

Illinois Section

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Equity in Agricultural Water Quality Monitoring (EAWQM)

By Gary Paradoski, P.E.

# Casting a Vision for the Future in Water Quality

It is no secret that the nation's waterways are polluted with nutrients, bacteria, and sediment and that agricultural runoff from both farming and livestock operations are considered significant sources of the problem (Figure 1). The USEPA has been fervently looking for solutions and aggressively developing the concept of water quality trading credits. To date, the primary means for measuring water quality has been through the use of *(continued on page 7)* 



Figure 1. Acres of Cropland Fertilized as a Percentage of All Cropland Acreage (2007 Census of Agriculture)

# President's Notes Lou Arrigoni, P.E.



am honored to begin my term as President of the Illinois Section of the American Society of Civil Engineers. I would like to thank **Bill Cussen** for his dedication and Leadership this past year as President of the Illinois Section. Because of Bill, the Section continues to remain strong both technically and financially.



The Illinois Section has a number of initiatives we will be pursuing this year. We will continue to work with the Central Illinois and Quad Cities Sections, as well as other organizations such as APWA, ITE and TFIC to have a presence in Springfield to track decisions that affect us all as Civil Engineers and be sure that our concerns are heard. We will continue our annual drive down to Springfield to talk to the legislators over the condition of our State's infrastructure and offer our assistance as problem solvers.

We will continue our outreach efforts to grade school and high school students. We are emphasizing the importance of math and science as well as exposing them to our vocation of Civil Engineering through the support of programs such as GEMS (Girls to be Engineers, Mathematicians and Scientists), and schools such as the ACE Tech Charter High School that exposes inner city, low income students to architecture, engineering and construction.

Our Student Outreach Committee has worked very hard to coordinate requests from grammar schools and high schools to provide volunteer engineers at various math and science expos throughout the Chicagoland area. Our Institutes and Technical Groups do a fantastic job stepping up and staffing these activities with volunteers—but we could always use more.

We also want to encourage college students in Civil Engineering to get involved with their school chapters. Our section supports the local student chapters in their regional competitions each spring and the Institutes and Technical Groups offer yearly scholarships to both undergraduate and graduate students. The Section will continue to contribute to these endeavors. The backbone of our section is the Technical Groups and Institutes. They provide a staggering number of programs, seminars and technical meetings that provide opportunities to keep up on latest trends, earn PDH's or just network with other engineers.

Through our Minority Affairs Committee, we send minority students to a summer engineering camp at the University of Notre Dame. Since 1990, the Committee has provided approximately \$140,000 in scholarships to over 100 students. This program is supported by our Section's yearly golf outing. This year we are looking to reinvigorate the program to expand opportunities to minority students and better support the Minority Affairs Committee's initiatives.

The backbone of our section is the Technical Groups and Institutes. They provide a staggering number of programs, seminars and technical meetings, often in conjunction with other organizations, that provide opportunities to keep up on latest trends, earn PDH's or just network with other engineers. There are very few other Sections in the country that are as active and involved in the engineering community as the Illinois Section, and our Groups and Institutes are the primary reason. The Section supports the work done by the Technical Groups and Institutes and realizes we would not be who we are without them. (continued on page 8)

By Stephanie A. Nurre, P.E.

he Illinois Section held its 96th Annual Dinner meeting in the classic ballroom of the Union League Club of Chicago on October 10th. Over 310 people were in attendance at the cocktail hour and dinner, including a strong university contingent of over 80 students. The Section would like to thank the over 40 sponsors of the Annual Dinner and those in attendance for their support and help in making this year's dinner a success. Led by Steve Cochran, the guest Emcee and beloved radio host, the evening included the recognition of 27 life members, the induction and swearing in of the new Section President, Lou Arrigoni, and other Board of Directors and Technical Group positions.

The Section would like to thank the over 40 sponsors of the Annual Dinner and those in attendance for their support and help in making this year's dinner a success.

The highlight of the evening was the recognition of the awards winners selected from a pool of outstanding nominations. The winners were selected by the Section's Awards Committee, which is comprised of members from each Technical Group or Institute and representatives from the Board of Directors, and ratified by the full Section Board of Directors. The Section Board wishes to thank all those who submitted nominations and participated in the awards process and Annual Dinner Planning.

