

34TH ANNUAL

INTERNATIONAL BRIDGE CONFERENCE®

OFFICIAL CONFERENCE GUIDE

JUNE 5-8, 2017
GAYLORD NATIONAL RESORT, NATIONAL HARBOR, MD



CSI BRIDGE[®]

2017

INTEGRATED 3-D BRIDGE DESIGN SOFTWARE

From the developers of SAP2000[®]

A product of Computers and Structures, Inc. | Proudly developed in the United States of America

THE **FUTURE** OF
BRIDGE ENGINEERING
IS **HERE.**

For more information:
(510) 649-2201 or sales@csiamerica.com



COMPUTERS & STRUCTURES, INC.
Software for Structural and Earthquake Engineering

www.csiamerica.com

CSI is an ISO-9001 certified company.

TECHNICAL SESSIONS

ABC, Part 1	28
ABC, Part 2	37
Construction, Part 1	30
Construction, Part 2	38
Design	33
Design/Build	45
Design & Construction	40
Design/Seismic.....	55
Featured Agency.....	24
Foundations.....	42
Inspection/Analysis.....	20
Keynote	23
Liberty Bridge.....	19
Load Testing/Instrumentation	48
Long Span/Cable Stay.....	46
Long Span/Segmental	53
Maintenance/Management.....	52
Proprietary	24
Rail	35
Rehab, Part 1	49
Rehab, Part 2.....	57
Skewed Bridges.....	18
Special Topics - Pedestrian Bridges & Tunnels.....	22

WORKSHOPS

W-1: Evaluating Internal Redundancy... ..	26
W-2: International Bridge Engineering Practices.....	26
W-3: BrIM Using Bridge Models After the Design Process	27
W4: Bridge Load Rating and Posting... ..	27
W5: Drones - Regulation, Technology, and the Future.....	43
W6: FRP Composites Impact to Sustainable Design... ..	51
W7: Development of Spliced Precast Girder Bridge Technology	59
W8: Introduction to Steel Bridge Fatigue and Fracture Design	60
W9: Complex Bridge Analysis Software	60
W10: Bridges to Prosperity	61
W11: Implementing Bridge Management Systems	61
W12: ABC Systems	62
W13: Engineering Ethics	63

OTHER

Awards Information	16
Exhibits	10 & 64
General Information.....	2-16
International Reception	27
Posters Session.....	63
Sponsors.....	14-15
Boat Tour.....	9

TIME	SESSION	ROOM
MONDAY, JUNE 5		
8:00–10:00 a.m.	Skewed Bridges	Baltimore 3
8:00–10:00 a.m.	Liberty Bridge	Annapolis 1/2/3
8:00–10:00 a.m.	Inspection/Analysis	Woodrow A
8:00–10:00 a.m.	Pedestrian Bridges & Tunnel Inspection	Woodrow B/C/D
10:30 a.m.–12:00 noon	Keynote Session	Cherry Blossom BR
12:00 noon–2:00 p.m.	Exhibit Hall Luncheon	Prince George Hall B
2:00–5:00 p.m.	Featured Agency Session: DDOT	Cherry Blossom BR
2:00–4:00 p.m.	Proprietary Session	Woodrow B/C/D
2:00–5:00 p.m.	W1: Evaluating Internal Redundancy of Built-Up...	Baltimore 3
2:00–5:30 p.m.	W2: International Bridge Engineering Practices	Annapolis 1/2/3
2:00–5:00 p.m.	W3: BrIM Using Bridge Models after the Design Process	Woodrow A
2:00–5:00 p.m.	W4: Bridge Load Rating and Posting for State-Specific Legal Loads	Magnolia 1
5:00–6:00 p.m.	International Welcome Reception	Cherry Blossom Foyer
5:00–7:00 p.m.	Exhibit Hall Reception	Prince George Hall B
TUESDAY, JUNE 6		
8:00 a.m.–12:00 noon	ABC, Part 1	Baltimore 3
8:00 a.m.–12:00 noon	Construction, Part 1	Annapolis 1/2/3
8:00 a.m.–12:00 noon	Design	Woodrow A
8:00 a.m.–12:00 noon	Rail	Woodrow B/C/D
12:00 noon–2:00 p.m.	Exhibit Hall Luncheon	Hall B
1:00–5:00 p.m.	Boat Tour	
2:00–5:00 p.m.	ABC, Part 2	Baltimore 3

TIME	SESSION	ROOM
2:00–5:00 p.m.	Construction, Part 2	Annapolis 1/2/3
2:00–5:00 p.m.	Design & Construction	Woodrow A
2:00–5:00 p.m.	Foundations	Woodrow B/C/D
2:00–5:00 p.m.	W5: Drones	Magnolia 1
5:30 p.m.	IBC Awards Dinner	Cherry Blossom BR

WEDNESDAY, JUNE 7

7:30–9:00 a.m.	Exhibit Hall Breakfast	Prince George Hall B
9:00 a.m.–12:00 noon	Design/Build	Baltimore 3
9:00 a.m.–12:00 noon	Long Span/Cable Stay	Annapolis 1/2/3
9:00 a.m.–12:00 noon	Load Testing/Instrumentation	Woodrow A
9:00 a.m.–12:00 noon	Rehab, Part 1	Woodrow B/C/D
9:00 a.m.–12:00 noon	W6: FRP Composites Impact to Sustainable Design...	Magnolia 1
12:00 noon–2:00 p.m.	Exhibit Hall Luncheon	Prince George Hall B
2:00–5:00 p.m.	Maintenance/Management	Baltimore 3
2:00–5:00 p.m.	Long Span/Segmental	Annapolis 1/2/3
2:00–5:00 p.m.	Design/Seismic	Woodrow A
2:00–5:00 p.m.	Rehab, Part 2	Woodrow B/C/D
2:00–5:00 p.m.	W7: Development of Spliced Precast Girder Bridge Technology	Magnolia 1

THURSDAY, JUNE 8

8:00–12:00 noon	W8: Intro to Steel Bridge Fatigue	Annapolis 1
8:00–10:00 a.m.	W9: Complex Bridge Analysis Software	Annapolis 2
8:00–11:00 a.m.	W10: Bridges to Prosperity	Annapolis 3
8:00–11:00 a.m.	W11: Implementing Bridge Asset Management Systems	Annapolis 4
8:00–12:00 noon	W12: ABC Systems	Baltimore 3
11:00 a.m.–12:00 noon	W13: Engineering Ethics	Annapolis 2

CHAIRMAN'S WELCOME

By Matt Bunner

On behalf of the Engineers' Society of Western Pennsylvania (ESWP) and the Conference Executive Committee, welcome to the 34th Annual International Bridge Conference! This year we return to our Nation's Capital and to the wonderful facilities provided at the Gaylord National Resort and Convention Center. Last year was our first year hosting in the D.C. area. This followed over three decades of the ESWP hosting the Conference in Pittsburgh.



Last year we felt a new sense of interest and enthusiasm from our attendees and exhibitors. Making the monumental move from Pittsburgh was a challenge for many of us on the Executive Committee who have roots in the City of Bridges. However, we found the new site in National Harbor a welcoming venue with many benefits and enhancements that helped make the 33rd Conference successful and memorable. We look forward to continued growth and success this year for the IBC, the pre-eminent international technical bridge conference and exhibition.

This year we are honored to welcome, from just a few miles away, the District Department of Transportation (DDOT) as our Featured Agency. DDOT manages and maintains the transportation infrastructure for the District of Columbia. On Monday June 5th, DDOT will host a Featured Agency Session that will provide an overview of their bridge program, a discussion of their historic structures, and focused presentations on an interesting and varied collection of their bridge projects. DDOT will also host a special area on our exhibit floor. We invite you to stop by and learn more about DDOT and their bridge program.

Our Conference is once again blessed with so many outstanding technical presentations that we are starting our Technical Sessions bright and early in the morning on Monday, June 5th. Later that same morning, our Keynote Session will signal the official start of the Conference. This year we are excited to be joined by Mr. Leif Dormsjo, Director of DDOT. In addition, Mr. Joseph Abriatis, who works for the Architect of the Capitol and was the construction manager for the U.S. Capitol dome restoration project, and Mr. Scott Jarvis, who is Chief Engineer for the California High Speed Rail Authority will be presenting on their landmark projects. Additionally, FHWA's Thomas Everett, P.E. has been invited as our keynote speaker. We look forward to his insight into the new administration's plans for major infrastructure investments which will help repair our existing infrastructure and fund new transportation projects.

The Executive Committee has always felt that the cornerstone of our Conference is our technical program that is second-to-none, something that attendees have come to expect at the IBC. This year will not disappoint as we have received and reviewed more abstracts than ever before from across the country

and around the world. We have worked diligently to select an outstanding group of nearly 110 presentations and 13 workshops that will fill the four days of the IBC with valuable information that will benefit you immeasurably in your future work.

A new highlight on the afternoon of Tuesday, June 6th, will be a Boat Tour presented in conjunction with DDOT. Those attending will be picked up in National Harbor and will cruise the Potomac and Anacostia Rivers for the afternoon, viewing the bridges and other monuments along the way. DDOT representatives will be on hand providing narration along the tour route. You will arrive back at National Harbor late in the afternoon in time for Tuesday night's Awards Dinner. Our Awards Committee has reviewed many outstanding nominations this year and selected a most-impressive group of winners. This includes Mr. Vijay Chandra, winner of the John J. Roebling Lifetime Achievement Award. Mr. Chandra served as a Senior Bridge Technical Manager for Parsons Brinckerhoff and guided the design of numerous signature bridge projects over his many years of service to our profession. Seating is limited and a separate registration fee is required for both the Tour and the Awards Dinner, so be sure to sign-up early.

Building on the incredibly strong response from exhibitors last year, we expect over 150 booths this year in our Exhibit Hall, which will provide an excellent venue to network with others from across the bridge community. Our Exhibit Hall will host lunches on Monday through Wednesday, an evening reception on Monday, and a new breakfast event on Wednesday morning. The format will once again enable our exhibitors to attend our technical sessions.

Please join me in thanking the volunteer Executive Committee members, as well as the ESWP Staff, who have worked diligently over the past year to organize an outstanding program of technical presentations, workshops, exhibits and special events highlighting recent developments, current trends and state-of-the-art practices in the bridge industry. The Committee's goal is to provide this exciting program in a comfortable and enjoyable atmosphere. When you see Committee members throughout the week, please provide feedback to them on your experience and ways you feel that we can improve the Conference. We hope you have a rewarding experience this year and will return again in 2018 for the 35th anniversary Conference where we will feature the People's Republic of China.

We are so happy that you have joined us for this year's IBC!



Matthew A. Bunner, P.E.

Matt Bunner is the General Chair of the 2017 International Bridge Conference® and a Vice President and Senior Professional Associate for HDR Engineering, Inc.

**Iconic.
Impactful.
Reliable.**

World-class
bridge design

aecom.com

AECOM

PEOPLE FOCUSED

WRA

PROJECT DRIVEN

WWW.WRALLP.COM

- Accelerated Bridge Construction
- Bridge Design, Rehabilitation, and Replacement
- Design-Build
- Program Management Services
- Innovative Technologies
- NBIS Bridge Inspections
- Railroad and Transit Bridges
- Geotechnical Analysis and Foundation Design

IBC

GENERAL INFORMATION

WELCOME

Welcome to the 2017 International Bridge Conference® (IBC), sponsored by the Engineers' Society of Western Pennsylvania (ESWP) — our 34th annual conference! 2017 marks our return to the Gaylord National Resort and Convention Center, in National Harbor, MD, 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 District of Columbia Department of Transportation, (DDOT) as our Featured Agency to showcase their bridge program. The 2017 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.nationalharbor.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: tours, the IBC Awards Dinner, and conference proceedings require an additional registration fee. Please visit the Conference Registration Desk for details.

REGISTRATION DESK

The Conference Registration Desk is located on the 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 do 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 6 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.

IBC

GENERAL INFORMATION

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 1 GB flash drive that contains all available pre-prints in .PDF format for only \$30.00. Also, you can find copies of previous years' IBC Proceedings (for \$55 per volume).

PROCEEDINGS

Proceedings are an optional order-only purchase and may be ordered in advance or on-site at the IBC for \$30.00. Following the conference, proceedings may be ordered for \$55.00. The official proceedings of the 34th Annual International Bridge Conference® will be available in late Summer 2017.

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

Please note the common use of abbreviations throughout this guide, including:

DOT = Department of Transportation

DDOT = District of Columbia Department of Transportation

ft or ' = foot

m = meters

" = 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. Official confirmation from the IBC Offices regarding each attendee's eligibility for PDHs will be mailed after the Conference. PDH Request Letters must be returned to ESWP. (PDH Letters can be obtained at the Conference Registration Desk or website, or by contacting the Engineers' Society of Western PA, sponsors of the IBC.)

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

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 B. You will be able to view the exhibits during the following hours:

- Monday, June 5: 12:00 noon—2:00 p.m. with a strolling luncheon buffet
- Monday, June 5: 5:00—7:00 p.m. with appetizers and bar service
- Tuesday, June 6: 10:00 AM—2:00 p.m. with a strolling luncheon buffet
- Wednesday, June 7: 7:30—9:00 a.m. with a continental breakfast
- Wednesday, June 7: 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 DDOT Featured Agency Exhibit in Baltimore 1 & 2 on the Hotel Ballroom Level, open most hours during the conference (Featured Agency Exhibit may be closed during IBC Exhibit Hall hours.)

COFFEE STAND

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

IBC GIFT ITEMS

Once again at this year's IBC, you will have the opportunity to purchase the popular IBC neckties, 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 2017 IBC!

IBC SPOUSE PROGRAM

The IBC Spouse Breakfast will be hosted at the Gaylord National Resort and Convention Center on Monday, June 5 at 10:00 AM. This includes a free continental breakfast and a brief presentation from the Director of Tourism of National Harbor. Also, there will be coupons and brochures offered for spouses to take with them. The IBC Spouse Breakfast is an opportunity for spouses to mingle and learn about the various activities they can explore during their stay.

ATTENDEE REGISTRATION LISTS

Conference registrations received prior to May 26 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 26, or on-site during the conference.

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

QUESTIONS?

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

JOIN US AT THE 2018 IBC!

Join us in 2018 for the International Bridge Conference®, June 10-14, 2018 as we return to the Gaylord National Resort and Conference Center, in National Harbor, MD. Many different sponsorship and exhibit opportunities are available - don't miss out and make your reservation early to take full advantage of all promotions!

GET INVOLVED!

Interested in presenting a paper, workshop, seminar presentation at a future IBC? The IBC Call For Papers will open immediately following the 2017 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, Matt Bunner, for his leadership in planning this years conference.

ELFATIH AHMED, Ph.D., P.E.

Co-Meetings Chair
A&A Consultants, Inc.

SHANE R. BEABES, P.E.

AECOM

CALVIN BORING, JR.

Construction Chair
Brayman Construction Corporation

ENRICO T. BRUSCHI, P.E.

AECOM

MATTHEW A. BUNNER, P.E.

Conference Chair
HDR Engineering, Inc.

JOHN C. DIETRICK, P.E., S.E.

Michael Baker International

KEVIN DURIS, P.E.

Trumbull Corp.

RAYMOND A. HARTLE, P.E.

Membership Chair
GAI Consultants, Inc.

DONALD W. HERBERT, P.E.

Pennsylvania DOT

TYSON HICKS

Joseph B. Fay Co.

GEORGE M. HORAS, P.E.

Magazine Co-Chair
Alfred Benesch & Company

M. PATRICK KANE, P.E.

Tour Chair
A&A Consultants, Inc.

DONALD KILLMEYER, JR., P.E.

ms consultants, inc.

BRIAN M. KOZY, Ph.D., P.E.

FHWA Office of Bridges and Structures

THOMAS G. LEECH, P.E., S.E.

Awards Chair, Magazine Co-Chair
Gannett Fleming, Inc.

M. MYINT LWIN, P.E., S.E.

Consultant

THOMAS P. MACIOCE, P.E.

Pennsylvania DOT

ELLIOT D. MANDEL, P.E.

AECOM

RONALD D. MEDLOCK, P.E.

Technical Program Chair
High Steel Structures

JANE-ANN PATTON, P.E.

Exhibits/Co Sponsors Chair
LOCHNER

REX L. PEARCE, P.E.

Virginia DOT

GERALD J. PITZER, P.E.

Consultant

MATTEO POZZI

Education/Student Award Chair

Carnegie Mellon University

W. JAY ROHLEDER JR., P.E., S.E.

FIGG

GARY RUNCO, P.E.

Strategic Planning Chair

Virginia DOT

HELENA RUSSELL

Bridge design & engineering

LOUIS J. RUZZI, P.E.

Keynote/Featured Agency Chair

Pennsylvania DOT

JEREMY SHAFFER, Ph.D., PMP

Bentley Systems, Incorporated

STEPHEN G. SHANLEY, P.E.

Workshops Chair

Allegheny County, Department of Public Works

RACHEL STIFFLER

Attendance/ Marketing Chair

Vector Corrosion Technologies

JAMES L. STUMP, P.E.

Pennsylvania Turnpike Commission

THOMAS J. VENA, P.E.

HNTB

KENNETH J. WRIGHT, P.E.

HDR Engineering, Inc.

HONORARY MEMBERS**CARL ANGELOFF, P.E., MSCE**

Con-Serv Inc.

VICTOR E. BERTOLINA, P.E.

Budget Chair

SAI Consulting Engineers, Inc.

RICHARD L. CONNORS, P.E., PMP

Rules Chair

County of Allegheny, Department of Public Works

JAMES DWYER

Advanced Rail Management Corporation

JOHN F. GRAHAM, JR., P.E.

Graham Consulting, LLC

HERBERT M. MANDEL, P.E.

Consultant

LISLE E. WILLIAMS, P.E., PLS

Consultant

EMERITUS MEMBERS**JOEL ABRAMS, Ph.D.**

Consultant

REIDAR BJORHOVDE, Ph.D., P.E.

The Bjorhovde Group

ARTHUR W. HEDGREN, JR., Ph.D., P.E.

Consultant



COMPUTERS & STRUCTURES INC.



CO-SPONSORS/MEDIA PARTNERS

Thanks to our many co-sponsors and media partners, who support the IBC throughout the year!

American Concrete Institute (ACI) www.concrete.org

American Metal Market (AMM) www.amm.com

American Society of Highway Engineers
(ASHE) www.ashe.pro

Associated Pennsylvania Constructors
(APC) www.paconstructors.org

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

Pile Driving Contractors Association
(PDCA) www.piledrivers.org

Precast/Prestressed Concrete Institute (PCI) www.pci.org

Short Span Steel Bridge Alliance (SSSBA) www.steel.org

The International Association of Foundation Drilling
(ADSC) www.adsc-iafd.com

Transportation Research Board (TRB) www.trb.org

Media Partners

ACCESS Magazine www.uctc.net/access

Better Roads www.betterroads.com

Bridge design & engineering www.bridgeweb.com

CoatingsPro Magazine www.coatingspromag.com

Roads & Bridges Magazine www.roadsbridges.com

The Journal of Protective Coatings & Linings and Paintsquare.com (JPCL)
www.paintsquare.com

V1 Media

ZweigWhite, LLC www.zweigwhite.com

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 2017 IBC Awards of Distinction. The IBC Awards will be presented in a ceremonial dinner on Tuesday, June 6 during the IBC. Advance reservations are required. Check with the IBC Registration Desk for seating availability. The honorees include:

John A. Roebling Medal

Honoring an individual for lifetime achievement in bridge engineering, we are pleased to recognize Mr. Vijay Chandra as the 2017 recipient.

George S. Richardson Medal

Recognizing a single, recent outstanding achievement in bridge engineering, we are pleased to recognize Dr. Robert Connor of Lehigh University, for the significant research contribution to the bridge industry as outlined in his report entitled "Member Level Redundancy of Built-up Steel Girders Subjected to Flexure".

Gustav Lindenthal Medal

Recognizing an outstanding structure that is also aesthetically and environmentally pleasing, we are pleased to recognize ADIF Alta Velocidad, the owner of the Viaduct over the Almonte River, at the Alcántara Reservoir in the western region of Cáceres, Spain. "

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 Arkansas State Highway and Transportation Department, the owner of the Broadway Bridge spanning the Arkansas River and connecting the communities of Little Rock and North Little Rock.

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 City of Santa Monica, the owner of the Idaho Avenue Pedestrian

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 the New York City Department of Design and Construction, the owner of the Revitalization of New York City's High Bridge.

The James D. Cooper Student Award

Recognizes undergraduate and graduate students who demonstrate an interest and passion for bridge engineering. The award is presented to winners of a student completion for technical writing and engineering insight. The 2017 award is presented to principal author, Mr. Suliman A. Gargoum for a paper entitled: "Automated Network-Level Assessment of Bridge Clearance on Highways Using Mobile LiDAR Data."



Pickering, Corts & Summerson

Consulting Engineers & Surveyors

Experience • Responsiveness • Innovation • Results



Serving Clients in Pennsylvania, New Jersey, and Delaware since 1918

Bridge Inspection
Underwater Inspection
Bridge & Roadway Design
Traffic Engineering
Hydrographic Surveying

Transportation Planning
Civil Highway Engineering
Contractor Services
Design-Build Engineering
Land Surveying

Newtown, PA • Phillipsburg, NJ • Lemoyne, PA
www.pcs-civil.com

PARSONS

People. Partners. Progress.

Proud to serve as the lead designer on
the Fore River Bridge design-build project.



SKEWED BRIDGES

Monday, June 5; 8:00–10:00 a.m.

Room: Baltimore 3/4/5

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

8:00 a.m.

IBC 17-1: Effective Cross-Frame Distribution for Straight Steel

I-Girder Bridges with Skewed Supports

Telmo Andres Sanchez, Ph.D., ADSTREN Cia. Ltda., Quito, Ecuador; Cagri Ozgur, Ph.D., P.E., HDR Engineering, Albany, NY

The primary function of cross-frames in straight steel I-girder bridges is connecting girders to obtain a stable structural system. During steel erection and deck pour, cross-frames work as lateral supports that stabilize the I-girders and prevent them from lateral-torsional buckling. In addition, in bridges with skewed supports, cross-frames provide a transverse load path, where internal forces are developed and transferred to the girders. These collateral and undesired forces may affect the performance of the overall structure both during construction and in service. This presentation shows different cross-frame patterns and configurations that may be used for the design of skewed steel I-girder bridges that do not affect the primary functions of these elements, while reducing undesired collateral effects.

8:30 a.m.

IBC 17-2: Unique Field Inspection Findings at Sharply Skewed Steel Bridges

Rama Krishnagiri, Tharmarajah Rishindran, P.E., Michael Morales, NHI, CBI, and Walter Hucal, P.E., Parsons Brinckerhoff, Lawrenceville, NJ; Mula Reddy, NJ Department of Transportation, Ewing, NJ

Our presentation of field inspection findings discusses sharply skewed steel bridges, and curved bridge decks with skewed supports and/or flared straight steel girders. Steel details, bearing types, support skew, framing details, and girder layout affect the main members and bearings. Special attention is required, particularly at older, horizontally curved decks on steel girders - straight, parallel or flared with staggered cross frames, and rocker type/pinned bearings, as they may be vulnerable to cracking and unseated bearings.

9:00 a.m.

IBC 17-3: Replacing the Mann Ave. Bridge: Innovative Design For a High Skewed Rigid Frame Bridge Using Composite Precast Prestressed Concrete Box Girders On Secant Caisson Walls

Maged William Ibrahim, B.Sc., M.A.Sc., P.Eng., P.E., FEC, Seyyed Nima Mahmoudi and Shelley Huang, P.Eng., WSP- MMM Group, Thornhill, ON, Canada

The main goal of this project is to replace an existing single-span, skewed overpass to accommodate Ottawa Light Rail Transit loads. A number of geometrical and construction constraints had to be addressed

by the new design. The main challenges included dealing with high skew, vertical clearance, aggressive design and construction schedule, and access limitations. The structure consists of Secant caisson wall abutments forming rigid frame action with precast prestressed concrete box girders.

9:30 a.m.

IBC 17-4: Design Case Study of a Highly-Skewed Steel Plate Girder Bridge: What Level of Analysis is Required?

Daniel Baxter, P.E. and Alexandra Willoughby, P.E., Michael Baker International, Minneapolis, MN

Bridge 27W02 will be a highly-skewed steel plate girder bridge over I-35W. Preliminary design was performed using line girder analysis (LGA), while final design of the girders and cross frames used 3D finite element modeling (FEM), with flanges modeled as beam elements and webs as shell elements. By comparing the results, this paper will show which aspects of design are satisfactory using LGA, and which require the additional complexity of 3D FEM.

10:00 a.m. Break

LIBERTY BRIDGE

Monday, June 5; 8:00–10:00 a.m.

Room: Annapolis 1/2/3

Chair: Louis J. Ruzzi, P.E., PennDOT District 11-0, Bridgeville, PA

8:00 a.m.

IBC 17-5: Emergency Repair of Fire Damage to Liberty Bridge Truss in Pittsburgh

Jonathan Moses, P.E., and Louis Ruzzi, P.E., PennDOT District 11-0, Bridgeville, PA

On Friday, September 2, 2016 a fire ignited on the Liberty Bridge in Pittsburgh, PA. The bridge was undergoing a 2-year, \$80 million rehab when sparks ignited piping and tarps that were on the paint containment system. As a result, a bottom chord member buckled due to the intense heat and sustained dead load. PennDOT, contractor, and consultant personnel worked around the clock to develop and implement a repair to reopen the bridge to traffic in 24 days. This paper gives an overall view of the incident, PennDOT's response and incident management.

8:30 a.m.

IBC 17-6: Liberty Bridge Emergency Jacking Frame Design for Repair of Fire-Damaged Member

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

Fire caused significant damage and displacement to the west truss bottom chord and gusset plates of Liberty Bridge, a 775' 3-span deck truss in downtown Pittsburgh carrying 55,000 vehicles per day, resulting in

Monday

SESSIONS

immediate closure for collapse concerns. That night, SAI began designing jacking and lateral bracing systems to bypass the damaged chord, establish a new load path, relieve the east truss of overload forces from displacement, and accommodate west truss final repairs.

