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CHAIRMAN'S MESSAGE


Matthew P. McTish, P.E.

Welcome to the City of Pittsburgh and the 29th Annual International Bridge Conference® (IBC). This year's theme is entitled "The Sky is the Limit" which represents the unlimited diversity and creativity of the international bridge industry. The Executive Committee of the IBC and the Engineers' Society of Western Pennsylvania have worked diligently over the past year to develop an outstanding program consisting of technical presentations, seminars, workshops, exhibits, and special events featuring current state-of-the-art bridge engineering and construction practices throughout the world. The goal of the IBC Executive Committee is to provide the best venue for the presentation of new and innovative bridge industry concepts, practices, and products each year.

The David L. Lawrence Convention Center will once again accommodate nearly 1500 attendees, speakers, and exhibitors who plan to attend the IBC. Similar to last year, the concurrent technical paper sessions will be located within the Exhibitor Hall, increasing your opportunity to attend multiple technical sessions, and network with others within the Exhibitor Area. Exhibitor sponsored refreshment breaks, and lunches will also be hosted in the Exhibit Hall allowing you to interact and network with fellow attendees and visit over 140 exhibitors.

On behalf of the IBC Executive Committee, it is my pleasure to welcome the Missouri Department of Transportation (MoDOT) as the featured Agency at the 2012 IBC. Keynote speaker Mr. Don Hillis, assistant Chief Engineer at MoDOT, and Bryan Hartnagel, MoDOT Structural Resource Manager, have prepared an excellent technical session for Monday afternoon, as well as an impressive exhibit.

On Tuesday and Wednesday, the Executive Committee has put together a remarkable technical program which includes the presentation of over 110 technical papers, 4 seminars, 15 workshops, poster displays, and various networking events. Highlights of the 29th IBC also include:

- Six (6) Bridge Engineering Awards will be presented to internationally recognized Bridge Projects. The IBC will also present the John A. Roebling Medal award to Dann H. Hall for his lifetime achievement in bridge engineering.
- 2012 James D. Cooper Student Paper presentation.
- The winning photos from the IBC Magazine Photo Contest entitled "Mississippi River Bridges" will be displayed.
- 2012 Bridge Engineering Poster Session – A display of various Bridge Engineering topics including research, testing, design, inspection, and construction.
- Pittsburgh Bridges Bus Tour – On Tuesday, don't miss your chance to see some of the current Bridge Projects in Allegheny County.
- High School Bridge Explorers Program – Area high school students with an interest in Bridge Engineering will visit the IBC for the opportunity to learn more about the Bridge Industry.

The IBC Executive Committee and the Engineers Society of Western Pennsylvania hope your attendance at the IBC will be a rewarding and fulfilling experience. We also hope you will join us again next year in the "City of Bridges" when the IBC will celebrate its 30th anniversary.

Matthew P. McTish, P.E. is the General Chair of the 2012 International Bridge Conference and President of McTish, Kunkel & Associates

WELCOME TO THE 29TH ANNUAL INTERNATIONAL BRIDGE CONFERENCE®

Please read the following general information to learn about many of the new features of the IBC! With our return to the David L. Lawrence Convention Center (DLLCC), we have the opportunity to offer many new and exciting elements to the Conference, and many new improvements from the 2011 IBC. As always, Conference personnel (found at the Registration Desk) and IBC Executive Committee Members (look for their ribbons!) can be an additional valuable source of information!

REGISTRATION DESK

The Conference Registration Desk is located in HALL A of the DLLCC, on the riverside of the convention center. The hours of operation are:

- Sunday, June 10: 5:00 - 7:00 PM
- Monday, June 11: 7:00 AM - 5:00 PM
- Tuesday, June 12: 7:00 AM - 5:00 PM
- Wednesday, June 13: 7:00 AM - 1:30 PM

REGISTRATION AND ADMISSION

Full Registration includes admission to the Keynote Session, Featured Agency Session, daily Technical Sessions, Workshops, IBC Exhibit Hall, and the Monday, Tuesday, and Wednesday Exhibit Hall Buffet Luncheon. One-Day Registration includes the Technical Sessions, Workshops, and IBC Exhibit Hall and corresponding exhibit function for that day only.

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. Again, we are offering several "Seminars" that are educational programs for continued training. We also offer for your consideration a number of "Workshops" presented by many of our co-sponsors and other industry-leading groups on an even wider variety of bridge industry subject matter. Lastly, many of these same groups have coordinated their "Committee Meetings" during the dates of IBC; some of which are open to all conference registrants.

Remember: Seminars, Tours, the IBC Awards Reception, and Conference Proceedings require an additional registration fee. Please visit the Conference Registration Desk for details.

BADGE IDENTIFICATION

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

MEETING INFORMATION

IBC functions are located in the DLLCC. Please check individual listings throughout this program for specific locations and times for all technical sessions, seminars 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.

CELL PHONES AND PAGERS

As a courtesy to the Speakers and fellow attendees, the IBC requests that all cell phones and pagers be turned off or switched to silent mode in all Presentation Rooms.

ATTENDEE REGISTRATION LISTS

Conference registrations received prior to June 1 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*. Please note, as we try to continually green the IBC, we are no longer printing Registration Lists for every attendee.

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 June 1, 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.

MESSAGE BOARD

As a service to Conference registrants, a Message Board will be located in the Registration area of the DLLCC. The board will be available on June 10 -13. Messages will be retained until the end of each day.

IBC BRIDGE TOUR

Tuesday, June 12; 1:00 - 5:00 PM

Pittsburgh is the city of bridges, and the IBC is pleased to once again offer our tour of unique area bridges. A signed waiver and release and appropriate footwear will be required to enter the construction area. This guided tour departs from the Convention Center at 1:00 PM and will visit the Mansfield Bridge and Ambridge/Aliquippa Bridge

(An additional fee of $40 is required; advance registration is required and seating is limited.) Please check the IBC registration Desk for availability and advance registration.

IBC EXHIBIT HALL

One of the main attractions of the Conference is the IBC Exhibit Hall. As you stroll through more than 140 exhibits, you will be able to explore the latest technologies, products and services the bridge industry has to offer. Additionally, don't forget to participate in our popular "Exhibit Hall Bingo" game for your chance to receive cash prizes, simply by visiting the exhibitors on your bingo card. All registered attendees will have a bingo card in their registration packet.

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

- Monday: 12:00 Noon - 5:00 PM
- Tuesday: 8:00 AM - 5:00 PM
- Wednesday: 8:00 AM- 1:30 PM

The IBC will feature a Luncheon Buffet throughout the Exhibit Hall on Monday, June 11, Tuesday, June 12, and Wednesday, June 13 and is open (at no additional charge) to all conference-registered attendees and registered spouses.

HOST HOTEL INFORMATION

Enjoy the luxury and convenience of the IBC Headquarters Hotel, the Westin Convention Center Hotel. The Westin is Pittsburgh's newest and most elegant hotel. Linked to the DLLCC via Skybridge, or by an easy outdoor walk across Penn Avenue. Hotel reservations can be made by contacting the Westin Convention Center Hotel directly at 412-281-3700.

Westin Convention Center Hotel
1000 Penn Avenue
Pittsburgh, Pennsylvania 15222
412-281-3700

PRE-PRINTS AND IBC MERCHANDISE

Pre-prints for all technical presentations are available at the Merchandise Booth located just inside of the Exhibit Hall near the Conference Registration Desk. Pre-prints can be purchased for just $3.00 per copy.

Again this year: purchase a 1 GB flash drive that contains all available pre-prints in .PDF format for only $30.00

Also, you can find copies of previous years' IBC Proceedings (for $55 per volume). the Merchandise Booth will be open:

- Monday: 9:00 AM - 5:00 PM
- Tuesday: 8:30 AM - 5:00 PM
- Wednesday: 8:30 AM - 1:30 PM

IBC GIFT ITEMS

Once again at this year's IBC, you will have the opportunity to purchase the popular IBC neckties, IBC Golf Shirts, T-shirts, and Hats. These items are high quality and feature the popular IBC logo. The Gift Item Table is located near the Registration Desk, just inside of Hall A, where you can make your purchases throughout the Conference until Wednesday at 1:30 PM. Please be sure to stop by and shop before Wednesday and check out our newest styles for the 2012 IBC!

PROCEEDINGS

Proceedings are an optional order-only purchase and may be ordered in advance or on-site at the IBC for $30.00. Following the conference, proceedings may be ordered for $55.00. The official proceedings of the 29th Annual International Bridge Conference® will be available on CD in late Summer 2012 and mailed to you at that time.

COFFEE STAND

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

PDH'S

Earn Professional Development Hours (PDHs) by attending the IBC!

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

To obtain verification of attendance at the IBC from the ESWP, you must submit a

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

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

PARKING

The Westin Convention Center Hotel does have its own parking facility, and valet parking is available for an additional cost of $22 per day. Simply pull up to the front door of the hotel to utilize this service. Parking at the David L. Lawrence Convention Center is also available. Self parking lots are in the immediate vicinity. Maps are available on line at http://www.pittsburghcc.com/cc/Directions/Parking.aspx

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 ESWP Conference Department at 412-261-0710, ext. 11 and advise us of any such requirements in advance.

LOOKING AHEAD!

Interested in presenting a paper, workshop, seminar presentation at a future IBC? The IBC Call For Papers will open immediately following the 2012 Conference, and everyone is welcome to submit an idea for presentation.
Visit www.eswp.com/bridge for more details.

JOIN US AT THE 2013 IBC!

Join us in 2013 for the 30th Anniversary of the International Bridge Conference,® June 2-5, 2013, David L. Lawrence Convention Center, Pittsburgh, PA. Many different sponsorship oportunities are available - don't miss out and make your reservation early to take full advantage of all promotions!

IBC EXECUTIVE COMMITTEE

The Engineers' Society of Western Pennsylvania wishes to extend its thanks and gratitude to the following members for their dedication to the planning of the 2012 International Bridge Conference®. (*denotes Honorary Member)

Michael J. Alterio ..... Alpha Structures Inc.
Carl Angeloff, P.E.* ..... Bayer Material Science, LLC, Keynote / Featured Agency Chair
Victor E. Bertolina, P.E. ..... SAI Consulting Engineers, Inc., Budget Chair
Calvin Boring Jr. ..... Trumbull Corporation, Construction Chair
Enrico T. Bruschi, P.E. ..... AECOM, Attendance/Marketing Chair
Matthew A. Bunner, P.E. ..... HDR Engineering, Inc.
Richard L. Connors, P.E. PMP. Bureau Veritas North America, Inc., Exhibits/Co-Sponsors Rules Chair
John C. Dietrick, P.E., S.E. ..... Michael Baker Jr., Inc.; Seminars/Workshops Chair
James D. Dwyer* ..... Advanced Rail Management Corporation
James Garrett, Jr., Ph.D. ..... Carnegie Mellon University; Student Award Co-Chair
John F. Graham, Jr., P.E.* ..... Straen, Inc
Kent Harries, Ph.D., FACI, P.Eng. .... University of Pittsburgh; Education/Student Award Co-Chair
Donald W. Herbert, P.E. ..... Pennsylvania DOT
George M. Horas, P.E. ..... Alfred Benesch & Company
Donald Killmeyer, Jr., P.E. ..... ms consultants, inc.; Tours Chair
Eric S. Kline, PCS ..... KTA-Tator, Inc.
Thomas G. Leech, P.E., S.E. ..... Gannett Fleming, Inc., Awards Chair; Magazine Chair
M. Myint Lwin, P.E., S.E. ..... Federal Highway Administration
Thomas P. Macioce, P.E. ..... Pennsylvania DOT
Herbert M. Mandel, P.E.* ..... GAI Consultants, Inc.
Matthew P. McTish, P.E. ..... McTish, Kunkel & Associates; General Chair
Ronald D. Medlock, P.E. ..... High Steel Structures, Inc.; Co-Meetings Chair
Gerald J. Pitzer, P.E. ..... Consultant
W. Jay Rohleder Jr., P.E. S.E. ..... FIGG; Technical Program Chair
Gary Runco, P.E. ..... Borton-Lawson; High School Program Chair
Helena Russell ..... Bridge design & engineering
Louis J. Ruzzi, P.E. ..... Pennsylvania DOT
Jeremy Shaffer, Ph.D., PMP ..... InspectTech Systems, Inc.
Stephen G. Shanley, P.E. ..... Allegheny County, Department of Public Works
Cori Stellfox ..... Engineers' Society of Western Pennsylvania; Conference Manager
Rachel Stiffler ..... Vector Corrosion Technologies
James L. Stump, P.E. ..... Pennsylvania Turnpike Commission
David A. Teorsky ..... Engineers' Society of Western Pennsylvania
Thomas J. Vena, P.E. ..... A&A Consultants Inc.; New Membership Chair
Lisle E. Williams, P.E., PLS* ..... Consultant; 30th Anniversary Chair
Kenneth J. Wright, P.E., HDR Engineering, Inc. ..... Strategic Planning Chair

Emeritus Members

Joel Abrams, Ph.D. ..... Consultant
Reidar Bjorhovde, Ph.D., P.E. ..... The Bjorhovde Group
Arthur W. Hedgren, Jr., Ph.D., P.E. ..... Consultant

SPONSORS

A special "Thank You" to all of our financial sponsors of the 2012 International Bridge Conference®, it is through the generous support of the following companies that we are able to present the following amenities and events during this year's IBC.

SPONSORS

Acrow Corporation ..... Westin Hotel Guest Room Keycards
AI Engineers, Inc. ..... Conference Tote Bag
Alpha Structures Inc. ..... Conference Tote Bag
Bentley Systems, Incorporated..... Bronze Sponsorship
CBSI ..... Conference Tote Bag
Computers & Structures Inc. ..... Gold Sponsorship
Epoxy Interest Group ..... Bag Stuffer
ERICO ..... Bag Stuffer
GAI Consultants, Inc. ..... Hand Sanitizer
HRV Conformance Verification Associates, Inc. ..... Bronze Sponsor
L.R. Kimball ..... Name Badge Lanyards
Lochner ..... Bronze Sponsor
Mageba USA ..... Bronze Sponsor; Bag Stuffer
McTish, Kunkel & Associates ..... Conference Tote Bag
Michael Baker Jr., Inc. ..... Coffee Break
Parsons Brinckerhoff ..... Silver Sponsor
Ralls Newman, LLC ..... Conference Tote Bag
SAI Consulting Engineers, Inc. ..... Welcome Banner at Keynote Session
Sika Corporation ..... Welcome Banner at Registration Desk

CO-SPONSORS & MEDIA PARTNERS

A special "Thank You" to the media partners and co-sponsoring organizations of the 2012 International Bridge Conference®, through their support and marketing efforts, we are able to introduce the IBC to greater audiences. Thank you!

CO-SPONSORS

American Concrete Institute (ACI) ..... www.concrete.org
American Public Works Association (APWA) ..... www.apwa.net
Deep Foundations Institute (DFI) ..... www.dfi.org
National Council of Structural Engineers ..... www.ncsea.com
Precast/Prestressed Concrete Institute (PCI) ..... www.pci.org
Short Span Steel Bridge Alliance (SSSBA) ..... www.steel.org
Structural Engineering Institute (SEI) ..... www.seinstitute.org
The International Association of Foundation ..... www.adsc-iafd.com
Transportation Research Board (TRB) ..... www.trb.org

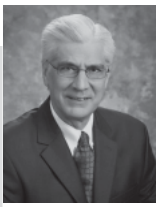
MEDIA PARTNERS

Better Roads: ..... www.betterroads.com
Bridge design & engineering: ..... www.bridgeweb.com
Coatings Pro Magazine: ..... www.coatingspromag.com
Government Engineering Journal: ..... www.govengr.com
Concrete Construction: ..... www.concreteconstruction.net
Public Works: ..... www.pwmag.com
Roads & Bridges Magazine: ..... www.roadsbridges.com
The Journal of Protective Coatings & Linings: ..... www.paintsquare.com

KEYNOTE SESSION

Time: 8:30–11:30 AM
Room: Ball Room B
Chair: Matthew P. McTish, P.E., 2012 Conference Chair, *McTish, Kunkel & Associates, Allentown, PA*

The 29th Annual International Bridge Conference® kicks off with the Keynote Session, featuring leaders of the bridge industry from around the world. The session is chaired by the 2012 General Chair of the Conference, Matthew P. McTish, P.E., and features the following presenters:



WELCOMING REMARKS

Thomas E. Donatelli, P.E., ESWP President,
Michael Baker Jr., Inc., Pittsburgh, PA

WELCOMING REMARKS

Rich Fitzgerald, Allegheny County Chief Executive,
County of Allegheny, Pittsburgh, PA

MISSOURI DOT'S "BFYD" (BOLDER 5-YEAR DIRECTION)

Don Hillis, Assistant Chief Engineer,
Missouri Department of Transportation, Jefferson City, MO

AASHTO UPDATE

Malcolm T. Kerley, P.E., Chief Engineer,
Virginia Department of Transportation, Richmond, VA

BRIDGES ARE FAILING FASTER NOW – WHY IS THIS HAPPENING?

Timothy G. Galarnyk, CEO,
Construction Risk Management, Inc., St. Paul, MN

BRIDGE DESIGN AND THE ART OF APPROPRIATION

Keith Brownlie, RIBA RIAS FRSA, Architect, *T oller Porcorum, Dorset, United Kingdom*

FEDERAL PERSPECTIVE

Victor M. Mendez, Administrator,
Federal Highway Administration, Washington, DC

TITLE TBA

Kirk T. Steudle, P.E., State Transportation Director, *Michigan Department of Transportation, Lansing, MI*

KEYNOTE BIO BRIEFS

RICH FITZGERALD

Rich Fitzgerald was sworn into office as Allegheny County's 3rd Chief Executive on January 3, 2012 at Soldiers & Sailors Memorial Hall & Museum. Surrounded by his wife, Cathy Tomasovich Fitzgerald, and his children Jocelyn, Erin, Caroline, Tanner, Madeline, Louisa, Mara, and Jackson, Rich took the oath of office as administered to him by The Honorable James J. Hanley, Jr., Magisterial District Judge.

The oldest son of Dick Fitzgerald and Pat Mangold, Rich was born at St. Francis Hospital in Pittsburgh's Bloomfield neighborhood. He attended St. Lawrence O'Toole grade school and Central Catholic High School before going on to attend Carnegie-Mellon University. He earned his B.S. in Mechanical Engineering with a business minor in 1981.

In 1982, Rich started a small business, Aquenef, (acronym for "water and energy efficiency"). Three decades later, the company is the leading provider of water treatment equipment and services in the Western Pennsylvania Region, with over 700 customers.

Rich first became active in government when his children began school. He and his wife became involved in the PTO and worked with local elected officials on zoning and other issues. In 1998, he worked on the campaign to change the form of government in Allegheny County and in 1999, ran for one of the district council seats on the newly-formed County Council. He represented District 11 from 2000-2011 and served from 2004-2011 as the President of Council.

During his time on County Council, Rich worked to reform government and save taxpayers money by taking on popular officials and eliminating a number of row offices. Rich also worked to improve the way Allegheny County does business. Through his legislation and leadership, Allegheny County now has a Homestead Exemption for property owners and a Human Relations Commission. In 2011, Rich resigned from County Council to run for Chief Executive, winning the seat by a huge margin on November 8, 2011.

DON HILLIS

Don Hillis became MoDOT's Assistant Chief Engineer on May 1, 2010. He served as the department's first Director of System Management just prior to becoming Assistant Chief Engineer directing the efforts of the Traffic, Maintenance, Motor Carrier Services and Highway Safety Divisions

During his 28 year career, he has served in a variety of leadership roles including state maintenance engineer and transportation planning director at Central Office, and assistant district engineer in the Northwest District in St. Joseph. He has held the positions in MoDOT's Central Office of needs assessment engineer, traffic studies and corrections engineer, bridge inspection engineer, maintenance and traffic studies engineer, senior structural designer, and structural designer.

He began his career with MoDOT in 1984 after graduating from the University of Missouri – Rolla with a B.S. in Civil Engineer. He is a registered professional engineer in Missouri, is married and has two sons.

MALCOLM T. KERLEY, P.E.

In July 2004, Malcolm T. Kerley was named Chief Engineer, accountable for the quality, cost and timeliness of all engineering plans associated with the design of, and right-of-way acquisition for, VDOT transportation projects. He had previously served as Administrator of VDOT's Structure & Bridge Division from 1992 to 2002, planning, designing, and overseeing construction, maintenance and inspection of more than 20,000 bridges and overpasses. He began his career with VDOT in 1971. A registered professional engineer in Virginia, Mal is actively involved in various committees within the transportation industry, represents Virginia on the AASHTO Standing Committee on Highways, and is Chairman of the AASHTO Subcommittee on Bridges and Structures.

TIMOTHY G. GALARNYK

Timothy G. Galarnyk is the Chief Executive Officer of the international firm Construction Risk Management, Inc. Galarnyk, a seasoned and very rare Construction Forensic Investigator has been involved in the construction industry for more than 36 years. His field of expertise includes heavy construction, railway construction, residential and commercial construction, inspection and evaluation of highway and railway bridges and the evaluation and determination of proper construction means and methods for railway, residential, commercial and heavy construction operations. His specialty is infrastructure all over the world from oil and gas fields to bridges and dams. Galarnyk has been involved in the inspection of over 1000 bridges worldwide and in the construction, repair, replacement or renovation of over 3000 bridges since his career began in the mid 1970s.

Galarnyk is actively involved in the forensic investigation of construction collapses, defects, deaths and injuries. He is one of the world's leading experts in the field of construction analysis, construction safety, construction defects and in identifying construction problems. He is an expert in the creation of programs that manage the risks associated with railway, highway and general construction projects. Galarnyk has personally investigated more than 300 construction related fatalities and literally thousands of construction injuries in his career.

Galarnyk was the Host of a 2011 History Channel reality-based television program where he appears as "Inspector America". Galarnyk visited 6 cities in America inspecting roads, bridges, sewer and water and other vital pieces of American Infrastructure and provided conclusions on the State of America's Infrastructure.

KEITH BROWNLIE, RIBA RIAS FRSA

Keith Brownlie is an independent chartered Architect specializing in the design of transport infrastructure and bridges. He was, until 2011, Director of Wilkinson Architects in London where over the course of 20 years his work ranged from bespoke footbridges to some of the world's longest structures and tallest buildings including the Stirling Prize winning Gateshead Millennium Bridge (2001), the 440m high Guangzhou International Finance Centre (2011), and the 18km long Fehmarnbelt Tunnel between Germany and Denmark (to 2020).

He is currently acting as architectural consultant to several bridge projects in the US including Tappan Zee Bridge in NY, and Gerald Desmond Bridge in CA. In autumn 2012 he will launch a new practice in the UK providing architectural consultancy to the engineering profession worldwide.

