highway and Airport Paving Equipment for the Heavy Civil Market

American Composites Manufacturers Association (ACMA)
Booth #: 403/405
Contact: John P. Busel
Phone: 914-961-8007
E-mail: jbusel@acmanet.org
Website: www.discovercomposites.com
ACMA is the world's largest composites trade association. The Transportation Structures Council and FRP Rebar Manufacturers Council serve to inform and educate engineers on FRP composites used in infrastructure applications. Products on display include FRP bridge decks, rebar, girders, bridge pier protection, and concrete repair/strengthening systems. Today there is a better way to make things – Composites – An infinite world of possibilities. Visit, www.discovercomposites.com, www.acmanet.org, www.thecamx.org.

American Piledriving Equipment
Booth #: 431
Contact: Jimmy Deemer
Phone: 757-373-9328
Fax: 757-518-9741
E-mail: jimmyd@apevibro.com
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American Piledriving Equipment, and its wholly owned subsidiary J&M Foundation Equipment, manufacture and sell deep foundation construction equipment direct to the contractor. APE is one of the largest providers of deep foundation installation equipment in the world. We manufacture Vibratory hammers, diesel and hydraulic impact hammers, rotary drills & augers, wick drain installation equipment, drill rigs, pile rigs and leader systems. A recent introduction of APE's HD drilling equipment makes possible the fast installation of high strength piles in all ground conditions...

Exhibitors
ALPHABETICAL LISTING

American Segmental Bridge Institute (ASBI)
Booth #: 215
Contact: William R. Cox
Phone: 512-523-8214
Fax: 512-523-8213
E-mail: wrcox@asbi-assoc.org
Website: www.asbi-assoc.org
A nonprofit organization to provide a forum where owners, designers, constructors, and suppliers can meet to further refine current design, construction and construction management procedures, and evolve new techniques that will advance the quality and use of concrete segmental bridges.

Anderson Hydra Platforms, Inc.
Booth #: 214
Contact: Cynthia Dandridge
Phone: 803-366-8195.2
Fax: 803-366-0603
Email: cyndi@inspectabridge.com
Website: www.inspectabridge.com
Manufacturer of under bridge work/inspection platforms. Nationwide sales, service and rental.

Armtec LP
Booth #: 141
Contact: Michael Pruden
Phone: 909-615-2037
Fax: 850-665-0143
E-mail: michael.pruden@armtec.com
Website: www.armtec.com/locations/location_detail/us-sales-soundwalls-office/21/l:eng
Manufacturer and supplier of the Durisol Absorptive Noise Barrier System and the Acrylite Soundstop Transparent Noise Barrier Systems. To include, the FHWA approved Acrylite Soundstop Transparent TL-4 Crash Tested Noise Barrier System.

AUR, Inc.
Booth #: 212
Contact: Dr. Roger L. Simpson
Phone: 540-961-3005
Fax: 866-223-8673
E-mail: rogersimpson@aurinc.com
Website: www.noscour.com
Scour of bridge piers and abutments is a common cause of bridge failure over water. AUR, Inc. analyzes the scour and designs and manufactures PROVEN streamlined scour-vortex-preventing products (scAUR and VorGAUR) for PERMANENT and cost-effective scour prevention of bridge pier and abutment local and contraction scour. Products for retrofits of existing bridges and new bridges are available (www.NoScour.com). This permanent solution costs less than 10% of temporary scour countermeasures over the life of a bridge.

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AZZ Metal Coatings
Booth #: 205
Contact: Mike Stroia
Phone: 330-327-2080.2
Email: mikestroia@azzgalv.com
Website: www.azz.com
For decades, AZZ has been protecting critical infrastructure from the destruction of corrosion as North America's leading provider of galvanizing for prefabricated steel. AZZ offers continuous galvanized rebar, powder coating, metalizing and steel surface treatment. Our comprehensive metal coating capabilities create enduring infrastructure for constructing a stronger, safer world. AZZ GalvaBar, AZZ GalvXtra Natina, AZZ GalvXtra Color and AZZ Metalizing are available AZZ Metal Coatings services in addition to our award-winning AZZ Galvanizing Services.