9:00 a.m.

IBC 17-7: Liberty Bridge Fire & Emergency: Initial Response and Monitoring Plan

Nick Burdette, P.E., Roger Eaton, P.E., and Nick Cervo, P.E., HDR Engineering, Pittsburgh, PA

As the designer for the rehabilitation work, HDR worked with PennDOT District 11 and several other consultants and universities to orchestrate an emergency repair of the truss. This repair required jacking the damaged bridge chord axially, laterally, and locally. This presentation will focus on the initial damage assessment, initial 3D modeling of the fire-damaged spans, development of the jacking frame concept, and development of the bridge monitoring plan used during jacking.

9:30 a.m.

IBC 17-8: The Liberty Bridge Fire - Global Behavior

Thomas Murphy, P.E., Andrew Adams, Christopher Smith, P.E., and Nohemy Galindez, Modjeski and Master, Inc., Mechanicsburg, PA

As part of the emergency response, a global 3D analysis of the Liberty Bridge was performed to evaluate the capacity of the bridge after fire damaged a bottom compression chord member. The analysis results were combined with calculated capacities and field measurements of strain and displacement to produce real-time ratings of the main trusses during jacking. Based on the results, the bridge was reopened to traffic following jacking operations.

10:00 a.m. Break

INSPECTION/ANALYSIS

Monday, June 5; 8:00–10:00 a.m.

Room: Woodrow Wilson A

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

8:00 a.m.

IBC 17-9: Thermal Integrity Profiling for Drilled Shafts

Matthew Silveston, P.E., Terracon Consultants, Inc, North Charleston, SC

Thermal Integrity Profiling is an emerging technology that is being rapidly adopted by owners across the US to assess the quality of drilled shaft construction. The presentation provides an explanation of the theory as well as several examples that will allow the audience an opportunity to understand the new benefits the test provides as well as its limitations.

8:30 a.m.

IBC 17-10: A 21st Century Retrofit for a 20th Century Bridge: Design of the Winona Bridge Retrofit using Nonlinear Finite Element Analysis

Daniel Baxter, P.E., S.E. and Krista Stippelmans, EIT, Michael Baker International, Minneapolis, MN

This presentation describes the analysis and retrofit of the Winona Bridge, a 1940s-era historic through truss spanning the Mississippi River. The retrofit will allow the bridge to carry today's heaviest permit loads with internal redundancy while preserving the structure's historic character. To maintain appearance, many members are retrofit with high-strength bars concealed within existing steel sections. This required complex nonlinear finite element analysis to establish that the high-strength bars perform as intended with existing steel.

9:00 a.m.

IBC 17-11: 2017 Biennial Inspections of the Fort McHenry and Baltimore Harbor Tunnels for the Maryland Transportation District (MDTA)

David Lynch, P.E., M.ASCE, and Jordan Lair, P.E., AECOM, Baltimore, MD; Tekeste Amare, P.E., Maryland Transportation Authority, Baltimore, MD

The implementation of the NTIS brings the operation, maintenance, inspection, and evaluation of tunnels up to the level of bridges and in line with the requirements of MAP-21. This paper discusses the technical, practical, and strategic aspects of tunnel inspections. The perspectives of the inspection team and the tunnel owner are considered and presented to impart a working understanding of the process, purpose, and goals of the NTIS for application at other tunnel facilities.

9:30 a.m.

IBC 17-12: Application of Lean Philosophy in Bridge Inspection

Emal Masoud, Abigail Clarke-Sather, Ph.D., and Jennifer Righman McConnell, Ph.D., University of Delaware, Newark, DE

This work applies Lean Philosophy, originating from manufacturing, to improve the efficiency of bridge inspections. Lean maximizes time on activities that add value to the final output and reduces losses identified as waste. A time log of activities from 22 bridge inspections was collected. Activities include, review of documents; mobilization of equipment and personnel to the site; visual inspection; demobilization; and reporting. Findings suggest that reporting often takes more time than visual inspection of bridges.

10:00 a.m. Break

SPECIAL TOPICS - PEDESTRIAN BRIDGES & TUNNEL INSPECTION

Monday, June 5; 8:00–10:00 a.m.

Room: Woodrow Wilson B/C/D

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

8:00 a.m.

IBC 17-13: Design and Construction of the Terwillegar Park Stressed Ribbon Footbridge

Reed Ellis, Ph.D., P.Eng., Stantec Inc., Edmonton, AB, Canada; David MacLaggan, MScE, P.Eng., Stantec Inc.; Jason Reske, M.Eng., P.Eng., City of Edmonton, Edmonton, AB, Canada

In October 2016, the longest and first multi-span stressed ribbon bridge in Canada was opened to the public in Edmonton, Alberta. Although stressed ribbon bridges are relatively common in Europe, they are not as common in North America. Stressed ribbon bridges can be described as precast concrete structures that are erected segmentally on cables and post-tensioned to achieve a continuous, slender, prestressed concrete structure. The design and construction process is described, together with lessons learned.

8:30 a.m.

IBC 17-14: The Francis “Fanny” Appleton Pedestrian Bridge: Maintaining Aesthetics While Improving Pedestrian Comfort

Marian Barth, P.E., and William Goulet, P.E., STV Incorporated, Boston, MA
Francis “Fanny” Appleton, wife of Henry Wadsworth Longfellow, will be memorialized with a 750-foot-long “ribbonlike” pedestrian bridge structure. The 222-foot main span is an arched Vierendeel truss. Approach spans are curved tub girders supported by Wye-shaped piers. The design mitigates pedestrian induced vibrations without the use of tuned mass dampers while still meeting the architect’s intent. Each element was evaluated for its strength and stiffness in contributing to vibration performance.

9:00 a.m.

IBC 17-15: Construction and Monitoring of the Innovation Bridge

Guillermo Claude, Ph.D., Antonio Nanni and Francisco De Caso y Basalo, University of Miami, Miami, FL

Climate change and maintenance costs demand sustainable construction practices. To demonstrate commitment to sustainability through innovative construction, University of Miami constructed a pedestrian bridge using concrete solely reinforced with fiber-reinforced polymer (FRP) composites. The reinforcement features basalt and glass FRP (BFRP and GFRP) rebars, unique configurations such as BFRP continuous closed stirrups, prefabricated BFRP cages, and two main double-tee girders prestressed with carbon FRP (CFRP) tendons. Performance is monitored with internally installed vibrating-wire gauges.

9:30 a.m.

IBC 17-16: Initial NTIS Inspection of the Lehigh Tunnels Case Study and Lessons Learned

Brian Leshko, P.E., HDR Engineering, Pittsburgh, PA

This presentation will describe the initial National Tunnel Inspection Standards inspection of the Lehigh Tunnels, two separate bores (circa 1957 and 1991) approximately 4,379' in length on the Northeast Extension (I-476) for the Pennsylvania Turnpike Commission, as a Case Study providing valuable Lessons Learned from the perspective of implementing the new Federal requirements, and sharing inspection methods, equipment, and management techniques, as well as focusing on innovations, ideas, and best practices for all tunnel inspectors.

10:00 a.m. Break

KEYNOTE SESSION

Monday, June 5; 10:30 a.m.—12:15 p.m.

Room: Cherry Blossom Ballroom

Chair: Matthew A. Bunner, P.E., HDR Engineering, Inc., Pittsburgh, PA

The Keynote Session is the official start to the 2017 IBC! Conference Chair Matthew A. Bunner, P.E. will host the session. Following welcoming remarks, we are pleased to announce the following presenters:

10:45 a.m.

Joseph J. Abriatis, CCM, PMP, Project Controls Manager, Architect of the Capitol, Planning & Project Management Division, Washington, DC

11:05 a.m.

Scott Jarvis, CAHSR Chief Engineer, California High-Speed Rail Authority, Sacramento, CA

11:25 a.m.

Leif Dormsjo, Director, DDOT, Washington, DC

11:45 a.m.

Thomas Everett, P.E., FHWA, Washington, DC

12:05 p.m.

Dr. Rengui Wang, Vice General Manager and Dr. Huang Liji, Dean of Bridge Research Office, CCCC Highway Planning Consultancy Co., Ltd with the introduction of the "2018 Featured County - China"

12:15 p.m.

Presentation of the James D. Cooper Student Paper award to Suliman Gargoum

IBC EXHIBIT HALL LUNCHEON

12:00 noon—2:00 p.m. in the Prince George Exhibit Hall B

Monday

SESSIONS

FEATURED AGENCY SESSION

Monday, June 5; 2:00–5:00 p.m.

Room: Cherry Blossom Ballroom

Chair: Richard Kenney, P.E., Deputy Chief Engineer, DDOT, Washington DC

This session highlights the bridge program of our Featured Agency, the District of Columbia Department of Transportation (DDOT). Presentations include:

Bridges in Washington DC

Dawit Muluneh, P.E., Chief Engineer, DDOT, Washington, DC

The District's Bridges - Historic Structures

Richard Kenney, P.E., Deputy Chief Engineer, DDOT, Washington, DC

The Frederick Douglass Bridge and South Capitol Street Project

Delmar Lytle, P.E., DDOT, Washington, DC

H Street Bridge

Ali Shakeri, P.E., DDOT, Washington, DC

Capitol Crossing

Abdullahi Mohamed, DDOT, Washington, DC

Long Bridge

Anna Chamberlin, DDOT, Washington, DC

16th Street and 27th Street Bridge Projects

Paul Hoffman, P.E., DDOT, Washington, DC

Active Transportation- The District's Trail Bridges

Jim Sebastian, DDOT, Washington, DC

PROPRIETARY SESSION

Monday, June 5; 2:00–4:00 p.m.

Room: Woodrow Wilson B/C/D

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

2:00 p.m.

IBC 17-17: Deep Pipe Pile Cell Foundations Built in Rivers for Expressway Viaduct Widening

Masashi Nagano and Ian Vaz, Giken America Corp., Orlando, FL

Pipe pile cell foundations are being constructed to support a new expressway interchange on a viaduct section over rivers flowing through a densely-populated part of Tokyo, Japan. The state-of-the-art Gyro Press Method (rotating and simultaneously pressing in the pipe piles) was chosen to drive 60-meter (197-foot) long and 800mm (31.5-in) diameter pipe piles to minimize noise and vibration and to deal with a low overhead clearance. Mechanical joints were used to facilitate pile installation.

2:30 p.m.

IBC 17-18: The Inspection Revolution: How a Combined Above/Below Water Hi-Resolution Mapping System is Changing the Way We Assess the Condition of Marine Structures

Mark Farber and Rich Hisert, Ph.D., Innovative Mapping Technologies, LLLP (IMT), Troy, NY

Innovative Mapping Technologies (IMT) utilizes its combined multi-beam-LiDAR mapping vessel to characterize structures, below and above the waterline, throughout the New York State Canal System. The high resolution, geospatially referenced, 3D models have become the standard of the inspection program, which previously used divers alone. The new program has produced more accurate and comprehensive inspections with less time on the water, resulting in a higher number of structures completed with lower costs and increased safety.

3:00 p.m.

IBC 17-19: Effectiveness of added damping systems for structures in Latin America

Carlos Mendez-Galindo, Ph.D., Mageba Mexico; Gianni Moor, Mageba USA, New York, NY; Borja Bailles, Mageba International, New York, NY

Several countries in Latin America have started to implement seismic protection systems based on advanced technologies. The main objective is always to protect people's lives. However, the integrity of the structures and their serviceability immediately after an earthquake are key in the speed of the emergency response. Seismic damping systems provide an alternative to conventional earthquake resistance design, and have the potential for significantly reducing seismic risk without compromising safety, reliability, and economy of structures.

3:30 p.m.

IBC 17-20: Structural Health Monitoring of Cable Stay Bridges as Applied on the New Champlain Bridge in Montreal, Canada

Gianni Moor, Mageba USA, New York, NY; Samy Rassy, Mageba International, New York, NY; Kleidi Islami, Ph.D., Mageba Switzerland, Bulach, Switzerland

With the continuous optimization of design software, construction technologies and materials, structural design has taken tremendous leaps. However, demonstrating proper structural behavior and providing timely maintenance, more specifically of modern cable stay bridges, remains challenging. This paper introduces the new Champlain Bridge in Montreal, Canada as a case study to demonstrate how the implementation of Structural Health Monitoring (SHM) can help ensure a structure's full life expectancy while also being used to confirm structural models.

W-1: EVALUATING INTERNAL REDUNDANCY OF EXISTING BUILT-UP STEEL MEMBERS TO SET HANDS-ON INSPECTION INTERVALS

Time: Monday, June 5, 2:00–5:00 p.m.

Room: Baltimore 3/4/5

Presented By: Purdue University

This workshop will familiarize bridge engineers with newly developed provisions on how to exploit the internal redundancy of existing or new built-up steel members presently classified as FCMs in order to establish a rational hands-on inspection interval. Built-up members meeting the provisions are internally redundant and therefore should not be classified as FCMs. The supporting research (TPF-5(253)) and specifications/commentary with detailed examples, including setting the hands-on inspection interval, will be presented.

Speakers: Robert J. Connor, Ph.D., Purdue University, West Lafayette, IN; Francesco Russo, Ph.D., P.E., Michael Baker International, Philadelphia, PA; Matt Hebdon, Ph.D., P.E., Virginia Tech, Blacksburg, VA

W-2: INTERNATIONAL BRIDGE ENGINEERING PRACTICES

Time: Monday, June 5; 2:00–5:30 p.m.

Room: Annapolis 1/2/3

Presented By: M. Myint Lwin, P.E., S.E., Bridge Engineering Consultant, Olympia, WA

The objectives of this workshop are to learn of bridge engineering practices from around the world, and to provide a forum for participants to present and discuss innovative bridge design, construction, inspection, maintenance and preservation practices for addressing bridge engineering challenges and opportunities. Five to six international speakers will be invited to share their practices for information and discussion. There will be time for attendees to ask questions after each presentation. After all the presentations are completed, an “Open Forum” will be scheduled for general discussion of topics presented and other issues of interest to the participants. International bridge engineering practices are quite varied in different parts of the world. There are many good practices and valuable lessons to be learned. Attendees of this IBC workshop will be able to take away ideas and solutions that can be applied to their daily practice of bridge engineering.

Speakers: Phillip Yen, IABEE, Centreville, VA; Barry Colford, AECOM, Philadelphia, PA; Morgan Trowland, McElhanney Consulting Services, Inc., Vancouver BC, Canada; Jiangguo Lv and Houqiang Ji, Anhui Transportation Holding Group Co., Hefei, Anhui, China; Guillermo Capellan Miguel, Arenas & Associates, Santander, Spain.

W-3: (BRIM) USING BRIDGE MODELS AFTER THE DESIGN PROCESS

Time: Monday, June 5; 2:00–5:00 p.m.

Room: Woodrow Wilson A

Bridge Information Modeling (BrIM) is a process to plan, design, construct and manage infrastructure assets that involves creating and using intelligent 3D models. Implementation of an effective BrIM strategy that integrates people, processes and technology can greatly improve accuracy and efficiency. This workshop will explain:

- How BrIM technology and processes are being used on live projects.
- How to create a managed BrIM framework using the OpenBrIM library concept.
- How the information in intelligent bridge models can be used for construction, inspection and maintenance.
- How this process is being implemented in the United Kingdom.

Speakers: Mina Mahdavi, Entech Engineer, PC, New York, NY; Ali Koc, Red Equation Corp., Melville, NY; Alexander Mabrich, P.E., MSc, Bentley Systems, Sunrise, FL; Andy Lohan, Lochner, Chicago, IL.

W-4: BRIDGE LOAD RATING AND POSTING FOR STATE-SPECIFIC LEGAL LOADS

Monday, June 5; 2:00–5:00 p.m.

Room: Magnolia 1

Presented By: Federal Highway Administration

State laws governing truck size and weight vary from state to state, leading to the variation of legal loads allowed to operate in different States. In accordance with the National Bridge Inspection Standards, the State-specific legal loads need be considered in bridge rating and posting. The objective of this Workshop is to provide awareness to bridge engineers/load raters about the State-specific legal loads, the regulatory requirements, and the method to rate and post highway bridges for these loads.

Speakers: Lubin Gao, Ph.D., P.E., and John Berg, P.E., Federal Highway Administration, Washington, DC; Scott Neubauer, P.E., Iowa DOT, Ames, IA; Ping Jiang, Ph.D., P.E., Delaware DOT, Dover, DE

INTERNATIONAL ATTENDEES WELCOME RECEPTION

Monday, June 5; 5:00–6:00 p.m.

Room: Cherry Blossom Ballroom Lobby

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

IBC EXHIBIT HALL RECEPTION

Monday, June 5; 5:00–7:00 p.m.

Room: Prince George Exhibit Hall B

Tuesday

SESSIONS

ABC, PART 1

Tuesday, June 6; 8:00 a.m.—12:00 noon

Room: Baltimore 3/4/5

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

8:00 a.m.

IBC 17-21: Accelerated Design/Build of the SEPTA Crum Creek

Viaduct

Robert L. Lund Jr., P.E., Southeastern Pennsylvania Transportation Authority (SEPTA), Philadelphia, PA; Garrett Hoffman, P.E., FIGG Bridge Engineers, Inc., Exton, PA

The replacement of the I-95 NB bridge deck using ABC is presented. The bridge is composed of four short, simple spans on a 35° skew and carries four lanes over an arterial. Reuse of steel beams and heavy traffic volumes led to the use of ABC technology. Full-depth precast concrete deck panels with UHPC longitudinal and transverse deck joint details, conventional expansion joints at piers/abutments and a polyester polymer concrete overlay was selected for reasons to be explained.

8:30 a.m.

IBC 17-22: Launching Three Trusses over the BNSF Northtown Rail Yard

Martin Furrer, P.E., S.E., and Greg Hasbrouck, Parsons, Chicago, IL; Jack Yuzna, City of Minneapolis, Minneapolis, MN

Minneapolis' historic St. Anthony Parkway crossing of the BNSF Northtown rail yard has five deteriorating Warren trusses requiring removal and replacement with a new skewed 305' truss. The railroad requires that trusses over mainline tracks be replaced using a launching system. The new truss incorporates unique redundancy measures including eliminating fracture critical steel truss members and gusset plates and using a post-tensioned concrete bottom chord.

9:00 a.m.

IBC 17-23: Design & Construction of a Grade Separated Interchange with a Very Accelerated Schedule

Chris Vaught, P.E., DBIA, RK&K, Richmond, VA.

The major feature of VDOT's \$100M+ Route 29 Solutions project is upgrading the highly-skewed at-grade intersection at Rio Road. Only 103 days of full road closure was allowed for the construction of a bridge and several thousand feet of retaining wall. A structural system that had never before been constructed in Virginia was developed to allow traffic to continue operating throughout construction and was delivered in nearly half of the allowable time and well under budget.

9:30 a.m. Break

T
U
E
S
D
A
Y

10:00 a.m.

IBC 17-24: 2-Span Continuous Integral Abutment Bridge

Replacement Using ABC

Robert Elliott, P.E., CDR Maguire, Pittsburgh, PA; Donald Herbert, P.E., and Jeremy Hughes, P.E., PENNDOT District 12-0, Uniontown, PA

This presentation will discuss the ABC of a 206' 2-span continuous integral abutment bridge. Numerous design challenges included constructability, longitudinal and transverse UHPC closure pours, negative moment reinforcing, deflections during precasting, and crane sizing. The presentation will also discuss the unique manner of the bridge erection based on the use of a conventional deck negative moment region rather than a link slab or transverse UHPC joint at the pier.

10:30 a.m.

IBC 17-25: Four California ABC Case Histories Describing Equipment, Techniques, Means And Methods Used To Move Superstructures Via Land

Alfred Mangus, P.E., Steve Lee, and Greg Kaderabek, Professional Engineers in California Government, Sacramento, CA

Belgian, Dutch and German manufacturer's equipment were utilized to move California bridge superstructures. Multi-wheeled trailers towed with trucks moved curved orthotropic steel box girder sections across Interstate I-80. The "A Span in Time" documentary discusses sliding a "football field" sized concrete superstructure replacement. Six weathering steel railroad trusses were installed via a Self-Propelled Modular Transporter. The Roll-Out, Roll-In of 270' double decker steel trusses created the Yerba Buena Island Detour. A table summarizes the issues.

11:00 a.m.

IBC 17-26: Eastbound Nalley Valley Interchange, Marketing Substructures for Precast Bridge Elements

Patrick Gallagher, P.E., Alpha & Omega Group, Raleigh, NC

Prefabricated crossbeams were a key feature in the construction of one of Washington State's Megaprojects, the Interstate 5 and Highway 16 interchange reconstruction in Tacoma, Washington. WSDOT built upon past experience, university research, and past implementations of precast substructure components. This paper displays how WSDOT implemented the use of prefabricated crossbeams, motivating the contractor to explore their application.

11:30 a.m.

IBC 17-27: Redecking of DelDOT BR 1-717, I-95 NB over SR1:

Lessons Learned

Jon Eberle and James Bellenoit, P.E., AECOM, Mechanicsburg, PA; Jason Hastings, M.C.E., P.E., Kevin Lindell, P.E., and Stephen Richter, P.E., Delaware DOT, Dover, DE

This paper presents the design and construction for the replacement of the existing I-95 NB bridge deck using accelerated bridge construction (ABC) technologies. The bridge carries I-95 NB over a high-volume principal arterial roadway and consists of four simple spans (32'-70'-70'-36') on a nearly tangent alignment having a 35° skew. The existing CIP concrete deck is composite and supported on rolled steel beams. The steel beams and the substructure units were reused. Originally constructed in 1962, the bridge has been widened twice since — once in 1968 and again in 1983. Current ADT is 85,000 for the bridge which carries four thru lanes with a merging on-ramp and 67,000 for the six-lane, divided SR1/7 underpass. Replacement of the bridge deck required two stages of construction to maintain traffic.

Preliminary engineering considered a variety of ABC technologies such as longitudinally post-tensioned precast panels, jointless deck construction via link slabs, slide-in bridge construction (SIBC) and full-width panels continuous over skewed supports. The pros and cons of each of these will be discussed with regard to practicality for this site. Full-depth precast concrete deck panels with UHPC longitudinal and transverse deck joint details, expansion joints at piers/abutments and a polyester polymer concrete (PPC) overlay was selected for reasons to be explained. The paper will include construction photographs to illustrate particular features of the project followed by lessons learned.

CONSTRUCTION, PART 1

Tuesday, June 6; 8:00 a.m.—12:00 noon

Room: Annapolis 1/2/3

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

8:00 a.m.

IBC 17-28: Erecting/Moving/Raising/Floating a 1600 Ton Lift-Span Truss

David Rogowski, P.E., Genesis Structures, Inc, Kansas City, MO; Josh Crain, P.E., Genesis Structures, Inc, Kansas City, MO; Jack Pecora, P.E., JF White / Skanska JV, Framingham, MA

This paper highlights the challenges related to the design of the temporary works used to install the new Fore River Bridge (a 328 ft, 1600-ton vertical lift span truss) which was constructed on land on 20 ft steel towers, rolled onto twin 54 ft x180 ft barges with four (16) axle SPMT units, lifted to a final vertical height of 70 ft above the water with self-raising towers and then floated into position with only 3" of clearance each end.

8:30 a.m.

IBC 17-29: Rehabilitation Design and Construction of the Main Street Bridge

Robert Durfee, P.E., SECB, DuBois & King, Inc., Laconia, NH; Eric Ohanian, P.E., Tighe & Bond, Westwood, MA

The Main Street Bridge consists of three independent superstructures. After decades of heavy winter-time salt-usage and differential movement, the bridge required extensive rehabilitation due to heavy corrosion of deck, stringer, joint, and bearing components. Design included partial replacement of steel girders, framing, and deck modifications to merge the three superstructures into a single structure. Unique construction and traffic phasing minimized business impacts and accommodated cultural and tourist events throughout construction. Total construction cost was \$3.4-million.

9:00 a.m.

IBC 17-30: Bayonne Bridge Main Span Steel Erection

Kevin O'Neill, P.E. and Thomas Rabinko, Siefert Associates, LLC, Naugatuck, CT

This presentation explores the challenges of erecting the steel of the new main span roadway of the Bayonne Bridge through the existing arch while the bridge remained open to traffic during construction; highlighting the surgical erection of new structural elements through the steel arch and suspenders, the analysis of the existing roadway under the load of hydraulic cranes during limited closures, and the design and implementation of custom rigging equipment and various other temporary works.

9:30 a.m. Break

10:00 a.m.

IBC 17-31: Construction of the Broadway Bridge Arch Spans over Arkansas River

Steve Eads, P.E., and John Boschert, P.E., Genesis Structures, Kansas City, MO; Kyle Allen, P.E. and Cooper Kyhl, P.E., Massman Construction Co., Overland Park, KS

The Broadway Bridge connects Little Rock and North Little Rock and spans the Arkansas River. The project was planned to minimize the duration of the roadway closure by incentivizing construction completion over a specific time-limit. Erection of the new spans was performed at high elevation using steel towers supported on deck barges. Following fast-track demolition of the existing bridge, the new spans were floated into position and prepared for deck placement and final construction activities.

10:30 a.m.

IBC 17-32: Innovative Steel Erection Procedure for a Curved Girder Viaduct Over Water and Soft Soils

Michael Marks, P.E., and Zeus Wu, EIC Group LLC, Fairfield, NJ

The erection of this 1000' long curved steel superstructure presented challenges due to the shallow river limiting the location of barge cranes, soft soils impeding crane positioning on land and the 70' high superstructure complicating the configuration of support towers.

EIC Group LLC developed innovative erecting techniques including rolling tower systems, transverse hanger beams supported on previously erected girders, assembly of girders supported on land and barges, and a rapidly adjustable pipe spreader beam.

11:00 a.m.

IBC 17-33: Brooklyn Bridge Ramp C Pier Replacements

Andrew Ritter, P.E. and Vincent Siefert, P.E., Siefert Associates, LLC, Naugatuck, CT

An innovative temporary support system, for Ramp C to the Brooklyn Bridge, was engineered to replace failing concrete piers with two-piece steel piers. The inventive design was a modular system with custom lifting and handling devices that accommodated tight clearances and variable geometry between five locations. Creative engineering and careful planning allowed the contractor to perform the work using precise and controlled operations, minimize fabrication and on site costs, and not disrupt active traffic above.