## CITIZEN ENGINEER OF THE YEAR

Frank Avila, P.E.



Elected Commissioner at the Metropolitan Water Reclamation District of Greater Chicago in 2002 and re-elected in 2008, Commissioner Frank Avila is Chairman of ommittee and the

the Engineering Committee and the Maintenance & Operations Committee. Commissioner Avila achieved his Bachelor of Science Degree in Civil Engineering from the University of Illinois, Champaign, Illinois, 1961 and his Master's Degree in Finance from the University of Arizona, Tucson, Arizona, 1968.

An Environmentalist, Commissioner Avila owned a Civil Engineering Company named AVILA & ASSOCIATES, INC. and practiced engineering and land surveying for over 45 years.

As a Commissioner at the MWRDGC, Avila works to protect the health and safety of the public and protect the quality of water in the Chicago area waterways. His top priorities include cost effective wastewater treatment, flood prevention, the regulation of waste disposal to protect our waterways including eliminating toxic chemicals from the source to prevent endocrine disruption. Commissioner Avila and his wife, Sherry, have produced numerous Environmental Chicago Access Network TV shows. In addition, Commissioner Avila has produced several Public Service Announcements for children as well as adults on protecting our water environment. He frequently speaks about the MWRDGC addressing a

number of community and business organizations, schools, and public agencies.

Married for 47 years, Commission Frank Avila and his wife Sherry have three children.

## YOUNG GOVERNMENT CIVIL ENGINEER OF THE YEAR

Jason Salley, P.E.



Jason works at the Illinois Department of Transportation (IDOT) as District One's Geometrics engineer. He is a registered Professional Engineer with the

State of Illinois and was a member of ASCE while attending Purdue University which he graduated from in 2000.

Jason began working at IDOT in 2001 where he has worked in the Bureaus of Construction, Land Acquisition, Design and Programming. This enabled Jason to oversee the geometric design of over 200 projects within the last year in various stages of development proposed by not only IDOT but other entities as well. Among these were very complex projects such as Elgin O'Hare West Bypass, Interstate 190 and I-57 at I-294 as well as arterial reconstructions like 159th St in Homer Glen, IL 59 in Naperville and Willow Rd in Northfield. Other notable projects include four proposed Diverging Diamond Interchanges, over twenty potential modern roundabouts and the City of Chicago's proposed cycletracks.

Outside of IDOT Jason is extremely active in the Illinois and USA Wrestling

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Community where he is a respected official. Jason's career as a wrestling official has included working many local, state, regional and national level tournaments for various age groups from the very young to the senior level. Within the wrestling community Jason mentors and trains others in officiating

folkstyle, freestyle and greco-roman styles of wrestling. Jason recently began traveling to international events where he aspires to referee the Olympics. Jason's been married to his wife Danielle since 2006 and they have a daughter named Alexandra.

### GOVERNMENT CIVIL ENGINEER OF THE YEAR

Martin Buehler, P.E.



After graduating Round Lake High School in Lake County, Marty has spent his entire 39 year professional career with Lake County government,

starting as a summer intern in the Highway Department while attending the University of Illinois Urbana, where he earned a Bachelor's Degree in Civil Engineering in January of 1973. He worked in the construction division and took a leave of absence to achieve a Master's Degree in Civil Engineering from Northwestern University 1975. Thereafter, he started serving as the county's first traffic engineer. He was appointed by the Lake County Board as Director of Transportation/County Engineer in 1984 to serve as head of the Lake County Department of Transportation. Since that appointment in 1984 he has not bothered to update his resume, which since he retired May 31st 2012 was a sound 28 year gamble. Marty is married to Kathy of 39 years and they have 3 grown children and 2 grandchildren.

Marty's time with the county as traffic engineer and county engineer has been spent as a self-described "relentless innovator" fighting the good fight against being trapped in the all too often misoneism of long time government employees.

Lake County DOT operates a highly technical transportation department on the cutting edge of many transportation topics. Marty, over the years, has been involved in many regional and statewide transportation issues. He is now serving part time as the Executive Director of the Lake County Transportation Alliance, a public-private partnership to move the transportation agenda forward in Lake County.