VICTOR M. MENDEZ

On July 17, 2009, Victor Mendez was sworn in as the Federal Highway Administrator - the 18th person to hold the position. In his role, he oversees the Federal Highway Administration's (FHWA) 2,900 employees in Washington and field offices across the country and provides executive guidance on strategic initiatives and policy.

Previously, Mr. Mendez served as Director of the Arizona Department of Transportation (ADOT). Mr. Mendez has more than 20 years of state DOT experience, having worked at ADOT since 1985. Most recently, Mr. Mendez served as Director of ADOT as an appointed member of former Arizona Governor Janet Napolitano's Cabinet. As Director, Mr. Mendez worked to improve the agency's customer service in both its highway and motor vehicle divisions. Under his leadership, ADOT built the Regional Freeway System in the Phoenix area six years ahead of schedule and consistently delivered statewide construction programs on time.

In 2006, Mr. Mendez was elected president of both the Western Association of State Highway and Transportation Officials and the American Association of State Highway and Transportation Officials, its national counterpart. He chaired its Standing Committee on Research, the Operations Council of the Standing Committee on Highways, and the oversight group for the TRB Long-Term Pavement Performance program.

Mr. Mendez earned a civil engineering degree from the University of Texas at El Paso and later earned an MBA from Arizona State University.

KIRK T. STEUDLE, P.E.

Kirk Steudle was appointed as Director of the Michigan Department of Transportation by Governor Rick Snyder on January 1, 2011. He also served as State Transportation Director from 2006 to 2010.

As State Transportation Director, Steudle oversees MDOT's more than three billion dollar budget, and is responsible for the construction, maintenance and operation of nearly 10,000 miles of state highways and more than 4,000 state highway bridges at a department with 2,500 employees. He also oversees administration of a variety of multi-modal transportation programs and projects that range from Aviation to the Zilwaukee Bridge.

Steudle is the 2011-12 president of the American Association of State Highway and Transportation Officials (AASHTO), and serves on the AASHTO Executive Committee. In addition, he chairs the Strategic Highway Research Program (SHRP) II oversight committee and the implementation report to the U.S. Congress. Steudle is a national expert in Connected Vehicle Technologies, a high-tech highway operations technology that enables vehicles to communicate with roads and each other to improve safety and mobility. Steudle is on the Board of Directors of the Intelligent Transportation Society of America (ITSA) and the Engineering Society of Detroit, the largest engineering society in the country.

Born and raised in Adrian, Michigan, Steudle graduated from Lawrence Technological University with a Bachelor of Science degree in Construction Engineering. He is a registered professional engineer. He joined MDOT in 1987 as an engineer trainee and has served the department in various positions across the state throughout his career.

In 2010, he was recognized nationally for his continuous outstanding service and exceptional contribution to highway engineering when he received the prestigious Thomas H. MacDonald award from AASHTO. In 2011, he was awarded the P.D. McLean Award from the Road Gang for excellence in highway transportation.

FEATURED AGENCY SESSION: MISSOURI DEPARTMENT OF TRANSPORTATION

Time: 1:30–5:00 PM
Room: Theatre 1
Chair: Bryan A. Hartnagel, Ph.D., P.E., *Structural Resource Manager, Bridge Division, Missouri DOT*

THE STATE OF MISSOURI BRIDGES

Dennis Heckman, *Missouri DOT, Jefferson City, MO*

INNOVATIVE PROJECT DELIVERY

CURVED PLATES, DEEP SHAFTS, AND LITTLE TIME – DELIVERING THE BIG STEEL ON MODOT'S I-64 DESIGN BUILD PROJECT
Vincent Gastoni, *Parsons, Minneapolis, MN*

THE NEW MISSISSIPPI RIVER BRIDGE – CHALLENGES AND INNOVATIONS
Jeff Smith and Hans Hutton, *HNTB, St. Louis, MO*

SAFE & SOUND'S BRIDGE IN A BOX
Harry Koenigs, *KTU Constructors, Lee's Summit, MO*

THE CHRISTOPHER S. BOND CABLE-STAYED BRIDGE – A KANSAS CITY ICON
Martin Furrer, *Parsons, Chicago, IL*

MAJOR RIVER BRIDGE SUPERSTRUCTURE REPLACEMENTS

SUPERSTRUCTURE REPLACEMENTS OVER THE MISSOURI RIVER AT GLASGOW AND MIAMI
Cory Imhoff, *HDR, Inc., Kansas City, MO*

WESTBOUND BLANCHETTE BRIDGE – ACHIEVING A 100-YEAR SERVICE LIFE
Ernst Petzold, *Jacobs, St. Louis, MO*

PROPRIETARY SESSION

Time: 1:30–5:00 PM
Room: Computers & Structures Inc. Theater
Chair: Rachel Stiffler, *Vector Corrosion Technologies, McMurray, PA*

IBC 12-109 1:30 PM

RESPONSE OF CONCRETE-FILLED TUBULAR FRP ARCHES TO CONSTRUCTION-INDUCED LOADING

William Davids, Ph.D., P.E., Harold Walton, Joshua Clapp, Roberto Lopez-Anido, and Habib Dagher, *University of Maine, Orono, ME*

This study assessed the structural response of concrete-filled tubular FRP arch bridges to construction loads, including filling of the arch with wet concrete and backfilling the structure after the arch concrete is sufficiently cured. Local tube buckling capacity was examined experimentally and using FEA. The effect of soil backfilling on the cured arches was addressed with a nonlinear beam FE model that tracks the installation of each soil lift on alternate ends of the structure.

IBC 12-110 1:55 PM

3-D VISUALIZATION OF COMPLEX BRIDGES: A NEW, IMPROVED APPROACH TO COMPLEX BRIDGE INSPECTION AND ASSET MANAGEMENT

Jeremy Shaffer, Ph.D., Michael Schellhase, and Benjamin Witter, *InspectTech Systems, Inc., Pittsburgh, PA*

This presentation will discuss a new 3-D Visualization software system that is being used on multiple continents to better inspect and manage complex bridges. The system enables inspectors to enter inspection data and attach files to specific components of a bridge. Bridge engineers can then visualize component conditions and relationships while avoiding the need to sift through thousands of report pages. This presentation will profile the system's use at several world-famous, signature bridges.

IBC 12-111 2:20 PM

INNOVATIVE TOOL FOR THE OPTIMUM MANAGEMENT OF CONCRETE BRIDGES EXPOSED TO AGGRESSIVE ENVIRONMENTS

Nate Sauer P.E., Eric Ouellet, Eng., M.Sc., Richard Cantin, Eng., Ph.D., and Marie-Josée Houde, Eng., M.Sc., *SIMCO Technologies, Quebec, Canada*

In collaboration with the New Jersey Transit Authority (NJTA), SIMCO Technologies benchmarked an innovative tool for the optimum management of concrete bridges exposed to aggressive environments. This new approach combines typical deterioration ratings yielded by visual inspections with concrete durability modeling to obtain a more complete assessment of the current condition of reinforced concrete structures, provide an accurate evaluation of their residual service-life, and, if necessary, select the most appropriate repair solutions. In this project, cores were extracted from key structural elements of six existing bridges. Samples were then tested according to an experimental protocol designed to obtain both input and independent validation data for the service-life analyses. Numerical simulations were run using a concrete durability software called STADIUM. For each bridge, a unique degradation curve was generated for all primary structural elements. The curve was obtained considering the influence of local exposure

conditions affecting the structural element under consideration. Degradation curves were then validated using information derived from the characterization of the concrete cores extracted from the structure, and correlated to the deterioration ratings obtained during the visual inspections. This correlation was then used to perform a residual life-cycle cost analysis of each of the six bridges, and generate early warning criteria for inspection and maintenance activities. Finally, the approach was used for the systematic evaluation of different repair scenarios on the basis of service-life extension and cost. This method is a promising large-scale application of service life modeling, which could assist owners with their asset management of concrete structures.

IBC 12-112 **2:45 PM**

PROTECTION OF BRIDGES FROM TERRORISM AND OTHER THREATS

Skip Ebaugh and Tim Keller, *Hardwire LLC, Pocomoke City, MD*

Terrorism and other naturally occurring events such as fire are very real threats to our nation's bridges. We will explain in detail these threats facing our nation's bridges and their single points of vulnerability, specifically the cable systems. We will look into what makes up a threat assessment, what are the types of threats, and how they can be defeated. We will also look at real life examples of deterrent measures currently in use.

WORKSHOP 15

OPEN FORUM - WHY ARE BRIDGES FAILING MORE RAPIDLY

Time: 1:30–3:00 PM
Room: 330
Presented by: Construction Risk Management, Inc.

Timothy Galarnyk, CEO, Construction Risk Management, Inc.

- 1990 to 2009 Collapses/Failures - 31
- 2010 to present Collapses/Failures - 21
- What factors may play roles in the increase in frequency?
- What conditions may play roles in this increase in frequency?
- What must be done to slow or stop the frequency of bridge collapses/failures?

DESIGN, PART 1 SESSION

Time: 8:30 AM–12:00 Noon
Room: Theater 1
Chair: Kenneth J. Wright, P.E., *HDR Engineering, Inc., Pittsburgh, PA*

IBC 12-01 — 8:30 AM

BRIDGE OVER TER RIVER IN GIRONA (SPAIN), A NEW BRIDGE CONCEPT

Juan Sobrino, Ph.D., P.E., *Pedelta Inc., Coral Gables, FL*; Javier Jordan, ICCP (Civil Eng.), *Pedelta Inc., Spain*

A new innovative concept has been developed for the steel-concrete bridge crossing the Ter River in Girona (Spain). The bridge is a nine span continuous deck with an overall length of 485 m. The main span is 120 m long and its deck is hung in the central part by a curved tied steel member between two pylons that split into two branches at the side spans to create a doorway.

IBC 12-03 — 8:55 AM

DESIGN OF IH-35 EXTRADOSED BRIDGES OVER THE BRAZOS RIVER

Eric Nelson, P.E., *AECOM, Nashville, TN*; David McDonnold, *AECOM, Austin, TX*

The paper entitled "Design of IH-35 Extradosed Bridges over the Brazos River" will discuss the major elements involved in the design of these unique 620-foot long bridges in Waco, Texas. These twin bridges spanning over the Brazos River were designed for the Texas Department of Transportation using features of an "extradosed" bridge, which is the first use of this bridge type in Texas and one of only a few currently in the U.S.

IBC 12-04 — 9:20 AM

DESIGN OF THE SOUTH ROAD SUPERWAY

Ben Soule, *International Bridge Technologies, San Diego, CA*

The South Road Superway is a 2.6 km elevated highway under construction in Adelaide, Australia. The bridge superstructure is constructed of twin precast segmental guideways, built in balanced cantilever. The twin box girders rest on a central "Y" shaped pier, which presents a unique design challenge. The design was performed under the Australian Standards, the AS5100. This code departs from US practice in several key respects, leading to a more robust design.

IBC 12-05 — 9:45 AM

HANGER EFFICIENCY, ADJUSTMENT AND LOSS IN A NETWORK ARCH BRIDGE

Shaoyun Sun, P.E., Ph.D. and Gregory Hasbrouck, *Parsons Corporation, Chicago, IL*

The structural function and efficiency of network arch bridge hangers along with important design aspects including hanger adjustment and loss are investigated through the design of the new Hastings Bridge over the Mississippi River in Hastings, MN.

COFFEE BREAK — 10:10–10:30 AM

IBC 12-06 **10:30 AM**

DESIGN OF THE ELIZABETH CITY DOUBLE LEAF BASCULE BRIDGE

Adrienne Crider, P.E., Dan Irwin, P.E. and Kevin Johns, P.E., *Modjeski and Masters, Mechanicsburg, PA*

The Elizabeth City Bridge carries US 158 over the Pasquotank River in Elizabeth City, North Carolina. The project involves the complete replacement of the superstructure and substructure of the eastbound span with a new double leaf trunnion bascule span measuring 146 ft. from centerline to centerline of trunnions. The paper will focus on the design of the new bascule bridge and provide a brief summary of construction related activities to date.

IBC 12-07 **10:55 AM**

REHABILITATION OF THE HISTORIC EADS BRIDGE OVER THE MISSISSIPPI RIVER IN ST. LOUIS, MO

F. Allen Smith, P.E., S.E. and Jared Wigger, *TranSystems Corporation, St. Louis, MO*

The Historic Eads Bridge is one of the oldest constructed over the Mississippi River with a construction date of 1874. Eads Bridge was the first major bridge to use steel as a primary material. The existing paint system has failed allowing for severe corrosion. A 2009 in-depth bridge inspection reported 22 cracks in stringers. As a result of the failed coatings and cracks in the stringers, a major rehabilitation was determined necessary.

LONG SPAN BRIDGES SESSION

Time: 8:30 AM–12:00 Noon
Room: Theater 2
Chair: Herbert M. Mandel, P.E., *GAI Consultants, Inc., Homestead, PA*

IBC 12-08 **8:30 AM**

JOHN JAMES AUDUBON BRIDGE - DESIGN-BUILD DELIVERY OF THE LONGEST SPAN CABLE-STAYED BRIDGE IN THE AMERICAS

Armin Schemmann, Ph.D., P.Eng., and Don Bergman, *Buckland & Taylor Ltd., North Vancouver, British Columbia, Canada*; Greg Shafer, *Parsons Transportation Group, Baltimore, MD*

With a 1583 foot long cable-stayed main span over the Mississippi River, the John James Audubon Bridge offers a light and highly competitive design-build solution. Efficiency is delivered through the H-frame towers, which are designed for constructability permitting rapid construction and significant overlap between tower and deck construction. The towers which are the dominant aesthetic feature are key to the aerodynamic stability of the open composite steel deck section in a hurricane prone wind climate.

IBC 12-09 **8:55 AM**

DESIGN OF THE PEARL HARBOR MEMORIAL BRIDGE: THE FIRST EXTRADOSED PRESTRESSED BRIDGE IN THE U.S.

Steven Stroh, P.E., *URS Corporation, Tampa, FL*; James A. Platosh, *URS Corporation, Rocky Hill, CT*

The centerpiece of Connecticut's I-95 New Haven Harbor Crossing Corridor Improvement Program is the Pearl Harbor Memorial Bridge over the Quinnipiac River; the first extradosed prestressed bridge in the United States. This paper will provide a brief introduction of the extradosed bridge concept, and will provide design and construction details for this project. The Pearl Harbor Memorial Bridge is presently under construction with the first deck scheduled for completion in the spring of 2012.

IBC 12-10 **9:20 AM**

THE MESSINA STRAIT BRIDGE TOWERS

Christopher Scollard, P. Eng., Charles King, C.Eng., and Matthew Kleymann, *Buckland & Taylor, Ltd., North Vancouver, British Columbia, Canada*; Yasutsugu Yamasaki, *Eurolink SCpA, Milan, Italy*

The 380m tall main towers of the Messina Strait Bridge comprise approximately 108500 tonnes of structural steel and so their optimization is vital to managing overall construction costs. Reducing material quantities and fabrication costs requires the use of high strength steels and optimization of the longitudinal and transverse stiffening arrangements. This paper describes the primary design considerations and optimizations that were completed as part of the Progetto Definitivo.

IBC 12-11 **9:45 AM**

THE BASOHLI CABLE STAYED BRIDGE, INDIA

Dave Jeakle, P.E., *Infinity Engineering, Tampa, FL*; Devin Sauer, *Infinity Engineering Group, North Vancouver, British Columbia, Canada*

The Basohli Bridge is a new three span cable stayed bridge with a 350 meter long mainspan over the River Ravi in Jammu-Kashmir, India that is being procured under the Design-Build delivery system for the Border Roads Organization. Construction commenced in June 2011 and has an expected completion date of January 2014. The presentation will discuss the development of the bridge and also present various challenges and aspects of detailed design.

COFFEE BREAK **10:10–10:30 AM**

IBC 12-12 **10:30 AM**

BAYONNE BRIDGE - THE NEXT ONE HUNDRED YEARS

Joseph LoBuono, P.E., *HDR Engineering, Inc., Newark, NJ*; Catherine Britell, P.E., *The Port Authority of New York & New Jersey, Newark, NJ*

Opened in 1931 as the world's longest arch span, the 1,652' steel truss arch features a vertical clearance of 151 feet. This project will raise the roadway to provide 215' of clearance. Presented will be the concept of the new roadway, dealing with an 80 year old structure, the detailed analysis of the modified structure, the construction methodology to achieve a project goal of extending the life of the bridge for 100 years.

IBC 12-13 **10:55 AM**

THE CONSTRUCTION OF 1,176 M LONG AIZHAI SUSPENSION BRIDGE

Yinbo Liu, Ph.D., P.E. and Ning Wang, *H & J, International, PC, Collegeville, PA*

The Aizhai Suspension Bridge will be one of the longest suspension bridges in the World. The main span is 1176 m long and the two side spans are 242 m and 116 m, respectively. The bridge is supported by two reinforced concrete towers with spread footings on bedrock, and the superstructure is made of single deck steel truss. Due to the difficult site conditions and restricted transport accesses, many unique construction schemes and techniques have to be developed during the construction.

IBC 12-14 **11:20 AM**

THREE-DIMENSIONAL MODELING FOR THE CRACK INVESTIGATION AND REPAIR SCHEME DEVELOPMENT FOR THE HALE BOGGS CABLE STAYED BRIDGE

Jian Huang, Ph.D., P.E., *TranSystems, Fort Lauderdale, FL*; Paul Norton, *TranSystems Corporation, Boston, MA*; G. Alan Klevens, *TranSystems Corporation, Ft. Lauderdale, FL*

The Hale Boggs Bridge carries Interstate I-310 over the Mississippi River in Luling, Louisiana. The decking system of the cable stayed spans consists of two steel tub girders, diaphragms, and orthotropic deck. Cracks were found in deck plate and fillet welds at the connections of the girder web transverse stiffeners to the deck. A three-dimensional structural model was developed for determination of the likely causes of the cracks and verification of repair schemes.

SPECIAL PURPOSE BRIDGES, PART 1 SESSION

Time: 8:30 AM–12:00 Noon
Room: Theater 3
Chair: Gerald J. Pitzer, P.E., *Consultant, Pittsburgh, PA*

IBC 12-15 **8:30 AM**

CAPILANO CLIFFWALK

Kent LaRose, M.A.Sc., P.Eng., Scott Loptson, Ruby Kwan, and Stuart Masterman, *Morrison Hershfield Limited, Burnaby, British Columbia, Canada*; Duncan Wyllie, *Wyllie Norrish Rock Engineers Ltd., Vancouver, British Columbia, Canada*

Cliffwalk is a breathtaking structure that hangs off the cliff at the Capilano Canyon in British Columbia. It provides thrilling and educational experiences to visitors through its series of narrow bridges, stairs, and platforms with interactive signage which describe the environment and water cycle. The unique structure is the product of years of innovative engineering, allowing people access to the previously never been explored 160 million year-old granite cliff face and west coast rainforest.

IBC 12-16 **8:55 AM**

NETWORK TIED ARCHES AND THE HAPPY HOLLOW PARK AND ZOO PEDESTRIAN BRIDGE

Gregor Wollmann, P.E., Ph.D., *HNTB, Blacksburg, VA*; Robin Lee, P.E. and Theodore Zoli, P.E., *HNTB, New York, NY*

The network tied arch system has been promoted by Norwegian Engineer Per Tveit since the 1960's, but due to the complexity of the structural analysis it has become more popular only in more recent years. The presentation will give a brief overview of recent and current network tied arch structures in the United States and will then discuss design and construction of the Happy Hollow Park and Zoo pedestrian bridge project in detail as a case study.

IBC 12-17 **9:20 AM**

DESIGN AND CONSTRUCTION OF CENTER STREET PEDESTRIAN ARCH BRIDGE

Qiyu Liu, *Arup, San Francisco, CA*

This paper will look at the design, fabrication, and erection of a 430 feet span steel arch bridge. The iconic Center Street Bridge consists of a large size non-prismatic steel arch and two orthotropic steel decks. The fabrication of these geometrically complicated steel members was easily achieved with the intelligent use of single curvature steel plates. Pedestrian induced vibration, aerodynamic behavior and buckling stability were also carefully considered in the design.

IBC 12-18 **9:45 AM**

CASCADES PEDESTRIAN BRIDGE DESIGN - A SIGNATURE PEDESTRIAN BRIDGE

Shawn Woodruff, P.E. and W. Denney Pate, P.E., *Figg Bridge Engineers, Inc., Tallahassee, FL*

A signature pedestrian bridge is being designed by FIGG for the City of Tallahassee, Florida's capital. The community-selected concept features modern concrete with organic shaping, canopies and eco-friendly design. The bridge deck is supported by circular columns positioned at angles and columns support canopies of solar fabric to capture the sun's energy and provide shade. That energy will light the bridge at night with dramatic color-changing LED lights that reflect off the canopies.

COFFEE BREAK **10:10–10:30 AM**

IBC 12-19 **10:30 AM**

PABLO PEDESTRIAN BRIDGE

Bradley Miller, P.E., *HDR Engineering, Inc., Florence, MT*

This unique AARA funded pedestrian bridge is part of a larger project for the Confederated Kootenai and Salish Tribes in Western Montana called the People's Way. The prefabricated steel bridge spans 265-feet over 4 lanes of traffice. Sixty-foot high styalized teepee structures, made from steel pipe reciprochal frames, support roofs over ADA landings at both ends of the bridge. There are many sustainable design and special Native American cultural aesthetic features in this project.

IBC 12-20 **10:55 AM**

BRIDGES TO PROSPERITY – LOCALLY APPROPRIATE CABLE-SUPPORTED PEDESTRIAN BRIDGES FOR DEVELOPING COUNTRIES

Avery Bang, *Bridges to Prosperity, Denver, CO* and Thomas Cooper, *Parsons Brinckerhoff, Denver, CO*

Bridges to Prosperity (B2P) is a non-profit organization that utilizes the volunteer efforts of engineering design and construction professionals to construct cable-stayed pedestrian bridges in rural communities around the world. This presentation will discuss the challenges and successes experienced developing and constructing these simple, yet robust designs. Examples provided will demonstrate the aspects of the bridge designs, the construction phases, and the sense of local involvement that is evident throughout all of the B2P projects.

IBC 12-21 **11:20 AM**

DESIGN AND CONSTRUCTION OF A NICARAGUAN FOOTBRIDGE: A STUDENT'S PERSPECTIVE

Brittani Russell, EIT, *University of Notre Dame, Notre Dame, IN*

As part of the Notre Dame Students Empowered through Engineering Development (ND Seed) team the author was intimately involved in every aspect of an engineering project from the initial conception and design of a 125 meter suspended footbridge, to the funding of the project, the construction, and the witness of the impact to the local rural Nicaraguan community after it was constructed. This paper includes the challenges, lessons learned, and reflections from this project.