11:30 a.m.

IBC 17-34: Carroll Avenue Bridge Demolition

Jolene Fennema, P.E., Kiewit, Englewood, CO; Richard Walters, Kiewit, Hanover, MD

The Carroll Avenue (MD 195) Bridge over Sligo Creek and Sligo Creek Parkway is an 83 year-old, 3-span, cast-in-place reinforced concrete open spandrel arch bridge that has been rehabilitated. Everything above the arch was demolished and rebuilt to match the original bridge. The contractor optimized the demolition sequence to reduce schedule and cost. In addition, the project required numerous temporary structures for access and to protect the public and the environment.

Tuesday

SESSIONS

DESIGN

Tuesday, June 6; 8:00 a.m.—12:00 noon

Room: Woodrow Wilson A

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

8:00 a.m.

IBC 17-35: Replacement of the Historic Greenfield Bridge

William Beining, P.E., and Anthony Ream, P.E., HDR Engineering, Weirton, WV; Patrick Hassett, City of Pittsburgh, Bureau of Transportation and Engineering, Pittsburgh, PA

In replacing the historic concrete arch linking the Pittsburgh neighborhood of Greenfield to Schenley Park, the designers were challenged to recreate a landmark structure while minimizing impacts to the congested Parkway (I-376) running under the structure. From demolition of the existing bridge to design and erection of the new 287' steel arch, the challenges were met through careful planning, extraordinary community outreach, and innovative design features that recall the past while embracing the new.

8:30 a.m.

IBC 17-36: Design and Construction of the Sir Ambrose Shea Vertical Lift Bridge Located in Placentia, Newfoundland and Labrador, Canada.

Jack Ajrab, M.Sc., P.E., and Ryan O'Connell, Parsons, Ottawa, ON, Canada; Joanne McCall, P.Eng., P.E., Parsons, Markham, ON, Canada

The new Sir Ambrose Shea Vertical Lift Bridge is located in the Province of Newfoundland and Labrador on the east coast of Canada. The paper will go through the design process of a vertical lift bridge and the various options considered for the foundations, approach spans, lift span, counterweights, and the tubular towers and machine rooms. The durability and reliability features of the design will be presented as well as construction challenges encountered.

9:00 a.m.

IBC 17-37: Partial Isolation of a Bridge on Interstate 40 in the New Madrid Seismic Zone

Timothy Huff, Ph.D., P.E., and Jonathan Shoulders, Tennessee DOT, Nashville, TN

A Tennessee bridge on Interstate 40 was identified as a candidate for partial isolation. Seismic accelerations place the bridge in AASHTO Seismic Design Category C. Abutment construction is to be integral, with the superstructure at the piers supported on lead-rubber bearings. Ground motion records were selected and scaled to the 2,500 year response spectrum. Nonlinear response history analyses were performed to obtain final design displacements. Large substructure design shear reductions were realized.

9:30 a.m. Break

T
U
E
S
D
A
Y

10:00 a.m.

IBC 17-38: Garden State Parkway Mainline Bridge over NJ Route 17

Manuel Vera Caraballo, P.E., and David Hicks, P.E., Dewberry, Bloomfield, NJ; Lamis Malak, New Jersey Turnpike Authority, Woodbridge, NJ

Dewberry is providing professional engineering services for improvements to the GSP Interchange 163 in Paramus, NJ. Various alternatives of span configuration, span length and skew angle were evaluated for the mainline structure over NJ Route 17. 235' single-span structures constructed on a 55 degree skew were selected to minimize traffic impacts, and future inspection and maintenance costs. The design and detailing of the bridge considered the structure's span length, severe skew angle, and erection.

10:30 a.m.

IBC 17-39: Virginia's First Long-Span GRS-IBS Project

Ahmad Faqiri, Pennoni Associates, Inc., Herndon, VA

The Mine Road Bridge over Rocky Run, located in the Embrey Mill Community in Stafford County, Virginia, is a 120' long Prestressed AASHTO Bulb-Tee multi-girder bridge supported by Geosynthetic Reinforced Soil-Integrated Bridge System (GRS-IBS). The GRS-IBS allowed the bridge to span long enough to push its abutments to the edge of the wetland. The focus of this paper is to discuss design alternatives, report on the construction activities, and discuss lessons learned.

11:00 a.m.

IBC 17-40: Long-term Performance & Durability of Bridge Beams

Prestressed with Innovative Carbon Fiber Reinforced Polymer Strands

Nabil Grace, Ph.D., P.E., FESD and Mena Bebawy, Ph.D., P.E., Lawrence Technological University, Southfield, MI; Dr. Tsuyoshi Enomoto, Tokyo Rope USA, Inc., Canton, MI

A four-year long extensive research investigation has been executed to evaluate long-term performance of highway bridge beams prestressed with carbon fiber composite cable (CFCC) strands. The investigation included long-term monitoring and testing of unbonded prestressed CFCC strands as well as CFCC pretensioned bridge beams to evaluate long-term characteristics such as creep rupture strength, relaxation, and long-term prestress loss. Test results were used in the design of several highway bridges in Michigan and other states.

11:30 a.m.

IBC 17-41: Bridge Systems on the New NY Bridge

Michael Whalen, P.E., HDR Engineering, White Plains, NY; Marco Buysen, HDR Engineering, Tarrytown, NY

On the new modern super crossings like the New NY Bridge to replace the Tappan Zee, the bridge systems become the heart beat and lifeline of the bridge. In this presentation, we will focus on the various systems which are part of the New NY Bridge project. These systems include power distribution, fiber optic communication, roadway lighting, ITS traffic signage, structural health monitoring, security and mechanical sub systems.

Tuesday

SESSIONS

RAIL

Tuesday, June 6; 8:00 a.m.–12:00 noon

Room: Woodrow Wilson B/C/D

Chair: Carl Angeloff, P.E., Con-Serv, Inc., Pittsburgh, PA

8:00 a.m.

IBC 17-42: Field Testing, 3D Modeling, and Load Rating of the Transit Track Bridges over Lorain Avenue

Edward Baznik, P.E. and Christopher Cummings, P.E., Michael Baker International, Cleveland, OH; Robert Connor, Ph.D., P.E., Purdue University, West Lafayette, IN; James Stock, P.E., Greater Cleveland Regional Transit Authority

Two large web cracks were discovered in a continuous steel through girder bridge that carries commuter trains over Lorain Avenue in Cleveland, Ohio. The Greater Cleveland Regional Transit Authority retained Michael Baker to determine the likely cause. Michael Baker, supported by Purdue University, performed inspection, sampling, testing, evaluation and analysis. This information was used in combination with a 3D finite element model to understand the web cracking, predict future cracking, evaluate retrofits and load rate the bridge.

8:30 a.m.

IBC 17-43: West 73rd Street Grade Separation Project – Cleveland, OH

Kirsten Bowen, P.E. and Kimberly Guice, P.E., Michael Baker International, Cleveland, OH; Julie Meyer, P.E. and Robert Wallace, P.E., Ohio DOT, Garfield Heights, OH

One of the goals of the City of Cleveland's 2004 Lakefront Plan was to enhance neighborhood connectivity with the Lake Erie Waterfront. In order to achieve this goal, a grade separation was proposed with an extension of West 73rd Street under Norfolk Southern's mainline. This presentation will discuss the importance of this project as part of the overall Lakefront plan, design details, challenges of the urban landscape, construction coordination and highlights.

9:00 a.m.

IBC 17-44: WB-207 & WB-208 Railroad Bridge Replacements over I-76

Matthew Macey, P.E., CDR Maguire Inc., Pittsburgh, PA; Brad Updegrave, P.E., Pennsylvania Turnpike Commission, Middletown, PA

The Pennsylvania Turnpike Commission will be widening a 2-mile section of I-76 at the Beaver Valley Interchange. In advance of this total reconstruction project, two overhead Norfolk Southern Railroad bridges were replaced. This presentation will discuss the design, fabrication, and construction of the adjacent 2-Span Railroad Bridges over I-76. The thru-girder superstructures had many critical details due to the requirement of all bolted connections.

9:30 a.m. Break

T
U
E
S
D
A
Y

10:00 a.m.

IBC 17-45: San Diego River Bridge Double Track: Innovative Project Delivery over a Coastal River

Nathan Johnson and Ebrahim Amirhormozaki, Kleinfelder, San Diego, CA

This \$95M project will provide a new double-track segment on the second-busiest passenger-rail corridor in the US. The centerpiece is a 1000-foot crossing over the San Diego River. Site challenges included seismically induced liquefaction, soil susceptible to surcharge settlement, and limited shared corridor right-of-way. This paper will describe project delivery using the CMGC approach, technical obstacles that were overcome using innovative design methods, and lessons learned regarding the delivery method and challenging river site.

10:30 a.m.

IBC 17-46: Preserving Railroad History while Upgrading for Modern Service

Steven Deller, P.E., and Michael McGowan, P.E., Gannett Fleming, Inc., Camp Hill, PA; Robert Lund, Jr., P.E., SEPTA, Philadelphia, PA

SEPTA operates on three viaducts over the Cobbs, Darby and Ridley Creeks in Delaware County Pennsylvania. Some of the piers and abutments date to the 1850's when built by the West Chester & Philadelphia Railroad with the wrought iron and soft steel superstructure being built in the 1890's by the Philadelphia, Wilmington & Baltimore Railroad according to PRR specifications. This project replaced track, performed concrete, steel and masonry repairs, built walls and repainted the bridges.

11:00 a.m.

IBC Student Paper: Automated Network-Level Assessment of Bridge Clearance on Highways Using Mobile LiDAR Data

Suliman A. Gargoum, MSc, University of Alberta, AB, Canada.

This paper proposes an algorithm to automatically detect and measure clearance at bridges on rural highways using LiDAR data. The algorithm is tested on two different highway segments at the province of Alberta and was successful in detecting all overhead structures on those highways, and in accurately measuring the clearance at bridges. Further, the detailed clearance assessment using the proposed algorithm increases the likelihood of detecting the absolute minimum clearance at bridges.

11:30 a.m.

IBC 17-48: Direct Fixation Design Challenges for the North Metro Rail Line Skyway Bridge

J. Taylor Perkins, P.E., S.E., Stantec, Lexington, KY; Jim Bader, P.E., Stantec, Denver, CO

The North Metro Rail Line Skyway Bridge is a 9,533' curvilinear commuter rail structure with 64 prestressed concrete girder spans that, upon completion, will become Colorado's longest bridge. The structure utilizes a direct fixation deck with continuously welded rail running the full length of the structure. This paper explores the design challenges

due to the complex rail-structure interaction and details the unique analysis performed to eliminate the need for rail expansion joints on the structure.

IBC EXHIBIT HALL LUNCHEON

Tuesday, June 6; 12:00 noon–2:00 p.m.

Room: Prince George Exhibit Hall B

ABC, PART 2

Tuesday, June 6; 2:00–5:00 p.m.

Room: Baltimore 3/4/5

Chair: Jane-Ann Patton, P.E., LOCHNER, Pittsburgh, PA

2:00 p.m.

IBC 17-49: Construction of Ecuador's First Launched Steel Girder Bridge

Telmo Andres Sanchez, Ph.D., ADSTREN Cia. Ltda., Quito, Pichincha, Ecuador; Mike LaViolette, P.E., P.Eng., HDR Engineering, Pittsburgh, PA; Mario Fiallo, RIPCONCIV Cia. Ltda., Quito, Pichincha Ecuador

This presentation demonstrates the implementation of the incremental launching method in the construction of a steel I-girder bridge in Ecuador. The presentation will include designer and contractor perspectives and will highlight how this approach will advance bridge construction in this challenging construction environment.

2:30 p.m.

IBC 17-50: Fully Integral 2-Span Curved Girder Bridge Replacement in 72 days

Adam Stockin, P.E., WSP USA, Manchester, NH; Rebekah Gaudreau, WSP USA, Eliot, ME

This ABC project, which consisted of a 164' long, 2-span curved steel girder superstructure with integral abutments, was constructed in 72 days. The integral pier cap was prefabricated with portions of the superstructure and was supported on a single column utilizing an innovative grouted connection, which was supported on a mono-shaft. Due to the complex nature of the structural system, a 3D Hybrid Stiffness/Finite Element Model was required for design.

3:00 p.m.

IBC 17-51: Bridges Designed for Disassembly: a Resilient and Sustainable ABC Solution

Sebastian Varela, Ph.D., Freese and Nichols Inc., Forth Worth, TX; Mehdi Saiidi, Ph.D., P.E., University of Nevada, Reno, NV

A novel structural system was developed to allow bridges to remain fully operational after strong earthquakes and facilitate dismantling and reusing components when bridges reach their useful lifetime. The new system is compatible with ABC and links the concepts of sustainability and resiliency, which intend to utilize natural resources more effectively

Tuesday

SESSIONS

while minimizing the impact of natural hazards. The investigation involved large-scale shake-table tests on bridge components and systems supplemented by analytical studies.

3:30 p.m. Break

4:00 p.m.

IBC 17-52: Accelerated Bridge Construction Using Innovative Materials, Designs and Construction Methods

Jed Bingle, P.E., S.E., Washington State DOT, Tumwater, WA

Developing connections that can accommodate inelastic cyclic deformations and are readily constructible is the primary challenge for ABC in seismic regions. WSDOT has employed innovative bridge design and construction for the reconstruction of a three-span, precast post-tensioned, spliced tub girder bridge in Seattle, Washington. The bridge substructure consists of two intermediate piers utilizing shape memory alloy (SMA) along with engineered cementitious concrete (ECC) in plastic hinging regions of the columns.

4:30 p.m.

IBC 17-53: Bridge Replacement, Route 10/Manhan River, East Hampton, Massachusetts, Utilizing Prestressed Precast Deck Bulb Tee Beams and Ultra High Performance Concrete (UHPC)

Paul White, P.E., P.Eng., LafargeHolcim, Chicago, IL

This replacement project, selected by the Massachusetts Department of Transportation's Accelerated Bridge Construction Program in 2011 employed the use of precast prestressed concrete deck bulb tee girders with integral deck slab and Ultra High Performance Concrete (UHPC) to connect the tee beam flanges. With the bridge near schools and on bus routes, the replacement of the bridge needed to be done with a majority of the work in summer months with school out. Although the bridge superstructure was installed in a few days (ABC), the foundation retrofits necessitated a total of five months

to open the bridge to traffic.

CONSTRUCTION, PART 2

Tuesday, June 6; 2:00–5:00 p.m.

Room: Annapolis 1/2/3

Chair: Donald W. Herbert, P.E., PennDOT, Uniontown, PA

2:00 p.m.

IBC 17-54: East End Crossing: Optimizing Mainspan Erection Cycles

Shawn Woodruff, P.E., S.E., Parsons Corporation, Prospect, KY; Ben Soule, P.E., S.E., International Bridge Technologies, Inc., San Diego, CA; Doug VanSlambrook, Walsh Construction, Prospect, KY

The East End Crossing is a cable-stayed bridge near Louisville, Kentucky. The two-tower, three span structure has a 1,200-foot mainspan, and two 540-foot backspans. The project team pre-staged significant

Tuesday

SESSIONS

portions of the backspan, and optimized deck erection cycles during mainspan construction to remove operations from the critical path. Overlapping operations whenever possible was critical to meeting the construction schedule, and required close coordination between construction, engineering and the owner's representatives.

2:30 p.m.

IBC 17-55: East End Crossing: Backspan Girder Launching

Shawn Woodruff, P.E., S.E., Parsons Corporation, Prospect, KY; Jared Spaans, P.E., S.E., Janssen and Spaans Engineering, Inc., Indianapolis, IN; Doug VanSlambrook, Walsh Construction, Prospect, KY

Over several months in three major stages, the asymmetric, 1600-ton Indiana backspan steel grillage of the East End Crossing cable-stayed bridge was assembled and launched 775 feet into permanent position over the Ohio River from an adjacent hillside. Temporary supports were used to guide and anchor the steel throughout the course of the launch. Extensive structural checks at each stage were performed to ensure stability and resistance of the permanent members.

3:00 p.m.

IBC 17-56: Reconstruction Challenges of the Historic Georgia Street Reinforced Concrete Arch Bridge

Ebrahim AmiriHormozaki, Ph.D., P.E., and Nathan Johnson, Kleinfelder Inc., San Diego, CA

Thorough reconstruction was recently performed to address rehabilitation and retrofit needs for the historic 102-year-old Georgia Street Bridge and retaining walls. The bridge arch-ribs have three hinges with floating end spans supported on approximately 30' tall anchor-block abutment walls. Adjacent anchor-block retaining walls create an approximate 670' long grade separated traveled way below the bridge. This paper focuses on construction, including the complex staging, unique materials, hydro-demolition, and a thorough discussion of lessons learned.

3:30 p.m. Break

4:00 p.m.

IBC 17-57: Route 37 EB over Barnegat Bay - Redecking of the Mathis Bridge

Rama Krishnagiri, P.E. and Steven Esposito, P.E., Parsons Brinckerhoff, Lawrenceville, NJ; George Kuhn, P.E., New Jersey DOT, Trenton, NJ; David Wallis, P.E., Jacobs, Clark, NJ

The presentation is on the construction aspects for a major rehabilitation of this 4860-foot long viaduct, including 176,000 SF of precast Exodermic decking, 650 bearings, and a mechanical/electrical upgrade. The \$60-million project replaces all decking while integrating scuppers, railings, lighting bosses, and safetywalks into the prefabricated deck panels. We will discuss production rates, storage to alleviate creep and shrinkage, staging areas, high early strength closure pours, embedded conduit fittings, bearing replacement sequence, and field issues/solutions.

4:30 p.m.

IBC 17-58: Advanced Materials & Complex Construction Methods on the Lesner Bridge Replacement Project

Robert Bennett, P.E., RS&H, Virginia Beach, VA

Efforts to advance quality standards and the use of high performance materials contribute to the sustainable 100-year design life of the twin, 1,575' long pre-cast segmental bridges comprising The City of Virginia Beach's Lesner Bridge Replacement Project. Designed to utilize both span-by-span and cantilever erection methods, construction began on this locally administered project along Route 60 adjacent to the Chesapeake Bay in 2014 and is scheduled for completion in 2018.

DESIGN & CONSTRUCTION

Tuesday, June 6; 2:00–5:00 p.m.

Room: Woodrow Wilson A

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

2:00 p.m.

IBC 17-59: Special Detailing for Staged Construction of a Continuous, Reverse Curved Bridge

Michael Liona, P.E. and Rasmin Kharva, P.E., Hardesty and Hanover, LLC, New York, NY; Harold Fink, New York State DOT - Region 11, Long Island City, NY

Staged construction for curved steel girder bridges must consider additional stage-related loading and eccentricity conditions. Our bridge dealt with the complex geometry of being 7-span fully jointless, reverse curved (with tight 245' radius), and employed a unique partial staging of two spans to minimize construction costs and impacts to the traveling public. We will cover the staging conditions analyzed to allow proper steel fit-up of a curved structure during construction, as well as the FEM developed.

2:30 p.m.

IBC 17-60: Macdonald Bridge Redecking - Construction Engineering Project Status Update

Keith Kirkwood and Dusan Radojevic, COWI, North Vancouver, BC, Canada

The entire suspended superstructure of the Angus L. Macdonald Bridge in Halifax, Nova Scotia is being replaced during evening and weekend closures while traffic runs during the day. Deck segments were locally pre-fabricated and erected into the bridge segment-by-segment. Concurrently, the bridge deck was raised to allow larger ships to pass underneath. A dehumidification system is being installed on the main cables as each hanger is replaced. This presentation provides an update on the status of the project.

3:00 p.m.

IBC 17-61: Ground Improvement at Approach Embankments of a Railroad Bridge

Suresh Gutta, Ph.D., P.E., and Sebastian Lobo-Guerrero, Ph.D., P.E., A.G.E.S., Inc., Canonsburg, PA; Taylor Towle, Menard USA, Carnegie, PA

For the railroad bridge over SR 19 in Pennsylvania, soft ground conditions were encountered at the approaches. Full height abutments supported on driven piles were proposed for the abutments. Due to existing soft ground conditions, significant settlements were anticipated at the approaches. Overexcavation of soft material or preloading was not feasible due to contaminated soils and limited construction duration. CMCs were used to transfer the loads to the underlying dense layers and limit settlements.

3:30 p.m. Break

4:00 p.m.

IBC 17-62: Use of Horizontally Curved Precast Concrete U-Girders for Ramp Construction

Don Hammack, P.E., Dewberry Engineers, Orlando, FL; Ted Davidson, P.E., Parsons, Orlando, FL

A unique aspect of the SR 417 interchange was the use of horizontally curved, precast concrete U-girders for three of the ramp bridges. This was the first use of these girders in Florida, and the first standard delivery project in the United States to incorporate curved precast concrete U-girders as the primary design. This presentation will discuss general details of the interchange, analysis procedures used, and the lessons learned from the design and production process.

4:30 p.m.

IBC 17-63: Design and Construction of a Mission Critical Bridge at Vandenberg Air Force Base

Anthony Sanchez, Ph.D., P.E., Gernot Komar and Robert Dameron, Moffatt & Nichol, San Diego, CA

The 13th Street Bridge at Vandenberg Air Force Base provides access for specialized space-launch transporter vehicles over the Santa Ynez River. Because the bridge is "Mission Critical" it must remain in service after major floods and earthquakes. An innovative approach was used to address multiple design challenges, and meet enhanced performance criteria. Deep mono-pile foundations address scour and liquefaction, and special detailing allows the piers and abutments to share seismic loads, which improves seismic performance.

FOUNDATIONS

Tuesday, June 6; 2:00–5:00 p.m.

Room: Woodrow Wilson B/C/D

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

2:00 p.m.

IBC 17-64: Progressive Tower Foundations

Matt Baughman, P.Eng., P.E., S.E., COWI, Seattle, WA; T.J. (Steve) Zhu, P.Eng., P.E., COWI, North Vancouver, BC, Canada; John Finke, Dr.Eng., P.E., S.E., Jacobs, St. Louis, MO

The Abraham Lincoln Bridge is a 2106' long, 101' wide, 3-tower cable-stayed bridge over the Ohio River in Louisville, Kentucky. The winning solution for this Design-Build contract included an aggressive schedule and innovative foundation design for the bridge. The team faced many challenges during design and construction as a result of the choice to use a single line of large diameter drilled shafts for the tower foundations, including a unique retrofit of a deficient shaft.

2:30 p.m.

IBC 17-65: Verification of Installation and Performance of ACIP Piles for Bridges

Morgan NeSmith, P.E., Berkel, Austell, GA

The DFI ACIP Pile Committee, in conjunction with the Florida DOT, completed an ACIP Pile installation monitoring and performance test program in late 2016 to advance the inclusion of ACIP piles in future specifications for bridges by state agencies. Piles of different diameters were installed for compression, tension and lateral testing, and one pile was extracted for visual inspection. This paper presents the pile installation, non-destructive testing and load test results of the program.

3:00 p.m.

IBC 17-66: Saving a Bridge Foundation

Les Chernauskas, P.E., Geosciences Testing and Research, Inc., North Chelmsford, MA; Peter Connors, P.E., Massachusetts Department of Transportation, Boston, MA

Many bridge foundations are not reused. For a variety of reasons, it is easier to replace rather than reuse the bridge foundations. GTR was involved in a project where existing pile foundations were reused. Pile resistances were estimated using the wave equation and compared to the factored pile loads determined from Group Analyses. Geofoam light-weight backfill was used to allow reusing the piles. Some piles were exposed, investigated and found to be in pristine condition.

3:30 p.m. Break

4:00 p.m.

IBC 17-67: Using Load Testing to Save Money and Time on Two Minneapolis Highway Projects

Matthew Glisson, P.E., M.ASCE., Braun Intertec Corporation, St Louis, MO; Morgan Race, Ph.D., P.E., Braun Intertec Corporation, Lenexa, KS; Van Komurka, P.E., D.GE, F.ASCE, GRL Engineers, Inc., Cleveland, OH

The cost and time of performing design-phase load testing or altering the design based on load tests at the start of construction often inhibits load tests. Case histories of two transportation projects in the Minneapolis-St. Paul area demonstrate significant monetary and time savings that come from load testing before or at the start of construction. The I-35W Bridge project utilized a bi-directional load test to reduce shaft lengths, and the TH 610 Completion project employed high-strain dynamic testing to reduce costs and schedule.

4:30 p.m.

IBC 17-68: Reducing Longitudinal Demands on Tall Bridge Piers with an Anchored Abutment

David S. Graham, P.E., Dan Brown and Associates, Sequatchie, TN; Gregory T. Hasbrouck, P.E., Parsons, Chicago, IL; Paul Axtell, P.E., D.GE, Dan Brown and Associates, Overland Park, KS; John Turner, Ph.D., P.E., P.G., D.GE, Dan Brown and Associates, Laramie, WY

The Highway 53 relocation project in Virginia, Minnesota, includes a tall bridge across an iron ore mine pit. Longitudinal demands on the piers are reduced by resisting load through an anchored abutment and bracing the top of the piers through the superstructure. The combination of tieback tension and passive resistance allow the abutment to serve as an anchor point. This paper presents the key design considerations from both a geotechnical and structural engineering standpoint.

W-5 DRONES- REGULATION, TECHNOLOGY, AND THE FUTURE

Tuesday, June 6; 2:00–5:00 p.m.

Room: Magnolia 1

Session 1: Regulations, Technology, and the Future

Unmanned Aircraft Systems (UAS), popularly known as drones, are fast becoming an important tool in the construction industry, including the construction and inspection of bridges. This session will provide an introduction to drones, discuss the current regulatory framework governing the use of drones, and outline the research and innovation in UAS technologies. Regulations governing the commercial use of drones are rapidly evolving in the United States and around the world. This session will discuss the varied local, national and international regulatory landscape, safety and security concerns, current and potential litigation, and what you could do to be in compliance. Current research and potential innovations in the UAS industry will be discussed. The session will outline how drone technology is adapting to handle bridge

Tuesday

SESSIONS

inspection challenges. Near Earth Autonomy will demonstrate their solution to operate without GPS, which will help navigate safely around and within bridge structures. Research on automated drone inspection that will help enable full coverage of bridge structures, with precision surveys and comprehensive imagery will be presented.

