



Illinois Section  
Founded 1916

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**ASCE Illinois Section**

# News

Vol. 57, No.3  
Fall 2016

## Green Stormwater Infrastructure in Northeastern Illinois

*By Megan Elberts, P.E.*

In 1997, Mayor Daley visited Hamburg, Germany and was impressed by the green roofs atop many of their buildings<sup>1</sup>. He was so inspired by this visit, that a green roof

was constructed on top of the City Hall Building in Chicago in 2001. Some historians point to this as the beginning of modern green stormwater infrastructure in Chicago.



Figure 1 City of Chicago Green Roof (Image Courtesy of Choose Chicago)

<sup>1</sup> [http://articles.chicagotribune.com/2010-04-20/news/ct-met-0421-green-roof-20100420\\_1\\_green-roofs-conventional-roof-flat-roofs](http://articles.chicagotribune.com/2010-04-20/news/ct-met-0421-green-roof-20100420_1_green-roofs-conventional-roof-flat-roofs)

The term green infrastructure can be used to describe a number of concepts. The concept of green infrastructure can (continued on page 8)

## President's Notes

Jennifer Gora President-Elect for Thera Baldauf, P.E.



While our members are enjoying the summer and outdoor activities, the Illinois Section has also enjoyed the warmer temps with activities associated with the Centennial Anniversary, Committee activities and the Institutes monthly programs. As I write this article, the Region 3 Assembly is taking place in Chicago where Section and Branch leaders have converged to share ideas, learn more of Society Initiatives (*check out information on the Grand Challenge*, <http://www.asce.org/Grand-Challenge/> and *Dream Big Sneak Peek Trailer*, [https://www.youtube.com/watch?v=dRFK\\_eRKXII](https://www.youtube.com/watch?v=dRFK_eRKXII)) and hear from regional speakers on topics of interest to civil engineers.

As part of the Centennial Anniversary summer fun, the Section hosted a family baseball outing in June. Merriment was had by the attendees as they relished a night out watching the Schaumburg Boomers take on the River City Rascals. The attendees had dinner in the Schaumburg Club, enjoyed the game in the grandstands and wrapped up the evening with fireworks and running of the bases for the kids.

Our most recent Centennial Anniversary event was the Civil Engineering Boat Tour on August 12. The rain could not hold back attendees from participating in this event as we had over 100 attendees enjoy a Friday evening learning about civil engineering

achievements along the Chicago River.

Mark your calendars for October 13 as we wrap up the Centennial Anniversary with our Annual Dinner event. This year will be a more elaborate occasion as we have a Gala that includes dinner and dancing; yes you read correctly that there is dancing! So bring your significant other for a night out on the town and don't forget to dust off your dancing shoes! Please check out our website for additional information on this event (<http://www.isasce.org/event/>).

For those that like some bling, have you gotten your free Centennial Anniversary pin? The pins are available to Section Members and have been accessible at Section sponsored Centennial Anniversary events during the year. If you have not gotten one yet, time is running out so make sure to attend one of the upcoming events and grab your pin!

Looking ahead there will be an update to the 2014 Report Card for Illinois Infrastructure with anticipated release in 2018. Additional information will be forthcoming as we gear up and seek volunteers to lead the efforts on the update.

Many of you may be wondering why the President-Elect is writing the President Notes in this newsletter. Well, the reason is that Thera Baldauf and her husband, Rob Novotny, (continued on page 11)

## ASCE Illinois Section News

**ILLINOIS SECTION NEWSLETTER**  
E-Mailed to all ASCE-IS dues-paying members  
American Society of Civil Engineers Illinois  
Section - Region 3

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# ***Engineering Programmed Solutions: Using Scripting Languages to Speed up Repetitive Tasks.***

*By Brett Mattas, P.E., S.E.*

**H**ow many times have you sat, repeating the same monotonous task telling yourself there has to be a better way to do this? Many entry-level engineers, early in their career, have been stuck at a computer performing just this kind of mind numbing task for days and even

**How many times have you sat, repeating the same monotonous task telling yourself there has to be a better way to do this?**

weeks. Some examples include opening file after file of bid tabulations in search of applicable unit costs for a cost estimate and having to generate and print hundreds of construction quantity takeoff sheets for use in the field.