REHABILITATION, PART 1 SESSION

Time: 8:30 AM–12:00 Noon
Room: Computers & Structures Inc. Theater
Chair: John C. Dietrick, P.E., S.E., *Michael Baker Jr., Inc., Cleveland, OH*

IBC 12-22 **8:30 AM**

INSPECTION AND EMERGENCY REHABILITATION OF THE SHERMAN MINTON TIED ARCH BRIDGE

Francesco Russo, Ph.D., P.E., *Michael Baker Jr., Inc., Philadelphia, PA*; Anne Rearick, *Indiana DOT, Indianapolis, IN*; George Gorrill, *Michael Baker Jr., Inc., Chicago, IL*

The Sherman Minton Bridge includes two 800-ft. long tied arch spans carrying I-64 over the Ohio River. As part of the 2011 inspection, a strategy to assess the tie girder butt welds was developed including UT testing to determine the quality of welds and the use of "fitness for service" models to determine the fracture resistance of the tie. While the engineering evaluation was underway a critical flaw was discovered resulting in the emergency closure of the bridge.

IBC 12-23 **8:55 AM**

I-10 MISSISSIPPI RIVER BRIDGE AT BATON ROUGE REHABILITATION DESIGN

Durk Krone, P.E., *TRC Engineers, Inc., Baton Rouge, LA*; Ray Mumphrey, *Louisiana DOT, Baton Rouge, LA*; John Richard, *TRC Engineers, Inc., Baton Rouge, LA*; David Huval, Jr., *CEC, Layfayette, LA*

The I-10 Mississippi River Bridge, located in Baton Rouge, Louisiana, carries Interstate I-10 over the Mississippi River. A large percentage of the approximately 110,000 vehicles traveling across each day is truck traffic. Located in the vicinity of the Port of Baton Rouge, heavy river barge traffic and also ocean-going vessels pass under the I-10 Bridge. The bridge was constructed in 1968 with an overall length of approximately 4,550 feet. The main portion of the bridge, a three span fracture critical steel cantilever through truss, is 2,423 feet in length, and is supported on reinforced concrete piers. The center portion of the cantilever through truss, a suspended span, is approximately 618 feet in length. The suspended span facilitates expansion and contraction of the structure by major structural elements called false chords. In 1996 the Louisiana Department of Transportation and Development ("DOTD") determined that the main span of this Structure had shortened due to rotation of one river pier. The false chords expansion

devices moved out of alignment and overtime experienced excessive deterioration. The false chords and the roadway expansion (finger) joint at panel point 35 would jam at temperatures above 85 degrees Fahrenheit. TRC was awarded a Contract by DOTD to conduct an in-depth inspection and provide a rehabilitation design. This paper discusses the innovative method of retrofitting the false chords and associated expansion devices and the jacking scheme that facilitated jacking of the suspended span under traffic into new alignment. Construction has been completed in November 2010.

IBC 12-24 **9:20 AM**

THE INSPECTION, ANALYSIS AND REHABILITATION OF AN ENGINEERING MARVEL: THE WALNUT LANE BRIDGE OVER WISSAHICKON CREEK IN PHILADELPHIA, PA

Michael Cuddy, P.E. and Manjeet Ahluwalia, P.E., *TranSystems, Langhorne, PA*; Peter Berg and Henry Berman, Ph.D., P.E., *Pennsylvania DOT District 6-0, King of Prussia, PA*

With a main span of 232' and a rise of 70', the Walnut Lane Bridge majestically crosses Wissahickon Creek in Fairmount Park. The structure is listed on the National Register and when completed in 1908, was the longest and highest concrete arch bridge in the world. The uniqueness of the bridge is the arch rings which were constructed with embedded flat stones with no steel reinforcement. The presentation will document the inspection, analysis and development of rehabilitation details for this structure.

IBC 12-25 **9:45 AM**

REVITALIZATION OF AN OHIO RIVER SUSPENSION BRIDGE

Matthew Lewellyn, P.E., *Burgess & Niple, Inc., Parkersburg, WV*; David Whited, *West Virginia DOT, Charleston, WV*; Joseph Juszczak, P.E., *West Virginia DOT, Moundsville, WV*

Through innovation and aesthetic enhancement, this project transformed a tired, forgotten structure into an icon for the communities on both sides of the river. The rehabilitation of the century-old, Market Street Bridge included truss retrofits, eyebar backup rods, cable suspender retrofits, tower strengthening, packrust sealing, painting, and state-of-the-art decorative lighting. By lengthening the life of the structure, WVDOT has shown a commitment to preserve history, reduce the use of new materials, and protect the environment.

COFFEE BREAK **10:10–10:30 AM**

IBC 12-26 **10:30 AM**

A 30 YEAR JOURNEY FROM POOR TO FAIR - THE TRANSFORMATION OF ONE BRIDGE SYSTEM IN NORTHWEST PA

William Koller, P.E., *Pennsylvania DOT, Oil City, PA*

This paper will show case PENN DOT District 1's bridge system from 1981 to the present. The bridge system in Northwest Pennsylvania has been transformed from poor to fair in 30 years despite the harsh climate, increasing environmental requirements, generally poor foundation material, and other challenges. The rehab and replacement strategies, technology, construction techniques, and materials used to make this transformation will be highlighted and explained.

IBC 12-27 **10:55 AM**

WIDENING THE HISTORIC RIVER ROAD ARCH BRIDGE OVER HARRODS CREEK

Daryl Carter, P.E., *Stantec, Lexington, KY*

The historic River Road Bridge over Harrods Creek, constructed circa 1912, is a three-span, reinforced concrete, filled-spandrel arch, located in Jefferson County, KY. The challenge was to rehabilitate and widen the existing bridge from one lane to two, while preserving its historic character. The solution was to "hide" a new prestressed concrete bridge inside the existing arches. Prestressed concrete deck panels form the deck, which cantilevers out over the spandrel walls on each side. This award-winning bridge was re-opened to traffic in August, 2010.

IBC 12-28 **11:20 AM**

THE MEMORIAL BRIDGE REHABILITATION

Robert Victor, P.E., *AECOM, Pittsburgh, PA*

The rehabilitation of the 800-foot long Memorial Bridge in Connellsville, PA was completed in summer, 2011. It provided a new deck, a trail connection, removal of all joints on the bridge and elimination of pin/hanger systems. Removal of the pin/hangers required an innovative reconfiguration of the bridge behavior that necessitated a total redistribution of loads. Two lanes for vehicles and access for pedestrians were provided during construction. Context-sensitive solutions were incorporated into the bridge.

DESIGN, PART 2 SESSION

Time: 1:30–5:00 PM
Room: Theater 1
Chair: W. Jay Rohleder Jr., P.E., S.E., *FIGG, West Chester, PA*

IBC 12-29 **1:30 PM**

DESIGN PHASE LOAD TEST PROGRAMS FOR THE SAKONNET RIVER BRIDGE REPLACEMENT PROJECT

Heather Scranton, P.E., Jean Louis Locsin, Michael Capraro, and Douglas Gifford, *Haley & Aldrich, Inc., Boston, MA*; Samuel Paikowsky, *Geosciences Testing and Research, Inc., North Chelmsford, MA*; Scott Bamford P.E., *Geocomp Corporation, Acton, MA*

For the new 2,265 ft. long Sakonnet River Bridge Replacement Project in RI, design-phase static and dynamic load tests were conducted on a number of pile foundation types including a 190-ft. long, 72-in. diameter (6000 kips), open-ended steel pipe pile fitted with an internal plate located 40 ft. above the tip. These load tests enabled the project team to make critical adjustments during the design phase rather than during construction, thereby avoiding potential construction delays.

IBC 12-30 **1:55 PM**

SCHEMATIC DESIGN OF THE NEW TUOJIANG RIVER BRIDGE IN SICHUAN, CHINA

Deng Yu, Zhonggui Jiang, and Chunlin Du, *T. Y. Lin International Engineering Consulting (China) Co., Ltd, Chongqing, China*

This paper introduces the design scheme of the new Tuojiang Bridge. The existing First Tuojiang Bridge is a arch bridge with seven spans of 45 meters. To achieve aesthetic compatibility with the existing bridge, the main span of the new bridge is 135m. The

new superstructure is a cast-in-place, prestressed concrete box girder bridge constructed with form travelers. This scheme provides valuable ideas for urban bridge reconstruction.

IBC 12-31 **2:20 PM**

TWO CABLE STAYED BRIDGES IN OYALA (EQUATORIAL GUINEA)

Juan Sobrino, Ph.D., P.E., *Pedelta Inc., Coral Gables, FL*; Javier Jordan, ICCP (Civil Eng.), *Pedelta Inc., Spain*

Two similar cable-stayed bridges have been completed to cross the Wele River in Oyala. These signature bridges will become a new emblematic entrance to the new city (Oyala) developed by the Government of Guinea Equatorial. The bridges have been designed to have a clear identity without disturbing the natural environment. The minimization of material quantities has been a major feat to reduce the construction cost due to difficult access to the site.

IBC 12-32 **2:45 PM**

RAPID BUILD USING 100% PRECASTING - SOUTH MAPLE STREET BRIDGE, ENFIELD CT

Jeffrey Scala, P.E., *Tectonic Engineering & Surveying Consultants P.C., Rocky Hill, CT*

Tectonic designed this rapid build project using 100% precast Construction Bridge. This approach cut the construction duration from 1 1/2 years to less than 4 months. A construction time analyses led us to propose this method. This would reduce the traffic detour time as well as eliminating winter construction and the river's flood issues that occur in the spring. Building with precast concrete also reduces the amount of disturbance to the surrounding forest and river because much of the work is done off site making it less intrusive and easier to protect the area. It is Connecticut's first fully precast bridge.

COFFEE BREAK **3:10–3:30 PM**

IBC 12-33 **3:30 PM**

CHALLENGES AND INNOVATIONS - SR 519 DESIGN-BUILD PROJECT

Sammy Tu P. Eng, P.E., S.E., *Arup, San Francisco, CA*; Huanzi Wang, *AECOM Technology, Oakland, CA*

The paper presents challenges and innovations for SR519 Intermodal Improvement Phase II Design-Build Project. Located in downtown Seattle, the project consists of two major bridges: Atlantic Ramp (AR) Bridge connecting existing I-90 westbound off-ramp to the Port of Seattle, and Royal Brougham Way Grade Separation (RBW) Bridge over BNSF tracks. AR Bridge is a 5 span post-tensioned cast-in-place concrete box girder bridge with a maximum span of 275ft. and a minimum horizontal radius of 400 ft. The RBW Bridge is a five-span, 670 foot long bridge with a combination of post-tensioned box girders, reinforced curved box girders, and precast, prestressed, pre-cambered girders over the railroad; and a flat slab ramp bridge to the second floor of the Qwest parking garage. The project team faced numerous challenges due to high seismic zone, liquefiable soils, utility constraint and fast-track design-construction, however, the team was able to successfully design and build the two bridges using and the success mainly came from some major innovative designs the team developed.

IBC 12-34 **3:55 PM**

CONCEPTUAL DESIGN FOR FUJIANG 1ST BRIDGE IN HECHUAN CITY, CHONGQING, CHINA

Chen Zu-Sheng, Guo Lei Ren, and Zhen Dong Ma, *T. Y. Lin International Engineering Consulting (China) Co., Ltd, Chongqing, China*

Fujiang 1st Bridge is a newly built bridge after demolition. The original bridge is a double-curved arch bridge. The new bridge integrates the features and figure of the beam bridges with those of the arch bridges through masterly design. The methods for beam bridges are applied to construct this bridge with arch features during construction process. Moreover, the ornamental effects of the new bridge are greatly improved by the typical spandrel arch and the archaistic laminated styling.

IBC 12-35 **4:20 PM**

DESIGN KINKED STEEL GIRDERS FOR I-91 OVER THE WHETSTONE BROOK

Joe Krajewski, P.E., *HNTB, Boston, MA*

Bridges 9N and 9S carry I-91 over the Whetstone Brook in Brattleboro, Vermont. The structures are twin bridges consisting of 2 span continuous kinked hybrid steel plate girder (240', 148') supported by semi-integral abutments and a pier. The girders are kinked 6 degrees over the pier to limit the deck overhangs to less than 6 feet, accommodate the curved alignment of I-91 and as a more economical solution than utilizing curved girders.

CONSTRUCTION TOPICS, PART 1 SESSION

Time: 1:30–5:00 PM
Room: Theater 2
Chair: Donald W. Herbert, P.E., *Pennsylvania DOT, Uniontown, PA*

IBC 12-36 **1:30 PM**

LAKE CHAMPLAIN BRIDGE ERECTION

Stephen Percassi, Jr., P.E., *Erdman Anthony, Rochester, NY*; Christopher Daigle, *Flatiron, Firestone, CO*; Theodore Zoli, P.E., *HNTB, New York, NY*

The new Lake Champlain Bridge, spanning between Crown Point, New York and Chimney Point, Vermont, was opened to traffic in November 2012 nearly 2 years after the previous structure was unexpectedly closed. The bridge replacement project, progressed by both the New York State Department of Transportation and the Vermont Agency of Transportation was awarded to Flatiron Construction Corporation in May of 2010. Erdman Anthony was retained by Flatiron to provide construction engineering services for all steel erection related components of the project. The new Lake Champlain Bridge, designed by HNTB, is an 8 span – 2200 ft. long steel superstructure supported on reinforced concrete piers with concrete filled drilled shafts and rock sockets into the lake bottom. Spans 1 through 4 from the New York approach and spans 6 through 8 from the Vermont approach are steel plate girders with a composite cast-in-place reinforced concrete deck. Span 5 is a 402 ft. Modified Network Tied Arch with precast deck and sidewalk panels. This presentation will focus on the engineering and construction efforts for the erection of the New York and Vermont approach spans including the custom falsework system used to erect the rigid frames flanking the main navigation channel. The presentation will highlight the unique construction techniques used to facilitate delivery and erection

of the 402 ft. Modified Network Tied Arch span. The 915 ton main span was erected 2 miles off-site, floated down Lake Champlain on twin barges and lifted vertically 75 ft. into its final position using hydraulic strand jacks.

IBC 12-37 **1:55 PM**

NON-TRADITIONAL WELDING PROCESSES FOR JOINING BRIDGE STEELS

Justin Ocel, Ph.D., P.E., *Federal Highway Administration, McLean, VA*; William Wright, *Virginia Tech, Blacksburg, VA*; Yoni Adonyi, *LeTourneau University, Longview, TX*

Bridge steels have been continually improved by the introduction of tougher, stronger and more corrosion resistant steel during the past decades. However, the fusion welding technologies used in bridge fabrication have remained stagnant in the same time period. This paper will explore the efficacy of non-traditional technologies, such as autogenous laser, hybrid laser arc, high-frequency, friction stir, and thermal stir welding technologies in the fabrication of steel bridge structures

IBC 12-38 **2:20 PM**

SEGMENTAL CAST-IN-PLACE CONSTRUCTION IN A COLD CLIMATE

Matthew Bowser, P. Eng, *McCormick Rankin Corporation, Kitchener, Ontario, Canada*; Bob Stofko, P.Eng. and Scott Leitch, P. Eng., *McCormick Rankin Corporation, Mississauga, Ontario, Canada*

Three of the four spans for the new Grand River Bridge were cast on falsework while the 315 foot river crossing was placed using progressive cantilever segmental construction. The structure consists of twin cast-in-place post tensioned, variable depth, box girders. This presentation delivers a brief design narrative, a summary of the means and methods employed for cold weather protection, and an overview of the services provided by the Contractor's bridge erection engineer.

IBC 12-39 **2:45 PM**

BRIDGE DEMOLITION APPLYING PRINCIPLES OF SEGMENTAL CONCRETE BOX CONSTRUCTION IN REVERSE

Gary Dinmore, *Halmar International LLC, Pearl River, NY*; Glenn Newmark, *Newmark Engineering, P.C., Montclair, NJ*

Innovative techniques were used to stabilize Ramp TE during demolition operations as part of the Alexander Hamilton Bridge Project. Ramp TE structure is a hollow box girder viaduct with a horizontal curve made of reinforced concrete, era 1964, suspended high over Interstate 95 in New York City near the George Washington Bridge. One technique mimicked balanced cantilever construction while another used a span-to-span type support system; both techniques are typically used in segmental concrete post-tensioned bridge construction but in a reverse sequence.

COFFEE BREAK **3:10–3:30 PM**

IBC 12-40 **3:30 PM**

THE 460 CONNECTOR PROJECT - A MAJOR BRIDGE IN A UNIQUE LOCATION

Timothy Barry, P.E., *RS&H CS, Jupiter, FL*; Robert Bennett, *RS&H CS, Abingdon, VA*

The 100 Million Dollar Route 460 connector in Breaks, VA presents numerous challenges to the owner and contractor. This Design/Build project consists of twin 1700 foot long cast-in-place segmental bridges over the Grassy Creek which, when finished, will be the tallest bridge in the Commonwealth of Virginia. Located in Buchanan County, Virginia, this project is in a rural part of the country. This presents numerous challenges in regards to labor, housing, right-of-way, and project communications.

IBC 12-41 **3:55 PM**

DESIGN AND ERECTION OF THE SHENANDOAH RIVER BRIDGE

Nicholas Cervo, Anthony Ream, Jason Fuller, and Matthew Bunner, *HDR Engineering, Inc., Pittsburgh, PA*; Nicklaus Graczyk, *Trumbull Corporation, Pittsburgh, PA*

The Shenandoah River Bridge in the eastern panhandle of West Virginia is a Design-Build project being completed by a team of HDR Engineering and Trumbull Corporation. With a main structural unit that spans 1400' and rises almost 200' above the valley, it will be one of the largest steel delta frame structures in the country. This paper presents the analysis, design, and erection engineering of this unique and complex structure, which is currently under construction.

IBC 12-42 **4:20 PM**

THE HODARIYAT BRIDGE PROJECT IN ABU DHABI (UAE)

Erwan Allanic, P.E., *International Bridge Technologies, San Diego, CA*

The new Hodariyat bridge is the first cable-stayed bridge built in the city of Abu Dhabi, UAE. Although the structure is over 1,300 meter long and 36 meter wide, the design and construction of the bridge have been completed in just over 2 years. Extensive use of precast techniques was employed to complete the bridge within this short time frame while meeting the project goals in term of cost and durability.

SPECIAL PURPOSE BRIDGES, PART 2 SESSION

Time: 1:30–5:00 PM
Room: Theater 3
Chair: Thomas G. Leech, P.E., S.E., *Gannett Fleming, Inc., Pittsburgh, PA*

IBC 12-43 **1:30 PM**

44TH ST. PEDESTRIAN BRIDGE- INNOVATIVE LINK TO THE CITY OF PHOENIX

Jonathan McHugh, P.E., M.ASCE, *Gannett Fleming, Inc., Pittsburgh, PA*; Steve Sherrill, *Gannett Fleming, Inc., Phoenix, AZ*

The 44th St. Pedestrian Bridge is a key linkage in the City of Phoenix, Department of Aviation's multimodal facility which integrates the PHX Sky Train project with the City's eastern transit hub. The bridge is 491'-2" and comprises four two-span continuous precast, pre-stressed, and externally post tensioned trapezoidal concrete box girders. Design and construction of this bridge in the CM@R contract structure incorporated the challenges of complex design, rigid aesthetics, multi-disciplinary coordination and aggressive schedule.

IBC 12-44 **1:55 PM**

FLOATING BRIDGES AND THEIR ANALYSIS FOR WIND AND WAVE EFFECTS

Ahmet Ozkan, P.E., S.E., *Ben C. Gerwick, Inc., Seattle, WA*; Michael Gebman, Ph.D., P.E., *Ben C. Gerwick, Inc., Oakland, CA*

Ben C. Gerwick, Inc. (Gerwick) was retained to provide analysis and design support service for the wind and wave analysis of proposed 7,710-foot-long SR520 floating pontoon bridge during the bid design phase. This paper gives a brief overview of the floating bridge behavior and presents the methodology and results of a wind and wave analysis performed on the floating bridge by using non-linear time-domain analysis due to 100-year return period storm.

IBC 12-45 **2:20 PM**

EAST SIDE PEDESTRIAN BRIDGE - PUBLIC PRIVATE PARTNERSHIP PRODUCES LANDMARK DESIGN

John Perkun, P.E. and Jerry Legowik, *SAI Consulting Engineers, Inc., Pittsburgh, PA*

Two Pittsburgh neighborhoods were disconnected for 30 years. Reconnecting these neighborhoods with an 88-foot signature pedestrian bridge required a public-private partnership. An array of government agencies, funding groups, a private developer, local businesses, community groups, the engineer, and the artist were partners in this effort. Incorporation of the artist's concepts into the final bridge plans provided an exciting engineering challenge. All aspects of the public-private partnership and the bridge artwork will be explored.

IBC 12-46 **2:45 PM**

REHABILITATION OF THE WHITTIER COVERED BRIDGE

Robert Durfee, P.E., SECB, and Michael Brassard, *Dubois & King, Inc., Bedford, NH*

The Whittier Covered Bridge was constructed using a rare "Paddleford Truss" configuration. The bridge has gone through several modifications during its 150 year existence. Modifications to trusses and other structural supports have changed the load and stress patterns of bridge members. This paper addresses the procedures that were followed to analyze structural members, determine load sharing and load distribution between redundant supports, and identify repairs and strengthening to structural members on this historic bridge.

COFFEE BREAK **3:10–3:30 PM**

IBC 12-47 **3:30 PM**

WILLIS AVENUE BRIDGE

William Nyman, *Hardesty & Hanover, New York, NY*

The $612m Willis Avenue Bridge replacement project addressed numerous constraints including maintaining traffic on the river, in a railyard and on multiple interfacing streets and highways within the confines of a complex urban site. The new 2500 ton swing span was floated into position after a 140 mile long journey from the assembly site. Notable features included a record breaking center pivot bearing, unique precast pier boxes and a FRP fender system.

IBC 12-48 **3:55 PM**

MOVABLE PEDESTRIAN BRIDGES OVER THE OLD DOCKYARDS IN GHENT: A CASE STUDY

Ellen Maes, *Waterwegen en Zeekanaal NV, Gent, Belgium*

Three bridges over the Old Dockyards in the city of Ghent (Belgium) are needed to inject life in this urban development project. Considering the docks give access to the city centre by water transport, vessel movements underneath the bridges must remain possible. Feichtinger Architectes delivered an elegant design for these bridges, that allows pedestrians to pass the bridge when it is moving. The first of these three bridges, the so called Bataviabrug, is now under construction.

IBC 12-49 **4:20 PM**

KING'S CROSS FOOTBRIDGE

James Clifford and David Warrior, *Tata Steel Projects, York, North Yorkshire, United Kingdom*; Neal Wyman, *Tata Steel Automotive Engineering, Coventry, United Kingdom*

King's Cross Footbridge is a new 5-span footbridge installed as part of a £500million refurbishment scheme of the 1852 Grade II listed King's Cross Station. The 60m long slim steel deck footbridge with glass parapets, escalators and glazed liftshafts was constructed within an operational station environment over 8no electrified railway tracks. Solutions to complex issues such as natural frequency sensitivity, bomb blast requirements, architectural and structural interfaces with new and historic infrastructure are discussed.

