LONG SPAN I SESSION

8:30 - 11:30 A.M.

Room: Theater 1

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

8:30 A.M.

IBC 14-07: The Dragon Bridge
Christopher Gagnon, P.E. and Radu Dragan, Ammann & Whitney, New York, NY
In the spring of 2013 the City of Da Nang officially opened a landmark new bridge which since has become the symbol for the city.

The bridge, crossing the Han River, is a five-span continuous arch bridge with a main span of 200 meters and total length of approximately 650m; it carries a six-lane roadway with pedestrian access. The design intended to visually resemble a flying dragon, resulted in an iconic structure that also serves as an important transportation link, the design demonstrates that engineering projects can serve both cultural and functional purposes.

9:00 A.M.

IBC 14-08: Design of the I-74 True Arches Across the Mississippi
Thomas Murphy, Ph.D., P.E., S.E., Philip Ritchie, Ph.D., P.E., Andrew Adams, P.E., and Nohemy Galindez, Ph.D., P.E., Modjeski and Masters, Inc., Mechanicsburg, PA
The new I-74 crossing of the Mississippi river will consist of side-by-side true arches in a basket-handle configuration with minimal arch bracing. The overall design of the two bridges will be discussed, including the use of a cantilevered bike trail and the lateral load implications of this, the hanger and floor beam system, and aerodynamic mitigation measures. An in-depth evaluation of the stability of the arches will also be discussed.

9:30 A.M.

IBC 14-09: Key Technology of Steel Pylon Segments Erection of Yangtze River Bridge at Ma-an-shan
Dunhua Sun, B.E., Zheng Zhang, B.E., and Weifeng Zheng, M.C.E., Anhui Expressway Holding Group Co. Ltd., Hefei, Anhui, China
The steel and concrete composite and the rigid fixity of the tower and girder system were used for the mid pylon of the Yangtze River Bridge at Ma-an-shan. Through optimizing the schedule of construction, adjusting precisely the position of the rigid fixity of the tower and girder system, the expected goal was achieved successfully. Additionally, the largest tower crane called “D5200” has been made to assemble the large steel parts of which the largest one weighed 213.2 tons.

COFFEE BREAK - 10:00 - 10:30 A.M.

10:30 A.M.

IBC 14-10: CONSOL Energy Wing Tip Pedestrian Bridge

Schaun Valdovinos, P.Eng., Hatch Mott MacDonald, Seattle, WA; Michael Stein, P.E., Schlaich Bergermann and Partner, New York, NY

Spanning nearly 800' across a wide, wooded valley, the CONSOL Energy Wing Tip Pedestrian Bridge is designed to be a centerpiece of the new national camp for the Boy Scouts of America. The suspension bridge has a level main deck formed from wooden planks. Secondary walkways are placed atop the cables for the adventurous, with observation decks installed at the tops of the piers and at the belly of the bridge.

11:00 A.M.

IBC 14-11: Visually Transparent Kentucky Truss Overcomes Design Challenges

Craig R Klusman, P.E., URS Corporation, Louisville, KY; Donald N. Corda, P.E., S.E., URS Corporation, Hunt Valley, MD; C. Tony Hunley, Ph.D., P.E., S.E., Stantec, Lexington, KY

The Kentucky Transportation Cabinet replaced an aging structure in western Kentucky with a three-span continuous parallel-chord Warren truss. The new superstructure features an aesthetically pleasing and visually transparent bridge that is not cluttered with vertical members and sway bracing utilized in conventional truss designs. The challenge of providing this clean and open design in the New Madrid seismic region was met by paying particular attention to truss proportions, erection requirements, and connection details.

ABC I SESSION

8:30 A.M. - 12:00 Noon

Room: CSI Theater (Video Recorded)

Chair: Louis J. Ruzzi, P.E.
Pennsylvania Dept. of Transportation, Bridgeville, PA

8:30 A.M.

IBC 14-13: Easy As ABC: Accelerated Rehabilitation of the Stillwater Viaduct Bridge No. 278
Peter Chiu, P.E., Vanasse Hangen Brustlin, Inc., Providence, RI; David Morgan, P.E., RIDOT, Providence, RI
The historic Stillwater Viaduct, constructed in 1932, is a 450-foot-long concrete structure. This bridge served as an important example of Rhode Island's two remaining open spandrel concrete arch bridges. Due to its severely deteriorated condition, the superstructure was replaced with precast concrete components. By using accelerated bridge construction techniques, the bridge was substantially completed in seven months. The rehabilitated structure has increased load capacity and lifespan of the bridge.