While these repetitive tasks are ideal for automation, there may be no existing program for your specific situation or client. However, using scripting languages such as Visual Basic for Applications (VBA, also known as macros) in programs such as Microsoft Excel, Microsoft Word, Bentley's

Microstation, and other commonly used engineering programs, both

**By using scripting languages, both efficiency and consistency can be improved.**

efficiency and consistency can be improved. Some other VBA examples include:

- Renaming mass amounts of files such as a day's worth of inspection photos
- Linking a plan set's page numbering to a spreadsheet to avoid manually changing the individual sheet's page numbers
- Importing and sorting output from analysis and design programs
- Performing iterative design calculations rapidly with only a mouse click

## **Why VBA?**

While most engineers take an introduction to programming class during their education, this often excludes creating a user interface beyond manually typing commands and values into a

command prompt. While this is a good introduction to programming, no finished program would use as slow and unappealing an interface. A scripting language differs from a programming language by automating tasks performed by an existing program instead of creating a new program. Because of this difference an engineer can save time spent both learning, during specific projects creating interfaces, and programming the entire behind the scenes work needed to create a standalone program.

While there are other scripting languages, such as JavaScript, VBA is already available and built into the ubiquitous Microsoft Excel making it an ideal candidate for a first scripting language. Because most engineers are already familiar with Excel, this leads to a gentle learning curve with many incremental benefits. Shortly after beginning to use VBA, an engineer can write their own simple functions such as an interpolator and automated copy & paste commands for an iterative design calculation. From simple scripts and functions, the engineer (continued on page 7)

# William Eckardt Research Center at University of Chicago

By Joel Dellaria, S.E., P.E., M.ASCE and Shane Farr, S.E., P.E., M.ASCE

Opened this past January, the new 277,000 sq ft William Eckhardt Research Center (WERC) comprises a modern research facility that includes 80,000 sq ft of below-grade research space and five floors of above-grade programming centrally located on the University of Chicago campus. The excavation for the facility's below grade research space extended 49 to 54 ft below the existing street level and adjacent to active streets and research facilities. Complicating matters, the excavation was located 1.25 miles west of Lake Michigan, challenging the design team to engineer an earth retention system capable of performing up to 36 ft below the lake's water level. The team selected a diaphragm wall as the earth retention system and permanent foundation wall, because of its cost-effectiveness and ability to minimize groundwater infiltration into the facility following construction.

Constructed on the northwest corner of 57th Street and Ellis Avenue, the project presented many design and construction challenges because of its urban, congested nature. The two adjacent active research facilities housed experiments that are highly sensitive to vibrations and settlement. The streets and associated easements contained utilities critical to university

operations and permanent ground anchors that supported a similar deep excavation for the Mansueto Library to the east. To address these many issues, the university selected Hayward Baker Inc. to assist with the design, planning,



and construction of the proposed excavation. The final design process began in summer 2011 and was permitted for construction in summer 2012.

Each side of the excavation was constructed with a unique solution to best mitigate the various design risks. The excavation support systems included a combination of tiebacks, internal bracing, and micropiles. The neighboring university research structures required underpinning, which was accomplished through the use of micropiles, tie downs, and jet grouting.

Nearby structures included the five-story Biopsychology Research Building, which was founded on spread footings and had a single basement level. The two-story Accelerator Building, also founded on spread

foundations with a single basement level, was located directly north of the Research Institute building and adjacent to the proposed excavation. To the east, across Ellis Avenue, is the Mansueto Library, which features a 55 ft deep basement, constructed by means of a diaphragm wall with permanent ground anchors extending below the right-of-way of Ellis Avenue.

The soil profile at the WERC site consists of approximately 3 to 10 ft of urban fill, followed by loose to medium dense sand to a depth of approximately 20 ft.

Underlying the sand material, a layer of stiff to very stiff clay 10 to 15 ft thick is encountered to a depth of 30 to 35 ft below grade. The stiff to very stiff clay transitions to Chicago Hardpan, which is a hard, silty clay with interbedded layers of dense to very dense sand and silt. The hardpan layer extends to the top of the dolomitic limestone bedrock. The dolomite is encountered at 61 to 71 ft below grade. Groundwater was encountered at depths varying from 10 to 13 ft below grade. Because it is hydraulically connected to Lake Michigan, the groundwater fluctuates with the level of the lake.