RESEARCH/EVALUATION, PART 1 SESSION

Time: 1:30–5:00 PM
Room: Computers & Structures Inc. Theater
Chair James Garrett, Jr., Ph.D., P.E., *Carnegie Mellon University, Pittsburgh, PA*

IBC 12-50 **1:30 PM**

BRIDGE LESSONS LEARNED FROM GREAT EAST JAPAN EARTHQUAKE

W. Phillip Yen, Ph.D., P.E., *Federal Highay Administation, Washington, DC*

On March 11, 2011, a magnitude 9.0 (Mw) earthquake, called Great East (Tohoku) Japan Earthquake, which occurred near the northeast coast of Honshu, Japan, resulted from thrust faulting on or near the subduction zone plate boundary between the Pacific and North America plates. The largest peak ground acceleration recorded was almost 3g and duration of earthquake exceeded 200 seconds. About 200 highway bridges and numerous rail bridges were damaged during this devastated earthquake, including span unseating, foundation scour, ruptured bearings, column shear failures and approach fill settlements. The causes of this damage can be broadly classified in two categories: ground shaking including ground failure (liquefaction), and tsunami inundation. Of these, the tsunami was responsible for about one-half of the number of damaged bridges. An US- Japan joint reconnaissance team, including representatives from FHWA, EERI, GEER and PWRI of Japan, visited the affected area from June 2 to June 6, 2011 and investigated 11 bridges. And among them, two had extensive bearing failures, two had column failures, two had combined bearing and column failures and four suffered

tsunami-related damage (unseated spans, scour, loss of approach fill). This paper presents the preliminary findings of the bridge performance of these eleven bridges and lessons learned from this earthquake. The paper will also discuss the seismic design codes used in Japan and ground motion recorded with response spectrum, and recommends research needed in improving bridge seismic safety.

IBC 12-51 **1:55 PM**

ASSESSMENT AND EVALUATION OF A HISTORIC STEEL RAIL ROAD VIADUCT USING ADVANCED SENSING TECHNIQUES

Ehsan Minaie, Ph.D., P.E., Franklin Moon, and A. Emin Aktan, *Intelligent Infrastructure Systems-division of Pennoni Associates Inc., Philadelphia, PA*

In this paper application of sesning and simulation techniques in assessment and evaluation of a historic railroad bridge has been discussed. Appropriate implementation of technology can reduce uncertainties and therefore risks associated with decision making process.

IBC 12-52 **2:20 PM**

EXPERIMENTAL AND ANALYTICAL EVALUATION OF A NEWLY-DEVELOPED MODULAR PANEL TRUSS BRIDGE SYSTEM

Gregory K. Michaelson, Karl E. Barth, and Jennifer M. Stains, *West Virginia University, Morgantown, WV*; Dennis L. Gonano, *U.S. Bridge, Cambridge, OH*

The goal of this study is to assess the performance of a newly developed bolted-diaphragm panel bridge. The main focus of this study involves the physical live load testing of a full scale 90 ft. Liberty Series specimen. Results from the field testing are then compared with a refined 3D finite element model using a commercial finite element package to assess the accuracy of the field test.

IBC 12-53 **2:45 PM**

COMPARISON OF SEISMIC PERFORMANCE OF INTEGRAL AND CONVENTIONAL BRIDGES

Murat Dicleli, Ph.D., P.E. and Semih Erhan, *Middle East Technical University, Ankara, Turkey*

In this study, seismic performances of integral and conventional bridges are compared. For this purposes, three existing integral bridges with one, two and three spans are selected and then designed as conventional jointed bridges. Next, nonlinear time history analyses of the bridges are conducted using a set of ground motions. The analyses results revealed that integral bridges have superior seismic performance compared to conventional bridges for the bridges considered in this study.

COFFEE BREAK **3:10–3:30 PM**

IBC 12-54 **3:30 PM**

FAILURE ASSESSMENT OF A PRE-STRESSED CONCRETE BRIDGE USING TIME DEPENDENT SYSTEM RELIABILITY METHOD

Mojtaba Mahmoodian, P.E., *University of Greenwich, Gillingham, Kent, United Kingdom*; Chun Qing Li, *RMIT, Melbourne, Australia*

The collapse of Ynys-y-Gwas Bridge in the UK is reviewed. The review shows how ingress of chloride into partially grouted ducts and anchorages had caused serious corrosion for tendons. Then a numerical system reliability analysis is carried out to check the limit

state function for bending moment. The results shows how the availability of monitoring data from corrosion rate could help the bridge owners to predict the time of collapse before it happens.

IBC 12-55 3:55 PM

SAFETY EVALUATION, DYNAMIC TESTING, AND SHM OF A HEAVY DAMAGED R.C. BRIDGE

Kleidi Islami, F.E., *University of Padua, Columbia University, New York, NY*; Filippo Casarin and Claudio Modena, *University of Padua, Padua, Italy*

In a project developed in north-east Italy, a r.c. bridge was subject to analytical and dynamic investigations to evaluate static and dynamic characteristics, due to live-cycle damage. It has a typical cross-section with girders bearing a thin slab and characterized by three spans. Severe damage on the edge girders was revealed recently, so lots of destructive tests and ambient-modal-tests were executed. The vulnerability analysis showed consistent deficiency and suggested the installation of a SHM system.

IBC 12-56 JAMES D. COOPER STUDENT PAPER 4:20 PM

SEISMIC PERFORMANCE OF EMULATIVE PRECAST BRIDGE COLUMN ELEMENTS WITH GROUTED COUPLER CONNECTIONS

Zachary B. Haber, *University of Nevada, Reno, NV*

Three half-scale bridge column models were recently tested at the University of Nevada, Reno to investigate the performance of precast column-to-footing connections for accelerated bridge construction (ABC) in areas of high seismicity. Models were subjected to slow cyclic loading at increasing levels of drift. A benchmark column with conventional cast-in-place (CIP) details was designed. Two other column models were precast and incorporated emulative grouted coupler connections in the plastic hinge region. Results indicate that the precast connections tested are emulative of CIP construction in with regards to damage levels, hysteretic behavior, and energy dissipation but had slightly reduced drift capacity.

WORKSHOP 1 — 8:00-11:00 AM

USING FRP COMPOSITES AS PREFABRICATED BRIDGE ELEMENTS AND SYSTEMS AS SOLUTIONS FOR EXTENDING BRIDGE LIFE

Room: 330

Presented by: American Composites Manufacturers Association

John P. Busel, *ACMA*; Dan Richards, *ZellComp*; Scott Reeve, *Composites Advantage*; John Hillman, *HC Bridge*; David White, *Sika Corp.*; Ryan Koch, *Hughes Brothers, Inc.*

FRP composite products have been successfully used in new bridge construction and rehabilitation that provide bridge engineers and owners with innovative and cost effective solutions. For over 20 years, composites have demonstrated long term durability for FRP reinforced concrete decks in highly corrosive regions of North America. FRP composites features such as lightweight, corrosion resistance, and prefabrication have contributed to the goals of accelerated bridge construction by reducing assembly and installation time resulting in lower installation costs for new construction. In rehabilitation, features such as speed and minimal disruption to the structure while in service have provided bridge owners with solutions for extending the service life of bridge structures with minimal disruption to the public.

This workshop will present six case histories on recent bridge installations from a variety of FRP composites products including bridge decks, girders, and pedestrian bridges where the installations demonstrate support of the FHWA Prefabricated Bridge Elements and Systems program for new construction. In addition, rehabilitation solutions using structural strengthening systems applied to transit bridges located in seismic regions will demonstrate the feasibility of composites to extend the service life of structures including other applications that transportation agencies face with repairing facilities with shrinking available funds. Lastly, the use of FRP rebar offers the benefit of an extended bridge service life using traditional design methodologies. An analysis of life cycle costing using FRP bars will demonstrate a valuable return on investment for bridge owners because of the increased service life of bridges.

WORKSHOP 2 — 8:00 AM-12:00 NOON

TUNNEL MANAGEMENT SYSTEMS

Room: 329

Presented by: Federal Highway Adminstration

Jesus M. Rohena, P.E., *Federal Highway Administration*; Brian J. Leshko, P.E., *HDR Engineering, Inc.*; Chester L. Allen, *Gannett Fleming, Inc.*

This workshop discusses issues relevant to tunnel data management as a tool to operate and maintain tunnels at a least cost. Description benefits, and hand on demonstration of a FHWA Tunnel Management System software will be used during the workshop. To manage both the tunnel structure and its complex systems, a tunnel data management system should be used to provide historical records of the components, and their condition.

The software is provided free of charge by FHWA and participants are encouraged to download it and to bring their laptops to the workshop.

WORKSHOP 3 — 8:00 AM-12:00 NOON

GEOSYNTHETIC REINFORCED SOIL INTEGRATED BRIDGE SYSTEM (GRS-IBS)

Room: 328

Presented by: Federal Highway Adminstration

Jennifer Nicks and Michael Adams, *Federal Highway Administration*; Randy Albert, *Pennsylvania DOT*

This workshop will provide attendees with background information on the design, construction, and performance of the Geosynthetic Reinforced Soil Integrated Bridge System (GRS-IBS). The IBS is a fast, cost-effective method of bridge support that utilizes GRS technology blending the roadway to the superstructure creating a joint-less bridge system. For transportation agencies utilizing this technology, the result is a lower cost bridge alternative, with savings up to 60% that can be constructed in as little as 10 days. It has been highlighted by the Federal Highway Administration (FHWA) in its recent Every Day Counts (EDC) initiative. For more information on this program prior to the webinar, please visit: http://www.fhwa.dot.gov/everydaycounts/technology/grs_ibs/

WORKSHOP 4 — 1:00-5:00 PM

MESSINA STRAIT BRIDGE

Room: 330

Presented by: Buckland & Taylor Ltd.

Enzo Vullo, *Stretto di Messina*; Fabio Brancaleoni, *Università di Roma TRE*; Lars Jensen, Jacob Egede Andersen, and Matthew Bloomstine, *COWI A/S*; Chris Walker, *Flint & Neill Ltd.*; Christopher Scollard, *Buckland & Taylor Ltd.*; Yasutsugu Yamasaki, *Eurolink*

1. General Outline of the Project - Enzo Vullo, Stretto di Messina
2. Design Concept, from Early Days to Present - Fabio Brancaleoni, Università di Roma TRE
3. Design Overview and Superstructure Design - Lars Jensen, COWI A/S
4. Suspension System Design - Chris Walker, Flint & Neill Ltd.
5. Tower Design - Christopher Scollard, Buckland & Taylor Ltd.
6. Dehumidification Systems - Matthew Bloomstine, COWI A/S
7. Runability, Safety and Comfort Analysis - Jacob Egede Andersen, COWI A/S
8. Structural Health Monitoring System - Jacob Egede Andersen, COWI A/S
9. Erection Procedures and their Challenges - Yasutsugu Yamasaki, Eurolink

WORKSHOP 5 — 1:00-5:00 PM

PRESERVATION OF BRIDGE DECKS

Room: 329

Presented by: Federal Highway Adminstration

M. Myint Lwin, P.E., S.E. and Anwar Ahmad, *Federal Highway Administration*; Michael Sprinkle, *Virginia DOT*; David Whitmore, *Vector Corrosion*; Anthony McCloskey, *Pennsylvania DOT*

The goal of this workshop is to provide bridge owners, engineers and maintenance personnel with examples of effective preventative maintenance activities and treatment techniques to extend the service life of bridge decks, and reduce the life-cycle cost of highway bridges.

Bridge decks are constantly subject to the abrasive effects of traffic, and the cor-

rosive and damaging effects of the environment. As the bridge decks deteriorate, it is important and urgent to develop bridge deck preservation programs to keep the bridge decks in a state of good repair.

In this workshop we will hear from practitioners from States, FHWA and industry on effective methods and strategies for improving and maintaining bridge deck performance. The attendees will have an opportunity to work on developing a bridge deck preservation program, which can be adapted to individual needs.

At the end of the workshop, the participants will:

1. Understand the effectiveness of systematic preventative maintenance.
2. Gain a good knowledge of the various preventive maintenance activities and treatments that can be used to extend the service life of bridge decks.
3. Learn how other bridge owners apply preservation strategies to stretch their budgets.
4. Be able to develop Bridge Deck Preservation Programs to meet the needs of bridge owners.

This workshop will consist of presentations and hands-on exercise on developing a bridge deck preservation Program.

Moderator: Myint Lwin

1. Welcoming Remarks – M. Myint Lwin, P.E., S.E., FHWA
2. Implementation Strategies for Systematic Preventive Maintenance Program - Anwar Ahmad, FHWA (continued)

3. Rapid Overlays for Deck Preservation - Michael Sprinkle, Virginia DOT
4. Corrosion Mitigation Techniques – David Whitmore, Vector Corrosion
5. Overview of PennDOT Bridge Preservation Program – Anthony McCloskey, PennDOT
6. Exercise: Develop a Bridge Deck Preservation Program – All Attendees
7. Open Discussion - Moderated by Myint Lwin

WORKSHOP 6 — 1:00-5:00 PM

FUNDAMENTALS AND APPLICATION OF BRIDGE LIFE CYCLE COST ANALYSIS

Room: 328

Presented by: Federal Highway Administration

Nathaniel Coley, *Federal Highway Administration*

This workshop conveys fundamental concepts used in the economic analysis of highway bridge projects and proceeds to an explanation of economic analysis methods, especially life-cycle cost analysis and benefit-cost analysis. The workshop also reviews the use of traffic forecasts, risk analysis, and economic impact analysis in the economic analysis process. It concludes with an interactive training session on use of network level benefit-cost analysis using the National Bridge Investment Analysis Software and a project level analysis using a prototype version of FHWA's new Bridge Life-Cycle Cost Analysis Software – BLCCA2. Participants wishing to explore the software to be displayed should bring their laptops and contact Nathaniel Coley at ncoley@dot.gov to obtain the software for installation on personal laptops.

WORKSHOP 14 — 1:00-5:00 PM

OWNERS FORUM

Room: 327

Presented by: High Steel Structures, Inc.

Paul DelSignore, *Amtrak*; Sandra Dumas, *Connecticut DOT*; Dennis Heckman, *Missouri DOT*; Kristin Langer, *Pennsylvania DOT*; James Stump, *Pennsylvania Turnpike Commission*

Owners will provide a forecast of their bridge program at this forum, including an overview of upcoming structures design, construction or inspection work.

DESIGN, PART 3 SESSION

Time: 8:30 AM–12:00 Noon
Room: Theater 1
Chair: Matthew A. Bunner, P.E., *HDR Engineering, Inc., Pittsburgh, PA*

IBC 12-57 8:30 AM

DESIGN OF YUYUN BRIDGE IN YINKO

Liu Xueshan, Guolei Ren, and Anshuang Liu, *T.Y.Lin International China, Chongqing, China*

Yuyun Bridge is located in Yingkou of Liaoning. The reinforced concrete arch bridge is employed for major structure, and the rococo style is employed for the decoration of main bridge, the Chinese classical style is employed for the sidewalk and the bridgehead tower. Due to soft geology on both banks of bridge, the horizontal thrust of arch bridge is formed as the tie bar arch bridge through increasing the inclined brace of side span and weights.

IBC 12-58 8:55 AM

COMPLETE ANALYSES OF BUCKLING OF SLENDER DEEP FOUNDATION ELEMENTS IN SOFT RIVERBED SOILS

Jesús Gómez, Ph.D., P.E., D.GE. and Helen Robinson, *Schnabel Engineering, West Chester, PA*

This paper outlines a procedure to evaluate buckling of slender foundations in soft soils that considers non-linearity of the soil and of the foundation element. The method also provides an estimate of the factor of safety against buckling failure and rotations and deflections of the foundation element under vertical load. It considers the eccentricity of loading on the foundation element, which is an essential part of the development of construction specifications and assessment of the suitability of a given foundation type. Several examples of slender foundations in soft soils are provided, as well as methods to mitigate the potential for buckling.

IBC 12-59 9:20 AM

PRACTICAL DESIGN METHODS FOR SKEWED BRIDGES

Travis Butz, P.E., *Burgess and Niple, Inc., Columbus, OH*

Girder bridges constructed on skewed supports experience out-of-plane deflection not encountered in non-skewed structures. Neglecting the effects of skew in design can introduce significant error in the calculation of moments and shears in individual girders. Methods will be presented by which a designer can evaluate the magnitude of skew effects using simple analysis techniques during preliminary design in order to determine if a more refined analysis is justified.

IBC 12-60 9:45 AM

A STUDY OF USER COMFORT ON WILLAMETTE BRIDGE DUE TO WIND AND TRAIN LOADS

Stoyan Stoyanoff, Ph.D., P. Eng., Ing. and Pierre-Olivier Dallaire, *RWDI, Bromont, QC, Canada*; Semyon Treyger, Michael Jones and Michael Van Duyn, *HNTB, Seattle, WA*; Steve Barrett, *TriMet, Portland, OR*

During the conceptual design of Willamette River Transit Bridge (WRTB), HNTB and RWDI studied user comfort under wind and train-induced vibrations. Traffic on bridges presents more exposed area to wind and introduce higher loads. Passing trains were

simulated under high winds and an assumed schedule. eak responses were computed, combined with rolling stock analysis and compared to user comfort criteria. This study predicted that this criteria can be met for winds up to approximately 40-mph.

COFFEE BREAK 10:10–10:30 AM

IBC 12-61 10:30 AM

BRIDGE OVER THE BLACKFOOT, TRUSS SPAN LENGTHENING

Bradley Miller, P.E., *HDR Engineering, Inc., Florence, MT*

The 1921 Black Bridge over the Blackfoot River was converted to pedestrian use in 1948. Dam removal directly downstream from the bridge would cause faster stream velocities and major scouring at the center pier located at midstream. The bridge was scheduled for replacement with a much longer span bridge but a way was found to lengthen one of the truss spans and re-purpose it for the main span to the delight of the local community.

IBC 12-62 10:55 AM

FLOATING BEARING SYSTEM FOR SEVERELY CURVED I-GIRDER BRIDGES: CASE STUDY OF CORBIN STREET FLYOVER

Preston Vineyard and Ruchu Hsu, *Parsons Brinckerhoff, New York, NY*; Owen Lee, *Port Authority of NY & NJ, Newark, NJ*; Yu Shing Wong, *Port Authority of NY & NJ, Newark, NJ*; WooSeok Kim, *Chungnam National University, Daejeon, South Korea*

This paper highlights the design challenges for the new Corbin Street flyover bridge serving Port Newark, NJ. The horseshoe shaped curved steel plate girder flyover is comprised of 7 continuous spans and has an extremely tight radius of only 169 ft. The paper focuses on the innovative controlled floating bearing system developed to accommodate thermal expansion and contraction. The controlled floating bearing design minimizes the number of expansion joints, which not only simplifies the construction, but also minimizes future maintenance.

IBC 12-63 11:20 AM

LONG-SPAN CHALLENGES FOR THE IL-170 BRIDGE OVER THE ILLINOIS RIVER

Christopher L. Stine, P.E., S.E., *AECOM, Chicago, IL*

The existing structure carrying IL-170 over the Illinois River was a 4-span thru-truss found to be both structurally and functionally deficient. The proposed bridge utilizes long-span plate girders to maintain the 360-ft. navigational channel, while improving the vertical navigational clearance. As a result of the span-to-depth and span-to-width ratios used and support limitations in the river, unique solutions were required to ensure global stability of the structure during girder erection and pouring of the decks.

IBC 12-64 **11:45 AM**

THE USE OF STAINLESS STEEL IN BRIDGE STRUCTURES

Nancy Baddoo, MA, CEng, MICE and David Iles, MSc, CEng, MICE, *The Steel Construction Institute, Ascot, Berks, United Kingdom*; Cynthia Duncan, *American Institute of Steel Construction, Chicago, IL*; Catherine Houska, *Outokumpu Stainless, Inc. - North America, Itasca, IL*

Stainless steels are highly corrosion resistant and suitable for applications in aggressive environments, for example by the coast or exposure to deicing salts. The paper discusses the properties of stainless steels and their selection for different environments. Design rules for structural stainless steel (to be introduced in a new AISC Design Guide) are compared with carbon steel rules in ANSI/AISC 360-10 and the AASHTO LRFD Bridge Design Specifications. Examples of stainless steel bridges are given.

ABC SESSION

Time: 8:30 AM–12:00 Noon
Room: Theater 2
Chair Louis J. Ruzzi, P.E., *Pennsylvania DOT, Bridgeville, PA*

IBC 12-66 **8:30 AM**

SOUTH LAYTON INTERCHANGE: LAUNCHING A TWO SPAN SPUI

Logan Julander, *Michael Baker Jr., Inc., Midvale, UT*; Donath Picardo, *Picardo, Klophaus and Associates, Salt Lake City, UT*; Michael Romero, *Utah DOT, Salt Lake City, UT*

This presentation includes several unique accelerated bridge techniques to launch a 218'-0" long by 220'-0" wide SPUI bridge. These techniques include constructing the bridge over the abutment surcharge, lowering the bridge from the surcharge height, the use of lightweight concrete bridge elements and launching the bridge longitudinally into place.

IBC 12-67 **8:55 AM**

MASSACHUSETTS BRIDGE IN A BACKPACK

John Watters, P.E., *Greenman-Pedersen, Inc., Stoneham, MA*

This project involved the construction of the first "bridge in a backpack" carbon fiber bridge outside of Maine. This 32 foot span arch is comprised of unreinforced self consolidating concrete filled carbon fiber arch elements. The use of carbon fiber tubes as well as other corrosion resistant materials such as FRP headwalls, decking, and geogrid reinforcement, will provide for a maintenance free structure. An instrumentation program was completed to verify design assumptions and bridge performance.

IBC 12-68 **9:20 AM**

DESIGN AND FLOAT-IN CONSTRUCTION OF MAJOR RIVER BRIDGES

Kevin Eisenbeis, *Burns & McDonnell, Kansas City, MO*

This paper highlights design and construction aspects of several major river bridge float-ins. Projects discussed include a variety of float-in techniques for spans ranging from 250' to 625' in length. Highlights include structural modifications, barge configurations, system stability, tower supports, and various considerations of "high" vs. "low" float-ins. Paper will include discussion of load transfer from temporary bents to barges. Projects covered include fixed and movable bridges.

IBC 12-69 **9:45 AM**

ABC OF I-95 CORRIDOR IN RICHMOND, VA

Scott Fisher, P.E., *Virgina DOT, Midlothian, VA*; Jorge Suarez, *Michael Baker, Jr., Inc., Richmond, VA*

This section of the I-95 corridor is a north-south, six-lane, interstate highway that crosses through Richmond and Henrico County, Virginia. Eleven bridge rehabilitations will be performed using state-of-the-art accelerated bridge construction techniques. All the bridge superstructures will be constructed off site and delivered to the bridge locations with specialty transport trailers. Unique prefabricated bridge superstructure units, night-time lane closures and crossovers using the Quick-Change barrier system, and possible weekend bridge replacements, public involvement, MOT schemes and haul route coordination and permitting.