## YOUNG CIVIL ENGINEER OF THE YEAR

Shawn Murphy, P.E.



Shawn is a Project Engineer focusing in airfield design and construction with HNTB Corporation in Chicago. He is the local design lead for airfield geometry,

lighting, signage, and markings and is a key contributor for construction phasing, layout of utilities, siting of airfield navigational equipment, airspace analysis, and airfield pavement design. Some of Shawn's project experience includes the Runway 10L-28R Extension and Runway 9C-27C design, both part of the O'Hare Modernization Program; airspace analysis for the I-190 Collector-Distributor Roadway project adjacent to O'Hare; and pavement design for an assault landing zone runway at Lakehurst Naval Air Engineering Station in New Jersey.

Shawn is also an active member of ASCE. He just completed his tenure as Chair of the Illinois Section Younger Member Group and is the current Chair of the Illinois Section Engineers Without Borders Committee. He also serves as a Regional Coordinator for the Future City Competition and as captain of the HNTB Tug Team for the Special Olympics Plane Pull at O'Hare.

Additionally, Shawn is an active member of Engineers Without Borders (EWBUSA). In 2008, Shawn helped to construct a suspended pedestrian bridge in a remote jungle location in Guatemala. This bridge was built in partnership with the Mayan villagers it serves and has already survived an earthquake. In 2011, Shawn helped to construct a reinforced concrete, agricultural vehicle bridge in a small farming community in Honduras, also in partnership with the local villagers.

In his spare time Shawn is an avid softball player and enjoys traveling with his wife, Katie. They live in Western Springs with their dog, Gus.

#### CIVIL ENGINEER OF THE YEAR

Karen C. Chou, Ph.D., P.E., F.ASCE



Dr. Karen Chou is Assistant Chair and Clinical Professor of Civil and Environmental Engineering at Northwestern University. She is

a Fellow of ASCE and a registered *(continued on page 5)* 

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Professional Engineer in seven states. Dr. Chou was a faculty member at Syracuse University, University of Tennessee at Knoxville, and Minnesota State University where she was the founding coordinator of the civil engineering program which achieved full ABET accreditation two years after the program started. She was also a visiting and adjunct professor at the University of Minnesota, a faculty research fellow at various U.S. Air Force and U.S. Navy labs; structural engineer at Harza Engineering (Chicago, IL) and senior structural engineer with Paulsen Architects (Mankato, MN).

Dr. Chou's research and scholarly interest include structural reliability, applications of probability and statistics in constructed systems, structural health monitoring, development of learning tools, and engineering education. Her research was supported by NSF, U.S. AFOSR, U.S. Navy, and TN DOT.

Dr. Chou has served the profession extensively including ABET program evaluator, many officer positions at Syracuse Section and Knoxville Branch ASCE for almost 15 years, member of editorial board of the International Journal of Structural Safety and Engineering Advisory Board of Aluminum Association, Associate Editor of ASCE Journal of Structural Engineering, and ASCE faculty advisor at four universities.

For her service as faculty advisor of ASCE student chapters, Dr. Chou was recognized by ASCE with the Certificate of Commendation in 1999 and 2012, by the Knoxville Branch ASCE in 1996 and by the Tennessee ASCE Student Chapter numerous times. The Class of 2003 at Minnesota State placed a brick in Dr. Chou's honor on the ground of the University's Memorial Arch in 2004. In 2010, Dr. Chou received the Charles W. Britzius Distinguished Engineer Award from the Minnesota Federation of Engineering, Science, and Technology Societies.

#### PUBLIC INVOLVEMENT AWARD

Structural Engineering Institute – Illinois Chapter



SEI Illinois Chapter presents \$2,500 scholarships to ASCE Student Chapter Winners The Structural Engineering Institute Illinois Chapter (SEI-IL) is a committee of people who volunteer their time to organize professional development, engineering outreach, and networking opportunities, to serve the membership within the ASCE Illinois Section. SEI-IL has approximately 539 members in the chapter and an email distribution list of over 1,000.