The project deflection requirements (1.5 inches or 0.25 (continued on page 10)

# GEO-CHICAGO 2016: Sustainability, Energy, and the Geoenvironment

By Krishna R. Reddy, Ph.D., P.E., D.GE., Env. SP, F.ASCE

From August 14 to 18, 2016, about 600 engineers, scientists, academicians, and students from 32 countries around the world gathered in Chicago downtown for the ASCE specialty conference *Geo-Chicago: Sustainability, Energy, and the Geoenvironment*. This

**600 engineers, scientists,  
academicians, and students  
from 32 countries**

conference provided a unique forum to explore recent advancements, new directions, and opportunities for sustainable and resilient approaches to design and protect infrastructure and the environment. The conference featured the presentation of technical papers, panel discussions, short courses, workshops, keynote lectures, posters, mini-symposiums honouring geo-legends, exhibits, and technical tour. The conference also included several networking events such as welcome reception, awards reception, Cubs game, and boat cruise dinner, that helped participants gain a memorable experience in Chicago with their new friends and acquaintances.

The authors presented their papers in the technical sessions that

encompassed a broad spectrum of topics primarily involving sustainability and resiliency, energy, geoenvironmental systems, materials and resource conservation, waste management and remediation, policy and regulations. The sustainability theme of the conference was carried through these topics with dozens of technical sessions, several posters, seven keynote lectures (including the 2016 Monismith lecture), two panel discussions, and two mini-



symposiums. The technical papers were presented in five parallel sessions and posters were presented during the two extended early afternoon sessions. A total of 392 peer-reviewed technical papers are compiled into five Geotechnical Specialty Publications (GSPs) and two additional GSPs are compiled based on the papers submitted to the special symposia honouring Daniel and Koerner. All of these

seven GSPs can be accessed from the ASCE Library at: <http://ascelibrary.org/action/doSearch?AllField=Geo-Chicago+2016>

“The conference was a great success,” said conference chair Krishna Reddy. “It gave the attendees to learn new and emerging technical challenges of sustainability, geo-energy, and the geo-environment. Moreover, it gave the unique opportunity for the attendees to make new friends as well as explore the dynamic city of Chicago. It was so nice to see so many participants from around the world interacting with each other to the advancement of geoenvironmental engineering.”

On Sunday, August 14, 2016, the conference started off with offering short courses all through the day with a welcome reception and exhibit hall grand opening in the evening. The reception was lively with the latest innovations from wide variety of vendors focused on sustainability and the geoenvironment. At the end of the day, the welcoming reception provided good networking opportunities to the attendees.

The official start of the conference was on Monday, August 15, 2016, by the conference chair Krishna (continued on page 12)

# Sustainability: Today is the Day of the Civil Engineer and ASCE Needs to Step Up to Lead

*Edited by Karen C. Kabbes*

**H**ow do ASCE's sustainability initiatives impact you and the way you practice now and in the future? The answer is ... perhaps more than you realize.

As civil engineers, we are planning, designing, constructing, restoring and operating infrastructure in a world with uncertain and changing conditions. In many areas, civil engineers have failed to stay abreast of increased social awareness and community involvement in infrastructure development. There is continuing scarcity and lack of public commitment to infrastructure funding. Nationally, we are facing shortages of energy, water, resources and the public's good will. Not only have environmental conditions changed, but we also continue to overuse our natural resources, degrade ecosystems and contaminate the atmosphere with greenhouse gases.

In January of 2016, ASCE convened a Sustainability Summit in the Washington, DC area to bring together the very best minds and proponents we could find to help us define the issues, identify how critical the situation is, and develop a road map for ASCE.

What we heard at the summit was that the conditions under which infrastructure is being designed today are inadequate for the future. The very basis of civil engineering design assumes that conditions of the past can be relied upon as good predictors of future conditions, a property called stationarity. Using those conditions, we have developed and relied upon formulas, tables, graphs and standards to do work more efficiently. We, as licensed and certified engineers, use those standards to manage risk and liability. However, our changing climate has made this principle no longer reliable for future development.

If we continue to do what we have done in the past, the infrastructure we deliver will not be functional, reliable or safe under those future conditions nor will it be protective of public health, safety and

**Engineers need to understand the changing development environment and need to take their place**

welfare as called for in ASCE Canon No. 1. If we accept that stationarity is no longer reliable, then to ensure that we can fulfill our professional obligations, we

must have new standards and processes that can address these issues.