COFFEE BREAK **10:10–10:30 AM**

IBC 12-70 **10:30 AM**

SAM WHITE BRIDGE - SPMT MOVE OF 2-SPAN CONTINUOUS BRIDGE

Daniel Baker and Richard Hansen, *Michael Baker Jr., Inc., Midvale, UT*

The 354-ft. two-span continuous steel-plate girder Sam White Bridge was designed and constructed as part of the I-15 CORE design-build project. The superstructure was constructed offsite and moved into its final location using Self Propelled Modular Transporters (SPMTs). Sam White is the longest bridge of its type to be moved using SPMTs in the western hemisphere. Multiple geometric factors greatly increased the complexity of the bridge move.

IBC 12-71 **10:55 AM**

TEMPORARY AND PERMANENT WORKS DESIGN FOR LEICESTER ROAD BRIDGE

Greg P. Collingridge, M.Eng (Hons), David A. Warrior, B.Eng, Ph.D, C.Eng, MICE, and Peter Mullen BSc, MSc, *Tata Steel Projects, North Yorkshire, United Kingdom*

This paper discusses a recent bridge reconstruction that was able to construct a new road bridge over the railway with minimal disruption to either the road or railway. The existing bridge was demolished, site cleared, the new bridge slid into place and the road re-opened within a single weekend (Friday 8pm – Monday 6am). The design of the permanent works to act as temporary supports was vital to this process.

IBC 12-72 **11:20 AM**

I-595 EXPRESS CORRIDOR - ACCELERATED COMPLEX BRIDGE DESIGN AND CONSTRUCTION

Nathan Porter, P.E., *AECOM, Glen Allen, VA*; Joseph Allwarden, *AECOM, Boston, MA*

AECOM's engineers successfully completed the design of three adjoining complex bridge structures known as the "Y" bridge in less than 12 months. The bridges are part of a 1.2 billion dollar P3 project between FDOT and the concessionaire I-595 Express LLC. Ultimately, the "Y" bridge will become part of the reversible express toll lanes and will serve as a direct connection from I-595 to the median of Florida's Turnpike. Unique design features include bifurcated and horizontally curved steel plate trapezoidal box girders, steel straddle bents, post-tensioned concrete integral caps, and the use e of temporary girder support towers to facilitate integral cap construction.

INSPECTION/INSTRUMENTATION SESSION

Time: 8:30 AM–12:00 Noon
Room: Theater 3
Chair: Gary Runco, P.E., *Borton-Lawson, Wexford, PA*

IBC 12-73 — 8:30 AM

LOAD RATING BRIDGE-SIZE CULVERTS - THE STATE OF PRACTICE

Lubin Gao, Ph.D., P.E., *Federal Highway Administration, Office of Bridge Technology, Washington, DC*; M. Myint Lwin, P.E., S.E., *Federal Highway Administration/HIBT-1, Washington, DC*

Culverts greater than 20 ft. must meet load rating requirements set forth in NBIS. FHWA's NBIS compliance reviews found States' practices in load rating culverts vary significantly and there are potentially high risks in culvert safety. It is of significance to review the current state of practice. This presentation will: (1) introduce federal requirements about load rating culverts; (2) discuss state of practice; (2) identify challenges facing State agencies; and (3) discuss LRFR methodology.

IBC 12-75 — 8:55 AM

BENEFITS OF LIVE LOAD TESTING AND FINITE ELEMENT MODELING IN BRIDGE RATINGS

Douglas Heath, *AECOM, Boston, MA*; Corey Richard, *AECOM, Providence, RI*; Georgette Chahine, *Rhode Island DOT, Providence, RI*

This presentation discusses a live load testing and bridge rating program implemented for the Rhode Island Department of Transportation. Finite element models were developed and calibrated against field tests. The calibrated models helped identify unreliable sources of strength, such as locked bearings, and provided a means for determining an accurate and reliable rating factor. The modeling and calibration process, a case study, and an overview of the benefits load testing provided will be presented.

IBC 12-76 — 9:20 AM

MINNESOTA DOT'S NEW SOFTWARE FOR BRIDGE INSPECTION AND MANAGEMENT

Jennifer L. Zink, P.E., *Minnesota DOT- Bridge Office, Oakdale, MN*

The Minnesota Department of Transportation has recently implemented a new software system called SIMS – Structure Information Management System. The system is used for inspection and management of its 20,000+ bridges. It reduces the amount of clerical work by allowing data entry in the field and integrates modules for structure management and maintenance. SIMS is a complete repository for all structure data. This paper discusses the process leading to implementation and features of the application itself.

IBC 12-80 — 9:45 AM

PARK RIVER CONDUIT (PRC) INSPECTION

Muhammad Asif Iqbal, E.I.T.,and Aslam Siddiqui, *AI Engineers, Inc., Middletown, CT*

The Park River Conduit (PRC) is a large two-cell box culvert (conduit) approximately 3 miles long, 30 feet high and 45 feet wide carrying the Park River (sometimes called the Hog River) under the City of Hartford, Connecticut. It was built by the Army Corps of Engineers in the early 1980s, which was originally started in 1940s after the great floods of 1936, 1938 and 1955 which inundated all of Bushnell Park and much of Hartford under several feet of water. The Park River Conduit is a Permit-required Confined Space

(PRCS) as it contains or has the potential to contain a hazardous atmosphere. AI Engineers Inc. of Middletown, Connecticut was tasked by the Connecticut Department of Transportation to perform an in-depth inspection of the structure. The paper outlines the detailed safety plan, inspection coordination, deployment of equipment and an agreed upon procedure for the visual and hands-on inspection of this prominent structure.

COFFEE BREAK 10:10–10:30 AM

IBC 12-77 10:30 AM

STEEL AND RIVET SAMPLING AND TESTING FOR PULASKI SKYWAY TRUSS SPANS

John Bryson, P.E., Lop-Man Yu, and Yi Qiu, *Parsons Brinckerhoff, New York, NY;* Miguel Santiago, *Parsons Brinckerhoff, Lawrenceville, NJ*

Pulaski Skyway (1932) includes 3 miles of truss spans. Load ratings of truss members and gusset plate connections based on AASHTO and FHWA guidelines resulted in many truss members gusset plate connections not rating HS20. A sampling and testing program was implemented to determine actual material properties and a statistical evaluation was performed to determine actual material properties. Truss member and gusset plate connection ratings performed using the higher material properties resulted in improved ratings.

IBC 12-78 10:55 AM

ADVANCED PERFORMANCE EVALUATION OF A LENTICULAR TRUSS

Raymond Hartle, P.E., *GAI Consultants, Homestead, PA*; Toader Balan, Ph.D., *Fynite Solutions, LLC, Moon Township, PA*

The performance evaluation and load rating of complex structures is often not possible using currently available base level analytical programs. This is especially true when member elements of the structure begin to exhibit deterioration. Fynite Solutions has developed, successfully implemented and will present in this paper, a cost effective evaluation protocol for refined load rating analysis using advanced 3D Finite Element Analysis and Modeling calibrated for accuracy through selective instrumentation and controlled load testing.

IBC 12-79 11:20 AM

WHEN IS 3D MODELING OF TRUSS AND ARCH BRIDGES A GOOD BET? LESSONS LEARNED FROM THE ANALYSIS OF THREE LONG-SPAN STRUCTURES.

Daniel Baxter, P.E., S.E., *Michael Baker Jr. Inc., Cleveland, OH*

The paper focuses on some of the key structural analysis and design points learned from the three-dimensional analysis of long-span truss and arch bridges. Structural analysis and modeling aspects of the Innerbelt Bridge deck truss rehabilitation project in Cleveland, Ohio, the Milton-Madison Bridge through truss replacement in Indiana/Kentucky, and the Hastings Bridge Replacement in Minnesota will be discussed. These projects have demonstrated the importance of careful consideration of structure widening, interaction between main load carrying members and the floor system, floorbeam end moments, and geometric nonlinear effects. The types of structures for which the added complexity of a three-dimensional analysis is likely justified are discussed as well.

REHABILITATION, PART 2 SESSION

Time: 8:30 AM–12:00 Noon
Room: Computers & Structures Inc. Theater
Chair: John F. Graham Jr., P.E., *Straen, Inc., Pittsburgh, PA*

IBC 12-81 8:30 AM

REPLACEMENT OF CANTILEVER TRUSS TIE-DOWNS ON BOSTON BRIDGE

Gary L. Gardner, Jr., P.E., *ms consultants, inc., Coraopolis, PA*; Heath Butler, *PennDOT, District 11-0, Bridgeville, PA*; Michael Little, *Trumbull Corporation, Pittsburgh, PA*; Brodie Claybaugh, P.E., *Century Steel Erectors, Dravosburg, PA*

During construction of the $17.3 Million rehabilitation of the Boston Bridge, it was discovered that the pin and linkage assemblies anchoring the cantilever truss spans were significantly deteriorated and required replacement. This paper will describe how the project team designed and safely constructed the tie-down replacement system and temporary works while increasing redundancy, maintaining an aggressive construction schedule, and minimizing the duration of traffic disruption.

IBC 12-82 8:55 AM

POST-TENSIONING STRENGTHENING OF A MULTIPLE-SPAN CONTINUOUS CONCRETE BOX BRIDGE

Genmiao Chen, P.E., *Parsons Brincherhoff, Seattle, WA*; Kit Loo, *Seattle DOT, Seattle, WA*; Luke Su, *AECOM, Seattle, WA*; Jingjuan Li, *KPFF Consulting Engineers, Seattle, WA*

Constructed circa 1950, the rehabilitated bridge consists of six continuous spans composed of double-box reinforced concrete structure. The deficiencies included insufficient shear and flexure capacity, excessive deflection/vibration, deck cracking, and expansion joint deterioration. Post-tensioned tendons bonded and encapsulated within the thickened concrete webs were used to strengthen the superstructure. Use of self consolidating concrete for superstructure and a suspended work platform construction method was utilized to address work space constraints, minimize environmental impacts, and cost efficiency.

IBC 12-83 9:20 AM

ABLE DEHUMIDIFICATION - INSTALLATION, OPERATION AND MAINTENANCE

Mark Bulmer, C.Eng., MICE, *AECOM, Leeds, West Yorkshire, United Kingdom;* Charles Cocksedge, *AECOM, London, United Kingdom*

Traditionally, suspension bridge main cables have been protected by paste with round wire wrapping and external paint. Internal cable inspections worldwide have revealed that this has been ineffective and significant remedial actions have been necessary to provide additional corrosion protection, including dehumidification. Cable dehumidification systems installed on the UK's three major suspension bridges have been operational for a number of years and are having positive results. These systems have proved to be inexpensive to install, operate and maintain.

IBC 12-85 **9:45 AM**

STAGED REPLACEMENT OF A FRACTURE CRITICAL PINNED FLOORBEAM-COLUMN BENT AT GOWANUS EXPRESSWAY (I-278)

Ramesh Panchalan, Ph.D., P.E., Joseph Katsman, and Philippe Bousader, P.E., *WSP-SELLS, Briarcliff Manor, NY*

As part of a $750 million repair project, a deteriorated, fracture critical bent (floorbeam-column structure with framed stringers) with a 7 inch diameter pin in the floorbeam web, was replaced with a new wider structure comprising of a built-up capbeam supported on concrete straddle bents and columns. Due to limited access and critical under bridge clearance, staged construction schemes were used to replace the bent and two spans while maintaining traffic lanes and minimizing lane closures.

COFFEE BREAK **10:10–10:30 AM**

IBC 12-86 **10:30 AM**

REHABILITATION OF RETAINING WALLS DAMAGED BY ALKALI-SILICA REACTION

Steven Bennett, P.E., *Parsons Brinckerhoff, New York, NY*

Innovative engineering techniques provided an economical solution for the rehabilitation of a 1.5-mile-long section of retaining walls and abutments of the Port Washington Branch of the Long Island Rail Road (LIRR) in Elmhurst, Queens. Extensive deterioration of the concrete walls and abutments was attributed to alkali silica reaction (ASR) that had taken place over many years due to the use of an aggregate that contains a silica that reacts with the alkali in cement in the presence of moisture. In addition, a stability analysis found that under current train live loads, the factor of safety against sliding and overturning was inadequate. Avoiding a major replacement, a combination of unconventional techniques allowed the walls to be repaired, improved their capacity, and halted further ASR deterioration. Rather than replacing the walls where there was significant ASR deterioration, a new technique based on the application of lithium chloride was used to halt ASR damage. To further address ASR deterioration, the outer several inches of the wall faces were removed and replaced with a specially designed low-permeability concrete that contained a high proportion of fly ash to counter any further alkali-based deterioration and to seal the exterior wall surface. Soil nail walls—typically used as temporary support of excavation—were used in this project to replace the function of the existing walls where they were seriously deteriorated. This allowed the deteriorated walls to essentially be replaced without removing the existing wall, without temporary shoring and without impacting train operations for those areas of walls found deficient for sliding and overturning, ground anchors were added to bring the walls up to current criteria

IBC 12-87 **10:55 AM**

REPAIRING AND PRESERVING BRIDGE STRUCTURE BY INNOVATIVE CRACK ARREST REPAIR SYSTEM

Len Reid, *Fatigue Technology, Seattle, WA*

Cracking in steel bridges is a major concern for continued safe operation. The commonly employed method of retarding crack growth involves drilling a crack arrest hole at the end of the detectable crack with repeat inspections. An innovative repair method that arrests growth of cracks and makes drill stops effective is presented. This technology can be applied to fatigue critical fastened joints, eliminating potential for cracking, improving structural integrity and minimizing repair/inspection cost.

IBC 12-88 **11:20 AM**

REHABILITATION OF HISTORIC WELLS STREET BASCULE BRIDGE, CHICAGO, ILLINOIS

Dipal Vimawala, S.E., P.E., *AECOM, Chicago, IL*; Daniel Burke, S.E., P.E., *CDOT, Division of Engineering, Chicago, IL*

The Chicago Department of Transportation (CDOT) retained services of AECOM to perform engineering services for the Wells Street Bridge over the Chicago River. This historic bascule bridge, built in 1922 and listed on the Illinois Historic Bridge Survey, is a double-deck, double leaf, fixed trunnion structure that carries the Chicago Transit Authority (CTA) elevated railway on the upper level, and vehicle, bicycle and pedestrian traffic on its lower level. The main span of the bridge is 345 feet long and 72 feet wide. The bridge has been in operation for about 90 years and has numerous members with extensive corrosion and loss of section. A major rehabilitation of the bridge is targeted around spring 2012.

CONSTRUCTION TOPICS, PART 2 SESSION

Time: 1:30–3:35 PM
Room: 330
Chair: Richard L. Connors, P.E. PMP, *Bureau Veritas North America, Inc., Pittsburgh, PA*

IBC 12-89 **1:30 PM**

SURGICAL DEMOLITION OF THE PASEO BRIDGE

David D. Byers, Ph.D., P.E. and Lisa Matchulat, *Genesis Structures, Kansas City, MO*; Terrence J. Colombatto and Patrick Byrne, *Massman Construction Co., Kansas City, MO*

Once one the longest self-anchored suspension bridges in the world, the three-span Paseo suspension bridge, containing spans of 308, 616 and 308 feet, was demolished in 2011. Details of the original analysis and construction methods are presented along with in in-depth discussion of the step-by-step deconstruction modeling techniques used to analyze and safely remove the bridge are presented.

IBC 12-90 **1:55 PM**

STRANK MEMORIAL BRIDGE VALUE ENGINEERING

Kevin O'Connor, P.E. and Chuck Nelms, *L.R. Kimball, Pittsburgh, PA*
Ralph DeStefano, P.E., *Pennsylvania DOT District 9-0, Hollidaysburg, PA*; Ed Jones, P.E., *L.R. Kimball, Ebensburg, PA*

The Strank Memorial Bridge Project was originally conceived as the rehabilitation of an existing Nine-Span Structure over two railroads and the little Conemaugh River just North of Johnstown, PA. Through the value engineering process, this rehabilitation project was converted to an off-line bridge replacement, providing the owner with a new structure, improved traffic flow, and increased railroad clearances. The use of this process provided Penn DOT with a new 100-year bridge at minimal additional cost.

IBC 12-91 **2:20 PM**

DESIGN & CONSTRUCTION OF FOOTHILLS PARKWAY BRIDGE NO. 2

John Corven, P.E., *Corven Engineering, Inc., Tallahassee, FL*; Jean-Claude Demosthenidy, *Interactive Design Systems, San Diego, CA*

Bridge No. 2, located near the Great Smoky Mountain National Park in Tennessee, is the last significant bridge along "missing link" of the Foothills Parkway. The owner of the $25 million design-build project is the National Park Service. The project is being led by the Eastern Federal Lands Highway Division of the FHWA. The team of Bell & Associates Construction/VSL/Corven Engineering is building this complex precast segmental bridge in very difficult and environmentally sensitive terrain.

IBC 12-92 **2:45 PM**

EFFECTS OF SUPPORT SKEW ON THE BEHAVIOR OF STEEL I-GRINDER BRIDGES DURING CONSTRUCTION

Andres Sanchez, Ph.D., *HDR Engineering, Inc., Pittsburgh, PA*; Donald White, *Georgia Institute of Technology, Atlanta, GA*

Steel I-girder bridges with skewed supports exhibit three-dimensional response characteristics that can affect their structural performance during the various construction stages. Some of the most relevant effects that skewed supports can induce are: excessive web out-of-plumbness, large cross-frame forces, high levels of flange lateral bending, fit-up problems during erection, and difficulties with the control of the overall bridge geometry during deck placement. This paper presents studies conducted to assess the skew influence during the construction process, and to propose methods to identify cases where the skew may have an important contribution to the structural behavior.

IBC 12-93 **3:10 PM**

CONSTRUCTION LIVE LOAD RESPONSE AND PROGRESSIVE CALIBRATION OF THE VGCS CABLE STAY BRIDGE MODEL

Parag Nimse, *The University of Toledo, Houston, TX*; Douglas Nims, Ph.D., P.E., *University of Toledo, Toledo, OH*; Robert Ward, *Owens-Illinios, Perrysberg, OH*; Arthur Helmicki and Victor Hunt, *University of Cincinnati, Cincinnati, OH*

On the Veterans' Glass City Skyway (VGCS), a small number of sensors was used to characterize the structure. Critical segments were instrumented during casting and measurements have been continuously collected throughout the bridge's life. This allowed the instrumentation to measure the structural response at all stages from casting to service. These measurements were used to develop a calibrated model that captures the as-built construction conditions and is tuned against variety of loading and boundary conditions.

RAIL SESSION

Time: 1:30–3:35 PM
Room: 329
Chair: W. Jay Rohleder Jr., P.E., S.E., *FIGG, West Chester, PA*

IBC 12-94 1:30 PM

HONOLULU TRANSIT BRIDGE DESIGN-BUILD PROJECT, A SUSTAINABLE BRIDGE FOR HAWAII

Jose Rodriguez, P.E., PMP, *Figg Bridge Engineers, Inc., Tallahassee, FL*

The Honolulu Rail Transit Project is planned to reduce congestion in this urban area. The first two sections, were awarded as design-build projects to Kiewit with HNTB and FIGG. The concrete segmental design focuses on sustainability in its design and construction, through both environment friendly materials and construction methods. Typical spans range will be built span-by-span with segments erected from a deck-mounted crane on the completed bridge deck to maintain traffic.

IBC 12-95 1:55 PM

RIUDELLOTS BRIDGE: AN EXAMPLE OF HIGH SPEED RAILWAY SKEW BRIDGE

Romo Josã Prof., *FHECOR Ingenieros Consultores SA, Madrid, Spain*

The high-speed line between Barcelona and the French border cross an important highway, with a large skew 34º. The resultant bridge has two spans of 53.00 + 53.00 m. The high visibility of the structure, the importance of span and strong deformational constraints imposed by the railroad, led to a bridge with two lateral variable steel lattices. The structure combines stiffness conditions with a sense of lightness.

IBC 12-96 2:20 PM

DART ORANGE LINE - A DESIGN/BUILD PRECAST SPLICED-GIRDER BRIDGE SOLUTION

Thomas W. Stelmack, P.E., *Parsons, Denver, CO*; Jonathan Kempfer, *Kiewit Infrastructure South Co., Irving, TX*

Dallas Area Rapid Transit's (DART) Orange Line Light Rail project provided a unique challenge crossing the Trinity River Levee. The horizontal and vertical constraints, both above and below, were met by using a spliced and post-tensioned precast concrete girder structure with a 260 ft. long main span. Construction presented many challenges, all of which were met by using an innovative design and construction procedure that was effectively integrated though the design/build delivery process.

IBC 12-97 2:45 PM

RAPID REPLACEMENT OF TIMBER APPROACH TRESTLES OF NS RAILROAD BRIDGE

Harold Plott, P.E. and Andrew Burkholder, *AECOM, Roanoke, VA*; Jonathan Hocker, *Norfolk Southern Railway Corporation, Atlanta, GA*

This project consisted of replacing approximately 1,100 linear feet of timber trestle approach spans of the existing single track NS Bridge V-2.8 over the Eastern Branch of the Elizabeth River in Norfolk, Virginia. The replacement approach spans consist of ballasted, single track, precast concrete spans. The spans were designed to be replaced one at a time. Precast concrete pile caps and pier caps were erected underneath existing timber stringers and between alternate existing timber piers. During brief track outages,

RESEARCH/EVALUATION, PART 2 SESSION

Time: 1:30–3:35 PM
Room: 328
Chair: M. Myint Lwin, P.E., S.E., *Federal Highway Administration, Washington, DC*

IBC 12-99 1:30 PM

A STUDY OF THE IMPACT STRENGTH OF STEEL FIBER R.C. BRIDGE COLUMN ELEMENTS FOR PRECAST SEGMENTAL BRIDGE CONSTRUCTION IN SEISMIC REGIONS

Nasi Zhang, *University at Buffalo, Buffalo, NY*; **George Lee,** *State University of New York at Buffalo, Buffalo, NY*

Steel fiber reinforced concrete (SFRC), which provides high impact strength and ductility, can be used in segmental bridge construction to delay the crack and crush of concrete and absorb more energy under an earthquake. In this paper, ACI drop weight impact test and modified ACI drop weight impact test are performed on both normal concrete and SFRC. The impact strength of normal concrete and SFRC are compared and analyzed.

