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CHAIRMAN'S WELCOME ADDRESS

Jeffrey J. Campbell, P.E.

It is a great honor and privilege to serve as the Chairman of the 27th International Bridge Conference®. The men and women of the Engineers' Society of Western Pennsylvania (ESWP) and the Executive Committee of the IBC have been working tirelessly since the conclusion of the 2009 conference to bring you the finest technical bridge conference in the world. It is truly amazing to me to see the dedication of these people to the practice of bridge engineering, construction, research and education.

For those of you who have never attended the IBC in Pittsburgh, *what were you waiting for (and please join us at the First-Timers Reception on Monday June 7)?* For those who have attended in the past, know that the program this year will be equally jam-packed with outstanding technical sessions, workshops and seminars and we trust that you will be back.

Highlights of the 27th Annual International Bridge Conference® include:

A KEYNOTE SESSION WITH INTERNATIONALLY RENOWNED SPEAKERS:

- Peter R. Taylor, Ph.D., P. Eng., P.E., Principal, Buckland and Taylor, LTD
- Jim J. Moynihan, AIA, President and C.E.O., Balfour Beatty Infrastructure, Inc.
- Neil J. Pedersen, P.E., Administrator, Maryland State Highway Administration
- Dr. T. Peter Ruane, President and CEO, American Road & Transportation Builders Association
- M. Myint Lwin, P.E., S.E., Director, Office of Bridge Technology (HIBT), Federal Highway Administration
- Malcolm T. Kerley, P.E., Chief Engineer, Virginia Department of Transportation, AASHTO

In addition to the renowned speakers scheduled for the Keynote Session, the Engineers' Society of Western Pennsylvania is pleased to recognize five members of the IBC Executive Committee who have served as members of the planning body for more than 25 years! These individuals were recognized as Honorary Members at the 2010 ESWP Annual Banquet (held annually during National Engineers Week) in front of an audience of fellow ESWP members, and we feel it appropriate to recognize them during this IBC for their long-time service to the conference. All of these gentlemen remain active on the Committee, but are deserving of this special recognition. Please congratulate these familiar faces during the conference:

- Carl Angeloff, P.E.
- James Dwyer
- J. Fred Graham, P.E.
- Herb Mandel, P.E.
- Lisle Williams, P.E., PLS

2010 FEATURED AGENCY: MARYLAND STATE HIGHWAY ADMINISTRATION & MARYLAND TRANSPORTATION AUTHORITY

This year we welcome the Maryland State Highway Administration & Maryland Transportation Authority as our featured agency. Bob Healy and his staff have planned an exciting and expanded exhibit area and have lined up numerous technical presentations

featuring major projects and programs across the state. Presentation topics will include Recent Bridge Mega-Projects, Ongoing Bridge Research, Accelerated Bridge Construction, and Opportunities for Success – Dealing with Recent Bridge "Emergencies".

INTEGRATED EXHIBITOR'S HALL

In 2010, the Exhibitor's Hall will be bigger and better than ever. In order to increase networking opportunities for all attendees, the Technical Sessions will be located in rooms within the exhibit hall itself. This will allow plenty of time for exhibitors and conference attendees to interact between sessions, coffee breaks and lunchtimes. We are anticipating an even larger hall of exhibitors of more than 200 and look forward to increasing our attendance to more than 1,600 attendees!

TECHNICAL PROGRAM

The heart and soul of the IBC has been the rich and diverse technical program and this year is no different. More than 70 technical papers were selected from nearly 200 abstracts to create a program for those interested in design, signature spans, maintenance, rehabilitation, inspection, management and accelerated bridge construction.

An outstanding collection of technical papers, poster presentations, workshops and seminars are featured again for young and veteran engineers alike. Our construction workshops will feature the popular "Owners Forum" at which bridge owners from all over the country discuss their upcoming bridge construction programs and challenges.

We are excited to offer seminars on topics ranging from Load Rating of Gusset Plates to Dynamic Testing and Analysis of Bridge Foundations; a full listing can be found throughout this program guide.

IBC SPONSORS

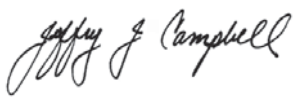
I would also like to acknowledge and thank the great support that we have received from our sponsors. Many of the items and events – such as lanyards, tote bags and coffee breaks – of the IBC are brought to you courtesy of our sponsors, and are identified on the event they have chosen to sponsor. Thank you for your sponsorship! Additionally, I would also like to acknowledge the 5 financial sponsors who have provided their generous financial support to the 2010 IBC:

- American Bridge Company — Silver Sponsorship
- Bayer MaterialScience — Awards Luncheon
- ICE® - International Construction Equipment, Inc. — Silver Sponsorship
- Parsons — Silver Sponsorship
- Parsons Brinckerhoff — Silver Sponsorship

These sponsors help keep up the high quality event delivered to all registrants!

As you can see, this year's IBC promises to be bigger and better than ever. Thanks for coming to Pittsburgh, the City of bridges; renew old friendships, begin new ones and enjoy one of the best technical conferences on the planet.

I hope that you enjoy the 2011 IBC!



Jeffrey J. Campbell, P.E.
2010 International Bridge Conference® General Chair
Vice President, Transportation
Michael Baker, Jr., Inc.

WELCOME TO THE 27TH 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 2009 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 6: 5:00 - 7:00 P.M.
- Monday, June 7: 7:00 A.M. - 7:00 P.M.
- Tuesday, June 8: 7:00 A.M. - 5:00 P.M.
- Wednesday, June 9: 7:00 A.M. - 1:30 P.M.

REGISTRATION AND ADMISSION

Full Registration includes admission to the Keynote Session, Featured Agency Session, daily Technical Sessions, Workshops, IBC Exhibit Hall, Monday evening Exhibitors Party, and the Tuesday and Wednesday Exhibit Hall Buffet Luncheon. The Bridge Awards Luncheon (Monday) is included, however seating is strictly limited to the first 300 requests; you must select the luncheon on the registration form to receive a ticket. 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 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 also 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 May 28 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 May 28 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, and 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 6 - 9. Messages will be retained until the end of each day.

2010 IBC BRIDGE TOUR

Tuesday, June 8; 1:00 - 5:00 P.M.

Pittsburgh is the city of bridges, and the IBC is pleased to once again offer our tour of unique area bridges. The tour this year includes stops at the Jack's Run Bridge Rehab Project and the Port Authority North Shore Connector (a signed waiver and release and appropriate footwear will be required to enter the construction area). These two structures will be under construction in 2010. This guided tour departs from the Convention Center at 1:00 p.m. (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 over 200 exhibits, you will be able to explore the latest technologies, products and services the bridge industry has to offer. We also present several "Mini-Theatre" presentations at various times throughout the conference, where you can learn even more about the products and services of many of the exhibitors. 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 of the DLLCC. You will be able to view the exhibits during the following hours:

- Monday: 4:00 P.M. - 7:00 P.M.
- Tuesday: 8:00 A.M. - 5:00 P.M.
- Wednesday: 8:00 A.M. - 1:30 P.M.

The IBC will feature a Luncheon Buffet throughout the Exhibit Hall on Tuesday, June 8 and Wednesday, June 9 and is open (at no additional charge) to all registered attendees and registered spouses. Also, don't miss our popular Exhibitor Reception, on Monday evening from 5:00-7:00 P.M. throughout the Exhibit Hall. All registered attendees will receive one ticket redeemable for a beverage at the reception, (Additional tickets can be purchased at the Conference Registration Desk.)

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 Pre-Print area located just outside of the Exhibit Hall on Concourse A, outside Hall A of the DLLCC. Pre-prints can be purchased for just $3.00 per copy.

New for 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 Pre-Print Booth will be open:

- Monday: 9:00 A.M. - 6:00 P.M.
- Tuesday: 8:30 A.M. - 5:00 P.M.
- Wednesday: 8:30 A.M. - 1:30 P.M.

IBC GIFT ITEMS

Once again at this year's IBC, you will have the opportunity to purchase 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 Pre-print desk on Concourse A, just outside of Hall A, where you can make your purchases throughout the Conference until Wednesday at 1:30 P.M. Please be sure to stop by and shop before Wednesday and check out our newest styles for the 2010 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 27th Annual International Bridge Conference® will be available on CD in late Summer 2010 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. In addition, a coffee kiosk will offer beverages for purchase at various times during the conference. The Kiosk will be located outside of Hall A.

FIRST-TIMERS RECEPTION

Open to all first-time attendees! Please join members of the IBC Executive Committee for a "meet & greet" and learn more about the many ways to benefit from the IBC. The First-Timers Reception takes place on Monday, June 7th at 5:00 P.M. on Concourse A, outside Hall A. This reception will help you to better understand all that IBC offers! Also, the IBC Executive Committee is interested in what you are looking for by attending the IBC. Enjoy this great opportunity to meet new friends at the First-Timers Reception before visiting the Exhibitor Hall Reception in Hall B, which takes place from 5:00-7:00 PM.

GENERAL INFORMATION

PDH'S

Earn Professional Development Hours (PDHs) by attending the IBC! The Engineers' Society of Western Pennsylvania (ESWP), sponsor of the IBC, has been 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.

To obtain verification of attendance at the IBC from the ESWP, you must request a PDH Confirmation Letter. Official confirmation from the IBC Offices regarding each attendee's eligibility for PDHs will be mailed after the Conference. Attendees who checked the "PDH Letter Requested" box on your Registration Form will automatically receive a Verification Letter that must be returned to ESWP. (PDH Letters can be requested 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 or mini-theatre presentation at a future IBC? The IBC Call For Papers will open immediately following the 2010 Conference, and everyone is welcome to submit an idea for presentation.
Visit www.internationalbridgeconference.org for more details.

JOIN US AT THE 2011 IBC!

June 5-8, 2011, David L. Lawrence Convention Center, Pittsburgh, PA

IBC EXECUTIVE COMMITTEE

The Engineers' Society of Western Pennsylvania wishes to extend it's gratitude to the following members for their dedication to the planning on the 2010 International Bridge Conference®. (*denotes Honorary Member)

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Michael Baker Jr., Inc.

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Seminars/ Workshop Chair
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Pennsylvania Dept. of Transportation

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Federal Highway Administration

THOMAS P. MACIOCE P.E.
Pennsylvania Dept. of Transportation

JAMES MADARA, P.E., L.S.
Gannett Fleming, Inc & ARTBA

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GAI Consultants, Inc.

DENNIS R. MERTZ, Ph.D.
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GARY RUNCO, P.E.
Borton Lawson

HELENA RUSSELL
Bridge design & engineering

LOUIS J. RUZZI, P.E.
Pennsylvania Dept. of Transportation

CO-SPONSORS:

American Association of State Highway and Transportation Officials (AASHTO)
www.transportation.org

Association of Drilled Shaft Contractors (ADSC)
www.adsc-iafd.com

American Council of Engineering Companies (ACEC)
www.acec.org

American Public Works Association (APWA)
www.apwa.net

American Society of Highway Engineers (ASHE)
www.highwayengineers.org

Associated Pennsylvania Constructors (APC)
www.paconstructors.org

Association of Diving Contractors International (ADCI)
www.adc-int.org

The Canadian Society for Civil Engineering (CSCE)
www.csce.ca

Carnegie Mellon University - Dept. of Civil Engineering
www.ce.cmu.edu

Central Atlantic Bridge Associates (CABA)
www.caba-bridges.org

Deep Foundations Institute
www.dfi.org

The Federal Highway Administration (FHWA)
www.fhwa.dot.gov

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

National Steel Bridge Alliance (NSBA)
www.steelbridges.org

Pennsylvania Department of Transportation (PENNDOT)
www.dot.state.pa.us

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

Short Span Steel Bridge Alliance
www.shortspansteelbridges.org

SSPC: The Society for Protective Coatings
www.sspc.org

Transportation Research Board (TRB)
www.trb.org

University of Pittsburgh - Dept. of Civil & Environmental Engineering
www.engr.pitt.edu/civil

MEDIA PARTNERS

Bridge design & engineering: www.bridgeweb.com
Coatings Pro Magazine: www.gobridges.com
Government Engineering Journal: www.govengr.com
The Journal of Protective Coatings and Linings (JPCL) and Paintsquare.com: www.paintsquare.com
Rebuilding America's Infrastructure: www.gobridges.com
Roads & Bridges Magazine: www.roadsbridges.com

KEYNOTE SESSION

Time: 8:30 A.M. - 12:00 Noon
Room: Ballroom A

The 27th Annual International Bridge Conference® will kick off with the Keynote Session, featuring leaders of the bridge industry from around the world. This annual kick-off to the IBC will be led by Jeffrey J. Campbell, P.E., Chair of the 2010 Conference. Scheduled speakers include:

PETER R. TAYLOR, PH.D., P. ENG., P.E., PRINCIPAL, BUCKLAND AND TAYLOR, LTD

Peter Taylor started his career in 1965 at Dominion Bridge Co., Canada's largest steel fabricator and erector. During this period he was seconded to a consulting firm to head the design team for the Papineau Cable-stayed Bridge in Montreal. He returned to Dominion Bridge to be project engineer for the construction of the bridge, thus having designed and built the longest span cable-stayed bridge in North America from 1971 to 1977. He joined the Burrard Inlet Crossing team as the earthquake and dynamics expert, and in 1972 co-founded Buckland & Taylor Ltd. Since then, Peter Taylor has become a renowned expert on cable-stayed and other large bridges. He was Designer of Record of the award-winning Alex Fraser Bridge, the world's longest span cable-stayed bridge from 1986-1991. More important than size, it set a new trend in cable-stayed bridges with composite steel girders and concrete deck, and other innovations. It was the longest cable-stayed bridge in the Americas until the Cooper River Bridge opened in July 2005. Dr. Taylor was in charge of bid design and check of final design for the Design/Build Contractor for Cooper River Bridge. He gave expert advice to the Design/Build Contractor of the Second Severn Cable-Stayed Bridge in the U.K., and the Design/Build Contractor of the Ting Kau Cable-Stayed Bridge in Hong Kong. He also headed the construction engineering team for the Cooper River Cable-stayed Bridge, SC, William Natcher Cable-stayed Bridge, KY and seven other cable-stayed bridges. Other notable projects include the world's first replacement of a concrete bridge deck with a wider steel orthotropic deck during short night time closures (Lions' Gate Bridge, 1975), a technique since copied on George Washington Bridge, Golden Gate Bridge, and others. He also designed the world's longest span conveyor suspension bridge (Similkameen Ore Conveyor Bridge, 1981). He has been an invited key-note speaker at bridge engineering conferences in Hong Kong, France, Canada and the U.S. His papers are listed in the company publications list. In 2009, Peter Taylor was appointed to the Order of Canada for his contributions to innovative developments in bridge engineering, notably as an expert in cable-stayed bridges.

JIM J. MOYNIHAN, AIA, PRESIDENT AND CHIEF EXECUTIVE OFFICER, BALFOUR BEATTY INFRASTRUCTURE, INC.

A long-term member of Balfour Beatty's U.S. management team, Jim Moynihan is president and CEO of Heery International and Balfour Beatty Rail, Inc. as well as Balfour Beatty Infrastructure, Inc. For more than 20 years, he has provided strong leadership to Heery, spearheading such high-profile projects as the 1996 Olympic Stadium/Turner Field, developing the company into one of the preeminent firms in its markets. As president and CEO of Balfour Beatty Infrastructure, Inc., Moynihan has expanded his management responsibilities and philosophies into Balfour Beatty's U.S. infrastructure building programs.

Moynihan is on the board of the Construction Management Association of America, and is a member of the American Institute of Architects, Design/Build Institute of America, United Way of Metropolitan Atlanta and the National Council of Architectural Registration Boards. He holds a master of science degree in architectural administration and a bachelor of science degree in architecture, both from the University of Illinois. Before joining Heery, Moynihan was senior vice president at Hellmuth, Obata & Kassabaum, Inc., and was acting director for the Capitol Development Board with the State of Illinois.

