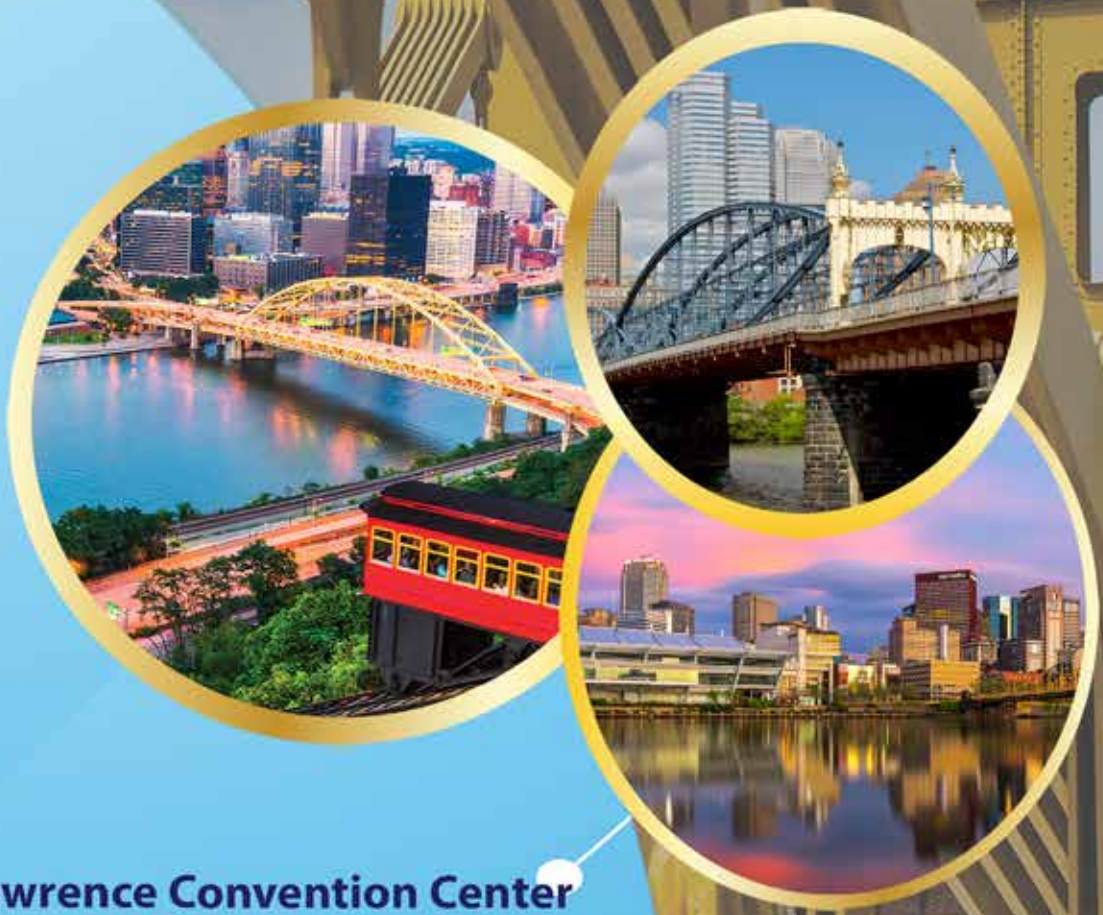

David L. Lawrence Convention Center
Pittsburgh, PA USA

THE 39TH ANNUAL

The International Bridge Conference®

Conference Program Guide

July 18-20, 2022

eswp.com/bridge

GENERAL INFORMATION

WELCOME

Welcome to the 2022 International Bridge Conference® (IBC), sponsored by the Engineers' Society of Western Pennsylvania (ESWP) — our 39th Annual Conference! 2022 marks our return to the David L. Lawrence Convention Center (DLLCC) in Pittsburgh, and a return to meeting "in-person" after two years of virtual conferencing. This location is ideally suited for the ever-growing IBC, and is located within walking (and easy viewing) distance of many bridges that cross our three rivers. We are pleased to honor the Indiana Department of Transportation as our Featured State to showcase their bridge program. The 2022 IBC is a three-day event with technical content scheduled across all three days of the IBC.

REGISTRATION

Full Registration at the IBC includes admission to the Keynote Session, Featured State 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, and on our conference APP. 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 industry-leading groups or individuals on an even wider variety of bridge industry subject matter.

Remember: the Boat Tour, Walking Tour, IBC Awards Dinner, and conference proceedings require an additional registration fee. Please visit the Conference Registration Desk for details.

The Conference Registration Desk is located on the Ballroom Level of the DLLCC and is open:

- Monday: 7:00 AM – 7:00 PM
- Tuesday: 7:00 AM – 7:00 PM
- Wednesday: 7:00 AM – 5:00 PM

MEETING INFORMATION

All IBC functions (excluding tours) are located in the DLLCC, except for the Boat Tour, Walking Tour, and Fun Run. 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 APP.

BADGE IDENTIFICATION

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

AMERICANS WITH DISABILITIES ACT

The International Bridge Conference® and ESWP support the Americans with Disabilities Act (ADA), which prohibits discrimination against, and promotes public accessibility for those with disabilities. We ask those requiring specific equipment or services as an attendee to contact the Conference Registration Desk.

THE 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 100 booths offer attendees the opportunities to extend their learning experience beyond the technical presentations made during the conference. Also, networking in the Exhibit Hall is enhanced by the, reception and luncheons presented there and open to all registered attendees.

IBC WALKING TOUR

The 2022 IBC Walking Tour will give attendees the opportunity to learn about the "Three Sister Bridges" along the Allegheny River. The walking tour (approx. 1/2 mile total) runs from 1:00 – 3:00 PM on Tuesday– advance reservations required. Check with the IBC staff for availability. While PPE is not a requirement, walking shoes are suggested. Some limitations apply.

PRE-PRINTS AND IBC MERCHANDISE

Pre-prints for all technical presentations are available at the Merchandise Booth located near the IBC registration Desk. Again this year: purchase a flash drive that contains all available preprints in .PDF format for only $40.00. 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 $50.00. Following the conference, proceedings may be ordered for $55.00. The official proceedings of the 39th Annual International Bridge Conference® will be available in late Summer 2022.

CELL PHONES AND PAGERS

As a courtesy to the Speakers and fellow attendees, the IBC requests that all cell phones and other electronic devices be turned off or switched to silent mode in all presentation rooms.

COFFEE STAND

Thanks to the generosity of our sponsors, complimentary coffee breaks are available at various times throughout the Conference in the Exhibit Hall (exc. Wednesday) as noted in your Program Guide. Take this time to visit with the exhibitors!

GENERAL INFORMATION

IBC GIFT ITEMS

Once again at this year's IBC, you will have the opportunity to purchase the popular IBC neckties, and IBC Polo-style Shirts, perfect for golf! 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 2022!

BRIDGING THE GAP THEATRE

We are pleased to bring back the "Bridging the Gap" theatre to the IBC! Informal presentations on a variety of bridge-related topics given by experts in their field. The informal presentations are 25 minutes in length and start on the half-hour. WANT TO PRESENT? There is still time to sign up for a time slot! Check the registration desk for scheduling!

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, you must complete an on-line PDH Request Form to ESWP, AFTER THE CONFERENCE. Official confirmation from the IBC Offices regarding each attendee's eligibility for PDHs will be sent after the Conference. The on-line form can be found at www.eswp.com/bridge, or by contacting the Engineers' Society of Western PA, sponsors of the IBC.)

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

IBC EXHIBIT HALL

One of the main attractions of the Conference is the IBC Exhibit Hall. As you stroll through the many exhibits, you will be able to explore the latest technologies, products and services the bridge industry has to offer. Additionally, don't forget to participate in our popular "Exhibit Hall Bingo" game for your chance to receive cash prizes, simply by visiting the exhibitors on your bingo card. All registered attendees will receive a bingo card in their registration packet.

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

- Monday: 11:00 AM – 7:00 PM with a strolling luncheon buffet and evening reception
- Tuesday: 11:00 AM – 7:00 PM with a strolling luncheon buffet and evening reception
- Don't miss the Featured State Exhibit by Indiana State DOT located just outside of the Exhibit Hall, in the Atrium, near Registration.

ATTENDEE REGISTRATION LISTS

Conference registrations received prior to July 15 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 Wednesday morning of the conference and reflects those attendees who registered after July 15, or on-site during the conference.

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

QUESTIONS?

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

GENERAL INFORMATION

IBC 2022 CHAIRMAN'S WELCOME

It is my honor and privilege to welcome you to the 39th annual International Bridge Conference (IBC) hosted by the Engineer's Society of Western Pennsylvania. Following two unprecedented years of COVID-19 restrictions and virtual on-line conferences, I am especially excited to see everyone in person again. I am also honored and excited to welcome everyone back to the host City of Pittsburgh, my home for over 30 years. I trust you will find many interesting things to do here, including our walking bridge tour to see the rehabilitation of the iconic Roberto Clemente (6th Street) Bridge, and a return of the IBC Boat Cruise on the 3 rivers of Pittsburgh on Monday evening.

For nearly 4 decades, the IBC has been the premier showcase of the latest ideas and knowledge of state-of-th- art bridge engineering, design, construction and evaluation from the United States and around the world. Every year, the program is brought to fruition by a dedicated, all volunteer group of bridge practitioners who make up the IBC Executive Committee. It is through their tireless efforts that we consistently offer a stellar program and event. Functioning in the background, is the steadfast ESWP crew of Dave Teorsky, Kristina Emmerson and Mike Gaetano who repeatedly meet deadlines, post notifications and leverage technology to facilitate the conference. Please thank them for their efforts.

We are honored to welcome and include presentations the Indiana Department of Transportation as our Featured Agency this year. Monday afternoon will be dedicated to a presentation of their papers.

Some of the technical sessions that we will present this year include: Accelerated Bridge Construction, Alternate Delivery, Design/Build, Cable Stayed Bridges, Long Span Bridges, Pedestrian and Special Purpose Bridges, Railroad and Transit Bridges, Segmental Concrete Bridges, and Suspension Bridges. Our trusted exhibitors have stayed the course with us through the last two "virtual" years. We are happy to welcome them back with in-person booths. Please be sure to stop in and visit. To celebrate the achievements of our peers, we will once again present honors at the IBC Awards Dinner on Tuesday evening.

I wish you all a heartfelt welcome to ESWP's 39th International Bridge Conference – enjoy the conference!

M. Patrick Kane, P.E., is a Senior Transportation Engineer (Structures) for GPI – Greenman-Pedersen, Inc. in Pittsburgh, PA and the chairman of the executive committee for IBC 2022.

GENERAL INFORMATION

IBC EXECUTIVE COMMITTEE

The Engineers' Society of Western Pennsylvania, sponsoring organization of the IBC, recognize the following members for their efforts in planning the 2022 International Bridge Conference. This all-volunteer Executive Committee meets routinely, year-round to plan the conference. All individuals listed below are noted with a special ribbon on their name tag. Please feel free to seek these individuals to express your appreciation, and offer any constructive comments to help better the IBC.

Annette Adams, P.E.
Virginia DOT

Shane R. Beabes, P.E.
AECOM

Matthew A. Bunner, P.E.
HDR Engineering, Inc.

Brandon Chavel, Ph.D., P.E.
Michael Baker International

Michael Cuddy, P.E.
TranSystems

William Detwiler, P.E.
T.Y. Lin International

John C. Dietrick, P.E., S.E.
Michael Baker International

Kevin Duris, P.E.
Trumbull Corporation

Jamie F. Farris, P.E.
Texas DOT

Tyson Hicks
Joseph B. Fay Company

Liji Huang, Ph.D.
CCCC Highway Consultants Co., Ltd.

Margaret A. Jackson, P.E.
Pennsylvania DOT

M. Patrick Kane, P.E., *Conference Chair*
GPI – Greenman-Pedersen, Inc.

Donald Killmeyer, Jr., P.E.
ms consultants, inc.

Brian M. Kozy, Ph.D., P.E.
Michael Baker International

Jennifer C. Laning, P.E.
TranSystems

Thomas P. Macioce, P.E.
Pennsylvania DOT (Retired)

Elliott D. Mandel, P.E.
AECOM

Jonathan McHugh, P.E.
Gannett Fleming, Inc.

Jane-Ann Patton, P.E.
LOCHNER

Francesco M. Russo, Ph.D., P.E.
Russo Structural Services

Louis J. Ruzzi, P.E.
WSP USA

Stephen G. Shanley, P.E.
County of Allegheny, DPW

Derek J. Soden, P.E., S.E.
Federal Highway Administration

Rachel Stiffler
Vector Corrosion Technologies

James L. Stump, P.E.
Pennsylvania Turnpike Commission

Shane Szalankiewicz, P.E.
Pennsylvania DOT

Kevin Western, P.E.
Minnesota DOT

Brian Wolfe, P.E.
Maryland Transportation Authority

Kenneth J. Wright, P.E.
HDR Engineering, Inc.

HONORARY MEMBERS

Carl Angeloff, P.E.
Con-Serv Inc.

Victor E. Bertolina, P.E.
SAI Consulting Engineers, Inc.

Richard L. Connors, P.E., PMP
County of Allegheny, DPW

Donald W. Herbert, P.E.
Pennsylvania DOT (Retired)

Herbert M. Mandel, P.E.
Consultant

Gerald J. Pitzer, P.E.
Consultant

Gary Runco, P.E.
Virginia DOT

Lisle E. Williams, P.E., PLS
Consultant

EMERITUS MEMBERS

Calvin Boring, Jr.
Brayman

Enrico T. Bruschi, P.E.
Jacobs

Arthur W. Hedgren, Jr., Ph.D., P.E.
Consultant

Thomas G. Leech, P.E., S.E.
Gannett Fleming, Inc.

Myint Lwin, P.E., S.E.
Consultant

Ronald D. Medlock, P.E.
High Steel Structures

W. Jay Rohleder, Jr., P.E. S.E.
FIGG

Thomas J. Vena, P.E.
AWK Engineers, Inc.

MEDIA PARTNERS:

Associated Pennsylvania Constructors (APC)

American Society of Highway Engineers (ASHE)

Bridge design & engineering

Coatings Pro magazine

Deep Foundations Institute

Informed Infrastructure magainze

National Council of Structural Engineers Associations (NCSEA)

Roads & Bridges magazine

Short Span Steel Bridge Alliance (SSSBA)

GENERAL INFORMATION

MONDAY, JULY 18, 2022

CONSTRUCTION SPECIAL SESSION
ROOM 301-302

Session Chair: Kenneth J. Wright, P.E., HDR Engineering, Inc., Pittsburgh, PA
Time: 8:00 AM - 10:00 AM

IBC 22-SS01: Bridging Kentucky, Design-Build
Time 8:00 AM

Wes Hagerman, P.E., HDR, Lexington, KY; Robin Justice, Bizzack, Lexington, KY

"Bridging Kentucky" is a statewide program that set a goal to repair or replace up to 1,000 bridges across the state. In November 2019, four local contractors and one design firm partnered under a design-build contract within this larger program to replace 105 bridges in the rural mountainous area of southeastern Kentucky. Come hear how this grew into a successful project—from the pre-bid phase, to design, and all the way through construction.

IBC 22-SS03: Utah DOT Structures Digital Delivery
Time 8:30 AM

Cheryl Hersh-Simmons, Utah DOT, Taylorsville, UT; Daniel Jensen, P.E., Michael Baker International, Sandy, UT; Scott Fernald, Granite Construction, Salt Lake City, UT; Kaleb Nelson, E.I.T, PEC, West Jordan, UT

UDOT is on the forefront of transitioning to Digital Delivery by utilizing fully detailed 3D models attributed with design and supplemental information. This session will explore how these models are prepared and certified for the department as well as the steps taken to ensure a constructible package. Personal experiences from completed construction projects will be shared describing model usage in the field by both the contracting team and field inspectors.

IBC 22-SS04: PPC Overlays
Time: 9:00 AM

Nick Burdette, P.E., HDR, Pittsburgh, PA; Shane Szalankiewicz P.E., PennDOT, Pittsburgh, PA; Michelle Olszewski, Shikunusa, Pittsburgh, PA

Polyester Polymer Concrete (PPC) overlays are increasingly being used in Pennsylvania to protect concrete bridge decks and increase their service life. This presentation by an owner, designer, and contractor will describe design and construction considerations for this PPC, including benefits to the bridge owner. A local bridge rehabilitation project will be used as a case study to share construction details and best practices.

MONDAY, JULY 18, 2022

AUTONOMOUS VEHICLES SPECIAL SESSION
ROOM: 304-305

Session Chair: Margaret A. Jackson, P.E., Pennsylvania DOT, Montoursville, PA
Time: 8:00 AM - 10:00 AM

IBC 22- SS05: Introduction to Argo AI
Time: 8:00 AM

Elizabeth Fishback, Argo AI, Pittsburgh, PA USA
Argo AI is a global autonomy products and services company on a mission to make the world's streets and roadways safe, accessible, and useful for all.

IBC 22-SS06: Preparing for the Future: PennDOT's Approach to Automated Vehicles
Time: 8:30 AM

Mark Kopko, Pennsylvania DOT, Harrisburg, PA
As a state that has always been at the forefront of innovation and industry, it should come as no surprise that Pennsylvania is at the epicenter of the rise in Automated Vehicle (AV) technology. Using experience gained from over a decade of on-road AV testing, PennDOT is taking steps to prepare for the transportation of the future today.

IBC 22-SS07: Transitioning to a Smarter and More Sustainable Transportation System
Time: 9:00 AM

Corey Harper, Carnegie Mellon University, Pittsburgh, PA
In this talk, Dr. Harper will discuss how autonomous vehicles (AVs) could change the way we envision our cities and communities. In the first part of his talk, he will discuss how AVs could impact parking economics and energy use in our downtown urban cores. In the second part, Dr. Harper will discuss how AVs could be used to increase public health and safety in rare events (e.g., pandemics).

IBC 22-SS08: Multi-Jurisdictional Truck Platooning Demonstration
Time: 9:30 AM

Jeffrey Bergsten, Michael Baker International, Harrisburg, PA
The Smart Belt Coalition (SBC), a tri-state collaboration between five transportation agencies and educational institutions in Michigan, Ohio and Pennsylvania, conducted a demonstration of truck platooning and automated driving system (ADS) technology to test the administrative and procedural requirements necessary for a truck platooning system to operate continuously through a multijurisdictional environment. Through a request for information (RFI) process, the SBC partnered with Locomation, who is developing a trucking technology platform to combine AI-driven autonomy with driver augmentation, for this initiative. The purpose of the demonstration was to identify ways for SBC members to align processes with best practices in supporting truck platooning and ADS operations to the extent allowable by existing individual state regulations and agency policies.

DIGITAL DELIVERY/BIM SPECIAL SESSION
ROOM 306-307

Session Chair: Ronald D. Medlock, P.E., High Steel Structures, Lancaster, PA
Time: 8:00 AM - 10:00 AM

IBC 22-SS09: BIM Delivery for Total Precast Accelerated Bridge Systems
Time: 8:00 AM

Russell Dickson, P.E., and Jason Reffner, PennStress, Hollidaysburg, PA
Discussing the advantages of utilizing digital BIM (Building Information Modelling) technology to provide top quality, highly accurate engineering and production solutions for delivering complicated projects, including accelerated bridge construction. Identifying key element design and detailing considerations. Presenting multiple types of total precast concrete bridge structures, with BIM generated engineering deliverables, as successful case studies.

IBC 22-SS10: Advancing Digital Delivery: Bridging the Digital Data Gap at PennDOT
Time: 8:30 AM

Allen Melley, P.E., Pennsylvania DOT, Harrisburg, PA; Joseph Brenner, Michael Baker International, Lititz, PA
Pennsylvania DOT (PennDOT), in support of the Digital Delivery Directive 2025, is leveraging 3D engineered bridge models. This presentation will cover overall 3D2025 goals and specific challenges in implementing models for digital delivery in bridge projects with direct examples of specific tools, techniques, and solutions. Critical components such as a robust working environment, a comprehensive training program, standards development, and implementation in pilot projects will be discussed in a practical sense which is applicable for project managers and engineers/technicians.

IBC 22-SS11: BIM for Bridges and Structures
Time: 9:00 AM

James Hauber, Iowa DOT, Ames, IA
Update on BIM for Bridges Pool Fund TPF-5(372) accomplishments and goals to be completed next year. Iowa DOT BIM completed demonstration STIC grant project for design to construction and digital as-builts and future Iowa DOT research. Discuss continued AASHTO BIM community involvement.

IBC 22-SS12: The Value of "i"—A Steel Bridge Fabricator's Perspective on BIM
Time: 9:30 AM

Brad Dillman, P.E.; High Steel Structures; Lancaster, PA
This presentation will provide a fabricator's perspective on BIM for bridges and structures as it relates to the flow of design information within contract documents to steel fabrication. The discussion will include insights on their experience on a recent project completed through model-based delivery, as well as a perspective on potential misperceptions regarding the use of BIM in steel bridge fabrication.

MONDAY, JULY 18, 2022

RESEARCH SPECIAL SESSION
BALLROOM B

Session Chair: Louis J. Ruzzi, P.E., WSP USA, Pittsburgh, PA
Time: 8:00 AM - 10:00 AM

IBC 22-SS13: Learn why the Precast/Concrete Institute Funded Nonproprietary Ultra High-Performance Concrete (UHPC) Research
Time: 8:00 AM

William Nickas, P.E, PCI and George Morcous, Ph.D., P.E., University of Nebraska
This presentation will focus on recent efforts to advance UHPC in precast, pretensioned concrete structural applications. The speakers will share some of the industry forward looking UHPC aspirations. Speakers will also present on the UHPC research completed by the Precast/Prestressed Concrete Institute and the ongoing committee work to bring these durable and resilient solutions to market.

IBC 22-SS14: Improving Bridge Assessment through the Integration of Conventional Visual Inspection and Non-Destructive Evaluation Data
Time: 8:30 AM

Amir H. Alavi, Department of Civil and Environmental Engineering, University of Pittsburgh, Pittsburgh, PA
The purpose of this study is to establish a framework capable of integrating traditional non-destructive evaluation (NDE) and emerging automated unmanned aerial vehicle (UAV)-based techniques to provide improved performance assessment of bridges. The proposed framework focuses on addressing the principal challenges associated with studying the service life of bridge structures: (a) the long-time scales (which requires accelerated aging), (b) the diverse outputs related to bridge condition (in terms of data collected through UAV, NDE, and visual inspection), and (c) an advanced data interpretation and fusion framework for automated detection and quantification of bridge surface and subsurface defects. By leveraging the access to the unique dataset generated by the Bridge Evaluation and Accelerated Structural Testing (BEAST) facility, this study aims to identify the potential synergies among bridge degradation, remaining service life, and the results taken from the multimodal sensing technologies (i.e., UAV and NDE techniques). Data processing frameworks based on deep learning and a systematic UAV data collection strategy are developed to automatically detect and quantify the surface defects from HD images and subsurface defects from Infrared thermography (IR) images. New multi-source NDE data fusion methods based on discrete wavelet transforms and improved Dempster-Shafer evidence combination theory are proposed to provide a more comprehensive concrete bridge deck assessment.

IBC 22-SS15: Depth to Bedrock Seismic Method Evaluation
Time: 9:00 AM

Steven Sachs, Ph.D., University of Pittsburgh, Pittsburgh, PA
The purpose of this research is to evaluate the use of passive seismic methods to estimate the depth to bedrock. These seismic investigations are used to delineate different geologic conditions such as layer geometry, water table, and the bedrock topography. The goal of the project is to establish the accuracy and efficacy of these methods as compared to current and historic core boring taken by PennDOT, with the goal being to eliminate a portion of the core borings currently being performed.

IBC 22-SS16: INDOT Bridge Research Program
Time: 9:30 AM

Anne Rearick, Indiana DOT, Indianapolis, IN
This presentation will provide an overview of the Indiana Department of Transportation's bridge research program. Projects to be highlighted include A New Approach to Accelerated Fabrication of Steel Bridges and Post-Fire Assessment of Prestressed Concrete Bridges in Indiana

MONDAY, JULY 18, 2022

KEYNOTE SESSION
BALLROOM B

Time: 10:30 AM – 12:00 PM

The Keynote Session is the official start to the 2022 IBC!