IBC 12-100 1:55 PM

NONLINEAR FINITE ELEMENT ANALYSIS OF HMCFRP STRENGTHENED STEEL BRIDGE GIRDERS

Yusuf Sumer, Ph.D., Muharrem Aktas, and Elif Agcakoca, *Sakarya University, Sakarya, Adapazarı, Turkey*; **Serdar Kuyuk,** *University of California, Berkeley, CA*

Carbon fiber reinforced polymer materials became popular in construction industry for strengthening and retrofitting of concrete structures in last decade. Together with the recent availability of higher modulus carbon fiber reinforced polymer strips has resulted in the possibility of strengthening steel structures, either. They used at steel bridge girders and structures that are under risk due to corrosion induced cross section losses, structural deterioration from aging or changes in use. Moreover the safety level of flexural strengthened steel bridges against forces due to earthquake excitation is of world-wide concern. A full-scale finite element analysis are performed to investigate the behavior of the steel bridge girders in undamaged, damaged and strengthened states based on the acceleration record of the 1989 Loma Prieta earthquake. Nonlinear finite element analysis (NLFEA) software, ABAQUS, was used to execute dynamic analysis. The analyses were carried out using the procedure "Dynamic, Explicit" which is available in ABAQUS\Explicit. Steel beams for the numerical study were chosen to have enough shear-carrying capacity. The girders were W27x84 and 5m in length. Eight-node three-dimensional cohesive elements (COH3D8) used to bond the composite materials to the steel beam. It has been found that the NFLEA results are sensitive to mesh density selection thus a special consideration should be given to the proper/optimum size. We have obtained increase up to 20% in load carrying capacity of strengthened steel beams with high modulus composite materials.

single spans were replaced by removing the existing timber trestle, erecting the prec! ast beams on the substructure, installing ballast and a temporary ballast retainer, and using a short "jump span" to transition from the new span to the existing span. An individual span could be replaced within a track outage of 6 hours.

IBC 12-98 **3:10 PM**

DESIGN AND CONSTRUCTION OF GRADE SEPARATION AT 71ST STREET AND CSXT/B&OCT/IHB RAILROADS IN BRIDGEVIEW, IL

Bradley Radovich, *AECOM, Chicago, IL*

The paper describes design and construction issues for a four-track grade separation over a busy street in a progressive south Chicago suburb. Requirements for bridge construction under active tracks with limited rail shut-down windows available resulted in the use of "jump span" temporary structures to construct the substructure. Two-track 24 hour shut-downs for superstructure installation were utilized. The location of utilities complicated the work, primarily a 84" diameter sewer main through the proposed abutment location.

IBC 12-101 **2:20 PM**

EVALUATION OF ADVANCED ANALYSIS TECHNIQUES FOR SKEWED REINFORCED CONCRETE RIGID FRAME BRIDGES

William Farrow III, P.E., *Greenman-Pedersen, Inc., Lebanon, NJ*; Daren Dong, P.E., *Gannett Fleming, New York, NY*; Chelsea Stachura, *Gannett Fleming, Newark, NJ*

With the current limited resources available to rehabilitate or replace substandard bridges, the reliance on advanced 3D analysis methods to determine the safety of the in-service bridges is becoming prevalent. This paper will evaluate several skewed reinforced concrete rigid frame bridges with varying span lengths and skew angles to compare the results of from traditional 2D analysis with 3D analysis techniques. From this analytical comparison a discussion of the findings and recommendations will be made.

IBC 12-102 **2:45 PM**

PREDICTION OF GUSSET PLATE LIMIT-STATES

Justin Ocel, Ph.D., P.E. and Rob Zobel, *Federal Highway Administration, McLean, VA*; Don White, *Georgia Institute of Technology, Atlanta, GA*

After the collapse of the I-35W Bridge, FHWA and AASHTO collaboratively began an experimental research program to investigate the limi-states of steel truss gusset-plated connections. This paper will discuss the results from the testing and preliminary recommendations derived from them.

IBC 12-103 **3:10 PM**

ACOUSTIC IMAGING TO ENHANCE BRIDGE INSPECTION AND BRIDGE REPAIR DESIGN

David Reser, P.E. and Jeff Rowe, P.E., *Infrastructure Engineers, Inc., Spartanburg, SC*

This presentation will address several case studies where underwater acoustic imaging was used to provide information to the design team for bridge rehabilitation and scour countermeasure design projects. The actual scans will be shown, and a presentation of how this information was incorporated into the construction plans used by the contractor which ultimately reduced the possibility of construction claims for unknown conditions below the waterline.

DESIGN AND EVALUATION SESSION

Time: 1:30–3:10 PM
Room: 327
Chair: Stephen G. Shanley, P.E., *Allegheny County, Department of Public Works, Pittsburgh, PA*

IBC 12-104 1:30 PM

DESIGN AND CONSTRUCTION OF CHIBOUGAMAU BRIDGE

Victor Egorov, Ph.D., Louis-Philippe Poirier, and Mario Levesque, *SNC-LAVALIN, Montreal, Quebec, Canada*

This paper describes the design and construction of a wooden bridge in Chibougamau, Quebec, Canada. The bridge has a 67.5m span and consists of a system of two curved box girders, deck and transverse diaphragms. The length of the span and high traffic loads are unique features of this project. The design and construction challenges are presented.

IBC 12-105 1:55 PM

SOUTH NORFOLK JORDAN BRIDGE DESIGN AND CONSTRUCTION

Charles Silcox, P.E., *Figg Bridge Engineers, Inc., Tallahassee, FL*; Thomas Jenkins, *Figg Bridge Builders LLC, Tallahassee, FL*

The new South Norfolk Jordan Bridge is a 5,371′ long precast concrete bridge across the Elizabeth River in Chesapeake, Virginia. Approach spans (typically 150′ long) are being built using segmental span-by-span construction. The 385′ long main span is being built using segmental balanced cantilever construction. Piers are also precast and range from 19′ to 145′ tall to accommodate the shipping channel and are founded on precast pile foundations. Construction will be completed in Spring 2012.

IBC 12-106 2:20 PM

ANALYTICAL MODEL FOR OPTIMIZING THE DESIGN OF ISOLATED AND DAMPED BRIDGE STRUCTURES

Viacheslav Koval, P.Eng.,and Constantin Christopoulos, *University of Toronto, Toronto, Ontario, Canada*; Robert Tremblay, *Ecole Polytechnique de Montreal, Montreal, Quebec, Canada*

Over the last two decades, the benefits of using isolation as an efficient means for enhancing the earthquake resistance of bridges has been recognized worldwide. Besides achieving superior seismic performance objectives, this advanced technology provides appreciated cost savings over the life span of both new and retrofitted bridge structures. The design process for seismically isolated bridges is regulated by different construction codes throughout the world such as the CSA-S6 Canadian Highway Bridge Design Code and the AASHTO LRFD Seismic Bridge Design Specifications in North America (NA). These seismic provisions have been developed based on historical events that have occurred along the North American west coast and their appropriate use in eastern NA has been questioned by many. Despite the generally well-understood effects of isolation in reducing the seismic demand on bridges, the combined effect and optimal use of isolation and supplemental damping devices in bridges has not been fully exploited to achieve optimal designs. A new analytical model and methodology to carry out nonlinear simplified isolated bridge analysis is presented in this paper. A series of time-history analyses representing western and eastern North American earthquakes were performed for a range of linear equivalent and nonlinear structural systems covering a wide range

MONDAY JUNE 11 EVENTS					
8:30 AM-12 NOON	KEYNOTE SESSION BALL ROOM B/C				
12:00-5:00 PM	EXHIBIT HALL OPEN (LUNCHEON BUFFET AT NOON)				
1:30-5:00 PM	FEATURED AGENCY: MODOT THEATRE 1	PROPRIETARY SESSION C&SI THEATRE	W-15 WHY ARE BRIDGES FAILING? ROOM 330		

TUESDAY JUNE 12 MORNING EVENTS					
8:00 AM-5:00 PM	EXHIBIT HALL OPEN (LUNCHEON BUFFET AT NOON)				
8:00 AM-12 NOON	W-1: FRP COMPOSITES ROOM 330	W2: TUNNEL MANAGEMENT ROOM 329	W3: GRS-IBS ROOM 328	INTEGRAL ABUTMENT DESIGN SEMINAR*	LOAD RATING OF SHORT SPAN SEMINAR*
8:30 AM-12 NOON	DESIGN, PART 1 THEATRE 1	LONG SPAN THEATRE 2	SPECIAL PURPOSE BRIDGES, PART 1 THEATRE 3	REHABILITATION, PART 1 C&SI THEATRE	

TUESDAY JUNE 12 AFTERNOON EVENTS					
1:00-5:00 PM	W4: MESSINA STRAIT BRIDGE ROOM 330	W5: PRESERVATION OF BRIDGE DECKS ROOM 329	W6: BRIDGE LIFE CYCLE COST ANALYSIS ROOM 328	W14: OWNERS FORUM ROOM 327	EXTREME EVENTS AASHTO/PENN DOT SEMINAR*
1:00-5:00 PM	IBC BUS TOUR* (CHECK IN AT 12:45 PM)				
1:30-5:00 PM	DESIGN, PART 2 THEATRE 1	CONSTRUCTION, PART 1 THEATRE 2	SPECIAL PURPOSE BRIDGES, PART 2 THEATRE 3	RESEARCH/EVALUATION, PART 1 C&SI THEATRE	TRB CO-MEETING ROOM 323

TUESDAY JUNE 12 AFTERNOON EVENTS (CONT'D.)

2:30-3:30 PM	POSTER SESSION Q&A
5:00-7:00 PM	IBC AWARDS RECEPTION* CONCOURSE C

WEDNESDAY JUNE 13 MORNING EVENTS

8:00 AM-1:30 PM	EXHIBIT HALL OPEN (LUNCHEON BUFFET AT NOON)				
8:00 AM-12 NOON	W7: CONTRACTOR WORSKHOP ROOM 330	W8: ANTI-GRAFFITI ROOM 326	W9: BRIDGE PRESERVATION ROOM 329	W10: EFFECTIVE SKEWED PRACTICES ROOM 328	FRACTURE CRITICAL SEMINAR*
8:30 AM-12 NOON	DESIGN, PART 3 THEATRE 1	ABC THEATRE 2	INSPECTION/ INSTRUMENTATION THEATRE 3	REHABILITATION, PART 2 C&SI THEATRE	
9:30-10:30 AM	POSTER SESSION Q&A				

WEDNESDAY JUNE 13 AFTERNOON EVENTS

1:30-4:00 PM	DESIGN & EVALUATION ROOM 327	RESEARCH/EVALUATION, PART 2 ROOM 328	RAIL ROOM 329	CONSTRUCTION, PART 2 ROOM 330	
1:30 PM	W11: CHALLENGES OF CONCRETE DESIGN ROOM 326	W12: AUTOMATED BRIDGE PLANS ROOM 323	W13: STAINLESS STEEL DESIGN (1:00) ROOM 324		

* TICKETED EVENT

of isolated and damped bridge configurations. Based on these results some conclusions are drawing on the optimal combination of isolation and supplemental damping systems for each of the configurations that are studied. Finally, examples of real bridges that are retrofitted following the recommendations that have been derived from this study are examined and modelled to further illustrate the benefits of such optimal designs.

IBC 12-107 **2:45 PM**

THE DESIGN/BUILD REPLACEMENT OF MCNAIR ROAD BRIDGE

Laura Anderson, *Pennoni Associates Inc., Newark, DE*

The recent replacement of the 234-foot McNair Road Bridge at the U.S. Naval Academy was a fast-tracked and challenging project in the design-build format. The six span continuous bridge ties into adjacent structures along three sides, and an expedited schedule was required to complete the work prior to the start of the fall semester. Because of the short construction period available, Accelerated Bridge Construction (ABC) Technologies were used including precast pilecaps and precast concrete beams.

WORKSHOP 7 — 8:00 AM-12:00 NOON

CONTRACTOR WORKSHOP -LAKE CHAMPLAIN & HUEY P. LONG BRIDGES

Room: 330

Presented by: Flatiron, MTI, a Joint Venture, and Rizzani de Eccher, USA

Cody Hix, *Flatiron*; Steve Hayes, *MTI, a Joint Venture*; Andrea Travani, *Rizzani de Eccher, USA*

A contractors retrospect on the construction of The Lake Champlain Bridge Replacement by Flatiron Construction Corporation, The Huey P. Long Bridge Expansion by Massman Construction Company and Concrete Segmental Bridge Erection by Rizzani de Eccher, USA.

WORKSHOP 8 — 8:00 AM-12:00 NOON

ANTI-GRAFFITI

Room: 326

Presented by: The Sherwin Williams Company Protective & Marine Coatings

Mark Hudson, Dee McNeill, Sid Oakes, *Sherwin-Williams Protective and Marine Coatings*

According to the latest U.S. Justice Department figures, State Department s of Transportation (Dot's) and American property owners spend approximately $12 billion dollars annually in order to remove graffiti.

This presentation will discuss two "State of the Art" Anti-graffiti technologies that have been developed to solve the problem. A single component Siloxane technology that allows complete graffiti removal with water, and a Super-Hydrophobic Polyurethane, less than 100 VOC, that can be applied in one-coat over a sealed surface that provides ASTM D6578 Level 3 Graffiti Removal. The technical presentation will be followed by an on-site live graffiti removal demonstration.

WORKSHOP 09 — 8:00-10:00 AM

BRIDGE PRESERVATION

Room: 329

Presented by: AZZ Galvinizing Services

Kevin Irving, *AZZ Galvanizing Services*

The purpose of this seminar is to inform and educate architects, engineers, and other specifies about hot-dip galvanized steel and how it can address the growing corrosion problem throughout North America.

Upon completion of this seminar, you will be able to:

- Recognize the corrosion issues confronting North America
- Describe how zinc coatings, specifically hot-dip galvanizing, can protect against steel corrosion
- Incorporate sound corrosion protection into the design of steel products that can significantly reduce maintenance costs over the life of a project

WORKSHOP 10 — 8:00 AM-12:00 NOON

EFFECTIVE SKEWED BRIDGES PRACTICES

Room: 328

Presented by: TRB Committee on Steel Bridges, AFF10

This workshop will address the design and construction of skewed steel bridges, with emphasis on understanding and dealing with girder rotation during erection and associated design, detailing, fabrication, and erection practices. There will be presentations as described below, including Q&A and a panel discussion with the presenters lead by John Yadlosky of HDR.

- Issues of Focus - Barney Martin, Modjeski and Masters; Chair TRB Committee on Steel Bridges, AFF20
- Skewed Bridge Erection - Robert G. Urban, High Steel
- Skewed Bridge Detailing and Fabrication - Ronald D. Medlock, High Steel
- Skewed Bridge Behavior and Design - Daniel G. Linzell, Pennsylvania State University
- Advanced Bracing Concepts - Todd Helwig, University of Texas, Austin
- Key Analysis Considerations - Donald W. White, Georgia Institute of Technology
- Case Studies and Wrap Up - Karl H. Frank, Hirschfeld Industries

WORKSHOP 11 — 1:30-2:30 PM

OVERCOMING CHALLENGES OF MODERN CONCRETE SEGMENTAL DESIGN

Room: 326

Presented by: Bentley Systems, Inc.

Jeff Kroon, *Bentley Systems, Inc.*

This workshop will provide the attendee with a detailed look at some of the challenges of designing cast-in-place concrete segmental bridges using the balanced cantilever method, and how those challenges are overcome using modern software. Challenges include detailed analysis of time dependent effects and construction stages, determining camber curves, and modeling of the bridge and tendons in 3D.

A special approach to the numerical analysis of construction sequencing and the effect is has on concrete creep calculations is required for the complex detailed design of such bridges. Modeling the bridge geometry including variability of the cross section and accurate modeling of the application of construction loads must be efficient but also accurate due to the effect that they have on constructability.

An example will be shown where the challenges described here were mitigated through the use of modern software to substantially shorten and relieve the effort required to design the bridge.

WORKSHOP 12 — 1:30-3:30 PM

AUTOMATED BRIDGE PLANS PRODUCTION

Room: 323

Presented by: Bentley Systems

Alex Mabrich, P.E., Msc, *Bentley Systems*

Design-Build Projects, ABC Projects have shrinking the delivery times of bridge projects. Even though, engineers still need to comply with the proper and sometimes very strict CADD standards in order to submit their plans. Using software to do the bridge calculations and another software to transfer this calculations to actual plans is nowadays inefficient and time consuming. Bridge engineers can take advantage now of design and plans production software that eliminate the transfer of information from one design software to a drafting software while still complying with CADD standards and without doing repetitive work even if the bridge design is modified.

WORKSHOP 13 — 1:00-4:00 PM

STAINLESS STEEL STRUCTURAL DESIGN & SPECIFICATION FOR CONSTRUCTION

Room: 324

Presented by: Nickel Institute and Steel Construction Institute

Juan Sobrino, *Pedelta Inc.*; Dan Fitzwilliam, *TY Lin International*; Catherine Houska and Gary Coates, *Nickel Institute*; Nancy Baddoo, *The Steel Construction Institute*

Topics:

1. Case studies: structural stainless steel in bridges
2. How to specify stainless steel for bridge applications
3. Grade selection and mechanical properties
4. Design of members and connections and response to seismic loading
5. Weldability and fabrication issues
6. Environmental impact and whole life cost

SEMINARS (TICKETS REQUIRED)

IBC Seminars are intensive, four-hour, single-topic focused sessions. An additional fee of $175 is required for each seminar and advance registration is required, and a ticket will be provided to you at that time. Tickets are required to attend all seminars. Seating for each Seminar is limited, so please register early. Certificates of Completion are awarded upon completion.

INTEGRAL ABUTMENT DESIGN

Date: Tuesday, June 12
Time: 8:00 AM–12:00 Noon
Presented by: Gannett Fleming, Inc.

Tom Leckrone, P.E. and Rhett A. Heiple, P.E., *Gannett Fleming, Inc.*

This course provides an introduction to the design of integral abutments based on PennDOT's design criteria. It includes an overview of how integral abutments are designed and how they function, an introduction to how they are detailed, an explanation of the department's integral abutment spreadsheet and how this is used in conjunction with LPile (lateral pile analysis software) to perform a design, an example problem that participants will review in class, and an overview of multi-span integral abutment structures and their unique design requirements.

LOAD RATING OF SHORT SPAN BRIDGES AND CULVERTS

Date: Tuesday, June 12
Time: 8:00 AM–12:00 Noon
Presented by: Federal Highway Administration

M. Myint Lwin, P.E., S.E. and Lubin Gao, *Federal Highway Administration*; Tim Carre, Pennsylvania DOT; Cindy Wang, Ohio DOT

In accordance with the National Bridge Inspection Standards (NBIS), each bridge or bridge-size culvert must be load rated as to its live-load carrying capacity following the method and procedure specified in the AASHTO Manual for Bridge Evaluation (MBE). When the maximum unrestricted legal loads or State routine permit loads exceed that allowed, the bridge must be posted or restricted.

A majority of bridges on local roads and some state highway bridges are short-spans or culverts. The FHWA's NBIS compliance reviews found that the practices in load rating short span bridges and culverts vary significantly among agencies. There is a need to provide training in achieving uniformity and consistency in load rating of short span bridges and culverts.

This seminar is to provide bridge owners, managers and engineers with:

- Fundamental knowledge in load rating of short span bridges and culverts in accordance with the AASHTO Manual for Bridge Evaluation. and
- Tools and experience in performing load rating of short span bridges and culverts.

At the end of the seminar, the participants will:

- Understand the background behind the AASHTO Manual for Bridge Evaluation
- Gain a good knowledge on how load ratings are done by State, County, City and Consultant Bridge Engineers
- Acquire hands-on experience in the load rating of short span bridges and culverts.
- Be able to establish inspection practices and evaluation procedures for meeting the NBIS requirements in load rating of bridges and culverts.

This seminar will consist of presentations and hands-on working examples. Participants will receive a booklet on "Introduction to AASHTO Manual for Bridge Evaluation".
Moderator: Myint Lwin

- Welcoming Remarks – by Myint Lwin
- Introduction to the AASHTO Manual for Bridge Evaluation – by Lubin Gao
- A State's Perspective in Load Rating of Short Span Bridges and Culverts – by Tim Carre, Pennsylvania DOT
- Use of Spreadsheets in the Load Rating of Short Span Bridges and Culverts – by Cindy Wang, Ohio DOT
- Hands-on Exercise in Load Rating of Short Span Bridges and Culverts - by Lubin Gao and Myint Lwin
  - Worked Examples
  - Classroom Exercises by all attendees
  - Discussion on the classroom exercises
- Open Forum – moderated by Myint Lwin

Notes: Bring your pens and calculators for the classroom exercises.

EXTREME EVENTS - RECENT CHANGES TO AASHTO SEISMIC DESIGN & PENNDOT FLOOD RESPONSE

Date: Tuesday, June 12
Time: 1:00–5:00 PM
Presented by: UNR, BergerABAM, and Pennsylvania DOT

Moderator: W. Phillip Yen, Ph.D., P.E., *Federal Highway Administration, Office of Bridge Technology.*

- Welcoming Remarks - Phil Yen
- Bridge Seismic Performance in Recent Large Earthquakes and the Potential Impacts on Seismic Design Practice - Ian Buckle, UNR
- Break
- AASHTO Bridge Seismic Design Guide Specifications Updates - Lee Marsh, BergerABAM
- Break
- Penn DOT Flood Response - Lloyd E. Ayres, PennDOT
- Closing Remarks and Adjournment - Lee Marsh

Many lessons learned from the bridge seismic performance of the recent devastated earthquakes, including Maule earthquake in Chile (2010) and Tohoku earthquake in Japan (2011). Bridges constructed or retrofitted with good seismic design details performs greatly even under large ground motions. The duration of these two large ground motion had both exceeded more than 2 minutes, and this long duration has impacted the bridge performance with pounding effects and energy dissipation issues. A brief overview of the bridge earthquake reconnaissance reports will be presented; lessons learned from these two earthquakes and recommendations of the future design will be discussed.

Ian Buckle, Ph.D., *Earthquake Engineering Research Laboratory, Reno, University of Nevada*

The participants will develop an understanding bridge performance during two of the largest earthquakes in recent history, including:

- effects of load path design between superstructure and substructures,
- effects of tsunami on bridges,
- effects of duration, and

- potential recommendations for bridge seismic design practice.

Many changes have taken place in the AASHTO seismic design provisions over the last five or so years. This seminar will highlight these changes and will provide insight into the 'why' behind the changes. AASHTO has moved to a 1000-year return period and has introduced a displacement-based guide specification that may be used in lieu of the seismic provisions in the LRFD Bridge Design Specifications. An overview of the guide specification approach will be provided, and the similarities, as well as differences between the two specifications will be covered. Participants should expect to gain useful knowledge of the two seismic design approaches that are now available.

Lee Marsh, Ph.D., P.E., *BergerABAM, Inc.*

The participants will gain an understanding of the two AASHTO seismic design methods and be able to:

- describe the differences and similarities between the seismic design approaches of the two specifications,
- describe the basic steps of design using the new guide specification approach, and
- explain several advantages of each procedure.

In September 2011, PennDOT District 3-0 was impacted by two separate flooding events produced by Hurricane Irene and Tropical Storm Lee. Both storm events produced flood waters that were calculated to be greater than the 100-year storm event for portions of District 3-0. This seminar will provide details on the magnitude of the flood damage that occurred in District 3-0, the state wide PennDOT response in District 3-0, and lessons learned managing the response to the flooding events. Participants should expect to gain useful knowledge on managing large scale flooding events during the storm and managing the recovery effort after the storm.