BDB Bridge Precast Steel
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Contact: Jim Benzing or Gary Dinmore
Phone: 470-Benzing
E-mail: Bflok@structuralservices.com
Website: www.structuralservices.com
BDB Bridge is a rental company that specializes in temporary bridge supports & structures. BDB strives to put themselves ahead of others thru innovations in jacking equipment; such as our HYDRA-TOWER™ which makes splicing girders and bearing replacements easier than ever. BDB also shares in the innovative product that's revolutionizing the way bridge overhangs are constructed, namely PRECASTEEL® SIP Fascia Forms.

BDI - Infrasense
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Contact: Jesse Grimson
Phone: 720-273-8943
E-mail: dianas@bditest.com
Website: http://bditest.com http://www.infrasense.com
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Bentley Systems, Inc.
Booth #: 242
Contact: Alex Mabrich
Phone: 954-343-9334
E-mail: Alex.Mabrich@bentley.com
Website: www.bentley.com
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Exhibitors
ALPHABETICAL LISTING

BERD
Booth #: 143
Contact: Brigitte Rouquet
Phone: 351-229-399-520
E-mail: brigitte.rouquet@berd.eu
Website: www.berd.eu
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Booth #: 224
Contact: Clay Davis
Phone: 912-245-1893
E-mail: cdavis@berkelandcompany.com
Website: www.berkelandcompany.com
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Big R Bridge
Booth #: 304
Contact: Mike Napior
Phone: 770-468-4405
Email: mnapior@bigrbridge.com
Website: www.bigrbridge.com
Big R Bridge, a member of the AIL Group of Companies, is a world leader in developing innovative engineered solutions in Prefabricated Bridges, Structural Plate, MSE Wall Systems, Sound Wall Systems, and Corrugated Pipe for the transportation, public works, railway, mining, forestry and development sectors.

BrandSafway
Booth #: 225/227/229/324/326/328
Contact: Heather Shugarman
Phone: 518-381-6000
Fax: 518-381-4613
E-mail: hshugarman@brandsafway.com
Website: www.brandsafway.com/
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– allows us to offer the most efficient and cost-effective site-specialized craft services. BrandSafway supports maintenance, renovation and new construction projects.

Bridge design & engineering

Booth #: 421
Contact: Adele Humphries
Phone: +44 (0)7905 374448
E-mail: a.humphries@hgluk.com
Website: https://bridgeweb.com/
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Bridge Grid Flooring Manufacturers Association (BGFMA)

Booth #: 112
Contact: Phil Gase
Phone: 877-257-5499
E-mail: bgfma@bgfma.org
Website: www.bgfma.org
The Bridge Grid Flooring Manufacturers Association (BGFMA) industry group is comprised of companies that fabricate steel grid deck systems for bridges and other companies with an interest in this market. Building on the near 100-year service history of concrete filled grid systems, this expanded professional organization is focused on the reliable development and application of open grid, grid reinforced concrete, and Exodermic® bridge decks to meet the demands of the engineering community and traveling public.

Bridon-Bekaert Ropes Group

Booth #: 441
Contact: Jessica Novitski
Phone: 570-822-3349
E-mail: jessica.willner@bridon-bekaert.com
Website: www.bridon-bekaert.com
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Exhibitors
ALPHABETICAL LISTING

Bureau Veritas North America
Booth #: 302
Contact: Roberta Luba
Phone: 412-503-4107
Fax: 412-921-8836
E-mail: roberta.luba@us.bureauveritas.com
Website: www.us.bureauveritas.com
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Buzzi Unicem USA
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Contact: William Krupa
Phone: 484-264-2141
E-mail: william.krupa@buzzinicemusa.com
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Campbell Scientific
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Contact: Brittany Batt
Phone: 435-227-9710
Fax: 435-227-9001
E-mail: bbatt@campbellsci.com
Website: www.campbellsci.com/bridge-monitoring
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E-mail: sales@decorcable.com
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CBSI

Booth #: 101/200
Contact: Jerry V. Clodfelter
Phone: 713-675-1180
Fax: 713-675-1140
E-mail: jvclodfelter@cbsii.com
Website: www.cbsiusa.com
CBSI is the definitive resource for engineering matters relating to cable-supported structures. In addition to consulting services, CBSI personnel design, contract for, storehouse, and supply both custom and standard bridge strands, ropes and related structural sockets, casting and forgings. We are driven by a determination to provide each client with the finest products and services available today. We know the excellence of our work is our most important asset.