Conference Chair M. Patrick Kane, P.E., will host the session and provide welcoming remarks, followed by the presenters listed below.

Session Chair: M. Patrick Kane, P.E., IBC General Chair, Greenman-Pedersen, Inc., Pittsburgh, PA
Mr. Kane is a Senior Structural Engineer for GPI-Greenman-Pedersen, Inc. based in Pittsburgh, PA. He is responsible for technical assignments in bridge design, rehabilitation and safety inspection. Mr. Kane also manages GPI's Pennsylvania quality program and GPI relationships with select PA transportation clients.

He earned a BSMET from the University of Pittsburgh at Johnstown, and an MBA degree in Management from Robert Morris University. He is a registered Professional Engineer in 7 states.

Mr. Kane has over 38 years of experience in highway, bridge, tunnel, and wall design and inspection, design/build projects, software development, and nationwide bridge safety inspection training.

As an employee of GPI-Greenman-Pedersen, Inc., Mr. Kane returned to presenting training courses on behalf of the National Highway Institute in 2018. Mr. Kane has been an instructor for over 200 courses throughout his career.

Rich Fitzgerald, Chief Executive, County of Allegheny, PA
The county's top elected official, Rich Fitzgerald is in his third and final term as County Executive. Widely recognized for his work ethic, Rich is one of the county's biggest champions and is well known for bringing together people and organizations on regional issues. Under his leadership, the county has concentrated on economic development and job creation and boasts high-quality jobs, a diverse and growing economy, low cost of living, and an excellent quality of life.

The 2020 Census numbers have underscored the success of those efforts. For the first time in 60 years, the county's population grew over the last decade. Just as importantly, the area is also becoming more diverse. There was substantial growth in the Hispanic and Asian populations in the county, and more people are identifying as multiracial. That increased diversity can also be attributed to multiyear efforts to ensure that this community is more welcoming. That diversity, along with the population growth, will continue to move this region forward.

He is also managing the county's response to the coronavirus pandemic, working closely with the Health Department, and has provided consistent and reassuring messaging to county residents since the first case was reported in the county in March 2020. As a participant in the Moderna COVID-19 Vaccine trial, he frequently speaks about his experience in the trial and his confidence in the vaccine and its role in the county's and country's recovery from the virus.

Born and raised in the City of Pittsburgh, Rich graduated from Carnegie Mellon University. He and his wife, Cathy, live in Squirrel Hill. They have eight children.

MONDAY, JULY 18, 2022

Yassmin Gramian, P.E., Secretary of Transportation, Pennsylvania DOT
Yassmin Gramian, PE, serves as the secretary of the Pennsylvania Department of Transportation, a position that she assumed in May 2020. She manages PennDOT's annual budget of $9.5 billion and oversees programs and policies affecting highways, urban and rural public transportation, airports, railroads, ports, and waterways. Under her leadership, the department is directly responsible for Pennsylvania's vast system of state and local highways and bridges, as well as oversees the state's vehicle registration, driver's licenses and ID operations.

Gramian assumed the role of secretary amid the COVID-19 global pandemic. This challenging time necessitated quick, decisive action to mitigate the spread of COVID-19 to best protect citizens, employees, and business partners. Under Gramian's leadership, PennDOT moved swiftly during the early stages of the pandemic to transfer essential functions to remote operations, while continuing to ensure roads were kept safe and passable, and crews remained available for responding to weather events. Gramian also serves as chair of the Transportation Revenue Options Commission (TROC), which was established by Executive Order of Governor Tom Wolf to develop comprehensive funding recommendations for Pennsylvania's large and aging infrastructure.

Prior to joining PennDOT, Gramian worked for over 30 years in operations, design, and management of transportation infrastructure systems, including highway, tolling, bridge, and railroad projects. Gramian earned master's and bachelor's degrees in civil engineering from the University of Michigan and completed the Tuck Management Training Program at Dartmouth College. She is a professional engineer in Pennsylvania, Delaware, New Jersey, and Florida.

Scot Becker, P.E., Deputy Administrator – Regions, Wisconsin DOT
Scot Becker is the Deputy Administrator for Regions of the Division of Transportation System Development (DTSD) at the Wisconsin Department of Transportation (WisDOT). He has been in this role since September of 2019. In this role he leads the five Wisconsin DOT regions in providing planning, development and operation of safe, reliable and efficient multimodal transportation systems. He serves with the Administrator and Deputy Administrator of Statewide Bureaus in leading over 1,300 dedicated and talented people. Previously, He served as Director of the Bureau of Structures for eight years where he led the Bureau which oversees program, policy, design, maintenance, and administration of the state's 15,000 transportation bridges and ancillary structures.

He currently serves as the Vice Chair of AASHTO Committee on Bridges and Structures (COBS). Prior to this appointment, he had served as the State Bridge Engineer representative for 13 years as the primary voting member for Wisconsin. He has served on T-5 technical committee for loads and on T-19 software and technology where he was the T-19 chairman for nine years.

Scot has been with WisDOT for 28 years and worked three years for a consultant prior to joining the department. He holds a bachelor's and master's degree in civil engineering from the University of Wisconsin–Madison and is a licensed professional engineer.

Louis Fegans, P.E, MS, Managing Director of Asset Management, Indiana DOT (IBC Featured Agency)
Louis is the INDOT Managing Director of Asset Management and Planning. He has over 32 years of transportation experience. During his career he has worked in asset management, hydraulics, water resources, design, scoping, and project management. He is a professional engineer with a BS for University of Evansville and MS for Purdue University. He is married to his wife Julie and has two children; Louie and Mandy.

Dr. Alison Black, Senior Vice President & Chief Economist, American Road & Transportation Builders Association, Washington, DC
Dr. Alison Premo Black serves as senior vice president and chief economist for ARTBA. She oversees the association's Transportation Investment Advocacy Center and the Transportation Officials, and the Research and Education Divisions.

Dr. Black manages ARTBA's economics staff and is responsible for over 100 studies examining national and state transportation funding and investment patterns, including the association's landmark economic profile of the transportation construction industry, state bridge condition profiles, federal-aid highway dashboard, and annual modal forecast.

She has been interviewed numerous times as an industry expert for national and local print, television and radio, including the NBC TODAY show, the Washington Post, NPR, USA Today, the Wall Street Journal, The Economist and industry publications. She has testified before state legislative committees in Illinois, Kansas, New Jersey, North Carolina, Tennessee, and Pennsylvania.

Dr. Black completed her PhD in Economics at The George Washington University and holds an MA in International Economics and Latin American Studies from the Johns Hopkins School of Advanced International Studies (SAIS). Dr. Black graduated magna cum laude from Syracuse University with majors in International Relations, Latin American Studies and Spanish. She is a member of the Phi Beta Kappa and Golden Key Honors Societies, and a recipient of the Syracuse Remembrance Scholarship.

A native of the Eastern Shore of Maryland, Dr. Black resides in Washington, DC with her husband and four children.

MONDAY, JULY 18, 2022

FEATURED AGENCY SESSION: INTRODUCTION TO INDOT AND INDIANA'S PLAN FOR THE FUTURE
BALLROOM B

Time: 2:00-5:00 PM

Indiana is known as the Crossroads of America for good reason. A combination of ports, railroads and freight make Indiana a leader in commerce and warrant a robust plan for maintain this valuable infrastructure. INDOT representative will share how the agency and its partners are working hard to plan, construct and maintain the state's bridge inventory today, tomorrow and well into the future.

Major Projects, Major Challenges, Major Achievements
Stephanie Wagner, Director of Bridge Engineering, INDOT
The Indiana Department of Transportation currently has three major projects under construction. These projects represent an approximately $1.2 billion investment in the state nicknamed The Crossroad of America. The three contracts include the construction of more than 100 new bridges and a significant rehabilitation of a complex signature bridge.

Representatives from INDOT's Project Management and Bridge Engineering Divisions, along with the agency's consultant partners will share the challenges faced throughout the development of these projects. The following topics will be covered: contract delivery methodology, risk mitigation, utilization of innovative materials, alternative technical concepts, and unique design challenges and solutions .

Sherman Minton Corridor Project – Rehabilitating a Signature Bridge over the Ohio River
Danny Corbin, Senior Project Manager, INDOT; Donald Shaw, Senior Bridge Engineer, INDOT; Aaron Stover, Vice President, Michael Baker International
https://shermanmintonrenewal.com/

I-65/I-70 North Split – Rebuilding a System Interchange in the Heart of Indianapolis
Burleigh Law, Structures Lead, HNTB ; Brian Shattuck, Project Manager, INDOT
https://northsplit.com/

I-69 Finish Line Contract 5 – Completing the Interstate Connection between Evansville and Indianapolis
Jim Lesh, Bridge Engineering Team Leader, INDOT; Burleigh Law, Design Manager, HNTB; Sarah Rubin, Major Projects Deputy Director, INDOT
https://i69finishline.com/

Indiana's Oversize-Overweight (OSOW) Vehicle Permit Modernization
Kristin Brier, Multimodal Director, INDOT; Jennifer Hart, Bridge Evaluation Manager, INDOT
Over the last four years, the state of Indiana's OSOW vehicle permits review process has evolved from paper maps and envelope routes to real-time bridge evaluation and GIS based routing. The release of new permit review software in 2021 represents the culmination of a multiagency partnership, years of work and significant amounts of data clean up. This state-of-the-art program evaluates the entire state bridge network for the specific vehicle configuration and automatically provides the carrier an approved route for most vehicles. Representative from the Indiana Department of Transportation will share a history of the project, lessons learned and thoughts on the value of data collected in the program.

PROPRIETARY
ROOM 304/305

Time: 2:00 PM - 5:30 PM

Session Chair: Brandon Chavel, Ph.D., P.E., Michael Baker International, Cleveland, OH

IBC 22-01: UHPC Repair of Steel Columns in the Walnut Tunnel in Philadelphia
Time: 2:00 PM

Michael McDonagh, P.E., P.Eng., Steelike, Inc., Springfield, VA; Joseph Sirignano, P.E., VMA, Alfred Benesch & Company, Allentown, PA
The Pennsylvania Department of Transportation (PennDOT) rehabilitated the bridge structure located within SEPTA's Walnut Tunnel conveying the Philadelphia airport regional rails. A series of steel columns supporting the bridge/tunnel structure exhibited advanced section loss. The designer repaired the deteriorated steel columns with ultra-high performance concrete (UHPC) the first such application in North American transportation infrastructure. The contractor and UHPC supplier implemented unique mixing and placement techniques, including using a 70-ft tremie to place the UHPC.

IBC 22-02: The Smart Hybrid Bridge - Time to Innovate in Bridge Management Policy and Practice
Time: 2:30 PM

Brian Westcott, Ph.D., Intelligent Structures, Inc., Menlo Park, CA; Lawrence Kirchner, P.E., S.E., TranSystems, Chicago, IL
Productive management of bridge infrastructure assets requires digital information. Depending primarily on visual inspection provides limited information and conservative bridge ratings. Resulting bridges are under-utilized, and unproductive. A smart hybrid bridge policy combines visual inspection and continuous bridge performance measurement for a more accurate assessment of the state of a bridge. A case implementing Smart Hybrid Bridge Policy on two NYS load restricted bridges resulted in better performing bridges with decreased annual budget costs.

IBC 22-03: Cast-In-Place ABC Solution - The InQuik Bridge System Technical and Projects Presentation
Time: 3:00 PM

Logan Mullaney, InQuik Pty Ltd., Pyrmont, NSW, Australia
The International Award winning InQuik Bridge System, is a modular reinforced concrete bridge system, however very different from typical bridge systems.

The InQuik System uses pre-fabricated, pre-engineered and certified components that have the formwork and reinforcement, however no concrete. These components are self supporting and are simply transported to site, easily lifted into position and filled with concrete with limited skills.

This revolutionary system has been used in over 150 projects and in this session, we will discuss how the InQuik System works, along with discussing the research programs that have been completed by Universities and the AASHTO Verification process. On top of this we will discuss range of projects that the system has been used on, including Accelerated Bridge Replacement projects, projects using local county and contractors, and Flood / Fire recovery.

With consideration of the recently released Federal Bridge

Formula Program, we will also discuss how the InQuik System has been key in a 24-month program to deliver 300% the usual amount of annual bridge projects in Australia. We will explore the learnings and challenges of such a program in delivery with Supply chain constraints, high infrastructure demand, tight labor market, rising prices and availability. In this session you will learn how InQuik and several county's have ensured their Fixing County Bridges program is delivered on time, within scope and within budget whilst navigating the challenging market.

IBC 22-04: Japan's Proven Solution to Prevent Unseating of Bridges During a Seismic Event
Time: 4:00 PM

Hideto Kida, Dr. Eng., P.E., SHO-BOND Corporation, Tsukuba, Ibaraki, Japan; Benjamin Z. Reeve, Structural Technologies, Fort Worth, TX; Fujihiko Hayashi, Mitsui & Co., Tokyo, Japan
Unseating prevention is a critical step in bridge seismic retrofit projects, not only ensuring life safety but also allowing post-earthquake functionality and serviceability.

Japan's historical experience with large earthquakes offers numerous lessons learned about bridge unseating, from which practical solutions have been developed.

SHO-BOND's innovative seismic devices, applied to numerous concrete and steel bridges in Japan, provide backup to existing bearings, restrain higher loads, and enable prompt recovery of bridges following a large seismic event.

IBC 22-05: Bridge Rehabilitation with Ultra-High Performance Concrete Bridge Overlays
Time: 4:30 PM

Peter Seibert, P.Eng. and Gil Brindley, P.E., UHPC Solutions North America, Orange, NJ; Jerry Reece, WALO Civil, Birmingham, AL
Ultra High Performance Concrete (UHPC) Bridge Overlays are an ideal solution for bridge agencies to rehabilitate bridge decks as a long lasting, cost effective alternative to full deck replacement. Only recently, UHPC overlays were installed in a few select States across the US.

The enhanced durability and flexural capacity of UHPC overlays are key to the solution for extending the service life and performance of deteriorating bridge deck structures. When installed with a Thin Lift UHPC Paver, this rehabilitation method helps bridge owners to accelerate bridge repairs by shortening the total construction time and by minimizing traffic interruptions.

This paper will describe the fundamentals of the UHPC technology, material properties and various UHPC overlay design details. Key success factors and construction methods from a contractor's perspective will be explained. Bridge owners will be informed about risk management, quality, and specification considerations of UHPC overlays. Detailed reviews and lessons learned of several recently completed US and Swiss projects will be discussed.

IBC 22-06: Structural Health Monitoring of the Canakkale Bridge in Turkey, the Largest Monitoring System for the Longer Bridge in the World
Time: 5:00 PM

Stéphane Joye and Marcel De Wit, Sixense, Nanterre, France
The 1915 Canakkale bridge in Turkey is the longest suspension bridge in the world with its 2023m main span. Sixense is installing the biggest SHM System ever installed on a bridge with more than 1000 sensors. This will allow to monitor the environment of the bridge, its structural behavior and its ageing. Data will also allow to predict the evolution and anticipate maintenance.

W01: TRANSPORTATION WELDING WORKSHOP ROOM 315/316

Time: 2:00 PM – 5:30 PM

Justin Ocel, USDOT-FHWA, Baltimore, MD
Room: 315/316

The objective of the workshop is a workforce development tool to educate early career engineers on the ins/outs of welding they may encounter in their careers. Typical college curricula do not get into anything beyond how to design a weld for strength, and new engineers are quickly faced with having to approve/accept welding processes, joints, filler metals, welding procedures, procedure qualifications, or inspection results in accordance to AWS welding code with no knowledge of how those codes work, or what they cover. After the workshop they should have a kickstarted understanding of how to navigate the AWS welding codes and feel much more comfortable in the oversight role of transportation welding.

TUESDAY, JULY 19, 2022

W03: BRIDGE LOAD RATING AND POSTING: UNDERSTANDING MEMBER RESISTANCE
ROOM 315/316

Time: 7:30 AM – 10:00 AM

Lubin Gao, FHWA, Washington, DC; John Holt, P.E., Modjeski and Masters, Round Rock, TX; Francesco Russo, Russo Structural Services, Havertown, PA

Room: 315/316

Resistance of a section is a function of many factors such as shape, dimension, composition and material properties. For existing in-service bridges, structural condition such as section loss and material degradation will also affect sectional resistance. In this workshop, we will talk about the factors that affect sectional resistance and discuss how to appropriately consider all the affecting factors in the determination of sectional resistance for bridge load rating.

LOAD TESTING & INSTRUMENTATION
ROOM 306/307

Session Chair: Jamie F. Farris, P.E., Texas DOT, Austin, TX
Time: 8:00 AM - 9:30 AM

IBC 22-21: Fatigue Testing in Negative Moment Region of a Continuous Stringer Bridge

Time: 8:00 AM

"Leon" Lung-Yang Lai, P.E., S.E. and Brian T. LoCicero, Specialty Engineering, Inc., Bristol, PA; Kyle Mathews, Specialty Engineering, Inc., Blue Bell, PA; Grant Flothmeier, Gannett Fleming, Inc., Audubon, PA; Kamlesh Ashar, Pennsylvania DOT, Allentown, PA

The approach spans of the SR61-10B Bridge are two-span continuous non-composite multi-stringer structures. Fatigue life at end of the top flange welded cover plates was calculated to have been exceeded. A fatigue and load testing proves that the fatigue life is not a concern due to unintended composite actions between the deck slab and stringers. Since the deck in the negative moment region is in tension, behavior of concrete in tension is also studied.

IBC 22-22: Diagnostic Load Testing of Ten Bridge-Class Culverts

Time: 8:30 AM

James Werosta and Christopher Gentz, P.E., WSP USA, Lawrenceville, NJ; Biniam Aregawi, P.E., Texas DOT Bridge Division - Field Operations, Austin, TX; Amir Gheitasi, Ph.D., P.E., Parsons, Baltimore, MD

According to the Texas Department of Transportation (TxDOT), there are more than 19,000 reinforced concrete box culverts in service with many carrying unrestricted traffic for years without signs of structural distress. Recent load rating analysis indicated insufficient live-load capacity to carry design and legal loads which would require posting and traffic restrictions. Ten culverts were selected for diagnostic load testing to cover a wide range of geographical locations, geometrical configurations, material properties, design loads, and design standards with the goal of gaining better understanding of the structural performance and load distribution characteristics of this class of culverts and eventually improving their ratings. Load testing was performed with fully loaded tri-axle dump trucks representative of the design truck EV3 rear axle configuration and the data was collected using a combination of strain gauges and deflection sensors. This paper presents the diagnostic load testing of ten in-service reinforced concrete bridge-class culverts in Texas. The planning and execution of the load testing program is discussed in-depth, and the use of the diagnostic load testing results to calibrate 3-D and 2-D Finite Element (FE) models is examined. Findings of this work indicated that modelling assumptions informed by diagnostic load testing produced load ratings more representative of the real-life performance of reinforced-concrete culverts. Ultimately this enabled the owner to significantly reduce the number of culverts requiring posting in their inventory.

IBC 22-23: Construction and Live Load Behavior of a Skewed Steel I-Girder Bridge

Time: 9:00 AM

Siang Zhou, Larry Fahnestock, James LaFave, and Ricardo Dorado, University of Illinois Urbana-Champaign, Urbana, IL

A two-span continuous skewed steel I-girder bridge was instrumented in the field for monitoring during construction and after the bridge was in service. Field measurements during deck placement and live load testing are discussed, from which three-dimensional finite element analyses were also conducted. Live load distribution factors used during design conservatively overestimate girder strong-axis bending response under live load. Lateral flange bending stresses and out-of-plane response at girder web plates were also observed.

W02: DESIGN GUIDANCE FOR ROUTINE STEEL GIRDER BRIDGES
ROOM 310/311

Time: 8:00 AM – 11:00 AM

Brandon Chavel, Ph.D., P.E., Michael Baker International, Cleveland, OH; Domenic Coletti, HDR, Raleigh, NC

ROOM: 310/311

The design of routine steel I-girder bridges can be relatively simple if the engineer knows where to focus their efforts and is provided with guidance on how to streamline the more predictable, repetitive aspects of the design effort. To this end, the NSBA has developed this Guide to Navigating Routine Steel Bridge Design to help designers navigate the comprehensive design provisions of the AASHTO LRFD Bridge Design Specifications (BDS), identifying just the provisions that are applicable to the design of routine steel I-girder bridges, explaining how to apply those provisions, recommending practices proven to lead to economical designs, and suggesting ways to streamline the design effort.

Furthermore, the NSBA recently updated the Steel Bridge Design Handbook as well as it's free line girder software, LRFD Simon. The Handbook covers a full range of topics to provide bridge engineers with the information needed to make knowledgeable decisions regarding the selection, design, fabrication, and construction of steel bridges. LRFD Simon allows users to quickly produce complete steel I- and tub-girder superstructure designs in accordance with the AASHTO LRFD BDS.

This workshop will take attendees through several design examples showing how these new and updated free resources from the NSBA can simplify the design effort for routine steel girder bridges. Engineers will be able to see how the new interactive Guide to Navigating Routine Steel Bridge Design provides a direct link to the resources they need to complete a design, while also increasing their familiarity with, and understanding of the AASHTO LRFD BDS.

TUESDAY, JULY 19, 2022

ABC, PART 1
ROOM 301/302

Session Chair: Elliott D. Mandel, P.E., AECOM, Arlington, VA
Time: 8:00 AM - 12:00 PM

IBC 22-07: OCCI Bridge Builder
Time: 8:00 AM

David Rogowski, Genesis Structures, Inc., Kansas City, MO; Matthew Struemph, P.E., OCCI, Inc, Fulton, MO
The new Canadian National (CN) McComb Bonnet Carre Spillway Bridge, 300 spans of 39 feet, was constructed, one span per day, using a unique system of machines for material delivery and span construction. This paper focuses on the ABC methods used to build the spillway bridge, and the criteria used for the design of the machines, including consideration of hurricane winds, storm surges and complex coordination/meshing of the various structural, mechanical and electrical systems.

IBC 22-08: De Roche Creek Lateral Bridge Slide – Easing Traffic Disruption & Improving Safety
Time: 8:30 AM

John Zuleger, P.E., SPRAT 3, and Fred Harper, Michael Baker International, Cincinnati, OH
The Arkansas Department of Transportation (ARDOT) has completed the replacement of two aging bridges over De Roche Creek on I-30 in Southwest Arkansas near the city of Arkadelphia. ARDOT partnered with Michael Baker International to provide bridge and roadway design and plans for this innovative endeavor, which serves as Arkansas' first highway bridge replacement project to use the Accelerated Bridge Construction method known as a Lateral Slide. I-30 is a heavily trafficked interstate route that connects Little Rock, AR to Dallas, TX, so using ABC to replace the structures was the ideal solution to reduce lane closure time and improve safety.

Michael Baker conducted an initial Bridge Construction Staging Study to compare various lateral slide replacement options, and ultimately recommended an approach that uses two separate lateral slide operations. The new 170' long steel plate girder superstructures were erected on temporary falsework outside of the existing parallel bridges, while crews constructed the permanent semi-integral straddle bent substructure underneath the existing bridges, which utilize 72" diameter drilled shafts. Once completed, two separate bridge-slide operations were performed to move each of the new bridges into their permanent positions using post-tensioning jacks and a PTFE & stainless steel slide track. This option limited traffic disruption to two short-term periods, roughly eight days each, during which traffic was reduced to a single lane in each direction. The single span arrangement served to simplify the slide process, and also helped to reduce the environmental impact on De Roche Creek, a tributary of the Ouachita River.

IBC 22-09: Accelerated Bridge Construction for the Long Island Railroad Mainline Expansion Project
Time: 9:00 AM

Pak So and David Beyers, P.E., Stantec, New York, NY; Nick Almeter, Halmar International, Nanuet, NY
The LIRR Expansion Project upgrades a 9.8 mile two-track Main Line segment in Long Island, NY. The Project's main goals are to add a third track to the Main Line and to improve public safety. Existing railroad bridges were retrofitted to support the extra track. Additionally, at-grade crossings were replaced by railroad supported bridges over depressed roadways. The Design Build Team used innovative accelerated bridge construction techniques including lateral bridge jacking and roll-in with SPMT.