Session 2: UAS – Case Studies Bridge Inspections & Beyond

Utilizing drones in performing bridge inspections has garnered a great deal of attention in recent years. Several state agencies have initiated pilot programs to determine the practical use of this emerging technology for their inspection programs. The regulations involved have recently changed making the technology more viable. While field test results are generally positive, specific information on when and where a drone is effective remains limited. With this presentation, attendees will better understand the progression of FAA regulations, experience and lessons learned from drone inspection test projects with the state of Connecticut, the Delaware River and Bay Authority and the Rhode Island Turnpike and Bridge Authority, and scenarios where drone use may be practical based on type of structure, location, desired inspection results, efficiency, and time and cost feasibility.

Speakers: Matthew Sullivan, P.E. WSP USA, Charlton, MA; Sunu M. Pillai, Esq., Saul Ewing, LLP, Pittsburgh, PA; Aslam Siddiqui, P.E., and Michael Patenaude, AI Engineers, Middletown, CT; Michael Rondinelli, Near Earth Autonomy, Pittsburgh, PA

IBC AWARDS DINNER

Tuesday, June 6; 5:30–7:30 p.m. (est.)

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 2017 awards. Tickets required - please check with the Registration Desk for availability.

WEDNESDAY MORNING - DON'T FORGET!

IBC EXHIBIT HALL BREAKFAST

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

Room: Prince George Exhibit Hall B

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 opportunity to visit the Exhibit Hall.

Wednesday

SESSIONS

DESIGN/BUILD

Wednesday, June 7; 9:00 a.m.—12:00 noon

Room: Baltimore 3/4

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

9:00 a.m.

IBC 17-69: HSR Viaduct over River Almonte. Design and Construction Control

Guillermo Capellán Miguel, Ph.D., M.Sc., Arenas & Asociados, Santander, Cantabria Spain; Javier Martinez Aparicio, Arenas & Asociados, Santander, Cantabria Spain; Pascual Garcia Arias, IDOM, Madrid, Spain; Pablo Jimenez Guijarro, M.S. Civil Engineer, ADIF, Sevilla, Andalusia, Spain

The High Speed Railway link Madrid – Lisbon crosses over River Almonte with a great arch viaduct of high-performance concrete. The main span of the structure reaches 384 m, for a total length of 996 m. Exceptional techniques and structural analysis were developed to reach its design and construction. The arch has been erected by cantilever method with the aid of a temporary cable-stay system. The deck was constructed using an overhead movable scaffolding system.

9:30 a.m.

IBC 17-70: Design of Bridges to Meet Track-Structure Interaction Requirements for CA High Speed Rail Project

Ravi Mathur, Ph.D., P.E., Parsons, San Francisco, CA; Ryan Simpson, P.E., Parsons, San Francisco, CA

All bridges carrying high speed trains are designed to limit bridge deformations and vibrations which can be magnified under dynamic effects of trains traveling at speeds up to 250 mph. This paper discusses how a simple four-span bridge supported on pre-cast girders is designed to meet deflection and frequency limits established in the design criteria. Results from a frequency analysis, track serviceability analysis, rail-structure interaction analysis as well as the dynamic structural analysis are presented.

10:00 a.m.

IBC 17-71: Design and Construction of an Innovative Curved and Spliced Precast Girder Flyover Bridge in Jacksonville, FL

Gregg Reese, P.E., and Andrew Mish, P.E., Summit Engineering Group / Modjeski and Masters, Littleton, CO

The Ramp 1 Flyover Bridge is being constructed as part of the SB I-95 to EB SR-202 Interchange in Jacksonville, FL. The flyover bridge is a seven-span structure with two lines of curved precast U-girders, spliced and post-tensioned for continuity, and a substructure that includes four precast pier caps. The paper will describe the innovative design features and unique challenges solved during design and construction of this bridge.

10:30 A.M. Break

W
E
D
N
E
S
D
A
Y

Wednesday

SESSIONS

11:00 a.m.

IBC 17-72: Tallest Piers in NY, A Design-Build Effort

Edwin Anthony, P.E., F.ASCE, Erdman Anthony and Associates, Inc., Rochester, NY

The bridge site is known as the Zoar Valley and is located 60 miles south of Buffalo, NY. The new bridge is a three-span continuous steel multi-girder. Spans are 210', 250', and 160'. The center span was set to provide an adequate floodway for Cattaraugus Creek. The two piers rise from footing foundation 163 ft. and are the tallest piers in New York State. The project cost was \$16.9 million.

11:30 a.m.

IBC 17-73: Fort Lauderdale-Hollywood International Airport South Runway Expansion - Value Engineering Methods

William Hess, P.E. and Ryan Rapp, P.E., S.E., HNTB Corporation, Lake Mary, FL; Jeremy McNutt, P.E., HNTB Corporation, Kansas City, MO

This \$180M design/build project includes massive multi-span runway and taxiway structures up to 850 feet wide utilizing post-tensioned deck slabs composite with modified 72-inch Florida I-Beams, and designed for maximum aircraft loading as large as 2.5M pounds associated with 747 and A380 commercial jetliners. Unique design challenges and value-engineering enhancements undertaken by HNTB during final design will be summarized, including how the structural modeling approach facilitated fast-track design solutions generating both cost and schedule savings.

LONG SPAN/CABLE STAY

Wednesday, June 7; 9:00 a.m.—12:00 noon

Room: Annapolis 1/2/3

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

9:00 a.m.

IBC 17-74: Suspension Bridge Cable Dehumidification - A Fundamental Change in Preservation Strategy

Shane Beabes, P.E., AECOM, Baltimore, MD; Barry Colford, BSc, C.Eng., FICE, and Joshua Pudleiner, P.E., AECOM, Philadelphia, PA

Suspension bridge cables are comprised of high-strength steel wires. Over time, moisture inevitably penetrates into the cable and causes corrosion, cracked and broken wires, as well as contributing to hydrogen-induced stress corrosion cracking. Dehumidification has emerged as an effective method to practically eliminate water and its deleterious effects on the cable. The presentation will discuss the global history of cable dehumidification and its growing application in the United States.

Wednesday

SESSIONS

9:30 a.m.

IBC 17-75: Design and Construction of Waterline Footings for the New US 52 Mississippi River Bridge

Greg Hasbrouck, P.E., Parsons, Chicago, IL; Martin Furrer, Parsons, Chicago, IL; Faith Duncan, Illinois DOT, Dixon, IL

Waterline footings have become an increasingly popular choice for large river pier foundations to alleviate issues with the construction of deep and costly cofferdams. This presentation will discuss the unique design and construction aspects that led to the selection of waterline footings for the new US 52 Mississippi River Bridge as well as the challenges in specifying requirements for this unique construction method in a design-bid-build environment and the construction experience from the field.

10:00 a.m.

IBC 17-76: Design and Erection of the Arrah-Chhapra Ganges River Bridge

Brook R. Robazza, Morgan T. Rowland and Prabhjeet R. Singh, McElhanney Consulting Services Ltd., Vancouver, BC, Canada

Upon completion, the Arrah-Chhapra Bridge will be the longest extradosed bridge in India. The 4.35km-long 4-lane bridge is composed of 15 extradosed 120m spans over the main river channel and 36 simply-supported 58m approach spans. The precast girder segments were erected using the balanced cantilever method and supported by a single plane of harp-arranged cables. This paper describes the bridge design and erection, focusing on the challenges overcome by the contractor and the engineering consultant.

10:30 a.m. Break

11:00 a.m.

IBC 17-77: Design of a Cable-Stayed Icon: the New Ship Channel Bridge

Mike Perez, P.E., Harris County Toll Road Authority, Houston, TX; Wade Bonzon, P.E., FIGG, Houston, TX

This new signature bridge is the technical and aesthetic centerpiece of the widening of the Sam Houston Tollway where it crosses the busy Houston Ship Channel. The precast segmental concrete cable-stayed bridge features a 1,320' main span between pylons. It comprises twin structures connected at the main pylons that will be built in phases within the existing ROW. The project includes the demolition of a record-setting 750' span segmental concrete box girder bridge.

11:30 a.m.

IBC 17-78: Analysis of The Global Stability Of Slender Piers Of High Bridges

Jose Simon-Talero, Ph.D., Torroja International, Madrid, Spain

A simplified method for taking into account the influence of the deck and the stiffness of all the substructure when calculating the effects of buckling of a slender pier of a high viaduct is presented. It is proposed using iterative first order calculations to take into account the effect of the geometric non linearity, the cracking of the concrete and the elastoplastic behaviour of the materials (concrete and reinforcing steel).

W
E
D
N
E
S
D
A
Y

Wednesday

SESSIONS

LOAD TESTING/INSTRUMENTATION

Wednesday, June 7; 9:00 a.m.—12:00 noon

Room: Woodrow Wilson A

Chair: Gary Runco, P.E., Virginia DOT, Fairfax, VA

9:00 a.m.

IBC 17-79: Monitoring the Tappan Zee Bridge During Pile

Installation for the Adjacent New NY Bridge

Patrick Mahon, P.E., and Robert Palermo, P.E., GZA GeoEnvironmental of New York, New York, NY

High capacity driven piles are being used to support two new bridges that will replace the Tappan Zee Bridge over the Hudson River. Some new piles were driven within 20 feet of the bridge. A monitoring system was required to evaluate the impacts of pile installation. The system was designed to use networked automated total stations with GPS base stations to overcome the challenge of measuring deflections on the bridge without fixed reference points.

9:30 a.m.

IBC 17-80: Unforeseen Effects of Secondary Members

Natalie McCombs, P.E., S.E. and Samantha Kevern, P.E., S.E., HNTB, Kansas City, MO; Micah Drew, P.E., Mississippi Department of Transportation, Jackson, MS

This presentation will cover a case study for a two-girder bridge where lateral braces are used for wind loads on 16-foot deep box girders. Cracks have been observed in the floorbeam webs and welds at the upper lateral bracing connection. Placement of these braces was intended to carry wind load but the unique framing system combined with a mis-fabricated detail has created fatigue cracks for loads that were likely not considered in design.

10:00 a.m.

IBC 17-81: Quantifying The Effects of Localized Corrosion Through the Use of Digital Imaging

Terrence Moran, George Mason University, Woodbridge, VA; David Lattanzi, Ph.D., P.E., George Mason University, Fairfax, VA

This paper reports on the development of a nondestructive evaluation technique for corroded steel. The goal is to provide better analytical models for quantifying the impact of localized corrosion defects on steel component load capacities. Tensile testing in conjunction with digital image correlation were used to calibrate an imaging method that quantifies pitted regions and provides a capacity evaluation. Comparisons of the two evaluation methods indicate that the non-contact imaging technique more accurately represented the true load capacity of the specimens.

10:30 a.m. Break

W
E
D
N
E
S
D
A
Y

Wednesday

SESSIONS

11:00 a.m.

IBC 17-82: Pre-installed Jacking System Prevents Shutdown of Existing Bridge during Adjacent Construction

Heather Scranton, P.E. and Jean Louis Locsin, Haley & Aldrich, Inc., Boston, MA; Mark S. Greenleaf, P.E., Commonwealth Engineers & Consultants, Inc., Providence, RI; Alec Smith, Haley & Aldrich, Inc., Bedford, NH

Given potential settlement of a nearby existing bridge during new bridge construction, a jacking system was installed at existing bents as an initial contract item. Instrumentation consisting of deformation points and strain gages on existing steel members were monitored remotely. During adjacent construction, several bents settled. When strain/movement neared action limits, jacking was implemented. Pre-installed jacks raised the bents quickly back into place without interrupting traffic and helped prevent bridge shutdowns and construction delays.

11:30 a.m.

IBC 17-83: Structural Health Monitoring of the Hernando De Soto Bridge

Matthew Yarnold, Ph.D., P.E., Tennessee Technological University, Cookeville, TN; Justin Alexander, Cooper Steel, Nashville, TN; Tim Huff, Tennessee DOT, Nashville, TN

The Hernando De Soto Bridge underwent substantial retrofits due to its proximity to the New Madrid fault line and importance to the region. Recently, a monitoring system was implemented which tracks the position of the structure and member force distribution before, during, and after a seismic event. The system provides actionable information to the owners regarding the current performance of critical bridge components and information for decision making after an extreme event.

REHAB, PART 1

Wednesday, June 7; 9:00 a.m.—12:00 noon

Room: Woodrow Wilson B/C/D

Chair: Richard L. Connors, P.E., PMP, Allegheny County—Dept. of Public Works, Pittsburgh, PA

9:00 a.m.

IBC 17-84: Renovation of a Historic Burr Arch Timber Truss Bridge

Kevin Sabolic and Keith Duerling, Baltimore County (MD) Department of Public Works, Towson, MD; Megan Peal, P.E., Wallace, Montgomery & Associates, LLP, Hunt Valley, MD

Baltimore County (MD) Bridge No. B-0004 is a single span, 86' long, covered timber Burr Arch Truss bridge constructed circa 1865. Due to an increasing number of deficiencies found during routine inspections, a rehabilitation project was undertaken to preserve this historic structure. The project included preliminary studies, federal grant process, public outreach, design, prequalified construction bidding and construction. This presentation will discuss project development, milestone decisions and recommend best practices for future similar projects.

W
E
D
N
E
S
D
A
Y

Wednesday

SESSIONS

9:30 a.m.

IBC 17-85: "A Walk Above the Harlem River" - The Revitalization of New York City's High Bridge

James Valenti, P.E., Greenman-Pedersen, Inc., Babylon, NY; Ali Mallick, P.E., NYC Department of Design and Construction, New York, NY

The High Bridge is the original water supply conduit and oldest standing NYC Bridge (1848). From effects of neglect, the High Bridge was closed in the late 1970's. In 2012, NYCDDC and NYCDPR embarked on an ambitious project to reopen the Bridge as a walking park/tourist destination. This presentation provides an overview of the rehabilitation work tasks necessary to transform the 1,400 lf steel and masonry arch structure from obsolete eyesore to beneficial use pedestrian promenade.

10:00 a.m.

IBC 17-86: Ben Franklin Bridge - Renewing the Ride

Alex Lawrason, P.E., HNTB Corporation, Cherry Hill, NJ; Michael Venuto, P.E., PLS, Delaware River Port Authority, Camden, NJ; John Parola, HNTB Corporation, New York, NY

The \$100 million reconstruction of the PATCO tracks across the Ben Franklin Bridge replaced the 30-yr old rail system in its entirety, rehabilitated the supporting structural steel and replaced 47 miles of associated power, signal and communication cables. The majority of the restoration was performed during three separate 2-month track outages. Special schedules were established to allow continuous work on one track at a time, while still maintaining uninterrupted service for the 40,000 daily passengers.

10:30 a.m. Break

11:00 a.m.

IBC 17-87: The Rehabilitation of the Walnut Lane Bridge

Michael Cuddy, P.E., TranSystems, Philadelphia, PA; Henry Berman, Ph.D., P.E., PennDOT Engineering District 6-0, King of Prussia, PA

The Walnut Lane Bridge which carries State Route 4013 over Wissahickon Creek in Philadelphia, is eligible for listing on the National Register of Historic Places. The 6-span 565-foot-long, open-spandrel, ribbed, concrete arch bridge is located in Fairmount Park and at the time of its construction in 1908, had the tallest and longest arch span in the world. The arch ribs are constructed of unreinforced concrete with embedded large flat stones. A program of major rehabilitation was performed that included a new deck, sidewalks, replicated pre-cast concrete balustrades with exposed aggregate finish, concrete repairs and ornamental lighting.

W
E
D
N
E
S
D
A
Y

11:30 a.m.

IBC 17-88: Route 72 Manahawkin Bay Bridges Project, Rehabilitation of Three Trestle Bridges

Steve Esposito, Joseph Mumber, P.E., and David Rue, WSP USA, Lawrenceville, NJ; James Meisterich, WSP USA, Philadelphia, PA; Pankesh Patel, New Jersey DOT, Trenton, NJ

Route 72 in NJ is the only vehicular connection from Long Beach Island to the mainland, carrying traffic over Manahawkin Bay. Three structures between 360 and 480 feet long each are founded on timber pile bents and require rehabilitation. In-depth condition ratings, including NDT to estimate pile lengths/embedment and the determination of capacities, justified the rehabilitation project that included protective pile jackets, deck resurfacing, and scour countermeasures consisting of stone mattresses. Construction is ongoing.

W-6: FRP COMPOSITES IMPACT TO SUSTAINABLE DESIGN OF CONCRETE BRIDGES AND ACCELERATED BRIDGE CONSTRUCTION

Wednesday, June 7; 9:00 a.m.—12:00 noon

Room: Magnolia 1

Presented By: American Composites Manufacturers Association

This workshop will showcase advancements in design and specification of FRP products to build steel-free concrete structures and retrofit/rehabilitate aging bridges. Presentations include the first-ever use of FRP rebar in a cable-stayed bridge and new techniques for accelerated bridge construction and rapid composites deck replacement. A 20-year durability performance study will demonstrate sustainable construction techniques and the viability of bridge protection systems. Assistance on writing special provisions to utilize FRP using industry guidelines will conclude the workshop.

Speakers: Sam Fallaha, P. E., Florida Department of Transportation, Tallahassee, FL; Dr. Brahim Benmokrane, P. Eng., FACI, FCSCE, FIIFC, FCAE, FEIC, University of Sherbrooke, Sherbrooke, Quebec, Canada; Gregory R. Bond, P.E., Strongwell, Chatfield, MN; Scott Reeve, Composite Advantage, Dayton, OH; Dr. Amol Vaidya; Owens Corning - Composites, Granville, OH; Erik Grimnes, Harbor Technologies, Augusta, ME; Gregg Blaszak, P.E., Milliken Infrastructure Solutions, LLC, Spartanburg, SC; Steve Hom, P.E., Hardesty & Hanover, New York City, NY; John Busel, American Composites Manufacturing, Arlington, VA

Wednesday

SESSIONS

MAINTENANCE/MANAGEMENT

Wednesday, June 7; 2:00–5:00 p.m.

Room: Baltimore 3/4

Chair: M. Patrick Kane, P.E., A&A Consultants Inc., Pittsburgh, PA

2:00 p.m.

IBC 17-89: Low-Cost Scour Preventing Fairings for Bridges

Roger Simpson, Ph.D., P.E. and Gwibo Byun, Ph.D., AUR, Inc, Blacksburg, VA

Cost-effective optimized versatile scour-preventing three-dimensional convex-concave hydrodynamic fairings with attached vortex generators have been designed, developed, extensively tested (NCHRP-IDEA) for all types of bridge piers and abutments, and are available for retrofit or new bridge installation for any river level, speed, and angles of attack up to 45 degrees, unlike other countermeasures that do not prevent scour. They exceed HEC-23 requirements, prevent local scour for smaller sediments and the effects of open-bed scour on foundations.

2:30 p.m.

IBC 17-90: Repair, Strengthening, and Re-use of Steel Girder Bridges: Two Case Studies

Brandon Chavel, Ph.D., P.E., and Jacob Wroten, HDR, Cleveland, OH

Bridge repairs and strengthening techniques require careful consideration of the behavior of the structure and load paths through the repairs and construction sequencing. This presentation will discuss two case studies that required unique solutions to repair, strengthen, and modify the steel superstructure: a bridge where the first interior pier was relocated closer to the abutment and the subsequent superstructure strengthening; and a bridge that required a portion of beam to be replaced due to a full-depth fracture.

3:00 p.m.

IBC 17-91: Development of an Asset Management Plan (AMP) as a Decision-Making Tool for Bridge Management

Y. Edward Zhou, Ph.D., P.E., AECOM, Germantown, MD; Ruel Sabellano, P.E., Maryland Transportation Authority, Baltimore, MD; Shane Beabes, AECOM, Baltimore, MD; Barry Cofford, AECOM, Philadelphia, PA; Jeffrey Heilstedt, AECOM, Chicago, IL

This paper discusses an on-going effort for developing an Asset Management Plan (AMP) as a decision-making tool for bridge system management. It involves development of software tools to assist the Maryland Transportation Authority (MDTA) in making data driven decisions on bridge maintenance, rehabilitation, and forward-looking budgetary planning. Decision trees are based on analysis of historical bridge inspection data, bridge elements deterioration curves, maintenance and repair records, risk management, and life cycle costs.

3:30 p.m. Break

Wednesday

SESSIONS

4:00 p.m.

IBC 17-92: Corrosion Evaluation of 19 Bridges in Virginia

Alireza Hedayati, P.E., WSP USA, Herndon, VA; Siva Venugopalan, Siva Corrosion Services, Inc, West Chester, PA

Parsons Brinckerhoff provided corrosion evaluation studies and plans for 19 bridges in Virginia, including deck and substructure corrosion evaluation for 17 bridges along the I-395 corridor in northern VA and two bridges in Salem. The PB team provided visual/delamination survey, sounding, clear cover survey, electrical continuity tests, carbonation, chloride profile, petrographic, service life modeling and Lifecycle cost analysis. PB has also prepared reports for the tests/analysis results and repairs recommendations. One of those bridges is King Street/ I-395.

4:30 p.m.

IBC 17-93: Earthquake Preparedness and Response; Oklahoma DOT's Proactive Approach for Bridges

Gregg Hostetler, P.E., Infrastructure Engineers, Inc., Edmond, OK; Philip Scott Harvey Jr., Ph.D., University of Oklahoma, Norman, OK; K.K. "Muralee" Muraleetharan, Ph.D., University of Oklahoma, Norman, OK; Steve Jacobi, P.E. and Walt Peters, P.E., Oklahoma DOT, Oklahoma City, OK

In response to a tremendous increase in earthquake activity, the Oklahoma Department of Transportation hired a team of consultant and university professionals in 2015 to develop an earthquake response plan for their bridges. During Phase I the team established an inspection protocol; developed a response plan and post-earthquake bridge inspection manual; developed and delivered post-earthquake bridge inspection training; and evaluated USGS ShakeCast, a program that automates much of the response process.

LONG SPAN/SEGMENTAL

Wednesday, June 7; 2:00–5:00 p.m.

Room: Annapolis 1/2/3

Chair: Jeremy Shaffer, Ph.D., P.E., Bentley Systems, Inc., Pittsburgh, PA

2:00 p.m.

IBC 17-94: Global Analysis and Design of the Approach Structures of the New Champlain Bridge in Montreal

Sevak Demirdjian, P.Eng., M.Eng., SNC Lavalin Inc., Montreal, QC, Canada; Zachary McGain, P.E., International Bridge Technologies, Laval, QC, Canada

The new Champlain Bridge is approximately 3.4 km long and stretches across the St. Lawrence River. It consists of a 2044.4 m long west approach, a 528.8 m long cable stayed section over the Saint Lawrence Seaway and a 761.6 m long east approach. This paper will focus on elements of the global analysis of the steel approach spans and their substructures including the steel pier caps, precast post-tensioned pier segments and their foundations.

W
E
D
N
E
S
D
A
Y

Wednesday

SESSIONS

2:30 p.m.

IBC 17-95: Bayonne Bridge Raise the Roadway Project

Roger Haight, P.E., ENV SP., and Matthew Spoth, P.E., WSP USA, New York, NY; Chester Werts, P.E., S.E., P.Eng., HDR Engineering, Olympia, WA

The Bayonne Bridge Navigation Clearance Program raises the roadway of the existing Bayonne Bridge to provide 215 feet of navigational clearance. The project rehabilitates the original 1931 steel arch bridge and replaces the aging approach structures on existing alignment using phased structure construction to maintain two lanes of traffic at all times. The presentation includes a brief overview of the arch design and construction, but focuses mainly on the new precast approach structure replacement.

3:00 p.m.

IBC 17-96: Joint Distress in Wide Precast Segmental Box Girder Bridges

Gregor Wollmann, HNTB, Blacksburg, VA; Theodore Zoli, HNTB, New York, NY

The Hathaway Bridge, located in Panama City, Florida, comprises two parallel, precast segmental concrete box girder bridges with 12 and 14 spans, respectively, erected using balanced cantilever construction. Since its opening in 2004, the bridge has exhibited continuous deterioration of the segment joints at and immediately adjacent to the cast-in-place closure pours between precast segmental cantilevers. This paper will discuss the mechanisms leading to the joint distress, the repair schemes to restore the structure, and the lessons learned from the project.

3:30 p.m. Break

4:00 p.m.

IBC 17-97: Balanced Cantilever Bridges of the Riyadh Metro Project

Douglas Heath, P.E., Latif Ebrahimnejad, Ph.D., and Firooz Panah, P.E., AECOM, Boston, MA

The Riyadh Metro Project is a large infrastructure project in the city of Riyadh, Saudi Arabia. AECOM was contracted to design over 20 km of pre-cast segmental elevated viaduct. Most of the viaduct consisted of simple spans; however, at nine locations throughout the project, three span balanced cantilever bridges were used to avoid conflicts on the ground. This paper describes the design of the balanced cantilever bridges and discusses some of the challenges encountered.

Wednesday

SESSIONS

4:30 p.m.

IBC 17-98: Latest Development of Uncoated Weathering Steel Bridges in China

Dr. Wang Houxin, CITIC Metals Co., Ltd, Beijing China; Kaijian Chen, China Railway Eryuan Engineering Group Co., Ltd, Chengdu China; Shengqiao Xu, China Railway Engineering Consulting Group Co., Ltd.; Amin Gup, CITIC Metals Co., Ltd., Beijing China; Jansto Steve, CBMM-North America, Inc., United States; Marcus Stuart, CBMM, São Paulo, São Paulo, Brazil

A railway arch bridge, with a 430m main span, over Yarlung Zangbo River and a suspension bridge, with a 720m main span, over a reservoir near Beijing will be presented. They both used weathering steels of mainly Q345qENH and Q420qENH without coating, in which Nb is added for comprehensive properties and performances. The steels bring life-cycle cost, drinking water protection, and other advantages to the two bridge projects.

DESIGN/SEISMIC

Wednesday, June 7; 2:00–5:00 p.m.