Engineers need to understand the changing development environment and need to take their place as planners, leaders, risk managers and implementers of sustainable infrastructure, knowing that the design conditions are no longer static and stationary.

**Today is the day of the civil engineer and ASCE members need to step up to lead.**

At the summit, we heard that transformation was not just a good idea but that it was required to ensure a safe and sustainable future; and that engineers are best equipped to lead this transformation. Addressing civil engineers, Ron Sims, former Deputy Secretary of the United States Department of Housing and Urban Development, emphasized, "We will either succeed because of your skills or we will fail because of your indifference and your lack of them."

The strategic issue for ASCE is the transformation of the profession so that the "new" (continued on page 7)

# Sustainability: Today is the Day of the Civil Engineer and ASCE Needs to Step Up to Lead

(continued from page 6)

standard, or the “new normal”, is that all civil engineering is sustainable. We are not referring to simply a quality of the finished product but that the very process, methodology, and discipline by which we conceive, produce and operate infrastructure is guided by sustainability as the standard of development.

In this “new” actuality, all infrastructure that civil engineers create will be environmentally, economically, and socially sustainable so that it meets the needs of human welfare to realize healthy communities, supporting the fulfillment of human potential in an equitable and appropriate form for the specific location and the culture where applied.

We must build and expand the capacity of civil engineers to achieve this vision. It is much easier to apply standards and processes that have been prescribed in manuals of practices or bodies of knowledge. This

approaches the commoditization of civil engineering.

Unfortunately, the data and conditions upon which those standards were created may no longer be descriptive of future conditions and requirements. We need to instill in the engineer the confidence and expand their capacities to identify, understand, navigate and manage risk and uncertainty.

New standards and protocols must be developed that are needs and process based rather than prescriptive. We need to apply life cycle assessment and life cycle cost analysis to account for lifetime impacts, even impacts beyond the useful life, of infrastructure. We must fully address the issue of resiliency in our standards so that we can develop infrastructure that will support a society confident in its safety and its ability to recover from disturbances, allowing its resources to be applied to innovation and advancement,

rather than defense and re-activeness. We must address sustainability and non-stationarity in the built and natural environment. We must focus on the needs of the project and employ the systems approach to engineering.

We can do this by adopting standards, and perhaps more importantly protocols, appropriate for this new state. We must give the civil engineer the tools to navigate unfamiliar waters when there is no longer a lighthouse to guide.

## **This is ASCE’s challenge of the future**

*Edited by Karen C Kabbes, Member ASCE Committee on Sustainability, from remarks given by Doug Sereno, Chair of the ASCE Committee on Sustainability, to the ASCE Board of Direction in July 2016*

# Engineering Programmed Solutions: Using Scripting Languages to Speed up Repetitive Tasks.

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can go on to create increasingly more complex features.

## **How to Start**

There are both books and free online tutorials for learning VBA such as the free tutorial at [ozgrid.com](http://ozgrid.com). After an introduction to the language, the best way to

reinforce that knowledge is with a small project. For a first project, an engineer should focus on as simple and self-contained task as possible to avoid the frustrations a more complex task may bring to the novice scripter. Ideally, this task will be something the engineer already knows how to do

and is repetitive to the point of inefficiency. Making a quantity calculator spreadsheet that takes a list of pay items and template tab, then generates a new quantity calculation tab for each pay item linking them together in a summary table, is one example.

(continued on page 8)

# Engineering Programmed Solutions: Using Scripting Languages to Speed up Repetitive Tasks.

(continued from page 7)

After gaining some experience, additional areas to expand into include learning VBA for other

**Visual Basic for Applications used within Microsoft Excel has a gently sloping learning curve that offers continuous incremental benefits.**

programs and other scripting languages. Both Bentley and Autodesk drafting programs allow for control of drafting objects

using VBA from both spreadsheet scripts and writing of scripts within their respective programs. Cloud based spreadsheets such as Google Sheets feature similar scripting using the language JavaScript.

## Conclusion

Although far from a universal tool, scripting for existing programs allows much more efficient and consistent work when applied properly to repetitive tasks. Visual Basic for Applications used within Microsoft Excel has a gently

sloping learning curve that offers continuous incremental benefits to the engineer as they are learning the language from one of the many free online and printed sources.