IBC 22-10: BNSF Railroad over the Central Tri-State Tollway (I-294)
Time: 9:30 AM

Demico L. Cole, TranSystems, Schaumburg, IL; Michael Brink, Illinois Tollway, Downers Grove, IL
The replacement of the BNSF bridge over the Central Tri-State Tollway (I-294) is an advance enabling project for the Illinois Tollway's $4 billion reconstruction and widening program. The existing railroad bridge was a "pinch point" on I-294 that required replacement prior to starting mainline roadway reconstruction.

The project has interesting engineering and public coordination aspects; utilizing several "state of the art" engineering techniques to maintain schedule such as SPMT's and a Slide Rail System.

IBC 22-11: Doing ABC in Massachusetts. The Acceler-8 I-90 Bridge Replacements Project
Time: 10:30 AM

Robert Elliott Jr., P.E., CDR Maguire, Warrendale, PA; Carlos Merino, CDR Maguire, Milton, MA; Gary Baxter and Savas Kiriakidis, Massachusetts DOT, Boston, MA; Mohammed Nabulsi, Massachusetts DOT, Worcester, MA
The Acceler-8 project consisted of the replacement of four twin structures (eight bridges) in eight weekends along the Massachusetts Turnpike using Accelerated Bridge Construction (ABC) techniques in summer 2021. The project included substructure rehabilitation work and superstructure replacement of six single span steel multi stringers bridges (EB and WB) over Flanders, Parkerville and Woodland Roads and full replacement of two three-span multi stringer bridges with two single-span bridges over Cordaville Road. For this project, MassDOT engaged several consultants and contractors to maximize collaboration at all project stages utilizing the Design Build project delivery and ABC methodologies. The selected solution included NEXT D beams with high-strength concrete closure pours, micropiles for the proposed substructures, and weekend crossovers that allowed for a safe and efficient construction sequencing and minimum traffic disruption. This presentation will go through all project stages, starting with its initial conception as a Design Bid Build project and why it finally became a Design-Build project, continuing with the design challenges anticipated at the Base Technical Concept stage (preliminary design), ABC techniques under investigation during procurement and Alternative Technical Concept stages, and finalizing with a detailed overview of the solutions adopted in final design, including construction

sequencing and challenges found at fabrication and construction. This presentation will also include lessons learned and futured ABC developments and updates in the state of Massachusetts.

IBC 22-12: Using ABC Techniques and Innovative Design Details to Overcome Site Access Challenges
Time: 11:00 AM

Lawrence Kirchner, P.E., S.E., TranSystems, Chicago, IL; David Moses, P.E., Gannett Fleming, Inc., Chicago, IL
This paper will describe the innovative design details and accelerated bridge construction (ABC) techniques that successfully facilitated erecting the 555', four-span superstructure of Metra's Bridge Z-100 over the Fox River in Elgin, Illinois. Challenges included adjacent upstream and downstream bridges, overhead high voltage lines, an overhead highway bridge, and river geometry significantly constraining construction access and working space. Innovative design and ABC were employed to mitigate access limitations and optimize construction operations, reducing construction costs and rail disruptions.

The existing bridge was a 500' long structure constructed in 1881. The bridge was the only single-track segment on the 40 mile Milwaukee District – West Line. Passenger delays on this line exceeded 36,000 hours annually. Metra received a $14 million grant from the USDOT through the TIGER program for the construction of this project.

Nearby crossings of the Fox River and river hydraulics limited offset construction opportunities within Metra's ROW. The nearby passenger station prevented cost-effective use of an off-alignment shoo-fly. The design team developed a ballasted deck-beam superstructure with modified pier locations that allowed for phased construction of the new bridge overlapping the footprint of the existing bridge. The construction contractor used ABC methods to assemble the Phase I spans offsite and move them into place as single units. Trackwork phasing plans were developed in six intermediate phases to minimize impacts to operations and track outage durations while cutting over to the new alignment.

IBC 22-13: Innovation, Teamwork and a 4 Day Closure – Bunker Creek Bridge
Time: 11:30 AM

Adam Stockin and Nevin Gomez, WSP USA Inc., Merrimack, NH
This Accelerated Bridge Construction (ABC) project consisted of the replacement of a 15' concrete slab bridge built in 1933 on Route 4 over Bunker Creek. Route 4 is one of two major East-West corridors in New Hampshire and carries 17,000 vehicles per day. The existing roadway consists of a causeway through a tidal marsh which the Design-Build team, consisting of SPS New England Inc. and WSP USA Inc., was tasked with ensuring that minimal future settlement would not occur.

The proposed bridge was designed with a primary focus to limit the impact to the traveling public, mitigate settlement, meet a 100-year service life, and minimize impacts to the environment. The replacement bridge is a 60' simple micropile supported integral span with Prefabricated Bridge Units consisting of metalized steel beams and a 9" bare deck with Ultra High-Performance Concrete closure joints. To reduce cost, the PBU design was modified to include an integral concrete end diaphragm to decrease the depth of the UHPC closure pour within the abutment stem.

Foamed Glass Aggregate, an inert lightweight fill material, was installed in the roadway embankment to reduce the soil load to near net-zero gain and therefore limit future roadway settlement.

This bridge was completed within a 4 day closure, 10 days faster than the contract minimum. This project was an example of a designer and builder working hand in hand to mitigate risk by utilizing innovative materials and construction methods to exceed the expectations of the client and the traveling public.

DESIGN
ROOM 304/305

Session Chair: Rachel Stiffler, Vector Corrosion Technologies, Pittsburgh, PA
Time: 8:00 AM - 12:00 PM

IBC 22-14: I-20 Value Engineering Study and Final Design
Time: 8:00 AM

Natalie McCombs, P.E., S.E. and Joe Sturgeon, P.E., HNTB, Kansas City, MO; Jeff Bell, HNTB Corporation, Oklahoma City, OK
The project's exceedingly complex geometry and lengthy elevated spans seemed to dictate the use of steel girders for the bridge superstructure, which led to elevated costs. Mississippi DOT engaged HNTB to perform a formal Value Engineering Study. The largest cost savings would come by using innovation in bent placement and non-typical bent designs. The value engineering study revealed ten items to save the owner $19M in bridge costs.

IBC 22-15: Expanding the Metro System in Montreal, Viaducts and Bridges of Réseau Express Métropolitan (REM)
Time: 8:30 AM

Firooz Panah, Latif Ebrahimnejad, and Paul Kim, AECOM, Boston, MA; Joseph Smith, AECOM, Philadelphia, PA
Located in Quebec Montreal, this $CA6.5 billion project, infrastructure only, expands the existing metro system in Montreal by 67 km. The paper will describe the types of bridges and viaducts used to build 28km of elevated guideway structures, and their design and construction processes. The bridge types include segmental bridges, steel trapezoidal bridges, precast concrete bulb-tee girders, steel plate girder bridges, and more. The paper will discuss challenges in the design and the lessons learned.

IBC 22-16: Separation of a Post-Tensioned Box Beam Bridge
Time: 9:00 AM

Mario LoCoco, and Bernard Fennessey, HDR, Boston, MA
HDR's Bridges and Structures Group provided detailed design, construction phase services, and a load rating for the modification of the Summer St Bridge in Boston. Project included: shortening nine of the thirty-five 100ft long prestressed box beams by ~20ft; partially demolishing the top flanges to access, sever, then re-anchor the transverse post-tensioned strands between the shortened and full-length beams; and installing a longitudinal bridge joint allowing the two spans to function independently of one another.

IBC 22-17: Bootstrapping Opportunities for Design in an Risk Led Context

Time 9:30 AM

Emily Perchlik AIA, LEED AP, VIA Architecture, Seattle, WA

bootstrap, verb

1. get (oneself or something) into or out of a situation using existing resources

North American bridge design is primarily lead by the steady and practical hand of the engineering community with the primary objectives of maximizing safety and efficiency. While these objectives should be the baseline of any project, they are sometimes set as the sole benchmarks for a successful bridge design within the North American context. When the end game is to simply meet the baseline of safety and efficiency, goals related to user experience and aesthetic impacts are often considered superfluous.

This paper showcases lessons learned from designing within this context. Stories from eight bridge designs showcase the ups and downs of bootstrapping higher design goals into footbridge projects in the Wild West. Each project offers unique conditions to explore opportunities and challenges for incorporating architectural expression and elevated user experience. Strategic engineering partnerships, community buy-in, and good storytelling are just a few of the strategies utilized to make the case for a higher standard of care.

IBC 22-18: Closure Pour Innovations in Long-Span Concrete Bridges

Time: 10:30 AM

Brad Mielke, P.E., S.E., Michael Baker International, Santa Ana, CA

This paper discusses the use of closure pours in lieu of using traditional hinges and expansion joints for two similar long span concrete bridges over 1300' in length and constructed of cast-in-place concrete post-tensioned Box Girder superstructure. One bridge utilized traditional expansion joints and the other used closure pour details as an alternative, offering a unique and valuable case study comparing both methods.

In long concrete bridges, the path of the prestressing tendons are normally limited to approximately 700 feet at which point a hinge joint is introduced so that prestressing can be performed in more than one stage and allows for longitudinal movement. The hinge area is congested with spherical bearings, hinge restrainers and shear key reinforcing. These conditions require complex detailing requirements and preclude multiple utilities to pass through the hinge area.

An alternative to the traditional hinge detail is to use "closure pours" that allow the bridge to be post-tensioned in stages. The closure pours create separate frames during construction where the post tensioning can be performed, stressing the cables in both directions. The closure pours are located where moments are minimal and reinforced to transfer all required forces with mild reinforcing, maintaining continuity of the superstructure. Bearings are not required in this application.

Advantages of Closure Pours are addressed in detail including prediction in seismic behavior, initial construction costs, quality of construction, and long-term maintenance costs.

IBC 22-19: Bridge Aesthetics for Short Span Bridges Reflecting the Community: Case Studies for Two Aesthetic Driven Bridges

Time: 11:00 AM

Jesse Kadekawa Miguel, AIA, NCARB, ENV, SP, and Derek Vap, P.E., HNTB, Kansas City, MO; Jeffrey Hardy, P.E., and Matt Killion, P.E., Missouri DOT - Kansas City District, Lee's Summit, MO; Therese Vink, P.E., City of Olathe - Department of Public Works, Olathe, KS; Kyle Berg, P.E., HNTB, Overland Park, KS; Kati Horner Gonzalez, P.E., Walter P. Moore, Kansas City, MO

Bridge aesthetic solutions for two short-span bridges, collaborating with city officials and stakeholders on bridges that honor and showcase their community. The US 24 Bridge in Independence, Missouri, reflects history, including the start of the Santa Fe, Oregon, and California trails and the entry to the Harry S. Truman Presidential Library and Museum. The 119th Street Bridge over I-35 serves as the northern gateway to Olathe, Kansas, illustrating a contemporary vision unique to the area.

IBC 22-20: 3GW1 Elevated Guideway Triangular Bridge for the Los Angeles World Airports People Mover

Time: 11:30 AM

Ted Bush, HDR, Boise, ID

The $4.9B, 2.25-mile elevated guideway train system Automated People Mover project is the centerpiece of LAX's Landside Access Modernization Program. This paper focuses on the complex triangular 3GW1 guideway bridge segment and includes an overview of the site constraints/challenges that led to the triangular shape, benefits of hybrid post-tensioned / reinforced concrete superstructure design, unique substructure configuration, 2D beam versus 3D shell element analysis comparison, and Operating / Maximum Design Earthquake design.

CABLE MAINTENANCE
ROOM 306/307

Session Chair: Jamie F. Farris, P.E., Texas DOT, Austin, TX
Time: 9:30 AM - 10:00 AM

IBC 22-24: Health and Protection of Cable Stayed Bridges

Time: 9:30 AM

Robert Sward, P.E., Structural Technologies, Fort Worth, TX; Scott Greenhaus, Structural Technologies, Columbia, MD

Cable stayed bridges are important, yet vulnerable, parts of our transportation infrastructure. A holistic and proactive asset management approach is critical toward optimizing their operation and serviceability. This paper discusses condition assessment strategies to accurately identify root cause issues, and the importance and efficacy of integrated solution development, design and repairs.

Leveraging the industry's best available testing, modeling, structural health and acoustic monitoring technologies is crucial for making the best decisions for the health of these complex bridges. Example investigation results are discussed with corresponding repair and maintenance strategies.

A comprehensive protection plan for these important bridges should consider environmental, accidental, and intentional threats. The ramifications of significant damage or collapse to a major bridge affect the safety and security of the citizens as well as the economy of a city, region or nation. Leveraging experience

from worldwide events, extensive analytical modeling and field verification testing, bridge armoring designed to complement and integrate with cable systems has been developed and implemented. These solutions are available for both new bridges, and for retrofitting existing structures.

Environmental threats include UV exposure, precipitation, aeroelastic instability and road debris. Risk assessment, threat vectors for accidental and intentional causes (such as fire, blast, ballistics) and protection strategies will be discussed, and options explored. Recommendations are provided that include the development of planning processes which anticipate future threat development and creating flexible solutions.

These solutions incorporate continual assessment and modification of strategies to ensure a robust response to threats that are inevitably developed in the future.

W04: BIM WORKSHOP, PRESENTED BY BENTLEY SYSTEMS
ROOM 315/316

Time: 10:00 AM – 12:00 Noon

Alexander Mabrich, Bentley Systems, Sunrise, FL
Room: 315/316

Beyond BIM, iTwins for 3D Digital Project Deliverables

Introduce attendees on iTwins technology as a continuation of delivering BIM projects.

Moving to BIM: How Organizations are moving from 2D Plans to Digital Deliverables

Private and government organizations are facing new challenges as they are required to apply the BIM methodology in their projects in which not only 3D models need to be submitted but still provide 2D plans.

A new set of workflows, CADD standards and BIM standards need to be put in place before starting any project and at the same time dealing with software and hardware compliance and upskilling their personnel.

This workshop present the lessons learned to implement such process as more than 13 DOTs have gone thru it plus various private organizations around the World.

BRIDGE MAINTENANCE
ROOM 306/307

Session Chair: Jamie F. Farris, P.E., Texas DOT, Austin, TX
Time: 10:30 AM - 12:00 PM

IBC 22-25: 83 Days – The Hernando De Soto Bridge Repair
Time: 10:30 AM

Richard Schoedel, P.E., Michael Baker International, Moon Township, PA; Aaron Stover, P.E., S.E. and Jason Stith, Ph.D., P.E., S.E., Michael Baker International, Louisville, KY; Ted Kniazewycz, P.E., Tennessee DOT, Nashville, TN; Rick Ellis, P.E., Arkansas DOT, Little Rock, AR
On May 11, 2021, a partial fracture of one of the tie girders of the Hernando de Soto Bridge's arch span was found during a fracture-critical inspection, which required the immediate closure of highway and river traffic. The immediate challenge was to stabilize the bridge to allow the river traffic to resume. The team simultaneously began development of analytical models and repair plans for the removal of the fractured section and complete repair of the member to restore vehicular traffic.

The phased approach allowed Construction crews to safely perform repairs of the fracture and other areas identified in the ensuing follow-up inspections. This presentation will cover the activities undertaken by TDOT, Michael Baker, and the Contractor during the three phased approach to repair the structure so that it could be re-opened to traffic on August 2, 2021, just 83 days after the fracture was initially discovered.

IBC 22-26: Caltrans Load Rating of Complex Curved Steel Girder Bridges
Time: 11:00 AM

Michael Kochly, P.E., HDR, Walnut Creek, CA; Jason Nauman, HDR, Phoenix, AZ
Load rating of eight highly curved Caltrans' steel girder bridges was performed. Refined 3D FEM analysis was required for all bridges, which were mostly two girder systems with pin and hanger assemblies/suspended spans. Three bridges are highlighted, with components including: 350-ft suspended span, 125-ft radius horseshoe curve and 2-cell steel box girder typical section. Discussion will include modeling approach, key aspects of the Caltrans Bridge Load Rating Manual, refinements to ratings and modeling/rating challenges.

IBC 22-27: Reclassifying Fracture Critical Members to System Redundant Members in a steel Arch Bridge
Time: 11:30 AM

Ardalan Mosavi and Hao Yuan, Arup, Houston, TX; Matt Carter, Arup, New York, NY
AASHTO LRFD Design Specifications define Fracture Critical Members (FCMs) as steel primary members, which are subject to tension and whose failure could result in the collapse of a portion or the entire bridge. FCMs not only lead to additional material procurement and fabrication quality requirements but bridges with FCMs need to meet the requirements of special mandatory bi-annual inspections per National Bridge Inspection Standards (NBIS).

The special mandatory inspections for FCMs are a considerable budgetary constraint for asset owners whilst still not providing definite proof that the bridge remains safe within the period in between the inspections. Designation of FCMs is particularly wasteful in a new bridge constructed with high quality materials and well designed details.

In 2012, the FHWA published a memorandum which introduced System Redundant Members (SRMs) which could be identified through refined analysis and be exempted from the inspection requirements of FCMs. A new AASHTO guideline released in 2018 outlined a detailed procedure for reclassification of FCMs as SRMs by performing detail nonlinear finite element analysis (FEA).

This paper summarizes the analyses and results of a detailed FEA carried out for a newly designed steel arch bridge. The analyses consider potential failure scenarios at the edge girder of the steel arch bridge and demonstrates the available redundancy in the system to distribute the loads by satisfying the performance criteria set in the newly released AASHTO design guide.

Reclassification of the FCMs in this newly designed bridge could save considerable maintenance cost during service life of the bridge.

TUESDAY, JULY 19, 2022

ABC, PART 2
ROOM 301/302

Session Chair: William Detwiler, P.E., T.Y. Lin International, Coral Gables, FL
Time: 1:30 PM - 3:00 PM

IBC 22-28: Superstructure Modules at Bridges 3-155 N&S over Broadkill River, Sussex County, DE
Time: 1:30 PM

Fred Ophardt, P.E., Whitman, Requardt & Associates, LLP, Baltimore, MD

The "Rehabilitation of Bridges 3-155 N&S" project consists of the superstructure replacement of two parallel five span steel beam bridges owned by the Delaware Department of Transportation along the SR 1 corridor, Delaware's main north-south highway used to access the Delaware beaches. To meet a six-month construction schedule dictated by traffic demands, this project featured the use of prefabricated superstructure modules, precast concrete approach slab components, ultra-high performance concrete, and a polyester polymer concrete overlay.

IBC 22-29: Prefabricated Bridge Decks – Speed and Durability
Time: 2:00 PM

Lawrence Rolwes, Jr. and Joshua Phillips, HNTB, Arlington, VA; Bill Manuel, HNTB, Charleston, WV

Prefabricated bridge decks offer the flexibility to meet challenging construction schedules in both new and existing applications while also providing durability equal or better than traditional cast-in-place decks through incorporation of modern materials and details. Three projects are presented to showcase the versatility of the prefabricated deck concept with corresponding details: Rte. 52 over the Mississippi River in Louisiana, MO; West Virginia Parkways Authority bridge deck replacements; Rte. 120 over Pimmit Run in Arlington, VA.

IBC 22-30: Exploring Fiber-Reinforced Polymer Concrete for Accelerated Bridge Construction Applications
Time: 2:30 PM

Carolyn Donohoe and Travis Thonstad, University of Washington, Seattle, WA

This paper explores the use of fiber-reinforced polymer concrete (FRPC) as a closure pour material to connect adjacent prefabricated bridge elements. FRPC displays bond and tension strength comparable to UHPC and gains this strength in several hours. The mechanical and bond properties of FRPC were experimentally determined at several temperatures and ages. Using the collected data, an example joint configuration was developed, enabling comparison of FRPC with other closure pour materials in future ABC projects.

CABLE STAYED BRIDGES
ROOM 304/305

Session Chair: Brian M. Kozy, Ph.D., P.E., Michael Baker International, Linthicum, MD
Time: 1:30 PM - 4:30 PM

IBC 22-35: Gordie Howe International Bridge: Project Overview and Design Features
Time: 1:30 PM

Barry Chung, AECOM, Tampa, FL; Antonio Martínez and Juan Navarro, Carlos Fernández Casado, SL, Madrid Spain; Hugo Corres and Borja Regúlez Pérez, Fhecor, Madrid, Spain

The Gordie Howe International Bridge, crossing the Detroit river between Windsor (Canada) and Detroit (USA), will be the longest main span cable stayed bridge in North America with a 853 m / 2800 feet main span and the longest main span cable stayed composite deck in the world. This paper provides a general overview and design features including foundation, tower, and superstructure, and highlights design challenges including aerodynamics, stay cable design, redundancy and durability.

IBC 22-36: Replacement of the Kosciuszko Bridge over Newtown Creek Phase 2 - Construction and Erection Engineering
Time: 2:00 PM

Preston Vineyard, COWI, New York, NY

This presentation focuses on the erection engineering challenges of constructing the Kosciuszko Phase 2 Cable Stayed Bridge (K-Bridge). The K-Bridge is a complicated structure erected in a highly constrained environment on an aggressive schedule. Erection of the bridge presented numerous technical challenges, including dramatic proximity to the completed Phase 1 Bridge, limited right-of-way access; the location of underground remnants of the original 1931 bridge foundation, and the presence of Newtown Creek.

IBC 22-37: A Record Breaking Prestressed Concrete Extradosed Bridge
Time: 2:30 PM

Miguel Astiz, Carlos Fernández Casado S.L., Madrid, Spain; Marcos Sánchez, Arup, Dublin, Ireland

The Rose Fitzgerald Kennedy Bridge spans the river Barrow with two 230 m long main spans. It is an extradosed bridge with three towers, and four spans and several approach spans to complete the 887 m length of the whole bridge. The design is the consequence of a very careful attention to the preservation of the landscape as well as to the durability of the bridge while considering all the specific challenges due to the service loads, wind effects on traffic, ship collision and fire events analysis as well as construction issues related to the extreme slenderness of the deck. Most of the details of this bridge were designed in order to comply with these constraints leading to a non-standard design from a purely engineering point of view but to a structure which is more friendly with the society and with the environment.

IBC 22-38: Collapse of the Chirajara Cable Stayed Bridge in Colombia

Time: 3:30 PM

Thomas Murphy, Ph.D., P.E., S.E., Nohemy Galindez, Ph.D., P.E., Frank Artmont, Ph.D., P.E., Andrew Adams, P.E., and Maria Lopez, Ph.D., P.E., FACI, Modjeski and Masters, Inc., Mechanicsburg, PA

On January 15, 2018, while under construction and with only 164' left to connect the floorsystem at midspan, one of the towers of the Chirajara Bridge suddenly collapsed, destroying that part of the structure. The other tower remained standing, approximately in the same construction stage as the collapsed tower. The Chirajara Bridge was located about 40 miles to the southeast of Bogota, Colombia. It was a cable-stayed bridge consisting of two diamond-shaped towers, with a main span length of 940' and two 262' long side spans.

Modjeski and Masters was engaged to conduct a forensic investigation into the collapse. The investigation included an in-situ inspection of the collapsed structure, analytical studies of the bridge and its capacity for the conditions immediately prior to the collapse and for the final condition of service, an evaluation of the original design, a review of the construction documentation and testing of the critical component materials. Based on all of the available data resulting from the investigation, the cause of the Chirajara tower collapse was determined to be a deficiency in the strength of the tower due to an incorrect design assumption regarding the resistance provided by its cross beam and the diaphragm between the tower lower legs. While the investigation identified several other issues with the design and construction of the bridge, no other factor was found to contribute significantly to the cause of the collapse.

IBC 22-39: Varvsbron: a Unique Cable-Stayed Pedestrian Bridge

Time: 4:00 PM

Stephen James, BSc DipArch, Stephen James Architects, London, United Kingdom; Kilian Karius, Leonhardt, Andrä und Partner, Stuttgart, Germany

'Varvsbron', an innovative cable-stayed structure represents state-of-the-art design in a location that is rich in industrial history. Our paper charts the development of the bridge's design, focusing particularly on how the team utilised advanced parametric modelling techniques, primarily used in the aircraft and automotive industry, to simultaneously confirm the final aesthetic form, address complex structural and buildability issues, and ultimately make this distinctive bridge both structurally efficient and buildable.