Room: Woodrow Wilson A

Chair: Victor E. Bertolina, P.E., SAI Consulting Engineers, Inc., Pittsburgh, PA

2:00 p.m.

IBC 17-99: Evaluation of the Failure of the Universidad Laica Overpass During the Pedernales Earthquake

Pedro Rojas, Ph.D., and Lissette Iturburu, Escuela Superior Politecnica del Litoral, Guayaquil, Ecuador. Jose Barros, Universidad Católica de Guayaquil, Guayaquil, Ecuador.

This paper discusses the collapse of the Universidad Laica overpass as a result of the Mw. 7.8 Pedernales Earthquake in Ecuador. The overpass was located in downtown Guayaquil at about 150 miles from the epicenter. From comparisons between the seismic demands and the shear capacity of the columns, it is concluded that the columns failed by shear due to pounding between the central span and the cap beam of the two central piers.

2:30 p.m.

IBC 17-100: Design and Rehabilitation of the Historic Albertus L. Meyers Bridge

Justin Baird, P.E., Bryan Spangler, P.E., and Timothy Ainsley, II, P.E., Michael Baker International, Harrisburg, PA

The Albertus L. Meyers Bridge (aka 8th Street Bridge), is a historic gateway located in Allentown, Pennsylvania. The open spandrel arch bridge was constructed in 1913 and was listed on the National Register of Historic Places in 1988. The presentation will cover key components from design through construction of the 2016 rehabilitation. The rehabilitation included partial superstructure replacement and substructure renovation to increase the roadway width, while maintaining aesthetics of the historic structure.

W
E
D
N
E
S
D
A
Y

3:00 p.m.

IBC 17-101: Truckee River Bridge - Tahoe City, CA: Seismic Analysis and Design of Torsionally Eccentric Cellular Abutments

Jon Emenheiser, P.E., CH2M, Englewood, CO

The Truckee River Bridge in Tahoe City, California will bypass the city and provide trail access along both sides of the river. The trails will pass below the bridge and through cellular abutments. The abutment cell wall near the river will have openings for river views, resulting in torsional eccentricity. The elements were designed to remain elastic during the design seismic event and detailed to be ductile during a seismic event that exceeds design levels.

3:30 p.m. Break

4:00 p.m.

IBC 17-102: Design of a Long-Span Suspension Bridge Anchorage System Located in a High Seismic Region and Susceptible to Large Cargo-Vessel Impact

Michael Whitney, Ph.D., P.E., BDES, Bechtel, Houston, TX; Vahid Zanjani, Ph.D., P.E., McLaren Engineering Group, New York, NY; Robert Baldwin, P.E., S.E., P.Eng., Bechtel, Reston, VA

This paper discusses the design of an approximately 1200-meter long main-span suspension bridge anchorage system. The bridge is founded within extremely challenging strata consisting of very deep weak clay and silt overlaying foliated rock of variable degrees of weathering, in some areas containing highly fractured/sheared zones. The Southwest Anchorage foundation, the main subject of this paper, is composed of large diameter post-tensioned cast-in-place steel shelled concrete piles, utilizing a unique battered arrangement (i.e., battered, rock-socketed bored piles). It is subjected to large-vessel impact risk and is located in a region with high seismicity.

4:30 p.m.

IBC 17-103: Seismic Isolation of the Manhattan Approach Ramps to the Robert F. Kennedy Bridge

Andrew Adams, P.E., Modjeski and Masters, Mechanicsburg, PA; Blaise Blabac, P.E., Modjeski and Masters, Poughkeepsie, NY

This presentation focuses on the site-specific seismic analysis of this unique steel rigid frame structure and the development of a continuous "floating deck" seismic isolation system consisting of both friction and elastomeric isolators. In addition to reducing the demands on seismically vulnerable regions (such as the riveted built-up member connections), use of a continuous deck reduced the number of expansion joints, making for a more maintenance-free structure.

Wednesday

SESSIONS

REHAB, PART 2

Wednesday, June 7; 2:00–5:00 p.m.

Room: Woodrow Wilson B/C/D

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

2:00 p.m.

IBC 17-104: Inspection and Analysis of Deteriorated Masonry Arch Bridges

John Kim, Ph.D., P.E., Michael Baker International, Richmond, VA; Michael Baron and John Zuleger, Michael Baker International, Louisville, KY

Due to their rarity, deteriorated masonry arch bridges are hard to inspect and analyze. This paper will use a deteriorated two-span masonry arch bridge as an example to demonstrate what to inspect, how to collect field data and how to analyze a masonry arch bridge. This paper will present analysis procedures utilizing a simplified method that Dr. Kim had developed for various bridge owners. A brief discussion on remedial procedures will also be presented.

2:30 p.m.

IBC 17-105: Historic Winona Bridge Through Truss Rehabilitation using the CMGC Delivery Method

Kent Zinn, P.E., S.E., Michael Baker International, Chicago, IL; Daniel Baxter, P.E., S.E., Michael Baker International, Minneapolis, MN; Keith Molnav, P.E., Minnesota Department of Transportation, Oakdale, MN

The \$60M rehabilitation and reconstruction of the 2,290'-long historic Winona Bridge over the Mississippi River is MnDOT's first use of the CMGC project delivery method for a bridge rehabilitation. The project represents one of the most technically challenging bridge rehabilitations undertaken by MnDOT. A complex analysis was performed to add internal redundancy to all existing fracture critical members and six new deck truss approach spans will be constructed.

3:00 p.m.

IBC 17-106: A Novel Repair for Steel Girder Bridges with Corrosion Damage Utilizing UHPC

Kevin McMullen, Dominic Kruszewski, Arash Esmaili Zaghi, and Kay Willie, University of Connecticut, Storrs, CT

The University of Connecticut is collaborating with the Connecticut Department of Transportation to develop a novel repair method for corroded steel bridge girders. The method involves welding headed studs to the intact portion of the web and encasing the girder end in Ultra-High Performance Concrete (UHPC). This creates a force transfer mechanism to bypass the corroded section. The repair may be implemented in situ eliminating jacking of the superstructure, lead paint removal, and lane closures.

3:30 p.m. Break

W
E
D
N
E
S
D
A
Y

Wednesday

SESSIONS

4:00 p.m.

IBC 17-107: Challenges in Historic Covered Bridge Rehabilitation:

Martin's Mill Covered Bridge

Aaron Craig, P.E., P. Joseph Lehman, Inc., Duncansville, PA; Martin Malone, P. Joseph Lehman, Inc., Hollidaysburg, PA

The 2016 Abba G. Lichtenstein Medal-winning Martin's Mill Bridge overcame a history of environmental damage, severe distress, and numerous funding, design and construction challenges. Rehabilitation of this transportation treasure—a Town lattice truss covered bridge—breathed new life into the structure, originally constructed in 1849. The Martin's Mill Bridge maintains its listing on the U.S. National Register of Historic Places.

4:30 p.m.

IBC 17-108: Rehabilitation of Aging Abutments

Robert Barrett, P.G., GeoStabilization International, Grand Junction, CO

Bridges throughout the United States are becoming unserviceable faster than they can be replaced. This paper presents a new concept in mitigating this mounting crisis. Current practice includes removal and replacement of the abutments and superstructures. There is now an innovative approach where the old abutment is left intact and used as a form during construction of a new abutment. This process can take as little as a few days and environmental concerns and permitting are avoided or minimized. The concept limits traffic disruption while minimizing costs; traffic flow can continue during non-construction hours. Costs are half or less, compared with the typical full removal and replacement.



LARSA 4D BRIDGE SERIES



**Visit Us At
Booth #319
For A Free
Trial License**

THE MOST TRUSTED SOFTWARE FOR BRIDGES

Analysis & Design | Construction Engineering | Code Check & Load Rating

Wednesday

SESSIONS

W-7: DEVELOPMENT OF SPLICED PRECAST GIRDER BRIDGE TECHNOLOGY

Wednesday, June 7; 2:00-5:00 p.m.

Room: Magnolia 1

The development of spliced precast bridges in the United States has steadily advanced over the last 62 years since the first bridge of this kind was built in Klickitat County WA in 1954. The concept was developed to increase potential span lengths beyond the limitations of what could be safely shipped to a project site. Since that time numerous bridges have been successfully constructed using this method. Span ranges have exceeded 300' for some projects. Recent advances, such as casting of curved U girder sections, have made it possible to use precast for medium-to-long span interchange bridges with complex roadway geometry.

Design standards have been developed for and adopted by the Pennsylvania and Florida DOT's to provide guidance to designers, fabricators and contractors for future projects. This workshop will focus on:

- Historical Development of the concept.
- Design and Analysis Techniques
- Design Details and Construction Practices
- Project Experiences
- Development of Design Aids and Standards

Speakers: Gregg Reese, P.E. and Amy Mish, P.E., Summit Engineering Group, Littleton, CO; Chris White, P.E., Volkert, Houston, TX; William Nickas, Precast/Prestressed Concrete Institute, Chicago, IL; Thomas Macioce, P.E., PennDOT, Harrisburg, PA

W-8: INTRODUCTION TO STEEL BRIDGE FATIGUE AND FRACTURE DESIGN AND EVALUATION

Thursday, June 8; 8:00 a.m.—12:00 noon

Room: Annapolis 1

Presented by: Michael Baker International

The technical content is based on selected material from the newly developed FHWA/NHI Course on Fatigue and Fracture. This workshop will provide background on the development of the AASHTO LRFD provisions for fatigue design, evaluation, and, fracture control. The workshop will discuss the development and background of the specifications and provide a practical demonstration of the application of the LRFD design and MBE fatigue evaluation procedures for steel bridges. Opportunities to ask questions will be provided throughout. Participants are encouraged to discuss prior and ongoing steel bridge fatigue and fracture concerns and receive feedback from the instructors during the class. The technical content is based on selected material from the newly developed FHWA/NHI Course on Fatigue and Fracture.

Speakers: Francesco Russo, Ph.D., P.E., Michael Baker International, Philadelphia, PA; Brian Kozy, Ph.D., P.E., FHWA, Washington, DC; Dr. Karl Frank, P.E., Hirschfeld Industries, Austin, TX

W-9: CLOSER TO REALITY - COMPLEX BRIDGE ANALYSIS SOFTWARE

Thursday, June 8; 8:00—10:00 a.m.

Room: Annapolis 2

Presented By: FINLEY Engineering Group

This presentation will discuss how to use bridge analysis software for complex bridges including projects such as the Veterans Memorial Bridge where 3-D complex geometry, time dependent material properties, staged construction, changing boundary conditions, composite section analysis, and member activation/deactivation are described and demonstrated using a complex bridge project example.

Speakers: Craig Finley, P.E., FINLEY Engineering Group, Tallahassee, FL; Jerry Pfuntner, P.E., S.E., and Ivan Liu, P.E., Finley Engineering Group, Tallahassee, FL

W-10: AN OVERVIEW OF THE BRIDGES TO PROSPERITY PROGRAM - PLANNING, DESIGN AND CONSTRUCTION OF FOOTBRIDGES IN REMOTE RURAL AREAS

Thursday, June 8; 8:00–11:00 a.m.

Room: Annapolis 3

Presented By: Michael Baker International

The objective of this workshop will be to give a comprehensive perspective of the planning, design, and construction undertaken on a typical Bridges to Prosperity footbridge project. The workshop will cover the perspective of the non-profit agency (Bridges to Prosperity) and discuss their overall program mission, goals, and plans for the future. In addition, the workshop will describe the logistics and effort required to establish a program in a foreign country that results in a program that constructs multiple bridges in one area or country. It will also give a perspective from a partnering consulting firm (Michael Baker Intl) who recently assisted B2P with a footbridge project in Nicaragua. The overall objective of the workshop will be to educate those who plan to participate in a future B2P project on the specifics of how the projects are undertaken and give insights on what to expect and prepare for on a typical project. An additional objective will be to generate more interest and enthusiasm for this exemplary organization's humanitarian efforts and assist with the ongoing growth of their program.

Speakers: John Dietrick, P.E., S.E., Anna Klenke, and Krista Stippelmans, Michael Baker International, Cleveland, OH; Brandon Johnson, Bridges to Prosperity, Denver, CO

W-11: IMPLEMENTING BRIDGE ASSET MANAGEMENT SYSTEMS

Thursday, June 8; 8:00–11:00 a.m.

Room: Annapolis 4

Presented By: AECOM

The workshop will in summary review:

1. Alternative approaches to bridge asset management strategic planning. Examples of "big plan" and "small plan" and other alternative bridge asset strategic planning approaches will be discussed and exemplified.
2. Currently available bridge management systems. Best practices, evaluation criteria and current field examples will be exemplified and reviewed.

Opportunity will be provided for participant review, input and discussion.

Speaker: Simon Lewis, Ph.D., AECOM, Philadelphia, PA

W-12: ABC SYSTEMS

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

Room: Baltimore 3/4

This workshop will introduce new ABC technology and advancements to the bridge industry by industry leaders. Topics include:

- **Concrete Filled Steel Tubes for Bridge Applications-Seismic:** Concrete filled tubes (CFTs) provide high strength, stiffness and damage-resistant ductility. In ABC, CFTs may be used as vertical elements of the superstructure and/or the substructure, offering material, labor, equipment related cost and time savings relative to conventional reinforced concrete or precast concrete components. Recent research has developed new connections that can sustain and transfer the full moment capacity of the CFT while facilitating construction. The talk will address all of these issues including structural response, component and connection engineering design expressions and examples of cost savings in bridge construction, including regions of high seismicity.
- **Construction Implementation of AccelBridge - A Low Cost and Durable Full Depth Precast Deck System:** Accelbridge is a low cost, durable, and quicker to build full depth precast deck system than current methods. Attendees can learn more about engineering principles, and design and construction considerations, and experience from completed construction projects.
- **Cost Effective and Easy to Build Pre-engineered ABC Solutions for Low to Medium Span Bridges:** Premanufactured steel bridges and Buried Bridges offer many ABC advantages in terms of design time, material lead times, construction schedule & labor requirements, cost, and quality for low to medium span bridges. Applications and advantages will be demonstrated through a series of case studies.

Moderator: Ben Beerman, P.E., FHWA, Atlanta, GA; Speakers: Joel Hahm, P.E., Sean Johnson, P.E., Big R Bridge, Greeley, CO; Eddie He, AccelBridge, Hinsdale, IL; Dawn Lehman and Charles Roeder, University of Washington, Seattle, WA; Amy Leland, P.E., S.E., Bridge Engineer, WSDOT, Seattle, WA

Thursday

SESSIONS

W-13: ENGINEERING ETHICS

Time: Thursday, June 8; 11:00 a.m.—12:00 noon

Room: Annapolis 2

Presented By: AECOM

Engineering ethics is a system of moral principles that sets the obligations of engineers to society, to their clients, and to the profession. It has a basis in the philosophy of science, the philosophy of engineering, and the ethics of technology. Because engineering impacts the quality of life for all people, engineers must perform under a standard of professional behavior that requires adherence to principles of conduct described by established codes of ethics. This session will review the development of engineering codes of ethics with a focus on general principles, obligations to society, responsibilities, whistleblowing, and conduct. It will then demonstrate these concepts through an examination of several case studies.

Speakers: Lusanna Ro, Esq., AECOM; Glen Allen, VA; Elliott Mandel, P.E., AECOM, Arlington, VA

Poster

SESSION

The IBC Poster Session is another opportunity to continue the learning opportunities at the IBC. Posters are displayed throughout the conference on the Hotel Ballroom level near the technical sessions.

IBC POS-01: New New York Bridge

Laura Hanson, American Galvanizers Association and the International Zinc Association

IBC POS-02: Self-Spanning & Tieless Formwork for Concrete Structures on the Tappan Zee Bridge

Troy Westenbarger and Tyler Shaner, Dayton Superior

Exhibit Hall

PRINCE GEORGE HALL B, 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 B of the Gaylord National Resort, on the lower level of the hotel. “Thanks” to all of our returning and new Exhibitors!

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 5: 12:00 noon—2:00 p.m. with a strolling luncheon buffet
- Monday, June 5: 5:00—7:00 p.m. with appetizers and bar service
- Tuesday, June 6: 10:00 AM—2:00 p.m. with a strolling luncheon buffet
- Wednesday, June 7: 7:30—9:00 a.m. with a continental breakfast
- Wednesday, June 7: 12:00 noon—2:00 p.m. with a strolling luncheon buffet

Below, you will find a numerical listing by booth number of all exhibitors, followed by an alphabetical listing with full contact information and company description. This listing contains all Exhibitors as of May 23, 2017

Baltimore 1/2 District DOT	134 Atlas Tube
100 WireCo World Group	135 Williams Form Engineering Corp.
102 Euclid Chemical Company, The	136 American Piledriving Equipment
103 CBSI	137 A.H. Beck Foundation Company, Inc.
104 Redaelli Structural Cables	138 CAN Equipment Sales LLC & CAN-USA Inc.
106 McClain & Co., Inc.	140/142 FATZER AG Wire Ropes
110 Bridge Grid Flooring Manufacturers Association	141 Kongsberg Mesotech
111 NANOKOTE North America, Inc.	143 U.S. Bridge
112 Precast/Prestressed Concrete Institute (PCI)	146 SOFiSTiK AG
113 Klaas Coatings (North America)	147 Perryman Company
114 Anderson Hydra Platforms, Inc.	150 Kenway Corporation
115 Associated Asphalt	151 Roads & Bridges
116 Buzzi Unicem USA	152 Tech4Imaging
118 HAKS	153 Moffatt & Nichol
122 Berkel & Company Contractors, Inc.	207/205 Michael Baker International
123 Whitman, Requardt and Associates, LLP	210 D.S. Brown
124 Giken America Corporation	211 MDX Software
125 Universal Minerals International, Inc.	212 HRV Conformance Verification Associates, Inc.
126 Wire rope Works, Inc.	213 National Steel Bridge Alliance (NSBA)
127 Pile Dynamics, Inc./GRL Engineers	214 KCI Technologies, Inc.
128 Mueser Rutledge Consulting Engineers	215 Tensa America/Deal/ Rizzani de Eccher USA
129 Deep Foundations Institute (DFI)	216 AUR, Inc.
130 Foundation Technologies Inc.	217 American Segmental Bridge Institute (ASBI)
131 Loadtest, a Division of Fugro USA Land, Inc.	218 MISTRAS Group
	219 Lusas

Exhibit Hall

PRINCE GEORGE HALL B, LOWER LEVEL

- | | |
|--|--|
| 222 Moog USA Inc. | 337 Quinn Consulting Services, Inc. |
| 223 Sofis Company Inc. | 338 Bridge Intelligence |
| 224 Carl Stahl DecorCable Innovations | 339 Shanghai Zhenhua Heavy Industries Co., Ltd. (ZPMC) |
| 225 Marine Solutions, Inc. | 340 A. Morton Thomas and Associates |
| 226/228 F&M MAFCO, Inc. | 342 Scott System, Inc. |
| 227 Bridge Preservation LLC | 343/341 BDB Bridge/Precastel LLC. |
| 229 Innovative Mapping Technologies | 346/348 SPG - A Division of AGF Access Group Inc. |
| 230 Evonik Corporation | 350 Coastal Precast Systems |
| 231 International Road Dynamics Inc. | 353/452/351/450/349/448/347/446 Safway Services, LLC |
| 234 Emseal Joint Systems | 403 Sika Corporation |
| 235 Viathor, Inc. | 404 Harcon Corporation |
| 236 Contractors Materials Company | 406 Figg Bridge Engineers, Inc. |
| 237 FRP Bridge Drain Pipe | 407/405 American Composites Manufacturers Association (ACMA) |
| 238 Bentley Systems | 409 CTS Cement Manufacturing Corporation |
| 239 Dow Chemical Company | 410 Freyssinet, Inc. |
| 240 Portadam, Inc. | 411 Vector Corrosion Technologies |
| 241 Informed Infrastructure | 412 Advitam-Sixense |
| 242 Armtec LP | 413 ChemCo Systems |
| 243 Mabey, Inc. | 414 Reinforced Earth Company, The |
| 246 Safespan Platform Systems, Inc. | 415 Allied Powers LLC |
| 247 Epic Polymer Systems | 416 Computers and Structures Inc. |
| 248 Bridge design & engineering | 417 GeoStabilization International |
| 252 Pharos Marine Automatic Power | 418 Salit Specialty Rebar |
| 253 V&S Galvanizing | 419 TRC |
| 304 Acrow Corporation of America | 421 International Zinc Association |
| 305 R.J. Watson, Inc. | 422 AECOM |
| 306 Greenman-Pedersen, Inc. | 423 ECA |
| 307 Headed Reinforcement Corporation (HRC) | 424 Contech Engineered Solutions |
| 310 Hilman Rollers | 425 STV |
| 311 STALITE | 426 Nickel Institute |
| 312 Hydro-Technologies/Modified Concrete Suppliers | 427 N.E. Bridge Contractors, Inc. |
| 313 Scougal Rubber Corp. | 428 Keystone Aerial Surveys, Inc. |
| 314 St. Louis Screw & Bolt | 429 Jenik |
| 315 WSP USA | 430 RK&K |
| 316 AZZ Galvanizing Services | 431 SPX Flow |
| 317 Big R Bridge | 433 Monotube, LLC |
| 318 Eriksson Technologies, Inc. | 434 Terex Bid-Well |
| 319 LARSA, Inc. | 435 Hycrete, Inc. |
| 322 Bureau Veritas North America | 436 Pickering, Corts & Summerson |
| 323 DIMETIX USA | 437 All Access Rigging Co. |
| 324 Neel Company, The | 438 Sea Safety/Sealite |
| 325 Wire Rope Industries | 439 Johns Hopkins University, Whiting School of Engineering |
| 326 Resensys LLC | 441 Watson Bowman Acme |
| 327 CONCORR, Inc. | 442 InfoSight Corporation |
| 328 Stafford Bandlow Engineering | 445 BridgeSight Inc. |
| 329 Stronghold Coating Systems, Ltd. | 447 Olson Instruments, Inc. |
| 330 Pennoni & Intelligent Infrastructure Systems | |
| 331 DBi Services | |
| 334 BVA Hydraulics | |
| 335 MMFX Steel Corp | |

Exhibitors

ALPHABETICAL LISTING

A. Morton Thomas and Associates, Inc.

Booth #: 340

Contact: Khoss Babaei

Phone: 301-881-2545

Fax: 301-881-0814

E-mail: kababaei@amtengineering.com

Website: www.amtengineering.com

AMT provides multidisciplinary services including engineering, environmental, landscape architecture, surveying and construction management and inspection in the eastern United States for a variety of public and private clients. More than 450 strong, AMT maintains our reputation by teaming with our employees, clients and community to provide high-quality, sustainable projects. We utilize the best engineering practices, scientific principles and management solutions to deliver high-quality, ecologically conscious and cost effective projects on time and within budget.

A.H. Beck Foundation Company, Inc.

Booth #: 137

Contact: Gloria Silva

Phone: 210-965-6569

Fax: 210-342-4965

E-mail: gloria.silva@ahbeck.com

Website: www.ahbeck.com

A.H. Beck Foundation Co., Inc. is a specialty deep foundation, ground improvement and earth retention contractor that has been in business since 1932. The company's heritage includes the pioneering effort of helping start the drilled shaft foundation industry in the United States. In the decades that followed, A.H. Beck has continued to remain at the forefront of the deep foundation and ground improvement industry, and is regarded as one of the premier foundation contractors in the United States. With accomplishments that include mechanically installing the first drilled shaft foundations in the United States to thousands of successful deep foundation and ground improvement projects, including many large bridges and bridge repair projects in the United States.

Acrow Corporation of America

Booth #: 304

Contact: Eugene Sobecki

Phone: 973-244-0080

Fax: 973-244-0085

E-mail: esobecki@acrow.com

Website: www.acrow.com

Acrow Corporation of America is a full-service design and engineering firm, Acrow Bridge specializes in prefabricated modular steel bridging solutions for permanent, temporary and emergency use. For more than half a century, Acrow has supplied tens of thousands of bridges to urban and rural locations all over the world to help customers build strong and sustainable transportation infrastructure.

Exhibitors

ALPHABETICAL LISTING

Advitam-Sixense

Booth #: 412

Contact: Stephen Schorn

Phone: 703-674-0813

Fax: 703-342-0426

E-mail: stephen.schorn@sixense-group.com

Website: www.sixense-group.com

Advitam-Sixense is a group of world-class excellence in digital services and solutions specializing in infrastructure, soil and the environment to understand, analyze, anticipate and optimize our clients' investments. The Advitam-Sixense principal mission is to provide support to designers, builders, operators and infrastructure owners to successfully overcome three challenges facing them: construction project management, asset management, and risk management. Our portfolio includes software for project and asset management as well as instrumentation of various structures.

AECOM

Booth #: 422

Contact: Ken Butler

Phone: 804-290-2460

Fax: 804-515-8308

E-mail: ken.butler@aecom.com

Website: www.aecom.com

AECOM is built to deliver a better world. We design, build, finance and operate infrastructure assets for governments, businesses and organizations in more than 150 countries. As a fully integrated firm, we connect knowledge and experience across our global network of experts to help clients solve their most complex challenges. From high-performance buildings and infrastructure, to resilient communities and environments, to stable and secure nations, our work is transformative, differentiated and vital. A Fortune 500 firm, AECOM had revenue of approximately \$17.4 billion during fiscal year 2016. See how we deliver what others can only imagine at aecom.com and @AECOM.

All Access Rigging Co.

Booth #: 437

Contact: Amy Guzma

Phone: 412-877-9660

Fax: 866-491-2140

E-mail: amy@allaccessrigging.com

Website: www.allaccessrigging.com

All Access Rigging Company - We are Certified Contractors offering rental and sales of the latest Under Bridge Inspection Units , Work Platforms, & Comprehensive Traffic Control Services that strictly follow both federal and state guidelines as defined within the MUTCD. We specialize in engineered cable rigging & bridge washing services. We have provided support services to some of the most challenging bridges. We have 2 strategic locations, in Aliquippa, PA and Waterbury, CT.

Exhibitors

ALPHABETICAL LISTING

Allied Powers LLC

Booth #: 415

Contact: Josh Greenman

Phone: 702-283-6401

E-mail: alliedpowersllc@gmail.com

Website: www.hidow.com

Visit us at Booth 415 to learn more about our products and services.