ChemCo Systems

Booth #: 409
Contact: John Bors
Phone: 650-261-3790
Fax: 650-261-3799
E-mail: bors@chemcosystems.com
Website: www.chemcosystems.com
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China: Featured Country of the 2018 IBC

Booth #: Rear/Cental of Exhibit Hall
Contact: Xiuqin Duan
Phone: 86-10-6428-3470
Fax: 86-10-6481-3501
E-mail: duanxiuqin@hotmail.com
Visit our mega-display in the IBC Exhibit Hall showcasing the bridge program of China.

Coastal Precast Systems

Booth #: 453
Contact: Dave Neal
Phone: 757-545-5215
Fax: 757-545-6296
E-mail: dave@cpsprecast.com
Website: www.cpsprecast.com
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Exhibitors
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Computers & Structures, Inc.
Booth #: 303/305
Contact: Miriam L. Storch
Phone: 510-649-2201
Fax: 510-649-2299
E-mail: sales@csiamerica.com
Website: www.csiamerica.com
Founded in 1975, Computers & Structures, Inc. is recognized worldwide as the innovative leader in the development of software tools for structural & earthquake engineering. CSI products are used by thousands of engineering firms involved in the design ofbuildings, bridges, dams, and other major projects in over 160 countries. CSI software tools—which include SAP2000, CSiBridge,ETABS, SAFE, and PERFORM 3-D—are the choice of sophisticated design professionals worldwide.

Contech Engineered Solutions
Booth #: 422
Contact: Lisa Doroba
Phone: 800-338-1122
E-mail: info@conteches.com
Website: www.conteches.com
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Contractors Materials Company
Booth #: 322
Contact: Dave Friedman
Phone: 1-513-733-3000
Fax: 513-956-3173
E-mail: dfriedman@cmcmmi.com
Website: www.cmcmmi.com
Contractors Materials Company is located in Cincinnati, OH and is a 111 year old company specializing in the supply & fabrication of concrete reinforcement products for the construction industry. CMC has the most modern technology and equipment with the ability to produce continuous stainless steel rebar lengths of #3 - #11 rebar up to 60' as well as fabricate to your project design. We pride ourselves on being the premier fabricator and supplier of Stainless Steel Reinforcement in North America.

CTS Cement Manufacturing Corporation
Booth #: 402
Contact: Chris Davis
Phone: 973-568-3134
E-mail: cdavis@ctscement.com
Website: www.ctscement.com
CTS manufacturers Rapid Set® cement and Type K shrinkage compensating cement (SCC). Rapid Set allows bridge deck overlays to be completed faster, with higher quality, long-term performance than Portland cement concrete. SCC has been used in over 800 bridge decks with reduced permeability, excellent durability and little to no cracks.

Exhibitors

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D.S. Brown

Booth #: 211
Contact: Chris Youngless
Phone: 419-257-3561
Fax: 419-257-2200
E-mail: dsb@dsbrown.com
Website: www.dsbrown.com

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Deep Foundations Institute (DFI)

Booth #: 434
Contact: Mary Ellen Bruce Large, P.E., D.GE
Phone: 973-423-4030
Fax: 973-423-4031
E-mail: melarge@dfi.org
Website: www.dfi.org

Deep Foundations Institute® is an international association of contractors, engineers, manufacturers, suppliers, academics and owners in the deep foundations industry. Our multidisciplinary membership creates a consensus voice and a common vision for continual improvement in the planning, design and construction of deep foundations and excavations. We bring together members through networking, education, communication and collaboration. With our members, we promote the advancement of the deep foundations industry through technical committees, educational programs and conferences, publication of guides and specifications, a peer-reviewed...