NEIL J. PEDERSEN, P.E., ADMINISTRATOR, MARYLAND STATE HIGHWAY ADMINISTRATION

Administrator of the Maryland State Highway Administration since January 2003, Neil J. Pedersen is responsible for an agency that maintains and operates nearly 17,000 lane miles of roadway and 2,500 bridges; employs more than 3,200 professionals in a variety of disciplines; and is responsible for an annual budget of $1.7 billion. In that position, he also serves as the Governor's Highway Safety Representative and Chair of the Maryland State Roads Commission. A registered professional engineer, he previously served for two and a half years as SHA's Deputy Administrator/Chief Engineer for Planning and Engineering – a position that oversees all of the agency's planning, design, environmental, and real estate functions. Prior to that, he was SHA's Director of Planning and Preliminary Engineering for 16 years. Mr. Pedersen led SHA in the delivery of two mega projects: the $2.4 billion Woodrow Wilson Bridge, which is nearing completion, and the $2.5 billion Intercounty Connector, which has begun construction. Mr. Pedersen believes in working with other transportation professionals to advance the practice of both engineering and public administration. His involvement with the American Association of State Highway and Transportation Officials includes being Vice Chair of the Standing Committee on Highways, being a member of the Standing Committees on Research; and being on its Board of Advisors for the Center on Environmental Excellence. He is also a member of the Executive Committee of the Transportation Research Board and chairs the Executive Committee of the I-95 Corridor Coalition, a consortium of transportation organizations from sixteen states along the eastern seaboard. He also serves on the Board of Visitors of the University of Maryland's Department of Civil and Environmental Engineering. Mr. Pedersen has received numerous awards for his service, including most recently the 2007 Thomas H. MacDonald Memorial award from AASHTO and the 2006 George S. Bartlett award, which is given by the Transportation Research Board, AASHTO and ARTBA. A native of Massachusetts, Mr. Pedersen holds two undergraduate degrees from Bucknell University and a Master's degree in Civil Engineering from Northwestern University. He lives in Silver Spring, Maryland with his wife, Barbara.

M. MYINT LWIN, P.E., S.E., DIRECTOR, OFFICE OF BRIDGE TECHNOLOGY (HIBT), FEDERAL HIGHWAY ADMINISTRATION

Myint Lwin is the Director of the Office of Bridge Technology with the Federal Highway Administration (FHWA). As Director of the Office of Bridge Technology, his responsibilities include: providing national guidance in the design and construction of major and unusual bridges and tunnels; developing national bridge program and engineering policies; initiating system and process improvements to continually improve the quality and safety of bridges and structures; and providing technical and program

direction for the Highway Bridge Replacement and Rehabilitation Program. Prior to his appointment in Washington, D.C., Mr. Lwin was the Structural Design Engineer at the FHWA Resource Center in San Francisco. Before joining FHWA in January 2000, he was the State Bridge and Structures Engineer, Office of Bridges and Structures, Washington State Department of Transportation. Mr. Lwin received his BSCE from the University of Rangoon, Burma, and his MSCE degree from the University of Washington, Seattle. He is a registered Professional Engineer in Civil and Structural Engineering.

MALCOLM T. KERLEY, P.E., CHIEF ENGINEER, VIRGINIA DEPARTMENT OF TRANSPORTATION, AASHTO

Mal Kerley, Chief Engineer for the Virginia Department of Transportation (VDOT), is a member of the AASHTO Standing Committee on Highways and has served as Chair of the AASHTO Highway Subcommittee on Bridges and Structures (SCOBS) since 2002. In July 2002, he was named Chief Engineer at VDOT, 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 served as Administrator of VDOT's Structure & Bridge Division from 1992 to 2002, responsible for planning, design, construction, maintenance and inspection of more than 20,000 bridges and overpasses. He began his career with VDOT in 1971. He has a civil engineering degree from the Virginia Military Institute (BSCE, 1971) and Master's degree from the University of Virginia (MECE, 1973).

DR. T. PETER RUANE, PRESIDENT AND CEO, AMERICAN ROAD & TRANSPORTATION BUILDERS ASSOCIATION

Pete is the President and CEO of ARTBA, a 108-year old national federation of public and private transportation construction interests with over 5,000 members. He has over 35 years of experience in economic development, transportation and construction fields. Prior to joining ARTBA, he served as President/CEO of the National Moving & Storage Association and Deputy Director of the Office of Economic Adjustment, the Office of the Secretary of Defense and the President's Economic Adjustment Committee. He received numerous awards, including the top two government-wide management awards made available to a young federal executive. He is a graduate of Loyola College of Baltimore, holds a masters degree from Pennsylvania State University and a doctorate from George Washington University.

FEATURED AGENCY

Time: 1:30 – 5:00 P.M.
Room: Ballroom A
Chair: Bob Healy, Deputy Director, Office of Structures, *MSHA*

Learn more about the bridge program of the Maryland State Highway Association & Maryland Transportation Authority, with sessions and speakers that include:

1. BridgeStat – the State of the State of Maryland's Bridges, Bob Healy, *MSHA*
2. Recent Bridge Mega-Projects in Maryland
   a. Woodrow Wilson Bridge – Lessons Learned, Jim Ruddell, *PB Americas*
   b. Intercounty Connector – Concrete Arch Bridge over Rock Creek, Greg Shafer, *Parsons*
   c. I-95 Express Toll Lanes Project, Dave LaBella, *MDTA*
3. Ongoing Bridge Research in MD
   a. Chloride Effects and Detection, Jeff Robert, *MSHA*
   b. Smart Aggregate – A Chloride Detection System, Srinivasan Rengaswamy, *Johns Hopkins Univ. — Applied Physics Lab*
4. Accelerated Bridge Construction in Maryland
   a. MD 362 over Monie Creek, Joe Navarra, *MSHA*
   b. Re-decking of the Chesapeake Bay Bridge, *URS*
5. Opportunities for Success – Dealing with Recent Bridge "Emergencies"
   a. American Legion Bridge – I-495 over Potomac River, Cecil Kincaid, *MSHA*
   b. Curtis Creek Bascule Span Rehabilitation, Dan Williams, *MDTA;* Scott Reynolds, *Hardesty & Hanover*
   c. MD 32 over Liberty Reservoir, Rod Thornton, *MSHA*
   d. MD 90 over Assawoman Bay, Will Pines, *MSHA*

IBC BRIDGE AWARDS LUNCHEON

TIME: Monday, June 15; 11:30 A.M - 1:00 P.M.
ROOM: Ball Room B
HOST: Tom Leech, P.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 the International Bridge Conference®, presents the 23rd Annual IBC Bridge Awards Luncheon, sponsored by Bayer MaterialScience LLC. The International Bridge Conference® annually awards five 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. The student award is named in honor of a former IBC General Chairman, champion of the student award's program and friend to the bridge community at large. Tickets are required to attend this event, as seating is limited to 300 registrants! Honorees will be recognized in the following categories:

JOHN A. ROEBLING MEDAL - recognizing an individual for lifetime achievement in bridge engineering. We are pleased to recognize John M. Kulicki, Ph.D., P.E. the 2010 recipient.

GEORGE S. RICHARDSON MEDAL - for a single, recent outstanding achievement in bridge engineering, is presented to recognize the Wuhan Tianxingzhou Rail-cum-road Yangtze River Bridge.

GUSTAV LINDENTHAL MEDAL - for an outstanding structure that is also aesthetically and environmentally pleasing, will be presented to recognize the Xihoumen Bridge, China.

EUGENE C. FIGG JR. MEDAL - recognizing a single recent outstanding achievement in bridge engineering, which is considered an icon to the community for which it is designed, will be presented to recognize the George Street Bridge in New Brunswick, New Jersey.

ARTHUR G. HAYDEN MEDAL - recognizing a single recent outstanding achievement in bridge engineering demonstrating vision and innovation in special use bridges, will be presented to recognize Riverside Bridge, Cambridgeshire County, UK.

JAMES C. COOPER STUDENT AWARD - recognizes undergraduate and graduate students who demonstrate an interest and passion for bridge engineering. The 2010 award will be presented to Sarira Motaref, University of Nevada- Reno.

HISTORIC PRESERVATION AWARD - this special award will be presented to the Poughkeepsie Highland Railroad Bridge.

DESIGN, PART 1

Time: 8:30 A.M. - 12:00 Noon
Room: Hall A: THEATER 1
Chair: Kenneth J. Wright, P.E., *HDR Engineering, Inc., Pittsburgh, PA*

10-01 **8:30 A.M.**

THE 4TH STREET BRIDGE - CROSSING THE PUEBLO RAIL YARD WITH COLORADO'S LONGEST HIGHWAY SPAN

John Dvorak, P.E.and Steve Fultz, P.E., *FIGG, Pueblo, CO*; **Karen Rowe, P.E.**, *Colorado Department of Transportation, Region 2, Pueblo, CO*

The new 4th Street Bridge in Pueblo, Colorado will replace the existing structure with a long span concrete segmental bridge and features five spans, including Colorado's longest highway span at 380 feet. Balanced cantilever construction from above is being utilized to assemble the 1,137-foot long twin box girders. The layout provides clear spans over 28 active rail tracks in the Pueblo Railroad Yard and Arkansas River - allowing yard operations and river recreation to continue throughout construction.

10-02 **8:55 A.M.**

FANTASY HARBOUR BRIDGE

Zhugang "Amos" Liu, P.E., *STV Incorporated, Charlotte, NC*; **Gregory Sigmon, P.E.**, *STV/Ralph Whitehead Associates, Inc., Charlotte, NC*; **Barry Bowers, P.E.**, *South Carolina Department of Transportation, Columbia, SC*

The 1,800' long Fantasy Harbour Bridge spans over the Atlantic Intracoastal Waterway in Myrtle Beach, SC. This bridge was named one of the Top 10 Bridges in 2009 by Roads and Bridges Magazine. The bridge comprises 12 spans, with a 330 feet main channel span. Project challenges included complex geological formations, vessel impact design considerations, satisfying FAA requirements for flight path encroachment relating to a local airport/air base, and seismic category "D" design requirements.

10-03 **9:20 A.M.**

DESIGN AND CONSTRUCTION CHECK OF THE ASTANA ARCH BRIDGE

Alexandre Chaperon, *Advitam, Vélizy Cedex, FRANCE*

The Ramstore Bridge, in Astana, Kazakhstan, has a very innovative design. With its single steel arch crossing the deck from the North-West to the South-East, and supporting it with hangers having up to 45° relative angles, this bridge became a signature structure in Kazakhstan. In order to validate the structure stability after construction, a parallel design and construction check has been performed by Advitam and the Freyssinet Technical Department (TD).

10-04 **9:45 A.M.**

THE GEORGE STREET BRIDGE - A CONTEXT SENSITIVE SOLUTION

Thomas Zink, P.E., *Gannett Fleming, Inc., Mount Laurel, NJ*; **Michael DiGiacomo, P.E.**, *Gannett Fleming, Inc., Orlando, FL*

The George Street Bridge is part of the New Jersey Department of Transportation's (NJDOT's) Route 18 Improvement Project in New Brunswick, New Jersey. NJDOT's foresight regarding the project's role in the urban redevelopment of New Brunswick led to an extensive context-sensitive design approach that resulted in the construction of an economical and environmentally friendly precast concrete arch bridge that compliments the historical charm of the City.

COFFEE BREAK: 10:10 – 10:30 AM

10-05 **10:30 A.M.**

ANALYSIS AND DESIGN OF THE NEW ST. CROIX RIVER EXTRADOSED BRIDGE

Preston D. Vineyard and Darren Vian, Ph.D., P.E., *PB Americas, Inc., New York, NY*

St. Croix River Bridge is a proposed 5,040 ft river crossing between Stillwater, MN and Houlton, WI. The new structure is to be of segmental concrete construction and consist of 3,460 ft of extradosed river spans (six 480 ft spans and two 290 ft end spans) and 1,580 ft. of approach spans. Upon completion, the crossing will be the second extradosed bridge constructed in the United States. The bridge will provide 40ft roadways in each direction and a 12ft pedestrian trail. The superstructure will be integrally connected to the substructure at every pier.

Preliminary design of the extradosed spans required the study of a few particular items, including the feasibility of using only two expansion joints to accommodate thermal and long term (creep and shrinkage) lateral movements of the superstructure, as well as that of tower bents consisting of two, rather than three, column legs. A three dimensional model was developed to investigate these items, as well as the extradosed cable force distribution, and the demands on the box girders, towers and foundations, via a staged construction analysis.

10-06 **10:55 A.M.**

REPLACEMENT OF THE HILLERY STREET BRIDGE OVER THE PASSAIC RIVER, PASSAIC COUNTY, NJ

Bruce Karalius, P.E., *Greenman-Pederson, Inc., Lebanon, NJ*; **Aurelia Mayer**, *Passaic County Engineer, Paterson, NJ*

The Hillery St. Bridge over the Passaic River, selected as the No. 3 bridge of Roads and Bridges magazine's top 10 bridges of 2009, involved the replacement of an historic four span Pratt pony truss bridge, constructed in 1898, with a conventional multi-steel beam bridge utilizing or replicating many of the original components. Although one end span had to be flared, the remaining three spans visually emulate the original bridge.

10-SP **11:20 A.M.**

SEISMIC PERFORMANCE OF PRECAST BRIDGE COLUMNS WITH ENERGY DISSIPATING JOINTS

Sarira Motaref, *Ph.D. student of Earthquake and Structural Engineering, University of Nevada at Reno*

Four one-third scale precast concrete segmental bridge columns with energy dissipating plastic hinges were designed and tested on one of the shake tables at the University of Nevada, Reno. They were subjected to increasing progression of the Northridge 1994 earthquake Sylmar ground motion record until failure. Conventional reinforced concrete was used in the plastic hinge of a reference column. In one of the models a built-in elastomeric pad integrated with the footing and a concrete segment constituted the plastic hinge. The other two columns incorporated ECC (Engineered Cementitious Composite) and FRP (Fiber Reinforced Polymer) wrapping at the lower two segments. Unbonded post tensioning system was used to connect the segments and to minimize residual displacements. Energy was dissipated mostly through the yielding of the longitudinal bars at base segments. Compared to conventional precast concrete segmental columns, all specimens showed superior performance such as minimal residual displacement and larger energy dissipation.

LONG SPAN BRIDGES

Time: 8:30 AM - Noon
Room: Hall A: THEATER 2
Chair: Herbert M. Mandel, P.E., *GAI Consultants, Inc., Homestead, PA*

10-07 **8:30 A.M.**

DESIGN, CONSTRUCTION AND ORGANIZATION OF A MAJOR SEA CROSSING IN KOREA

Andrew Yeoward and Don Fraser, *Halcrow Group Ltd, Swindon, Wilts, UK*; **Im Sig Koo,** *Daewoo E & C Ltd, Busan, Korea*;

This paper describes construction of two major cable stayed bridges on the US$2.5Bn fixed link connecting Busan to Geoje in Korea. The 1.65 kilometre, two-pylon, and the 1.87 kilometre, three-pylon, cable stayed bridges cross water depths of 30m with main spans of 475 metres and 2 x 230 metres respectively. Project organization is described, together with some challenges in construction of the island hopping link in the severe open sea conditions of the Pacific Ocean.

10-08 **8:55 A.M.**

US62/641 TENNESSEE RIVER BRIDGE - INNOVATIVE LONG-SPAN DESIGN

C. Tony Hunley, P.E., S.E., Ph.D. and Don Mills, P.E., S.E., *ENTRAN, PLC, Lexington, KY*

The navigation unit of the 3,100 foot long bridge consists of three spans at 304 feet, 505 feet, and 170 feet (counterweighted). The fabricator proposed a redesign due to the unavailability of the dedicated shop capable of fabricating the 14-foot deep navigation unit girders. The final haunched girder redesign, after agency coordination, featured a horizontal bolted web splice that was developed to facilitate fabrication. The horizontal web splice design, fabrication, and girder erection are discussed.

10-09 **9:20 A.M.**

DESIGN OF INDIAN RIVER INLET BRIDGE

Benjamin Soule, *International Bridge Technologies, San Diego, CA*; **Eric Nelson,** *AECOM Transportation, Nashville, TN*

Presentation will address design of the new Indian River Inlet Bridge in Bethany Beach, Delaware. The existing bridge across the inlet has long been plagued by extreme scour conditions within the channel. The bridge is also located within yards of the Atlantic Ocean and is subject to the corrosive effects of the marine environment.

10-10 **9:45 A.M.**

COMPARISON OF CHARACTERISTICS OF SOME UNIQUE CABLE-STAYED BRIDGES UNDER CONSTRUCTION IN KOREA

Young-Jae Seo, Kyoung-Jae Lee, Jae-Hong Kim, Yeong-Ho Kim, Jung-Min Nam, Gu-Sang Jeong, and Ju-Taek Park, *Daelim Industrial Company, Seoul, South Korea*

Recently, many cable-stayed bridges are under construction in South Korea and four of them are being constructed by Daelim Industrial Company which was founded in 1939. The bridges are Cheongpung Bridge, Second Dolsan Bridge, Sepung Bridge, and Geum-gang-2 Bridge. Each bridge has the unique characteristics and this paper deals with the introduction and the comparison of characteristics of each bridge.

COFFEE BREAK: 10:10 – 10:30 AM

10-11 **10:30 A.M.**

THE AMELIA EARHART TIED NETWORK ARCH BRIDGE

Natalie McCombs, P.E., S.E. and Frank Blakemore, P.E., *HNTB, Kansas City, MO*; **Mark Hurt, P.E., S.E.,** *Kansas DOT, Topeka, KS*

The new Amelia Earhart Bridge has an overall length of approximately 2,546 feet, which consists of 2,019 feet of 78 inch NU prestressed concrete I-girder approaches and 527 foot steel tied arch main span. The proximity of the existing bridges and resulting scour potential was a major design consideration, both during construction and long term.