American Composites Manufacturers Association (ACMA)

Booth #: 407/405

Contact: John Busel

Phone: 703-525-0511

Fax: 703-525-0743

E-mail: jbusel@acmanet.org

Website: www.acmanet.org

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. Council members represent material suppliers, manufacturers, consultants and academics with experience in this market. Products on display include FRP bridge decks, rebar, girders, bridge pier protection, and concrete repair/strengthening systems. Visit www.composite-sinfrastructure.org, www.acmanet.org, www.thecamx.org.

American Piledriving Equipment

Booth #: 136

Contact: Jimmy Deemer

Phone: 757-518-9741

Fax: 757-518-9741

E-mail: jimmyd@apevibro.com

Website: www.apevibro.com

APE and its wholly owned subsidiary J&M Foundation Equipment, manufacture and sell deep foundation construction equipment direct to the contractor. 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. PE services its equipment throughout the world, counting service managers and offices in Asia, Europe, South America, The Caribbean, Canada, Mexico and the US. APE equipment drives the largest piles in the world.

Exhibitors

ALPHABETICAL LISTING

American Segmental Bridge Institute (ASBI)

Booth #: 217

Contact: William R. "Randy" Cox

Phone: 512-523-8214

Fax: 512-523-8213

E-mail: wrcox@asbi-assoc.org

Website: www.asbi-assoc.org

The American Segmental Bridge Institute (ASBI) was incorporated in 1989 as 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. ASBI is a unique organization in that all components of the bridge construction industry are included as members.

Anderson Hydra Platforms, Inc.

Booth #: 114

Contact: Cynthia Dandridge

Phone: 803-366-8195

Fax: 803-366-0603

E-mail: cyndi@inspectabridge.com

Website: www.inspectabridge.com

Manufacturer of under bridge work/inspection platforms.

Nationwide sales, service and rental.

Armtec LP

Booth #: 242

Contact: Eric Humphries

Phone: 860-873-1737

Fax: 860-760-6658

E-mail: eric.humphries@armtec.com

Website: www.armtec.com/product/

[acrylite-soundstop-tl-4-system/](http://www.armtec.com/product/acrylite-soundstop-tl-4-system/)

Armtec has been designing and producing noise barrier systems since 1977. We have single source capabilities for Durisol absorptive and Acrylite Soundstop transparent noise walls to include; engineering, design, research, product development, technical assistance and project management, and are committed to the development of new and innovative methods to meet the challenge of any project. Stop by the booth and find out about our Crash-Tested Noise Barrier Wall.

Exhibitors

ALPHABETICAL LISTING

Associated Asphalt

Booth #: 115

Contact: Bruce Rideout

Phone: 207-219-9125

E-mail: brideout@associatedasphalt.com

Website: www.associatedasphalt.com

Associated Asphalt is one of the largest asphalt resellers in the US. We store, blend and haul a diverse mix of performance grade asphalts through 29 liquid and emulsion terminals. We operate up and down the East Coast from New York to Florida and have been in business since 1948.

Atlas Tube

Booth #: 134

Contact: Jim Erhart

Phone: 312-275-1608

E-mail: jim.erhart@zekelman.com

Website: www.atlaspipepiles.com

Atlas Pipe Piles is a leading manufacturer of ERW – straight seam A500 and A252 Pipe Piles in North America (up to 20”).

Our resume is extensive – from DOT projects in over 40 states to working with the U.S. Army Corps of Engineers, and an extensive list of private work - our piles are the strongest and most reliable in the industry.

AUR, Inc.

Booth #: 216

Contact: 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 customized streamlined scour-vortex-preventing products (scAURTM and VorGAURTM) 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.

AZZ Galvanizing Services

Booth #: 316

Contact: Mike Stroia

Phone: 330-327-2080

E-mail: 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

Exhibitors

ALPHABETICAL LISTING

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/Precastel LLC.

Booth #: 343/341

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.

Bentley Systems

Booth #: 238

Contact: Suzanne Canfield

Phone: 610-312-6446

E-mail: suzanne.canfield@bentley.com

Website: www.bentley.com

Bentley is a global leader dedicated to providing engineers, architects, geospatial professionals, constructors, and owner-operators with comprehensive software solutions for advancing infrastructure. Founded in 1984, Bentley has more than 3,000 colleagues in over 50 countries, more than \$600 million in annual revenues, and since 2008 has invested more than \$1 billion in research, development, and acquisitions.

Berkel & Company Contractors, Inc.

Booth #: 122

Contact: Clay Davis

Phone: 770-941-5100

E-mail: cdavis@berkelapg.com

Website: www.berkelandcompany.com

Berkel is a national specialty geotechnical contractor with offices across the US offering design-build services for Auger Pressure Grouted (APG) & Displacement (APGD) piles, Ground Improvement, Sheet piling/Shoring, Underpinning, Secant Walls, Tiebacks, Pressure Grouting, Driven Piles & Drilled Shafts.

Exhibitors

ALPHABETICAL LISTING

Big R Bridge

Booth #: 317

Contact: Rick Sauer

Phone: 770-315-3248

E-mail: rsauer@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.

Bridge design & engineering

Booth #: 248

Contact: Lisa Bentley

Phone: +44 207 973 4698

Fax: +44 207 973 6677

E-mail: l.bentley@hgluk.com

Website: www.bridgeweb.com

Bridge design & engineering is the world's only international publication which is dedicated entirely to the planning, design, construction, maintenance and operation of bridges both small and large. It is read by bridge owners, designers and builders all around the world, as well as specialist suppliers and manufacturers working in the industry. For more information, or to subscribe, call +44 (0) 20 7973 6694 or email customer@hgluk.com.

Bridge Grid Flooring Manufacturers Association (BGFMA)

Booth #: 110

Contact: Phil Gase

Phone: 877-257-5499

E-mail: bgfma@bgfma.org

Website: www.bgfma.org

BGFMA...this next generation Bridge Grid Flooring Manufacturers Association industry group is comprised of companies who fabricate steel grid deck systems for bridges and other companies with an interest in this market. Building on the 70-year service history of 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.

Bridge Intelligence

Booth #: 338

Contact: Hooman Parvardeh

Phone: 407-430-5216

E-mail: hooman@bridge-intel.com

Website: www.bridge-intel.com

Bridge Intelligence is a dynamic, user-focused software company that provides integrated solutions for bridge management, inspection, and evaluation. The flagship product of the company,

Exhibitors

ALPHABETICAL LISTING

inspectX, is a revolutionary 3D mobile bridge inspection platform with mobile app capabilities that will disrupt and transform how bridges are being inspected.

Bridge Preservation LLC

Booth #: 227

Contact: Joe Bilotti

Phone: 203-322-5684

Fax: 913-321-1490

E-mail: jbilotti@versaflex.com

Website: www.bridgepreservation.com

Specializing in the rail and highway markets, Bridge Preservation manufactures high performance spray applied waterproofing membrane systems designed to permanently protect rail and highway structures. These rapid setting high build elastomeric spray applied waterproofing systems are impervious to deicing chemicals, water, ballast, stray current and other factors that contribute to accelerated deterioration and wear of elevated structures.

BridgeSight Inc.

Booth #: 445

Contact: Richard Pickings

Phone: 877-441-0346

Fax: 866-302-0753

E-mail: mkting@bridgesight.com

Website: www.bridgesight.com

BridgeSight Software, founded 1997, provides software solutions and engineering services to bridge engineers through products, consulting, training, and support. The free, open-source, program PGSuper is the world's most utilized, most capable, precast bridge design software. BridgeSight provides customized versions of PGSuper and PGSplice at a fraction of the cost of commercial alternatives.

Bureau Veritas North America

Booth #: 322

Contact: Ray Momsen

Phone: 412-996-4427

Fax: 412-21-8836

E-mail: ray.momsen@us.bureauveritas.com

Website: www.us.bureauveritas.com

Founded in 1828, Bureau Veritas (BV) is a global leader in Testing, QA Inspection and Certification. Our Mission: Help identify, prevent, manage and eliminate risks. BV offers innovative solutions that go beyond simple compliance with regulations and standards, while reducing risk, improving performance and promoting sustainable development. BV deploys the multidisciplinary skills of over 60,000 employees in over 1,400 offices and laboratories in 140 countries worldwide. Our technical services are administered by licensed Professional Engineers and our staff includes AWS CWI, NACE, ASNT, ACI and PCI

Exhibitors

ALPHABETICAL LISTING

Buzzi Unicem USA

Booth #: 116

Contact: William Krupa

Phone: 610-882-5013

E-mail: william.krupa@buzziunicemusa.com

Website: www.buzziunicemusa.com

Buzzi Unicem USA headquartered in Bethlehem, PA, is one of the larger cement companies in the U.S. The company produces rapid setting repair products for use on roadways, bridge decks, runways, and other surfaces, allowing traffic loading in less than one hour under normal weather conditions.

BVA Hydraulics

Booth #: 334

Contact: Bryan Klimek

Phone: 816-891-6390

Fax: 816-891-6599

E-mail: katie@sfacompanies.com

Website: www.bvahydraulics.com

BVA Industrial Hydraulics located in Kansas City, Missouri is one of the world's leading manufacturers of heavy duty hydraulic lifting equipment. BVA products have pressure ranges up to 10,000 PSI with steel and aluminum cylinder capacities of up to 1,500 Tons; manual, air, electric motor and gas/diesel engine pumps; hydraulic gear pullers, nut splitters, flange spreaders, air lifting bags, H-frame presses, bottle jacks, maintenance kits and hydraulic fittings, hoses and accessories to name a few.

CAN Equipment Sales LLC & CAN-USA Inc.

Booth #: 138

Contact: Corey Hinyup

Phone: 504-934-4604

Fax: 504-617-7005

E-mail: crhinyup@can-usa.net

Website: www.canequipmentsales.com & www.can-usa.net

We at CAN-USA & CAN Equipment Sales can provide you with bridge inspection and maintenance services. We can also provide you with equipment from the industries top manufacturers.

Carl Stahl DecorCable Innovations, Inc.

Booth #: 224

Contact: David Barger

Phone: 312-474-1100

Fax: 312-474-1789

E-mail: sales@decorcable.com

Website: www.decorcable.com

Carl Stahl DecorCable offers a comprehensive range of cable, rod, and mesh systems for architectural, structural and design applications. Part of the global Carl Stahl Group, we are uniquely able to furnish the resources necessary for a successful project, no matter what its complexity or location. Specialized design services including tensile engineering, statics, and 3-D modeling are available. Our products include X-TEND® Flexible Stainless Cable Mesh and I-SYS® S.S. Cables, Rods & Hardware.

Exhibitors

ALPHABETICAL LISTING

CBSI

Booth #: 103
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 #: 413
Contact: John Bors
Phone: 650-261-3790
Fax: 650-261-3799
E-mail: bors@chemcosystems.com
Website: www.chemcosystems.com

ChemCo Systems Epoxy Asphalt is a highly fatigue resistant, extremely durable pavement primarily used on steel bridge decks. It is thermoset (will not melt), has fatigue resistance up to 4 orders of magnitude better than other asphalt pavements, can be opened within 2 hours, is applied with standard asphalt paving equipment, is impermeable to salts and water, will not rut or shove and has lasted up to 49 years on heavily trafficked bridges.

Coastal Precast Systems

Booth #: 350
Contact: Dave Neal
Phone: 757-545-5215
Fax: 757-545-6296
E-mail: dave@cpsprecast.com
Website: www.cpsprecast.com

Coastal Precast Systems provides high quality precast for highway, rail, and marine construction. The owners of Coastal Precast Systems have over 70 years of experience in the precast concrete industry. CPS has multiple patents, and prides itself on its innovative approach to precast solutions, as well as the most efficient service that this industry has to offer. CPS offers more than being a supplier of precast, with our professional engineering staff and the ability to provide transportation, we provide a total package. CPS is centrally located on the Intercoastal Waterway in Chesapeake, Virginia.

Exhibitors

ALPHABETICAL LISTING

Computers and Structures Inc.

Booth #: 416

Contact: Atif Habibullah

Phone: 510-649-2200

Fax: 510-649-2299

E-mail: sales@csiamerica.com

Website: www.csiamerica.com

Founded in 1975, Computers and Structures, Inc. (CSI) is recognized globally as the pioneering leader in software tools for structural and earthquake engineering. Its five primary software packages include SAP2000, CSiBridge, ETABS, SAFE, and PERFORM-3D. These products set the industry standard and are used by thousands of engineering firms in over 160 countries worldwide.

CONCORR, Inc.

Booth #: 327

Contact: Ali Akbar Sohaghpurwala

Phone: 571-434-1852

Fax: 571-434-1851

E-mail: ali@concorr.com

Website: www.concorr.com

CONCORR, Inc., for over a quarter century has been providing solutions for rehabilitation and extension of service life of reinforced concrete structures throughout the world. It has paved a path of innovation in the application of cutting edge technology for assessment, repair, and corrosion mitigation. We are leaders in the evaluation of condition of reinforced concrete elements, service life modelling, design of repair and corrosion mitigation systems including all types of cathodic protection systems, quality control and quality assessment during implementation of corrosion mitigation technology, and monitoring and maintenance cathodic protection systems.

Contech Engineered Solutions

Booth #: 424

Contact: Lisa Doroba

Phone: 800-338-1122

E-mail: info@conteches.com

Website: www.conteches.com

Contech Engineered Solutions offers an unparalleled choice of structural plate, precast concrete arch and truss bridges for vehicular and pedestrian needs. Spanning five feet to 250 feet or more, our innovative, modular solutions lower your in-place costs and trim schedules, and bring you the support of an expert team of product development, manufacturing, and installation specialists.

Exhibitors

ALPHABETICAL LISTING

Contractors Materials Company

Booth #: 236

Contact: Dave Friedman

Phone: 513-470-7390

Fax: 513-956-3173

E-mail: driedman@cmcmmi.com

Website: www.cmcmmi.com

Contractors Materials Company is located in Cincinnati, OH and is a 109 year old company specializing in the supply & fabrication of concrete reinforcement products for the construction industry. CRR is the fabrication arm of Contractors Materials Co. created for the sole purpose of fabricating stainless steel rebar in its own exclusive 70K sq/ft facility. We pride ourselves on being the premier fabricator and supplier of Stainless Steel Reinforcement in North America.

CTS Cement Manufacturing Corporation

Booth #: 409

Contact: Tracy Johnston

Phone: 512-497-7114

E-mail: tjohnston@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.

D.S. Brown

Booth #: 210

Contact: Chris Youngless

Phone: 419-257-3561

Fax: 419-257-2200

E-mail: dsb@dsbrown.com

Website: www.dsbrown.com

D.S. Brown has the most comprehensive product-line serving the transportation industry. We manufacture solutions for the most challenging infrastructure applications. Our high quality engineered products are available worldwide for new construction and rehabilitation of bridges, highways, airfields, pavements, and parking structures.

D.S. Brown is fully integrated, performing and controlling all manufacturing processes internally:

- Research and Development
- Engineering Design/CAD Detailing
- Extruding, Molding and Testing
- Custom Steel Fabrication and Machining

Exhibitors

ALPHABETICAL LISTING

DBi Services

Booth #: 331
Contact: Bob Gorski
Phone: 570-459-1112
E-mail: bgorski@dbiservices.com
Website: www.dbiservices.com

DBi Services offers a wide range of maintenance and preservation services for bridges, tunnels and all transportation-related structures. Work is performed by experienced project professionals to assist and compliment transportation agencies in order to meet their growing needs and ensure all structures continually operate properly and safely for their expected service life and

Deep Foundations Institute

Booth #: 129
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 journal, a flagship magazine, research, government relations and outreach.

DIMETIX USA

Booth #: 323
Contact: Darrin Kiessling
Phone: 484-212-0636
Fax: 206-338-4281
E-mail: info@dimetix-usa.com
Website: www.dimetix-usa.com

DIMETIX USA is the exclusive US distributor for Dimetix laser distance sensors. We stock the complete line of Dimetix lasers along with the full line of optional components including enclosures, brackets, cables, controllers, adapters and software. Make DIMETIX USA your partner by choosing a Dimetix laser distance sensor or integrated laser monitoring system as the non-contact measurement solution for your next structural monitoring, engineering, or construction project.

Exhibitors

ALPHABETICAL LISTING

District DOT - 2017 IBC Featured Agency Display

Booth #: Baltimore 1/2 (Ballroom level)

Contact: Richard Kenney

Phone: 202-671-2249

Fax: 202-671-4710

E-mail: richard.kenney@dc.gov

Website: www.ddot.dc.gov

District DOT - 2017 IBC F.A.

The District Department of Transportation (DDOT) manages a transportation system serving the people who live, work and visit Washington, DC. The Department strives to achieve a multi-modal transportation system that makes the city more livable, sustainable, prosperous and attractive, offering everyone in the District exceptional travel choices. The city's bridge inventory includes major river crossings as well as iconic, historical structures. DDOT is delighted to be the 2017 IBC feature agency.

Dow Chemical Company

Booth #: 239

Contact: J.D. Sterba

Phone: 989-636-5936

Email: jdsterba@dow.com

Website: www.dow.com

We're working to support the infrastructure industry and strengthen its ability to innovate through more sustainable and industry-accessible practices. We offer products that work for roads, structures, signage and road marking, as well as applications for industrial support and camps. Science is the most powerful solution to address global challenges. Let's match our expertise with your need and together we can put America's infrastructure on the road to recovery.

ECA

Booth #: 423

Contact: Jeff Harmston

Phone: 336-854-1220

Fax: 336-854-1210

E-mail: jharmston@ecanet.com

Website: www.ecanet.com

ECA has been a leading supplier of foundation construction equipment in the Eastern United States and Eastern Canada for nearly a century. We are exclusive distributors for Bauer Drills, Klemm Anchor and Micropile Drills, RTG Piling Rigs, Pileco Diesel Pile Hammers, HPSI Vibratory Pile Hammers, Word International Drill Attachments, Dawson Construction Products, and Grizzly Side Grip Vibros. ECA offers sales, rentals, service, and parts from six facilities throughout the Eastern United States and the Eastern Provinces of Canada.

Exhibitors

ALPHABETICAL LISTING

Emseal Joint Systems

Booth #: 234

Contact: Irene Friedman

Phone: 508-836-0280

Fax: 505-836-0281

E-mail: ifriedman@emseal.com

Website: www.emseal.com

EMSEAL JOINT SYSTEMS contributes to the preservation and sustainability of the built environment. EMSEAL is the leading innovator and manufacturer of BEJS, the premium preformed expansion joint system for bridges. BEJS uniquely solves changes in plane, terminations, and transitions with factory-fabricated universal-90 degree units, kickouts, and custom pieces to ensure a watertight seal.

Epic Polymer Systems

Booth #: 247

Website: www.epicpolymer.com

Contact: Martin Stuetz

Phone: 855-625-8800

Fax: 855-625-8880

E-Mail: MStuetz@epicpolymer.com

Website: www.epicpolymer.com

Epic Polymer is the exclusive manufacturer of DYNAMEX™ Engineered Elastomeric Bearings. DYNAMEX™ products are engineered to both AASHTO and CAN/CSA S6-06 standards, 100% manufactured in North America and available in a wide range of configurations. Fast Lead Times, Exceptional Customer Service & Intensive Technical Support make DYNAMEX™ your first choice for Engineered Elastomeric Bearings.

Eriksson Technologies, Inc.

Booth #: 318

Contact: Roy Eriksson

Phone: 813-989-3317

Fax: 813-989-3317

E-mail: ncrodriquez@lrfd.com

Website: www.lrfd.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, The

Booth #: 102

Contact: Steve Scarpinato

Phone: 216-531-9222

E-mail: sscarpinato@euclidchemical.com

Website: www.euclidchemical.com

For more than a century, The Euclid Chemical Company has served the global building market with a full line of quality products for the concrete and masonry construction industry. Euclid

Exhibitors

ALPHABETICAL LISTING

Chemical designs and manufactures and distributes worldwide a complete line of admixtures, concrete fibers, curing and sealing compounds, structural grouts, epoxy adhesives, floor hardeners and toppings, joint fillers, industrial and architectural coatings, decorative color/stains/stamps, and a comprehensive selection of restoration materials.

Evonik Corporation

Booth #: 230

Contact: Kenny Hopfensperger

Phone: 848-303-4055

E-mail: kenneth.hopfensperger@evonik.com

Website: www.protectosil.com

Evonik Corporation is the manufacturer of Protectosil building protection products, one of the most successful brands in the field of water repellents, graffiti control, corrosion inhibitors and surface protection products. Protectosil products have been proven to increase the service life of your structure by mitigating the effects of man-made and natural deterioration.

F&M MAFCO, Inc.

Booth #: 226/228

Contact: Jen Gardner

Phone: 513-367-8226

E-mail: jgardner@fmmafco.com

Website: www.fmmafco.com

At F&M MAFCO we are the tool and equipment experts. It is our primary focus. From hand tools to heavy equipment we have it all. When you partner with us you gain access to an endless inventory of tools and equipment and our fab and service teams. You essentially become an extension of our company. We ensure you have what you need available to you when and where you need it. We are in the business of providing you with the tools, equipment, consumables, and support you need to do your job. You build the world. We provide the tools and equipment. Our goal? Put the power in your hands so you can focus on what you do best. Getting the job done.

FATZER AG Wire Ropes

Booth #: 140/142

Contact: Alexander Strauch

Phone: +41714668104

Fax: +41714668110

E-mail: alexander.strauch@fatzer.com

Website: www.fatzer.com

Founded as a rope-making factory in 1836 in the Swiss town of Romanshorn, FATZER has been producing top-quality ropes for generations. In the early stages, hemp ropes were manufactured for agriculture, fishing and shipping, with steel wire rope production being added around 1900. Nowadays, FATZER specializes in the development, manufacture and global distribution of high-quality steel wire ropes for ropeways, winches, structural

Exhibitors

ALPHABETICAL LISTING

applications, and other applications. With a long history of meeting specific market needs, FATZER is recognized as a leading rope manufacturer.

Figg Bridge Engineers, Inc.

Booth #: 406

Contact: Eliza Partington

Phone: 850-694-5778

E-mail: epartington@figgbridge.com

Website: www.figgbridge.com

Evoking a sense of pride in their settings and communities, FIGG bridges are lasting monuments to the people, technology and spirit of their times. They are created through a careful analysis of the site; are context- and environmentally-sensitive; achieve a community's particular needs; and sustainably meet funding and maintenance realities.

Foundation Technologies Inc.

Booth #: 130

Contact: Nick Milligan

Phone: 678-407-4640

Fax: 678-407-4645

E-mail: nick@foundationtechnologies.com

Website: www.foundationtechnologies.com

Manufacturer and distributor of specialty products for foundation construction industry. ShaftSpacer®, BarBoot®, and Cagecaster® are products for centralizing rebar within drilled shafts: UNISPACER™ for single bar reinforcement positioning within Auger-cast, mini-piles, and tie-backs: Yellow Jacket™ friction reduction for piling associated with MSE walls. Slickcoat™ friction reduction system for coating piles.

Freyssinet, Inc.

Booth #: 410

Contact: Marit Chasse

Phone: 703-378-2500

Fax: 703-378-2700

E-mail: marit.chasse@freyssinetusa.com

Website: www.freyssinetusa.com

Freyssinet, Inc. offers integrated and innovative technical solutions in the construction, repair and maintenance of structures in its specialist areas:- Stay Cables & Hangers - Suspensions Cables - Post-tensioning Systems - Structural Repair, Strengthening & Monitoring - Barrier Cables -Expansion Joints, Bearings, Seismic Devices & Structural Dampers - Heavy Lifting & Handling.

Freyssinet, Inc. executes work as a specialty subcontractor, general contractor and supplier throughout the United States.

Exhibitors

ALPHABETICAL LISTING

FRP Bridge Drain Pipe

Booth #: 237

Contact: Nathan Peters

Phone: 636-938-6313

E-mail: nathan@gracecomposites.com

Website: www.frpbridgedrainpipe.com

For over 30 years our company has been committed to providing the highest quality fiberglass drainage materials in North America. By providing engineers with a corrosion resistant, light weight, high strength pipe that is practically limitless in its scope of custom capabilities, we have supplied engineers with a product that solves the problems typically associated with bridge drainage systems.

GeoStabilization International

Booth #: 417

Contact: Vonita Murray

Phone: 855-579-0536

Fax: 855-579-0536

E-mail: vonita.murray@gsi.us

Website: www.geostabilization.com

Our passion is to develop and install innovative solutions that protect people and infrastructure from the dangers of geohazards. We specialize in emergency landslide repairs, rockfall mitigation, and grouting using design/build and design/build/warranty contracting. GeoStabilization's team includes some of the brightest and most dedicated professionals in the geohazard mitigation industry. Our expertise, proprietary tools, and world-wide partnerships allow us to repair virtually any slope stability or foundation problem in any geologic setting.

Giken America Corp.

Booth #: 124

Contact: Jan Vaz

Phone: 407-666-8119

Fax: 407-380-9411

Email: info@gikenamerica.com

Website: www.giken.com/en

Giken America is a manufacturer of press-in pile driving equipment that also provides construction solutions and technical advice for projects that are sensitive to noise & vibration in areas with limited space. Our equipment & services are developed from and based on the press-in piling method, a non-vibratory piling method that generates minimal noise impacts. Compatible special attachments for press-in machines help increase the efficiency of the press-in method through various types of soil conditions.

Exhibitors

ALPHABETICAL LISTING

Greenman-Pedersen, Inc.

Booth #: 306

Contact: Ralph Csogi

Phone: 631-587-5027

Fax: 631-587-5027

E-mail: rcsogi@gpinet.com

Website: www.gpinet.com

Greenman-Pedersen, Inc. is a top national engineering design and construction services firm involved on major projects throughout the U.S. and overseas since 1966. GPI provides engineering, planning, survey, mapping and construction management and inspection on major highway, bridge, transit, rail and coatings projects for traditional and alternative delivery

GRL Engineers/Pile Dynamics, Inc.