Dynamic Isolation Systems

Booth #: 451
Contact: Tyler Jacob
Phone: 775-359-3333
Fax: 775-359-3985
E-mail: sales@dis-inc.com
Website: www.dis-inc.com

Dynamic Isolation Systems is a world leader in earthquake protection with over 450 projects completed in 22 countries. DIS designs and manufactures Lead Rubber Bearings (LRBs) for base isolation of bridges. LRBs allow bridges to survive earthquakes with no damage while providing cost savings on substructures due to reduced forces. LRBs require no maintenance and are extremely durable.

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DYWIDAG-Systems International
Booth #: 342
Contact: Ken Purinton
Phone: 610-268-2221
E-mail: ken.purinton@dsiamerica.com
Website: www.dsiamerica.com
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Phone: 845-235-4370
E-mail: sloughran@e2chem.com
Website: www.e2chem.com
Echem Consultants LLC is a material science consultancy whose primary focus is understanding material durability of the built environment. Our work includes diagnostics, analysis and repair of existing structures and advice on material selection, design and construction monitoring for new construction. Echem aims to assist clients, owners, engineers, and architects on making durable choices for extending the life of structures. Echem Consultants is WBE, DBE and SBE.

Emseal Joint Systems
Booth #: 133/232
Contact: Andy Castillo
Phone: 508-330-7900
Fax: 508-836-0281
E-mail: acastillo@emseal.com
Website: www.emseal.com/bridge-expansion-joint-division/Expansion Joints and Construction Sealants: Expansion joint covers and sealants for the built environment. Waterproof, fire rated, trafficable, sound attenuating, insulating, air, wind, seismic, and watertight, building and bridge expansion joints and precompressed hybrid sealants.

Epoxy Interest Group of CRSI
Booth #: 329
Contact: Peter Fosnough
Phone: 630-380-5876
Fax: 847-517-1206
E-mail: pfosnough@epoxy.crsi.org
Website: www.epoxyinterestgroup.org
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Eriksson Technologies, Inc.

Booth #: 316
Contact: Roy L. Eriksson
Phone: 813-989-3317
E-mail: ericksson@eriktech.com
Website: www.eriktech.com
Eriksson Technologies & Software provides consulting engineering services and develops/markets engineering design software. Engineering primarily rendered to the precast/prestressed concrete fabricators that serve both commercial buildings and transportation market.

Euclid Chemical Company

Booth #: 103
Contact: Steve Scarpinato
Phone: 216-531-9222
Fax: 216-531-9596
E-mail: sscarpinato@euclidchemical.com
Website: www.euclidchemical.com
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Evonik Corporation

Booth #: 216
Contact: Peter DeNicola
Phone: 732-981-5462
E-mail: peter.denicola@evonik.com
Website: www.protectosil.com/product/protectosil
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Contact: Joe Rothwell
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Phone: +41 71 466 81 11
E-mail: info@fatzer.com
Website: www.fatzer.com
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Phone: 850-694-5778
E-mail: ngavalas@figgbridge.com
Website: www.figgbridge.com
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Fax: 703-378-2700
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Phone: 443-753-5511
E-mail: drobb@gpinet.com
Website: www.gpinet.com
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Harcon Corporation

Booth #: 400
Contact: Jesse Stoltzfus
Phone: 717-368-5395
Fax: 717-687-9296
E-mail: jesse@harconcorp.com
Website: www.harconcorp.com
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Phone: 410-551-1938
E-mail: jrhill@haywardbaker.com
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E-mail: cholzapfel@hilmanrollers.com
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Mageba USA

Booth #: 311
Contact: Joseph Bilotti
Phone: 929-246-3623
E-mail: info@magebausa.com
Website: www.magebausa.com
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Manufacturier Jenik inc. / 9323-3229 Québec Inc.

Booth #: 313
Contact: Sylvain Hubert
Phone: 819-701-2072.2
Fax: 450-446-5950
E-mail: shubert@jenikgroup.com
Website: www.jenik.ca
Jenik was founded in 1984 in Montreal, Canada. We specialize in Manufacturing, Sales & Rentals of Under Bridge Work Access Platforms and Bucket Trucks suitable for all types of work relating to bridge inspection, construction, repair, and maintenance in Canada for over 15 years and expanding operations to the USA. Our rental fleet includes well-known brands such as Jenik, Moog, Barin, Hydra Platforms and Aspen Aerials. Our equipment complies with ANSI Standards.