Local activities include technical dinner meetings, scholarship award and engineering program funding, a biennial lecture series, structures congress participation, technical training seminars, engineering outreach activities, educational tours, a structural movie night, photo competition and engagement in public relations. The local committee for 2011-2012 consists of Jameelah C. Muhammad, P.E. (Chair), Victor Van Santen, P.E., S.E. (Past Chair), Dennis Morgan, P.E., S.E. (Vice Chair), Brett Sauter, P.E., S.E. (Secretary), Andrew Keaschall, P.E., S.E. (Treasurer), Jason Krohn, P.E. (Training Coordinator), Stephanie Coad, E.I. (Student Liaison), Nathan Holmer, E.I. (Special Events and Webmaster), and Jim Adams, P.E., S.E. (Committee Member). Kendra Bleers, P.E., Jessy Rojas, P.E., and Hussam Alkhatib recently joined as new chapter or lecture series committee members.

As an institute chapter, SEI-IL is able to take advantage of the resources provided by our national organization as well, which consists of a community of more than 20,000 structural engineers within the American Society of Civil Engineers.

#### OUTSTANDING CIVIL ENGINEERING ACHIEVEMENT OF THE YEAR AWARD -UNDER \$5 MILLION

2nd Street Stormwater Improvements – Downers Grove, IL



The area located at 2nd St. and Cumnor Rd. was identified as a high priority area by the Village's Watershed Infrastructure Improvement Plan. (continued on page 6)

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There is no overland flow path to St. Joseph Creek, to which this area drains, and the storm sewers are significantly undersized. The surrounding residential homes experienced frequent structural flooding and the intersection had to be barricaded and closed frequently as a result.

Through a voluntary buyout program, five homes were purchased by the Village and demolished. Underground and overhead utilities were relocated, and Cumnor Road was permanently closed between 2nd and 3rd Streets for the construction of a wetland bottom detention basin, which provided approximately 5.7 acre-feet of new flood storage. It is sized to contain the 10-year, critical duration storm event, and will eliminate street flooding at this location in all but the most severe of storms. The basin was planted with emergent wetland and upland prairie plants. It also includes amenities such as a path to facilitate pedestrian traffic to the existing park, and a plaza area constructed of permeable pavers, with benches and interpretive signage. In addition, storm water quality BMP's were constructed, including a forebay/rain garden and two hydrodynamic separators. The project was designed in-house by Downers Grove Engineering Division staff, with the assistance of several consulting firms who provided surveying, landscape design, stormwater modeling support, and CMA services. This project is a great example of how stormwater improvements can be implemented within existing mature neighborhoods.

#### SUSTAINABILITY IN CIVIL ENGINEERING ACHIEVEMENT AWARD

Benito Juarez Community Academy – Addition Project



Completed in September 2010, The Benito Juarez Community Academy -Addition includes a new performing arts building, classroom bridge, soccer and softball fields, and an open plaza. Located on Chicago's West Side Pilsen neighborhood, the project provides an example of a public building reenergizing an otherwise "cold area" through the implementation of sustainable practices to encourage economic and social development.

The project exemplifies the economic, social, and environmental principles of sustainable development, providing a number of sustainable features that benefit the surrounding environment and community. Prior to the addition, the Academy was largely surrounded by industry. Through the acquisition of adjacent industrial land and public streets, the project encourages economic development and feeds life into the community, providing community gathering spaces. The addition provides a number of site amenities available to the public including a soccer field, bioswale, and green plazas that transform the former industrial block into a focal point for the community. It boasts 100% infiltration of the 100YR rain event and no storm sewer connection to the City sewer main.

The project also exhibits innovation in sustainability through its construction phasing techniques and collaboration with public agencies. The project sets a new, sustainable precedent for multiphase projects in Chicago and also demonstrated that the integration of public and private developments can result in a more sustainable solution for property owners. **ASCE** 

Stephanie Nurre, PE, CFM is a Water Resources Engineer at Christopher B. Burke Engineering, Ltd. and is Co-chair of the Awards and Student Outreach Committees. This article was written on behalf of the Annual Dinner and Awards Committees.

#### **Equity in Agricultural Water Quality Monitoring**

(continued from page 1)

periodic discrete sampling with little regard to the growing season or climatic conditions. This approach has been fraught with legal challenges and arguably few demonstrable solutions that are legally defensible.