9:00 A.M.

IBC 14-14: Overnight Replacement of Skagit River Collapsed Span
Christopher Vanek, Victor Ryzhikov, Charles Rudie, and John Poulson, Parsons Brinckerhoff, Tampa, FL
The procurement and construction of the permanent Skagit River replacement bridge span required complex accelerated bridge construction materials and techniques. To meet the project constraints, including aggressive schedule and geometric limitations, an integral concrete deck girder system was enhanced with an innovative full flexural-shear connection and the utilization of the state's first lightweight concrete girder system. This system was constructed on a parallel temporary steel support structure and replaced under a full overnight closure.

9:30 A.M.

IBC 14-15: To Build or Not To Build – The Rehabilitation Story of New York Avenue Bridge in Washington DC
Inmar Badwan, Ph.D., P.E. and Amir Arab, Ph.D., P.E., T.Y. Lin International, Alexandria, VA; Ali Shakeri, P.E. and Ronaldo "Nick" Nicholson, P.E., DDOT, Washington, DC
The presentation includes the innovative design and accelerated construction solutions successfully implemented to resolve the construction complications and alleviate the existing site constraints for the New York Avenue Bridge in Washington, DC, located north of the Union

Station. The major rehabilitation items included the addition of third middle girders to address redundancy concerns with the existing two-girder structural systems and the use of two-way post-tensioned precast deck panels with 12-ft cantilevers over the exterior girders.

COFFEE BREAK - 10:00 - 10:30 A.M.

10:30 A.M.

IBC 14-16: Replacing the Memorial Bridge

David Rogowski, P.E. and Josh Crain, Genesis Structures, Kansas City, MO; Steve DelGrosso, Walsh Construction, Canton, MA

The 90-year old Memorial Bridge served Portsmouth, New Hampshire as a major link to nearby Kittery, Maine. The vertical lift bridge performed daily lifts flawlessly; however, the bridge required replacement due to deterioration of the steel framing. This paper highlights the advantages of the new "gusset-free" truss concept selected for the project and demonstrates the procedures developed to meet the 18-month replacement including the float-out removal of existing spans and float-in installation of new spans.

11:00 A.M.

IBC 14-17: I-91 Brattleboro Bridge Improvements Project

Garrett Hoffman, P.E., FIGG Bridge Engineers, Inc., Exton, PA; Eric Foster, Vermont Agency of Transportation, Brattleboro, Vermont, VT

The I-91 Brattleboro Bridge Improvements Project located in Brattleboro, Vermont includes the replacement of four bridges with two new bridges (Bridges 8 & 9). The best value selected, design/build project is being designed by FIGG Bridge Engineers, Inc. and built by PCL Civil Constructors, Inc. for the Vermont Agency of Transportation (VTrans).

11:30 A.M.

IBC 14-18: Hurricane Deck Bridge Replacement over the Lake of the Ozarks

Martin Furrer, P.E., S.E. and Pamela Yuen, P.E., Parsons Corporation, Chicago, IL; Scott Gammon, P.E., American Bridge Company, Overland Park, KA; Dennis Heckman, P.E., MODOT, Jefferson City, MO

For the Hurricane Deck Bridge replacement the owner elected to employ an Alternate Technical Concept (ATC) procurement process to replace the existing 2,200-foot-long steel deck truss with 463-ft spans over the Osage Arm of the Lake of the Ozarks in Camden County, MO. This paper discusses the development of the delta frame baseline and the winning ATC design, the unique contracting approach and the construction of this bridge with piers in up to 85 feet of water.

REHAB/PRESERVATION I SESSION

8:30 A.M. - 12:00 Noon

Room: **Parsons Theater**

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

8:30 A.M.

IBC 14-19: US 84 Mississippi River Bridge - Truss Pin Replacement

James Gregg, P.E., HNTB, Baton Rouge, LA

The Westbound US 84 Mississippi River Bridge is a 3,664-foot long 5 span cantilever truss bridge with one suspended span and two quasi-suspended spans located in Natchez, MS. Opened in 1940, the suspended and quasi suspended spans are supported by a total of 8 eye bar links and 16 – 10" diameter pins. Two of the pins have shifted and are now flush with the gussets. HNTB has developed plans to construct a temporary by-pass structures and remove and replace the two pins in concern. HNTB has also developed plans to replace the link if need be.

9:00 A.M.