10-12 **10:55 A.M.**

THE GEOMETRY CONTROL OF SEPOONG BRIDGE : A CURVED CABLE-STAYED BRIDGE

Jung-Min Nam, Joong-San Ahn, Jung-Nam Lee, and Jae-Hong Kim, *Daelim Industrial Company, Ltd., Seoul, South Korea*

The Sepoong Bridge is a multi-span curved cable-stayed bridge with each of the two spans being 220m long and the curvature radius of the girder is 2,000m.Since the behavior of the curved bridge is more complex than the behavior of the straight one, the geometric control of each erection stage should be performed carefully. Thus a present study presents the twisting effect at the construction stage and geometry control method for curved cable-stayed bridge.

10-13 **11:20 A.M.**

MAIN BRIDGE DESIGN AND CONSTRUCTION INNOVATIONS OF THE AUTOROUTE 25 COMPLETION PROJECT

Thomas Spoth, P.E., Joseph Viola, P.E., Augusto Molina, P.E., and Seth Condell, P.E., *Parsons, New York, NY*

This paper discusses A25's main bridge at the Rivière-des-Prairies - the centerpiece of this 7.2 kilometer, $500 million connection project from Montreal to Laval in Quebec. The main bridge, 1,200 meters long with multiple continuous 96-meter spans leading up to the 280-meter main span cable-stayed bridge, demanded unique structural systems, analysis techniques and construction innovations to meet an aggressive construction schedule, stringent environmental criteria and difficult river icing conditions.

BRIDGE REHABILITATION 1

Time: 8:30 AM - Noon
Room: Hall A: THEATER 3
Chair: Gerald J. Pitzer, P.E., *Consultant, Pittsburgh, PA*

10-14 **8:30 A.M.**

REHABILITATING THE SHIPPINGPORT BRIDGE FOR THE PRESENT AND FUTURE

John E. Cravotta, P.E., *HDR Engineering, Pittsburgh, PA*; **Shawn E. Tunstall, P.E.,** *H.W. Lochner, Inc.; Canonsburg, PA*; **Douglas Thompson, P.E.,** *PENNDOT - District 11-0, Bridgeville, PA*; **Ian Hodgson, P.E., S.E.,** *ATLSS Center, Lehigh University, Bethlehem, PA*

The 1613 foot Shippingport Bridge features a 3-span continuous truss crossing the Ohio River in Beaver County Pennsylvania. The structure is undergoing a major rehabilitation. This paper will present key elements in the rehabilitation including the elimination of deck joints by making the floor system and deck continuous over the truss spans. Lessons learned through construction will also be discussed regarding the presentation of repair details that will be valuable in future rehabilitation contracts.

10-15 8:55 A.M.

RANKIN BRIDGE REHABILITATION - CHALLENGES & INNOVATIONS

Glenn D. Stickel, P.E. and Robert Michalko, P.E., *SAI Consulting Engineers, Inc, Pittsburgh, PA*

The $46M re-decking, widening, rehabilitation and painting of the Rankin Bridge, a twelve-span cantilever deck truss, includes complicated and challenging items - retrofit of truss gusset plates, strengthening of truss members, addition of redundancy systems at anchor span tie-downs and suspended span hangers, seismic retrofit of rocker bearings, half-width replacement of a two-girder approach span, installation of passive tie-back anchors on one pier and two abutments, and the use of tangent caissons for a wingwall extension.

10-16 9:20 A.M.

CORPUS CHRISTI HARBOR BRIDGE REHABILITATION

Shawn Tunstall, P.E., Matt Bunner, P.E., and Tony Ream, P.E, *HDR Engineering, Inc, Pittsburgh, PA*; **Patrick Bachman, P.E.**, *HDR , Austin, TX*

The Corpus Christi Harbor Bridge carries US181 over the Port of Corpus Christi ship channel entrance. The main bridge consists of two 271-ft simple span deck truss units, two 426-ft cantilever truss units, and one 387-ft tied arch for an overall truss length of 1781-ft. The bridge rehabilitation project consisted of performing a detailed bridge inspection, performing a rating analysis, and generating repair and strengthening plans. The various phases of the project will be presented.

10-17 9:45 A.M.

"FLOATING" JOINTLESS STEEL GRID DECK FOR WALT WHITMAN BRIDGE

Qi Ye, P.E. and Guang-Nan Fanjiang, *Weidlinger Associates, Inc., New York, NY*; **Daniel Griffith, P.E.**, *AECOM Transportation, Philadelphia, PA*; **Vijay Pandya, P.E.**, *Delaware River Port Authority, Camden, NJ*

The existing deck in the suspended spans of Walt Whitman Bridge consists of a concrete-filled steel grid with transverse relief joints. Due to water leakage at these relief joints, stringers and top chords of floor trusses are heavily corroded. To eliminate potential of future corrosion, a new "floating" jointless (without relief joints) grid deck system was designed. The "floating" deck option will be accomplished by installing flexible elastomeric bearings under deck stringers at all floor trusses.

COFFEE BREAK: 10:10 – 10:30 AM

10-18 10:30 A.M.

FATIGUE INVESTIGATION AND RETROFIT OF GIRARD POINT BRIDGE IN PHILADELPHIA

Y. Edward Zhou, *URS Corporation, Hunt Valley, MD*; **John Lang, Jason Beecher, Rob Cunningham, and Mark Guzda**, *URS Corporation, Fort Washington, PA*

Main crossing of Girard Point Bridge (I-95 over Schuylkill River) is comprised of a double-deck, three-span, cantilever-suspended truss structure constructed in early 1970's. Connections between plate girder floor beams and the truss have experienced fatigue cracking in vicinities of the suspended span since early 1990's. This paper presents results of an investigation involving field instrumentation, laboratory testing and comprehensive finite element analysis for live load and temperature effects as well as development of retrofit design.

TUESDAY TECHNICAL SESSIONS

10-19 10:55 A.M.

AN AUXILIARY SUPPORT SYSTEM FOR CORRODED STEEL GIRDER HINGES

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

Leaking deck joints located over in-span hinges or pin-and-hanger assemblies can produce corrosion that will compromise the capacity of a steel girder structure. This presentation illustrates a method of strengthening areas where such corrosion is present by installing "catcher beam" type auxiliary supports attached to existing girders using post-tensioned rods. No lane closures were required to add the supports since all work was performed from below the bridge deck using man lifts atop barges on the waterway.

10-20 11:20 A.M.

WESTFIELD GREAT RIVER BRIDGE

Mark Ennis, P.E., P.M.P. and Kara Crawford, P.E., *STV Incorporated, Boston, MA*

The Great River Bridge, built in 1939 is located in downtown Westfield, a City in Western Massachusetts. The through truss bridge is a landmark for the City, forming perhaps the most distinctive structure in the downtown area. The project scope initially involved the rehabilitation of the 368 foot long, continuous, two span structure. However, the project has grown to include the design of an identical "Sister Bridge" and a four span railroad viaduct, 284 feet long.

DESIGN, PART 2

Time: 1:30 - 4:45 P.M.
Room: Hall A: THEATER 1
Chair: Carl Angeloff, P.E., *Bayer Material Science, LLC, Pittsburgh, PA*

10-21 1:30 P.M.

ELASTOMERIC BEARINGS: EFFECTS OF SPECIFICATION CHANGES ON DESIGN AND CONSTRUCTION

John Stanton, *University of Washington, Seattle, WA*

Elastomeric bearings are widely used in bridges. The AASHTO specifications have for many years contained design requirements associated with bearing rotation that are very conservative. Unfortunately they lead either to designs that may risk instability during construction, or to conflicting requirements that prevent the use of elastomeric bearings altogether. Recent research has led to development of new design provisions that both solve these problems and lead to a more transparent design procedure. The paper describes the underlying research, the new provisions, and the consequences for design.

10-22 1:55 P.M.

THE POINT MARION BRIDGE: STRUCTURAL ASPECTS OF A NEW TRUSS DESIGN

Anthony P. Ream, P.E. and William F. Beining, P.E., *HDR Engineering, Inc., Pittsburgh, PA*; **Stephen E. Hvizda, P.E.**, *Pennsylvania Dept. of Transportation, Engineering District 12-0, Uniontown, PA*

The Point Marion Bridge, located in Point Marion, Pennsylvania, carries S.R. 0088 over the Monongahela River. The new structure consists of a 412.50 foot simple span steel through-truss and steel plate girder approach units. For the truss design, built-up tension chord members provided structural redundancy, 3-D analyses were identified secondary effects, and a temporary 300 foot horizontal navigational clearance required cantilever erection using a temporary bent. These structural issues and others will be presented

10-23 2:20 P.M.

REPLACEMENT OF THE NORTHBOUND WHITESTONE EXPRESSWAY BRIDGE OVER FLUSHING RIVER

James A. Bager, P.E. and Daniel Wan, P.E., *Hardesty & Hanover, LLP, New York, NY*; Michael Bergmann, P.E., John Elias, P.E., John Kwok, P.E., *New York State Department of Transportation, Region 11, Long Island City, NY*

This presentation provides the design and construction overview for the replacement of the 60 year old deteriorating bascule bridge carrying 5 lanes of northbound Whitestone and Van Wyck (I-678) Expressways over the Flushing River. This complex urban interchange with geometric constraints under existing roadways and over the Flushing River initiates the need of utilizing shallow steel trapezoidal hybrid box girders to achieve a 306 feet span while maintaining the 34' vertical clearances over the waterway.

10-24 2:45 P.M.

DESIGN AND CONSTRUCTION OF THE CURVED AND SEVERELY SKEWED STEEL I-GIRDER EAST-WEST CONNECTOR FLYOVER RAMP OVER I-88

Brandon Chavel, Ph.D., P.E. and Lance Peterman, P.E., S.E., *HDR Engineering, Inc., Chicago, IL*; Caahlen McAtee, P.E., *Illinois State Toll Highway Authority, Downers Grove, IL*

The Illinois Tollway, East-West Connector Ramp carries 2-lanes of traffic from northbound I-294 to westbound I-88, was reconstructed on a new curved alignment, consisting of a 3-span curved and severely skewed steel plate girder unit, and a 2-span prestressed concrete unit. The presentation will discuss the unique design challenges of the steel plate girder unit, including steel erection; the transportation of large precast bulb tee girders; and the design of a complex modular joint.

BRIDGE MANAGEMENT

Time: 1:30 - 4:45 P.M.
Room: Hall A: THEATER 2
Chair: Gary Runco, P.E., *Borton-Lawson, Wexford, PA*

10-25 1:30 P.M.

INTEGRATED BRIDGE INSPECTION AND MANAGEMENT SYSTEM FOR STATE OF WEST VIRGINIA

Jeff Gula, *West Virginia DOT/DOH - Maintenance Division - Bridge Management Section, Charleston, WV*

The WVDOH is responsible for over 6,500 bridges. The Department had utilized a combination of mainframe software, decentralized spreadsheets, and small databases to manage its bridges for over 20 years. The Department has moved forward with a new system to inspect and manage all of its structures. The software allows both field entry on tablet or laptop computers as well as an integrated internet module for continuing reports and reviewing data in the office.

10-26 1:55 P.M.

UNITED STATES FISH AND WILDLIFE SERVICE BRIDGE SAFETY PROGRAM

Ronald R. Begin, P.E., *U.S. Fish & Wildlife Service, Arlington, VA*

The United States Fish and Wildlife Service owns and maintains over 700 bridges spread out over 93 million acres of National Wildlife Refuge and National Fish Hatchery

TUESDAY TECHNICAL SESSIONS

managed lands. These bridges represent a diverse inventory and range from Alaska to Puerto Rico. This paper examines key aspects of the Service's inventory, inspection, and management efforts and presents some of the more interesting elements and challenges posed by this unique inventory.

10-27 2:20 P.M.

BRIDGE INFORMATION MODELING OF QUINCY AVENUE BRIDGE: A CASE STUDY OF BRIM FOR PROJECT DELIVERY THROUGHOUT THE LIFE-CYCLE OF BRIDGES

Stuart Chen, Hanjin Hu, Qiang Gao and Il-Sang Ahn, *University at Buffalo, Buffalo, NY*; Arun Shirole', *S & A Shirole' P.C., Minneapolis, MN*

Bridge Information Modeling (BrIM) is the process that plans, constructs, and manages bridge projects in a virtual environment using bridge information model. In the 21st century, the idea of three-dimensional parametric modeling has been widely known and accepted by bridge industry as an important advancement to replace the two-dimensional Computer Aided Design technology. BrIM is different from the three-dimensional parametric modeling; it aims to organize and change information collected from various stages in the bridge life-cycle by using various software applications and exchangeable forms. This paper demonstrates the possibility of using BrIM for project delivery throughout the bridge life-cycle including the design phrase and construction, operation and management phrases. A streamlined approach, which can make analysis, detailing, construction preparation, inspection, and operation processes faster and better, has been investigated, applied, and assessed for the Quincy Avenue over I-25 case study bridge, is a recently designed, three span continuous bridge with two different skew angles. This bridge has been exemplified in authors' previous research on the bridge design based on the AASHTO LRFD Specifications, Accelerated Bridge Construction, and seismic design based on the AASHTO Guide Specifications.

10-28 2:45 P.M.

AREVA TRANSPORTATION PROJECT

Bryan Spangler, P.E. and Ronald Ladyka, *Michael Baker Jr, Inc, Harrisburg, PA*

The paper will focus on the bridge engineering related aspects of transporting two 1.8 million pound loads over 75 miles of state highways in PA and MD. This was the largest load in PA history. Various methods including temporary stream crossings, overbridges, bracings and buttressing to enable bridges to be crossed by such an large load. We will discuss the planning, designing, construction and actual crossing of the more unusual designs implemented for the project.

COFFEE BREAK: 3:10 – 3:30 P.M.

10-29 3:30 P.M.

INTRODUCTION TO THE MAINTENANCE SPECIFICATION FOR LONG SPAN CABLE-SUPPORTED BRIDGES IN JIANGSU CHINA

Congming Zhu and Yufeng Zhang, Ph.D., *Jiangsu Transportation Research Institute, Co. Ltd, Nanjing, Jiangsu Province, P.R. China*

In the recent years, the number of long span cable-supported bridges has been rising rapidly in Jiangsu China, such as Jiangyin Bridge, Sutong Bridge, Nanjing Second Bridge, Nanjing Third Bridge, Runyang Bridge, etc. Consequently, effective maintenance is essential to keep them serviceable and durable. This paper introduces the main contents of The Specification for Maintenance of Long Span Cable-supported Bridges in Jiangsu Province, which is expected to be put into effect soon.

BRIDGE REHABILITATION 2

Time: 1:30 - 4:45 P.M.
Room: Hall A: THEATER 3
Chair: Calvin Boring Jr., *Trumbull Corporation, Greensburg, PA*

10-30 **1:30 P.M.**

TENDON INVESTIGATION AND GROUT INJECTION REPAIRS FOR THE JAMESTOWN-VERRAZZANO BRIDGE

Michael Abrahams, P.E. and Steven Kaufman, P.E., *Parsons Brinckerhoff, New York, NY*; Ahmad El-Beik, *Parsons Brinckerhoff, Boston, MA*; Paul Fisk, *NDT Corporation, Worchester, MA*

A detailed investigation of the post-tensioning system of the bridge's segmental box girder spans using predominantly nondestructive methods revealed approximately 3,664 feet of voids. Subsequently, PB developed contract documents to address repair of the voids. Discussion will investigation methods, the contracting and QA provisions that helped ensure the quality of repairs and minimize claims that have occurred on similar past projects, and events that will provide lessons learned for future repairs of similar post-tensioning systems.

10-31 **1:55 P.M.**

SHEAR CAPACITY TESTING AND ASSESSMENT OF CORROSION DAMAGED REINFORCED CONCRETE BEAMS

William Farrow, III, P.E., *Gannett Fleming, New York, NY*; Chris Higgins, Ph.D., P.E., O. Tugrul Turan, *Oregon State University, Corvallis, OR*

With the aging infrastructure and limited resources to replace deteriorated bridge elements, rehabilitating existing structures has become important; however methods to accurately predict remaining capacity of corrosion damaged elements. An experimental investigation of corrosion on the shear capacity of conventionally reinforced concrete beams was conducted. From the experimental results, recommendations to modify the current AASHTO shear analysis methodologies were proposed to take into account the corrosion induced damage to both the concrete section and stirrups.