To find the problems and quantifiably measure the solutions, the following questions need to be answered:

- Where, when, and how much is agricultural runoff polluted throughout the growing season?
- How effective are the solutions?
- Is the data legally defensible?

The solutions can be economically beneficial, equitable for the agricultural community, and legally defensible through Equity in Agricultural Water Quality Monitoring (EAWQM). To accomplish this, EAWQM collects continuous and real-time data throughout the growing season that is correlated to varying climatic conditions. Not to be understated are the facts that data collection of this magnitude is a huge undertaking that requires vast amounts of data management and analyses by a third party that is unbiased and without prejudice.

Obviously funding is a significant component for getting EAWQM firmly established. Through collaboration between private and public entities, EAWQM can use real data and dollars to incentivize water quality trading credits and establish bigger, bolder public/ private partnerships. In doing so, EAWQM should use 21st Century technology to modernize the process and bring the data to the end user in real-time.

# Responsiveness to Climate Changes

EAWQM is a unique tool for the agricultural community to adapt to



Figure 2. <u>Getting Paid for Stewardship</u>: <u>An Agricultural Community Water Quality</u> <u>Trading Guide</u><sup>2</sup> by the USEPA with input from the NRCS.

climate change such as recent droughts and flash flood events. Its premise is to reduce nutrients, soil erosion, and pollutant loads in storm water runoff by monitoring system losses while correlating this data to ever-changing precipitation, temperature, and yield as well as creating datasets that serve as nutrient guides. Farmers can then adjust their application rates to the demand of their crops and the changing climatic conditions. EAWQM can measure the effectiveness of best management practices to provide a more targeted approach to reducing pollutant loads from farms and livestock operations. Best management practices that have measured, quantifiable effectiveness can result in water quality trading credits<sup>1</sup> with sewage treatment facilities or Publicly Owned Treatment Works (POTWs) and industrial processing plants that have reached their maximum effluent limits and need more capacity for growth in response to increasing population and/or product demands (Figure 2).

#### **Background and Rationale**

Communities are required to address storm water issues to the maximum extent practicable. The same mandate requires quantifiable solutions for industrial operations, POTWs and Concentrated Animal Feeding Operations (CAFOs). Recent breakthroughs in research and development, namely EAWQM, may soon make quantifiable results feasible for MS4s and farms which have historically been difficult to achieve. Proactive agricultural operations will then be in a position to be first to the water quality trading table.

With EAWQM, not only can pollutant loads be monitored effectively, equitable solutions to water quality improvements are uncovered. These solutions should financially compensate the agricultural community for its continued progress, improve secondary natural resource related industries thereby increasing the sales tax base, and provide improved quality of life for the community at large.

Until EAWQM costs decrease, however, it is highly unlikely that individual farmers will have the financial resources to pay for it. A significant source of funding today can be from fines levied by the USEPA for water quality violations. Water quality trading credits are also viable options for funding, particularly as the cost of EAWQM decreases through innovation and popularity. As benefits are quickly realized, it is expected that EAWQM will become self-sustaining and even revenue generating. Subsequently, in addition to crops and livestock,

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#### **Equity in Agricultural Water Quality Monitoring**

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agricultural communities could essentially provide clean surface water for the nation's lakes and streams.

EAWQM will serve the public interest in a big way toward the <u>USDA Strategic</u> <u>Plan</u><sup>3</sup> by assisting rural communities to create prosperity so they are selfsustaining, repopulating, and economically thriving while simultaneously enhancing the country's water resources and ensuring the national forests and private working lands are conserved, restored, and made more resilient to climate change. EAWQM promotes increases in secondary industries where improvements in water quality translate to improved ecological conditions. Nominal increases have dramatic economic benefits for industries such as boating, fishing, swimming, picnicking, photography, jogging, biking, camping, flood control, industrial processing, agricultural irrigation, municipal drinking water treatment, passive uses and reduced property losses. Its systematic approach will result in de-listing streams that are on the EPA 303(d) list and, more importantly, will proactively ward off future impairments by recognizing and addressing them before they become significant and costly problems. **ASCE** 

Gary Paradoski is a Senior Water Resources Engineer at Michael Baker Jr., Inc. who focuses primarily on ecosystem restoration and water quality projects primarily using bioengineering and ecologically based design techniques. This article was provided by EWRI.