IBC 14-20: Rehabilitation and Strengthening of the Freeport Bridge

Christopher Smith, P.E., Michael Irwin, P.E., and Christopher Ahlskog, P.E., Modjeski and Masters, Inc., Mechanicsburg, PA

This paper focuses on the rehabilitation of the Freeport Bridge steel deck truss bridge which is located 30 miles northeast of Pittsburgh, PA and carries State Route 356 over the Allegheny River. The main river crossing truss span concrete deck and stringers were replaced and all floorbeams and some main truss members were strengthened along with the complete replacement of the North and South steel multi-girder approaches. The rehabilitation also included tall rocker bearing replacement.

9:30 A.M.

IBC 14-21: Reconstruction of the Siegrist Covered Bridge

David Hoglund, P.E., RETTEW Associates, Lancaster, PA

Tropical Storm Lee's floodwaters ripped the Siegrist Covered Bridge from its abutments in September 2011. Once the water receded, Lancaster County salvaged the bridge from Chiques Creek and RETTEW evaluated it for reconstruction. With cooperation from federal, state, and local agencies, RETTEW designed and permitted the reconstruction using the original design and as much of the original timber as possible. The bridge is founded on new abutments that were elevated to minimize future flood damage.

COFFEE BREAK - 10:00 -10:30 A.M.

10:30 A.M.

IBC 14-22: Macdonald Suspension Bridge Deck Replacement: Engineering Challenges and Solutions

Keith Kirkwood, P.Eng., Dusan Radojevic, P.Eng., and Peter Buckland, C.M., P.Eng., Buckland & Taylor, North Vancouver, BC, Canada; Jon Eppell, P.Eng., Halifax Harbour Bridges, Dartmouth, NS, Canada

The suspended deck and hangers of the Macdonald Bridge in Halifax, NS, Canada will be replaced segment-by-segment starting in 2014 during full closures of the bridge at night (and some weekends), with traffic running during the day. The Owner's engineer, Buckland & Taylor, has developed erection sequences for the work. Challenges faced include a severe wind climate in Halifax and raising the main span deck after deck replacement is complete in order to increase headroom for ships.

11:00 A.M.

IBC 14-23: Preserving a Unique Seven Span Covered Bridge

Sean James, P.E. and Josif Bicja, P.E., Hoyle, Tanner & Associates, Inc., Manchester, NH

The Bath Village Covered Bridge is a 392'-6" long timber structure built in 1832. It is a rare type of covered bridge that consists of a unique truss and arch structure. The presentation will include an overview of the analysis of the bridge and rehabilitation design and then will focus on the construction phase of the project. The methods of re-introducing camber, methods of construction, materials used and lessons learned will be discussed in detail.

11:30 A.M.

IBC 14-24: Electrochemical Chloride Extraction, A Case Study: 12th Street Viaduct Rehabilitation

Mark Shafer, P.E., HDR, Inc., Kansas City, MI

A unique double-deck landmark structure, 12th Street Viaduct was constructed in 1915 and other than a 1965 rehabilitation had received only minor repair. Unless renovated, the only remaining option would have been to raze the bridge. Engineering evaluations focused on the acute repairs. Among solutions recommended and adopted involved the use of electrochemical chloride extraction (ECE). The benefit of the ECE process is that existing structures can often be salvaged, minimizing consumption of natural resources.

CONSTRUCTION SESSION

8:30 - 11:30 A.M.

Room: Theater 2
Chair: Gerald J. Pitzer, P.E.
Consultant, Pittsburgh, PA

8:30 A.M.

IBC 14-25: Long Span Steel I-Girder Bridge Design and Construction: I-270 over the Chain of Rocks Canal

Lance Peterman, P.E., S.E., HDR Engineering, Inc., Chicago, IL; Brandon Chavel, Ph.D., P.E., HDR Engineering, Inc., Cleveland, OH; Jared Cababe, P.E., HDR Engineering, Inc., King of Prussia, PA

This new continuous steel I-girder bridge over the over the main navigation channel for Mississippi River, located in southern Illinois, has spans of 250', 440', 490', 440', and 350'. The presentation will focus on the unique aspects associated with the design and construction of a long span steel plate girder bridge including structure type selection, haunched girders, top flange lateral bracing, deck placement sequence, design analysis, and development of a conceptual erection sequence during design.

9:00 A.M.

IBC 14-26: Design and Construction of St. Patrick's Pedestrian Bridge

Thomas Cooper, P.E., P.Eng. and Brent Whitcomb, Parsons Brinckerhoff, Denver, CO; Jean-Francois Blassel, Christian Rieser, and Daniel Garcia, RFR, Paris, France; Michael MCDONAGH, Parsons Brinckerhoff, Lawrenceville, NJ

The Saint Patrick's Bridge crossing the Bow River in Calgary is nearing completion. The footbridge is a three-span, 182 meter long network arch that will be completed in fall 2014. Construction has proceeded in spite of the unprecedented flooding of June 2013 that washed out critical deck falsework, causing damage to the recently completed deck.