Lloyd E. Ayres P.E., *Pennsylvania DOT*

FRACTURE CRITICAL BRIDGE INSPECTION AND RETROFIT

Date: Wednesday, June 13
Time: 8:00 AM-12:00 Noon
Presented by: Michael Baker Jr., Inc.

Robert J. Connor, Ph.D., *Department of Civil and Environmental Engineering*; Philip E. Fish, CWI, ASNT III, *Fish & Associates, Inc.*; George Gorrill, P.E., S.E., *Michael Baker Jr., Inc.*; Justin Ocel, P.E., Ph.D., *Federal Highway Administration;* Francesco Russo, P.E., Ph.D., *Michael Baker Jr., Inc.*; Kenton Zinn, P.E., S.E., *Michael Baker Jr., Inc.*

This seminar will describe a comprehensive approach to In-Depth and Fracture Critical complex bridge inspection, including:

- Preparing for and performing complex bridge inspection
- Non-Destructive Testing (NDT)
- Fitness for service analysis
- Fracture mechanics
- Overview of FHWA Technical Advisory T 5140.32 Inspection of Fracture Critical Bridges Fabricated from AASHTO M270 Grade 100 (ASTM A 514/A517) Steel
- Common defects encountered and retrofit strategies
- Case Study: Sherman Minton Bridge—from the owner's perspective
- Fracture critical research & potential future changes to inspection approach

POSTER SESSION

This year, attendees can browse the IBC Poster Session set in the Exhibit Hall. Presenters will be available for discussion at the following times:

- Tuesday, June 12th: 2:30–3:30 PM
- Wednesday, June 13th: 9:30–10:30 AM.

IBC POS-1

Applying Displacement-Based Methods in Seismic Design of the SR21-169 Bridge
Ali Hajihashemi, *Department of Civil Engineering, The University of Memphis, Memphis, TN*

IBC POS-2

Shear Capacity of Existing Reinforced Concrete Slab Bridges under Traffic Loads
Eva Lantsoght, TU Delft / Concrete Structures, *Delft, South Holland, The Netherlands*

IBC POS-3

Track-Structure Interaction Analysis for High Speed Rail and Transit Bridges
Paul Belchamber, *LUSAS, Surrey, United Kingdom*

IBC POS-4

Stay Cable Monitoring with Fiber Optics
Jennifer Yablonsky, *Applied Geomechanics, San Francisco, CA*

IBC POS-5

Statistical Analysis of the Sufficiency Ratings of the I-35W Bridge
Leslie Mills, *University Of Delaware, Newark, DE*

IBC POS-6

Rapid Non-Contact Tension Force Measurements of Stay Cables
Marcus Schmieder, *Metro Testing Laboratories Limited, Burnaby, British Columbia, Canada*

IBC POS-7

Ben Franklin Bridge Deck Truss Rehabilitation
Patrick Miner, *HNTB Corporation, Philadelphia, PA*

IBC POS-8

Rapid Sampling of Standard, Single-Coil Vibrating-Wire Sensors
Richard Andrus, *Campbell Scientific, Inc., Logan, UT*

IBC POS-9

Influence of Riverbed Scour on Seismic Performance of Bridges
Shin-Tai Song, *National Chung-Hsing University, Taiwan, Republic of China*

CO-MEETINGS

APC/PENNDOT JOINT BRIDGE COMMITTEE MEETING

Date: Tuesday, June 12
Time: 8:00 AM–12:00 Noon
Room: 323

1. Call to Order and Introductions
2. Approval of January 31, 2012 Minutes
3. Engineering for Erection of the Lake Champlain Bridge; Stephen J. Percassi, P.E., Senior Associate, Erdman Anthony
4. Fabrication and Delivery of the Lake Champlain Bridge; Ronnie Medlock, P.E., Vice President, Technical Services, High Steel Structures
5. Construction Quality Initiative; James Foringer, P.E., ADE District 11, PennDOT
6. Erection Issues and Detailing for Skewed Steel Bridges; Ronnie Medlock, P.E. and Robert Urban, Manager, Field Operations, High Steel Structures
7. Draft Specification for Self-Consolidating Concrete; Jim Casilio, P.E., Vice President, Casilio Concrete
8. Draft Specifications for Temperature Control for Mass Concrete; Jim Casilio, P.E., Vice President, Casilio Concrete
9. Review of Changes for Bridge Design Manual 4; Tom Macioce, P.E., Chief Engineer, PennDOT
10. Design and Construction of Modular U Walls; Troy Jenkins, P.E., Chief Engineer, Northeast Prestressed Products
11. Next Meeting Schedule Date/Adjournment

TRB

Date: Tuesday, June 12
Time: 2:00–5:00 PM
Room: 323

1. Call To Order
2. Introductions of Members and Guests
3. Presentations

- "Signature Bridge Design and Public Participation", Jesse Miguel, HNTB
- To be determined

4. Subcommittee Business

- Triennial Strategic Plan Projects and Activities
  - Version sent to AFF10
  - Define priority items
  - Implementation strategies
- Bridge Aesthetics Workshops
- 2013 TRB Conference
  - Paper Sessions
  - Meeting Agenda
- Other Subjects and Comments

IBC BRIDGE AWARDS RECEPTION

TIME: Tuesday, June 12; 5:00 - 7:00 PM
ROOM: Concourse C
HOST: Tom 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, presents the 25th 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 Reception. A separate registration is required with a fee of $30 ($40 without conference registration).

The International Bridge Conference® annually awards six medals and one student award to recognize individuals and projects of distinction. The medals are named in honor of the distinguished engineers who have significantly impacted the bridge engineering profession worldwide. Honorees will be recognized as follows:

JOHN A. ROEBLING MEDAL

Dann H. Hall, Coopersburg, PA awarded the John A. Roebling Medal, recognizing an individual for lifetime achievement in bridge engineering.

GEORGE S. RICHARDSON MEDAL

Nanjing Dashengguan Yangtze River Bridge, Nanjing, Jiangsu Province, China awarded the George S. Richardson Medal, presented for a single, recent outstanding achievement in bridge engineering.

GUSTAV LINDENTHAL MEDAL

I-76 Allegheny River Bridge, Oakmont, PA presented the Gustav Lindenthal Medal, awarded for an outstanding structure that is also aesthetically and environmentally pleasing.

EUGENE C. FIGG, JR. MEDAL

The Triplet Bridges, La Paz, Bolivia presented the Eugene C. Figg, Jr. Medal, awarded for Signature Bridges, recognizing a single recent outstanding achievement for bridge engineering, which is considered an icon to the community for which it is designed.

ARTHUR C. HAYDEN MEDAL

Peace Bridge, Derry-Londonderry, Northern Ireland awarded the Arthur C. Hayden Medal, recognizing a single recent outstanding achievement in bridge engineering demonstrating vision and innovation in special use bridges.

ABBA G. LICHTENSTEIN MEDAL New in 2012!

Bridge of Lions Rehabilitation, St. Augustine, FL presented the Abba G. Lichtenstein Medal, awarded for a recent outstanding achievement in bridge engineering demonstrating artistic merit and innovation in the restoration and rehabilitation of bridges of historic or engineering significance..

JAMES D. COOPER STUDENT AWARD

Zachary B. Haber, University of Nevada, Reno presented the James D. Cooper Student Award, awarded to undergraduate and graduate students who demonstrate an interest and passion for bridge engineering.

IBC BRIDGE TOUR

Tuesday, June 12; 1:00 - 5:00 PM

Pittsburgh is the city of bridges, and the IBC is pleased to once again offer our tour of unique area bridges. A signed waiver and release and appropriate footwear will be required to enter the construction area. This guided tour departs from the Convention Center at 1:00 PM and will visit the Mansfield Bridge and Ambridge/Aliquippa Bridge

(An additional fee of $40 is required; advance registration is required and seating is limited.) Please check the IBC registration Desk for availability and advance registration.

EXHIBIT HALL

The 2012 IBC Exhibit Hall is located in Hall A of the David L. Lawrence Convention Center. We can accommodate even more displays than ever before—heavy equipment, active displays and super-sized exhibits, along with numerous enhancements for your enjoyment. With more space than ever to accommodate additional features, the IBC Exhibit Hall is the place to be for attendees and exhibitors! In addition to approx. 140 Exhibits, the Featured Agency display from Missouri DOT is prominently featured in the center of the Exhibit Hall.

The IBC Exhibit Hall is open:

- Monday: 12:00 Noon - 5:00 PM, featuring complimentary lunch from 12:00 Noon -1:30 PM.
- Tuesday: 8:00 AM - 5:00 PM, featuring complimentary lunch from 12:00 Noon -1:30 PM.
- Wednesday: 8:00 AM - 1:30 PM, featuring complimentary lunch from 12:00 Noon - 1:30 PM)

Coffee breaks, when scheduled, will be located throughout HALL A.

Thanks to all of our returning and new Exhibitors! The following is a quick find numerical listing of all exhibitors. Following, an alphabetical listing with full contact information and company description can be found. This listing contains all Exhibitors as of May 31, 2012.

Booth	Exhibitor
101	Automatic Power Inc.
102	Hydro-Technologies Inc.
103	Deep Foundations Institute
104	Pultrall Inc.
105	Sealite USA
106	Bridge design & engineering
107	Pittsburgh Rigging
108	Hughes Brothers
201	Tensar International Corporation
203	Earthquake Protection Systems, Inc.
207	U.S. Bridge
211	All Access Rigging Co.
212	Metal Dek Group a unit of CSi
213	Kwik Bond Polymers
217	DOT Quality Services
221	TNO Diana Bv
223	ADSC
229	Euclid Chemical Company
300	KLAAS Coatings (North America) LLC
301	Bentley Systems, Inc.
302	Road & Bridges Magazine
303	InspectTech Systems Inc.
304	SIMCO Technologies
305	Campbell Scientific
306	Terex Hydra Platforms
310	FIGG
312	Eagle Pro Industrial Tools, Inc.
313	Hayward Baker

314..... Structural Engineering Institute
315..... American Segmental Bridge Institute
316..... Hardwire LLC
317..... AZZ Galvanizing Services
320..... TechStar Inc.
321..... Neel Company, The / T-WALL
322..... SSI/Dow Corning
323..... Rhea Engineers and Consultants Inc.
324..... Trinity Highway Products
325..... G.A. & F.C. Wagman, Inc.
326..... Crafco Inc.
327/329 ... Snap-Tite
328..... Skyline Steel
332..... TRC
334..... Oldenburg Group Incorporated
400..... R.J. Watson, Inc.
401..... Reinforced Earth Company, The
402..... St. Louis Screw & Bolt
403..... Advitam
404..... Transpo Industries, Inc.
405..... Freyssinet Inc.
407..... Jiangsu Zhongtai Bridge Steel Structure Co., Ltd. (ZTSS Bridge)
411..... Modjeski and Masters Inc.
412..... Wirerope Works, Inc.
413..... Salit Specialty Rebar
414..... Carolina Stalite Company
415..... Rampart Hydro Services
416..... Larsa Inc.
417..... Wheeling Corrugating Company
420..... McClain & Co., Inc.
422..... Moog USA Inc.
424..... AECOM
426..... Sofis Company Inc.
428..... Seismic Energy Products
433..... G.W.Y. Inc.
435..... DBi Services
500..... Contech Engineered Solutions LLC
501..... Termarust Technologies
502..... Outokumpu Stainless, Inc.
503..... Vector Corrosion Technologies
504..... Scougal Rubber Corporation
505..... Loadtest, Inc.
506..... Highway Care
507..... Polytec Inc.
510..... Bridge Grid Flooring Manufacturers Association (BGFMA)
511/610 ..IDS North America Ltd.
512..... Evonik Industries
513..... Houston Structures
514..... TUV Rheinland Industrial Solutions
515..... Clearspan Construction Products
516..... Viathor, Inc.
517..... D.S. Brown Company, The

532..... Harcon Corporation
533..... Fatigue Technology
600..... Sika Corporation
601/603/700/702 Clodfelter Bridge & Structures Int'l, Inc. (CBSI)
602/604 ... American Composites Manufacturers Association (ACMA)
605/704 ... Acrow Corporation of America
606..... MDX Software
612..... D'Appolonia
613..... Michael Baker Jr., Inc.
614..... Palmer Engineering
615..... Watson Bowman ACME
616..... Hilman Rollers
617..... Central Atlantic Bridge Associates
621..... US Aerial Video Inc.
623..... Williams Form Engineering Corp.
625..... National Steel Bridge Alliance
627..... HRV Conformance Verification Associates, Inc.
629..... Eriksson Technologies, Inc.
632..... Lusas
634..... Dynamic Isolation Systems Inc.
701..... WireCo World Group
703..... Foundation Technologies Inc.
705..... FRP Bridge Drain Pipe
707..... Cable Technologies North America, Inc.
711..... Strand7 PTY Ltd.
712..... Intelligent Infrastructure Systems (IIS)
713..... Pennoni Associates Inc.
715..... NDT Corporation
716..... Short Span Steel Bridge Alliance
717..... N.E. Bridge Contractors Inc.
720..... DYWIDAG Systems International USA Inc.
721..... Power Team An SPX Brand
722..... Greenman-Pedersen Inc.
723..... Geocomp
724/726 ... Burkhalter Rigging Inc.
725..... Hill & Smith Inc.
727..... Splice Sleeve North America, Inc.
728..... Erdman Anthony
729..... Sofistik AG
733..... Safway Services LLC
735..... Edgen Murray
800..... Bridon International
804..... MMFX Steel Corporation of America
806..... Trimble Navigation
810..... Intron Plus Ltd.
812/814 ... Dayton Superior Corporation
813..... Mageba USA
816 .....Applied Bolting Technology
820..... Gerdau - Knoxville ZBAR
828..... Officium Design Engineering, LLC

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Acrow is an industry leader in the design and manufacture of prefabricated modular steel bridges. Acrow's principal business is the engineering, manufacturing, and supply of Acrow Panel Bridges. We have been in business for over 50 years. Acrow is based in North America with representation in 35 countries.

ADSC

Booth #: 223
Contact: Dr. Antonio Marinucci
Phone: 469-359-6000
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E-mail: tmarinucci@adsc-iafd.com
Website: www.adsc-iafd.com

The ADSC-IAFD is a non-profit, international, professional, trade association representing the drilled shaft, anchored earth retention, micropile, and other related civil construction/design industries. Its members include specialty subcontractors, manufacturers and suppliers, and design engineers in the private and public sectors, and academicians. Through its 19 technical committees the ADSC establishes standards and specifications, funds research and scholarships, conducts design, construction, inspection and testing seminars, and offers field and management training programs. The ADSC-IAFD provides project review services to government agencies and owners at all levels, conducts technical conferences and industry trade shows, and publishes and distributes technical materials including its flagship periodical, FOUNDATION DRILLING Magazine. The ADSC is served by a national staff and eight regional chapters.

ADVITAM

Booth #: 403
Contact: Stephen Schorn
Phone: 703-674-0485
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Advitam provides solutions and services for infrastructure management. ScanPrint, our inspection and asset management system offers inventory, inspection, reporting and LCC modules for bridges and other highway structures. The systems can work as web-based solutions or as standalone software on Tablet computers. Advitam is also an expert in structural health monitoring, our Eversense system provide long/short-term solutions for bridge monitoring.

AECOM

Booth #: 424
Contact: Ken Butler
Phone: 804-515-8300
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E-mail: Ken.Butler@aecom.com
Website: www.aecom.com

Ranked No.1 in Transportation by Engineering News-Record, AECOM is also among the industry leaders in bridges. With more than 1,100 bridge staff in over 75 offices, we have been contributing to successful bridge engineering projects worldwide, providing planning and environmental evaluation, financing, rehabilitation, design, inspection, and program and construction management.

ALL ACCESS RIGGING CO.

Booth #: 211
Contact: Michael Guzma
Phone: 412-759-5807
Fax: 724-899-2280
E-mail: Contact@allaccessrigging.com
Website: www.allaccessrigging.com

AARC is a nationwide bridge inspection support service company with over 30 years of experience. We provide access to the most challenging structures while eliminating the need for lane closures and track time. We also provide traffic control. We are Penndot prequalified, hold PA & WV contractor licenses.

AMERICAN COMPOSITES MANUFACTURERS ASSOCIATION (ACMA)

Booth #: 602/604
Contact: Jonathan Roberts
Phone: 703-682-1653
Fax: 703-525-0743
E-mail: jroberts@acmanet.org
Website: www.acmanet.org

ACMA is the world's largest composites trade association and hosts the largest composites conference in North America–COMPOSITES 2013. The ACMA Transportation Structures Council serves to inform and educate engineers on FRP composites used in infrastructure applications. Products on display include FRP bridge decks, rebar, girders, and concrete repair/strengthening systems.

AMERICAN SEGMENTAL BRIDGE INSTITUTE

Booth #: 315
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Phone: 512-523-8214
Fax: 512-523-8213
E-mail: info@asbi-assoc.org
Website: www.asbi-assoc.org

The American Segmental Bridge Institute (ASBI) is a nonprofit organization providing a forum where owners, designers, constructors, and suppliers can meet to further refine current design, construction, and construction management procedures, as well as evolve new techniques to advance the quality and use of concrete segmental bridges.

APPLIED BOLTING TECHNOLOGY

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Booth #: 101
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Website: www.automaticpower.com

Automatic Power INC is a customer based manufacturer of marine, aviation and bridge navigation and hazard/obstruction lights as well as other electronic information equipment.

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Booth #: 317
Contact: Kevin Irving
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Website: www.bentley.com/Bridge

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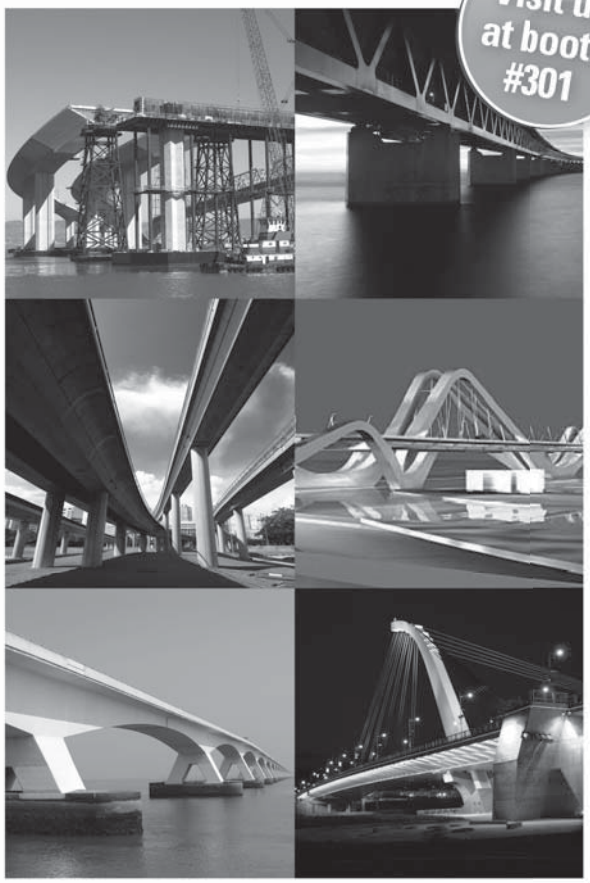

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IDS North America is an engineering systems technology company, providing research and innovation in the electromagnetic field for Civil and Defense markets. IDS NA will present IBIS-S for static and dynamic remote monitoring of bridges and multi frequency Ground Penetrating Radar systems for bridge deck assessment.

INSPECTTECH SYSTEMS INC.

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E-mail: shaffer@inspecttech.com
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InspectTech provides easy to use software solutions that streamline the inspection process from onsite to back-office. The BridgeInspectT software suite can be quickly customized for each client and offers significant time-savings to inspectors and managers. The bridge inventory and management software includes cost estimates, GIS interface, full searching, custom reports, maintenance, and scheduling modules. The standalone inspection software significantly enhances the inspection process through customized forms with pick lists, coding manuals, and digital picture integration. InspectTech works with governments, private owners, and engineering consulting companies to meet their specific software needs.

INTELLIGENT INFRASTRUCTURE SYSTEMS (IIS)

Booth #: 712
Contact: Jennifer Laning, P.E.
Phone: 215-222-3000
Fax: 215-222-0384
E-mail: jlaning@pennoni.com
Website: www.pennoni.com

Pennoni offers comprehensive bridge engineering services, including structural design, condition evaluation and inspection of highway, rail, movable, historic and long span structures. Our bridge engineers have successfully completed bridge projects that include underwater inspections, 3-D finite element analyses, emergency structural repairs, and constructability assessments for federal, state, and local agencies.

INTRON PLUS LTD.

Booth #: 810
Contact: Alexander Mironenko
Phone: +7-495-229-3747
Fax: +7-495-510-1769
E-mail: amironenko@intron-plus.com
Website: www.intron-plus.com

Intron Plus Ltd. is specialized in nondestructive inspection of steel ropes and cables. We deliver equipment and provide inspection of cables worldwide. The company has great experience with inspection of bridge cables as well as all kind of steel ropes onshore and offshore for different industries.

JIANGSU ZHONGTAI BRIDGE STEEL STRUCTURE CO., LTD. (ZTSS BRIDGE)

Booth #: 407
Contact: Tim Griffin
Phone: 866-854-4162
Fax: 334-792-4241
E-mail: tgriffin@ztssbridge.com
Website: www.ztsschina.com

Jiangsu Zhongtai Bridge Steel Structure Co., LTD. (ZTSS Bridge) is a publicly traded company that specializes in steel bridge fabrication. With multiple trial assembly lines specifically for steel bridge assembly including: Arch, Cable Stay, Continues Girder, Suspension, and Truss type bridges. ZTSS Bridge covers about 340,000 square meters (84 Acres) and has an annual capacity over 120,000 tons.

KLAAS COATINGS (NORTH AMERICA) LLC

Booth #: 300
Contact: Richard J. Taylor
Phone: 866-317-3633
Fax: 214-363-8422
E-mail: info@klaascoatings-northamerica.com
Website: www.klaascoatings-northamerica.com

North American manufacturer distributor of Klaas Coatings Si-Rex03™ Silicone Resin Emulsion Paint (SREP) for concrete and masonry. Water repellent, breathable architectural coating—using UV resistant inorganic pigments for non-fading colors—eliminates flaking and peeling with excellent durability and resistance to weathering and chalking to significantly outlast and outperform conventional paints. Primers: Si-Prime™ silane/siloxane/acrylic blend and Cremsil™ 80% active octylsilane based thixotropic cream that penetrate and seal the substrate.

KWIK BOND POLYMERS

Booth #: 213
Contact: Sheila Cherry
Phone: 720-202-5682
E-mail: sheila@kwikbondpolymers.com
Website: www.kwikbondpolymers.com

Kwik Bond Polymers is a manufacturer and distributor of road and bridge rehabilitation systems. We provide high molecular weight methacrylate, multi layer overlays, polyester polymer concrete overlays and more; solutions to last for over 30 years and traffic return under two hours.