Marine Solutions

Booth #: 115
Contact: Matt Owings, P.E.
Phone: 443-484-2394
Fax: 859-554-4100
E-mail: mowings@MSImarinesolutions.com
Website: www.MSImarinesolutions.com
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MDX Software

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Michael Baker International

Booth #: 201/203
Contact: John Dietrick
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E-mail: jdietrick@mbakerintl.com
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MISTRAS Group, Inc

Booth #: 105
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E-mail: sales.systems@mistrasgroup.com
Website: www.mistrasgroup.com
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Contact: Lee Johnson
Phone: 480-396-7124
E-mail: lee.johnson@cmc.com
Website: www.mmfx.com
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NANOKOTE North America, Inc.

Booth #: 111
Contact: Simon King
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Fax: 469-716-4016
E-mail: info@nanokote.com
Website: www.nanokote.com
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National Steel Bridge Alliance (NSBA)

Booth #: 213
Contact: Jeff Carlson
E-mail: carlson@aisc.org
Website: www.steelbridges.org
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New Millennium Building Systems

Booth #: 336
Contact: Rich Madden
Phone: 260-969-3582
E-mail: rich.madden@newmill.com
Website: www.newmill.com
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Norchem, Inc.

Booth #: 430
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Phone: 631-724-8639
E-mail: jim@norchem.com
Website: www.norchem.com
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Olson Engineering, Inc.
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Phone: 303-423-1212
Fax: 303-423-6071
E-mail: janet.shriner@olsonengineering.com
Website: www.olsonengineering.com
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Website: www.perrymanco.com
Perryman Company is a vertically integrated producer of specialty titanium products. Our operations include melting, forging, and fabrication to finished products. Perryman supplies and services customers in the aerospace, medical, infrastructure, consumer, recreation and 3D printing/additive manufacturing markets worldwide. Approvals include ISO9001:2015; and AS9100. Perryman Company is headquartered in Houston, Pennsylvania. Company offices are located in Philadelphia, Los Angeles, London, Zurich, Tokyo, and Xi'an.

Pharos Marine Automatic Power, Inc.

Booth #: 236
Contact: Phillip White
Phone: 713-228-5208
Fax: 713-228-3717
E-mail: pwhite@automaticpower.com
Website: www.automaticpower.com
Pharos Marine Automatic Power, Inc. designs, manufactures, installs, and services navigation aids, including lanterns, beacons, fog signals, fog detectors, bridge lights, Litepipes, traffic gate systems, solar/battery charging systems, warning and alarm systems, aviation obstruction lights, and other related equipment. We have been the industry leader for over 50 years, and our custom-made products are designed to provide the highest level of reliability, visibility, and safety.

Pile Dynamics, Inc./GRL Engineers

Booth #: 433
Contact: Tom Tutolo / Pat Hannigan
Phone: 216-831-6131
E-mail: ttutolo@pile.com / info@grlengineers.com
Website: www.pile.com / www.grlengineers.com
Pile Dynamics, Inc. is the world's leading developer and manufacturer of quality assurance testing systems for the deep foundations industry. Since 1972, it has been expanding its state of the art QA systems including: Pile Driving Analyzer®, Pile Integrity Tester, Cross-Hole Analyzer, Thermal Integrity Profiler, Pile Installation Recorder, GRLWEAP (pile driving simulation software), SPT Analyzer, Shaft Quantitative Inspection Device (SQUID) and more. Headquartered in Cleveland, OH, USA. GRL Engineers, Inc. specializes in analyzing and testing deep foundations with services such as...

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Post-Tensioning Institute
Booth #: 455
Contact: Ted Neff
Phone: 248-848-3180
E-mail: news@post-tensioning.org
Website: www.post-tensioning.org
The Post-Tensioning Institute (PTI)is a nonprofit organization for the advancement of post-tensioned, prestressed concrete design and construction. PTI represents a community of businesses and professionals dedicated to expanding quality post-tensioning applications. PTI advocates the quality use of post-tensioning by providing education, certification, and codes & standards, as well as promoting the industry and supporting research.