*Brett Mattas, P.E., S.E. is a Structural Engineer at Michael Baker International with 5 years of experience in the design, inspection, maintenance, and rating of transportation structures and the student liaison for ASCE Structural Engineering Institute.*

# Green Stormwater Infrastructure in Northeastern Illinois

(continued from page 1)

be used on a regional level to describe interconnected greenways and open spaces. Green infrastructure can be used on a neighborhood level to describe clustered development and the reduction of impervious surfaces. On the site level, green infrastructure has been applied to measures - some new, some old - that are focused on enhancing water quality and reducing the volume and rate of stormwater runoff<sup>2</sup>.

The Environmental Protection Agency describes green infrastructure as a tool that “reduces and treats stormwater at its source while delivering

environmental, social, and economic benefits<sup>3</sup>.” These

**Green infrastructure as a tool that reduces and treats stormwater at its source while delivering environmental, social, and economic benefits.**

measures are not necessarily capable of addressing flood flows, but rather, the more frequent storm events where opportunities exist to detain and temporarily (or permanently) store stormwater runoff that would otherwise quickly find its way into the combined sewers, storm sewers or

waterways. These methods commonly utilize vegetation and soil to infiltrate runoff into the subsurface. Green stormwater infrastructure practices include but are not limited to permeable pavements, rain gardens, bioswales, green roofs and rainwater harvesting.

Today, green infrastructure is incentivized through grant programs and is a required component of many of the regional stormwater management programs. In 2008, the City of Chicago adopted the Stormwater Ordinance which incentivizes green infrastructure by requiring buildings over a certain threshold either detain the first half-inch of rainfall on-site or alternately reduce the prior impervious (continued on page 9)

<sup>2</sup> <http://www.epa.state.il.us/green-infrastructure/docs/draft-final-report.pdf>

<sup>3</sup> <https://www.epa.gov/green-infrastructure/what-green-infrastructure>

# Green Stormwater Infrastructure in Northeastern Illinois

(continued from page 8)

surface on site by 15%. The City estimates the ordinance has resulted in a 3 million square feet reduction in impervious area<sup>4</sup>. The Chicago Department of Transportation's Streetscape and Sustainable Design Programs utilizes opportunities in the public right of way to implement green infrastructure practices such as bioswales<sup>5</sup>.

Along with the City of Chicago, the suburbs have been leaders in green infrastructure. All seven of the counties in northeastern Illinois have strong stormwater management ordinances that incorporate green infrastructure practices to improve water quality and reduce the volume of stormwater. There are countless examples of successful public and private developments throughout the region that have utilized green infrastructure.

**As we look to the future in stormwater management, green infrastructure will certainly continue to play a strong role alongside traditional grey infrastructure.**

As we look to the future in stormwater management, green infrastructure will certainly continue to play a strong role

**“Nature-based systems for managing stormwater, whether that’s protected open space or designed, engineered green infrastructure, will continue to play a bigger and bigger role in managing day-to-day storm events, shaving the peaks off demand on our hard infrastructure, and avoiding the need to spend time and energy cleaning water at a treatment plant that was never that dirty to begin with, simply by keeping that rain out of the sewer,” says Josh Ellis**

alongside traditional grey infrastructure. “Nature-based systems for managing stormwater, whether that’s protected open space or designed, engineered green infrastructure, will continue to play a bigger and bigger role in managing day-to-day storm events, shaving the peaks off demand on our hard infrastructure, and avoiding the need to spend time and energy cleaning water at a treatment plant that was never that dirty to begin with, simply by keeping that rain out of the sewer,” says Josh Ellis Program Director at Metropolitan Planning Council (MPC). The Center for Neighborhood Technology is working with individual homeowners to find customized solutions for localized flooding issues. Harriet Festing, Director, Water Program says “Working property by property, street by street, we provide one-

stop services that coordinate landscaping, building and plumbing contractors, along with financial services. When combined with plumbing and building solutions, we’ve found green infrastructure landscaping to be particularly effective because it’s low-cost, fast to install, and can be tailor-made to the needs of the property and neighborhood.”