9:30 A.M.

IBC 14-28: Steel Truss Bridge Redundancy Combined with Construction over a Busy Railyard

Jeffrey Cavallin, P.E., Parsons, Minneapolis, MN; Christopher Trcka, Matthew Curtiss, P.E., and Greg Hasbrouck, P.E., Parsons, Chicago, IL

The St. Anthony Parkway steel truss bridge replacement project, located in Minneapolis, Minnesota, USA, and crossing over the BNSF Northtown rail yard, incorporates unique load-path and internal redundancy measures, a post-tensioned concrete bottom chord member and eliminates fracture critical steel truss members. The replacement of the existing truss spans will require specialized construction techniques to minimize impacts to BNSF's heavily used rail yard including launching beams to remove the existing trusses and install the new truss span.

COFFEE BREAK - 10:00 - 10:30 A.M.

10:30 A.M.

IBC 14-29: The 11th Street Bridge - Reverse Analysis for Staged Construction

Shane Beabes, P.E., AECOM, Baltimore, MD; William Alko, P.E. and Raghu Krishnaswamy, P.E., AECOM, Pittsburgh, PA

What happens when the structural steel girders and cross-frames are already fabricated for a 916 ft. long 5-span, curved/kinked bridge and then the design-build contractor determines to re-sequence the work from original full-width construction to a two-stage sequence? Attend the presentation to learn about the reverse analysis that was performed and how all of the structural steel was salvaged in the new sequence with only minimal modifications needed to achieve both design and erection fit-up.

11:00 A.M.

IBC 14-30: University Avenue Bridge - Design & Construction Challenges

Jerome MacKenzie, P.E. and Evan Batchis, P.E., STV Incorporated, Boston, MA

The $29 million, 520-foot University Avenue Bridge spans the rugged and challenging terrain of the Merrimack River and adjacent hydro-power canal. This presentation explores our design methodology used for the new two span, deck truss river crossing, including development of permit documents as they relate to constructability of the bridge. We then explore the reality of the contractor's actual construction methods, some of the difficulties encountered, and solutions developed.

APC CO-MEETING AGENDA

9:00 A.M. – 12:00 Noon

Room: 330

1. **Tappan Zee Bridge – Focus on Construction Drivers to Bridge Design (80 minutes)**
   Ken Wright, P.E., HDR Engineering
2. **Bent Plate Modular Units (30 minutes)**
   Karl Barth, P.E., High Steel Structures
3. **Precast Bridge Decks (20 minutes)**
   Troy Jenkins, P.E., Northeast Precast Products
4. **Fabricated Structural Steel – Bolt Payment Issues (15 minutes)**
   Greg Burkhart, P.E., JD Eckman Inc.
5. **Use of Point Cloud Surveys for Existing Structures (15 minutes)**
   Joe Rovnan, P.E., JD Eckman Inc.
6. **Steel Diaphragms for Precast Girders (15 minutes)**
   Tom Macioce, P.E., PennDOT

DESIGN I SESSION

1:30 - 4:00 P.M.

Room: Parsons Theater

Chair: **Matthew P. McTish, P.E.**
McTish, Kunkel & Associates, Allentown, PA

1:30 P.M.

IBC 14-31: John K Tener Memorial Bridge: Design/Build Success and Lessons Learned

Jason DeFlitch, P.E., Ahmad Ahmadi, Ph.D., P.E. and Raymond Henney, P.E., SAI Consulting Engineers, Inc., Pittsburgh, PA; Michael Trettel, Joseph B. Fay Company, Tarentum, PA

With a total length of 1,770', the John K Tener Memorial Bridge (previously known as the Charleroi-Monessen Bridge) is a 12-span bridge carrying S.R. 2018 over the Monongahela River. The recently completed design/build project involved the replacement of the existing closed truss spans, with a total length of 1,011', and their supporting piers. The project included the design, fabrication, and construction of one of the longest span haunched steel multi-girder bridges in the region.

2:00 P.M.

IBC 14-32: Design and Reconstruction of the Jeremiah Morrow Bridge

Tony Shkurti, Ph.D., P.E., S.E., Michael Xin, Ph.D., P.E., HNTB Corporation, Chicago, IL

The Jeremiah Morrow Bridge is a cast-in-place segmental bridge on Interstate 71 north of Cincinnati. The twin-bridges will replace existing truss structures. The first structure was opened to traffic at the end of 2013. The new 6-span bridge is 2,252' long with 440' main spans. Each of the single cell boxes carries 55' wide roadway. The new bridge is the tallest bridge in Ohio at 239' above ground when the $88 million project is completed in May 2016.