Precast/Prestressed Concrete Institute
Booth #: 107
Contact: William Nickas
Phone: 850-510-8621
Fax: 312-621-1114
E-mail: wnickas@pci.org
Website: www.pci.org
PCI develops, maintains and disseminates the Body of Knowledge for the precast/prestressed concrete structures industry. PCI provides technical resources, certification, and education, as well as conducts industry events, R&D, and more.

Quinn Consulting Services, Inc.
Booth #: 343
Contact: Roger Triana
Phone: 540-850-0435
Fax: 703-818-9392
E-mail: rtriana@quinn-consulting.com
Website: www.quinn-consulting.com
DBE/WBE certified firm established in 1997 that specializes in Construction Management, Construction Inspection, and Engineering Services. Areas of expertise include: Coatings and Drone Inspections for Bridges and Water Tanks / Road and Bridge CM Inspections / Rail Systems / Bridge Safety Inspections. Providing QAM/QA/QC inspection services on a number of alternate delivery Design - Build and P3 Projects. Providing services to the Federal Highway, DOTs and localities across the Mid-Atlantic and Northern states region.

R.J. Watson, Inc.
Booth #: 301
Contact: Zack Searer
Phone: 716-548-6206
E-mail: zsearer@rjwatson.com
Website: https://www.rjwatson.com/
R.J. Watson, Inc. is a structural engineering and manufacturing company specializing in the engineering, design, manufacturing, and testing of bridge bearings and expansion joint systems. R.J Watson, Inc. also supplies spray coating systems, FRP strengthening systems, noise mitigation materials, and cable protection technologies. R.J. Watson, Inc. was founded in 1992 by current Owner and President, Ronald Watson.

Redi-Rock International

Booth #: 427
Contact: J. Scott Mathie
Phone: 414-412-7888
E-mail: smathie@redi-rock.com
Website: www.redi-rock.com
Redi-Rock® is a complete wall solution that uses giant concrete blocks (1,500 - 4,900 lb/block) that stack up like Legos and allow for retaining and sea wall heights to exceed that of typical retaining wall options. The Redi-Rock® Positive Connection (PC) System for MSE walls provides a massive amount of connection strength with virtually no chance of a connection failure because the grid wraps through the block. Stop by our exhibit to learn how we can assist in your next bridge...

Reinforced Earth Company, The

Booth #: 411
Contact: Joe Harris
Phone: 800-446-5700
E-mail: jharris@reinforcedearth.com
Website: www.reinforcedearth.com
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Resensys LLC

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Contact: Mehdi Kalantari
Phone: 301-405-9108
E-mail: mehdi@resensys.com
Website: www.resensys.com
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Roads & Bridges
Booth #: 323
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Phone: 512-739-2102
Fax: 847-390-0408
E-mail: bwilliamson@sgcmail.com
Website: www.roadsbridges.com
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Salit Specailty Rebar LLC
Booth #: 416
Contact: Kevin Cornell
Phone: 716-299-1990
Fax: 716-299-1993
E-mail: kcornell@stainlessrebar.com
Website: www.stainlessrebar.com
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Fax: 775-284-8501
E-mail: sales@scougalrubber.com
Website: www.scougalrubber.com
Manufacturer of elastomeric bridge bearing pads, bearing assemblies, PTFE slide assemblies, and custom molded rubber parts.

Sea Safety/Sealite
Booth #: 325
Contact: Joseph F. Richter
Phone: 603-554-2868
Fax: 603-737-1320
E-mail: j.richter@sealite.com
Website: www.sealite.com
Sea Safety: Sea Safety International (Secaucus, NJ) is a leading maritime safety equipment distributor. We exclusively distribute Sealite LED bridge navigation aids which are USCG compliant and obstruction lights that are FAA compliant. The lights can be powered with 110-240VAC or 12-24VDC Solar. There are applications for AIS, monitoring and control. For construction phase we offer USCG Regulatory Buoys and marine lanterns for temporary bridge navigation aids and for marking obstructions to navigation. Sealite: Sealite USA, in conjunction with distributor...