# President's Notes

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I would also like to remind everyone of the Infrastructure Report Card. The updated National Report Card will be released next year, and we in the Illinois Section will be starting the process of gathering the data required for the Illinois Report Card update to be released in 2014. If anyone would like to participate in supporting this effort, please contact me. The National Report Card has been getting referenced in the media, but we need to continue getting the word out on infrastructure and its deterioration so people understand the impact on their daily lives. This is effectively described in ASCE National's latest "Failure to Act" Series. I highly recommend you check it out.

Over the last couple of years, the way the Section communicates with you has changed. We have made the transition from paper, snail mail delivery of this Newsletter to emailing. Of the thousands If you are interested in supporting any of the initiatives I have mentioned, provide suggestions for the Newsletter, or help with the updating of the Illinois Report Card, please let me know.

of newsletters that go out each month, only ten are mailed hardcopy to those select few who do not have an email address. Unfortunately, of those newsletters emailed, only around 20% are opened. Important information that cannot wait for a newsletter and activity reminders are sent out in emailblasts that seem to be better received. Because we want to provide value to our members, the Section is modifying the format of the Newsletter to be more substantial, provide better information, and be distributed on a quarterly basis rather than monthly. We are looking for suggestions on what members would like to see in the newsletter and we will be soliciting feedback once the changes take effect. So –PLEASE– at least open and read the first one we send. Look for the new format around March.

Finally, the biggest impact you can have to the profession of Civil Engineering is to get involved. If you are interested in supporting any of the initiatives I have mentioned, provide suggestions for the Newsletter, or help with the updating of the Illinois Report Card, please let me know. I can be reached at <u>larrigoni@terraengineering.com</u>. There is always room for one more volunteer. **ASCE** 

# Congress Parkway Bascule Bridge Rehabilitation: Vital to Chicago's Transportation Network

Original Research Paper by Ahmad M. Hammad, Ph.D., P.E., S.E., Jamal Grainawi, P.E., S.E., Brian Kuttab, P.E. Adapted for Article by Jameelah C. Muhammad, P.E., M. ASCE

esidents, tourists and commuters access the City of Chicago Central Business District daily via an extensive transit system, giving the City its notable pulse of energy. The Congress Parkway Bascule Bridge, functionally classified as an Other Principal Arterial, is on the National Highway System, and is a Class I Truck Route. The average daily traffic (ADT) along Congress Parkway was 139,000 (2.0% trucks) in 2006 and the forecasted 2021 ADT is 166.680. This structure is a vital part of Chicago's transportation network. Just as major arteries of our heart must be maintained to facilitate the flow of oxygen to our bodies, bridges must be preserved to support traffic flow at an acceptable level of service. The Congress Parkway Bascule Bridge, constructed between 1952 and 1954, has incurred structural, electrical and mechanical deficiencies during its useful service life. To revive the structure and maintain the lively heartbeat of our City, major work was necessary to extend its service life. The Illinois Department of Transportation (IDOT) embarked



Congress Parkway Bascule Bridge underside of deck prior to rehabilitation



Congress Parkway Bascule Bridge during rehabilitation.

on its mission to upgrade the structure with the assistance of professional engineering and construction firms to provide services associated with the rehabilitation of this movable bridge.

A field inspection and evaluation was done to determine the condition of the existing structure. The existing structure is a dual double-leaf, trunnion type bascule bridge, carrying the eastbound and westbound traffic of Congress Parkway over the South Branch of the Chicago River. Congress Parkway is the terminus of I-290 (Eisenhower Expressway) as it enters the City limits from the west. The bascule bridge has four lanes of traffic in each direction with no shoulder, a sidewalk (9'-9" wide) on each side, and a median (4'-9" wide consisting of New Jersey Aluminum Barrier). There was a posted weight limit of 9 tons per axle

and 37 tons gross. The movable structure has an overall length of approximately 298'-8<sup>3</sup>/<sub>8</sub>" (centerline of anchor columns) and has an out-to-out deck width of approximately 110'-4". The fixed spans vary in length.

Deficiencies and deterioration, including collision damage, were located, photographed and recorded on previously prepared sketches. The elements were assigned descriptive ratings based on condition. Each descriptive rating corresponds to a general condition rating in accordance with the National Bridge Inspection Standards (NBIS).