10-32 **2:20 P.M.**

GRAND CONCOURSE BRIDGE OVER METRO-NORTH RAILROAD

Christopher Mele, P.E., P.M.P and Porfirio Lantigna, P.E., *Michael Baker Engineering, Inc., White Plains, NY*

Bridge Structure Description: Grand Concourse Bridge over MNRR: A single span structure spanning 140 feet over MNRR tracks. The superstructure is composed of three portions: East, Center and West. The eastern portion is a concrete deck supported on longitudinal steel stringers framing into steel floor beams supported on a subway truss and two 8-ft deep longitudinal steel plate girders. The roadway at center is a concrete deck supported on longitudinal steel stringers framing into steel floor beams supported on four 18-ft deep longitudinal steel subway structure trusses. The western portion is a concrete deck supported by longitudinal steel stringers framing into steel floor beams supported by three 10-ft deep longitudinal steel plate girders and a 12-ft deep longitudinal steel truss. This bridge is categorized as a dual function structure, carrying both six lanes of traffic at the Grand Concourse level and three NYC Transit subway lines at the subway tunnel level. The original structure was constructed to carry the Grand Concourse, and subsequently the Board of Transportation of NYC inserted the subway structure into the existing bridge when the subway line was buil tcirca 1920.This multi-level structure is supported on concrete abutments founded on rock. The proposed design will separate the two structures by raising the superstructure about two(2)inches above the existing subway trusses while maintaining the lateral stability of the existing subway trusses and constructing two longitudinal trusses at each side of the subway structure.

10-33 **2:45 P.M.**

EXISTING SIMPLE STEEL SPANS MADE CONTINUOUS, A RETROFIT SCHEME FOR THE I-476 BRIDGE OVER THE SCHUYLKILL RIVER

John Milius, P.E. and Daniel Griffith, P.E., *AECOM, Philadelphia, PA*

The rehabilitation of SR 476 over the Schuylkill River converted existing steel multi-girder simple spans into three and four-span continuous units. The simple-made-continuous design, coupled with other deck joint elimination techniques, reduced the number of deck joints from 25 to 8, and extended the remaining life of the bridge. The paper illustrates the design and construction requirements for simple to continuous conversion - from substructure retrofits and sequential bearing replacements to superstructure continuity details.

COFFEE BREAK: 3:10 – 3:30 P.M.

10-34 **3:30 P.M.**

FATIGUE EVALUATION AND ENHANCEMENT OF A MODULAR STEEL ORTHOTROPIC DECK

Sougata Roy, Ph.D. and Yeun Chul Park, *Lehigh University, ATLSS Engineering Research Center, Bethlehem, PA*

Modular steel orthotropic deck panels can provide cost-effective solution for accelerated construction of bridges. These decks have been widely used as part of temporary structures in battle zones, as emergency bridge replacements and in large urban construction projects. However, their fatigue performance under highway loading is not well established. This paper presents a pilot study conducted at Lehigh University to evaluate fatigue performance of a typical modular bridge deck subjected to AASHTO tandem axle loading.

10-35 **3:55 P.M.**

CRITICAL MEMBER REMOVAL AND LOAD REDISTRIBUTION OF DETERIORATED TRUSS BRIDGES

Lynsey Reese, *Virginia Polytechnic Institute and State University, Blacksburg, VA*; Daniel G. Linzell, *The Pennsylvania State University, University Park, PA*

Questions surrounding the strength and stability of truss bridges and the adequacy of the aging infrastructure have arisen due to some recent notable bridge collapses. This paper investigates the behavior of truss bridges when a critical member is removed, and summarizes computational research that examined a healthy, or "pristine" through-truss bridge and a deteriorated version of the same bridge to determine the effects of aging and deterioration on critical member location and load redistribution.

RESEARCH/EVALUATION 1

Time: 8:30 A.M. - 12:00 Noon
Room: Hall A: THEATER 1
Chair: W. Jay Rohleder Jr., P.E. S.E., *FIGG, West Chester, PA*

10-36 **8:30 A.M.**

ANALYSIS ON LONGITUDINAL CRACKS OF PRESTRESSED CONCRETE HOLLOW SLAB BEAM BRIDGE

Zhu Xiaowen, Zhang Yufeng and Peng Yousong, *Jiangsu Transportation Research Institute Co.,Ltd, Nanjing, Jiangsu, China*; **Yuan Aiming,** *Hohai University, Nanjing, China*

Prestressed concrete hollow slab beam bridges were very popular in Jiangsu province. A wide survey consisting of statistic of data and on-site investigation revealed that extensive longitudinal cracks occur in bottom slab of these beams during operating period. To provide the reasons for the cracking, full-scale loading experiment and numerical analysis were conducted. The research results show that temperature difference of beam stem during operating period may be the major factor of the longitudinal crack.

10-37 **8:55 A.M.**

STABILITY ANALYSES AND DETERMINATION OF LIMITING LOAD CAPACITY OF WASHINGTON AVENUE BRIDGE GIRDERS

Sougata Roy, *Lehigh University, ATLSS Engineering Research Center, Bethlehem, PA*; **John Milius,** *AECOM, Philadelphia, PA*

Stability of three span continuous girders in the iconic Washington Avenue Bridge over the Mississippi River in Minneapolis was evaluated by a series of linear and nonlinear 3D Finite Element Analyses. Built in 1965 using T1 steel, the welded plate girders within the 18 ft deep haunched regions do not meet the geometric requirements of the current AASHTO Specifications. The advanced collapse analyses provided key justification in retrofitting the bridge for LRT use.

10-38 **9:20 A.M.**

INVESTIGATION OF CRACKS IN THE WEB OF A HORIZONTALLY CURVED TWIN BOX GIRDER BRIDGE

Jian Huang, Ph.D., P.E. and R. Wayne McLennon, P.E., *Transystem Corporation, Fort Lauderdale, FL*; **Anthony D. Koloze, E.I.,** *Transystem Corporation, Cleveland, OH*

This paper presents the findings from the investigation of likely causes of cracks occurring in the web of a horizontally curved twin box girder bridge. The results from the three-dimensional analysis emphasize that an in-depth understanding of the structural behaviors and smooth loading path are crucial in the design and detailing of curved steel box girders. In addition, repair schemes are modeled for the stress distribution in the area of consideration.

10-39 **9:45 A.M.**

BARGE IMPACT DESIGN HIGHWAY BRIDGE OVER INLAND WATERWAYS

Joseph J. Romano, P.E., Ling Zhao, Ph.D., P.E., and Yongxian Chen, P.E., Ph.D., *Michael Baker Jr, Inc., Hamilton, NJ*; **Aaron L. Stover, P.E.,** *Michael Baker Jr. Inc., Louisville, KY*; **Terrence J. Tiberio, P.E.,** *Michael Baker Jr., Inc., Moon Township, PA*

Through the barge impact study of Milton Madison Bridge, this paper presents a method by which the available barge and flotilla traffic database maintained by the U.S. Army Corps of Engineers may be utilized to perform risk assessment studies for other inland waterway bridges subject to barge impact. The necessary data collection efforts through communications with USACE, USCG, bridge owners and industries are presented. Recommendations for facilitating future similar studies are suggested.

WEDNESDAY TECHNICAL SESSIONS

COFFEE BREAK: 10:10 – 10:30 AM

10-41 **10:30 A.M.**

USE AND PERFORMANCE OF EPOXY-COATED REINFORCING STEEL OVER 35 YEARS

David McDonald, *Epoxy Interest Group of CRSI, Schaumburg, IL*

Epoxy-coated reinforcing bars (FBECR) have been used in over 65000 bridge decks and other bridge components to provide resistance to chloride-induced corrosion of the reinforcing steel. This paper outlines the performance of these bars since their introduction in 1973, and provides information on improvements made over the past 35 years. The paper will include information on the laboratory and field performance and demonstrate that epoxy-coated reinforcing bars provide cost-effective corrosion protection.

CONSTRUCTION

Time: 8:30 A.M. - 12:00 Noon
Room: Hall A: THEATER 2
Chair: Dennis R. Mertz, Ph.D., *University of Delaware, Newark, DE*

10-42 **8:30 A.M.**

Launch of Structural Steel for the Athabasca River Bridge

Matthias Schueller, PEng., Matthew Bowser, and Prabhjeet Singh, P.Eng., *Infinity Engineering Group Ltd., North Vancouver, BC, Canada*; **Brad Gunnlaugson,** *Surespan Construction Ltd., North Vancouver, Canada*

This paper presents the erection engineering and construction behind the incremental launch of the new 472 meter long and 30 meter wide Athabasca River Bridge. All ten plate girders were launched simultaneously resulting in an incredible schedule advantage and setting a precedent as the widest steel bridge launch undertaken in North America. A general description of the entire launch system is presented while innovative components are described in detail.

10-43 **8:55 A.M.**

I-76 ALLEGHENY RIVER BRIDGE - PRESERVING THE ENVIRONMENT WITH PENNSYLVANIA'S LONGEST CONCRETE SEGMENTAL SPAN

Garrett Hoffman, P.E., *FIGG, Exton, PA*; **Gary Graham, P.E.,** *Pennsylvania Turnpike Commission, Harrisburg, PA*

The new I-76 Allegheny River Bridge outside of Pittsburgh is nearing completion. Pennsylvania' first long span concrete segmental bridge features twin 2,350-foot structures that are being constructed over local roads, active rail lines, and the Allegheny River. Environment friendly balanced cantilever construction from above is accomplishing each of the long spans, including the 532-foot main span over the river, while rail, vehicular and marine traffic remains operational.

10-44 **9:20 A.M.**

DESIGN & CONSTRUCTION OF SEGMENTAL BRIDGE IN ALGERIA EAST-WEST CORRIDOR

Adel R. Zaki, P.E. and Abdelkrim Settouf, P.E., *SNC-Lavalin Inc., Montreal, QC, Canada*

The Government of Algeria is currently in the process of an intensive $ 10.0 bn. development of its largest public road network .In the country with many valleys and mountains many exceptional bridges are to be constructed through a mega trans-country corridor .Once completed, scheduled for late 2010, the East-West 6-lanes highway will link Algeria's east border with Tunisia to Moroccan border at the west with a distance of 1216 Km. This paper describes the unique segmental bridge built in the highway network, and presents the construction methods and the specific equipment and technologies that have been used.

The bridge is a 4-span continuous segmental twin bridge, each carrying 3-lanes, built by the balanced cantilever method, crossing a national road and an existing railroad. It is 340 meters long and has spans of 64m, 106m, 106m and 64m with a horizontal curve of 700m. The structure is designed to be erected as a series of individual cast-in-place concrete segments with variable depth using form travelers, featuring early loading of newly cast segment. The piers are constructed using reinforced concrete with a height varying from 13m to 18m. Each pier is built over a 4-caisson type foundation having 3m diameter and 10m deep.

The structure is being built in compliance with European standards, with the implementation of quality standard anti-seismicity criteria.

10-45 **9:45 A.M.**

INNOVATIVE APPLICATIONS OF PRECAST CONCRETE ON COMPLEX, LONG SPAN URBAN BRIDGE

Gregg A. Reese, *Summit Engineering Group, Inc., Littleton, CO*

The development of the precast U girder has created a cross section that can be cast in curved sections. Combining this development with spliced, post tensioned construction has created a new design option for complex, long span bridge projects. A number of projects that have been constructed in Colorado using this new technology will be presented.

COFFEE BREAK: 10:10 – 10:30 AM

10-46 **10:30 A.M.**

ROLL-OUT OF THE CLIFTON AVENUE AND NESBITT STREET BRIDGES OVER NEW JERSEY TRANSIT

Wendy Haugeto, *Michael Baker Jr., Inc., Hamilton, NJ*

This paper describes how the superstructure demolition of two bridges spanning over active New Jersey Transit Railroad lines was accomplished within an accelerated construction schedule by rolling the bridges from their span over the New Jersey Transit lines to the adjacent approach roadway prior to demolition. This construction procedure reduced the number of full outages required for demolition to three (3) outages and allowed the work to be completed within an accelerated construction schedule.

WEDNESDAY TECHNICAL SESSIONS

10-47 **10:55 A.M.**

THE SUCCESSFUL IMPLEMENTATION OF FLORIDA'S FIRST POST-TENSIONED DUCT COUPLERS

Timothy Barry, P.E., *Reynolds Smith & Hills CS, Inc, Rockledge, FL*; **Robert Bennett, LEED AP**, *Reynolds Smith and Hills CS, Inc, Jacksonville, FL*

The first project in the State of Florida, and nationwide, to make tendon couplers a contractual requirement for segmental bridges is in Jacksonville, Florida. For the I-95/I-295 North Interchange project, The Florida DOT mandated that a coupler system, meeting specific contract requirements, be incorporated in to the structure. With the project nearly complete, the development and implementation process can be analyzed to determine successes and failures and to provide guidance for the industry for future projects.

10-48 **11:20 A.M.**

TEMPORARY WORKS IN LARGE CONSTRUCTION PROJECTS - RESPONSIBILITIES AND LIABILITIES

Martin Kendall, P.E., *STV Incorporated, New York, NY*; **Tariq M. Bashir, P.E.**; *New York State Department of Transportation, Region 11 ; Long Island City NY*; **John Hanke, P.E., Hui-Pung (Johnny) Ho, P.E.**, *Jacobs, New York, NY*

The paper discusses the responsibilities and liabilities of the permanent works designer in preparing temporary works designs for the contractor's use. The example used is the temporary works designs for the rehabilitation of nine bridges in the Alexander Hamilton Bridge complex on the Cross Bronx Expressway, including supports to the main bridge superstructure to carry full live load during reconstruction; a full demolition and erection scheme for the tightly curved Ramp TE bridge, and temporary diversion bridges for six curved ramp bridges.

ACCELERATED BRIDGE CONSTRUCTION

Time: 8:30 A.M - 12:00 Noon
Room: Hall A: THEATER 3
Chair: Thomas G. Leech, P.E., S.E., *Gannett Fleming, Inc., Pittsburgh, PA*

10-49 **8:30 A.M.**

ROLL-IN/FLOAT-IN COMBINATION LAUNCH OF A PRE-FABRICATED TRUSS BRIDGE (NY RTE 270 OVER THE ERIE CANAL)

Robert A. Cisneros, Robert G. Urban, and Ronald D. Medlock, *High Steel Structures, Inc., Lancaster, PA*

This paper illustrates Accelerated Bridge Construction principles via the launch of a three hundred foot long through-truss over the Erie Canal in five stages:

1. superstructure pre-assembly (blocked to no-load profile)
2. load transfer to roller supports, transport to shoreline
3. install forward cantilever barge support, "roll-float" to far shore
4. re-transfer load to forward rollers, transport to final position
5. lower truss onto bearings.

Technical principles applied, and lessons learned, are discussed.

10-50 **8:55 A.M.**

FOUR BRIDGES COMPLETELY REPLACED AND OPENED IN AN AVERAGE CLOSURE TIME OF SEVEN HOURS

Jason Klophaus, S.E., *Michael Baker Jr., Inc., Midvale, UT*; Josh Sletten, S.E., *Utah Department of Transportation, Salt Lake City, UT*

This paper details the major issues, challenges and successes of 2 design build projects to replace 4 existing bridges on I-80 in Utah with minimal impact to traffic. The pre-stressed girder superstructures were built to the side of the existing structures and slide into place on new substructures constructed under the existing bridges. The substructures consisted of straddle abutments on pile foundations. The average closure time on I-80 was 7 hours.

10-51 **9:20 A.M.**

RAIL BRIDGE REPLACEMENT USING TEMPORARY TRACK SUPPORTS AND PRECAST CONCRETE

Robert J. Lund, Jr., P.E., *Southeastern Pennsylvania Transportation Authority (SEPTA), Philadelphia, PA*; Michael J. McAtee, P.E., James E. Maccariella, Ph.D., P.E., and Anand Patel, P.E., *Urban Engineers, Inc., Cherry Hill, NJ*

The Southeastern Pennsylvania Transportation Authority's new Jenkintown Bridge over the Tacony Creek was constructed without relocating electrical catenary lines while maintaining service for the two electrified rail lines crossing the bridge. The final design featured construction staging that permitted the catenary lines to be de-energized and the transmission lines to remain energized, without relocation. Temporary track supports were designed to span the footing excavation, allowing the bridge to remain in service while the footings cured.

10-52 **9:45 A.M.**

LABORATORY TESTING OF TRANSVERSE CONNECTIONS FOR USE IN ACCELERATED BRIDGE CONSTRUCTION

Logan Julander, *Michael Baker Jr., Bountiful, UT*; Dr. Marvin Halling, Scott Porter, and Dr. Paul Barr, *Utah State University, Logan, UT;* Hugh Boyle, *Michael J. Baker Jr., Inc., Midvale, UT*

Testing was performed on the following transverse bridge deck connections: post tensioned, welded tie using shear studs, welded tie using rebar, 24 inch curved bolt type post tensioning, and 36 inch curved bolt type post tensioning. The experimental 36-inch curved bolt connection had the highest average moment capacity. The welded tie connection had cracking moments and loads comparable to the post tensioned connection. The welded stud held the least ultimate moment capacity and cracking moment.