SGS North America Inc.

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Contact: Terry Tamutus
Phone: 609-433-8485
E-mail: terry.tamutus@sgs.com
Website: www.sgs.com
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Booth #: 222
Contact: Rich Tavoletti
Phone: 412-458-5822
E-mail: rtavoletti@steel.org
Website: www.shortspansteelbridges.org
Short Span Steel Bridge Alliance is a group of bridge and buried soil structure industry leaders providing educational information on the design and construction of short span steel bridges up to 140' in length. Visit www.espan140.com for free preliminary short span steel bridge designs.

Sika Corporation

Booth #: 401
Contact: Tessy Reumer
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Fax: 201-933-6225
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Website: www.usa.sika.com
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Sixense, Inc.

Booth #: 412
Contact: Stephen Schorn
Phone: 703-798-0474
E-mail: stephen.schorn@sixense-group.com
Website: www.sixense-group.com
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Skyline Steel

Booth #: 445
Contact: Sylvana Salgado
Phone: 321-274-9285
E-mail: sylvana.salgado@skylinesteel.com
Website: www.skylinesteel.com
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Phone: 49-911-39901-48
E-mail: andrea.weber@sofistik.de
Website: www.sofistik.com
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Website: www.stlouisscrewbolt.com
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Email: kcornell@stainlessrebar.com
Website: www.stainlessrebar.com

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Stronghold Coating Systems, Ltd.

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Phone: 937-704-4020
Fax: 513-834-7003
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Website: www.strongholdone.com
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Booth #: 424/426
Contact: Bassim Oshiba
Phone: 832-732-2534
Fax: 713-681-6233
E-mail: bassim.oshiba@tidelandsignal.com
Website: www.tidelandsignal.com
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TRC Engineers Inc.
Booth #: 210
Contact: Terry Maechler
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E-mail: tmaechler@trcsolutions.com
Website: www.trcsolutions.com; www.trcbridgedesignsoftware.com
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U.S. Bridge

Booth #: 237
Contact: Brian Mergenthaler
Phone: 412-445-7661
E-mail: bmergenthaler@usbridge.com
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UHPC Solutions

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E-mail: davide.difalco@uhpcsolutions.com
Website: www.uhpcsolutions.com
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Phone: 916-987-0246
E-mail: vinfo@viathor.com
Website: www.viathor.com
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Wagners Composite Fibre Technologies

Booth #: 243
Contact: Ken Robinson
Phone: +61 417 610 813
E-mail: Ken.Robinson@wagnerscft.com
Website: www.wagnerscft.com
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Contact: Amy Leland
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Fax: 360-705-6814
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Website: www.wsdot.wa.gov
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Fax: 716-691-9239
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WSP USA

Booth #: 315
Contact: Anthony Sheldon
Phone: 410-246-0522
E-mail: anthony.sheldon@wsp.com
Website: www.wsp.com
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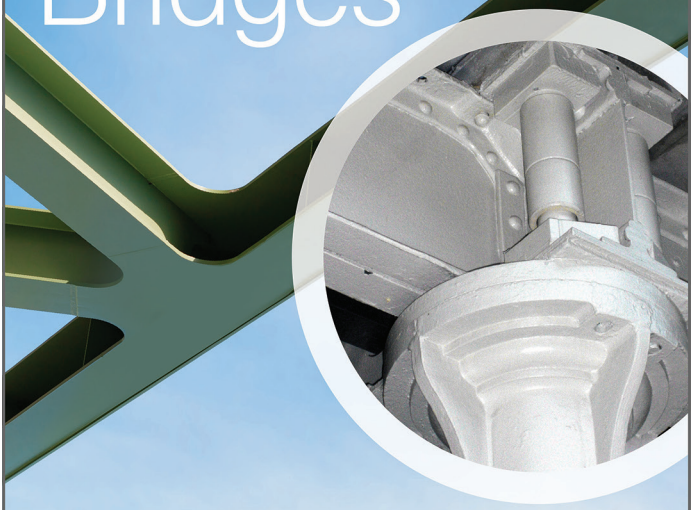

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