The Illinois State Water Survey (ISWS) estimates that average annual precipitation has increased approximately 5 inches over the last 125 years<sup>6</sup>. US EPA predicts that the Midwest will be subject to more intense rainfall “leading to increased flood damage, strained drainage systems, and reduced drinking water availability<sup>7</sup>.” We are already well aware that financial resources for stormwater infrastructure are becoming increasingly scarce and are competing with many other infrastructure needs in our region. Illinois will continue to incorporate green infrastructure with traditional grey systems as well look to make our stormwater management systems more resilient to meet future demands.

*Megan Elberts, P.E., is a water resources engineer at Christopher B. Burke Engineering, Ltd and current secretary of the Chicago Chapter of Environment and Water Resources Institute.*

<sup>4</sup><http://www.cityofchicago.org/content/dam/city/progs/env/ChicagoGreenStormwaterInfrastructureStrategy.pdf>

<sup>5</sup>[http://www.cityofchicago.org/city/en/depts/cdot/supp\\_info/streetscapes\\_and\\_sustainable\\_design.html](http://www.cityofchicago.org/city/en/depts/cdot/supp_info/streetscapes_and_sustainable_design.html)

<sup>6</sup><http://www.sws.uiuc.edu/atmos/state/cli/climate-change/NE-IL-trends/rainfall.htm#Fig1>

<sup>7</sup><https://www3.epa.gov/climatechange/impacts/midwest.html#impactswater>

# William Eckhardt Research Center at University of Chicago

(continued from page 4)

percent of the excavation height) led the design team to select a diaphragm wall as the earth retention system. The diaphragm wall design included a total wall length of 935 ft and extended to a maximum depth of 60 ft below the top of the wall, varying in thickness between 36 and 42 in.

## **A diaphragm wall was used to provide earth retention and allow for excavation up to 36 feet below the water table with minimum water infiltration**

A pedestrian bridge across 57<sup>th</sup> street to the south and the Biosychology Building were very close to the diaphragm wall and were therefore supported by high-capacity micropiles drilled into bedrock so that the load from the footings would not be supported by the diaphragm wall. The centerline of the Accelerator Building's columns was 13 ft away from the diaphragm wall, and the loads from the columns were much lighter than those of

## **Nearby adjacent structures were underpinned with micropiles and jet grout to minimize risk of settlement**

the Biopsychology Building's columns. To protect the Accelerator Building, 4 ft diameter jet grout columns were constructed beneath all of the exterior footings adjacent to the diaphragm wall. Begun at the

bottom of the footing elevations, the jet grout columns continued 1 ft into the underlying clay layer, providing additional strength to the sandy materials. This resulted in the building loads being supported at a lower elevation on the diaphragm wall.

The diaphragm wall was restrained through a combination of tiebacks and internal bracing. Tiebacks are frequently the preferred method of providing lateral restraint during construction of an earth retention system, as they enable construction of the basement floor slabs and foundation walls without the obstruction of internal braces or rakers that need to be boxed out and built around. The resulting design for most of the excavation included three levels of tiebacks and internal bracing at the corners.

Case Foundation began diaphragm wall construction in July 2012, following demolition of the previous Research Institute structure. Each panel was excavated under slurry to a depth of 60 ft below steel level by means of a specialty clamshell bucket. Additional bentonite slurry was pumped into the excavated cavity as the depth increased to prevent soil caving. After the design depth was reached on a particular panel, a steel rebar cage was lowered into the trench. A tremie pipe was then lowered, and concrete was pumped to the bottom of the panel, displacing the slurry. After the concrete panels had cured a reinforced-concrete cap beam was constructed on top of the

diaphragm wall to distribute vertical loads from superstructure columns and to connect the individual panels together.

Diaphragm wall construction was completed in November 2012, after which excavation for the basement began. As the excavation proceeded, the tieback anchors and internal bracing were installed to support the diaphragm wall. The tiebacks used for this project were strand anchors, consisting of between 3 and 6 strands per anchor. Each anchor



was installed by first drilling to the anchor design depth, after which the tendon was lowered into the hole, grouted, and allowed to cure. The level 1 anchors were installed 8 ft below grade, with the tiebacks varying in length between 59 and 94 ft. Because the installation of these tiebacks required drilling through the upper sand layer, casing was used to install them. The level 2 and 3 anchors were installed at 23 and 36 ft below grade, respectively. Because they were located in an area having a consistent clay profile, the tiebacks in these two levels were installed by means of augering. The level 2 anchors varied in length between 54 and 69 ft, while (continued on page 11)

# William Eckhardt Research Center at University of Chicago

(continued from page 10)

the level 3 anchors varied between 44 and 59 ft.