At the time of inspection, the bridge was generally in poor overall condition. In the movable span, the open-welded steel grid deck was in poor condition with loose sections and repair patches, particularly at the approach ends.

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#### **Congress Parkway Bascule Bridge Rehabilitation**

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The structure's poor condition rating was mainly due to the deterioration of structural components below the roadway level in the movable spans. This deteriorating condition may have been attributed to the open-welded steel grid deck, which was not providing adequate protection to the superstructure elements. Deicing chemicals, moisture, and debris accumulation were likely the underlying causes of the deterioration.

After a potential scope of work determination and analysis, removal of the open steel grid deck and replacement with an orthotropic, closed deck system with abrasion resistance polyurethane wearing surface was selected as the best rehabilitation option. This option would fully protect the structural elements below the roadway due to the elimination of the open grids in the deck. Additionally, the orthotropic deck system recommended was specifically designed to keep the actual stresses low, by introducing closely spaced built-in transverse floorbeams, and in this case closely spaced longitudinal stringers as well. Thus, the design stress range for the deck and its components could be kept to less than 50 percent of the constant-amplitude fatigue threshold. This means that the fatigue resistance of the deck theoretically provides an infinite life. Therefore, if the stress range is below a certain value, fatigue no longer controls the design life of the deck.

Other rehabilitative project work included: performance of structural concrete repairs and epoxy injection of cracks in the substructure elements; reinforcing concrete pedestals at the trunnion bearings with carbon fiber reinforced polymer repair system; repair/replacement of floorbeams and floorbeam brackets in the movable spans; truss steel repairs; removal and replacement of the steel curb in the movable spans with F-shape aluminum



All lanes are open to traffic after two years of construction.



Congress Parkway Bascule Bridge underside of orthotropic deck in open position.

barrier; removal and replacement of pile dolphins, fender system, mechanical components, electrical controls and power; as well as other civil, architectural work.

After two construction seasons, all lanes of the Congress Parkway Bascule Bridge are open to traffic. The project recently received the ACEC-Illinois 2013 highest level award, an Honor Award. The rehabilitation of this significant structure certainly assisted in sustaining Chicago's infrastructure and heartbeat. **ASCE** 

Ahmad M. Hammad, Ph.D., P.E., S.E., is a Senior Supervising Structural Engineer at Parsons Brinckerhoff and was Project Manager of the Congress Parkway Bascule Bridge Rehabilitation Project. Jamal Grainawi, P.E., S.E. is the Movable Bridges Specialty Group and Structural Department Manager at Parsons Brinckerhoff. Brian Kuttab, P.E. is a Project Manager with the Illinois Department of Transportation/Consultant Services and was the Project Manager for the Congress Parkway Project. Jameelah C. Muhammad, P.E., M. ASCE, is a Structural Engineer at Parsons Brinckerhoff and Past Chair of the Structural Engineering Institute-Illinois Chapter.



#### Huey P. Long Bridge – National Historic Civil Engineering Landmark

On September 28, 2012, the New Orleans Huey P. Long Bridge, has been designated a National Historic Civil Engineering Landmark. This honor places the Bridge in the company of Eiffel Tower, the Panama Canal, the Hoover Dam and the US Capitol Building. When it was completed in 1935 it was the first railroad highway bridge to cross the Mississippi River in Louisiana. It was the longest high-level, double truss railroad bridge in the world. Bridge carries also a narrow, 18 ft. wide, two-lane roadway bracketed off each side of the trough-truss structure. The total length of the bridge is 22,996 feet between the railroad abutments. The navigational clearance is 135 feet above the high water river stage of +18 feet, to clear ocean going vessels. It's an example of pioneering engineering. Prior to the bridge all trans river rail commerce was handled by ferries. With the development of highway traffic and resulted increase in ferry traffic the need for improved crossing became very important. Port of New Orleans is considered one of the busiest in the world. It handles shipping lines traffic carries large tornages for trans shipment.