2:30 P.M.

IBC 14-33: Ohio River Bridges Downtown Crossing D/B - Section 1 Design

William Amrhein, P.E., S.E., Stantec Consulting Services Inc., Lexington, KY; James Gallt, P.E., Palmer Engineering, Winchester, KY; Edward O'Dell, P.E., WMB, Inc., Lexington, KY; Rodney Riley, P.E., S.E., Jacobs, St. Louis, MI

This complex interchange rebuild in Louisville, KY involves the following project features: complexities in steel framing due to curvature, long spans, and severe skews; applications of steel and post-tensioned concrete integral pier caps; applications of micropile foundations in sensitive utility areas; development of a method for mitigating downdrag loads in deep foundations; and testing methods and corresponding retrofits of existing piers.

3:00 P.M.

IBC 14-34: Design Innovations for a Modern Vertical Lift Bridge

Sean-Philip Bolduc, P.E., M. ASCE and Daniel Warren, P.E., M. ASCE, Parsons, Baltimore, MD; Ted Henning, P.E., Parsons, New York, NY

The new Fore River Bridge consisting of a 324-foot long vertical lift span and 2,000 feet of approach structures joining the Boston, MA suburbs of Quincy and Weymouth will replace a temporary crossing erected in 2004 when the previous 1936 bascule bridge was demolished. The Design-Build project includes coordination, analysis, design, and construction planning, that has produced innovations in the design and construction of the Vertical Lift Bridge.

3:30 P.M.

IBC 14-35: I-90 Dresbach Bridge over the Mississippi River: A Bridge Springs Forth From Nature

Courtney Oltman and Stephen Fultz, P.E., S.E., FIGG, Englewood, CO; Manjula Louis, P.E., Minnesota Department of Transportation, Oakdale, MN

Construction is underway on the new Dresbach Bridge carrying I-90 over the Mississippi River linking Minnesota and Wisconsin's regional and interstate needs. MnDOT is replacing the deficient structure with a modern, ecologically conscious concrete bridge with 100 year life. Crossing the main channel are twin, cast-in-place post tensioned segmental concrete structures built from above in balanced cantilever with dual 508' main spans. East channel spans are a first-use of new MnDOT deep precast beam standards.

LONG SPAN II SESSION

1:30 - 4:00 P.M.

Room: CSI Theater (Video Recorded)
Chair: Herbert M. Mandel, P.E.
Consultant, Pittsburgh, PA

1:30 PM

IBC 14-36: Construction of Yangtze River Bridges at Maanshan

Yonggao Yin, M.C.E., Likui Zhang, B.E., and Weifeng Zheng, M.C.E, Anhui Expressway Holding Group Co. Ltd., Hefei, Anhu, China

The Yangtze River Bridges at Maanshan consists of two major bridges. The major bridge crosses over the main stream with a suspension bridge with three main towers and two major spans of 1,080 meters (3,543 ft) in span length. The middle tower of the suspension bridge is the composite tower made up of steel structure at its upper part and reinforced concrete structure at its lower part.

2:00 P.M.

IBC 14-37: A New Cable-Stayed Bridge across the Mississippi River

Hans Hutton, S.E., HNTB, Kansas City, MO; Randy Hitt, P.E., MODOT, St. Louis, MO; Jeff Smith, P.E., HNTB, St. Louis, MO

A new Mississippi River Bridge has been opened to traffic in St. Louis, MO. This bridge is the cornerstone of a multi-phase project that will provide significant relief for commuters in the St. Louis area. The bridge possesses the third longest cable-stayed span (1500-ft) in the United States. Design and construction challenges include being located in a relatively high seismic area and over a major, navigable waterway subject to significant fluctuations in water surface elevation.

2:30 P.M.

IBC 14-38: Design of the St. Croix River Crossing

Kevin Western, P.E., MNDOT, St Paul, MN; Don Bergman, P.E. and Nedim Alca, P.E., Buckland & Taylor Ltd, North Vancouver, BC, Canada; Philip Walker, P.E., HDR, Tampa, FL

The presentation will cover the design of the new St. Croix River extradosed bridge near Stillwater, MN. When complete the bridge will be the largest extradosed structure in North America and one of the largest in the world. The presentation will focus on why an extradosed bridge was selected, the environmental challenges of the project, the design issues unique to extradosed bridges in general and to the St. Croix Bridge in particular.