COFFEE BREAK: 10:10 – 10:30 AM

10-53 **10:30 A.M.**

DEVELOPMENT AND EFFECTS OF ACCELERATED CONSTRUCTION METHOD FOR OVERPASSES USING STEEL BRIDGES WITH STEEL SPREAD FOUNDATIONS

Yuji Mishima, Kazuhiro Fukumoto, and Yasumi Wakabayashi, *Hitachi Zosen Corporation, Osaka, Japan*

Traffic congestion at intersections is a serious problem in urban Japan. Shorter construction periods and minimal traffic restrictions are needed to prevent further congestion during the construction of overpasses. Steel rigid-frame bridges with steel spread foundations were developed to achieve dramatically shorter construction periods for overpasses. This paper describes the development of such bridges, projects for which they have been used to reduce construction time, and their advantages.

10-54 **10:55 A.M.**

REHABILITATION OF THE NORTHBOUND AND SOUTHBOUND BRUCKNER EXPRESSWAY BRIDGES AS EASY AS A, B, C (ACCELERATED BRIDGE CONSTRUCTION)

Marco Buyson, P.E. and Mohammad Shams, Ph.D., *HDR Engineering, Inc., New York, NY*

The Bruckner Expressway Bridges carries the Northbound and Southbound Bruckner Expressway (I-95) over Amtrak and CSX tracks. In 2008, the New York City Department of Transportation awarded design-build project for the rehabilitation of both bridges to Judlau Contracting, Inc. and HDR Engineering, Inc. The high traffic volumes on I-95 and the time windows that provided to work over the railroad necessitated the use of accelerated bridge construction techniques.

10-55 **11:20 A.M.**

SHORT SPAN INNOVATIVE BRIDGE DESIGN CHOICES

Sevak Demirdjian, P.E. and Oliver Joly, P.E., *SNC Lavalin Inc., Montreal, Quebec, Canada*

The last expansion of Hwy 30 in south shore of Montreal featured the construction of 5 diverse bridges over Hwy 132. The expansion works affected all surrounding residential, commercial and industrial areas as well as environmentally precarious rivers and flood plains. The project called for the construction of a selected 2.2 kilometers of road, including 2 road overpasses, 2 river bridges and 1 railway underpass.

In all, the design encompassed new constructions of structurally diverse bridges including:

- St. Francois Xavier & Fouquet Overpass Bridges: continuous cast in place post tensioned spans of integral beam deck system
- Main and Local Bridges over Tortue River: simple spans of Prestressed Prefabricated Beam Girders
- CN Massena Railway Bridge: Continuous cast in place post tensioned deep beam.

Considering the substantial traffic flows of the area, innovative construction methods, as well as, temporary roads and alternate itineraries for highway traffic flows were implemented.

A diversity of bridges, integrated with their unique aesthetics, was designed. The constructability as well as all structural and non-structural challenging features of the expansion project of Hwy 132, were met by the engineering team. Engineering challenges in accomplishing state of the art design concepts, as well as construction complexities in this urbanized area are featured.

BRIDGE MAINTENANCE

Time: 1:30 - 3:45 P.M.
Room: Room 330
Chair: Louis J. Ruzzi, P.E., *Pennsylvania Dept. of Transportation, Bridgeville, PA*

10-56 **1:30 P.M.**

TESTING OF VERY OLD CATHODIC PROTECTION SYSTEMS ON OHIO BRIDGE DECKS

Jack Bennett, *J.E. Bennett Consultants, Inc., Chardon, OH*; Thomas Turk and Matt Sexton, *De Nora Tech, Chardon, OH*

Impressed Current Cathodic Protection (ICCP) has been proven to effectively control corrosion of reinforcing steel in concrete. To date, ICCP has been installed on over 200 bridge decks worldwide, totaling more than 3.5 million square feet of reinforced concrete surface. But very little long-term data have been published regarding the effectiveness of ICCP for extending the service life of concrete bridge repair. This paper presents results of testing of ICCP systems on two bridges in Ohio 23 and 17 years after installation. Even after this time, the systems were still operating as intended. Reinforcing steel was polarized $>$100mV at each test point, indicating complete protection against corrosion. Comparison of protected areas to unprotected areas on the older bridge provided conclusive evidence of the prevention of damage due to corrosion.

10-57 **1:55 P.M.**

AN INTERNATIONAL APPROACH TO DETAILING FOR SAFETY, SERVICEABILITY, AND SUSTAINABILITY IN BRIDGE DESIGN

Meghann Valeo and Harry A. Capers, Jr., P.E., *Arora and Associates, P.C., Lawrenceville, NJ*

The purpose of the International scan on Assuring Bridge Safety and Serviceability (ABSS) was to identify the best practices and processes for consideration by U.S. engineers and to put these approaches into practice in the U.S. During the scan, the team observed many practices and technologies related to the topic of interest. This paper outlines these findings in detail and provides specifics on the team's recommendations for transferring many of these approaches into U.S. practices.

10-58 **2:20 P.M.**

A VEHICLE MOUNTED BRIDGE DECK SCANNER FOR INTERNAL CONDITION ASSESSMENT OF CONCRETE BRIDGE DECKS

Yajai Tinkey, Ph.D., P.E., Pat Miller, and Larry Olson, *Olson Engineering, Inc, Wheat Ridge, CO*

This paper describes the newly developed Bridge Deck Scanner (BDS) which can be mounted to a vehicle hitch for rapid condition assessment of concrete bridge decks. The objective of the research was to develop technologies for rapid inspection that can provide the following information about the concrete bridge deck:

1. Top delamination mapping.
2. Internal conditions; including cracks, crack depth, concrete deterioration and bottom deck delamination mapping.
3. Thickness profiling.

WEDNESDAY TECHNICAL SESSIONS

10-59 **2:45 P.M.**

MARKET STREET AND CHESTNUT STREET BRIDGE REHABILITATION

Leon Lung-Yang Lai, Ph.D., P.E., S.E. and Wan-Shu Chang, Ph.D., P.E., *Specialty Engineering, Inc., Bristol, PA*

The Market Street and Chestnut Street Bridges in the City of Philadelphia are under evaluation for rehabilitation. The bridges include three types of arch structures: 3-hinge concrete encased open-spandrel steel arches, jack-arch floorbeams, and stone masonry closed-spandrel arches. Load rating analyses are conducted to determine the load carrying capacity of the structures and to determine the necessity for rehabilitation. Evaluation of the masonry arch structure for carrying widened sidewalks is also conducted.

PEDESTRIAN

Time: 1:30 - 3:45 P.M.
Room: Room 329
Chair: Matthew P. McTish, P.E., *McTish, Kunkel & Associates, Allentown, PA*

10-60 **1:30 P.M.**

WALKWAY OVER THE HUDSON: A CENTURY OLD MARVEL, DERELICT FOR DECADES, RETURNED TO GLORY IN 18 MONTHS

Charles Michael Cooper, P.E., *Bergmann Associates, Albany, NY*; H.J. Marcelle, *The Fort Miller Co., Inc., Schuylerville, NY*; Jeffrey DiStefano, *Harrison & Burrowes Bridge Constructors, Inc., Glenmont, NY*

The notion of a railroad bridge spanning the Hudson River at Poughkeepsie was first conceived in 1868, but it was not until twenty years later that construction of the 1.25-mile long Poughkeepsie-Highland Railroad Bridge opened a direct link between the burgeoning Northeast and the coal fields of Pennsylvania. For nearly a century, the iconic bridge served dutifully, carrying as many as 3000 cars a day at its peak. However, a devastating fire upon the bridge, coupled with waning demand, led to the bridge's abandonment in 1974.

10-61 **1:55 P.M.**

DESIGN CHALLENGES OF THE FORT EDMONTON FOOTBRIDGE

Alex Harrison, P.E., *CH2M HILL, Sacramento, CA*; Brendan Gill, P.E., S.E. and Joe Showers, P.E., *CH2M Hill, Denver, CO*; Gary Kriviak, P. Eng. *CH2M HILL, Edmonton, Alberta*

The City of Edmonton's Fort Edmonton Footbridge, over the North Saskatchewan River, completes a link within the extensive riverfront park system, and will enhance access of the adjacent residential areas to this regional greenway. A suspension bridge was selected for final design to a minimize pier foundations in the river and provide an organic, light, visual profile. Construction occurred through all 4 seasons, only stopping during the winter months when temperatures dropped blew -30 degrees Celsius.

10-63 **2:20 P.M.**

RESTORATION OF A HISTORIC PHOENIX COLUMN TRUSS BRIDGE

Nathan W. Buttorff, P.E., *Pennoni Associates Inc., Wilmington, DE*

The rehabilitation of the Hibernia Mine Railroad Bridge, which was disassembled and stored in a maintenance yard for nearly 10 years, provides an elegant and scenic passageway for pedestrians and bicyclists to utilize along The Raritan River Greenway in Raritan, New Jersey. This 69 foot long Phoenix Column truss bridge required creative solutions to balance the foundation design, site geometry, and structural rehabilitation with the need to maintain the historical integrity of the structure.

RESEARCH/EVALUATION 2

Time: 1:30 - 3:45 P.M.
Room: Room 328
Chair: Donald W. Herbert, P.E., *Pennsylvania Dept. of Transportation, Uniontown, PA*

10-64 **1:30 P.M.**

SIMPLIFIED METHODS FOR TRIAGE EVALUATION OF GUSSET PLATE CONNECTIONS

Jeffrey W. Berman, Aaron Olson, Bo-Shiuan Wang, Charles W. Roeder, and Dawn E. Lehman, *University of Washington, Seattle, WA*

The failure of a large steel truss bridge in Minnesota has been, in part, attributed to overstressed and buckled gusset plates. This catastrophic event signaled concerns across the county. To provide guidance to bridge engineers, the Federal Highway Administration released FHWA Bridge Design Guidance No. 1 Load Rating Evaluation of Gusset Plates in Truss Bridges; however, the somewhat complex evaluation methods make rapid assessment costly for DOTs. A study supported by the Washington State Department of Transportation and FHWA has developed a procedure for rapid and reliable evaluation of the state of gusset plates, including the maximum stresses, likelihood of gusset buckling, and critical connection configurations. The development utilized a parametric study of several gusset plate configurations performed using advanced nonlinear finite element analysis. Parameters such as plate thickness, yield stress, and load distribution were considered for actual gusset plate connections from bridges primarily in Washington State. The selected gusset connections also had different geometries to ensure the resulting evaluation approach is sufficiently broad in applicability. The new approach should enable bridge engineers to more expediently evaluate the capacity of gusset plates, allowing gusset plates with near critical demand-to-capacity ratios to be identified for further, more refined analysis or retrofit. The paper and presentation will detail the analyses and resulting rapid gusset plate evaluation procedure.

10-65 **1:55 P.M.**

EFFECT OF PILE ORIENTATION IN INTEGRAL ABUTMENT BRIDGES

Rabih Najib, Ph.D., P.E., *Alpha Corporation, Baltimore, MD*; Amde M. Amde, Ph.D., P.E., *University of Maryland, College Park, MD*

Integral abutment bridges provide an excellent alternative to conventional bridges built with bearings and expansion joints. Reducing pile stresses may lead to construction of longer integral abutment bridges. A three-dimensional non-linear finite element model is used to perform parametric study to investigate the effect of pile orientation on the behavior of skewed, jointless steel girder bridges and the stresses induced into the piles themselves due to the integral abutment configuration.

10-66 **2:20 P.M.**

ADVANCED UNDERWATER ACOUSTIC IMAGING OF PIERS ON MISSISSIPPI RIVER BRIDGES: HOW TO INSPECT BRIDGES UNDERWATER WHEN DIVING CANNOT BE PERFORMED SAFELY

David Reser, P.E., *Infrastructure Engineers, Inc., Saint Cloud, FL*

The purpose for performing underwater bridge inspections is to assess the condition of bridge foundation elements with certainty and to evaluate and document scour conditions. The underwater environment at several signature rivers in the United States is extremely hazardous making a thorough and accurate underwater inspection virtually impossible. This paper reviews the results of underwater acoustic imaging performed during high water events on Mississippi River bridges in the Winter of 2009 to comply with the National Bridge Inspection Standards.

10-67 **2:45 P.M.**

DESIGN OF CONCRETE FILLED TUBULAR FLANGE GIRDER

Richard Schoedel, P.E., *Michael Baker Jr Inc, Moon Township, PA*; Richard Sause, Ph.D., P.E., *Lehigh University, Bethlehem, PA*

A Concrete Filled Tubular Top Flange Girder (CFTFG) demonstration bridge has been designed. This two span structure is the first of its kind to be placed into service. A CFTFG is an I-shaped girder that uses a concrete filled hollow structural section (HSS) as the top flange. The resulting I-girder section has lateral torsional buckling strength that is much larger than that of a conventional I-girder with similar depth, width, and steel weight. This increased strength permits the lateral bracing of CFTFG's to be minimized compared to conventional I-girders.

10-68 **3:10 P.M.**

NOISE LOCALIZATION VIA ACOUSTIC EMISSION MONITORING ON A ROLLING BASCULE BRIDGE

David Kosnik, P.E., Daniel R. Marron, Mathew Kotowsky, P.E., and David Corr, P.E., Ph.D., *Northwestern University, Evanston, IL*

Acoustic emission monitoring was used to locate the source of disturbing loud noises generated during operation of a bascule bridge over a busy waterway. Initial analyses ruled out the machinery as the noise source and showed that the noises were coming from the heel area of the bascule girder. Source location analysis suggested that the bangs were generated along the bascule girder-track casting interface. It is hypothesized that highly localized stick-slip behavior is the cause.

SEMINARS

IBC Seminars are intensive, four-hour, single-topic focused sessions. An additional fee of $150 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.

LOAD RATING OF GUSSET PLATES SEMINAR:

Monday, June 7, 1:00 - 5:00 P.M.

Seminar Leader: M. Myint Lwin, PE, SE, *FHWA*

This seminar will focus on providing bridge engineers with the following knowledge:

1. the fundamental understanding for using the FHWA guide for load rating gusset plates in accordance with the AASHTO LRFR and LFR methods.
2. lessons learned by state and consultant bridge engineers in addressing the impact of the evaluation requirements for existing truss bridges.
3. some techniques on retrofit if found necessary.

EARTH RETENTION SEMINAR:

Tuesday, June 8, 8:00 A.M. - 12:00 Noon

Seminar Leader: John Wolosick, P.E., *Hayward Baker Inc.*

The ADSC earth retention seminar will consist of presentations from industry leaders regarding the design and construction of earth retaining structures related to bridge structures and bridge construction. Presentations of new and innovative retaining structures including cylinder pile walls, jet grouting, and soil nailing will be provided. LRFD design methodology, with attention to related constructability issues will be highlighted. Quality control and quality assurance procedures will also be emphasized.

Seminar Outline:

1. "Material Advancements in Anchored Earth Retention"- Tom Bird, *Williams Form Engineering.*
2. "Design and Construction of 5th Street Bridge Abutment, Atlanta, Georgia" – John Wolosick, *Hayward Baker Inc.*
3. "Important Aspects of LRFD Design of Earth Retaining Structures" – Jesus Gomez, *Schnabel Engineering.*
4. "How do I test a Tieback Anchor in LRFD – Impacts and Possible Errors" – Tom Richards, *Nicholson Construction Co.*
5. "Anchored Sheet Pile Wall for West End Bridge and Rock Anchors Stabilize Existing Expressway" – Scott Dodds, *Brayman Construction Corp.*
6. Closing Discussion.

DOMESTIC TUNNEL SCAN SEMINAR:

Tuesday, June 8, 1:00 - 5:00 P.M.

Presented by Federal Highway Administration (FHWA) & American Association of State Highway & Transportation Officials (AASHTO)

Seminar Leader: Jesus Rohena, *FHWA*

The objective of this workshop is to present the findings and recommendations of the 2009 highway tunnel domestic scan sponsored by AASHTO and FHWA. At the workshop participants will receive a copy of the scan report. Participants will learn challenges and the innovative solutions being used by tunnel owners to keep tunnels safe and secure around the country.

MICROPILE APPLICATIONS SEMINAR:

Tuesday, June 8, 1:00 - 5:00 P.M.

Seminar Leader: Allen Cadden, P.E., *Schnabel Engineering, Inc.*

This half day ADSC seminar will review micropile applications to bridge and highway facilities ranging from new foundations to underpinning, retrofit, and repair applications. Industry leaders in design, construction, and micropile materials will focus on the design, installation and quality control elements of a micropile foundation. Utilizing case histories and recent FHWA and AASHTO design and construction documents, this seminar will give the attendees a solid introduction to the proper use and unique challenges of the growing micropile technology.