Booth #: 127

Contact: Pat Hannigan/George Piscalko

Phone: 216-831-6131

E-mail: info@grlengineers.com/info@pile.com

Website: www.grlengineers.com/www.pile.com

GRL Engineers, Inc. specializes in analyzing and testing deep foundations with services such as Dynamic Pile Monitoring, Dynamic Load Testing, Wave Equation Analysis of Pile Driving, Foundation Integrity by Cross Hole Sonic Logging, Pulse Echo Testing and Thermal Integrity Profiling, SPT Hammer Performance Analysis, and more. GRL serves the entire US with branch offices in California, Colorado, Florida, Louisiana, Illinois, North Carolina, Ohio, Pennsylvania, Texas and Washington. 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.

HAKS

Booth #: 118

Contact: Sophie Boreshe, P.E.

Phone: 410-605-0592

Fax: 410-605-0593

E-mail: sboreshe@haks.net

Website: www.haks.net

HAKS has been conducting award-winning bridge biennial inspections for over two decades and bridge inspections throughout the Northeastern U.S. The 675-person full-service consulting firm ranked 131 on ENR's 2016 Top 500 Design Firms and was recognized in 2015 as "One of the Best Firms to Work for" by the Zweig Group. Our New York City headquarters is ISO 9001:2008 certified for all departments. Always client-focused, we strive to improve communities while enhancing social, economic and environmental conditions.

Exhibitors

ALPHABETICAL LISTING

Harcon Corporation

Booth #: 404

Contact: Carolyn Miller

Phone: 717-687-9294

E-mail: carolyn@harconcorp.com

Website: www.harconcorp.com

Harcon Corporation provides bridge access services for bridge inspection, maintenance and utility installation. Our unique equipment allows 100% hands on access without lane closures and without the additional costs of traffic management. It is the safest way to approach bridge access saving both time and more importantly lives.

Headed Reinforcement Corporation (HRC)

Booth #: 307

Contact: Jeremy Maldonado

Phone: 714-852-1333

Fax: 714-557-4460

E-mail: jeremy@hrc-usa.com

Website: www.hrc-usa.com

High Performance Reinforcement Products for Structural Integrity and Constructability.

Hilman Rollers

Booth #: 310

Contact: Deb Brenner

Phone: 732-462-6277

Fax: 732-462-6355

E-mail: dbrenner@hilmanrollers.com

Website: www.hilmanrollers.com

Hilman Rollers are an essential component for bridge construction projects. They have proven their value in rapid bridge replacements, launching bridge segments, launching entire spans, as travelers for gantries; as well as being used in casting yards to move heavy segments. Hilman Rollers move the Heavyweights!

HRV Conformance Verification Associates, Inc.

Booth #: 212

Contact: H. Rochelle Stachel

Phone: 412-299-2000

Fax: 412-299-2007

E-mail: hrstachel@hrvinc.com

Website: www.hrvinc.com

We are leading experts in materials QA/QC inspection, construction management/construction inspection for transportation, rail & transit, oil & gas, power, commercial, and water/wastewater markets worldwide. HRV provides certified CCM, AWS CWI, NACE, SSPC, ACI, PCI and API inspectors for materials fabrication plants and project sites nationwide. We are Quality.

Exhibitors

ALPHABETICAL LISTING

Hycrete, Inc.

Booth #: 435

Contact: Andrew Rhodes

Phone: 201-519-0665

Fax: 201-386-8155

E-mail: info@hycrete.com

Website: www.hycrete.com

Hycrete, Inc. provides hydrophobic concrete admixtures for waterproofing, corrosion protection and moisture-vapor reduction by sealing internal capillaries responsible for water penetration into concrete. In addition to reducing water absorption and dissolved salts infiltration, Hycrete forms a protective coating around steel reinforcement that enhances corrosion protection, even in cracked concrete. Hycrete's solutions deliver water-tight concrete construction, cost savings and reduced construction time, all with a greener solution. Our admixtures are Cradle-to-CradleCM Gold for the highest positive environmental impact in building materials.

Hydro-Technologies/Modified Concrete Suppliers

Booth #: 312

Contact: Ed Liberati

Phone: 502-693-3253

Fax: 614-389-4991

E-mail: eliberati@hughesgrp.com

Website: www.hydro-technologies.com

Hydro Technologies and Modified Concrete Suppliers specializes in the repair and preservation of bridge decks utilizing Hydrodemolition Surface Preparation followed by the installation of Latex Modified Concrete Overlays. This work can be performed very cost effectively, with accelerated construction methods and will increase the service life of an existing bridge deck for over 30 years. Latex Modified Concrete Overlays have been used successfully on thousands of bridge decks since the 1960's.

Informed Infrastructure

Booth #: 241

Contact: Kevin Carmody

Phone: 312-771-9818

E-mail: kcarmody@v1-media.com

Website: www.informedinfrastructure.com/

Engage now with Informed Infrastructure, your news source that delivers actionable information for improving the design and delivery of water systems, energy, transportation, structures, and aligned infrastructure. Receive our magazine, and our weekly e-news and video alerts

Exhibitors

ALPHABETICAL LISTING

InfoSight Corporation

Booth #: 442

Contact: Becky Dolan

Phone: 740-642-3600

Fax: 740-642-5001

E-mail: bdolan@infosight.com

Website: www.infosight.com

"We BARCODE Difficult Stuff™" is more than just a catchy slogan at InfoSight; it is the driving force behind our business. Tag layouts are designed to contain any style of bar code and man readable characters. If your process requires only man readable markings, we do that with the same expertise that we use to create bar codes. What that means to you and your company is that you can rely on InfoSight Tags and Printers to easily and durably identify your products. Our team of specialists will assist you to determine which products offer the most cost effective identification method for your applications. Common applications include exposure to Heat (Up to 1800F), UV Light, Chemicals, Abrasion, and Processes including Shot Blasting, Hot Dip Galvanizing and Painting. We supply identification systems from on-demand manual feed tag printers and automatic feed printers to fully automated systems that print the tags on demand and attach them to your products. Our automation group also creates custom machinery to provide ink jet and other ink marks as well as dot-peen marking. What Can We Do For You?

Innovative Mapping Technologies

Booth #: 229

Contact: Richard Hisert

Phone: 929-320-0299

E-mail: rhisert@innovativemapping.com

Website: www.innovativemapping.com

Innovative Mapping Technologies (IMT) is a HUBZone Small Business certified firm focused on providing equipment for hydrographic and topographic mapping to public and private clients. IMT offers vehicle-based mobile LiDAR, vessel-based combined multibeam and LiDAR, UAS based aerial photogrammetry, hand held indoor/underground mapping, and static LiDAR. Data processing capabilities include point cloud analysis, digital surface generation, model creation, volumetric calculation, structural analysis, condition assessment, asset inventory, GIS integration, and CAD drafting.

International Road Dynamics Inc.

Booth #: 231

Contact: Donna Bergan

Phone: 306-653-6216

Fax: 306-242-5599

E-mail: donna.bergan@irdinc.com

Website: www.irdinc.com

IRD is a worldwide provider of Traffic Monitoring/Management Products, Systems and Solutions for measuring traffic, collecting

Exhibitors

ALPHABETICAL LISTING

data and providing actionable information on operations and performance of transportation infrastructure and systems. IRD's core competence is providing advanced technologies to detect and weigh vehicles at highway speeds, and the integration of other complementary ITS Technologies into web-based solutions that improve safety and mobility.

International Zinc Association

Booth #: 421

Contact: Shannon M. Pole

Phone: 289-440-1886

Fax: 289-440-1886

E-mail: spole@zinc.org

Website: www.zinc.org

International Zinc Association supports the development and use of zinc products for engineering applications, agriculture and human health, through research and market development programs. Corrosion of reinforcing steel bar is a significant cause of concrete failure, causing expensive repairs and premature structure replacements. Galvanizing provides proven corrosion protection for reinforcing steel significantly extending the life of concrete bridge structures.

Jenik

Booth #: 429

Contact: Sylvain Hubert

Phone: 819-701-2072

Fax: 450-446-5950

E-mail: shubert@jenikgroup.com

Website: www.jenikgroup.com

Jenik was founded in 1984 in Montreal, Canada. We specialize in 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 now expanding operations to the USA. Our rental fleet includes well-known brands such as Moog, Barin, Hydra Platforms and Aspen Aerials. Our equipment complies with ANSI Standards.

Johns Hopkins University, Whiting School of Engineering

Booth #: 439

Contact: Cheryl Williams

Phone: 410-516-2304

E-mail: cheryl.williams@jhu.edu

Website: www.engineering.jhu.edu

The Whiting School of Engineering at Johns Hopkins University offers a wide range of online and on-site programs in civil engineering. Master's degree programs and graduate certificates can be completed entirely online. Undergraduate, graduate, and doctoral programs are also offered on the picturesque Homewood campus in Baltimore, Maryland. Students learn from practicing civil engineers and prominent researchers, and can focus on important subjects like structural engineering, geomechanics, hazards management, and sustainable design.

Exhibitors

ALPHABETICAL LISTING

KCI Technologies, Inc.

Booth #: 214

Contact: John Hudacek

Phone: 410-316-0817

E-mail: john.hudacek@kci.com

Website: www.kci.com

KCI is a 100% employee-owned engineering, consulting and construction firm serving clients throughout the eastern, central, and mountain states and beyond. ENR consistently places KCI among the top engineering firms in the country. KCI's professional staff of more than 1,300 offers technical expertise in civil, structural, transportation, environmental, mechanical, electrical, telecommunications, and soils engineering; land planning and landscape architecture; geology; hazardous waste; natural and water resources; surveying; security; and construction management and inspection.

Kenway Corporation

Booth #: 150

Contact: Erik Grimnes

Phone: 207-622-6229

E-mail: info@kenway.com

Website: www.kenway.com

At Kenway we pioneer new ideas with composite materials. Our engineers and technicians build solutions — from standard items such as FRP pilings and bridge drains to one-offs such as composite bridge beams and culvert linings. From design to installation, we're using the best methods and materials for each customized solution. Our engineers at the office, our technicians on the shop floor and our workforce at the installation sites all work together to ensure we're building parts and structures that will last for decades.

Keystone Aerial Surveys, Inc.

Booth #: 428

Contact: David Day

Phone: 215-677-3119

E-mail: dday@kasurveys.com

Website: www.kasurveys.com

Keystone is an industry leader in the safe and legal use of Unmanned Aerial Systems(UAS) as an inspection and mapping tool. Under FAA Part 107 rules, Keystone is using fixed-wing aircraft and vertical takeoff and landing (VTOL) systems to flexibly and efficiently acquire data for inspection (including several major bridges), GIS and mapping in the Northeast and around the

Exhibitors

ALPHABETICAL LISTING

Klaas Coatings (North America) LLC

Contact: Richard Taylor

Phone: 886-317-3633

Fax: 214-363-8422

E-mail: info@klaascoatings-northamerica.com

Website: www.klaascoatings-northamerica.com

North American manufacturer/distributor Si-Rex03 Silicone Resin Emulsion Paint (SREP) coating system for concrete and masonry substrates. Water repellent yet highly breathable coating for protection integrity that can extend infrastructure service life.

Proven coating system with excellent resistance to, and durability against, weathering and UV exposure in all climatic conditions including freeze/thaw. Inorganic pigments for optimal fade resistance with wide range of color choices. Added protection with penetrating primers; Si-Prime and Cremsil. Extensive track record with numerous DOTs and Authorities. AASHTO NTPEP

Kongsberg Mesotech

Booth #: 141

Contact: Aziah North

Phone: 604-464-8144

Fax: 604-941-5423

Email: aziah.north@km.kongsberg.com

Website: www.km.kongsberg.com

Kongsberg Mesotech Ltd, the Canadian subsidiary of Kongsberg Maritime, is a global leader in underwater acoustic industry.

Throughout its history, the company has produced sonars with unprecedented image resolution supplying worldwide customers with products for marine inspection, search & recovery, ocean engineering and underwater mapping, security and surveillance, fisheries, environmental monitoring, research and other underwater applications.

Larsa Inc.

Booth #: 319

Contact: John Horner

Phone: 800-LARSA-01

Fax: 631-454-5252

E-mail: info@larsa4d.com

Website: www.larsa4d.com

LARSA 4D BRIDGE SERIES is recognized as the premier software for bridge engineers with the innovative tools necessary to support bridge projects through design, construction and rehabilitation. Informed by three decades of experience working closely with its loyal client base, 4D BRIDGE SERIES has become one of the most reliable software packages of its kind for segmental, cable-stay, suspension, steel girder, stressed-ribbon and other bridge forms, as well other structures requiring geometric or material nonlinearity.

Exhibitors

ALPHABETICAL LISTING

Loadtest, a Division of Fugro USA Land, Inc.

Booth #: 131

Contact: Bubba Knight

Phone: 850-260-5528

Fax: 352-339-7701

E-mail: bubbaknight@loadtest.com

Website: www.loadtest.com

Loadtest, a division of Fugro, pioneered bi-directional load testing with the original patented tilt free Osterberg Cell® (O-Cell®). We provide premier world leading design calibration testing of bored piles, drilled shafts and other deep foundation elements. Backed by foundation quality assurance with SoniCaliper® excavation inspection and production foundation performance verification with RIM-Cell® proof loading, Loadtest redefines the science of foundation optimization worldwide. Projects of any size will benefit from the application of Loadtest's technology and 25-year experience for foundation optimization

Lusas

Booth #: 219

Contact: Terry Cakebread

Phone: 646-732-7774

E-mail: terry.cakebread@lusas.com

Website: www.lusas.com

Use LUSAS Bridge design and analysis software for frequency, seismic, dynamic, nonlinear, buckling, fatigue, creep modeling, heat of hydration, prestress / post-tensioning and staged construction of all bridge types. A vehicle load optimization facility simplifies worst-case vehicle loading patterns. AASHTO and other design codes are supported. Extensive results processing and visualisation facilities are provided.

Mabey, Inc.

Booth #: 243

Contact: Andrew Boorman

Phone: 410-379-2800

Fax: 410-379-2801

E-mail: a.boorman@mabey.com

Website: www.mabey.com

Mabey carries a broad range of products for temporary and permanent bridges, excavation and trench shoring, structural shoring and temporary roadways. From PE certified engineered plans to on-site support, Mabey carries what you need to complete your project on time and on budget.

Exhibitors

ALPHABETICAL LISTING

Marine Solutions, Inc.

Booth #: 225

Contact: John Kennan

Phone: 443-484-2394

Fax: 859-554-4100

E-mail: jkeenan@msimarinesolutions.com

Website: www.msimarinesolutions.com

Marine Solutions is a specialized construction and engineering firm focused on building and maintaining waterfront, hydraulic, navigation, and bridge structures. Marine Solutions is a certified small, woman-owned, disadvantaged business enterprise (WBE/DBE) and are fully insured for general, marine and professional liability. Our headquarters are in Kentucky with offices in Maryland, New Jersey, and New York. We offer our services throughout the United States and our valued clients included federal, state and municipal agencies, architectural and engineering firms, construction companies, and industrial entities.

McClain & Co., Inc.

Booth #: 106

Contact: Lisa Albertson

Phone: 540-423-1066

Fax: 540-423-1066

E-mail: vellington@mcclain1.com

Website: www.mcclain1.com

McClain & Co., Inc. provides rental equipment & supporting services to Engineers, Contractors & Government Agencies for the Inspection, Maintenance & Repair of our nation's bridges. Specialized UBU equipment including highway & rail compatible units A-75, A-62, UB-60, UB-50, A-40, A-30, B-32R & platforms units by Moog reaching up to 75' horizontally. Insulated Bucket & Boom Trucks 40-110', Traffic Safety Sales & Services, Bridge Utility& Construction Services.

MDX Software

Booth #: 211

Contact: Chris Douty

Phone: 573-446-3221

Fax: 573-446-3278

E-mail: sales@mdxsoftware.com

Website: www.mdxsoftware.com

MDX Software Curved & Straight Steel Bridge Design & Rating is in use by many top design firms and DOTs to design and rate steel girder bridges for compliance with LRFD, LRFR, LFD, and ASD AASHTO Specifications.

Exhibitors

ALPHABETICAL LISTING

Michael Baker International, Inc.

Booth #: 207/205

Contact: John C. Dietrick, P.E., S.E.

Phone: 216-776-6626

Fax: 216-664-6532

E-mail: jdietrick@mbakerintl.com

Website: www.mbakerial.com

Michael Baker International—a global leader in engineering, planning and consulting—has been partnering with communities and agencies since 1940 to solve their most complex infrastructure challenges with a legacy of expertise, experience, innovation and integrity. Supported by more than 6,000 employees in 90 offices, we provide a full continuum of solutions for a broad range of markets including highways, bridges, airports, rail and mass transit systems, domestic and overseas government and commercial facilities, water and wastewater infrastructure, energy infrastructure and urban planning and development. We Make a

MISTRAS Group

Booth #: 218

Contact: Sales Department

Phone: 609-716-4000

Fax: 609-716-0706

E-mail: events@mistrasgroup.com

Website: www.mistrasgroup.com

MISTRAS Group (NYSE: MG) is a leading, global one-source provider of nondestructive testing (NDT) and structural health monitoring (SHM) solutions for bridges. Our StructurAlert™ brand of advanced SHM solutions includes long-term, remote monitoring systems—like our Sensor Highway series—to keep you informed of your bridge's condition. MISTRAS' drone inspection brand, AETOS, safely inspects hard-to-access assets, and we offer a range of portable condition assessment products. Learn more at Booth #218. www.mistragroup.com.

MMFX Steel Corp

Booth #: 335

Contact: Tom Russo

Phone: 410-624-6961

E-mail: tom.russo@mmfx.com

Website: www.mmfx.com

MMFX® Steel is a global specialty steel company that has removed long-standing limitations faced by structural engineers and the construction industry with its ChromX 9000, 4000 and 2000 Series, grades 100 and 120 high strength concrete reinforcing steel products. With three levels of corrosion resistance, designers can utilize the high strength efficiencies and best match the uncoated, corrosion protection requirements of a given project delivering solutions to problems faced by steel customers.

Exhibitors

ALPHABETICAL LISTING

Moffatt & Nichol

Booth #: 153

Contact: Cole Rocca

Phone: 562-590-6500

E-mail: crocca@moffatnichol.com

Website: www.moffatnichol.com

Moffatt & Nichol is a leading global infrastructure advisor specializing in the planning and design of facilities that shape our coastlines, harbors and rivers as well as an innovator in the transportation complexities associated with the movement of freight.

Monotube, LLC

Booth #: 433

Contact: Scott Udelhoven

Phone: 330-454-6111

Fax: 330-454-1572

E-mail: sudelhoven@monotube.com

Website: www.monotube.com

Tapered Steel Shells for friction applications of Driven Piles. Various gauges and tapers to fit your piling needs. Engineering analysis available to assist in the best Monotube Pile for your application and capacity.

Moog USA Inc.

Booth #: 222

Contact: Cindy Watson

Phone: 540-586-6700

Fax: 540-586-6161

E-mail: cwatson@moogusa.com

Website: www.moogusa.com

Since 1980 MOOG has been supplying their customers with state of the art mobile under-bridge access equipment. Superior quality, innovative designs, plus meeting and fulfilling our customer's requirements have been the driving force of MOOG's success. MOOG supplies units with reaches ranging from 15 ft. to 70 ft. and load capacities from 660 lbs. to 2,200 lbs.

Mueser Rutledge Consulting Engineers

Booth #: 128

Contact: Tony D. Canale

Phone: 917-339-9300

Fax: 917-339-9400

E-mail: tcanale@mrce.com

Website: www.mrce.com

MRCE is a leading engineering firm providing design of foundations and complete geotechnical studies for all structure types. Design solutions for bridges are a specialty, with services ranging from site investigations; condition evaluations; development of foundation parameters; design of bridge piers, collision and scour protection, and fendering; to seismic evaluation; field testing of prototype foundations; design of cofferdams and temporary support structures; instrumentation and automated monitoring, and full construction inspection services.

Exhibitors

ALPHABETICAL LISTING

N.E. Bridge Contractors, Inc.

Booth #: 427

Contact: Bridget Waitkus

Phone: 508-238-1941

Fax: 508-238-2093

E-mail: Bridget@bridgeriggers.com

Website: www.bridgeriggers.com

N.E. Bridge specializes in road and railroad under bridge accessing equipment rental. Our equipment can help you safely inspect, repair, and access every part of any bridge. In addition to road bridges, we also provide Hi-Rail Under Bridge Trucks and Hi-Rail Bucket Trucks for use on Class I Railroads and Shortline Railroads. Our Under Bridge Inspection Units are designed for completing all types of bridge inspection and maintenance work. You can easily access both roadway and railroad bridges with the large two-person basket.

NANOKOTE North America, Inc.

Booth #: 111

Contact: Simon King

Phone: 855-844-3345

Fax: 469-420-5378

E-mail: info@nanokote.com

Website: www.nanokote.com

NANOKOTE is a global trailblazer in the field of nanomaterials with a proven track record for over a decade. Headlining this success is the PRIMOGUARD Concrete+ coating designed for use on transportation infrastructure including tunnels and bridges; a patented, single coat application system direct to concrete without the need for a primer. This high performance, durable coating protects against harsh weather, deicing salts and has inherent anti-graffiti resistance for easy cleaning/removal. Can be applied to damp or dry concrete in conditions down to 36°F (2°C) and up to 99% humidity. Manufactured Dallas, Texas.

National Steel Bridge Alliance (NSBA)

Booth #: 213

Contact: Matthew Shergalis

Phone: 312-363-8218

E-mail: shergalis@aisc.org

Website: www.steelbridges.org

The National Steel Bridge Alliance (NSBA), a division of the American Institute of Steel Construction (AISC) is a national, not-for-profit organization dedicated to the advancement of steel bridge design and construction. The NSBA functions as the voice of the bridge fabricators and steel mills while also partnering with the bridge design and construction community. The NSBA's partners include the American Association of State Highway and Transportation (AASHTO), Federal Highway Administration (FHWA), state departments of transportation (DOTs), design consultant, contractors, and academia. With these resources, NSBA is uniquely positioned to find solutions to the toughest bridge challenges, including those related to cost, sustainability and performance.

Exhibitors

ALPHABETICAL LISTING

Neel Company, The

Booth #: 324

Contact: Kamal Dixit

Phone: 703-913-7858

E-mail: kdixit@neelco.com

Website: www.neelco.com

For more than 30 years The Neel Company has specialized in the design, supply, and sale of the T-WALL Retaining Wall System. The T-WALL System is a precast, modular gravity-type retaining wall system composed of structurally reinforced, monolithic T-WALL units. With over 130 years combined T-WALL experience, our engineers are able to custom design each project for optimal economy and efficiency. T-WALL bridge applications include abutments, flyovers, approaches, grade separations, rapid replacement, and fill structures.

Nickel Institute

Booth #: 426

Contact: Frank Smith

Phone: 613-544-1697

E-mail: fnsmith01@gmail.com

Website: www.nickelinstitute.org

The Nickel Institute promotes the use of nickel-containing stainless steel rebar in bridge construction and rehabilitation.

Olson Instruments, Inc.

Booth #: 447

Contact: Stan Smith

Phone: 303-423-1212

Fax: 303-423-6071

E-mail: stan.smith@olsonengineering.com

Website: www.olsonengineering.com

Olson Engineering specializes in providing structure and infrastructure condition assessment. Also Olson's geoscientists address geological and geotechnical problems needing site characterization. For our customers world-wide, Olson applies methods from NDE to structural assessment and engineering geophysics to subsurface imaging. Olson Instruments designs, assembles and distributes world class NDT instrumentation. Our sensors and data acquisition systems meet rugged field and precision laboratory requirements.

Pennoni & Intelligent Infrastructure Systems

Booth #: 330

Contact: Jennifer Laning

Phone: 443-449-2503

E-mail: jlanning@pennoni.com

Website: www.pennoni.com

Pennoni offers comprehensive bridge engineering services, including structural design, instrumentation, structural health monitoring, asset management, condition evaluation and inspection of highway, rail, movable, historic and long span structures. Our bridge engineers have successfully completed bridge projects

Exhibitors

ALPHABETICAL LISTING

that include underwater inspections, 3-D finite element analyses, emergency structural repairs, and constructability assessments for federal, state, and local agencies. For more information, visit www.pennonni.com

Perryman Company

Booth #: 147

Contact: Brian Brandstetter

Phone: 724-746-9390

Fax: 724-746-9392

E-mail: BBrandstetter@perrymanco.com

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 ISO9001:2008; 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 #: 252

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.

Pickering, Corts & Summerson

Booth #: 436

Contact: Tanya Swartz

Phone: 215-968-9300

Fax: 215-968-3649

E-mail: tswartz@pcs-civil.com

Website: www.pcs-civil.com

Thriving on a long-standing tradition of excellence, Pickering, Corts & Summerson maintains award-winning practices in Civil Engineering, Transportation Design, Bridge Inspection, Underwater Bridge Inspection, Municipal Engineering, and Surveying. We offer a multitude of services across a diverse array of technical disciplines. This availability of varied, in-house expertise allows us to provide our clients with immediate solutions to their everyday needs.

Exhibitors

ALPHABETICAL LISTING

Portadam, Inc.

Booth #: 240

Contact: Timothy McTigue

Phone: 856-740-0606

E-mail: tmctigue@portadam.com

Website: www.portadam.com

Our cofferdam equipment enables contractors to responsibly perform their in-water work in a dry condition. Bridges, piers, sea-walls and pipeline crossings are some of the many types of projects we've helped contractors complete successfully. Portadam's system can also be an integral part of your floodfighting plan – having been validated by the US Army Corps. Additionally, our above-ground water storage systems provide custom sized, large capacity solutions for energy and industrial applications.

Precast/Prestressed Concrete Institute (PCI)

Booth #: 112

Contact: William Nickas

Phone: 312-583-6776

E-mail: wnickas@pci.org

Website: www.pci.org

The Precast/Prestressed Concrete Institute (PCI) is the trade association and technical institute for the precast concrete structures industry. PCI develops, maintains, and disseminates the Body of Knowledge for designing, fabricating, and constructing with precast concrete; and provides technical resources, continuing education, events, and much more. PCI also operates the world's leading certification program for firms and individuals in the precast concrete structures industry.