3:00 P.M.

IBC 14-39: Gerald Desmond Bridge Replacement - Seismic Design of the Main Span Bridge and MSS Construction of Approach Spans

Matt Carter, P.E., Arup, New York, NY; Neil Carstairs, P.E., Arup, Los Angeles, CA

The Gerald Desmond Bridge Replacement in the Port of Long Beach will be California's first major cable stay bridge. The main span bridge has 500 ft tall reinforced concrete mono-pole towers which are protected from damage by seismically isolating the superstructure with viscous dampers. This paper will describe the seismic design of the main span bridge as well as the use of a moveable scaffold system (MSS) self launching formwork in order to rapidly construct the approaches.

3:30 P.M.

IBC 14-40: New Kentucky Lake Bridge: Design of a Basket-handle Network Tied Arch

Chou-Yu (C.Y.) Yong, P.E., S.E. and Jason Stith, Ph.D., P.E., S.E., Michael Baker Jr., Inc., Louisville, KY; Richard Schoedel, P.E., Michael Baker Jr., Inc., Moon Township, PA

This paper will focus on the rationale for the selection of various features of the KY Lake arch bridge superstructure such as the selection of network hanger arrangement, integral floor system, open H-section rib, and non-welded knuckle plate connection. This is explored by outlining the goals established for the design of the arch such as minimizing the extent and severity of fatigue prone details, simplification of details for fabrication, and planning for a low-maintenance/ inspection friendly structure.

RAIL SESSION

1:30 - 4:00 P.M.

Room: Theater 1

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

1:30 PM

IBC 14-41: Alteration of Mobile and EJ&E Railroad Bridges

Kamal Elnahal, Ph.D., P.E., US Coast Guard, Washington, DC; Chuck Davis, P.E., Scott Bridge Co., Inc., Opelika, AL

The presentation will address various challenges and unusual construction techniques used to replace the old narrow spans over the waterway of the Mobile and EJ&E Railroad Bridges with new long lift spans that provide a wide navigation opening that meets today and future navigation needs. Also, the presentation will address valuable and useful information about two methods of accelerated bridge construction techniques used to construct the new bridges with the least interruption to rail and river traffic.

2:00 P.M.

IBC 14-42: Great River Bridge: A Focus On Gusset Plate Replacement

Andrew Bradshaw, P.E. and Mark Ennis, P.E., STV Incorporated, Boston, MA

The Great River Bridge Project involved restoration of a historic, 368-foot, two-span continuous truss bridge. Unexpected complexity arose during rehabilitation when the deck was removed. It became apparent that bottom chord members and gusset plates were more significantly deteriorated than expected. Repairs for the deteriorated bottom chord and gussets involved steel collars designed to connect to chord members around each gusset, allowing removal of gusset plates without deflection that could lock stress into truss members.

2:30 P.M.

IBC 14-43: Design of the New CTA Wilson Station and Elevated Track Structure

Johann Aakre, P.E., S.E. and Marco Loureiro, P.E., HNTB Corporation, Chicago, IL

The Wilson Red-Line Station Reconstruction project will be one of the largest CTA 'L' station projects in the agency's history. The reconstruction will replace the severely deteriorated station along with 1,800 feet of elevated structure supporting 4 tracks leading to and from the station. The design of the elevated structure track faced a number of challenges, including details for the direct fixation system, foundations layout in a congested urban setting, and staged construction considerations.

3:00 P.M.

IBC 14-44: Direct Fixation Track for High-Speed Rail on Aerial Structures

Gregor Wollmann, Ph.D., P.E., HNTB, Blacksburg, VA

The advent of high-speed rail has revealed the limitations of ballasted track and promoted the development of ballastless track systems in Asia and Europe. This presentation provides an overview of such direct fixation track systems with a focus on their application on aerial structures. Structural design considerations and cost implications will be briefly discussed. In certain environments the higher cost of direct fixation track can be economically justified if reduced maintenance demands and higher track availability are considered.

3:30 P.M.

IBC 14-45: Major Bridge Structure at the World Trade Center

Martin Kendall, P.E., STV Incorporated, New York, NY; Kishor Doshi, P.E., STV Incorporated/ Downtown Design Partnership, New York, NY

The reconstruction of the World Trade Center complex in New York City includes the construction of a unique underground bridge structure. This bridge supports two subway tracks and Cortlandt Street Station to span over the PATH Transit Hall, and the newly reconstructed Greenwich Street through the heart of the WTC site. The primary trusses of the bridge structure are completely composed of heavy welded construction, both shop welded fabrication and field welded assembly.