Seminar Outline:

1. "Key Design and Construction Considerations for Micropiles for Bridges" – Allen Cadden, *Schnabel Engineering.*
2. "Micropile Applications for SR-28 Widening" – Daniel Uranowski, *Brayman Construction.*
3. "Misconceptions About Battered Piles" – *Tom Richards, Nicholson Construction.*
4. "Emergency Repair of the Birmingham Bridge" – *Scott Stonecheck, Moretrench.*
5. "Micropiles Restore Access to Caracas, Venezuela" – Jesus Gomez, *Schnabel Engineering.*
6. Closing Discussion.

DESIGN AND INSTALLATION OF DRILLED SHAFTS SEMINAR:

Wednesday, June 9, 8:00A.M. - 12:00 Noon

Seminar Leader: Dan Brown, Ph.D., P.E., *Dan Brown and Associates*

This ADSC sponsored seminar will be presented by industry leaders in the design and installation of drilled shafts to provide deep foundation support of bridge structures. Presentations will focus on recently updated design and construction guideline specifications recommended by FHWA and AASHTO. Case histories and examples of design considerations for constructability and quality will be provided. Quality assurance, integrity testing, and load testing to provide cost effective design and installation applications will also be emphasized.

Seminar Outline:

1. "An Overview of New FHWA Drilled Shaft Design Manual, Including LRFD Application" – Dan Brown, *Dan Brown and Associates.*
2. "The Efficient Design Model for Drilled Shafts – A two phase process for maximizing your foundation design" – *John Hayes, Loadtest, Inc.*

DYNAMIC TESTING AND ANALYSIS OF BRIDGE FOUNDATIONS SEMINAR:

Wednesday, June 9, 1:00 - 5:00 P.M.

Seminar Leader: Michael Morgano, *GRL Engineers, Inc.*

This seminar will focus on several current methods of deep foundation testing and analysis, including wave equation analysis of driven piles, high strain dynamic load testing of driven and drilled foundations, low strain (pulse echo) foundation integrity testing and cross-hole sonic logging of drilled shafts. The Wave Propagation Theory will be discussed as it relates to practical applications of the dynamic testing methods. The procedures used in various foundation testing and analysis methods will be discussed along with appropriate testing applications for various types of foundations such as driven piles and drilled shafts. Case studies will be shared with the participants to illustrate these applications. The AASHTO LRFD resistance factors for bridge foundations will also be discussed in the context of foundation testing and analysis. The seminar goal is to prepare the participants for selecting the most appropriate method of deep foundation testing and analysis for their design challenges with an understanding of the implications for implementation within the context of AASHTO LRFD specifications.

USE OF HEC-RAS FOR HYDRAULICS AND SCOUR ANALYSIS SEMINAR:

Wednesday, June 9, 1:00 - 5:00 P.M.

Presented by: Donna M. Newell, MS, P.E., *President, NTM Engineering, Inc.*, **Eric R. Brown, Ph.D., Hydraulic Engineer, FHWA**

This workshop will discuss the applicability of existing FHWA HEC-18 Scour Methodologies and other tools to develop a scour analysis for your project site. Topics will include the use of hydraulic data from HEC-RAS; consideration of scour countermeasures based on FHWA's HEC-23 publication; and ongoing scour research

W-1: FRP COMPOSITES IN ACCELERATED CONSTRUCTION

Monday, June 7; 1:30 - 4:30 P.M. — Room 330

Presented by ACMA

This workshop includes six presentations on how FRP composites provide cost-effective solutions for new construction and rehabilitation of bridge structures. These presentations will specifically focus on installations, design, and recently published AASHTO design standards. Attendees will learn about product advancements for bridge decks, girders, and codes, and will see that composite products are no longer experimental, are less expensive than traditional materials when life cycle is considered, and solve bridge construction problems that can't be resolved using traditional materials. The workshop will provide information for engineers and owners on how, even with limited funds, they can use FRP composites to improve infrastructure.

W-2: SHOTCRETE FOR REHABILITATION OF AMERICA'S INFRASTRUCTURE

Monday, June 7; 1:30 - 3:00 P.M. — Room 329

Presented by American Shotcrete Association

Through the use of a powerpoint slide presentation and the use of case histories, our objective will be to provide an overview of the shotcrete process and how it's versatility has lead to its growing use for the rehabilitation of bridges and other concrete structures. The presentation will provide an update on technical advancements in shotcrete mix design, including the benefits of silica fume, fiber reinforcement and air entrainment. It will also touch on important aspects of the shotcrete process such as curing and shotcrete nozzelman certification. Our intent will be to provide attendees with a better understanding of the shotcrete process and also provide them with basics required to write a good shotcrete specification. The message will be reinforced through the use of recent case histories taken from projects around North America.

W-3: BRIDGE OWNER PROGRAM FORUM

Monday, June 7; 1:30 - 4:30 P.M. — Room 328

Presented by High Steel Structures

In this forum bridge owners will describe their upcoming bridge programs. Attendees will get upcoming program details including

- Bridges programmed for letting during the next few years
- Major projects expected to be let within the next 3 to 10 years
- Upcoming projects of interest to large and medium sized contractors and fabricators
- Other details about funding that may be unique to each owner

In addition to presenting, Owner attendees will be able to assess the ongoing bridge construction and reconstruction programs in neighboring states in order to help ensure contractor capacity.

Attendees will learn about future owner bridge design needs, upcoming projects, upcoming letting information, and general bridge program information.

Forum participants include:

- Duane Green, *Minnesota DOT*
- Chris Blevins, *Virginia DOT*
- Percival McNeil, *Delaware DOT*
- Paul DelSignore, *Amtrak*
- James L. Stump, *Pennsylvania Turnpike Commission*
- Kristin L. Langer, *Pennsylvania DOT*
- Robert J. Healy, *Maryland DOT*

W-4: EPOXY POLYMER CONCRETE FOR USE ON BRIDGE DECKS

Monday, June 7; 3:30 - 4:30 P.M. — Room 329

Presented by The Euclid Chemical Company

The use of Polymer Concrete (PC) for the preservation and protection of bridge deck overlays has tripled over the past ten years. This is due to their performance history, rapid installation time (resulting in reduced traffic control costs) and enhanced deck skid resistance. Polymer concrete (PC) is a composite material formed by blending an aggregate with an organic polymeric binder. PC contains neither Portland cement nor water. This material differs from polymer modified concrete which is ordinary Portland cement concrete to which a polymer or monomer has been added during mixing. Polymers typically used in PC are epoxies, polyesters, urethanes, and methyl methacrylates.

Epoxy Polymer Concrete has captured the largest market share of polymer overlays used for rehabilitation or preventative maintenance of new or old decks. This workshop will provide basic description, application methods, specific application details, several case histories and NEW ACI Polymer Concrete Specifications. This workshop will also provide a demonstration of quality control tools and installation equipment to insure a successful project. After the presentation there will be a question and answer session.

W-5: BEST PRACTICES IN BRIDGE WORKER SAFETY

Tuesday, June 8; 8:00 - 9:30 A.M. — Room 330

Presented by Rutgers CAIT - NJ LTAP

W-6: CONSTRUCTION TECHNICAL SESSION/INDUSTRY CONVERSATION

Tuesday, June 8; 8:00 A.M. - 12:00 Noon — Room 329

Presented by Alpha Structures and Swank Associates Companies Inc.

- A status update on the construction of the new San Francisco-Oakland Bay Self Anchored Suspension Bridge; Michael Flowers, *American Bridge/Fluor Enterprises Joint Venture* - An overview of the complex design of the bridge, i.e., the self anchored design and how that drives any number of unique construction challenges and approaches. A status report on where the project stands in the overall construction process and a look ahead to the expected progress in the next year. The project bid in March 2006 and is scheduled to complete in 2013.
- Value of Working Together; Bill Lowry, P.E. and Chuck Thompson, P.E., Inspection Service Managers; *McTish & Kunkel,* Together they bring 50 + years of Penn DOT management experience.
- Highways for Life ; Gary L. Hoffman, P.E., Exec, Director, *Pennsylvania Asphalt Paving Association* - After leaving a top management position with Penn DOT, Gary worked in development and evaluation of longer lasting infrastructure product. He will share examples and thoughts on where we are headed and why.
- Teamwork Example -Visiting to bring an update on the "Bay Bridge" the presenter will share his personal observations on the teamwork efforts on one of the largest bridge. Construction bridge projects currently under construction in the U.S.
- Design / Build Forum for Owner's consumption - A contractor, a designer and our "protector" an attorney will present individual views and their first hand experiences with the design / build process. This will be followed by an open Q & A discussion involving the panel and all interested parties. Contractor: John Maffeo, Jr., P.E., Exec. Vice Pres., *Trumbull Corporation;* Designer: Matthew P. McTish, P.E., President, *McTish, Kunkel & Associates;* Protector: Frederick M. Brehm, Esq., Powell, Trachtman, *Logan, Carrle & Lombardo, P.C.*

W-7: SOCIETY FOR PROTECTIVE COATINGS (SSPC) COATINGS SESSION

Tuesday, June 8; 8:00 A.M.-12:00 Noon — Room 328

Presented by Society for Protective Coatings (SSPC)

SSPC will be serving as an official sponsor for the Coating Session at the Annual International Bridge Conference. SSPC has developed a fantastic Coatings Session in years past and this year will be no exception!

- 8:00-8:30 A.M. - Sustainability of Transportation Infrastructure and Accelerated Bridge; Myint Lwin, *Federal Highway Administration;* The presentation will cover sustainability of the transportation infrastructure and accelerated bridge construction.
- 8:30-9:00 A.M.-Environmentally Friendly Graffiti Resistant Coatings – Waterborne Polyurethane Coatings for Bridge Structures That Actually Work; Steven Reinstadter, *Bayer MaterialScience - Coatings;* Waterborne polyurethane coatings have been used in the bridge preservation market for years as an alternative to solventborne systems but early technologies required the bridge coatings engineer to compromise on durability. Additionally, many of these early products still contained high levels of VOC although touted as waterborne technology. New alternatives have evolved that address these issues and fit well into an overall sustainability plan.

The presentation will discuss the latest innovations in true waterborne polyurethane coatings for graffiti resistant applications on bridge trusses as well as concrete abutments. The coatings were subjected to the protocol of ASTM D 6578-00 as it pertains to the determination of the graffiti resistance of coatings. These next generation coating technologies do not require the user to sacrifice key attributes such as chemical resistance, abrasion resistance, or application ease in order to adopt more environmentally friendly coatings technologies. Additionally, new systems are "actually" waterborne - containing less than 20 g/l of cosolvent. This is achieved while meeting or exceeding the cleanability, chemical resistance, and durability of the older high performance polyurethane solventborne coatings.

- 9:00-9:30 A.M.- Next Generation High Build Aliphatic Polyurethane and Polyurea Technologies for the Bridge Market; Dee McNeill, *The Sherwin Williams Company*

Exciting new high build Moisture Cure Polyurethane and Polyurea technologies for the Bridge Market utilizing Bayer's new Aliphatic HD I/ IPDI Prepolymer.

- 9:30-10:00 A.M.- Calcium Sulfonate Coatings: HR CSA or CSA "What is the Difference?; Wayne A. Senick and Craig Bellinger, *Termarust Technologies;* This presentation will explore the difference between HR CSA (High Ratio Co-Polymerized Calcium Sulfonate) coatings and CSA (Calcium Sulfonate Modifed Alkyds) citing both technical specifications and field experience to illustrate the differences and help clear up the confusion.
- 10:00-10:15 A.M.- Break
- 10:15-10:45 A.M.- Polysiloxane Coatings for Steel Bridges; Chris McMillan, *Akzo Nobel;* This presentation will discuss the use of Polysiloxane technology for painting of steel bridge structures. Features and benefits of Polysiloxane compared to traditional technology will be discussed.
- 10:45-11:45 A.M.- Sunshine Skyway Bridge Repairs with FRP Composite Materials; David White, P.E., *Sika Corporation;* The Sunshine Skyway Bridge is one of the most recognized structures in the United States. With its signature bright yellow stay cables, the bridge resembles a sailboat, with its towers holding up the triangular sails across Tampa Bay in Florida.

The Sunshine Skyway Bridge is comprised of the main span, the high level approach, and the low level trestle spans. A total of 650 precast concrete girders support the northbound trestle spans and another 650 girders support the southbound trestle spans. AASHTO Type IV girders were used for a majority of the 100 ft. long trestle spans.

Shear cracking was observed during routine inspections of the bridge. The Sunshine Skyway Bridge was designed for a 75-year life span and the presence of shear cracks in the concrete girders less than 20 years after the bridge opened was a cause for concern. Any cracks in the concrete girders could provide a direct access for chlorides and moisture to the prestressed strands.

In order to restore the shear deficiencies at the end of the AASHTO girders, a bi-directional carbon fiber fabric was used to wrap the members. Most of the repairs for this project took place from a barge under the bridge thereby eliminating any traffic concerns on the bridge. The bridge was successfully strengthened with CFRP to meet the Florida DOT requirements at a cost approximately $1.6 million and took approximately 8 months to complete.

- 11:15 A.M.-Noon - An In-Depth Look at Standards Most Frequently Used By Industrial Painters; Aimee Beggs and Heather Bayne, *SSPC: The Society for Protective Coatings;* This presentation will explore all of the standards, used by industrial painters including a review of the basics and a focus on the more obscure requirements and ambiguities. The presentation will also address what constitutes an industry standard, the contractual implications of specifying using only a standard, and the impact of secondary and tertiary references in standards.

W-8: ASSOCIATED PENNSYLVANIA CONSTRUCTORS (APC) MEETING

Tuesday, June 8; 8:00 A.M.-12:00 Noon — Room 327

Presented by Associated Pennsylvania Constructors (APC)

W-9: GALVANIZE YOUR BRIDGE

Tuesday, June 8; 10:00 - 11:30 A.M. — Room 330

Presented by AZZ Galvanizing Services

The purpose of this Workshop is to inform and educate Architects, Engineers, and other Specifiers about hot-dip galvanized steel and how it can address the growing corrosion problem throughout North America.

Upon completion of this workshop, 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
- Show at least four bridges that have recently been galvanized; and two bridges that have been galvanized for over 40 years with the DOT spending zero dollars to maintain

W-10: TRAFFIC MANAGEMENT AND WORKZONE SAFETY POWER WORKSHOP

Tuesday, June 8; 1:00 - 5:00 P.M. — Room Hall A Theater 4 (continued on Wednesday, June 9; 8:00 A.M.–12:00 Noon)

Presented by National Workzone Safety Information Clearinghouse

The Work Zone Safety Power Workshop, sponsored by ARTBA's National Work Zone Safety Information Clearinghouse is being held in conjunction with the International Bridge Conference® on June 8-9. This free workshop is packed with timely information

delivered by national experts in the safety field. Professional development hours are also available.

Workshop topics:

- Federal Activities Update
- Injury Hazards in Road and Bridge Construction
- Health Hazards in Road and Bridge Construction
- Safety benefits from Accelerated Bridge Construction
- Preventing Falls in Work Zones and Bridge Construction Sites

W-11: EVALUATION, REPAIR, PROTECTION AND STRENGTHENING OF CONCRETE STRUCTURES

Tuesday, June 8; 1:30 - 5:00 P.M. — Room 330

Presented by Vector Corrosion Technologies

Vector Corrosion Technologies is a member of the Vector Construction Group, a privately owned corporation with 15 offices. Vector takes pride in offering technically advanced, cost effective solutions for concrete structures subject to corrosive conditions and has earned numerous awards and patents for product innovation. Vector is committed to a safe, healthy and sustainable environment.

Vector Corrosion Technologies provides products and services for concrete corrosion protection. Our innovative solutions include; electrochemical chloride extraction, impressed current cathodic protection, and an array of galvanic protection systems including; embedded galvanic anodes, galvanic jackets and activated arc spray zinc metallizing. Vector also provides corrosion evaluation, and mitigation of post-tension corrosion. Contact us at (813) 830-7566 or visit www.vector-corrosion.com.

Vector offers a portfolio of solutions for concrete corrosion repair and protection. Innovative solutions include electrochemical chloride extraction, cathodic protection, and an array of galvanic protection systems, including embedded galvanic anodes, galvanic jackets, and activated arc-spray zinc metalizing. Vector also provides evaluation, repair and mitigation services for post-tension corrosion and temperature resistant composite strengthening systems.

Innovative solutions for concrete corrosion repair and protection including electrochemical chloride extraction, embedded galvanic anodes, galvanic jackets, activated arc-spray zinc metallizing, evaluation, repair and mitigation services for post-tension corrosion.

We can offer 3 ½ CEU credits for attending our workshop. We are a certified provider from the NCSEA, National Structural Engineers Association.