LARSA INC.

Booth #: 416
Contact: John Horner
Phone: 800-LARSA-01
Fax: 631-454-5252
E-mail: info@larsa4d.com
Website: www.larsa4d.com

LARSA 4D analysis and design software from New York Based LARSA, Inc. addresses the specialized needs of segmental, cable, curved, and other types of bridge structures. A standard in leading U.S. firms for bridge design and construction analysis, LARSA 4D continually pioneers engineering technology by working closely with its clients.

LOADTEST,INC.

Booth #: 505
Contact: William Knight
Phone: 352-378-3717
Fax: 352-378-3934
E-mail: BubbaKnight@Loadtest.com
Website: www.loadtest.com

Loadtest, Inc. specializes in bi-directional deep foundation testing using the award-winning Osterberg Cell (O-cell). Loadtest offers O-cell load testing equipment, assembly and installation assistance, field load testing, and reporting services. Loadtest is dedicated to advancing state-of-the-art deep foundation load testing.

LUSAS

Booth #: 632
Contact: Terry Cakebread
Phone: 800-97-LUSAS
Fax: 212-257-6441
E-mail: info@lusas.com
Website: www.lusas.com

Use LUSAS Bridge software for all your frequency, seismic, dynamic, nonlinear, buckling and fatigue analysis. Staged construction, creep modeling, prestress / post-tensioning and curved girder analysis is supported. Traffic load optimisation facilities simplify worst-case loading patterns. AASHTO and other design codes supported. Extensive results processing facilities are provided.

MAGEBA USA

Booth #: 813
Contact: Jim Hatch
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Fax: 646-495-3005
E-mail: jhatch@magebausa.com
Website: www.magebausa.com

Mageba, a leading global manufacturer and supplier of bridge bearings, expansion joints, seismic protection devices and monitoring systems, has opened sales offices in New York and San Jose (CA) to build on recent project successes in North America, including the JJ Audubon, Golden Ears, Deh Cho and Port Mann Bridges, as well as the Oakland Airport Connector People Mover.

MCCLAIN & CO., INC.

Booth #: 420
Contact: Valerie Ellington
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Fax: 540-423-1066
E-mail: vellington@mcclainandcompany.com
Website: www.mcclainandcompany.com

McClain & Co. provides support services to Engineers, Contractors and Government Agencies for the Inspection, Maintenance, and Repair of our nation's bridges. We offer the largest rental fleet of specialized underbridge access equipment: UBIU's & Snoopers - Highway & Rail compatible - Platforms & Baskets reaching up to 75' under bridge. Visit our website today for UBIU Rentals, TTC Sales & Services, Bridge Utility & Construction Services.

MDX SOFTWARE

Booth #: 606
Contact: Chris Douty
Phone: 573-446-3221
Fax: 573-446-3278
E-mail: support@mdxsoftware.com
Website: www.mdxsoftware.com

Developer of curved and straight steel bridge design and rating software for AASHTO ASD, LFD, and LRFD.

METAL DEK GROUP A UNIT OF CSI

Booth #: 212
Contact: Wendy C. Wilson
Phone: 803-251-5091
Fax: 803-744-6290
E-mail: wendy.wilson@csisteel.com
Website: www.metaldek.com

With over 50 years of service to the construction industry, the Metal Dek Group® a unit of CSi® designs and manufactures various Bridge Dek® profiles that can accommodate design spans ranging from 18" to over 13'. CSi® offers permanent forming systems that can be utilized in both non-aggressive and extremely aggressive environments. CSi® sales, engineering, and project management personnel work collectively to provide Engineered Solutions™ for its customers.

MICHAEL BAKER JR., INC.

Booth #: 613
Contact: John C. Dietrick, P.E.
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Website: www.mbakercorp.com

Baker is at the forefront of advancing the state-of-the-art across a wide range of bridge services including: Asset Management & Bridge Management Systems, Bridge Inspection, Bridge Health Monitoring, Context Sensitive Design, Design/Build & Other Alternative Delivery Methods, Software Development, Training and Construction Inspection & Management. Baker provides engineering, design, planning and construction services for its clients' most complex challenges worldwide.

MMFX STEEL CORPORATION OF AMERICA

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E-mail: art.lupia@mmfx.com
Website: www.mmfx.com

MMFX Technologies Corporation is a materials science company, best known for its revolutionary corrosion-resistant, high-strength steel. Through its subsidiary MMFX Steel Corporation of America, the firm has successfully commercialized its patented nanotechnology in concrete reinforcing steel products like MMFX2 rebar.

MODJESKI AND MASTERS INC.

Booth #: 411
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Phone: 717-790-9565
E-mail: debeaver@modjeski.com
Website: www.modjeski.com

Modjeski and Masters is a nationwide leader in the design, inspection, and rehabilitation of all bridge types. Additional life-cycle services include: field instrumentation and nondestructive testing, bridge security and vulnerability analysis, vessel collision analysis, scour analysis, suspension bridge cable and suspender investigations, fatigue evaluations, emergency evaluations and forensic studies, seismic evaluation and design, and bridge research/code/course development.

MOOG USA INC.

Booth #: 422
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Phone: 540-586-6700
Fax: 540-586-6161
E-mail: quotes@moogusa.com
Website: www.moogusa.com

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

N.E. BRIDGE CONTRACTORS INC.

Booth #: 717
Contact: Donald Russell
Phone: 508-238-1941
Fax: 508-238-2093
E-mail: Donny@bridgeriggers.com
Website: www.bridgeriggers.com

N.E. Bridge Contractors specializes in road and rail bridge accessing equipment including Under Bridge Inspection Snoopers, Barges, and Bucket Trucks to help you safety inspect, repair, and access every part of any bridge.

NATIONAL STEEL BRIDGE ALLIANCE

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Website: www.steelbridges.org

NSBA, a non-profit trade association, is the unified voice representing the entire steel bridge community. In addition to structural steel fabricators and producers, NSBA brings together the agencies and groups who have a stake in the success of steel bridge construction, including representatives from AASHTO, FHWA, state DOTs, bridge consultants, erectors, and representatives of the coatings, fastener, and welding industries. The NSBA's mission is to establish steel as the bridge material of choice.

NDT CORPORATION

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NDT Corporation's high resolution nondestructive testing is used to determine the condition, integrity and as built specifications of bridges. Our bridge testing services are used to evaluate and document voided post tensioning ducts and strand corrosion; bridge deck condition, bridge foundation construction, as built details and damaged deteriorated concrete.

NEEL COMPANY, THE / T-WALL

Booth #: 321
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Website: www.neelco.com

T-WALL®, the premiere prefabricated concrete retaining wall system in North America. PennDOT approved for heights to 50'. The precast T-WALL units install quickly and require no bracing, tiebacks or mechanical connections. Recognized as a leading designer and supplier for Highways, Waterways and Railroads, The Neel Company provides engineering, sales and construction support directly for consultants and contractors.

OFFICIUM DESIGN ENGINEERING, LLC

Booth #: 828
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Phone: 312-698-8600
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E-mail: bradley@officium.net
Website: www.officium.net

Officium is a design and engineering firm specializing in the design of tensile structures using stainless steel cable and stainless steel mesh netting. Our bridge projects have included pedestrian safety, fall-protection and suicide prevention solutions, means restriction and even aesthetic installations.

OLDENBURG GROUP INCORPORATED

Booth #: 334
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Oldenburg Group Incorporated is a designer and manufacturer of performance-engineered products used in the defense, mining, energy and architectural lighting industries worldwide. Products include Shipyard Gantry Cranes and Transporters, UNREP, Cargo Weapons & Stores Elevators, Anchor Handling, Mooring, Towed Array Handling and custom material handling systems.

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Booth #: 502
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Phone: 800-833-8703
Fax: 800-545-8617
E-mail: tom.holsing@outokumpu.com
Website: www.outokumpu.com

Stainless plate, pipe, coil, and bar (including rebar) products from Outokumpu are the materials of choice for pedestrian, road, and highway bridge construction. Duplex grades like 2205 Code Plus Two® and our low-nickel, lean duplex LDX 2101®, combine the benefits of austenitic steels—high strength and high resistance to stress corrosion cracking—with very good resistance to uniform corrosion to deliver longer bridge life with lower maintenance.

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Booth #: 614
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E-mail: rspalmer@palmernet.com
Website: www.palmernet.com

Palmer Engineering is a full service engineering design and consulting firm with offices in six states. Palmer specializes in challenging transportation projects featuring highway and bridge design, inspection, and related services. We are committed to the needs of our clients; let us utilize 43 years of experience to design your engineering solution.

PENNONI ASSOCIATES INC.

Booth #: 713
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The mission of Intelligent Infrastructure Systems (IIS) as a Division of Pennoni Associates is to offer world-class applications of the most reliable monitoring, modeling and decision tools and technologies, together with the engineering support and experience of highly respected practicing engineers, to aid infrastructure owners as they preserve and renew their key assets.

PITTSBURGH RIGGING

Booth #: 107
Contact: Rusty Hufnagel
Phone: 724-899-3060
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E-mail: rustyhuf@gmail.com
Website: www.pittsburghrigging.net

At Pittsburgh Rigging we have a fleet of Aspen Aerial Under Bridge Inspection Trucks consisting of 1-UB40, 1-UB50, 3-UB60's, and 1-A62. We provide Traffic Control Services, Bucket Trucks Manlifts, Core Samples, and Cable Rigging Platforms for all types of Bridge Inspections. Contact Rusty Hufnagel for pricing and availability.

POLYTEC INC.

Booth #: 507
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Polytec, introduces a long range version of its laser Doppler vibrometer for precise measurement of bridge vibration and displacement data for structural health monitoring. The system is easy to position and align for measurements on decks, piers, pillars, cables as well as for verifying bearing integrity.

POWER TEAM AN SPX BRAND

Booth #: 721
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POWER TEAM is a world leader in hydraulic special service tools & equipment for global construction markets. We manufacture precision quality high-pressure hydraulic products including pumps, jacking cylinders/rams, post tension jacks and valves. Products are sold through a worldwide network of stocking industrial distributors.

PULTRALL INC.

Booth #: 104
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Phone: 418-333-2885
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E-mail: mathieu.champagne@pultrall.com
Website: www.pultrall.com

Established in 1987, Pultrall Inc. is the pioneer of non-metallic concrete reinforcement solutions in North America. Pultrall's achievements include some of the most prestigious projects in North America and around the world. The company serves clients through a network of Authorized Distributors throughout North America, Latin America, Europe, Australia and the Middle East.

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Booth #: 400
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R. J. Watson specializes in the design, manufacture, and testing of high load multi-rotational bearings, seismic isolation bearings, joint sealing systems, and waterproofing membranes.

RAMPART HYDRO SERVICES

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Rampart is the world leader in ultra-high pressure (UHP) Hydrodemolition and HydroCleaning. Ultra high pressure Hydrodemolition uses less water; is environmentally friendly; provides a superior bond; and is fast and cost effective. Rampart has used Hydrodemolition on bridge surfaces and substructures, dams, tunnels, and parking garages. Rampart now offers complete vacuum cleanup of the water and debris creating Dry Hydrodemolition. We look forward to helping you with your demanding projects.

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

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Booth #: 323
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Rhēa Engineers & Consultants, Inc. (Rhēa) is a 100% woman-owned professional corporation providing a wide range of civil, environmental, water resources, and geotechnical engineering and consulting services. Founded in Pittsburgh, Pennsylvania in 2001, Rhēa provides innovative and cost-effective solutions to clients ranging from the federal government to Fortune 1000 companies, from universities to engineering and architectural firms. Our work has spanned the world, and Rhēa takes a global view of every project/problem, allowing us to quickly investigate, evaluate and resolve the issue at hand.

ROAD & BRIDGES MAGAZINE

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SAFWAY SERVICES LLC

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The QuikDeck™ Platform System can provide the solution to reduce labor costs and enhance access for bridge construction, rehabilitation and maintenance. QuikDeck™ can significantly reduce man-hours and overall project costs. Safety is our number one goal. All QuikDeck™ components are designed to meet or exceed OSHA safety regulations.

SALIT SPECIALTY REBAR

Booth #: 413
Contact: Kevin Cornell
Phone: 716-299-1990
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E-mail: kcornell@stainlessrebar.com
Website: www.stainlessrebar.com

Salit Specialty Rebar (SSR) is North America's stainless rebar specialist. At SSR we offer shipping across North America, fabricated rebar, dedicated equipment, on time delivery, cut to length, and shrink wrapped to avoid contamination. SSR offers all sizes in both metric and Imperial from our vast inventory.

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Sealite USA is a supplier of solar powered bridge navigation lighting as well as buoys and navigation aids for all types of bridge construction projects and obstruction lighting.

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Booth #: 716
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Website: www.shortspansteelbridges.com

The Short Span Steel Bridge Alliance (SSSBA) is a group of bridge and culvert industry leaders–steel manufacturers, fabricators, coaters, service centers, owners, associations and universities–providing information on the design and construction of bridges and culverts up to 140 feet. Short span steel bridges and culverts are reliable, durable, cost effective, quickly fabricated and installed, and 100% recyclable after a long service life. Now available from the SSSBA: free standard designs and modular solutions, customized for your project, online via the eSPAN140 design tool.

SIKA CORPORATION

Booth #: 600
Contact: David White, P.E.
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E-mail: white.dave@sika-corp.com
Website: www.sikaconstruction.com

Sika Corporation, Lyndhurst NJ, is a technology leader celebrating 100 years of experience in concrete materials and restoration technology. Sika's innovative product line includes concrete admixtures, sealants, adhesives, corrosion inhibitors, specialty mortars, epoxy resins, structural strengthening systems, grouts, anchoring adhesives, overlays, and protective coatings.

SIMCO TECHNOLOGIES

Booth #: 304
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E-mail: sales@simcotechnologies.com
Website: www.simcotechnologies.com

SIMCO offers integrated solutions for the optimum design and maintenance of concrete infrastructure. SIMCO's expertise has been called on across the globe to understand concrete durability issues that go beyond the scope of routine engineering works. SIMCO's solutions enable clients to better understand their concrete's physical and chemical conditions to effectively plan or repair their structures.

SKYLINE STEEL

Booth #: 328
Contact: Skyline Steel
Phone: 866-875-9546
Fax: 973-428-7399
E-mail: engineering@skylinesteel.com
Website: www.skylinesteel.com

Skyline Steel is a premier steel foundation supplier serving the US, Canada, Mexico, Central America, Caribbean and South American markets. Skyline Steel is a wholly-owned subsidiary of ArcelorMittal, the world's leading steel company with operations in more than 60 countries. Skyline Steel has over thirty sales offices across two continents and a robust infrastructure.

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Website: www.sofiscompany.com

Sofis Company, Inc. has been a General Contractor for over 50 years. We are DOT prequalified. We have earned a reputation for knowledge and respectability specializing in Bridge Repair, Inspection and Support Services. Supplying top of the line Under Bridge Inspection Units, Cable Rigging, Lift Trucks, Traffic Control and all related services; with an exemplary safety record.

SOFISTIK AG

Booth #: 729
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Booth #: 727
Contact: Toshi Yamanishi
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Splice Sleeve North America markets the NMB Splice-Sleeve System, a grouted coupler for rebar used primarily to connect precast concrete members like bridge piers and abutments, sound walls and retaining walls. The couplers exceed the requirements of ACI-318 and AASHTO for type 2 performance. Also rated 18-KSI in NCHRP 10-35, a 5 million cycle fatigue test.

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St. Louis Screw & Bolt is a domestic manufacturer of structural bolts including A325 and A490 hex bolts that sells direct to steel fabricators, erectors and general contractors.

STRAND7 PTY LTD.

Booth #: 711
Contact: Anne Delvaux
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E-mail: anne@beaufort-analysis.com
Website: www.strand7.com

Beaufort Analysis, Inc. (BAI) is the distributor of the Strand7® Finite Element Analysis System in the United States. Strand7 is a general purpose finite element analysis program developed by Strand7 Pty Ltd, Sydney, Australia and is used throughout the world for the analysis of ship structures, aircraft, road and rail vehicles and a wide range of industrial products as well as for the analysis of buildings and bridges.

STRUCTURAL ENGINEERING INSTITUTE

Booth #: 314
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The Structural Engineering Institute of ASCE has more than 20,000 members. SEI serves the structural engineering profession while influencing change on issues that shape civil engineering. SEI produces publications, conferences, continuing education, and codes and standards that advance the profession. SEI membership is open to anyone with an interest in structural engineering. SEI provides great networking opportunities while stimulating coordination and understanding between practice and academia - driving the practical application of cutting edge research.

TECHSTAR INC.

Booth #: 320
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D. S. TechStar, Inc. designs, manufactures and sells a variety of engineered products for bridges. Over the past twenty years, TechStar has supplied modular expansion joints, pot bearings, disc bearings, shock transmission units and parallel wire cable to bridges around the world. With manufacturing bases in several continents, TechStar can supply the bridge community with quality products meeting any design specification.

TENSAR INTERNATIONAL CORPORATION

Booth #: 201
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Tensar International Corporation improves property values by providing technology-driven site solutions for common development problems such as grade changes requiring retaining walls, and poor soil conditions affecting the cost of roadways, parking lots, and building structures. These solutions, based on patented Tensar® Geogrids, offer cost-effective alternatives to traditional construction methods.

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Booth #: 501
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Website: www.termarust.com

Termarust Technologies manufactures (HR CSA) High Ratio Co-Polymerized Calcium Sulfonate coatings for steel/metal structures and solves the structure critical corrosion problems others choose to ignore, specifically in crevice corroded and pack rust joints and connections. It is ideal for flexible steel structures like bridges, towers, cables, high mast light poles, etc.

TNO DIANA BV

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TNO DIANA is market leader in the field of FE software development and analysis consultancy for civil engineering industry. Building on over 30 years of research and experience, the company provides world-class software products and services in the field of finite element solutions dedicated to structural, geotechnical, and earthquake engineering.

TRANSPO INDUSTRIES, INC.

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Manufacturer of road safety products and specialized polymer concrete materials. Materials for the maintenance, rehabilitation and preservation of bridges. Breakaway supports for signs and light poles, Roadway Glare Screens, WZ intrusion alarm, Barrier panels for roads, tunnels, and bridges, Anti-Skid Color Surface, Airport blast fence and maintenance products.

TRC

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TRC is a national engineering, consulting and construction management firm providing integrated services to the infrastructure, environmental and energy markets. TRC supports the transportation and bridge industries with proven excellence in federal, state and local agency projects. Another service TRC provides is the selling, supporting and maintenance of multiple engineering design and analysis programs.

TRIMBLE NAVIGATION

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Trimble is a leading provider of advanced positioning solutions, application software, wireless communications, and services to enable you to reach new levels of productivity and collaboration. Trimble GNSS Infrastructure is the most established and widely used GNSS infrastructure solution available. Its integrated solutions allow customers to collect, manage and analyze complex information faster and easier, making them more productive, efficient and profitable. Trimble GNSS Infrastructure solutions are always a wise investment.

TRINITY HIGHWAY PRODUCTS

Booth #: 324
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Website: www.highwayguardrail.com

Trinity Highway Products, LLC is the leading manufacturer of highway guardrail, highway guardrail end treatments, temporary and permanent crash cushions, truck-mounted attenuators and cable barrier. Trinity is the market leader in booth innovation and safety standards.

TUV RHEINLAND INDUSTRIAL SOLUTIONS

Booth #: 514
Contact: Mike Forbes
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E-mail: mforbes@ndtg.net
Website: www.nondestructivetesting.com

Non Destructive Testing Services provides bridge fabrication inspections for steel and concrete prestressed bridges, NDT inspections on existing bridges, and bridge paint inspections. NDTS has developed and performs a complete sign structure inspection program. NDTS's mechanical laboratory provides weld procedure qualifications, bridge bearing pad testing, and numerous other testing services.

U.S. BRIDGE

Booth #: 207
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Website: www.usbridge.com

U.S. Bridge designs and fabricates vehicular steel bridges including the Liberty Series Bolted Diaphragm Modular Panel Bridge System for permanent, temporary or emergency applications. Designed with all-bolted connections (no pins, wear or maintenance), built-in proportional camber, new steel only. Single or double lanes availble.

US AERIAL VIDEO INC.

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US Aerial Video provides imaging services using Unmanned Aerial Vehicles (UAVs) specializing in gathering bridge and infrastructure video. Our UAV platforms deploy quickly and are capable of gathering up-close, real time imaging. This video can be transmitted as well as recorded for future playback. Safety concerns and cost are reduced when using our UAVs for visual inspection purposes.

VECTOR CORROSION TECHNOLOGIES

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Website: www.vector-corrosion.com

Vector Corrosion Technologies provides award winning products and services for concrete corrosion protection. Our innovative solutions include: chloride extraction, ICCP, and an array of galvanic protection systems (embedded galvanic anodes, galvanic jackets and activated arc spray zinc metallizing). Vector also provides corrosion evaluation and mitigation of post-tension corrosion.

VIATHOR, INC.

Booth #: 516
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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 in integral (monolithic) and non-integral piers. Recent enhancements include flexure and shear reinforcement design, prestressed bent caps, and integral outriggers and drop caps. 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 load for any bridge configuration and support type (integral and non-integral piers). Vbridge analyzes 3D bridge models, and creates Vbent input files by sharing geometry and load information.

WATSON BOWMAN ACME

Booth #: 615
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Watson Bowman Acme Corp. has been at the industry forefront of design and manufacture of expansion control devices for the bridge construction industry. Since the 1950's, Watson Bowman Acme has provided technical support and product solutions for the most complex and challenging applications.

WHEELING CORRUGATING COMPANY

Booth #: 417
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Website: www.wheelingcorrugating.com

Wheeling Corrugating Company specializes in permanent metal bridge deck forms. Form depths range from 2 inches through 4.5 inches accommodating girder spacings up to 15'-0".

WILLIAMS FORM ENGINEERING CORP.

Booth #: 623
Phone: 616-866-0815
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Website: www.williamsform.com

Williams Form Engineering Corporation has been providing threaded steel bars and accessories for rock anchors, soil anchors, high capacity concrete anchors, micro piles, tie rods, tie backs, strand anchors, hollow bar anchors, post tensioning systems, and concrete forming hardware systems in the construction industry for over 85 years.

WIRECO WORLD GROUP

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WireCo WorldGroup, the largest wire rope manufacturer in North America, leads in the production of structural bridge rope and strand. Our reputation for quality and service is unmatched. Each aspect of our engineering, manufacturing and fabrication process is monitored and controlled to assure the highest quality.

WIREROPE WORKS, INC.

Booth #: 412
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Website: www.wireropeworks.com

We have a full (GP) General Purpose product line including spin resistant crane ropes. We are also capable of producing the largest diameter strand in the country, as well as having the longest prestretching track.