LEARNED FROM MAJOR BRIDGE EMERGENCY RESPONSE AND REHABILITATION PROJECTS
ROOM: 315/316

Time: 1:30 PM – 5:30 PM

John C. Dietrick, P.E., Michael Baker International, Cleveland, OH; Francesco M. Russo, Ph.D., P.E., Russo Structural Services, Philadelphia, PA; Aaron Stover, Michael Baker International, Louisville, KY; Alicia McConnell, P.E., Michael Baker International, Chicago, IL; John Zuleger, P.E., SPRAT 3, Michael Baker International, Cincinnati, OH; Rich Schoedel, Michael Baker International, Pittsburgh, PA

This workshop will describe the efforts undertaken, under extreme pressure and public scrutiny, to successfully re-open major bridges that experienced a failure or deficiency significant enough to take the bridge out of service. The workshop will concentrate on the recent emergency repair of the I-40 Hernando de Soto Bridge over the Mississippi River between Tennessee and Arkansas. A major fracture in one of the tie girders of this steel tied arch bridge, found during a routine inspection, led to the closure of the bridge, after which emergency repairs were carried out under an extremely aggressive schedule. The workshop will describe efforts undertaken by Michael Baker inspection staff to quickly remove traffic from the bridge once the problem was detected, and the efforts subsequently undertaken to design and implement a repair to quickly allow traffic back on the bridge.

The successful repair and reopening of the Hernando de Soto bridge was assisted in part by lessons learned through similar emergency rehabilitation projects that Michael Baker staff participated on, including the I-71/I-75 Brent Spence Bridge fire, the I-64 Sherman Minton Bridge closure, and the I-43 Leo Frigo Bridge, which was closed after the dramatic settlement of several piers. This workshop will discuss these and other emergency repair projects and illustrate how experiences on these projects helped produce positive results under challenging circumstances on the Hernando de Soto emergency repair.

W06: HOW TO EFFECTIVELY WORK WITH A DOT
ROOM: 310/311

Time: 1:30 PM – 4:30 PM

Rachel Stiffler, Vector Corrosion Technologies, Canonsburg, PA; Lynnette Stevens, Ohio DOT, Columbus, OH; Matthew R. Weaver, P.E., Pennsylvania DOT, Harrisburg, PA

The objective is to help the consultant and contractor community work with the DOT more effectively and efficiently. 3 DOTs will be presenting their best practices in working with the DOT. If time allows, we hope to also hear from the featured agency.

TUESDAY, JULY 19, 2022

ALTERNATE DELIVERY METHODS
ROOM 301/302

Session Chair: William Detwiler, P.E., T.Y. Lin International, Coral Gables, FL
Time: 3:30 PM - 5:30 PM

IBC 22-31: CMAR Delivery of I-15 Virgin River Bridge No. 1 – Longest Steel Girder Span in Arizona
Time: 3:30 PM

Jason Nauman, P.E., and Greg Lingor, HDR, Phoenix, AZ
This $57 million Construction Management at Risk (CMAR) project will replace an existing 5-span haunched steel girder bridge, which is classified as structurally deficient and scour vulnerable, with a 3-span huanched steel plate girder bridge consisting of the longest steel girder span (340 feet) in Arizona. The presentation will highlight the effectiveness of the CMAR delivery method by providing an overview of the bridge layout, phasing and design elements that were CMAR influenced.

IBC 22-32: Optimizing Bridge Design and Construction through Collaboration
Time: 4:00 PM

Kumar Ghosh, Ph.D., P.E., Jeremy LaHaye, and Dan Fitzwilliam, T.Y. Lin International, San Diego, CA
The replacement of the San Elijo Lagoon Bridge on the Interstate-5 uses the Construction Manager/ General Contractor (CM/GC) delivery method. Schedule, traffic impacts, environmental impacts and risk reduction were major considerations in involving the CM early on to seek input on construction staging, public outreach and traffic handling. Collaboration with the CM resulted in cost savings through foundation optimization and design details vetted by the CM that helped to reduce Change Orders during construction.

IBC 22-33: Hurricane Ida Emergency Repairs at the Route 22 Bridge over Middle Brook Wall Washout
Time: 4:30 PM

Melissa Dawson, P.E., Eli D. Lambert III, P.E., Rama Krishnagiri, P.E., and Kwang Ro, P.E., WSP USA, Lawrenceville, NJ; Mohab Hussein, New Jersey DOT, Ewing, NJ
Hurricane Ida was a deadly and destructive tropical storm that impacted New Jersey with flooding and tornadoes on September 1, 2021. A single span bridge in Bridgewater Township, Somerset County, NJ experienced severe flooding well exceeding 100-year design storm levels. Flood water from the stream and the surrounding area and upstream flood control structure overtopped the bridge with 8' of water and a stepped, precast modular retaining wall on the western downstream side of the bridge was undermined and washed away. In addition, a 24" force main sewer ruptured and a major utility pole carrying about 1 ton of wires was undermined and leaning against the failed parapet. The ramp from Chimney Rock Road to Route 22 Eastbound was closed to traffic. The NJDOT and WSP team inspected the damage and immediately mobilized over the Labor Day weekend to develop a repair scheme. A design build approach was necessary to expedite immediate Emergency construction and secure materials. The sewer main was temporarily bypassed for repair and the utility pole relocated in two days. Demolition of the failed wall, parapet and moment slab followed as soon as safe access was available. A permanent wire mesh reinforced earth wall with precast concrete facing panels and concrete closure pour was recommended and ultimately installed to open traffic on the ramp and limit impacts to main line Route 22 traffic. The existing bridge abutment foundation was protected by an invert slab that survived the storm, however the downstream end was undermined for about 6'. Phase two of the project will include reconstruction of the existing embankments including installation of large riprap protection along the stream bank and armoring of the existing bridge shallow foundations at both the east and west embankment corners.

IBC 22-34: Rehabilitation of I-95 using the CM/GC Delivery Method
Time: 5:00 PM

William Geschrei and David Nizamoff, Whitman, Requardt & Associates, LLP, Baltimore, MD
The Delaware Department of Transportation is using the CM/GC delivery method to rehabilitate a 6-mile long stretch of I-95 in downtown Wilmington, DE. The project goals are to extend the useful service life of the interstate for at least 30 years, including 19 bridges and 11 entrance and exit ramps, while minimizing schedule risk to ensure the project, and its impact on traffic, can be completed in 2 years or less.

PEDESTRIAN/SPECIAL PURPOSE BRIDGES
ROOM 306/307

Session Chair: Jonathan McHugh, P.E., Gannett Fleming, Inc., Pittsburgh, PA
Time:1:30 PM - 5:30 PM

IBC 22-42: Steel Erection for the Margaret McDermott Pedestrian Bridges
Time: 1:30 PM

Nicola (Nick) Greco, P.E., P.Eng., American Bridge Company, Coraopolis, PA; John Boschert, Steve Eads, and Dave Byers, Genesis Structures, Inc., Kansas City, MO
Two 1,125 foot long arch pedestrian bridges were constructed in Dallas, Texas as part of the Trinity River Corridor improvement project. These bridges provide pedestrian access across the Trinity River at IH-30 and I-35E near downtown Dallas' Central Business District. The intricate geometry of the arch, while visually dramatic, added significant complexity to the erection engineering. The paper will highlight the construction engineering and the means and methods developed for the project.

IBC 22-43: Designing the Pittsburgh Airport Terminal Front Bridge
Time: 2:00 PM

Kevin O'Connor, HDR, Pittsburgh, PA; Michael Fitzpatrick, HDR, Irvine, CA
The Pittsburgh International Airport is executing a $1.39 billion terminal modernization program to update and right-size the airport's facilities. The new airport terminal will host 12-18 million travelers each year. On the front of that terminal will be a new two-level, 1,300-foot bridge. Most bridges are designed to carry travelers from point to point, this structure is designed to Improve the user experience for travelers beginning or ending their journeys and will serve as the entryway to both the departure and the arrival levels at the new terminal. The two-level

stacked bridge over a commercial curb level at grade features through lanes for drivers, parking lanes for passengers arriving and departing, a sidewalk curb with bollards for protection as well as benches and planters designed as crash-worthy protective elements, ADA access ramps, and a suspended and lighted ceiling at the vestibules that provide entry points to the terminal.

Aspects of the design that will be covered in this presentation include, the design of shallow in-plane rectangular steel cross-girders supporting trapezoidal box-girders due to the requirement to match the height of the terminal floors, foundation restrictions due to underground tunnels, and vibration limits due to automated people mover trains in the tunnels, the use of round multi-column steel jacketed concrete piers as a threat protective measure with short struts between the columns, bollards within the bridge deck, benches and planters designed for crash protection, wayfinding signage within the bridge deck, and the incorporation of art onto the bridge abutments and barriers.

IBC 22-44: Changeable Wind Conditions Affecting Pedestrian Bridges

Time: 2:30 PM

Pierre-Olivier Dallaire, Mark Istvan (presenter), RWDI Consulting Engineers & Scientists, Guelph, Ontario, Canada

Tintagel Castle is among the most popular tourist destinations in England. Built in the 13th century it is a unique historical site on the windswept north coast of Cornwall. The castle's location makes it difficult to access. Up until now it has been reached via an arduous approach involving many stairs which was difficult or impossible for people with mobility challenges. To improve accessibility to this historic site, an elegant cantilevered bridge was designed and constructed. The Tintagel Castle Bridge is unlike most pedestrian crossings as its design has two cantilevers that don't quite meet, creating a small gap in the middle. Situated on a site that is prone to extreme weather, this presented an engineering challenge to ensure maximum stability.

This presentation will provide an overview of the engineering approach taken to overcome the climate and topographical conditions influencing design to ensure a safe and comfortable structure. Wind tunnel testing assessed numerous aspects of the bridge's aerodynamic and aeroelastic performance such as the susceptibility to flutter and vortex shedding. Through the example case study, participants will gain a better understanding of optimizing bridge designs to withstand wind and other environmental influences without developing undesirable dynamic responses.

IBC 22-45: Outside of the Comfort Zone - When the Best Solution Makes a Client Uncomfortable

Time: 3:30 PM

Jeremy LaHaye, P.E., Dan Fitzwilliam, P.E., and Robert Sokolowski, T.Y. Lin International, San Diego, CA

Pedestrian bridges provide vital links for society and allow for design expressions not readily adapted by vehicular bridges. The San Elijo Pedestrian Bridge is an example of a such a bridge. This pedestrian bridge in Encinitas California is a part of the $6 Billion Caltrans I-5 North Coast Corridor Project. Suspended from the newly constructed I-5/San Elijo Lagoon Bridge, this elegant structure provides a vital link between the bicycle and pedestrian trails in and around the San Elijo Lagoon and creates more travel choices for the community.

This presentation examines how the opportunities and constraints influenced the aesthetics and design of this unique cable supported structure. The architecturally striking design was developed with input from multiple stakeholders and resource agencies while keeping the design and site constraints in mind. This bridge is the first of its kind in California and required the application of key client management and design tools to allow for acceptance by Caltrans. These tools can be readily applied to a myriad of other project challenges that designers will encounter on non-standard and complex bridge projects.As designers continue to push the envelope on what is possible, it is imperative that we are prepared to present our ideas to clients in a manner that facilitates their approval of the design. Utilizing the San Elijo Pedestrian Bridge as an example, we will review the novel engineering solutions required, the comments and concerns presented by Caltrans reviewers, and the tools used to obtain approval.

IBC 22-46: Design and Construction of the Robert L.B. Tobin Land Bridge

Time: 4:00 PM

Matt Carter and Eric Brunning, P.E., Arup, New York, NY; Greg Tuzzolo, Stephen Stimson Associates, Boston, MA

The Robert L.B. Tobin Land Bridge is a unique bridge that connects together two halves of the Phil Hardberger Park in San Antonio, Texas. The bridge provides a safe passage for animals to cross the six lane highway which bisects this important 330 acre nature reserve in the suburbs of the city. The bridge is a unique saddle shape steel girder bridge with the form providing a natural path. This presentation will describe the development of the design and how it responds to the unique requirements of being an animal crossing. The presentation will also describe the construction and operation.

IBC 22-47: A Bascule Bridge Within a Bascule Bridge

Time: 4:30 PM

Patrick Laux, P.E., S.E., WSP USA, Chicago, IL; Jamal Grainawi, P.E., S.E., WSP USA, Chicago, IL

The Lake Shore Drive Bascule Bridge stands apart in Chicago for many reasons. Not only is it colossal in size, its location at the mouth of the Chicago River requires it to carry fourteen (14) total lanes of DuSable Lake Shore Drive traffic on two levels along with the Lakefront Trail. The originally constructed bridge was modifying in the 1980s to carry this trail on the bridge's lower level in part by creating an opening in the eastern bridge houses. Consequently, trails users must navigate a narrow opening, approximately eight feet. Now with the Lakefront Trail more popular than ever, the City embarked on a plan to widen the trail to 20 feet to improve safety and accessibility for people walking, biking, and using assistive devices. The new bridge modification features a second opening through the bridge houses, new movable sidewalk pieces at each end, and 20-foot-wide cantilever brackets on the bascule bridge itself. The unique structure-type of these movable sidewalks made for a challenging design. Using a passive opening system facilitated by a linkage arm to the main bascule bridge, the movable sidewalk pieces serve as a bridge between the trail on the fixed structure to the bascule structure. The presentation will focus on the design of these 'bascules within a bascule bridge' as well as the various other movable bridge rehabilitation aspects of the project.

IBC 22-48: A Twist on Station Footbridge Design
Time: 5:00 PM

Victoria Richardson, Arup, Pittsburgh, PA; Tom Osborne, Knight Architects, United Kingdom

Seeking to improve both the passenger experience and the aesthetic quality of new station footbridges, the UK's national rail operator have produced a catalogue of signature station footbridge designs. The catalogue contains the Ribbon footbridge, which is the focus of this paper.

The Ribbon footbridge is characterized through a simple but innovative approach to rotate the lift shaft through-30 degrees. In doing so the design offers significantly improved visibility of the lift from views along the platform, presenting an equal experience for all users of the station. Introducing rotation into the lift shaft design brought structural challenges to balance the connection design with facilitating quick construction during track closures.

As a truly parametric design, the Ribbon footbridge design can accommodate a variety of station layouts including single span options and larger multi-span arrangements. Station capacities vary so the design choice also includes stair width, deck width and lift capacities. This was achieved through an integrated design and analysis grasshopper script to quickly assess multiple configurations.

To accommodate the matrix of options, the main deck consists of a U-frame through girder steel deck with inclined webs. The canopy and deck are separated into two independent 'ribbons'. This provides shelter while passengers remain in the open air to move seamlessly between platforms.

The Ribbon footbridge is part of an innovative change to enhance the passenger experience and apply an adaptable, enduring and high-quality design to suit the diverse of local contexts across the rail network.

LESSON LEARNED
ROOM 304/305

Session Chair: Brian M. Kozy, Ph.D., P.E., Michael Baker International, Linthicum, MD
Time: 4:30 PM - 5:30 PM

IBC 22-40: Route 6/10 Interchange Reconstruction: Design & Construction of an Urban Interchange using Design/Build
Time: 4:30 PM

Brian Guzas, P.E., AECOM, Providence, RI; Daniel Deacon, Barletta Heavy Division, Canton, MA; Katie Scancarello, P.E., and Megan McMorris, P.E., AECOM, Boston, MA; Matthew Sprague, P.E., AECOM, Providence, RI

Reconstruction of the Route 6 and Route 10 Interchange is the largest Design/Build Project in RIDOT history with a design and construction value of approximately $250 million. The interchange serves as a critical east-west regional link for automobile and truck traffic with nearly 100,000 vehicles using the interchange each day. Originally constructed in the 1950's the roadway and bridges were in a state of severe disrepair with seven of the nine bridges rated as structurally deficient. The new interchange was constructed within the same footprint as the existing interchange, resulting in multiphase bridge construction. The 11 new highway bridges consist of steel plate girder structures (both straight and curved) to conform with the complex ramp geometry. The new 729ft long, multi-span, Route 6 West flyover bridge consists of twin trapezoidal box girders that span over 250 feet, providing the "missing move" long sought after by users of the interchange. The site is very challenging, with organic soils, tight right-of-way, an urban environment, and the AMTRAK northeast corridor running through the middle of the interchange.

This paper describes the challenges the design and construction teams had to overcome and some innovative solutions to deliver this project, including: challenging soils (effects on foundation design, seismic design, and ultra-lightweight fill to mitigate embankment and utility settlement), bridge erection in a congested site, construction over and adjacent to an active railroad, bridge constructability details, and schedule flexibility during a global pandemic.

IBC 22-41: Fully Joint-less Continuous Steel Girder Structure – Update and improvements after 7 years in service
Time: 5:00 PM

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

This is a follow up to IBC Paper 13-15 presented in 2013. We will present an overview of the jointless details and how they have performed based on their real-world use over 7 years. The Kew Gardens Interchange in Queens, NY is a complex urban interchange with four major highways, several at-grade roadways and multiple inter-roadway ramp connections. NYSDOT Region 11 has implemented a four Phase safety and operational improvement plan at this complex interchange. As part of Phase 2 of that plan, the existing Northbound Van Wyck Expressway Viaduct was replaced as part of the proposed improvement and structural upgrade. This critical piece of New York City infrastructure is a major north-south travel route between NYC and the tri-state region leading to the JFK and La Guardia airports, carrying over 90,000 vehicles per day. The structure was designed to be fully joint-less as opposed to the use of typical deck joints that would be used along the structure and/or at the abutments. The joints were eliminated with the development of special joint-less deck and approach slab details with the use of pressure relief joints. The new bridge is the longest joint-less, continuous steel curved structure in NY State: 800' length, 4-spans: 191.6'/213.3'/213.3'/178.8'.

The bridge was completed and put into service in November 2014. Lessons learned from design through installation and how the joint-less details have performed after 5 years of high traffic volumes and heavy truck traffic. Detail improvements installed in 2020 and their 2-year performance will be reviewed.

TUESDAY, JULY 19, 2022

W11: BRIDGE COATING CONTRACTS – QUALITY CONTROL VS QUALITY ASSURANCE
ROOM 310/311

Time: 4:30 PM – 5:30 PM

Tony Serdenes, Greenman-Pedersen, Inc., Columbia, MD; Sarah Olthof, Greenman-Pedersen, Inc., Grand Rapids, MI
Room: 310/311

This workshop will discuss the requirements for both the contractor's Quality Control (QC) inspection and the owner's Quality Assurance (QA) inspection. It will detail the responsibilities of each inspector on a bridge painting project. This will include what types of inspections are required to be performed by each inspector based on their role. What type of documentation each inspector is required to generate. How they should work together to achieve a successful project while conducting themselves professionally without crossing lines. This will also include communication between the QC and the QA.

IBC AWARDS DINNER
BALLROOM B

Time: 5:30 Arrival

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 2022 IBC Awards of Distinction. The IBC Awards will be presented in a ceremonial dinner on Tuesday. . Check with the IBC Registration Desk for seating availability. Tickets are required at the entrance. The honorees include:

John A. Roebling Medal
Honoring an individual for lifetime achievement in bridge engineering, we are pleased to recognize Daniel Tassin, P. Eng., SYSTRA IBT, San Diego, CA

George S. Richardson Medal
Recognizing a single, recent outstanding achievement in bridge engineering, we are pleased to recognize the Gerald Desmond Bridge Replacement, Long Beach, CA

Gustav Lindenthal Medal
Recognizing an outstanding structure that is also aesthetically and environmentally pleasing, we are pleased to recognize the Huayudong Bridge, Guiyang, Guizhou, People's Republic of China

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 Varvsbron, Helsingborg, Sweden

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 I-579 Urban Open Space Cap, Pittsburgh, PA

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 Rachel Carson Bridge Rehabilitation, Pittsburgh, PA

Theodore Cooper Medal:
For a recent outstanding achievement in heavy and or light rail bridge engineering demonstrating innovation in the design of new rail bridges, the rehabilitation of rail bridges or the use of accelerated construction in rail bridge projects we are pleased to recognize the Zangmu Yarlung Zangbo River Bridge, Jiacha County, Tibet, China

WEDNESDAY, JULY 20, 2022

DESIGN/BUILD
ROOM 306/307

Session Chair: Francesco M. Russo, Ph.D., P.E., Russo Structural Services, Philadelphia, PA
Time: 8:00 AM - 9:00 AM

IBC 22-63: Complex Geometry Connects Communities
Time: 8:00 AM

Andrew Bradshaw, P.E., STV Incorporated, Boston, MA; Timothy Irwin, P.E., STV Incorporated, Harrisburg, PA

This presentation follows the design and construction of more than 50 spans of light rail viaduct for the Design-Build MBTA Green Line Extension project in Cambridge, Somerville, and Medford, Massachusetts. Highlights include complex geometry and foundation design along with some unconventional solutions and lessons learned. The viaduct crosses city streets, envelopes a new elevated station, snakes its way between existing buildings, navigates through an active rail yard, and wraps underneath itself.

IBC 22-64: Withdrawn

SUSPENSION BRIDGES
ROOM 304/305

Sesion Chair: Jane-Ann Patton, P.E., LOCHNER, Pittsburgh, PA
Time: 8:00 AM - 10:00 AM

IBC 22-56: Cable Inspection and Evaluation, Clinton Gateway Suspension Bridge
Time: 8:00 AM

Christopher Ligozio, S.E. and Scott Wyatt, KPFF Consulting Engineers, Evanston, IL; William A. Beisner, P.E., Illinois DOT, Springfield, IL

KPFF Consulting Engineers Inc. (KPFF) undertook in-depth inspection and non-destructive testing of main suspension cables, hangers and anchorages of the Clinton Gateway Bridge over the Mississippi River near Fulton, Illinois. The Gateway Bridge consists of a 644-foot catenary suspension main span and 271-ft. and 250 ft. stayed-back spans. Main cables are comprised of 19 parallel bridge strands wrapped with a No. 9 galvanized soft steel external wire. Select lengths of the main cable had been wrapped with a neoprene sheet material during a rehabilitation contract completed in 2000.

The inspection program encompassed:

- A full visual inspection of all main suspension cables, hangers, and anchorages;
- Magnetostrictive Sensor (MsS) testing and vibration based force measurement of the hanger cables and main cable strands in the anchorage pits;
- Detailed inspection of splay castings and main cable strands at the anchorage entry points;
- Internal inspection of main cable in 4 panel points, including removal of cable corrosion protection layers and wedging of exposed strands in select panel points.

Based on inspection findings, the present condition state of the main suspension cables and hangers was categorized in accordance with guidelines contained in NCHRP Report 534. Remaining life of the cable system was defined on this basis and used to develop detailed recommendations for the cable system, including:

- Main suspension cable and hanger inspection methods and schedule
- Hanger corrosion protection and preservation program
- Cable anchorage hood and splay casting restoration

IBC 22-57: Application of Negative Pressure at Exhaust Sleeves and Effects on Air Flow in Main Cables
Time: 8:30 AM

Jonathan Morey, P.E., WSP USA, Edgewood, MD; Dan Sheehan, American Bridge Company, Coraopolis, PA; Marek Solski, WSP USA, Pompano Beach, FL

During the start-up and commissioning of the main cable dehumidification system on the Anthony Wayne Bridge, it was observed that flow received by the cable was less than the desired amount by the design team. After troubleshooting the complex controls system that provides air flow to the cable without over-pressurizing the new cable wrapping system, it was thoroughly determined that the new system, which included dedicated blowers pushing air from a dehumidified room through dry-air supply pipes to injection sleeves on the main cable, was performing as designed. The challenge was the inherent resistance to flow in the existing cable, which was limiting the amount of flow entering the cable. Due to natural losses in air flow along the length of the cable system on the path to the exhaust sleeves, less than desired exhaust flow were present. By applying negative pressure at the exhaust sleeves, it was shown that flow at the injection sleeve increased, resulting in additional air volume changes within the cable per hour, and demonstrating that the effectiveness of a main cable dehumidification system is subject to the inherent amount of air the cable will receive. As the make-up and condition of each suspension bridge main cable is different, this design parameter will vary at each individual bridge, and should be considered during the design phase to ensure an effective long-term solution.