Due to difficult soil conditions in the delta of Mississippi, low lands, navigational clearances and strong river currents, for a very long time, the best engineers in the country were unable to build a bridge in New Orleans. In 1930 Ralph Modjeski (1861-1940) was engaged to prepare plans and specifications for a bridge to satisfy requirements of the Chief of Engineers of the United States Army. Bids were opened in 1931 and in December of 1932 construction started. Designing bridge piers Modjeski consulted with Karl Terzaghi, known for his outstanding foundations expertise. On the completion of the bridge, 15 December 1935, grateful New Orleans Morning Tribune called Ralph Modjeski the Greatest Bridge Builder in History of the Country. The Span was called Marvel of Engineering Skill and Artistic Beauty. Since completion it has been estimated that it carried 100,000 passenger trains and over 30 million freight cars. Bridge carries 34,000 vehicles daily.

Lately, mainly due to it's narrow roadway the bridge was classified as functionally obsolete. After an extensive study the Louisiana Department of Transportation decided to widen the existing bridge roadways to 43 feet each. New roadways will provide three 11 feet wide traffic lanes and inside and outside shoulders in each direction. Two new trusses have been added forming a three barrel structure. The existing two trusses will remain essentially undisturbed except for the connection of sway frames and cross-bracing between the new and old trusses. Major constrain was that the vehicular traffic on the bridge had to be maintained with no interruption during the entire construction period. The most amazing is the fact that even though the dead load of the bridge is more then double of its original weight, the structure will be carried by the same caisson piers with no measures necessary to increase the carrying capacity of the original foundations.

Jan .S. Plachta, PE, F. ASCE Corps of Engineers Chicago District

# Illinois Section News & Secretary Report

#### NOVEMBER 2012

n an effort to inform Illinois Section members of the discussions at the monthly Board meetings, the Section Secretary contributes this monthly article to the newsletter. Any questions or comments on the Board activities are welcome by contacting Thera Baldauf, at thera.a.baldauf@mwhglobal.com

#### ■ Treasurer's Report

▲ Treasurer Mike Mackinnon presented the Treasurer's Monthly Report.

#### ■ Group Reports

▲ Groups presented a written report outlining previous and current month's activities.

#### New Business

▲ Matt Miller announced the upcoming Future Cities Competition to be held during the month of January 2013. This year's topic is sustainable runoff. The preliminary judging is on January 19th followed by the competition on January 26th. They are looking for engineering mentors for participating schools. For those interested, please check out the Future City website for a list of schools or contact Matt Miller for more information. The Board authorized a \$1,000 sponsorship for the competition.

▲ Allen Staron our Region 3 Governor provided a Report on the State of the Region to the Board. He noted that next year's Multi-Leadership Conference for Regions 3, 6 and 7 will be held July 12, 2013 in Milwaukee, Wisconsin. This will be followed by the Region 3 Assembly that is generally conducted in Chicago every August. They are looking for ways or ideas to re-energize the assembly.

▲ The Board is planning to release the Section Report Card in 2014. The Section is gearing up to collect all necessary information. Past President Darren Olson will be chairing the committee.

▲ The National Annual Fly-In will be held March 19 – 21, 2013. The Past-President, President and President-Elect are slated to attend. For those planning to attend, please email President Lou Arrigoni.

▲ APWA will be hosting its International Congress in Chicago during August 2013. APWA has reached out to the Section to provide volunteers to help out with the conference. ▲ The ASCE Engineering Mechanics Institute 2013 Conference will be held August 4th to 7th at Northwestern University. The Institute has reached out to the Section looking for potential seminar ideas and advertising support.

#### Old Business

▲ The annual awards dinner was a success with over 300 attendees and 42 company sponsorships. Planning has started for the 2013 Annual Dinner. The Annual Dinner Committee is open to any recommendations on new venue locations.

▲ The Minority Affairs Committee is sending out a call for suggestions or opportunities for helping out the MAC on their initiatives or reinvigorating the annual golf outing.

The next board meeting is scheduled for Monday, December 3, 2012 at 5:30pm at MWH Americas, Inc., 175 West Jackson Blvd, 19th Floor.

By Thera A. Baldauf thera.a.baldauf@mwhglobal.com

# Section Activities

# Did you know you can see all the latest events scheduled for the Illinois Section by visiting our Google Calendar? Just click <u>HERE</u>.

or visit: www.isasce.org/web/section/calendar.html