W-12: AUTOMATED CONCRETE REBAR DETAILING FOR BRIDGES

Tuesday, June 8; 1:30 - 3:30 P.M. — Room 329

Presented by Bentley Systems

The purpose of this workshop is to inform the bridge designer about the advantages of using automated software to detail different concrete structures. Quantity takeoff and conflict checks are facilitated now thru the use of specific software applications and not just mere CADD drafting.

Bentley Rebar software will be showcased to demonstrate the advantages of such procedures.

W-13: BRIDGE POLICY AND PROMOTION COUNCIL (BPPC) MEETING

Tuesday, June 8; 3:00 - 5:00 P.M. — Room 328 & 326

Presented by American Road & Transportation Builders Association (ARTBA)

W-14: PROJECT DELIVERY METHODS WORKSHOP

Wednesday, June 9; 8:00 - 10:00 A.M. — Room 326

Presented by: ARTBA's Bridge Policy and Promotion Council (BPPC)

The BPPC's Project Delivery Methods Action Team was organized to facilitate discussion, understanding and refinement of project delivery methods used for bridge projects in the United States. This session, which will include panelists from the designer and contractor community, will cover a variety of delivery methods and the challenges and opportunities associated with each.

W-15: BRIDGE AESTHETICS: PRACTICAL IDEAS FOR SHORT AND MEDIUM SPAN BRIDGES

Wednesday, June 9; 8:00 A.M. - 3:30 P.M. — Room 327

Presented by Transportation Research Board (TRB) Bridge Aesthetics Committee

Members of the Bridge Aesthetics Subcommittee of the General Structures Committee will present a workshop on the aesthetics of short- and medium-span bridges constructed with conventional bridge components and systems, which make up the majority of the nation's bridge infrastructure.

The workshop format will consist of a series of presentations based on the content of the subcommittee's draft publication "Bridge Aesthetics Sourcebook: Practical Ideas for Short- and Medium-Span Bridges." Attendees are encouraged to download the sourcebook from the subcommittee's website (www.bridgeaesthetics.org) prior to the workshop. Topics included in the presentations include design fundamentals, historic considerations, lighting, and context sensitive design considerations. Following the presentations, a design workshop will be conducted to apply concepts to a representative bridge project.

W-10: (CONTINUED FROM TUESDAY) TRAFFIC MANAGEMENT AND WORKZONE SAFETY POWER WORKSHOP

Wednesday, June 9; 8:00 A.M. - 12:00 Noon — Hall A Theater 4

Presented by National Workzone Safety Information Clearinghouse

W-16: FUNDING AND FINANCING ISSUES WORKSHOP

Wednesday, June 9; 10:30 A.M. - 12:00 Noon — Room 326

Presented by: ARTBA's Bridge Policy and Promotion Council (BPPC)

The BPPC's Financing Issues Action Team was organized to facilitate discussion, understanding and refinement of financing methods used for bridge projects in the United States. This session will cover case studies and overviews of bridge projects, including public-private partnerships. The session will also include a current economic update and overview of U.S. bridge sector.

W-17: WESTERN PENNSYLVANIA TRANSPORTATION RESEARCH FORUM

Wednesday, June 9; 1:30 - 3:30 P.M. — Room 326

Presented by the University of Pittsburgh

The forum highlights both research-in-progress and recently completed bridge and transportation research funded by PennDOT and NCHRP. The forum is focused on technology transfer and is of interest to DOT engineers, consultants and practitioners. Forum attendees will receive a CD consisting of the presented papers. The forum is open to all IBC attendees.

POSTER SESSION

Time: Tuesday, June 8: 9:00 A.M. - 5:00 P.M.,
Wednesday, June 9th 8:30 A.M. - 1:30 P.M.
Room: Exhibit Hall A

Presenters will be present at their poster for 1 of 2 arranged time slots to entertain Q&A. Stop by either from Tuesday 2:30 P.M. - 3:30 P.M or from Wednesday 9:30 A.M. - 10:30 A.M. to visit with the poster presenters!

10-PS01

THE 2009 INSPECTION OF THE JAMESTOWN-VERRAZZANO BRIDGE

Michael Abrahams, P.E. and Steven Kaufman, *Parsons Brinckerhoff, New York, NY*; **Benoit Kroely,** *Advitam (Freyssinet), Sterling, VA*

The Jamestown Verrazzano Bridge is a 7,350ft, 51-span bridge linking the towns of North Kingstown and Jamestown in Rhode Island. The main structure is a prestressed segmental concrete box structure comprising 23 spans over the navigational channel. The adjacent trestle is structure comprising 28 spans with AASHTO Type IV precast, prestressed girders made continuous for live load over seven 4-span units.

10-PS03

GREENROADS: A TOOL FOR MORE SUSTAINABLE BRIDGES

Jeralee L. Anderson, P.E., *LEED-AP, University of Washington, Dept. of Civil Engineering, Seattle, WA*; **Joseph Showers, P.E.,** *CH2M Hill, Englewood, CO*; **Scott Roux, P.E.,** *CH2M Hill, Bellevue, WA*

Greenroads (www.greenroads.us) is a proposed voluntary standard for quantifying sustainable design and construction practices in transportation infrastructure projects. It is a project-based performance metric that provides a comprehensive and user-friendly decision-making tool to implement sustainability in bridges. Results of case studies show that 1) Greenroads is applicable for bridges, and there is room to improve sustainability in conventional practice, and 2) Greenroads offers many opportunities to recognize innovative bridge engineering practices in future versions.

10-PS04

MULTI-SPAN PRECAST ARCH BRIDGE BACKFILLED WITH LIGHT WEIGHT CELLULAR CONCRETE

Sherif Aziz, P.E., Kim Truong, P.E., John Sankey, P.E. and Hieu Tran, *The Reinforced Earth Company, Vienna, VA*

The Reinforced Earth Company designed and supplied a multi-barrel precast arch bridge at RT 18 New Brunswick, NJ. The bridge is 182m long with eight 20.2m span barrels. Arches were backfilled with lightweight concrete. Deflections were monitored during erection. Tension rods were installed in the pier caps to control lateral movements. The lifting technique used lifted and rotated the 66.9 ton units into erection position. The erection rate was 2-3 days per barrel.

10-PS05

ARRIGONI BRIDGE INSPECTION AND TESTING PROGRAM

Basil Bantimba, P.E., *AI Engineers, Inc., Boston, MA*; **Aslam Siddiqui, P.E.,** *AI Engineers, Inc., Middletown, CT*

In 2007, AI Engineers, Inc. (AI) of Middletown, Connecticut was tasked by ConnDOT to perform inspection of the Arrigoni Bridge in CT. This presentation outlines the plan that AI and the various non-destructive and equipment subconsultants used to perform the routine visual inspection, ultrasonic testing of the pins and electromagnetic cable

inspection of this prominent structure. Also included are equipment manifests required to complete the inspection and the maintenance and protection of traffic for this 4 lane, heavily travelled structure.

10-PS06

ROEBLING BRIDGE REHABILITATION DESIGN/BUILD

William J. Castle, P.E., S.E., F.ASCE, *W.J. Castle, P.E. & Associates, P.C, Hainesport, NJ*

The abandoned railroad bridge at the Roebling Steel Mill, listed as an EPA superfund site, was to be rehabilitated into a roadway bridge able to support heavy trucks. Our Company performed an in-depth analysis of the structure and determined the substructure and the steel stringers could be utilized in the new bridge design which saved both time and money. The design/build of the bridge was completed within 3 months and total was $170,000.

10-PS07

AN INNOVATIVE SYSTEM OF FRP BRIDGE DECK PANELS WITH CRASH-WORTHY GUARDRAIL

Moni G. El-Aasar, Ph.D., P.E., F. ASCE, *BG Consultants, Inc., Manhattan, KS*; **Hani Melhem, Ph.D., P.E., F.ASCE**, *Kansas State University, Manhattan, KS*

An economical and efficient alternative to concrete decks has been developed under the sponsorship of KDOT, following years of R&D and testing. The system consists of FRP honeycomb sandwich panels with proper precast concrete guardrails which were crash-tested and passed Test Level 3 (TL-3) evaluation criteria. This light-weight system is now ready for use on temporary/detour bridges, or as permanent concrete deck replacement allowing higher live load while keeping the existing steel girders and substructure.

10-PS08

LIVE LOAD RATING, ANALYSIS AND DESIGN OF MOODNA AND WOODBURY VIADUCTS

Chih-Ping Fan, Ph.D., P.E., Luigi Brasacchio, P.E., and Nicholas Altebrando, P.E., *STV Inc., New York, NY*

This poster will present inspection findings and discuss the typical deficiencies for Moodna and Woodbury Viaducts including corrosion, frozen expansion bearings at the bases of trestle towers, fatigue cracks at the X-bracing connection angles between deck girders, half-moon cracks at the top flanges of deck girders, and bent expansion bearing pockets of deck girders. The effect of the newly adopted longitudinal force in AREMA on live load rating and repair measurements will also be included.

10-PS09

THREE DIMENSIONAL FINITE ELEMENT MODEL OF CLEVELAND'S INNER BELT I-90 BRIDGE

Abelardo Garza, *SIMULIA Erie, Beachwood, OH*; **Sreeparna Sengupta, SIMULIA South, Lewisville, TX**; **Ramachandra Balasubramanian**, *SIMULIA Erie, Beachwood, OH*

The Ohio Department of Transportation (ODOT) was facing an engineering challenge with the Inner Belt I-90 Bridge in Cleveland Ohio. After careful inspection, deterioration due to corrosion of a section in a lower chord located in a cantilever span of the bridge developed concerns regarding its operational condition. This combined with the changing loading conditions since its construction in 1954 forced ODOT to close lanes and an entrance ramp on the bridge, as well as prohibit trucks to pass. ODOT contacted SIMULIA Erie in Beachwood Ohio in regards to creating a three dimensional finite element model using Abaqus technology for evaluation of the bridge's current condition, as well as evaluation of potential bridge repairs. The three dimensional finite element model of the concerned section of the bridge was constructed using a combination of beam, shell, and solid continuum elements.

10-PS10

WAVELET-BASED MODAL PARAMETERS IDENTIFICATION FOR ARCH BRIDGE

Jiangang Han, Ph.D., Daxiong Cai, Tianyin Xiao, and Zhiwei Ji, *Hainan University, Haikou, Hainan, China*

The wavelet-based identification that works in time-frequency domain is used to identify the dynamic characteristics of the structural system. An example of arch bridge had been used to demonstrate that the current identified results are accordant with those previously obtained from the peak pick method in frequency domain and stochastic subspace identification in time domain.

10-PS11

AN IN-DEPTH ANALYSIS OF I35W BRIDGE COLLAPSE

Su Hao, Ph.D., *ACII, INC., Wilmette, IL*

This presentation briefly summarizes an in-depth analysis of the I-35W Bridge over the Mississippi River in Minneapolis, Minnesota that collapsed suddenly on August 1, 2007. Based on the original design drawings, the material evidence provided by the U. S. National Transportation Safety Board (NTSB), and a full-scale load rating of the bridge superstructure. It has been concluded that the collapse is the direct subsequence of original design which had underestimated the forces in diagonal members and the corresponding bending moment to gusset plates.

10-PS12

CONSTRUCTION STAGE ANALYSIS OF CABLE STAYED BRIDGE

Heena B. Kharat, *Akersolutions Private Limited, Mumbai, Mahar, India*; **Dr. Ramakant Ingle, Dr. Pramod Godbole**, *Visveswaraya National Institute of Technology, Nagpur, India*

The modeling of bridge structures have seen a major evolution over recent decades linked directly to the rapid development of digital computing. The design and construction of this bridge represent the beginning of a new era of modern cable-stayed bridges. The technique and methods of erecting cable-stayed bridge is as varied and numerous as the ingenuity and number of erector contractors. Erection methods not only affect the stresses in structure during erection but also have an effect on the final stresses of completed structure.

The behavior of cable stayed bridge is of great importance. Major component of cable stayed bridge are deck, tower (pylons), cables and abutment/piers. The structure is of nonlinear nature and highly indeterminate. The focus of this paper is to study the various aspects of analysis of cable stayed bridge using SAP 2000 and STAAD Pro-2003. This paper also discussed the influence of tension force of the cable on various parameters of bridge along with changing support conditions and varying loads.

10-PS13

LESSONS LEARNED FROM GUSSET PLATE RATING ANALYSIS

Joseph Krajewski, P.E., *T.Y Lin International, Beaverton, OR*

Since the 2007 collapse of the I-35 Bridge in Minneapolis there has been a heightened emphasis on developing better design and rating guidelines for gusset plates. This is especially true since the cause of the collapse appears to be a design error that was not recognized at the time of construction or noted in forty plus years of inspection.

10-PS15

DEVELOPM.ENT AND INSTALLATION OF FOAM SEALANT FOR SMALL MOVEMENT BRIDGE EXPANSION JOINTS

Ramesh Malla, Ph.D., Brian Swanson and Montgomery Shaw, Ph.D., *University of Connecticut, Storrs, CT*

Bridge expansion joints, designed to accommodate movement of the road deck, can permit leakage of corrosive materials that can damage bridge components. Silicone foam has been developed to provide a durable, economical seal for bridge expansion joints on small movement bridges. Laboratory tests and application of the sealant to bridge expansion joints show that the silicone foam exhibits a strong bond to various joint header materials and shows compliance to large joint movement.

10-PS16

REPLACEMENT OF SEPTA BRIDGE 20.25

Justin McCarthy, P.E., Robert Bistline, P.E., *HNTB Corporation, Harrisburg, PA*; Robert L. Lund, Jr., P.E., *SEPTA, Philadelphia, PA*

Bridge 20.25 is a twin, riveted two-girder open deck structure located on SEPTA's R5 Lansdale Regional Rail Line believed to have been rebuilt in the early 1900's. A welded two-girder weathering steel superstructure with new precast concrete bearing seats was designed in approximately three (3) weeks. Each bridge was removed and replaced with the new prefabricated structures over two (2) weekend outages during the fall of 2009 while maintaining single-track service during peak travel operations.

10-PS17

ROOSEVELT ISLAND BRIDGE

Christopher McMillan, *International Paint LLC, Houston, TX*; Ronald Rauch, *New York City Department of Transportation, New York, NY*

This poster focuses on a project that required a truly high performance product, the Roosevelt Island Bridge. Roosevelt Island Bridge, owned by the New York City DOT, is a lift bridge spanning the East River. With 170 foot towers and deep cool red in color the Roosevelt is easily visible from the Manhattan skyline and required an ultra durable finish coat to keep the main span and towers from chalking, discoloring, and fading.

10-PS18

HIGH DEFINITION VIDEO AND INFRARED IMAGING IN BRIDGE INSPECTION

Yuji Nagao, P.E., *West Nippon Expressway Company, Ltd., Tokyo, Japan*; Lee R. Ahlstrom, P.E., *Louis Berger Group, Inc., Washington, DC*

Using high definition video cameras (HDV) to record concrete structure surface conditions, coupled with infrared imagery supported thermographic assessments; Japan's NEXCO-West analyzes and assesses existing bridge structural integrity. Combining HDV and infrared image data enables crack detection and measurement as well as sub-surface structural deterioration in terms of extent and severity. Bridge engineers can quickly identify those specific areas of the structure requiring additional hands-on investigations and possible further physical testing.

10-PS19

NUMERICAL SIMULATIONS ON THE EFFECT OF EDGE DETAILS ON AERODYNAMIC CHARACTERISTICS OF LONG SPAN BRIDGE DECK SECTIONS

Richard Obisanya, Ph.D., *Moffatt & Nichol, Long Beach, CA*

Current design of Long Span Bridge deck section is highly empirical and dependent on wind tunnel test to validate the static and dynamic aerodynamic properties such as lift, drag and moment coefficients. However, current development in turbulence models, computational fluid dynamics as well as very fast computers is making it possible to obtain the same by numerical analysis. Using a RANS(Reynolds Averaged Navier Stokes) model, the basic aerodynamic properties of the Carquinez Straight Bridge were obtained with good comparison with the wind tunnel test. The mechanics of vortes shedding leading to vibration of the deck are explained.

10-PS20

BRIDGE INFORMATION MODELING - BENEFIT AND CHALLENGES

Abdul Rauf, P.E., *URS Corporation, Tampa, FL*

Bridge Information Modeling allows conception, design, detailing, and maintenance of bridges in a single model. This model can contain distinct types of information including, geometric (alignment, profile, cross-slope), structural (beam sizes, rebars, plate sizes), lighting and drainage information. At this time, bridge information modeling is in initial conceptual stage. This paper explains what benefits this new modeling technique can provide at the same time what challenges we will face if we make this switch.