IBC 22-58: The Dublin Link Suspension Bridge Structural Cable System
Time: 9:00 AM

David Ward and Andrea Tognetti, Teufelberger Redaelli Tensostructures, Milan, Lombardy Italy

The Scioto River Pedestrian Bridge is located in Dublin, Ohio. The team involved in the realization of this iconic structure included the City of Dublin Ohio, Paul Endres of Enderstudio, TY Lin, Kokosing, Genesis Structures, Michael Baker, SBP and Redaelli. This pedestrian and bicycle bridge provides a new connection between the Riverside Crossing Park on the east side with Dublin's beloved historic district over the Scioto River. This crucial new link brings together two communties and "serves as landmark for the City of Dublin representing connectivity and inclusivity" the words of Dublin's Deputy City Manager.

232 metres long, 4.3 metres wide, the bridge has a 153 metre long suspension span in a reverse curve. The bridge is characterized by the needle shape concrete mast, the "S" shape deck and the cable hangers that connect to only one side of the deck. The large diameter main catenary cables are split and connected at the mast top with a neat connection avoiding the need for a traditional large saddle casting that was deemed to have been visually obtrusive.

Redaelli designed, manufactured, supplied and installed the two main catenary cables, the tie down cable, and the hanger cable system including clamps and specifically designed spherical pins and washers to accommodate any rotations between the cable sockets and the anchor plates under live load events.

This paper explores some of the challenges associated with the cable supply and installation including the specialist cable fatigue testing program that was specifically adopted for this project.

IBC 22-59: Suspension Span Link Replacement
Time: 9:30 AM

Dan Millman, P.E., Steve Richards, and Ted Zoli, HNTB, New York, NY; Shekhar Scindia, Delaware River & Bay Authority, New Castle, DE

The suspended span tower links of the Delaware Memorial Bridge were recently replaced with modern sliding uplift bearings. The existing links, which support the suspended span truss at the towers, were severely worn and needed replacement. Bearings were chosen over an in-kind replacement of the links, believed to be the first instance of such a change to a major suspension bridge in the United States. This paper reviews the full project development from concept through construction and in-service performance. The unique movements and loadings conditions demanded by the flexible suspended spans are discussed in detail. Additional complex rehabilitation work, including suspender rope replacement and wind restraint system repair, were included in the project and are discussed.

REHABILITATION/PRESERVATION
ROOM 301/302

Session Chair: Annette Adams, P.E., Virginia DOT, Fredericksburg, VA
Time: 8:00 AM - 12:00 PM

IBC 22-49: Use of Distributed Strain and Temperature Fiber Optic Monitoring on the West Seattle High Bridge
Time: 8:00 AM

Thomas Weinmann, BDI, Buffalo Grove, IL; Brett Commander, P.E., BDI, Louisville, CO; Coleman Davidson, BDI, Seattle, WA; Kit Loo, P.E., and Matthew Donahue, P.E., Seattle DOT, Seattle, WA

The West Seattle High Bridge was closed in March 2020 due to accelerated concrete cracking that was identified as a result of routine and increased frequency bridge inspection. Since that time a structural health monitoring system was installed to further identify ongoing deterioration. The decision was made to strengthen and repair the existing structure and expand the existing monitoring program for anticipated bridge re-opening to traffic in mid-2022.

The goal of the expanded instrumentation and monitoring program was to have it installed before final post tensioning retrofit was completed and to have baseline performance documented and evaluate performance of final post-tensioning operations. The instrumentation program included traditional vibrating wire strain sensors as well as implementing Distributed Strain and Temperature (DST) fiber optic technology for long-term assessment of performance.

DST Fiber Optic Technology is a proven measurement technique that utilizes the most economical solution for tens of thousands of strain and temperature measurement points over long distances (up to 25 kilometers) with a measurement spacial resolution of 1 meter. This solution is most appropriate for determination of measurements at yet-to-be-known areas of concern. Typical applications are buried pipelines, security perimeter fencing and levees. This is the first implementation of DST FO technology on a bridge structure in the US.

The West Seattle High Bridge is instrumented with DST fiber optics in the parallel concrete box sections to identify any future cracking that could occur in yet-to-be-identified locations. This presentation will provide an overview on the implemented technology for bridge structures.

BC 22-50: Post-Tensioning Tendon Repairs of Two Segmental Concrete Bridges
Time: 8:30 AM

Nick Amico, P.E. and John Williams, P.E., HDR, Charlotte, NC; Ying Tan, HDR, Raleigh, NC

This paper presents the design and construction of repairs for two segmental concrete bridges with damaged post-tensioning tendons. Designs for both structures utilized a combination of time-dependent 3D staged-construction models to evaluate overall behavior and non-linear finite element solids models to evaluate local effects. Repairs included detensioning and installation of external tendons, construction of expandable PT systems with post-installed anchors and deviators, and the extension of an existing end diaphragm.

IBC 22-51: Innovative UHPC Mixing and Placing Techniques for Repair of Three Illinois Bridges
Time 9:00 AM

Michael McDonagh, Steelike, Inc., Springfield, VA

Kane County, Illinois repaired three bridges in 2020 using ultra-high performance concrete (UHPC), a material known for its exceptional durability. The UHPC supplier, Steelike, introduced multiple innovative techniques that allowed the contractor to complete the projects in less time and for less cost.

Innovative mixing techniques included mixing the UHPC in ready-mix trucks, which allowed the UHPC placements to proceed faster than typical rates with traditional UHPC mixers. Additionally, the UHPC was mixed offsite for one project with over 1.5 hours between mixing and final discharge, providing greater flexibility for mixing location and placement timing.

Innovative placement techniques included directly discharging the UHPC from the ready-mix truck onto the bridge deck in front of the screed for a UHPC overlay. This eliminated buggies commonly used to transport UHPC and also reduced labor and UHPC waste. The UHPC overlay was also successfully cured without plastic sheeting, eliminating the risk of deep impressions in the overlay surface from the sheeting or sheeting hold downs that have been seen on other projects.

Additional innovative placement techniques for two projects repairing keyways between adjacent precast beams included flush forming the new UHPC connections. Flush forming was successfully performed without trapping air in the top layer – the reason why deck-level UHPC connections typically require overfilling and grinding – due to a unique process pioneered by Steelike.

IBC 22-52: Innovative Design of the Pulaski Skyway Rocker Bent Rehabilitation

Time: 9:30 AM

Xin Li, P.E., Gregory Ricks, Robert Rogoff, Joseph Strafaci, and Gregory Romano, HNTB, Parsippany-Troy Hills, NJ

The Pulaski Skyway carries US Route 1 and 9 over the Passaic and Hackensack Rivers. The bridge was built in the early 1930s as one of the first controlled-access superhighways. The overall bridge is 3.5 miles long consisting of a continuous truss bridge superstructure with 118 spans. The original deck slab had open finger joints with poorly maintained drainage, which allowed for water to leak on the truss below, causing extensive corrosion at the truss expansion device, also called as "Rocker Bent" which consists of two pin connections and one compression vertical truss chord.

This paper discusses an innovative design developed by the authors for the rehabilitation of the deteriorated Rocker Bent at Span 97. The design approach eliminates the frozen pin connections and replaces it with a state of the art high-load-multi-rotational (HLMR) bearing. The HLMR bearing is more readily inspectable and easier to maintain than the existing pin connection. Additionally, the design utilizes a unique self-supported jacking system to lift the suspended truss unit and relieve loads from the pin connection. The system comprises of upper and lower jacking brackets mounted on existing truss members, eliminating the need of falsework under the truss. To minimize the traffic interruptions during construction, the project was broken out into multiple construction stages. The construction was successfully completed recently during pandemic with only limited weekend and overnight closures of the bridge to traffic.

The presentation focuses on the project's unique technical challenges and innovative solutions led to successful project delivery.

IBC 22-53: The Rehabilitation of Route 1's Wayne Junction Viaduct

Time: 10:30 AM

Ahcene Larbi, Ph.D., P.E. and Joseph Sullivan, WSP USA, Philadelphia, PA

The rehabilitation of the 2500-foot long US 1 Wayne Junction Viaduct in the heart of Philadelphia is a major undertaking. The bridge spans SEPTA electrified train lines and many local roads. Deterioration in the steel superstructure of this 1950's structure led to a poor rating at its latest NBIS inspection. It is a riveted 15-span steel girder multi-girder structure. It has four units; a 7-span unit, two 3-span units and two simple span units. The continuous units contain pins and hangers located nearly at every other span. The rehab is being completed while maintaining 2 lanes of traffic in each direction. It is an extensive $90M rehabilitation that includes redecking and painting. The paper will focus on one of the key elements of the rehabilitation, the elimination of the existing pins and hangers. The pin and hanger elimination had to be accompanied by changes in bearing fixity and maintaining superstructure movement compatibility at all stages. The eliminations are also occurring in conjunction with the traffic staging, so each line of pin and hangers is not being replaced at the same time. The needed superstructure jacking is occurring from ground supported towers where possible. But in locations over the active rail line a strong back supported on the cantilever portion of the girder is used. A total of 13 deck joints are being eliminated when a total of 90 pins and hangers are eliminated and the bridge's ;ast two spans are made continuous for live load.

IBC 22-54: Rehabilitation and Retrofit Design of a Historic Steel Truss Bridge in Virginia

Time: 11:00 AM

Amir Gheitasi, Parsons, Baltimore, MD; John Michels, and Shiwei Luo, WSP USA, Herndon, VA

The rehabilitation and retrofit of the John G. Lewis Memorial Bridge, a 120-year-old historic steel truss carrying Featherbed Lane over Catoctin Creek in Loudoun County, Virginia, required a delicately balanced design blending old and new while working closely with the client, preservationists and the public. This paper details this rehabilitation project highlighting different aspects of design that includes partial disassembly, temporary relocation and retrofit of the truss combined with construction of new bridge elements.

IBC 22-55: Rehabilitation of Arch Skewbacks, Viaduct Piers and Lower Level North Abutment at Henry Hudson Bridge

Time: 11:30 AM

Chih-Ping Fan, AECOM, Bridgewater Township, NJ; Genaro Velez, COWI NA, New York, NY

The Henry Hudson Bridge carrying Henry Hudson Parkway traffic over the Spuytin Duyvil Creek is a bi-level steel arch bridge, designed and constructed in 1935. The bridge has a total length of 1530 ft from the south abutment in Manhattan to the north abutment in Bronx. It was confirmed through filed investigations and laboratory testing that the substructure concrete is suffering deterioration from Alkali-Silica Reaction (ASR). Since the ASR concrete can't be treated effectively it is proposed to replace all the substructure except that the skewbacks.

The skewbacks supporting the entire arch span can't be replaced practically. Instead, an innovative approach by introducing alternate load path (ALP) systems is developed and implemented to pick up the loads from the arch span as the existing skewbacks continue to lose strength and stiffness over time. The ALP systems include three primary components: load transfer frames, deep foundation and pile cap stools. The load transfer frames connect to the existing arch ribs. The deep foundation in the form of micropile group transfer the loads directly down to the bedrock without shedding loads to adjacent skewbacks. The pile cap stools connect and engage the above two components.

W07: GROUND IMPROVEMENT TECHNIQUES FOR BRIDGE EMBANKMENT SUPPORT
ROOM 315/316

Time: 8:00 AM – 12:00 PM

Dave Sandstrom, Menard USA, Carnegie, PA

The objective of the workshop will be to provide the attendees with an understanding of the various techniques and processes that are available to modify and improve soft and unstable ground conditions under the heavy loads of embankment fills. The combination of ground improvement under bridge approaches with the use of traditional bridge pile foundations has successfully been used to reduce project cost and schedule. These techniques have been used on projects with multiple state transportation agencies across the United States.

Multiple techniques, such as wick drains, stone columns, rigid inclusions, and soil mixing will be discussed and attendees will understand how these techniques work in relation to the design and construction of bridges. The types of ground improvement that are best suited for different soil conditions will be discussed. Explanation of design parameters, modeling, and interpretation of results will be provided.

Case studies will be provided that show the applications of ground improvement as they relate to embankment approaches and bridge abutments. Case studies will include design considerations, construction techniques, challenging field conditions, and results.

Field quality control procedures that confirm that the design objectives are met will be provided in each case study. These include real time monitoring of the installation work, static load test procedures and results, and settlement monitoring under embankments.

W08: INTERNATIONAL WORKSHOP
ROOM 310/311

Time: 8:30 AM – 10:30 PM

Thomas G .Leech, P.E., S.E., Gannett Fleming Inc., Pittsburgh, PA; Elliott D. Mandel, P.E., AECOM, Arlington, VA; John C. Dietrick, P.E., S.E., Michael Baker International. Cleveland, OH

The objective of this workshop will be to provide attendees with an understanding of emerging technologies and new constructions from an international perspective. Virtual presentations from global experts from Scotland and the Peoples Republic of China will demonstrate new and exciting facets of emerging technologies and new constructions. After the presentations, the audience will be able to interact with our global speakers through live feeds.

Emerging Technologies:

Effie Koursari: Scour Sensor Research

Effie works as a Senior Civil Engineer in Amey Consulting's Structures Team, leading a team specializing in scour, whilst also undertaking part-time PhD Research at the University of Glasgow on the topic of scour. Effie is leading scour related projects undertaken by Amey and is helping develop innovative scour monitoring and prediction tools and methods. Through her work, Effie is helping advance current techniques, while also providing input to current standards being developed, moving the industry away from grey, hard engineering techniques.

Cui Bing: High performance lightweight composite bridge and its industrialized construction

Cui Bing is a Chinese national master of engineering investigation and design, adjunct professor of Tongji University, chief engineer and chief expert of CCCC Highway Consultants Co., Ltd. The steel-concrete composite structure system of coarse aggregate reactive powder concrete, applicable to different bridge types, is proposed and established with bridge design experience, construction practice and research. The new composite structure effectively reduces the adverse effect of section internal force redistribution due to concrete shrinkage and creep, while it improves the compatibility between concrete and steel, improves the effectiveness of steel mechanical properties in the structure and reduces the self-weight. This presentation gives the solution of how to make the high-performance steel and concrete bridge members better accommodate industrialized assembled bridge construction, and to boost composite bridge development.

New Constructions – Mega Project

Xu Jun, Shenzhen-Zhongshan Link

Xu Jun, is the lead bridge engineer of Shenzhong Link and a design team member of CCCC Highway Consultants Co., Ltd. The Shenzhong Link that will connect Shenzhen and Zhongshan, two cities in Guangdong province, is the first infrastructure in the world that comprises four types of structures – immersed tube tunnel of record-breaking width and length, sea-crossing mega bridges with awesome long spans, artificial islands standing in deep water, and interchanges that travel in the sea. The Link is designed as an expressway with dual-four lanes. One of its vital parts, the Lingdingyang Bridge, is designed as a suspension bridge with main span of 1666m, both the main span and two back spans in continuous floating system. The Bridge is 10km offshore and holds its deck at an astonishing level of 90m from water. During the design process, crucial technologies that can address flutter stability and offshore deep-water anchor block design & construction of such long-span mono-box-girder suspension bridge, were developed.

LONG SPAN BRIDGE
ROOM 304/305

Sesion Chair: Jane-Ann Patton, P.E., LOCHNER, Pittsburgh, PA
Time: 10:30 AM - 11:00 AM

IBC 22-60: Richmond-San Rafael Bridge Gusset Plate Strengthening

Time: 10:30 AM

Michael Abrahams, P.E., and Joshua Hill, WSP USA, New York, NY; Jugesh Kapur, P.E., S.E., WSP USA, Seattle, WA

Opened to traffic in 1956, the Richmond - San Rafael Bridge, located in the San Francisco Bay, is nearly 5.5 miles long and includes various structure types, including two 2140 ft. steel cantilever suspended span trusses. The live load ratings found that there were two panel points that did not meet current live load rating criteria. This paper will describe strengthening those cantilever suspended span truss gusset plates under traffic.

FOUNDATIONS
ROOM 306/307

Session Chair: Francesco M. Russo, Ph.D., P.E., Russo Structural Services, Philadelphia, PA
Time: 10:30 AM - 11:30 AM

IBC 22-67: Two New Methods for Establishing Simple yet Durable Splicing of Prestressed Concrete Piles

Time: 10:30 AM

Seyed Saman Khedmatgozar Dolati and Armin Mehrabi, Florida International University, Miami, FL

This study introduces two novel methods for splicing prestressed concrete piles that are simple, can be applied rapidly, and provide for a corrosion-resistant connection. The new methods utilize Near Surface Mounted Fiber Reinforced Polymer (NSM FRP) and FRP sheet/jacket pile splice systems for splicing. The results of this study show that the proposed systems are effective and can pass all the requirements set forward by design specifications.

IBC 22-68: Advancing Foundations: Augered Cast-in-Place Bridge Foundations
Time: 11:00 AM

Eric Dues, P.E., S.E., Gannett Fleming, Columbus, OH; Tom Monaco, P.E., Gannett Fleming, Akron, OH; Benjamin White, GRL Engineers, Inc.

Augered Cast-in-Place (ACIP) piles are prevalent in vertical structures while bridge and transportation structures have been slow to adopt, with AASHTO not addressing their design. The OhioDOT used 176 ACIP piles in a 217' long pier footing requiring battered, reduced & low headroom, and phased installations within a highly charged aquifer. This is an overview of the project, geotechnical design, structural design, installation process, testing, and lessons learned from this first-of-its kind foundation for OhioDOT.

SEGMENTAL CONCRETE BRIDGES
ROOM 304/305

Sesion Chair: Jane-Ann Patton, P.E., LOCHNER, Pittsburgh, PA
Time: 11:00 AM - 12:00 PM

IBC 22-61: Smart Camber Analysis for close to 1,200 Precast Bridge Frames
Time: 11:00 AM

Gernot Komar, Dipl.-Ing., Sun Engineering & Technology International, Inc., San Diego, CA; Junling Sun, Ph.D., Wenbin Lei, and Chongju Peng, Sun Engineering Consultants International, Inc., Guangzhou, Guangdong, China

The City of Zhengzhou is the capital of the Henan Province and is a major transportation hub in the heart of China. The fast-growing city needed an additional elevated expressway to increase the traffic capacity from 10 lanes to 18 lanes on the 4th Ring Transportation Corridor with a total length of 58miles. 1,200 different bridge-frames were designed for the entire elevated expressway. Most of the precast segmental bridges are 3-span rigid frame systems, ranging from 112ft to 151ft for each span. The short-line match-casting system was utilized for the fabrication of close to 50,000 unique segments.

The camber of the bridge-frames need to be built into the precast segments maintaining a stress-free state so that the member can become the intended shape at a certain time. For this project time was of the essence because it would have been impossible to analyze the camber for 1,200 different bridge-frames individually. It was important to categorize the bridge-frames and determine boundary conditions, structure type, and alignment. Parameter studies were performed to better understand all influences. We developed parameter models for shortest and longest span and interpolated for the various frame length to evaluate the camber. With this approach we reduced the modeling effort tremendously and were able to analyze the camber data for 1,200 bridge-frames in an accelerated time frame. The largest precast segmental bridge project in the world was opened partially to traffic in 2020 and is now fully operational.

INNOVATIVE MATERIALS APPLICATIONS
ROOM 306/307

Session Chair: Francesco M. Russo, Ph.D., P.E., Russo Structural Services, Philadelphia, PA
Time: 9:00 AM - 10:00 AM

IBC 22-65: Stay-In-Place-Fascia-Forms (SIPFF) - a new trend in bridge overhang construction
Time: 9:00 AM

Gary M. Dinmore, P.E., Dinmore Engineering, Upper Black Eddy, PA

SIPFF's allow all construction work to be performed from the topside in a fraction of the time compared to conventional means (i.e. bridge brackets); the forms consist of relatively thin (3") precast panels 'L' shaped with a birds beak notch cast along the length of the panels toe that sockets onto the outboard edge of the top flange of the fascia girder, steel or precast, and is tied back with a diagonal tie to the same girder.

IBC 22-66: Design of the Golden Gate Bridge Main Suspension Span EDDs using Duplex Stainless Steel
Time: 9:30 AM

Ted Bush, HDR, Boise, ID; Ewa Bauer-Furbush, John Eberle, and Tom Burchell, Golden Gate Bridge Highway and Transportation District, San Francisco, CA; Kuang Lim, HDR, Walnut Creek, CA

Duplex stainless steel will be used for the energy dissipation devices to be implemented on the seismic retrofit of the landmark Golden Gate Suspension Bridge. This paper discusses the variables that led to Duplex being selected, how Duplex design is different than carbon steel, how Duplex is connected/isolated from carbon steel, unique considerations for welding thick Duplex plates, and successful results from the PQR welding and UT program that utilized two different steel bridge fabricators.

SEISMIC DESIGN
ROOM 306/307

Session Chair: Francesco M. Russo, Ph.D., P.E., Russo Structural Services, Philadelphia, PA
Time: 11:30 AM - 12:00 PM

IBC 22-69: The West Mission Bay Drive Bridge: Challenges in Achieving Seismic Resistance in a Coastal Environment
Time: 11:30 AM

Kumar Ghosh, Ph.D., P.E. and Jay Holombo, T.Y. Lin International, San Diego, CA

Located within one mile of the Pacific Ocean, the West Mission Bay Drive Bridge will be founded in formational materials below 70 feet of bay mud near the active Rose Canyon fault zone. The pier and abutment piles were designed to resist high lateral seismic demands and lateral loads induced by liquefaction and lateral spreading. Further, the bridge is designed to resist hydraulic forces with drift and debris from a tsunami runup.

WEDNESDAY, JULY 20, 2022

CONSTRUCTION ENGINEERING
ROOM 304/305

Session Chair: Derek J. Soden, P.E., S.E., Federal Highway Administration, Washington, DC
Time: 1:30 PM - 5:00 PM

IBC 22-70: Henry Hudson Bridge Rehabilitation
Time: 1:30 PM

Lucas Morgan, P.E., GCCOM Construction, Queens, NY; Vincent Siefert, Siefert Associates, LLC, Naugatuck, CT
The concrete foundations of the Henry Hudson Bridge Manhattan approach were severely corroded due to an Alkali Silica Reaction. All of the concrete footings had to be replaced while minimizing the construction impact to the 65,000 vehicles per day who traversed the bridge. Five lanes of traffic were to be maintained at all times during construction. Extensive temporary shoring towers were utilized, with up to thirty in total supporting the two-level viaduct during construction.

IBC 22-71: Safe Lifting and Handling of Rebar Cages for Deep Foundations
Time: 2:00 PM

Dylan Allen, P.E. and Charles Neth, P.E., Siefert Associates, LLC, Naugatuck, CT
The use of deep foundations, such as drilled shafts and slurry walls, has become more prevalent in today's construction than in years past. As the popularity of these elements has increased, the awareness of challenges associated with lifting and handling the pre-fabricated rebar cages has not kept pace. The fabrication and erection of these cages is based on field-experience and rule of thumb practices of suppliers, fabricators and contractors. However, several recent collapses have exposed shortcomings with relying on this empirical knowledge and demonstrated the greater need for establishment of scientific methods which address the safe lifting and handling of rebar cages for deep foundation elements. The tilt-up process is especially critical, as the rebar cage may be subjected to asymmetrical loading; this represents the most serious loading condition in consideration of rebar cage stability. During the tilt-up, any interruption in the load path or sudden loss of stiffness in the cage could result in failure and have a detrimental effect on project cost, quality, and schedule, and may result in serious injury or death. This presentation will introduce the audience to recommended principles, design/analysis methods, and best practices for fabrication of large rebar cages and address specification of internal bracing and added bars, lift planning and rigging, temporary support systems and installation procedures.