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American Tobacco Trail Pedestrian Bridge Durham, NC

EVALUATION/ANALYSIS SESSION I

1:30 - 4:00 P.M.

Room: Theater 2
Chair: Raymond A. Hartle, P.E.
GAI Consultants, Inc., Cranberry Township, PA

1:30 P.M.

IBC 14-46: Performance of Accelerated Bridge Construction Connection in Bridges Subjected To Extreme Events

W. Phillip Yen, Ph.D., P.E., FHWA, Washington, DC; M. Saiid Saiidi, Ph.D., UNR, Reno, NV; Michael Keever, P.E., Caltrans, Sacramento, CA

This paper summarizes the findings from NCHRP Project 20-68A, Domestic Scan 11-02 on "Best Practices Regarding the Performance of Accelerated Bridge Construction (ABC) Connections in Bridges Subjected to Multi-Hazard and Extreme Events". The objective of this Domestic Scan was to identify connection details that can be used for ABC and which perform well under extreme events, including waves and tidal or storm surge loads, earthquakes, blast, and other large lateral forces.

2:00 P.M.

IBC 14-47: Evaluation of Cross -frame Designs for Highly Skewed Steel I-Girder Bridges

Matija Radovic and Jennifer Righman McConnell, Ph.D, University of Delaware, Newark, DE

Current AASHTO specifications do not provide clear guidelines for designing cross-frames of highly skewed bridges. This paper presents an evaluation of the differences in structural responses as a result of four differing commonly used cross frame designs for highly skewed bridge. Twelve FEA models of different cross frame designs were analyzed. Preliminary results show that the peak cross-frame stresses can vary by more than double simply due to the cross-frame configuration.

2:30 P.M.

IBC 14-48: Inspection and Evaluation of the Main Cables of the Anthony Wayne Bridge over the Maumee River in Toledo, Ohio

Martin Smith, P.E., Philip Ritchie, Ph.D., P.E., and Scott Eshenaur, P.E., Modjeski and Masters, Inc., Mechanicsburg, PA; Doug Rogers, P.E., OHDOT, Bowling Green, OH

Modjeski and Masters, with assistance from Piasecki Steel Construction, ARCADIS, Lucius Pitkin and ODOT, conducted an investigation of the suspension cables of the Anthony Wayne Bridge in Toledo, Ohio. The cables are comprised of 3,534 parallel wires. A cable strength evaluation was performed using the recommendations in NCHRP Report 534, "Guidelines for Inspection and Strength Evaluation of Suspension Bridge Parallel Wire Cables". This paper discusses the inspection, laboratory testing and determination of the cable strength.

3:00 P.M.

IBC 14-49: Nonlinear Redundancy Analysis of Truss Bridges

Graziano Fiorillo and Michel Ghosn, Ph.D., City College of New York, New York, NY

This paper describes the results of the redundancy analysis of a typical simply supported truss bridge superstructure and its ability to continue to carry vehicular loads beyond the elastic limit. The analysis' objective is to investigate the residual capacity of the structure above the design load and the ensuing nonlinear behavior. The numerical model reflects the characteristics and the connection details of a real truss bridge tested up to failure in a recent study.

3:30 P.M.

IBC 14-50: Design of Bridges for Service Life: A Comprehensive and Systematic Approach

Atorod Azizinamini, Florida International University, Miami, FL

The objective of this presentation is to provide, briefly the general philosophy and major steps that could lead to comprehensive design of bridges for service life and outline the major steps involved in service life design. Presentation will provide the outline of systematic and comprehensive approach that is developed in U.S. under SHRP2 R19A project for design of bridges for service life. The recommendation of the project is summarized in a stand-alone publication called Design Guide for Bridges for Service Life. This publication became available in April 2013 through following web site. http://www.trb.org/Main/Blurbs/168760.aspx

IBC BRIDGE TOUR

Tuesday, June10; 1:00 - 4:30 PM

Pittsburgh is the city of bridges, and the IBC is pleased to once again offer our tour of unique area bridges. This guided tour departs from the Convention Center at 1:00 PM and will visit the Hulton Bridge, Heths Run Bridge, and SR 910 bridge over PA Turnpike. An additional fee of $40 is required; advance registration is required and seating is limited. A signed waiver and release and appropriate footwear will be required to enter the construction area. Please arrive no later than 12:45 P.M. for check in.

INTERNATIONAL WELCOME

4:30 - 5:30 P.M.