## **The tied back diaphragm wall performed very well for the 50 foot deep excavation with only 0.8 inches of horizontal deflection**

Nine inclinometers were installed before the start of construction to monitor the performance of the braced excavation. The inclinometers were measured weekly, and the deflection data obtained was compared against the anticipated design deflection of 1.5 in. Maximum deflections in April 2013, at the completion of the braced excavation, varied between 0.4 and 0.7 in. Deflection monitoring continued until October 2013, when the temporary excavation support was removed. Maximum deflections at this time did not exceed 0.8 in.

A settlement and survey monitoring program was also established to monitor the adjacent roadways, the Biopsychology Building, the Accelerator Building, and the cap beam of the slurry wall. A total of 253 settlement points was established in the roadways adjacent to the excavation, and 17 points along the cap beam and adjacent university buildings. Negligible movements were recorded throughout construction; any movements reported were within the expected margin of error.

The William Eckhardt Research Center offers an excellent application of multiple techniques to successfully complete a deep urban excavation. Hayward Baker designed and constructed a braced excavation, combined with multiple underpinning techniques to support several adjacent structures, to successfully complete the 54 ft deep cut in a challenging urban environment.

The earth retention system achieved the project requirements with negligible recorded settlements of the neighboring structures and a maximum horizontal deflection of 0.8 in.

[Project credits]

Owner: University of Chicago  
Architect: HOK, Chicago, with James Carpenter Design Associates, New York City  
Design/build geotechnical contractor: Roselle, Illinois, office of Hayward Baker Inc., Hanover, Maryland with Case Foundation, Roselle, Illinois  
Structural engineer: Chicago office of Thornton Tomasetti, New York City  
Construction manager: Chicago office of W.E. O'Neil Construction Company

*Joel Dellaria, S.E., P.E., M.ASCE, is a structural engineer in the Roselle, Illinois, office of Hayward Baker Inc., which has its headquarters in Hanover, Maryland. Shane Farr, S.E. P.E., M.ASCE, is Division Manager with Hayward Baker.*

## President's Notes

(continued from page 2)

welcomed the birth of their son,



Henry Harrison, into the world on July 26. Everyone is doing well and as you can see from the picture of Henry, enjoying some rest and relaxation as a family!

Most importantly, the Section Board wants to thank all of the volunteers throughout this past year for taking time away from your other commitments to lead, plan and participate in our events.

We would also like to thank the membership for participating and attending events provided by our Institutes, Committees and Section this past year. It is the participation of our volunteers and members that are key to our Section's success and we appreciate your time and efforts. (continued on page 13)

# GEO-CHICAGO 2016: Sustainability, Energy, and the Geoenvironment

(continued from page 5)

Reddy, who welcomed the attendees with a presentation on the overview of the program and its benefits. Following this was a welcome address by Kord Wissmann, Geo-Institute President, and brief overview of ASCE's sustainability perspectives by Robert Stevens, past ASCE president. This was followed by keynote presentations from Craig Benson (on value-added benefit of sustainability) and Mario Manassero (on containment barriers). Thereafter, the attendees participated in concurrent technical sessions that followed. The same day had a mini-symposium honouring the career of two Geo-legends, David Daniel, who is one of the founding fathers of geoenvironmental engineering and also one of the pioneers in modern waste containment systems. Another session on the same day witnessed honouring the career of Robert Koerner, who has been instrumental in the growth of the field of geosynthetics. This mini-symposium honoured their contributions in their fields

## **The conference began with state of the art/ state of the practice lectures from the leading experts in the field**

through a series of paper and presentations from those who worked closely with them throughout their career. The day ended with a celebration of the G-

I award winners by a nice reception, with the participants enjoying with colleagues and exhibitors.

On Tuesday, August 16, 2016 and Wednesday, August 17, 2016, the conference began with state of the art/ state of the practice lectures from the leading experts in the field as featured. Thereafter, the session followed with keynote presentation from Nathan Snorteland (on risk assessment of dams and levees) and John Daniels (on coal combustion residues management). The attendees then participated in the technical sessions on varied topics. The same day included a ticketed event to enjoy an iconic baseball experience at one of the America's historic ballparks to watch the Cubs vs. Brewers at Wrigley Field.