IBC 22-75: Temporary Tower Wind Tongues and Rocker Links for the Benjamin Franklin Bridge
Time: 2:30 PM

Qi Ye, P.E., Liwei Han, Ph.D., P.E., Steven Htet, EIT, and Kyunghwa Cha, CHI Consulting Engineers, LLC, Summit, NJ; Michael Venuto, P.E. and Michael D. Rakowski, P.E., Delaware River Port Authority, Camden, NJ
Temporary wind tongues and rocker links were designed for replacing existing ones at the towers of the Ben Franklin Bridge. Wind tongues need to resist a lateral force of about 1,200 kips and accommodate rotations and movements of the suspended spans. Rocker links need to resist about 2,200 tons of compression and 600 kips of tension. Innovative designs were developed to provide robust temporary supports for the bridge, and maximize the efficiency of construction.

IBC 22-73: Engineering for Bridge Demolition – The Need for Standardization
Time: 3:30 PM

Josh Sakumura Crain, P.E., S.E., Lisa Briggs, and David Byers, Genesis Structures, Kansas City, MO
For nearly all bridge replacement projects, safe and controlled demolition of the existing structure is of the highest importance. o properly execute a successful bridge demolition, much preplanning and preparation must occur before the equipment or explosives arrive on site. Similar to when a bridge is under construction, the partially complete and changing structural resistance of a bridge during demolition is when the structure is at its most vulnerable. With a growing number of resources available for engineering for design and construction, standardization of engineering for demolition remains limited. The paper will focus on the specific engineering challenges faced while evaluating bridge structures during demolition and highlight examples where shortcuts on structural analysis or field oversight proved costly. The paper will also discuss common removal methods and equipment used for deck removal/replacement projects and the engineering behind these methods. Specifically, the presentation will examine several case studies. The goal of the case studies is to learn from past experiences, and as the audience will see, not all the case studies went as planned.

IBC 22-74: Gantry Cranes Keep Vital Bridge Open During Complete Reconstruction
Time: 4:00 PM

Murray Johnson, P.Eng., P.E., Stantec, Victoria, British Columbia, Canada; Sam Johnson, Graham, Edmonton, Alberta, Canada; Melissa Jennings, COWI, North Vancouver, British Columbia, Canada
As a vital link in Edmonton's transportation system, Groat Road Bridge crosses the North Saskatchewan River near the downtown core. Built in 1955, the seven spans of concrete girder superstructure were deteriorated and structurally deficient, and a design was tendered to completely replace the superstructure and rehabilitate the piers. Two of the four lanes were to be kept open throughout construction, and any construction berms in the river could not block more than half the river at once, which meant that construction work would have to be done in quadrants, with significant environmental impact and schedule risk. During bidding, an innovative scheme was developed by the successful contractor to instead stay out of the river and use two 44 ton gantry cranes to demolish and replace the bridge one linear half at a time. The environmental impact was greatly reduced and overall schedule and risk profiles significantly improved as a result. Gantries on rails were supported on custom trusses hung off brackets stressed to the existing piers and a runway beam down the middle of the bridge deck. The concrete bridge was sawn into segments in a balanced cantilever demolition and removed by the gantries, after which new steel girders were installed in full span segments. Once traffic was diverted to the new half of the bridge, the gantry system was flipped over to the other side and the process was repeated for the second half of the bridge.

IBC 22-72: Rapid Partial Bridge Demolition of a Fractured Beam due to a Bridge Strike
Time: 4:30 PM

Mario LoCoco and Charles Swanson, P.E., HDR, Boston, MA
On July 19, 2021 at approximately 3:00pm, an over height trailer struck the fascia girder of an overpass in Medford, MA. The impact significantly damaged the bridge causing a full height fracture through the bottom flange, web and partially through the top flange. This presentation will discuss the process of simultaneous bridge analysis, plan production and active construction. This help engineers understand the nuances involved in partially demolishing a bridge adjacent to active traffic.

STRUCTURAL MODELING
ROOM 304/305

Session Chair: W. Jay Rohleder, Jr., P.E. S.E., FIGG, Exton, PA
Time: 1:30 PM - 3:00 PM

IBC 22-76: Using 3D Models to Improve Bridge Design and Deliver Better Projects
Time: 1:30 PM

Michael Alestra, P.E., Pennoni, Newark, DE; Scott Walls, P.E., M.C.E., Delaware DOT, Dover, DE
Pennoni is providing comprehensive design services to the Delaware Department of Transportation for the replacement of Bridge 1-447 Taylor's Bridge Road (SR-9) over Blackbird Creek in New Castle County. The replacement structure is a 4 span, 440-ft long bridge consisting of a precast, prestressed bulb-tee beam superstructure supported by reinforced concrete piers and semi-integral abutments that will pass the 50-year design storm and the effects of 3-ft of sea level rise, which will require raising the profile grade of Taylors Bridge Road at the bridge and along the approach roadways. This project highlights using a 3D model of the bridge and roadway as a valuable design tool. 3D BIM models were developed of the existing structure, proposed structure, and proposed roadway and grading. The 3D bridge and roadway models are being used directly for plan development, quantities, and reinforcement detailing and scheduling; a 100% bridge plan set has been completed. Benefits, challenges, and lessons learned from both the owner and consultant perspective are discussed.

IBC 22-77: Rehabilitation of Decks in Post-Tensioned Box-Girder Bridges
Time: 2:00 PM

Philippe Kalmogo, Ph.D., P.E., University of New Hampshire, Durham, NH; Nayana Sreekumar, Sri Sritharan, and Charly Sikorsky, Iowa State University, Ames, IA
This paper investigates the effects of full and partial deck removal/replacement in post-tensioned girder bridges (PTBG) and their short- and long-term behavior using analytical models representing different types of as-built PTBG bridges from California. In addition to showing the significant benefits of partial over full deck replacement in terms of limiting the short- and long-term deflections and stresses, the paper will discuss the benefits of using UHPC for deck rehabilitation in PTBG bridges.

IBC 22-78: Launching Summit 8 Over Little Cuyahoga River - Analytical Modeling
Time: 2:30 PM

Lawrence Rolwes, Jr., HNTB, Arlington, VA; Paul Papazisi, HNTB, Chicago, IL
Launching is an ideal erection scheme for long span steel structures spanning terrain that discourages the use of traditional methods. The new northbound and southbound structures carrying Summit 8 stretch a total length of about 1600 feet over Little Cuyahoga River and multiple railroad tracks near Akron, OH. The steel girder system was evaluated using 3D FE modeling techniques in CSi Bridge and LARSA 4D to simulate critical load conditions throughout the proposed launching scheme.

BRIDGE PROGRAM MANAGEMENT
ROOM 304/305

Session Chair: W. Jay Rohleder, Jr., P.E. S.E., FIGG, Exton, PA
Time: 3:30 PM - 4:00 PM

IBC 22-79: The Importance of a Well-Thought-Out Bridge Management Plan for Individual Bridges
Time: 3:30 PM

Ashley Grzybowski, P.E., Minnesota DOT, Oakdale, MN; Paul Kivisto, P.E., WSB Engineering, Minneapolis, MN
This paper describes how the Minnesota Department of Transportation (MnDOT) has prepared Bridge Management Plans for several individual bridges to enable decision makers to consider appropriate levels of preventative maintenance, preservation, rehabilitation, and historical preservation of their bridges. This approach differs from network level Bridge Management Systems in that project specific constraints are identified but draws on experiences learned from Bridge Management Systems (BMS) including deterioration models, cost models, and user costs.

RAILROAD AND TRANSIT BRIDGE MANAGEMENT
ROOM 304/305

Session Chair: W. Jay Rohleder, Jr., P.E. S.E., FIGG, Exton, PA
Time: 4:00 PM - 4:30 PM

IBC 22-80: CSX 59th Street Terminal Bridge Program: Extending the Service Life of an Elevated Terminal
Time: 4:00 PM

Matthew David Santeford, P.E., S.E., TranSystems, Schaumburg, IL
The CSX 59th Street Terminal is a 150 acre intermodal facility on an elevated rail yard that was built in 1913. The Bridge Program focuses on restoring the original load-carrying capacity to the 100+ year old bridge, which includes planning, inspection, load rating, design and management, in order to extended the service life of the infrastructure at the terminal.

WEDNESDAY, JULY 20, 2022

CONSTRUCTION
ROOM 304/305

Session Chair: W. Jay Rohleder, Jr., P.E. S.E., FIGG, Exton, PA
Time: 4:30 PM - 5:00 PM

IBC 22-81: Replacement of the TRRA Merchants Bridge Truss - Face Lift for a 120 year old bridge
Time: 4:30 PM

Josh Sakumura Crain, P.E., S.E., Genesis Structures, Kansas City, MO; Robert Neville, Walsh Construction; Matt Boben, Mammoet Americas Holding

The Terminal Railroad Association of St. Louis' (TRRA) Merchants' Bridge is a railroad gateway between Missouri and Illinois crossing the Mississippi River near downtown St Louis. Along with modifications to the existing approach structures, the project is highlighted by the replacement of the three original 4 million pound 517-foot pin-connected simple span main trusses and reinforcement of the limestone and granite masonry main river piers completed in 1890. The original twin-track truss spans are replaced with three 9 million pound twin-track ballasted trusses. This presentation will focus on the accelerated bridge construction methods used on the project, most notably the assembly of the new trusses on a floating plant on the river and the gantry system and temporary foundations utilized for the removal of the existing trusses and installation of the new trusses. We will contrast the construction techniques between the original structures with that of the new structure. The presentation will also highlight the preparatory coordination and planning required for the successful truss replacement occurring within a 10-day track outage involving the TRRA, their Designers (TranSystems and Burns & McDonnell), river navigation entities, Prime Contractor (Walsh Construction), Heavy Lift Contractor (Mammoet) and Erection Engineer (Genesis Structures).

INSPECTION & ANALYSIS
ROOM 306/307

Session Chair: Michael Cuddy, P.E., TranSystems,
Time: 1:30 PM - 4:30 PM

IBC 22-82: Evaluation of Cast-In-Place Open Spandrel Concrete Arch Bridges: Four Case Studies
Time: 1:30 PM

Daniel Baxter, P.E., S.E. and Ally Willoughby, P.E., Michael Baker International, Minneapolis, MN; Grace Shen, P.E., Michael Baker International , Virginia Beach, VA

Open spandrel concrete arch bridges from the first half of the 20th century can be challenging to evaluate for load rating and preservation purposes. Concrete reinforcing areas used in the spandrel columns and floorbeams of these structures will often not provide sufficient capacity for current vehicular loadings when capacity is computed using conventional analysis techniques. Additionally, non-standard details such as embedded steel Melan trusses may be present in the arch ribs. This presentation will provide case studies of the evaluation of four open spandrel concrete arch bridges constructed from the 1910s through the 1930s, describing techniques such as moment-curvature analysis that were used to obtain reasonable load ratings and to guide rehabilitation and preservation decisions for these structures. These bridges include the 3rd Ave. Bridge in Minneapolis, MN, Bridge 5133 in Redwood Falls, MN, US 29 over the Pacolet River in Spartanburg SC, and S-13-823 over the Lynches River in Chesterfield, SC.

IBC 22-83: Evaluating Steel Bridge Details for Susceptibility to Constraint-Induced Fracture
Time: 2:00 PM

Domenic Coletti, P.E., HDR, Raleigh, NC

Historically, reports of significant problems associated with details featuring intersecting welds in steel bridges have been rare. However, there have been several notable cases involving constraint-induced fracture (CIF). CIF is a particular concern since it can occur in a brittle fashion, suddenly and without warning (different from other types of problems such as corrosion or fatigue crack growth). CIF generally occurs in details that feature a high degree of constraint (leading to a high level of stress triaxiality), in combination with high levels of tensile stress (particularly from residual stresses) and a notch-like or crack-like planar discontinuity approximately perpendicular to the primary flow of tensile stress. Details subject to a high degree of constraint often feature the intersection of two or three welded structural elements and distinguishing between "intersecting welds" and "constraint resulting from the intersection of welded structural elements" is important in evaluating susceptibility to CIF. This paper summarizes the findings of a recently completed report on the current state of knowledge about constraint-induced fracture (CIF) in steel bridges. The report is based on a review of previous research, industry practices, and the input of a panel of steel-bridge industry experts. It provides a review of the fundamental principles of CIF and presents a general procedure that can be used to evaluate steel bridge details for susceptibility to CIF, with example assessments of commonly used steel bridge details.

IBC 22-84: Inspection of the World's Longest Moveable Span, Ford Island Bridge, Pearl Harbor-Hickam, Hawaii
Time: 2:30 PM

Amanda Schindhelm, P.E., Kyle Morrow, P.E., and John Loftus, P.E., Marine Solutions, Rosedale, MD; Anne Marie Prieto, P.E., Naval Facilities Engineering and Expeditionary Warfare Center, Washington Navy Yard, DC

The Ford Island Bridge in Honolulu, Hawaii is the world's longest moveable span. The floating moveable span retracts beneath the approach spans to open this important navigable waterway for the US Navy. The moveable section consists of a cellular concrete box pontoon and fracture critical steel transition spans. This paper provides a description of the bridge structure and discusses the specialized inspection techniques and maintenance challenges due to its unique design and sensitive location.

IBC 22-85: Retrofits in Twin Tub Girder Bridges for System-level Redundancy
Time: 3:30 PM

Francisco Javier Bonachera Martin, Ph.D., P.E., Michael Baker International, Indianapolis, IN

Due to the perceived risk of fracture critical members (FCM) in steel bridges, hands-on inspection cycles are mandated, resulting in high maintenance costs. This presentation describes the redundancy evaluation of three twin tub girder bridges with FCM designations. Several failure scenarios of primary members are considered using refined finite element analysis of each

structure to determine if fractures result in collapse or loss of serviceability of the bridge. The analysis follows the AASHTO Guide Specifications for Analysis and Identification of Fracture Critical Members and System Redundant Members. Based on the outcomes of these analyses, the feasibility of retrofit alternatives is assessed with the purpose of reclassifying FCMs as system redundant members (SRMs) and preclude hands-on inspection requirements.

IBC 22-86: Bridge Life Cycle Cost Savings Through Inspectability Design
Time: 4:00 PM

Jennifer Laning, P.E., Pennoni Associates, Baltimore, MD
Standard practice during bridge design and construction is to consider the biddability of the construction documents, the constructability of the design and the operability of the asset. Quite often, designers do not consider the inspectability of the bridge over its life cycle. Inspection, required by law on a 24-month cycle at a maximum, presents the bridge owner with costs: labor, equipment expenses, travel impacts, and safety. These costs, especially for complex bridges, signature structures and high level river crossings, can be reduced if inspectability is included in design. This paper will look at the impacts of inspectability on bridge inspection planning and execution and discuss various inspectability challenges and potential solutions.

W09: ENGINEERING FOR STRUCTURAL STABILITY IN BRIDGE CONSTRUCTION
ROOM 315/316

Time: 1:30 PM – 5:00 PM

Brandon Chavel, Ph.D., P.E., Michael Baker International, Cleveland, OH; Francesco M. Russo, Ph.D., P.E., Russo Structural Services, Philadelphia, PA; Brian M. Kozy, Ph.D., P.E., Michael Baker International, Baltimore, MD
Room: 315/316

Participants will gain a better understanding of the behavior of steel and concrete girder bridges during construction and be able to identify vulnerabilities and engineering methods than can be used to investigate the structure's strength and stability at each critical stage of construction.

Starting with basic structural stability principles, workshop attendees will be introduced to stability analysis methods and how they should be applied to properly engineer a bridge erection plan. The role of both permanent and temporary bracing in achieving structural stability will be addressed, and methods for bracing design presented. Behavior and design considerations for construction phases are provided through presentation of case studies and guided walk-through examples.

During bridge erection, the member support conditions, loads, stresses, strength, and stability are affected by the erection practices such as lifting, installation of bracing, bearing conditions, temporary supports, and placing sequence. Workshop attendees will learn how loads during construction differ from final design conditions and appropriate methods to compute and apply those loads, as well as equations for checking member conditions during erection will be included.

The workshop will be based on key takeaways from the National Highway Institute's FHWA-NHI-130102, Engineering for Structural Stability in Bridge Construction, for which the IBC Workshop presenters are approved instructors.

W10: INNOVATIONS WORKSHOP (VARIOUS PRESENTERS)
ROOM 310/311

Time: 1:30 PM – 5:00 PM

Preparing for the Future of Automated Bridge Construction
Carson Carney, P.E., Advanced Construction Robotics, Allison Park, PA
The construction market is rapidly evolving as advanced technology permeates onto jobsites. The industry is talking about the 4th industrial revolution but the stark reality is that few are prepared to embrace it. Come learn about real life robots that are currently deployed on projects today automating valuable physical work. We will discuss how to successfully identify, plan, execute and evaluate pilot programs for these existing technologies as well as those that don't currently exist.

Benefits of Using F3148 Fixed Spline Bolts and the Combined Method for Bridge Building
Jeff Greene, LeJeune Bolt Company, Burnsville, MN
In this section you will learn about the advantages of using ASTM F3148 TNA Fixed-Spline Bolt Assemblies and the Combined Method of installation in bridge applications. Learn how TNA will improve overall bolting quality while saving time and money. The TNA Fastening System is ideally suited where single sided installation is preferred including steel tub, box, and large plate girder designs. You will leave this workshop with the knowledge to specify F3148 for future projects.

Corrosion Resistant Reinforcement
Mike Stroia, Commercial Metals Company, Catoosa, OK
Discuss the design and specification strategies, and the research initiatives to compare corrosive resilient coatings in reinforced concrete.

- Discover the long-term proven principles to protect steel and the evolution of the corrosion resistant reinforcement performance in concrete.
- Distinguish reasons design professionals should specify corrosion resistant reinforcement rebar (protection, durability, longevity, availability, constructability, sustainability, etc)
- Identify the environmental and preservation contributions of corrosion resistant reinforcement rebar toward the goals of sustainable development while reducing economic demand.

WEDNESDAY, JULY 20, 2022

NON-DESTRUCTIVE
ROOM 306/307

Session Chair: Michael Cuddy, P.E., TranSystems, Philadelphia, PA

Time: 4:30 PM - 5:00 PM

IBC 22-87: Investigation of Ground-Penetrating Radar, Impact Echo, and Infrared Thermography Methods to Detect Defects in Concrete Bridge Decks

Time: 4:30 PM

Zachary Coleman and Anton Schindler, Ph.D., Auburn University, Auburn, AL

Reinforced concrete bridge decks are often at risk of many forms of deterioration that impact bridge deck service life. Nondestructive test (NDT) methods have seen increasing use by departments of transportation to locate deterioration in bridge decks before the deterioration becomes significantly severe and to help prioritize maintenance activities. Nonetheless, uncertainty in what forms of bridge deck deterioration each NDT method can identify has posed challenges in effectively deploying NDT methods for deck condition assessments. Thus, in this study, a full-scale 18 ft by 31 ft reinforced concrete bridge was constructed with defects in the deck simulating reinforcing steel corrosion, delaminations, concrete deterioration, voids, and poorly constructed concrete. The deck was evaluated with ground-penetrating radar (GPR), infrared thermography (IRT), and impact echo (IE) nondestructive technologies to evaluate their efficacy to detect defects. Receiver operator characteristic analysis was conducted to quantify the capability of these NDT methods to detect a particular defect. While GPR could not detect defects below the top reinforcing bar, it was able to detect environments of active chloride-induced corrosion in bridge decks. However, corroded reinforcement may only be identified with GPR if the corrosive environment is sufficiently severe. Surface staining (e.g. oil) or other features that significantly affect the deck emissivity can cause significant surface temperature differentials which may lead to false IRT predictions of deck condition. Based on the data analyzed and the methods evaluated, it is concluded that impact echo is the most reliable NDT method to implement to detect bridge deck

EXHIBITORS

Accolade Measurement Ltd.

Booth #: 222
Contact: Emily Hydes
Phone: 07703398113
E-mail: emily.h@accolademeasure.co.uk
Website: www.accolademeasure.co.uk
Accolade Measurement Ltd is a specialist engineering company delivering accurate and cost-effective solutions in static and dynamic load testing, instrumentation and movement monitoring of structures, (as well as vehicles and mechanisms). Our novel analytics-driven solution for end-to-end asset monitoring is a market leading way to manage structures and their risks. Lifespan maximisation and maintenance cost minimisation are underpinned by AI through deep analytics enabling future displacement forecasting, real-time rapid failure detection and more. Please contact us to understand how we can work with you.

Acrow Bridge

Booth #: 103
Contact: Bob Rose
Phone: 973-244-0080
E-mail: brose@acrow.com
Website: www.acrow.com
A full-service design and engineering firm, Acrow has been serving the transportation and construction industries for more than

70 years with a wide range of modular steel bridging solutions for permanent, temporary, military and emergency use. Designed and manufactured in the United States to the highest quality assurance standards in the world, Acrow's versatile modular technology is engineered to accommodate a wide range of customizable lengths, widths and loads, and hot-dip zinc galvanized, offering a service life of more than 100 years.

Acrow's extensive international presence includes leadership in the development and implementation of bridge infrastructure projects in over 150 countries worldwide, across Africa, Asia, the Americas, Europe and the Middle East. Whether your project requires a permanent solution to improve connectivity or a temporary detour rental solution for accelerated bridge construction, Acrow can connect you to the right solution, anywhere in the world. For more information, please visit www.acrow.com

AECOM

Booth #: 302
Contact: Cheryl Surdick
Phone: 412-316-3514
E-mail: cheryl.surdick@aecom.com
Website: www.aecom.com
AECOM is the world's trusted infrastructure consulting firm, delivering professional services throughout the project lifecycle – from planning, design and engineering to program and construction management. Our complex bridge experts are driven by a common purpose to deliver a better world through our unrivaled technical expertise and innovation, and a commitment to environmental, social and governance priorities. See how we are delivering sustainable legacies for generations to come at aecom.com and @AECOM.

AIT Composites

Booth #: 724
Contact: Luke Peabody
Phone: 207-215-4429
E-mail: luke@aitcomposites.com
Website: www.aitcomposites.com
AIT Composites is a leading provider of composite solutions for the infrastructure and construction industry. AIT specializes in composite bridge systems, concrete and structural reinforcement products, such as the GBar (frp rebar) and GWall (frp sheetpiling), and engineering services, with continuous research and development in collaboration with University of Maine's Advanced Structures & Composites Center.

ALLPLAN

Booth #: 218
Contact: David Loughery
Phone: 215-527-1449
E-mail: dloughery@allplan.com
Website: www.allplan.com/us_en
ALLPLAN is a global provider of BIM design software for the AEC industry. True to our "Design to Build" claim, we cover the entire process from the first concept to final detailed design for the construction site and for prefabrication. Allplan users create deliverables of the highest quality and level of detail thanks to lean workflows. ALLPLAN offers powerful integrated cloud technology to support interdisciplinary collaboration on building and civil engineering projects.

American Segmental Bridge Institute

Booth #: 116
Contact: Gregg Freeby
Phone: 512-523-8214
E-mail: info@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 UnderBridge

Booth #: 211
Contact: Chet Allen
Phone: 724-321-1514
E-mail: chet@andersonunderbridge.com
Website: www.andersonunderbridge.com
Anderson UnderBridge is the manufacturer, renter and provider of the Hydra Platform for safe and fast under bridge access to inspect, maintain, and repair our nation's bridges.

Our national, diverse rental fleets include hydra platforms and articulating boom vehicles to meet the needs of all bridge types. Please visit us at AndersonUnderBridge.com or call 803-366-8195.