10-PS21

EXECUTION OF THE BUREAU OF INDIAN AFFAIRS BRIDGE INSPECTION PROGRAM

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

The Department of the Interior, Bureau of Indian Affairs (BIA), supports over 550 recognized tribes. There are approximately 310 reservations throughout the United States, most of which have extensive roadway networks and bridges. There are over 700 bridges currently in the BIA inventory, ranging in complexity from fracture critical trusses to box culverts. Some of the challenges associated with conducting a project with a large geographic region and hundreds of bridge owners are local coordination, logistics, and bridge access at remote sites.

10-PS23

BRENT SPENCE BRIDGE, CINCINNATI, OHIO

Miguel Rosales, AIA, *Rosales + Partners, Boston, MA*; Ruchu Hsu, P.E. and Matthew Barber, EIT, *Parsons Brinckerhoff, New York, NY*

The poster will illustrate three potential bridge designs for the Brent Spence Bridge over the Ohio River in Cincinnati, Ohio. The three alternatives include long span bridges with a main span of a minimum of 1000 feet. Distinct characteristics of this major bridge crossing include a double deck configuration, a record breaking width of approximately 175' and inclusion of two interstates in single bridge: I-71 and I-75.

10-PS25

RENOVATION OF A SUSPENSION BRIDGE USING AN ALUMINUM ORTHOTROPIC BRIDGE DECK & ITS FUTURE IMPLICATIONS

Kurt Thompson, P.E., *Consultant for Sapa Aluminum Extrusions, Inc., Richmond, VA*

The Corbin Bridge; a historical, 300 foot suspension bridge near Huntingdon, PA, was in disrepair in the early 1990's and posted for load at 7 tons. The deck at that time was a lightweight steel and asphalt system and weighed about 45 pounds per square foot. In 1996 the bridge was renovated using an aluminum orthotropic deck system mounted on aluminum stringers. The deck system weighs less than 20 pounds per square foot including its wearing surface. This new aluminum deck on aluminum stringers coupled with strengthening the stiffening truss increased the capacity of the bridge significantly. The bridge is now weight limited at 24 tons.

This aluminum orthotropic deck design represents a first evolution improvement derived from 26 years of experience with an orthotropic deck installed on the Smithfield Bridge in Pittsburgh, PA in 1966. The aluminum features do not require paint and the original wearing surface, is still performing well. Considered new and innovative in 1996 this aluminum orthotropic deck technology now represents proven technology with major bridge renovation implications. The prefabricated with the wearing surface deck not only provides a reduction of dead load of up to 400%, it has inherent Accelerated Bridge Construction (ABC) capabilities. Bridges can be renovated quickly and cost competitively instead of replaced particularly in A+B bidding because of the system's ABC capabilities. This 13 year case study continues to prove the viability of aluminum in infrastructure.

10-PS26

ROBOTIC INSPECTION OF BRIDGES

Eric Thorkildsen, *Greenman-Pedersen, Inc., Albany, NY*

Increased costs and access limitations have impacted the ability to inspect bridges. Robots can be used to supplement such inspections and have been successfully deployed to inspect cables on suspension bridges, climb across overhead signs and up high mast light poles. Robot technology developed for military applications is being transferred over to civilian use at a rapid rate such as a current project to develop a 'truss' climbing robot specifically developed for use on bridges similar to the I35W bridge.

10-PS27

ELEVATED STRUCTURES - AN ELEGANT SOLUTION TO REDUCE URBAN CONGESTION

Brice Urquhart, P.E., *FIGG, Exton, PA*

Elevated structures such as the Selmon Expressway (Tampa, Florida) and AirTrain JFK (New York) have been used to successfully solve vehicular congestion in urban areas. The Selmon Expressway carries three reversible lanes along five miles of elevated structure, greatly reducing travel times for downtown commuters. The nine-mile AirTrain JFK Light Rail System provides an economical and convenient travel option to and from the airport with an elevated mass-transit line built within the existing right-of-way.

Tuesday, June 8, 2010 (Morning Events)		ROOM	Page #
7:00 AM-5:00 PM	Conference Registration Desk Open	Exhibit Hall A	4
8:00 AM-5:00 PM	Exhibit Hall Open	Exhibit Hall A	5
8:00 AM-12 Noon	Earth Retention Seminar	Refer to Ticket	
8:00-9:30 AM	W-5: Best Practices in Bridge Worker Safety	Room 330	39
8:00 AM-12 Noon	W-6: Construction Technical Session/Industry Conversation	Room 329	39
8:00 AM-12 Noon	W-7: SSPC Coatings	Room 328	40
8:00 AM-12 Noon	W-8: Associated Pennsylvania Constructors (APC) Meeting	Room 327	41
8:00 AM-10:00 PM	NSBA Co-Meeting	Room 325	
8:30 AM-1:30 PM	Poster Session	Exhibit Hall A	45
8:30 AM-12 Noon	Design, Part 1 Session	Hall A, Theater 1	14
8:30 AM-12 Noon	Long Span Bridges Session	Hall A, Theater 2	16
8:30 AM-12 Noon	Bridge Rehabilitation, Part 1 Session	Hall A, Theater 3	17
9:00 AM-4:00 PM	Mini Theatre Presentations (various times)	Hall A, Mini-Theater	57
10:00-11:30 AM	W-9: Galvanize Your Bridge	Room 330	41
11:30 AM-1:00 PM	Exhibit Hall Luncheon	Exhibit Hall A	5

SCHEDULE AT A GLANCE

Tuesday, June 8, 2010 (continued - Afternoon Events)		ROOM	Page #
1:00-5:00 PM	IBC Bridge Tour	Curbside	5
1:00-5:00 PM	Domestic Tunnel Scan Seminar	Refer to Ticket	34
1:00-5:00 PM	Micropile Applications Seminar	Refer to Ticket	35
1:00-5:00 PM	W-10: Traffic Management and Workzone Safety Power Workshop	Hall A, Theater 4	41
1:30-5:00 PM	W-11: Evaluation, Repair, Protection and Strengthening of Concrete Structures	Room 330	42
1:30-3:30 PM	W-12: Automated Concrete Rebar Detailing for Bridges	Room 329	42
1:30-5:00 PM	Design, Part 2 Session	Hall A, Theater 1	19
1:30-5:00 PM	Bridge Management Session	Hall A, Theater 2	20
1:30-5:00 PM	Bridge Rehabilitation, Part 2 Session	Hall A, Theater 3	22
3:00-5:00 PM	W-13: Bridge Policy and Promotion Council (BPPC) Meeting	Room 328	42

10-PS28

FAILURE AND REPAIR OF DECK CLOSURE POURS ON I-81 IN VIRGINIA

Richard Weyers, Andrei Ramniceanu, Sean A. Weyers, and Soundar S. G. Balakumaran, *Virginia Tech, Blacksburg, VA*; **Michael Sprinkel,** *Virginia Transportation Research Council, Charlottsville, VA*, **Chris Blevins,** *VDOT*

In April 2009 a 3′ x 3′ section of a closure pour in a reinforced concrete deck on Interstate 81 punched through. The deck was cast in 1992 during a deck replacement project in which each lane and shoulder of the deck was replaced while traffic used the adjacent lane. The center closure pour connected the two new deck placements. An evaluation of the failure revealed that a total of eighteen #5 rebars were sheared to create the hole in the deck. The epoxy coated rebars had sustained considerable section loss due to corrosion caused by water and chlorides leaking through the construction joint. Repair consisted of removing an 8-ft wide section of the deck that spanned between the steel beams along each side of the closure pour over the entire length of the bridge, forming the opening, placing MMFX2 rebars that spanned between the beams, and placing expansive concrete prepared with Type K cement.

10-PS29

UNUSUAL CRITERIA FOR A CABLE STAY BRIDGE

Tom Whiteman, P.E., Shuangling Shang, P.E., and James Turpin, P.E., *David Evans and Associates, Olympia, WA*

Design new bridge replacing 1000′ of existing 2500′ long, 1925, three lanes, truss and concrete viaduct spanning six railroad lines, wet-lands, historic Native-American grounds, major water, power and sewer lines. Criteria: construct in one year, no to minimal railroad closures, limited BRAC budget, active seismic zone in liquefiable soils, improve substandard railroad vertical clearance by 1′, connect horizontal skewed alignment of remaining bridge sections. Solution: Curved, single steel tower, prefabricated, segmental construction, slender cable-stay Bridge.

MINI-THEATERS

The 27th Annual International Bridge Conference® is excited to offer for the second year improved Mini-Theaters located within our expanded exhibit hall! Mini-Theater presentations are unique in length, and content – presentations times are a half an hour in length during exhibit hall hours. Content is provided by companies already represented in the Exhibit Hall, and provides attendees a further opportunity to learn more their products and services. Check out our Mini-Theatre location near Aisle 300 in the Exhibit Hall!

TUESDAY, JUNE 08, 2010

9:00 A.M. – STRUCTAL-BRIDGES

New Structal-Bridges Orthotropic Deck - A new type of bridge deck has been developed by Structal-Bridges. Designed so it can be built in long prefabricated panels that can easily be transported to bridge sites and erected rapidly the Structal orthotropic bridge deck can have a service life that exceeds 75 years and should require no or little maintenance over this time span.

10:00 A.M. – THE EUCLID CHEMICAL COMPANY

Zinc Anodes Used to Extend the Life of Concrete Repairs - How They Work

This presentation will discuss the theory of corrosion of reinforcing steel in concrete, a major cause of deterioration of concrete structures. Zinc anodes are one method used to extend the service life of patch repair. Data from a Pennsylvania bridge deck will be presented. A hands-on demonstration will also be conducted.

11:00 A.M. – SILICA FUME ASSOCIATION

Silica-fume concrete in today's HPC bridge structures.

The evolution of silica fume as a supplementary cementitious material (SCM) in high-performance concrete (HPC) is paralleled to its use today as a pre-consumer waste material in sustainable concrete bridge mixtures. This presentation will highlight HPC bridge projects in PA,LA, UT and CA, to name a few. Each state had a different use for the silica fume SCM as they prepared project specifications; low cracking, low permeability, high-strength, and a lower CO2 impact of the concrete.

12:00 NOON – NATIONAL INSTRUMENTS

Civionics: The Modern Approach to Structural Health Monitoring

Modern requirements for structural monitoring systems are exceeding the capabilities of traditional devices such as boxed instruments and dataloggers. Learn how civionics and virtual instrumentation can leverage the latest technologies to deliver performance modularity and flexibility while reducing development time and cost.

1:00 P.M. – QUAKEWRAP INC.

New FRP Products for Repair of Bridge Piers

Professor Ehsani will introduce his latest innovative product called SuperLaminates. These pre-cured laminates are 3 times stronger than steel and can be used to repair bridge piers with no need for excavation.

WEDNESDAY, JUNE 09, 2010

9:00 A.M. – STRUCTAL-BRIDGES

New Structal-Bridges Orthotropic Deck

A new type of bridge deck has been developed by Structal-Bridges. Designed so it can be built in long prefabricated panels that can easily be transported to bridge sites and erected rapidly the Structal orthotropic bridge deck can have a service life that exceeds 75 years and should require no or little maintenance over this time span.

10:00 A.M. – OLSON ENGINEERING

Sonic and Radar Imaging for Bridge Conditions, Displacements in Load Tests and Vibrations

Short case histories will be presented to illustrate the following sonic and radar imaging applications for concrete and steel bridges:

- Imaging of void/honeycomb in a concrete bridge column with ultrasonic tomography
- Detection of voided PT ducts with impact echo scanning
- Evaluation of concrete defects in drilled shafts with crosshole sonic tomography
- Mapping of post-tensioning and reinforcing with 3-D ground penetrating radar
- Measurement of displacements to 0.0004″ for rapid load tests with interferometric radar
- Measurement of vibrations from 0-100 Hz and modal analyses with interferometric radar

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Layne GeoConstruction, a division of Layne Christensen Company, is a specialty geotechnical construction company, offering a wide array of service capabilities. A commitment to solution-driven innovation positions Layne GeoConstruction as a leader in jet grouting, drilled micropiles, limited mobility grouting, permeation grouting, tie-back anchors, vibratory ground improvement and stone columns. Real time monitoring can be utilized in the providing of many of these services.

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Phone: 352-378-3717
Fax: 352-378-3934
E-mail: john@loadtest.com
Website: www.loadtest.com

Loadtest, Inc. specializes in deep foundation testing using the award winning Osterberg Cell method. Loadtest offers Osterberg cell testing equipment, installation services as well as full planning & specification support, field load testing and analytical services.

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Fax: 843-769-7392
E-mail: sales.usa@malags.com
Website: www.malags.com

Mala Geoscience USA, Inc. is a leading manufacturer of innovative ground penetrating radar (GPR) systems and software. Our innovative and extremely versatile ProEx system offers a flexible multi-channel solution for high frequency bridge deck investigation. This platform can also be utilized for evaluating pavement thicknesses, railway ballast and geotechnical investigations.

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Booth: 915
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Phone: 608-835-3500
Fax: 888-545-2214
E-mail: mcaya@mandli.com
Website: www.mandli.com

Mandli Communications is an industry leader in the design and development of highly specialized data collection systems and services for various organizations throughout the world. Mandli began collecting bridge clearance data in 2001, and has recently been using their new LIDAR-based mobile data collection system for clearance measurement collection.

MARYLAND STATE HIGHWAY ADMINISTRATION & MARYLAND TRANSPORTATION AUTHORITY

Booth: FEATURED AGENCY
Contact: Robert J. Healy
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Fax: 410-209-5002
E-mail: rhealy@sha.state.md.us
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AISC Structural Steel Bridge & Building Fabricator

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MISTRAS products & Systems Division develops and manufacturers leading edge technologies and products for nondestructive testing and predictive maintenance. Since 1972 we have been a leader in providing inspection solutions to assure structural integrity of bridges, parking garages, dams and structures worldwide. We also offer Structural Health Monitoring (SHM), a digital solution which tracks internal corrosion for bridges and other architecture.

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Website: www.steelbridges.org

The National Steel Bridge Alliance is organized and dedicated to better serve our customers and members with state-of-the-art design and construction of steel bridges. We are a unified industry organization of businesses and agencies interested in the development, promotion, and construction of cost effective steel bridges.

THE NEEL COMPANY

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Nicholson is a geotechnical contractor specializing in deep foundations, earth retention, ground treatment, and ground improvement. We work in a wide range of environments, from power plants and dams, to bridges and skyscrapers. Headquartered in Pittsburgh, PA, Nicholson has eight offices around the country.

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The Company's galvanizing and coating operations are composed of eleven facilities located in Denver Colorado, Louisville Kentucky, Missouri (Kansas City and St. Louis), Canton Ohio, Tulsa Oklahoma (2), Nashville Tennessee, Texas (Houston and Dallas Ft. Worth), and Wheeling West Virginia.

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Olson Engineering specializes in nondestructive evaluation (NDE) , infrastructure condition assessment and repair, structural health monitoring, geophysical and vibration engineering. Olson Instruments manufactures ultrasonic, sonic and seismic instruments for pavements, foundations and structures as well as seismic surface wave, crosshole, downhole, reflection and refraction tests, and distributes IDS radar systems in the US.

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Olympus provides an industry leading portfolio of ultrasonic testing, phased array, eddy current, remote visual inspection, High speed video and related support technologies. These technologies can be used to survey the quality and integrity of construction welds such as those in pipelines and bridges, as well as sheet metal spot welds and certain other weld geometries found in manufacturing.

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R.J. Watson, Inc. specializes in the design manufacture and testing of high load multirotational bearings, seismic isolation devices, joint sealing systems, waterproofing membranes and high strength fiber composite materials used to strengthen and rehabilitate structural members such as columns, beams, walls, piles, girders and slabs. In addition, R.J. Watson is now involved in the design and supply of FRP bridge deck and girder systems.

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The Short Span Steel Bridge Alliance is a group of bridge and culvert industry leaders, including manufacturers, fabricators and representatives of related associations and government organizations who have joined together to increase awareness of the unique benefits, cost-competitiveness and safety facts related to the use of short span steel bridges in installations up to 140 feet in length.

SIKA CORPORATION

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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.

SILICA FUME ASSOCIATION

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The Silica Fume Association, through a cooperative agreement with the FHWA, provides high-performance concrete technology transfer to transportation departments and the design community.

SIMULIA

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SIMULIA is the Dassault Systèmes brand that delivers an extensive portfolio of Realistic Simulation solutions including the Abaqus product suite. By building on established technology, respected quality, and superior customer service, SIMULIA makes realistic simulation an integral business practice that improves product performance, reduces physical prototypes, and drives innovation.

SKALA, INC

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Website: www.structalbridges.ws

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STRUCTURAL INTEGRITY SYSTEMS, LLC

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E-mail: sisllc@southwind.net
Website: www.structuralintegritysys.com

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STV

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Website: www.stvinc.com

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TECHSTAR-INC.

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E-mail: Warren@techstar-inc.com
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Booth: 309
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