Room: **Allegheny Overlook - 3rd Floor Concourse**

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

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

IBC AWARDS DINNER

5:30 - 7:30 P.M.

Room: **Ballroom B**

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

ESWP, in association with Bridge design and engineering (bd&e) Magazine, Roads and Bridges Magazine, Bayer MaterialScience LLC, and TranSystems, Inc. presents the 27th Annual IBC Bridge Awards Ceremony. Following Tuesday's sessions, unwind and network apart from the Conference with fellow attendees and celebrate the Award winners at our IBC Awards Dinner. A separate registration is required with a fee of $40 ($50 without conference registration). seating is limited, so please check at the IBC Registration Desk for availability.

The International Bridge Conference® annually recognizes individuals and projects of distinction. Honorees will be recognized as follows:

JOHN A. ROEBLING MEDAL

Malcolm Thomas Kerley, P.E., Richmond, VA recognizing an individual for lifetime achievement in bridge engineering.

GEORGE S. RICHARDSON MEDAL

Stan Musial Veterans Memorial Bridge, St. Louis, MO awarded for a single, recent outstanding achievement in bridge engineering.

GUSTAV LINDENTHAL MEDAL

South Norfolk Jordan Bridge, Chesapeake, VA, awarded for an outstanding structure that is also aesthetically and environmental pleasing.

EUGENE C. FIGG, JR. MEDAL

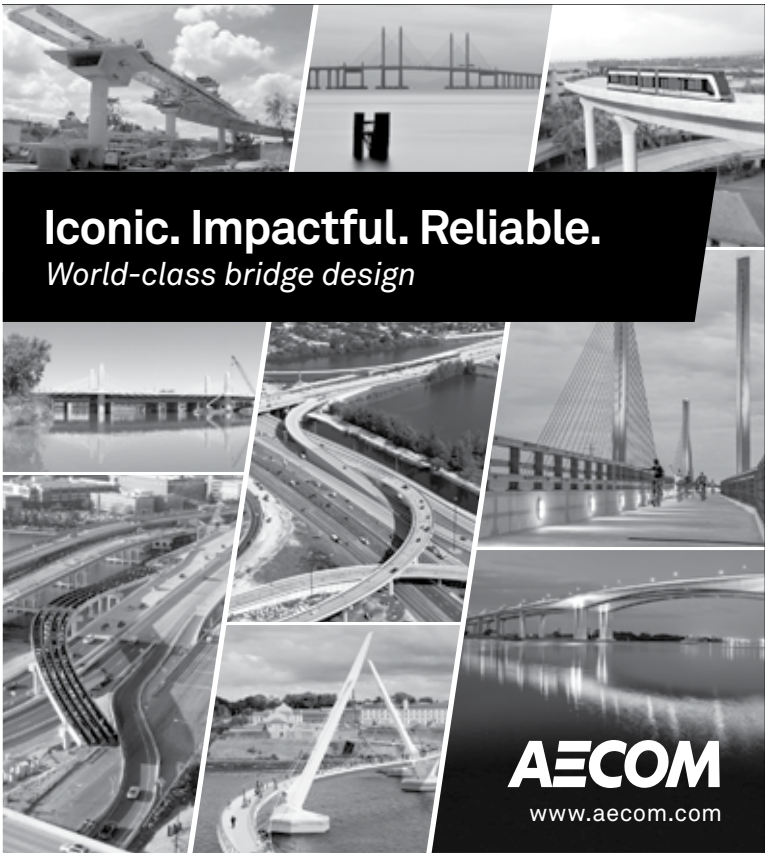
Dragon Bridge, Dan Nang, Vietnam awarded for signature bridges, recognizing a single recent outstanding achievement for bridge engineering, which is considered an icon to the community for which it is designed.

ARTHUR G. HAYDEN MEDAL

Squamish Pedestrian Overpass, Squamish, BC, Canada recognizing a single recent outstanding achievement in bridge engineering demonstrating vision and innovation in special use bridges.

ABBA G. LICHTENSTEIN MEDAL

Checkered House Bridge Route 2 Design-Build, Richmond, VT, awarded for a recent outstanding achievement in bridge engineering demonstrating artistic merit and innovation in the restoration and rehabilitation of bridges of historic or engineering significance.



ROLLER REHAB

BRIDGE BEARING SERVICE

RAIL APPROVED PROCESS
COST EFFECTIVE
NO TRACK/ROAD SHUT DOWN
MINIMAL IMPACT TO PUBLIC/ENVIRONMENT

SEE US AT BOOTH 233 OF THE CONFERENCE