EXHIBITORS

BDB Bridge LLC
Booth #: 225
Contact: Joe Tocci
Phone: 610-216-9050
E-mail: jtocci@bdb-bridge.com
Website: www.bdb-bridge.com

Bentley Systems
Booth #: 106
Contact: Kelly Fox
Phone: 610-458-2810
E-mail: kelly.fox@bentley.com
Website: www.bentley.com
Bentley Systems (Nasdaq: BSY) is the infrastructure engineering software company. We provide innovative software to advance the world's infrastructure – sustaining both the global economy and environment. Our industry-leading software solutions are used by professionals, and organizations of every size, for the design, construction, and operations of roads and bridges, rail and transit, water and wastewater, public works and utilities, buildings and campuses, and industrial facilities. Our offerings include MicroStation-based applications for modeling and simulation, ProjectWise for project delivery, AssetWise for asset and network performance, and the iTwin platform for infrastructure digital twins. Bentley Systems employs more than 4,000 colleagues and generates annual revenues of more than $700 million, in 172 countries. www.bentley.com

Bridge design & engineering
Booth #: 208
Contact: Adele Humphries
Phone: 44 207 973 4625
E-mail: a.humphries@hgluk.com
Website: www.bridgeweb.com
Bridge design & engineering (Bd&e) is exclusively dedicated to the international bridge industry. This high quality, visually stunning quarterly magazine offers subscribers across all bridge engineering sectors details of latest innovations, technical features, interviews and project reports. It includes a quality website www.bridgeweb.com, e newsletter, directory, and specialist supplements. If you finance, plan, design, build, maintain, operate or own a bridge, you need Bd&e. For more information call +44 (0) 20 7973

Bridge Grid Flooring Manufacturers Association (BGFMA)
Booth #: 206
Contact: Mike Riley
Phone: 724-355-1878
E-mail: bgfma@bgfma.org
Website: www.bgfma.org
BGFMA promotes the use of steel grid bridge decking by working with project owners and their consultants to aid in proper selection of decking materials. We offer detail, design and drawing guidance to help ensure best practices are employed. Our modular products offer light-weight, high strength decking that can be installed in a fraction of the time versus other decking alternatives. Grid reinforced concrete bridge decking is a 100 year decking material for those seeking durability.

Bureau Veritas North America
Booth #: 111
Contact: Bob Busch
Phone: 412-613-9921
E-mail: robert.busch@bureauveritas.com
Website: www.bvna.com
Bureau Veritas is the largest and most qualified Transportation Infrastructure Inspection Agency in operation today and is proudly serving many state DOT's, prominent transportation engineering firms and freight and passenger railroads. We provide our clients with tailored solutions to meet their specific requirements regarding QA/QC inspection, coating inspections, Non-Destructive Testing and staff augmentation through experienced, qualified personnel and the latest technology, including Robotic NDT Services for Cable Stayed Bridges and Bridge Suspension Cables.

Buzzi Unicem USA
Booth #: 310
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 a worldwide cement company, producing Portland, oil well, masonry, and CSA cements. For rapid repairs of pavement, runway, parking deck, bridge deck, and warehouse floors we offer products allowing reopening to traffic or travel in one hour or less.

CAHill TECH Inc.
Booth #: 723
Contact: Tony Mueckl
Phone: 716-244-7093
E-mail: tony@cahillresources.com
Website: www.cahilltech.com

CAHill TECH is on a mission to change the narrative surrounding construction industry careers by delivering innovative workforce development, with a focus on the heavy construction industry, and safety training. We are WBE, DBE, DOL and OSHA certified.

Carl Stahl DecorCable
Booth #: 621
Contact: David Barger
Phone: 312-474-1100
E-mail: sales@decorcable.com
Website: www.decorcable.com
Carl Stahl DécorCable offers a vast range of stainless steel cable, rod, and mesh systems for architectural and structural use. We specialize in safety applications for pedestrian, bike and shared use bridges. Tensile engineering, statics, and 3-D modeling as well as on-site management are available. We offer many products, including X-TEND® Stainless Steel Cable Mesh, manufactured at our production facility in Woodridge, IL that conform to domestic content and Made in USA requirements.

EXHIBITORS

Cleveland Electric Labs
Booth #: 125
Contact: Rodger Shepherd
Phone: 330-697-4125
E-mail: rs@cel-atg.com
Website: www.fiberstrike.com
Turnkey provider of bridge and large structure fiber optic health monitoring systems. Offering includes project planning, assistance with sensor selection, placement, egress routing, software, installation, and commissioning. Technologies available include FBG based sensors and sensing systems as well as distributed sensing for intrusion, third party interference, and fire

Clodfelter Bridge & Structures Inc. (CBSI)
Booth #: 101/200
Contact: Jerry V. Clodfelter
Phone: 713-675-1180
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.

Commercial Metals Company - ChromX
Booth #: 210
Contact: Tom Russo
Phone: 410-456-7547
E-mail: tom.russosr@cmc.com
Website: www.cmc.com
ChromX is a high strength, corrosion resistant rebar offering more than 100 years service life. Commercial Metals Company offers a variety of corrosion resistant products in addition to ChromX including Galvabar and Epoxy coated rebar.

Contractors Materials Company
Booth #: 425
Contact: Monty Marsh
Phone: 513-516-3411
E-mail: mmarsh@cmcmmi.com
Website: www.cmcmmi.com
Contractors Materials Company is located in Cincinnati, OH and is a 115-year-old company that expanded its product mix with the start of Stainless-Steel Rebar fabrication in 2008. Currently all SSR fabrication is produced in an exclusive 70K SF modern facility in KY. We stock all the popular DOT SSR chemistries which can be produce in lengths up to 60' in #3 - #11 and provide any project with full fabrication services. We pride ourselves on being the premier fabricator and supplier of stainless-steel rebar.

Creative Composites Group
Booth #: 516
Contact: Corey Sechler
Phone: 814-839-4186
E-mail: llocke@pultrude.com
Website: www.creativecompositesgroup.com
Creative Composites Group provides fiber reinforced polymer (FRP) products for infrastructure application including bridges, waterfront and rail platforms. CCG designs and manufactures prefabricated structures that accelerate construction and reduce onsite costs. Bridge products include lightweight decking, truss pedestrian bridges, and cantilever sidewalks. To protect waterway structures, fender systems include pipe piles for superior energy absorption, wales, splices and walkways. CCG's engineered solutions are resilient, sustainable, long lasting, and require minimal maintenance.

CTS Cement Manufacturing Corporation
Booth #: 110
Contact: Chris Davis
Phone: 973-568-3134
E-mail: cdavis@ctscement.com
Website: www.ctscement.com
CTS Cement Manufacturing Corp manufactures Rapid Set Concrete products. They are high strength, low shrinkage, and fast setting for use in structures when time is a factor.

D.S. Brown
Booth #: 114
Contact: Chris Youngless
Phone: 419-257-3561
E-mail: dsb@dsbrown.com
Website: www.dsbrown.com
D.S. Brown has designed and engineered structural movement, protection and repair solutions for the world's bridges, highways and airfields for more than 130 years. It's that experience that helps us to understand the many evolving challenges of today's infrastructure markets. As a fully integrated manufacturer, all D.S. Brown processes are controlled and performed internally to ensure quality standards for every product.

Decision Optimization Technology-US, L.P. (DOT-US)
Booth #: 619
Contact: Erin Calcari
Phone: 217-502-4160
E-mail: ecalcari@hanson-inc.com
Website: www.bettercapitalplanning.com
DOT-US's mission is to provide high quality decision support tools and consulting engineering services. By delivering a combination of these in one package, DOT-US is focused on assisting clients with the management of infrastructure asset lifecycles, creating actionable plans, and helping you do more with less. We have built a reputation for high level client service, quality work, and prioritizing solutions that improve the quality of life in the communities where we live and work.

EXHIBITORS

Dynamic Isolation Systems, Inc.

Booth #: 517
Contact: Riley Berk
Phone: 775-842-0827
E-mail: saloni@dis-inc.com
Website: www.dis-inc.com
Dynamic Isolation Systems, Inc. (DIS) has been the global pioneer in the engineering, manufacturing and distribution of seismic protection technology. Our engineers provide technical support and parameters for structural modeling as well as, feasibility studies, budget development, testing protocols and value engineering. Our markets include Transportation, ER Centers, Data Centers, Health Care, Wharves, Defense, Energy, Hydroelectric and others. Our systems are 100 % manufactured in the United States and include Lead Rubber Bearings (LRB's), Viscous Wall Dampers (VWD's) and Low Mass Isolators for non-structural applications. DIS has provided over 26,000 isolators for more than 500 bridges and buildings worldwide and some of our most notable projects include the iconic Golden Gate Bridge, San Francisco City Hall and the 1.7 million square-foot Tan Tzu Medical

Dyson Corp.

Booth #: 101/200
Contact: Chip Harman
Phone: 800-680-3600
E-mail: sales@dysoncorp.com
Website: www.dysoncorp.com
Dyson Corp is a manufacturer of large specialty fasteners and forgings used primarily in the Military Marine, Oil & Gas,

Renewable Energy, Heavy Construction, Hydropower, and other Infrastructure industries. Our products are produced to ASME, MIL, ANSI, SAE, DIN, and customer specific standards from domestically poured/DFARS compliant raw materials. Dyson is an ISO 9001:2015 certified ITAR compliant manufacturer. Dyson Corp was founded in a small forge shop in Cleveland, OH and has been Holding America Together Since 1884!

DYWIDAG

Booth #: 104
Contact: Jill Gantos
Phone: 616-690-2169
E-mail: Jill.Gantos@DYWIDAG.com
Website: www.dywidag.com
From the steel in our first reinforced bridge in 1903, to railway sensors, we work with government authorities, asset owners, construction companies, and design offices to support their infrastructure projects across many sectors, including dams, bridges, and slope stabilization. Our systems are found in iconic projects such as the Golden Gate Bridge, and Panama Canal. We specialize in repair and maintenance, infrastructure health monitoring, and robotic inspection for every bridge life phase.

We specialize in repair and maintenance, Infrastructure health monitoring schemes, and robotic inspection for every bridge life phase. Lifespan management solutions enable us to detect defects before they turn into critical problems and before complex and expensive repairs.

ECS Mid-Atlantic LLC

Booth #: 622
Contact: Kelly Clawson
Phone: 571-251-0866
E-mail: kclawson@ecslimited.com
Website: www.ecslimited.com
Founded in 1988, Engineering Consulting Services (ECS) started as a firm with a mission to raise the standard of professional services. From the beginning, we have recognized responsiveness, quality, and accountability as the baseline expectations of our profession. Our goal was never satisfaction, our goal has always been "wow!" Because of this deep belief in developing the people, systems and expertise to focus on our client's needs, our company growth spans multiple industry sectors and disciplines. Today, we are national leaders in the geotechnical, construction materials, environmental and facilities engineering fields - with the ability to assist our clients across the entire project lifecycle. Our staff of over 2,000 team members is spread across 80+ offices and testing facilities in the Mid- Atlantic, Midwest, Southeast and Southwest.

Epoxy Interest Group of CRSI

Booth #: 309
Contact: Peter Fosnough
Phone: 630-380-5876
E-mail: pfosnough@epoxy.crsi.org
Website: www.epoxyinterestgroup.org/
EIG of CRSI is a trade association providing an authoritative resource for information related to use of epoxy-coated steel in reinforced concrete. EIG serves the needs of specifiers, engineers, architects, fabricators and end-users with the most recent information about how and where epoxy-coated reinforcing steel is used, as well as recent technical changes, educational seminars and promotional activities.

Eriksson Software, Inc.

Booth #: 105
Contact: Brian Barngrover, P.E.
Phone: 813-989-3317
E-mail: info@erikssonsoftware.com
Website: www.eriktech.com
Eriksson Software is an engineering software firm providing design and analysis solutions for precast/ prestressed concrete

FATZER AG

Booth #: 122
Contact: Malte Kabelitz
Phone: +41797327014
E-mail: malte.kabelitz@fatzer.com
Website: www.fatzer.com

FPT Infrastructure

Booth #: 519
Contact: Marcy Ream
Phone: 336-789-7259
E-mail: info@fptinfrastructure.com
Website: fptinfrastructure.com
FPT Infrastructure manufactures and markets a portfolio of integrated solutions that expertly restore existing structures and maximizes the life of new construction. Serving bridge and

highway, rail, aviation, transit, water and power market segments, FPT Infrastructure supports, fills, coats, reinforces, seals, and protects the vital infrastructure that moves and connects us.

Freyssinet, Inc.

Booth #: 722
Contact: Drew Micklus
Phone: 703-378-2500
E-mail: drew.micklus@freyssinetusa.com
Website: www.freyssinetusa.com
Freyssinet, Inc. has been at the forefront of providing specialized civil engineering technology, material supply and installation for projects large and small. Originally a specialist in post-tensioning, Freyssinet has successfully expanded its portfolio of products and services into staycables, structural cables, bearings, joints seismic devices, repair, protection and strengthening of structures. We specialize in diagnostic survey, repair, refurbishment, bridge bearings and cathodic protection of reinforced concrete in the building, civil and marine sectors. Freyssinet operates as principal contractor, specialist subcontractor and supplier throughout the United States. Freyssinet is able to support the full product and services range with an in-house engineering design-team. Clients include major and specialist contractors, state DOT's, Local Authorities, and developers. Our office is located in Sterling, VA.

Greenman-Pedersen, Inc. (GPI)

Booth #: 205
Contact: Eric Thorkildsen
Phone: 518-898-9550
E-mail: ethorkildsen@gpinet.com
Website: www.gpinet.com
With a staff of over 1,700 employees in over 55 offices nationwide, Greenman-Pedersen, Inc. (GPI) is an award-winning, multi-discipline engineering firm that has been providing professional design, architecture, planning and construction management/inspection services to all levels of government and industry throughout the United States. Since our founding in 1966, GPI has relied upon the reputation and combined experience of our officers and staff to successfully handle projects ranging in size and complexity, some with individual budgets in excess of a billion dollars. We are nationally ranked in the Engineering News Record as one of the Top 60 design firms.

GRL Engineers, Inc.

Booth #: 618
Contact: Ben White
Phone: 216-831-6131
E-mail: info@grlengineers.com
Website: www.grlengineers.com
GRL Engineers, Inc., headquartered in Cleveland, OH, and with 14 offices nationwide, services land based, near shore marine, and offshore deep foundations projects utilizing Dynamic Load Testing; Foundation Integrity Evaluation (Cross Hole Sonic Logging, Pulse Echo Integrity Testing and Thermal Integrity Profiling); Pile Driving Monitoring (including remote monitoring); Wave Equation Analysis (GRLWEAP); Evaluation of shaft profile, verticality and cleanliness, Evaluation of Existing Unknown Foundations, SPT Hammer Performance Analysis, and more.

GWY, LLC

Booth #: 417
Contact: Donald Laro
Phone: 888-838-6500
E-mail: dlaro@gwyinc.com
Website: www.gwyinc.com
Since our beginning in 1975, GWY has been the global leader in providing bolt installation tools for bridges, buildings, and large-scale industrial products. From day one, we have given top priority to customer service, focusing on building lasting relationships and long-term value beyond the products offered. Founded as TC Bolt Corporation by Gene and Gwynne Mitchell, the business is now in its second generation of leadership.

Harcon Corporation

Booth #: 203
Contact: Carolyn Miller
Phone: 717-687-9294
E-mail: info@harconcorp.com
Website: www.harconcorp.com
Harcon provides bridge access services for bridge analysis and maintenance to meet the National Bridge Inspection Standards and ensure public safety. Stop by our booth and discover how Harcon's unique methods and exceptional equipment are changing the way America inspects bridges. Visit us online and see our equipment in action at harconcorp.com.

HNTB

Booth #: 720
Contact: Dan Kucz
Phone: 610-290-5143
E-mail: dkucz@hntb.com
Website: www.hntb.com
For 108 years, HNTB Corporation (HNTB) has helped create infrastructure for our state transportation, rail/transit, toll and aviation clients that best meets the unique demands of its environment. With client relationships spanning decades, we understand infrastructure life cycles and have the perspective to solve technical challenges with clarity and imagination. We see and help address far-reaching issues of financing, legislation, design, construction, community outreach and ongoing operations. As employee-owners committed to the highest levels of performance, we enable clients to achieve their visions and goals.HNTB is an employee-owned firm with more than 5,000 professional, administrative and technical staff located in 70 offices across the country. Constant attention to technical excellence and expanding opportunities have resulted in steady, diverse growth for HNTB since its establishment in 1914. Each office serves local client needs and draws upon the combined experience of the entire organization. This decentralized management structure enables HNTB to retain a personal relationship with its clients, yet assures adequate staffing and the most advanced solutions to project challenges.

EXHIBITORS

Houston Structures, Inc.
Booth #: 521
Contact: Marsh Gray
Phone: 503-982-9779
E-mail: marsh.gray@ulvencompanies.com
Website: www.ulvencompanies.com
Since 1996 Houston Structures Inc. has supplied architectural design firms, engineer of records, and prime contractors with world-class service & solutions for the infrastructure industry. Houston Structures Inc. is an ISO9001:2015 certified company, and provides cast, forged, machined, and fabricated support products for the bridge industry, guy-wired structures, dams, infrastructure, and specialized projects. We look forward to being your strategic partner.

HRV Conformance Verification Associates, Inc.
Booth #: 304
Contact: Betsy Wehner
Phone: 412-299-2000
E-mail: bwehner@hrvinc.com
Website: www.hrvinc.com
Leading experts in materials QA/QC inspection, coatings inspection, nondestructive testing, and construction management/ inspection focused on transportation, rail & transit, oil & gas, power, commercial, and water/wastewater markets. We excel by maintaining high standards of technical training, leveraging deep industry knowledge and experience, and applying innovative technologies. Our resume on large, complex projects includes the new Governor Mario M. Cuomo Bridge, the Goethals Bridge, and the Verrazano-Narrows Bridge. We are Quality. Assured.

Hydro Technologies Inc. / Modified Concrete Suppliers
Booth #: 124
Contact: Edward Liberati
Phone: 502-693-3253
E-mail: eliberati@hughesgrp.com
Website: www.hydro-technologies.com
Due to current labor shortages, silica fume safety requirements and with bridge projects needing to be done faster than ever , we all need to PUT AWAY THE JACKHAMMERS. Hydro-Technologies, Inc has been providing hydrodemolition services, which replaces the need for jackhammers, to DOT's throughout the United States for over 40 years. Our sister company, Modified Concrete Suppliers LLC, has been providing Latex Modified Concrete materials to DOT's for over 50 years. No other bridge deck material has been used longer or more often than Latex Modified Concrete.

HYTORC
Booth #: 525
Contact: Susan Stewart
Phone: 201-512-9500
E-mail: sstewart@hytorc.com
Website: www.hytorc.com

Indiana DOT
Booth #: East Atrium
Contact: Anne Rearick
Phone: 317-946-3373
E-mail: arearick@indot.in.gov
Website: www.in.gov/indot
Over the past 100 years, INDOT has transformed the state of Indiana into the Crossroads of America by working to collaboratively plan, build, and maintain safe and innovative transportation infrastructure that enhances quality of life, drives economic growth, and accommodates new modes of transport.

Informed Infrastructure
Booth #: 321
Contact: Kevin Carmody
Phone: 312-771-9818
E-mail: kcarmody@v1-media.com
Website: www.informedinfrastructure.com
INFORMED INFRASTRUCTURE is the leading media outlet for civil and structural engineers. We reach 40,000 readers via our magazine, weekly eNewsletter, web site, video content, surveys and our industry leading continuing education platform.

InQuik Bridging Systems
Booth #: 217/316
Contact: Logan Mullaney
Phone: 866-249-9661
E-mail: Inquiries@inquikbridge.com
Website: www.inquik.com.au
The International Award winning InQuik Bridge System, is a modular reinforced concrete bridge system, however very different from typical bridge systems. The Patented InQuik System is the only Cast On-site ABC System, where it uses pre-fabricated, pre-engineered and certified components that have the formwork and reinforcement, however no concrete. These components are self supporting and are simply transported to site, easily lifted into position and filled with concrete with limited skills. This revolutionary system has been used on over 150 projects and is now available in the USA!

International Road Dynamics
Booth #: 319
Contact: Tom Der
Phone: 306-653-6600
E-mail: info@irdinc.com
Website: www.irdinc.com
IRD (International Road Dynamics Inc.) is a multi-discipline, technology company with the expertise to integrate complementary ITS (Intelligent Transportation Systems) technologies into systems designed to solve unique and challenging transportation problems. IRD is the one source company that can offer multi-systems solutions by integrating a number of different technologies to the desired functionality.

EXHIBITORS

KCI Technologies, Inc.

Booth #: 423
Contact: Dierdre Crowl
Phone: 410-596-1640
E-mail: dierdre.crowl@kci.com
Website: www.kci.com
KCI is a 100-percent employee-owned engineering, planning and construction firm serving clients throughout the United States. Our multi-disciplined service offerings allow us to provide exceptional turnkey expertise to federal, state and local government agencies, as well as institutional and private-sector clients. Operating out of more than 55 offices in 20 states and the District of Columbia, our incredible team of more than 1,900 professionals offers technical expertise in transportation, resource management, environmental, telecommunications, utilities, facilities, and construction.

Klaas Coatings North America

Booth #: 216
Contact: Richard Taylor
Phone: 866-317-3633
E-mail: info@klaascoatings-northamerica.com
Website: www.klaascoatings-northamerica.com
Manufacturer of Si-Rex03 Silicone Resin Emulsion Paint (SREP) coating system for concrete and masonry substrates. Active water repellency yet highly breathable protective coating with lasting durability to extend infrastructure service life. Proven protection against weathering and resilience to UV exposure in all climatic conditions including freeze/thaw. Wide range of colors using only inorganic pigments for optimal fade resistance. Approved Product with Colorado, New York State, Pennsylvania, Texas, West Virginia DOTs and Authorities. AASHTO NTPEP Concrete Coating Systems (CCS) evaluated.

KTA-Tator, Inc.

Booth #: 323
Contact: Chaz Sztroin
Phone: 800-245-6379
E-mail: csztroin@kta.com
Website: www.kta.com
KTA-Tator, Inc. was the first Coating Inspection Firm qualified under SSPC QP-5. KTA employs over 150 NACE Certified Inspectors and 70 CWI inspectors across the globe. In addition to our coating inspection services, KTA offers cathodic protection inspection, NDT, coating assessments, laboratory testing, failure analysis, EH&S services, instrument sales, and

LARSA, Inc.

Booth #: 202
Contact: John Horner
Phone: 1-800-LARSA-01
E-mail: info@larsa4d.com
Website: www.larsa4d.cm
LARSA 4D provides unrivaled solutions for the design and analysis of steel girder, cable-stayed, precast, segmental, rail, and other bridge forms within a single environment. LARSA's flagship product, 4D BRIDGE PLUS, is the most trusted software for complex bridge leaders requiring advanced time-dependent staged construction analysis integrated with geometric and material nonlinearity.

LeJeune Bolt Company

Booth #: 123
Contact: Jeff Greene
Phone: 952-890-7700
E-mail: jgreene@lejeunebolt.com
Website: www.lejeunebolt.com
LeJeune Bolt is the leading international supplier of structural fasteners and tools and your source for ASTM F3148 TNA Fastening System. With the approval of the Combined Method of installation in the 2020 edition of RCSC "Specification for Structural Joints Using High-Strength Bolts" F3148 TNA Bolt Assemblies and Torque & Angle installation can be specified knowing industry approvals are complete. Contact LeJeune Bolt Company to learn more about how our TNA Fastening System provides improved efficiency, quality control, and cost savings for your next project.

Luna Innovations

Booth #: 118
Contact: Larry Vicari
Phone: 540-552-5128
E-mail: marketingteam@lunainc.com
Website: www.lunainc.com

LUSAS

Booth #: 209
Contact: Terry Cakebread
Phone: 646-732-7774
E-mail: terry.cakebread@lusas.com
Website: www.lusas.com
For nearly 40 years, LUSAS has helped its clients analyze and design all types of bridge and other infrastructure projects. Proven on some of the world's most iconic structures, our innovative, flexible and trusted software solution can satisfy the increasingly complex and demanding needs of clients. Our technical support is regularly cited as "best in class," and our consultancy services offer advanced technology capability through partnership.

mageba North America Corp.

Booth #: 717
Contact: Gian Reto Moor
Phone: 646-872-7764
E-mail: gmoor@mageba-group.com
Website: www.mageba-group.com

Manam Applications

Booth #: 624
Contact: Rafe lmagor
Phone: +972548163301
E-mail: rafea@manamapps.com
Website: www.manamapps.com
Founded by civil engineers and software experts; Manam offers a user-friendly, all-in-one digital managing platform for bridge inspection professionals, helping them to work smart and efficiently in a digital world. Manam 3DBIA SaaS platform is an online web platform developed in the last 4 years for visual inspections of infrastructure and construction. The system provides intuitive secured online tools to manage assets, allocate surveys to inspections firms, analyze and report on inspection data. Manam Verticles cover, roads, Bridges, buildings, solar farms, communication towers and other complex infrastructure.