Quinn Consulting Services, Inc

Booth #: 337

Contact: Roger Triana

Phone: 540-850-0435

E-mail: Rtcis@verizon.net

Website: www.Quinn-Consulting.com

Coating inspection / CEI inspection / Drone inspection for bridges/ water tanks / Construction sites and many other items. Quality control and management from Design Build projects. Quinn covers from DOT/ Water treatment plants / Federal projects and many others.

R.J. Watson, Inc.

Booth #: 305

Contact: Marc Stafford

Phone: 716-901-7020

Fax: 716-901-7015

E-mail: mdstafford@rjwatson.com

Website: www.rjwatson.com

R. J. Watson designs, manufactures, and markets high load multi-rotational disc bearings, seismic isolation devices, bridge deck joint sealing systems, waterproofing membranes, FRP strengthening materials, and cable protection systems.

Exhibitors

ALPHABETICAL LISTING

Redaelli Structural Cables

Booth #: 104

Contact: David Ward

Phone: 44 130-237-8327

E-mail: david.ward@redaelli.com

Website: www.redaelli.com

Redaelli is a world leading manufacturer of steel cable systems for tensile structure applications. Founded in 1819, bridge projects include the suspension system for the Great Baelt Suspension Bridge and replacement hanger cable systems for Forth, Alvsborg & first Bosporus suspension bridges. An innovative approach to cable system design, together with proven engineering and project management expertise enables delivery of a wide variety of cable solutions to stayed, tied arch and suspended structures including many iconic architectural bridges. Recent example includes the Consol Energy Wing Tip Suspension Bridge in West Virginia.

Reinforced Earth Company, The

Booth #: 414

Contact: Joseph Harris

Phone: 1-800-446-5700

Email: jharris@reinforcedearth.com

Website: www.reinforcedearth.com

The Reinforced Earth® Company has over forty five years of experience designing and supplying materials to contractors for MSE retaining walls, sound walls and precast arches used in civil engineering applications.

Resensys LLC

Booth #: 326

Contact: Mehdi Kalantari

Phone: 301-395-3892

E-mail: mehdi@resensys.com

Website: www.resensys.com

Resensys offers wireless solutions for remote monitoring of highway bridges based on its award winning wireless SenSpot sensors. Wireless SenSpot sensors provide a versatile platform for remote monitoring of strain (stress), vibration, tilt, inclination, displacement, temperature, and humidity. Examples applications of SenSpots include monitoring tilting of piers; monitoring strain and deflection in girders, beams, and steel members; and monitoring movement of bearings and expansion joints. Additionally, Resensys's quick-to-deploy wireless strain SenSpot sensors provide an attractive solution for fast and reliable load rating of highway bridges. SenSpot sensors offer 10 years of guaranteed battery life.

Exhibitors

ALPHABETICAL LISTING

RK&K

Booth #: 430

Contact: Bob Healy

Phone: 410-462-9428

Fax: 410-533-4164

E-mail: rhealy@rkk.com

Website: www.rkk.com

Founded in 1923, RK&K has served their clients by providing multi-discipline planning, engineering, environmental and construction phase services. Offering innovative and creative solutions on projects nationwide from 22 offices in eight states and Washington, DC, their technical expertise places them 69th on ENR's 2016 List of the Top 500 Design Firms. The firm is experienced in an array of disciplines, including planning, design and construction management/inspection/engineering for transportation, environmental, infrastructure, utility, civil/site and energy projects.

Roads & Bridges

Booth #: 151

Contact: Ryan Hanson

Phone: 847-391-1059

Fax: 847-390-0404

E-mail: rhanson@sgcmail.com

Website: www.roadsbridges.com

As the leading monthly trade publication for the transportation construction market, Roads & Bridges reaches 60,000 engineers, contractors, DOTs and other public officials (local, county, state & federal).

Safespan Platform Systems, Inc.

Booth #: 246

Contact: David Malcolm

Phone: 716-860-1283

E-mail: dmalcolm@safespan.com

Website: www.safespan.com

The Safespan Platform System was developed in 1994 as a direct response and solution to the challenges of bridge construction, namely safety and inspection issues, environmental concerns, business interruption, rising labor costs, and the need for increased efficiencies. We have proven ourselves as an industry leader in access solutions, increasing job safety on many of the country's most famous bridges. Our company deals in integrity with safety as our highest priority.

Exhibitors

ALPHABETICAL LISTING

Safway Services, LLC

Booth #: 353/452/351/450/349/448/347/446

Contact: Heather Shugarman

Phone: 518-381-6000

Fax: 518-381-4613

E-mail: heather.shugarman@safway.com

Website: www.safway.com

Safway Services, LLC offers two suspended access systems to help contractors reduce labor costs and enhance access for bridge construction during rehabilitation and maintenance.

QuikDeck(tm) is a heavy duty multi-point suspended truss system, and QuikShield(tm) is a cable supported system that can support significant loads for painting and light-duty applications.

Visit our booth to learn more!

Salit Specialty Rebar

Booth #: 418

Contact: Kevin Cornell

Phone: 716-299-1990

Fax: 716-299-1993

E-mail: kcornell@stainlessrebar.com

Website: www.stainlessrebar.com

Salit Specialty Rebar (SSR) is North America's most experienced Stainless Steel Rebar fabricator and distributor. SSR boasts a track record of outstanding quality and customer service based on our two fabrication facilities in Niagara Falls, and Buffalo, New York. Both these plants are dedicated exclusively to stainless steel rebar. SSR offers a broad "one-stop" product range of Stainless Steel products including Rebar, Welded Wire Mesh, Tie Wire, and Mechanical. With an extensive inventory and shipping capability throughout the US and Canada SSR can service all your SS reinforcing requirements. For further information visit our newly renovated website at www.stainlessrebar.com.

Scott System, Inc.

Booth #: 342

Contact: Buck Scott

Phone: 303-373-2500

Fax: 303-373-2755

E-mail: info@scottssystem.com

Website: www.scottssystem.com

Scott System of Denver, Colorado is a 46-year-old company that has developed architectural form liners and brick embed systems for poured-in-place and precast concrete projects. Scott is also involved in graphic art projects for highway and bridge work. We are emphasizing the thin brick embed system for this show.

Exhibitors

ALPHABETICAL LISTING

Scougal Rubber Corp.

Booth #: 313

Contact: Scott Nelson

Phone: 775-284-8500

Fax: 775-284-8501

E-mail: scottn@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 #: 438

Contact: Joseph Richter

Phone: 201-344-2853

Fax: 201-330-0448

E-mail: jfr@seasafety.com

Website: www.seasafety.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 marine and FAA compliant obstruction. The lights can be powered with 110-240VAC or 12-24VDC Solar. There are applications for AIS, GSM monitoring and control. Buoys and marine lanterns, for inland waterways, coastal ports, harbors, and oceans.

Sealite: Sealite USA, in conjunction with distributor Sea Safety, will be exhibiting at the 34th International Bridge Conference from June 5 – 8 in National Harbor, Maryland. The event, sponsored by the Engineer's Society of Western Pennsylvania, attracts over 1,200 bridge owners, engineers, government officials, designers, construction executives throughout the world. Sealite will show LED solar and mains powered bridge navigation lighting, obstruction lighting, solar power supplies, marine aids to navigation and barrier floats.

Shanghai Zhenhua Heavy Industries Co., Ltd. (ZPMC)

Booth #: 339

Contact: Fan Jiang

Phone: 86-21-58396666

Fax: 86-21-58399555

E-mail: mail@zpmc.com

Website: www.zpmc.com

Shanghai Zhenhua Heavy Industries Co., Ltd. (ZPMC) is a famous heavy-duty equipment manufacturer, and a state holding company listed in Shanghai Stock Exchange. The major shareholder is China Communication Construction Co., Ltd. (CCCC), which is one of the top 500 companies in the world. The main business of ZPMC include: offshore engineering, port machineries, large steel structures, electrical system, global shipping & installation, investment & finance, global after-sale service, resource integration and EPC.

Exhibitors

ALPHABETICAL LISTING

Sika Corporation

Booth #: 403

Contact: Tessy Reumer

Phone: 201-508-6801

E-mail: reumer.tessy@us.sika.com

Website: www/usa.sika.com

Sika Corporation, based in Lyndhurst, NJ, is a leading supplier of specialty chemical products and industrial materials serving construction and industrial markets including transportation, marine, and automotive. Its technologies are focused on sealing, bonding, damping, reinforcing and protecting. Sika's product lines include roofing, concrete admixtures, specialty mortars, epoxies, structural strengthening systems, industrial flooring, sealants, adhesives, specialty acoustic and reinforcing materials. Sika Products are used in a wide array of applications and always fulfill the highest quality standards. We are committed to customer satisfaction, innovation, and teamwork.

Sofis Company Inc.

Booth #: 223

Contact: Bill Sofis

Phone: 724-378-2670

Fax: 724-378-3719

E-mail: wsosis@sofiscompany.com

Website: www.sofiscompany.com

Sofis Company, Inc has been providing Bridge Inspection Support Services since 1959. We have always been a DOT certified general contractor, also specializing in bridge and substructure repair. We supply operated, certified under bridge inspection units, cable rigging, lift trucks, steel and concrete sampling, and traffic control. Our employees are trained, tested and certified. We also have one of the best safety records in the industry.

SOFiSTiK AG

Booth #: 146

Contact: Andrea Weber

Phone: 0049 911 39901 0

E-mail: info@sofistik.com

Website: www.sofistik.com

The German company SOFiSTiK is one of the leading European suppliers of structural analysis and BIM software and Autodesk® Industry Partner. Software solutions range from basic tools for more productive drafting to 3D analysis suites. SOFiSTiK's Authorized Training Center BiMOTiON provides training and consulting for all aspects of implementing BIM-Workflows.

Exhibitors

ALPHABETICAL LISTING

SPG - A Division of AGF Access Group Inc.

Booth #: 346/348

Contact: Alex Di Domenico

Phone: 450-589-8100

Fax: 450-589-0370

E-mail: alex@agfgroup.com

Website: www.agfgroup.com

SPG, a division of AGF Access Group, is uniquely positioned to offer standard and innovative steel & aluminum access solutions while increasing productivity and safety at the job site. In collaboration with Hydro Mobile, Winsafe, and Raxtar, SPG range of solutions can include: temporary work platforms for stay cable installation & repair, suspended platforms for pylon concrete finishing works, large-area engineered platforms, transversal and longitudinal post-tension platforms, under-deck traveling gantry systems, temporary & permanent elevators for pylon access, stay cable gantry inspection platforms, permanent tower inspection cradles, as well as traditional scaffolding and stairs. With access to 18 offices and 28 dealers across USA and Canada, SPG combines innovation and ingenuity to meet and exceed your project requirements for a turnkey operation.

SPX Flow

Booth #: 431

Contact: Beth Waelti

Phone: 815-873-3720

E-mail: beth.waelti@spxflow.com

Website: www.spxflow.com

SPX FLOW Power Team provides a full range of professional grade high-pressure hydraulic pumps, cylinders, jacks, pullers & tools.

St. Louis Screw & Bolt

Booth #: 314

Contact: Joseph Howard

Phone: 800-237-7059

Fax: 314-389-7510

E-mail: slhoward@stlouisscrewbolt.com

Website: www.stlouisscrewbolt.com

St. Louis Screw & Bolt is one of the longest operating bolt manufacturers in the United States. SLSB specializes in HEX HEAD BOLTS in A325 & A490. We also custom manufacture Anchor Bolts & Tie Rod Assemblies. SLSB also specializes in and has among the nations largest stock of TC bolts ASTM F2280/A490 & ASTM F1852/A325

Exhibitors

ALPHABETICAL LISTING

Stafford Bandlow Engineering, Inc.

Booth #: 328

Contact: Paul M. Bandlow

Phone: 215-340-5830

Fax: 215-340-5815

E-mail: lquinn@sbengineering.net

Website: www.sbengineering.net

Stafford Bandlow Engineering, Inc. (SBE) is a professional consulting and design firm specializing in electro-mechanical and electro-hydraulic systems for movable bridges and heavy movable structures. Our in-house personnel have experience on hundreds of movable bridges and heavy movable structures nationwide, as well as in Canada, Belize, Bermuda and Italy.

STALITE

Booth #: 311

Contact: Ken Harmon

Phone: 704-637-1515

Fax: 704-642-1572

E-mail: kharmon@stalite.com

Website: www.stalite.com

Carolina Stalite Company is committed to manufacturing the finest quality, high strength, low absorption, lightweight aggregate in the world. As a part of this commitment to quality, we procure the highest grade of raw material, utilize current testing and manufacturing technologies, employ the most knowledgeable and experienced people, and constantly research new approaches that will improve both our process and our product... STALITE

Stronghold Coating Systems, Ltd.

Booth #: 329

Contact: Larry F. Grimenstein

Phone: 937-746-7632

Fax: 937-746-7632

E-mail: strongholdone@cs.com

Website: www.strongholdone.com

Stronghold Coating Systems sells polymeric coatings for all types of special applications. We have also just gotten approval of a new Bridge Bearing material that is used thru out Europe. We have the rights to this material for all North America. Stronghold has a complete R&D lab to do analysis and development of special products for difficult applications like the Bridge Bearing material. There is a new spray process of two part materials for areas the have extreme corrosion problems. It is very simple and use able in the field with just a small air compressor. One rehab bridge company is looking at it to do field repairs on small areas on bridges that because of location have extreme corrosion problems.

Exhibitors

ALPHABETICAL LISTING

STV

Booth #: 425

Contact: Michael Good, P.E., PMP

Phone: 410-944-9112

Fax: 410-298-2794

E-mail: james.good@stvinc.com

Website: www.stvinc.com

STV is a nationwide leader in providing construction management, engineering, architectural, planning, and environmental services for transportation systems, infrastructure, buildings, energy and other facilities. Building Design & Construction magazine ranks STV 15th in its Top Construction Management Firms category. Founded more than 100 years ago, STV is 100 percent employee-owned.

Tech4Imaging

Booth #: 152

Contact: Eugene Greenfield

Phone: 614-516-7877

E-mail: eugene@tech4imaging.com

Website: www.tech4imaging.com

Tech4Imaging is at the forefront of noninvasive analysis and imaging. Our customized technologies can solve a wide variety of problems and provide real-time data in a fast and efficient manner. 4Inspection is Tech4Imaging's product line of nondestructive testing systems for infrastructure inspection. While each of our products vary in use and build, all share key qualities in scalability, safety, size, speed and service.

Tensa America/Deal/ Rizzani de Eccher USA

Booth #: 215

Contact: Andrea Travani

Phone: 305-866-9917

Fax: 305-866-9918

E-mail: travani@tensaamerica.com

Website: www.rizzanideecheer.com

Tensa America LLC is a specialized contractor, providing design, supply and installation of stay cables, post-tensioning, bearings, joints, anti-seismic devices and ground anchors for worldwide applications in civil engineering works. DEAL Srl is a designer and manufacturer of specialized equipment for bridge construction. Both companies are part of the de Eccher Group, a global general contractor with 20 years of construction history in North America.

Exhibitors

ALPHABETICAL LISTING

Terex Bid-Well

Booth #: 434

Contact: Christal Dietzenbach

Phone: 605-987-2603

Fax: 605-987-2605

E-mail: christal.dietzenbach@terex.com

Website: www.terex.com/en/

Since 1961 Terex Bid-Well has been an industry leader in the development and manufacture of a complete line of versatile and specialized concrete paving machines for the heavy and highway construction market. The Terex Bid-Well full line of concrete pavers includes bridge deck pavers, overlay machines, airport, road and street pavers, texturing/curing machines, specialized paver/trimmer for slopes and canal paving, along with work bridges that meet any job requirement.

TRC

Booth #: 419

Contact: Koung Thao

Phone: 916-366-0632

Fax: 916-366-1501

E-mail: kthao@trcsolutions.com

Website: www.trcsolutions.com/www.trcbridgedesignsoftware.com

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

U.S. Bridge

Booth #: 143

Contact: Brian Mergenthaler

Phone: 412-445-7661

E-mail: bmergenthaler@usbridge.com

Website: www.usbridge.com

U.S. Bridge has been the leader in bridge engineering, manufacturing and building for over 80 years. Visit www.usbridge.com for more information. Want to design your own bridge in minutes? Visit www.usbridgescope.com - our online tool that brings your project to life.

Exhibitors

ALPHABETICAL LISTING

Universal Minerals International, Inc.

Booth #: 125
Contact: Eric Bosler
Phone: 513-838-0951
Fax: 520-917-0664
Email: cari.barros@umint.com
Website: www.umint.com
Visit us at Booth #125 to learn about our products and services!

V&S Galvanizing

Booth #: 253
Contact: John Feeman
Phone: 717-861-7777
E-mail: johnf@hotdipgalv.com
Website: www.hotdipgalvanizing.com
Now with seven U.S. galvanizing facilities in the Midwest, Northeast and now the new Memphis, TN plant, V&S Galvanizing is one of the largest galvanizing companies in the world today. In-house engineering, NACE 3 level Inspection Services, Powder Coating, Wet Paint (aka COLORZINQ®), Packaging, Transportation, and Shipping services. A full-serve leader in value-added services for the galvanizing industry. Lunch time seminars for the architectural, construction and steel-fabrication communities. Some of the largest and deepest galvanizing kettles in the industry today, with a specialized spinner operation in our Perth Amboy facility and the ability to make 88 foot bridge girders in our Lebanon, PA plant. From bridges to fasteners, engineering to design help, trucking to packaging, a true "full-serve" hot dip galvanizing company. We have more than 30 years of experience as a member of the American Galvanizers Association, 50 years in the United States and celebrating more than 75 years of galvanizing work in Europe.

Vector Corrosion Technologies

Booth #: 411
Contact: Rachel Stiffler
Phone: 724-413-1959
E-mail: rachels@vector-corrosion.com
Website: www.vector-corrosion.com
Innovative solutions for concrete corrosion repair and protection in bridge structures including: embedded galvanic anodes, galvanic jackets, activated arc-spray zinc metallizing, corrosion detection and evaluation, repair and mitigation services for post-tension corrosion.

Viathor, Inc.

Booth #: 235
Contact: Clark Verkler
Phone: 916-987-0246
E-mail: vinfo@viathor.com
Website: www.viathor.com
Viathor, Inc. is dedicated to the development of top quality, user friendly, bridge design and analysis software. VBent is a fully interactive substructure design tool for pier caps, columns and

Exhibitors

ALPHABETICAL LISTING

footings, for both non-integral and integral (monolithic) piers. VBent can read PAPIER input files, and has been approved and accepted for use by PennDOT. VBridge is a superstructure design program for reinforced or cast-in-place post-tensioned concrete bridges. VBridge can compute live and other loads for any bridge configuration and support type (integral and non-integral piers). VBridge analyzes 3D bridge models, and creates VBent input files by sharing geometry and load information.

Watson Bowman Acme

Booth #: 441
Contact: Steve Pabst
Phone: 716-691-7566
Fax: 716-691-9239
E-mail: steve.pabst@basf.com
Website: www.wbacorp.com

Watson Bowman Acme provides comprehensive expansion joint solutions for the Bridge and Highway market. We offer a growing range of high performance products and systems to provide long lasting solutions to difficult construction or rehabilitation tasks. We are fully resourced to deliver results and exceed the expectations of our customers.

Whitman, Requardt and Associates, LLP

Booth #: 123
Contact: Melanie Hustead
Phone: 443-224-1770
E-mail: mhustead@wrallp.com
Website: www.wrallp.com

Established in 1915, WRA is a nationally recognized engineering, architectural and environmental firm that consistently ranks among the Top 125 Design Firms by Engineering News Record. WRA's services cover all aspects of bridge engineering including new field and structural investigations, testing, analysis, load rating, feasibility studies, foundation evaluations and design, life-cycle cost estimating, contract preparation and cost estimating, and construction related services for the repair, rehabilitation, and replacement of existing structures and new structures alike.

Williams Form Engineering Corp.

Booth #: 135
Contact: Ryan Williams
Phone: 616-866-0815
Fax: 616-866-1890
E-mail: williams@williamsform.com
Website: www.williamsform.com

Williams Form Engineering Corporation has been providing threaded steel bars and accessories for rock anchors, soil anchors, high capacity concrete anchors, micropiles, tie rods, tiebacks, strand anchors, hollow bar anchors, post tensioning systems, and concrete forming hardware systems in the construction industry for over 95 years.

Exhibitors

ALPHABETICAL LISTING

Wire Rope Industries

Booth #: 325

Contact: Kevin Tellier

Phone: 514-426-6448

Fax: 514-697-2927

E-mail: kevin.tellier@bridon-bekaert.com

Website: www.bridon-bekaert.com

Premier manufacturer of steel wire ropes and strands for all bridge applications. Full-service provider including non-destructive testing of bridge suspender cables. Wire rope Industries is part of the Bridon-Bekaert Ropes Group, with 19 manufacturing plants in 12 countries.

WireCo World Group

Booth #: 100

Contact: Richard Humiston

Phone: 816-270-4700

E-mail: richardhumiston@wirecoworldgroup.com

Website: www.wirecoworldgroup.com

WireCo Structures, a WireCo® WorldGroup brand, designs, develops, and manufactures real-world, hard-working solutions for bridges and structures. Fabricated to meet demanding requirements, wire rope support and suspender cables have been proven to stand the test of time even in the world's toughest applications. WireCo Structures produces EN 12385-10 Full Locked Coil Rope and Spiral Strand, ASTM A586 Structural Strand and ASTM A603 Structural Bridge Rope in both Galvanised and Galfan coated. ASTM A416 Stay Cable Strand and prEN 10138 Prestressing Concrete Strand also complement our product portfolio. We are QPL Qualified and certified by both API and ISO.

Wirerope Works, Inc.

Booth #: 126

Contact: Kevin Tellier

Phone: 514-426-6448

Fax: 514-697-2927

E-mail: tellierk@wirerope.com

Website: www.wirerope.com

Manufacturer of structural cable systems for use in all types of cable supported bridges. Full range of wire and wire rope types including bridge rope, bridge strand, locked coil. Class A, B, C galv, Galfan (Bezinal, Bezinal 3000). Sockets, clamps and specialty castings. Prestressing, socketing, proofloading of complete range of diameters.

Exhibitors

ALPHABETICAL LISTING

WSP USA

Booth #: 315

Contact: Amy Gilleece

Phone: 916-567-2506

E-mail: amy.gilleece@wsp.com

Website: www.wsp.com

WSP provides a full range of services for bridges—from feasibility studies and environmental permitting, through preliminary and final design, to construction management, inspections and rehabilitation. Experienced in both steel and concrete, the firm has worked on cable-stayed, arch, truss, segmental, suspension, girder, movable and floating structures as well as state-of-the-art thermoplastic and FRP bridges. For more than a century, WSP has contributed to some of the world's most notable bridges.

Exhibitors

ALPHABETICAL LISTING

ADDENDUM

mageba USA

Booth #: 110

Contact: Borja Bailles

Phone: 929-246-3623

E-mail: info@magebausa.com

Website: www.magebausa.com

Mageba USA is part of a global Swiss company. It is one of the world's leading suppliers of structural bearings, expansion joints and other high quality products and services for the transport infrastructure and building construction sectors. In the last 10 years, mageba has also significantly expanded its range of products and services relating to earthquake protection and structural monitoring. In 2016, mageba USA established an AISC certified production facility in Pottstown, PA.

Penetradar

Booth #: 443

Contact: April Alongi

Phone: 716-536-1007

Fax: 716-731-5040

Email: april.alongi@penetradar.com

Website: www.penetradar.com

Since 1974, Penetradar has designed and manufactured non-destructive testing (NDT) equipment--we invented the air-coupled, non-contacting, ground penetrating radar (GPR) which made high-speed GPR inspection of bridges possible. At high speed, we detect delaminations, debonding, and deteriorated concrete, and measure rebar depth and overlay thickness. We have inspected over 50,000,000 square feet of bridge deck and are the only firm to offer both full lane and high speed bridge deck inspections using GPR and infrared thermography.

Better Bridges, Beginning to End

Smart from the start

Material
Quantities

Supporting Factors									
Item	Unit	Quantity	Unit	Quantity	Unit	Quantity	Unit	Quantity	Unit
Soil	Excav	10000	1000	100	100	100	100	100	100
	Backfill	10000	1000	100	100	100	100	100	100
	Compact	10000	1000	100	100	100	100	100	100
	Gravel	10000	1000	100	100	100	100	100	100
	Asphalt	10000	1000	100	100	100	100	100	100
Laboring Factors									
Item	Unit	Quantity	Unit	Quantity	Unit	Quantity	Unit	Quantity	Unit
Excav	Day	10000	1000	100	100	100	100	100	100
Backfill	Day	10000	1000	100	100	100	100	100	100
Compact	Day	10000	1000	100	100	100	100	100	100
Gravel	Day	10000	1000	100	100	100	100	100	100
Asphalt	Day	10000	1000	100	100	100	100	100	100



Bentley
Advancing Infrastructure

Discover your bridge to BIM. Get the full story at: [bentley.com/OpenBridgeModeler](https://www.bentley.com/OpenBridgeModeler)

© 2017 Bentley Systems, Incorporated. Bentley, the "B" Bentley logo, and AutoPipe are either registered or unregistered trademarks or service marks of Bentley Systems, Incorporated or one of its direct or indirect wholly owned subsidiaries. Other brands and product names are trademarks of their respective owners.

Formerly
WSP | PARSONS BRINCKERHOFF

WSP

Question the ordinary
Imagine the extraordinary
Create the enduring

*We engineered some of our nation's tallest buildings
and designed bridges from coast to coast.*

*Our expertise lies at the intersection of the infrastructure
and the skylines we have helped to shape.*

Partner with us to deliver the bridges of tomorrow.

We are WSP USA.

[wsp.com/usa](https://www.wsp.com/usa)

For career opportunities, visit [wsp.com/usacareers](https://www.wsp.com/usacareers)

ONEHDR™

One hundred and HDR. A century of pushing the boundaries of what's possible. A legacy of bringing innovative solutions to every project—no matter the challenge. A future of collaborating and creating the only way we know how. Together. | hdr100.com



Proud Platinum Sponsor of the 34th Annual
International Bridge Conference®