EXHIBITORS

Marine Solutions, Inc.
Booth #: 112
Contact: Blair Flowers
Phone: 859-260-1055
E-mail: bflowers@msimarinesolutions.com
Website: www.MSImarinesolutions.com
Marine Solutions, Inc. is a woman-owned civil engineering and commercial diving firm specializing in underwater and topside inspection, imaging, design, repair, and construction of waterfront and bridge infrastructure. We blend the strengths of our commercial diving and marine construction experience with our engineering expertise to solve problems quickly and efficiently. We are a growing company with the capacity, the expertise, and the resources to be a dependable, responsive, innovative partner to our clients.

McDermott Light & Signal
Booth #: 221
Contact: Ryan Quick
Phone: 718-456-3606
E-mail: ryan@mcdermottlight.com
Website: www.mcdermottlight.com
McDermott makes all sorts of marine lighting for vessels and marking, at this show we are focusing on the marine lights that would be necessary for bridges and dredging work.

Michael Baker International
Booth #: 201/300
Contact: Brian Kozy
Phone: 410-689-3469
E-mail: brian.kozy@mbakerintl.com
Website: www.mbakerintl.com
Michael Baker International is a leading provider of engineering and consulting services with Practices that encompass all facets of infrastructure, including design, civil engineering, planning, architecture, environmental, construction and program management. For more than 80 years, the company has been a trusted partner to commercial clients, all branches of the military and federal, state and municipal governments, providing comprehensive services and solutions. Embracing emerging technologies and the latest innovations – like intelligent transportation and design-build project delivery, Michael Baker is an industry leader that delivers expertise and quality. The firm's more than 3,000 employees across nearly 100 locations are committed to Making a Difference for clients and communities through a culture of innovation, collaboration and technological advancement while Reimagining Michael Baker to become a full-service engineering and consulting firm over the next five years. To learn more, visit https://mbakerintl.com/conferences/supporting-the-nation-s-investment-in-infrastructure

Modjeski and Masters
Booth #: 223
Contact: Erin Bray
Phone: 717-790-9565
E-mail: erbray@modjeski.com
Website: www.modjeski.com
Modjeski and Masters is one of the world's leading bridge engineering firms, with a reputation for technical excellence and innovation that goes beyond current standards. Established more than 125 years ago, the firm is responsible for the design and maintenance of some of our nation's most recognizable structures. Services include fixed and movable bridge design, inspection and rehabilitation, and all facets of life-cycle maintenance, research and code development.

Move Solutions
Booth #: 721
Contact: Amber Brown
Phone: 412-758-0608
E-mail: amber.brown@movesolutions.it
Website: www.movesolutions.it
Move Solutions is the company for Smart Structural Health Monitoring. We offer innovative monitoring solutions for bridges, railways, construction sites, vertical structures, tunnels, and geotechnical analysis. Our sensors are all wireless, non-destructive and easy to install. Thanks to our unique devices, our Cloud Data Management Platform, which simplifies data processing and analysis, we are driving change within the world of infrastructures, redesigning the way Structural Health Monitoring can be done.

National Steel Bridge Alliance
Booth #: 204
Contact: Vin Bartucca
Phone: 857-337-7108
E-mail: bartucca@aisc.org
Website: www.aisc.org
Whether you're looking for information on improving your transportation infrastructure with structural steel or information on the construction marketplace, we have the answers you need. As we like to say, "There's always a solution in steel." Call 1.866. ASK.AISC or email solutions@aisc.org.

Northeast Work & Safety Boats LLC
Booth #: 322
Contact: Emily Casey
Phone: 860-573-6646
E-mail: ecasey@safetyboats.com
Website: www.safetyboats.com

EXHIBITORS

Nucor
Booth #: 219
Contact: Jason Lloyd
Phone: 860-941-4668
E-mail: jason.lloyd@yahoo.com
Website: www.nucorskyline.com
Nucor is North America's most diversified steel and steel products company. But we're also a team forged around a vision for leading our industry by providing unparalleled customer care, building trusted partnerships and creating sustained value.

OpenBrIM Platform
Booth #: 320
Contact: Ali Koc
Phone: 212-991-8956
E-mail: ak@openbrim.org
Website: www.openbrim.org

Pennoni
Booth #: 311
Contact: April Holloway
Phone: 410-718-3172
E-mail: aholloway@pennoni.com
Website: www.pennoni.com
As a multidisciplinary consulting engineering firm founded more than five decades ago, Pennoni approaches engineering challenges from a wider spectrum of angles than most, from land development to energy management. Our combination of talent and experience delivers results for diverse and iconic projects around the globe. To learn more, visit www.pennoni.com.

Perryman Company
Booth #: 107
Contact: Jill Adkins
Phone: 724-746-9390
E-mail: jadkins@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 aerospace, medical, infrastructure, consumer, recreation, and 3D printing/additive manufacturing markets worldwide. Perryman Company is headquartered in Houston, Pennsylvania. Company offices are located in Philadelphia, Los Angeles, London, Lagenfeld, Zurich, Tokyo, and Xi'an.

Phoenix National Laboratories
Booth #: 719
Contact: Roberta Gordon
Phone: 602-431-8887
E-mail: roberta@pnltest.com
Website: www.pnltest.com
Phoenix National Laboratories, Inc. is a full-service engineering and ISO accredited 3rd Party Quality Testing company specializing in Nondestructive and Destructive testing. We provide welding technology services, QA/QC resources, Physical/Mechanical ASTM Testing and Metallurgical analyses. We employ registered engineers in Mechanical, Civil, and Metallurgical disciplines. Our laboratory operations are located centrally in the Phoenix metropolitan area. We serve clients internationally. We offer both field and laboratory examinations to clients in the construction, manufacturing, automotive, fabrication, medical device, semiconductor, mining, power generation and petrochemical industries. Our core values: Integrity, Knowledge and Flexibility, have withstood the establishment of our operations for 28 years. Rest assured our brand is 'Loyalty to

Pickering, Corts & Summerson
Booth #: 121
Contact: John Wilhelm, P.E.
Phone: 215-968-9300
E-mail: jwilhelm@pcs-civil.com
Website: www.pcs-civil.com
Dating back over a hundred years to 1918, PCS has a notable history of performing surveying, engineering, and other related design services to communities and individuals throughout the Commonwealth of Pennsylvania and the states of New Jersey, Delaware, and New York. Our mission is to build upon this proud tradition by providing comprehensive technical expertise in a partnering environment surpassing client expectations.

Precast/Prestressed Concrete Institute (PCI)
Booth #: 308
Contact: William Nickas
Phone: 312-583-6776
E-mail: wnickas@pci.org
Website: www.pci.org
The Precast/Prestressed Concrete Institute (PCI) develops, maintains and disseminates the Body of Knowledge for the precast, prestressed concrete structures industry. PCI provides technical resources, certification, and education, as well as conducts industry events, R&D, and more.

PRECASTEEL
Booth #: 324
Contact: Gary L. Dinmore
Phone: 914-319-7779
E-mail: gdinmore@bdb-bridge.com
Website: www.precasteel.com

EXHIBITORS

ProMiles Software Development Corporation
Booth #: 422
Contact: Denise Golemb
Phone: 800-324-8588
E-mail: denise@promiles.com
Website: www.promiles.com
ProMiles Software Development Corporation (PSDC) leads in meeting the dynamic information and technology needs of the transportation industry with user-centered design and industry-driven innovations. PSDC is a leading provider of regulatory compliance software solutions, including private and public sector Oversize/Overweight (OS/OW) permitting, Automated Fuel Tax Reporting, fuel management, mapping and routing, bridge design & rating, as well as providing data and professional services.

R.J. Watson, Inc.
Booth #: 102
Contact: Marc D. Stafford
Phone: 716-531-5604
E-mail: mdstafford@rjwatson.com
Website: www.rjwatson.com
R. J. Watson designs, manufactures, and markets bridge bearings, seismic isolation devices, bridge expansion joints, bridge deck waterproofing membranes, and bridge strengthening and corrosion mitigation products.

Resensys LLC
Booth #: 220
Contact: Mehdi Kalantari
Phone: 301-405-9108
E-mail: mehdi@resensys.com
Website: www.resensys.com

Roads & Bridges
Booth #: 421
Contact: Brandon Williamson
Phone: 512-739-2102
E-mail: bwilliamson@endeavorb2b.com
Website: www.roadsbridges.com
As the leading trade publication and website covering the transportation construction market, Roads & Bridges reaches 60,000 contractors, DOTs officials (local, county, state & federal), and consulting engineers.

RWDI Consulting Engineers & Scientists
Booth #: 617
Contact: Dawn Porcellato
Phone: 519-823-1311
E-mail: dawn.porcellato@rwdi.com
Website: www.rwdi.com
RWDI is the world's leading expert in bridge aerodynamics. From cable-stayed to long-span to pedestrian bridges, we offer the critical services that enable you to safely plan, design, construct, operate, and rehabilitate your bridge project with minimal risk and maximum value.Our interdisciplinary team of specialists, led by our experienced wind engineers, deliver the all-encompassing insights you need. From bridge aerodynamics to vibration, ice and snow risks to pedestrian comfort, we help create, build, and maintain a bridge that is safe, resilient to extreme weather, and structurally efficient.

Samuel Roll Form Group
Booth #: 418
Contact: Patrick Coward
Phone: 662-689-0272
E-mail: patrick.coward@samuel.com
Website: www.samuel.com
Samuel Roll Form Group is a large steel manufacturing company specializing in large, long steel roll forming to shapes saving weight based on design. We do bridge flooring with corrugated floor segments and large steel structural components for the bridge industry.

Scougal Rubber Corp.
Booth #: 108
Contact: Scott Nelson
Phone: 206-419-0043
E-mail: scott.nelson@scougalrubber.com
Website: www.scougalrubber.com
Scougal Rubber manufactures bearing devices for bridge applications including steel reinforced elastomeric pads, plain unreinforced elastomeric pads, PTFE slide bearings, steel rocker assemblies, steel pin assemblies and many others. Scougal Rubber has extensive experience fabricating bearings to meet state & local agency specifications across the USA, Canada and

SeismicPS | Seismic Protection Solutions, LLC
Booth #: 420
Contact: Carlos Mendez-Galindo
Phone: 646-864-8333
E-mail: cmendez@seismicps.com
Website: www.seismicps.com
SeismicPS is dedicated to the development and application of advanced seismic protection technologies, providing structures with the capacity to withstand severe earthquakes, saving lives, avoiding seismic damage, and allowing immediate occupancy.

EXHIBITORS

Sessler Wrecking

Booth #: 523
Contact: Bruce Sherman
Phone: 315-539-3353
E-mail: bsherman@sesslercompanies.com
Website: www.sesslerwrecking.com
Innovative. Dependable. Committed.

Since 1958, our family name and reputation is our business name, and we take pride in both. Sessler Wrecking has developed the nationwide reputation as the "go-to" company for bridge demolition, regardless of construction type and demolition complexity. Coupled with our in-house, professional engineering team, we use innovative methods which include patented technology and state of the art equipment. If Sessler Wrecking is not performing your project, you are losing valuable time and money. We look forward to Making Good Things Happen with your next project!

Sika Corporation

Booth #: 301
Contact: Eri Vokshi
Phone:
E-mail: vokshi.eri@us.sika.com
Website: www.usa.sika.com
Sika is a specialty chemicals company with a leading position in the development and production of systems and products for bonding, sealing, damping, reinforcing, and protecting in the building sector and motor vehicle industry. Sika has subsidiaries in 101 countries around the world and manufactures in over 300 factories.

Sixense, Inc.

Booth #: 109
Contact: Stephen Schorn
Phone: 703-798-0474
E-mail: stephen.schorn@sixense-group.com
Website: www.sixense-group.com/en
Sixense provides distinct tools that improve knowledge of infrastructure condition through asset management software, sensor technology and instrumentation, and nondestructive testing. Our integrated solutions unify inspection and monitoring data to optimize infrastructure management and decisions. BeyondAsset® software optimizes bridge inspections and management of any infrastructure. EverSense® systems are turnkey instrumentation used for monitoring a single bridge to infrastructure networks. EverScan® is a unique portfolio of nondestructive measurement methods focusing on cable & post tensioned structures.

Skanska USA Civil

Booth #: 424
Contact: A.J. Powell, P.E.
Phone: 732-612-9454
E-mail: aj.powell@skanska.com
Website: www.usa.skanska.com
From subways to bridges to complexes that treat water, manufacture goods and produce power, Skanska USA Civil is one of the biggest infrastructure, power and industrial builders in the United States. We focus on delivering such projects through design-build, public-private partnership, engineer-procure-construct and construction management/general contractor methods, as these allow us to utilize our significant construction know-how to bring you the greatest value. At Skanska, we build for a better society.

Sofis Company Inc.

Booth #: 522
Contact: William Sofis
Phone: 724-378-2670
E-mail: wsofis@sofiscompany.com
Website: www.sofiscompany.com
Sofis Company Inc provides Support services for bridge inspections, including under bridge cranes, traffic control, concrete coring, and steel coupon removal, and have been for over 60 years. Our under-bridge units are all inspected annually and certified. They include an A62T, A-62, several UB-60s and a newly rebuilt Paxton Mitchell Mark IV. Our traffic control supervisors are ATSSA certified, and our traffic control devices are state of the art. We are an ISNetworld certified contractor with an A rating. Our goal is to continue to set the standards for safety and efficiency in our industry. Please let us know how we can help you

SOFiSTiK North America Corp.

Booth #: 119
Contact: Andrés von Breymann
Phone: 917-214-9594
E-mail: andres.vonbreymann@sofistik.com
Website: www.info.sofistik.de/en/north-america
SOFiSTiK is a market leader in software for Finite Element Analysis, design and detailing of building and infrastructure projects worldwide. In North America, we focus our attention on complex bridges - both concrete and steel (segmental, cable supported, composite, etc.). We help our clients deliver their projects in less time, with better quality. This can be achieved by integrating state of the art technologies - such as parametric design and building information modelling - with our reliable, innovative and robust analysis

EXHIBITORS

Splice Sleeve North America, Inc.

Booth #: 524
Contact: Nicole Rodriguez
Phone: 813-220-1577
E-mail: nrodriguez@splicesleeve.com
Website: www.splicesleeve.com
We, the pioneers of the grout-filled rebar coupler, have developed and released the NMB Splice Sleeve, a mechanical grouted coupler for splicing reinforcing bars which uses a cylindrical shaped steel sleeve filled with a non-metallic, cementitious based non-shrink high early strength grout. The Splice Sleeve is ideal for the precast and cast-in-place construction industry. It has excellent seismic resistance and fatigue performance and does not require any personnel with special certifications to make the

Steelike, Inc.

Booth #: 620
Contact: Michael D. McDonagh
Phone: 215-388-4445
E-mail: michael@steelike.com
Website: www.steelike.com
Steelike, Inc. develops, produces and supplies Steelike® Ultra-High Performance Concrete (UHPC) for construction projects including highway infrastructure. Founded in 2010 as Kulish Design Co., LLC, Steelike, Inc. has been producing and supplying Steelike® UHPC for construction projects commercially since 2014. Steelike® UHPC meets or exceeds performance specifications required by federal and state agencies for UHPC in highway infrastructure projects, and is all-white, mixable in a ready-mix truck, and saves the user time, labor, and money.

STRAAM Group Inc.

Booth #: 207
Contact: Thomas A. Winant
Phone: 908-339-2489
E-mail: twinant@straamgroup.com
Website: www.straamgroup.com

Structural Technologies

Booth #: 419
Contact: Chris Davis
Phone: 412-527-1340
E-mail: cdavis@structuraltec.com
Website: www.structuraltechnologies.com
STRUCTURAL TECHNOLOGIES is firmly committed to its mission of making structures stronger and last longer. We develop and integrate products, engineering support, repair and maintenance services to provide value-added solutions to owners, engineers and contractors. STRUCTURAL TECHNOLOGIES provides state-of-the-art proprietary products and engineering support, and delivers repair & maintenance services through our construction licensees.

STV

Booth #: 623
Contact: Jorge Suarez
Phone:
E-mail: jorge.suarez@stvinc.com
Website: www.stvinc.com
Founded more than 100 years ago, STV is a leader in providing architectural, engineering, planning, environmental, and construction management services for transportation systems, infrastructure, buildings, energy, and other facilities. Through our commitment to quality and innovation, we are creating a better future.

The Reinforced Earth Company

Booth #: 305
Contact: Mike Sison
Phone: 703-547-8797
E-mail: msison@reinforcedearth.com
Website: www.reinforcedearth.com
We began in 1971 with a newly patented retaining wall system called Reinforced Earth® (Mechanically Stabilized Earth). We have surpassed 50 years of engineering, research, and development of geotechnical structures that have lasted for generations and continue to improve our highways, railways, water resources, airports, commercial development, and more. We have proven we have the comprehensive technical and manufacturing expertise needed to complete retaining walls and other on projects in excess of 3 million sf. We continually innovate our systems and materials to offer a variety of MSE wall types including wire mesh-faced, geosynthetic-reinforced, and a full height panel alternative, Piano Wall Our product line also includes T-WALL® and TechWall modular retaining walls, TechSpan® arches, and sound wall products.

Our engineered precast concrete solutions are economical gravity structures having high strength, a limited footprint, flexibility to distribute loads evenly, and a wide variety of creative architectural finishes for all retaining wall projects. We offer customized solutions to build bridge abutments, bridges and tunnels under backfill, and we help protect people, infrastructure and the environment from natural and industrial hazards. No matter the application, we will work with engineers and contractors to deliver a solution.

TranSystems

Booth #: 616
Contact: Michael Cuddy
Phone: 215-601-3417
E-mail: mjcuddy@transystems.com
Website: www.transystems.com
Since 1966, TranSystems has provided engineering and architectural planning, design, and construction solutions to enhance the movement of goods and people across today's integrated transportation infrastructure. Its 1,000 professionals in more than 35 offices throughout the U.S. perform a broad range of services to all sectors of the transportation and federal marketplaces. Known as one of the nation's top bridge consultants, TranSystems boasts close to 200 bridge professionals throughout the country providing successful solutions to complex structural issues across the project lifecycle.

EXHIBITORS

TYLin
Booth #: 117
Contact: Shelby Matlock
Phone: 619-908-3314
E-mail: shelby.matlock@tylin.com
Website: www.tylin.com
TYLin is a globally connected and collaborative engineering company with 3,000+ professionals worldwide. With 58 offices across the Americas, Europe, and the Asia Pacific, we deliver word-class infrastructure to public and private clients through technical excellence and innovation.

V&S Galvanizing
Booth #: 716
Contact: Rich Collins
Phone: 614-554-0490
E-mail: richc@hotdipgalv.com
Website: www.Hotdipgalvanizing.com
V&S Galvanizing is a galvanizing service provider that believes in safely doing what we say we'll do and continually investing in our people, our equipment and our experience to ensure total customer satisfaction.

Our never say no, get it done attitude drives us forward to educate and work closely with our partners to produce exceptional work day in and day out. No opportunity is too large or too small for our experts who continue to deliver year after year.

Valmont Industries, Inc.
Booth #: 317/416
Contact: Amanda Swanberg
Phone: 651-233-0627
E-mail: amanda.swanberg@valmont.com
Website: www.valmont.com
At Valmont, we do business in two key segments (Agriculture and Infrastructure) and serve eight diverse markets: Utility, Lighting and Transportation, Telecom, Solar, Coatings, Irrigation, Ag Tech and Tubing. But across our segments and around the world, we are united in one purpose: delivering products, services and solutions that improve life.

Vector Corrosion Technologies
Booth #: 100
Contact: Scott McCulloch
Phone: 204-990-8307
E-mail: scottm@vector-corrosion.com
Website: www.vector-corrosion.com
Vector Corrosion Technologies has provided concrete preservation over the last 50 years. With the largest range of cathodic protection technologies and services to control concrete corrosion, Vector offers an innovative solution for any budget and service life objective. Vector works collaboratively with major engineering consultants, government agencies, private owners and contractors to identify the root cause of deterioration and deliver technically advanced, cost-effective corrosion solutions.

Veit & Company, Inc.
Booth #: 518
Contact: Abby Kemp
Phone: 651-802-8515
E-mail: abby.kemp@veitusa.com
Website: www.veitusa.com
Veit is one of the country's leading specialty contractors, with over 90 years of experience and the best people in the industry. We pride ourselves on our relentless pursuit to push the construction industry forward and deliver for our customers. Our modern fleet of iron, diverse expertise, and unmatched determination allow us to successfully tackle some of the largest and most complex projects across every sector while also living out our values every day.

Viathor, Inc.
Booth #: 307
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 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.

Victaulic
Booth #: 520
Contact: Stephanie Madara
Phone: 484-460-6861
E-mail: stephanie.madara@victaulic.com
Website: www.victaulic.com/infrastructure

Volumetric Lifting Systems Inc.
Booth #: 625
Contact: Harry Wasylyk
Phone: 800-961-3857
E-mail: Info@Jack-Mate.net
Website: www.Jack-Mate.net
Jack-Mate Lifting Systems, a division of V.L.S. Inc., manufactures synchronous jacking systems and wireless measuring devices for all types of bridge jacking and maintenance. Controlling multiple cylinders and ensuring the tight tolerances (within 1mm) that todays engineers demand is not an easy task for contractors. A familiar interface allows you to easily move between pre-loading,synchronous lifting/lowering, or independent cylinder operation. Wireless pressure/displacement sensors provide real-time feedback and allow data recording of the lift.

Watson Bowman Acme

Booth #: 725
Contact: Debbie Steiger
Phone: 716-817-5410
E-mail: debbie.steiger@watsonbowmanacme.com
Website: watsonbowmanacme.com

Watson Bowman Acme, an MBCC Group business, is located in Amherst, New York. Our facility houses all of our business activities allowing for seamless and coordinated operations to support the very demanding array of our customers' needs. For more than 70 years WBA has developed and manufactured products for some of the world's most unique and complex projects. While our core focus has been in the area of expansion control for civil structures, our technical expertise has developed to be much farther reaching. Today we have expanded beyond our core products and offer specialty products and services to not only the bridge and highway market, but also the parking and stadium, and architectural structures markets. It is our goal to be our customer's strongest partner for expansion joint systems.

Williams Form Engineering Corp.

Booth #: 318
Contact: Williams Form
Phone: 303-216-9300
E-mail: williams@williamsform.com
Website: www.williamsform.com
Williams Form Engineering Corporation has evolved over our 100 year history, becoming the most trusted name in the geotechnical support industry. Along with our original product line of Concrete Form Hardware, our Rock, Soil and Concrete Anchors, Micropiles, Post Tensioning and Wind Turbine Foundation Systems featuring our fully threaded steel bars are the trusted industry standard. Excellent customer service and extensive technical know-how are what you can expect from our next

WireCo WorldGroup

Booth #: 306
Contact: Jim Stillwell
Phone: 816-270-4843
E-mail: jimstillwell@wireco.com
Website: www.wireco.com
WireCo is the market leader in rope manufacturing, chosen to supply cables for the world's highest profile bridge and stadium projects. With a comprehensive range of trusted global brands, WireCo delivers unmatched technical expertise and innovation as well as unparalleled quality assurance meeting and exceeding international quality certifications.

WSP USA

Booth #: 303
Contact: Barton J. Newton, P.E.
Phone: 916-567-2506
E-mail: Barton.Newton@wsp.com
Website: www.wsp.com/usa
WSP USA is the U.S. operating company of WSP, one of the world's leading engineering and professional services firms. Dedicated to serving local communities, we are engineers, planners, technical experts, strategic advisors and construction management professionals. WSP USA designs lasting solutions in the buildings, transportation, energy, water and environment markets. With more than 12,000 employees in over 200 offices across the U.S., we partner with our clients to help communities