On Wednesday, August 17, 2016, were the keynote presentations by Michel Aubertin (mine waste management) and Marc Tuchman (sediment remediation). The day also included a Luncheon with Panel Discussion on Education: *The Interface of Professional Practice, Research, and Education*. The panellists included Edward Kavazanjian, James Hanson and Rudolph Bonaparte, who presented their perspective on the state of each of these aspects of the field, followed by an open discussion and questions on the challenges and opportunities on these aspects. The attendees came up with interesting questions and

discussions contributing to the opportunities that are to be explored and future directions on each of these aspects. The day

## **The lecture highlighted key examples where interdisciplinary knowledge from these areas of geo-technology has made a significant difference in the sustainability of the pavement system.**

also witnessed the Carl Monismith Lecture on Pavement Engineering by the 2016 Award Lecturer, Dallas Little, who spoke on Sustainable Pavement Systems, the role of the pavement engineer in perceiving the impact of Geomechanics and Geo-science on pavement performance and its sustainability. The lecture highlighted key examples where interdisciplinary knowledge from these areas of geo-technology has made a significant difference in the sustainability of the pavement system. Another panel discussion on *Geosustainability: Opportunities and Threats* was held, which focused on discussion of some of the challenges facing geotechnical engineers while incorporating sustainability principles into their practice. The day ended with a social event, Chicago River Dinner Cruise, where the participants explored the iconic skyline of Chicago from the deck of a river cruise (continued on page 13)

# GEO-CHICAGO 2016: Sustainability, Energy, and the Geoenvironment

(continued from page 12)

boat with their new friends and acquaintances.

The last day of the conference, August 18, 2016 included a technical tour to the Indiana Steel Mill. The site visit included the observation of all the processes to gain an appreciation of how slag products are generated and an appraisal on the level of quality control and quality assurance that makes them a reliable material for civil engineering uses.



The conference also witnessed two exclusive workshops namely, the US-Japan and US-India bilateral workshop. The workshops were sponsored by the Geo-Institute of ASCE. The US-Japan workshop on

Geoenvironmental Engineering was held on Sunday, August 14, 2016 organized by James Hanson and Nazli Yesiller from USA and Takeshi Katsumi from Japan. It included very brief presentations by the participants, two keynote presentations, and break-out sessions to identify potential areas of collaboration. Participants interacted during the pre-workshop and post-workshop dinner events.

The US-India Bilateral workshop was held on Thursday, August 18, 2016 organized by G.L. Sivakumar Babu and Manoj Datta from India and Krishna Reddy and Anirban De from USA. The theme of the workshop was on establishing linkages between geoenvironmental practices and sustainability. Several academicians, practitioners and professionals gathered to discuss the similarities and differences in the state-of-the-art and identify potential areas of collaboration for constructive research benefitting both the countries. The workshop involved University of Illinois at

Chicago's Geotech Lab tour, technical paper presentations, group discussions, technical tour to the CETCO laboratory, and group dinner. The workshops provided with several collaborative opportunities on the featured topics, and few major areas of potential collaboration were identified from the group discussions. The action plan and follow up includes, preparing state-of-the-art papers that give an overview of the current situation in both the countries on the topics identified and the need for collaborative research on the same.

**Krishna R. Reddy, PhD, PE, D.GE, ENVSP, F.ASCE**, is a professor in the Department of Civil and Materials Engineering at the University of Illinois at Chicago and serves as director of the Geotechnical and Geoenvironmental Laboratory. Dr. Reddy's research and consulting expertise includes geotechnical site investigations, structural foundations, earth structures, polluted site remediation, landfills, waste recycling, and sustainability. He can be reached at [kreddy@uic.edu](mailto:kreddy@uic.edu).

## President's Notes

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Lastly on a personal note, I would like to express my thanks to the members of the Section during my time in Illinois. It has been a pleasure to meet many of our members, serve on the board and

work with many of the members/boards on numerous activities over the past 5 years. While it is tough to say good-bye, I am thankful for the opportunity to have been part of such a

wonderful and successful group. I look forward to seeing the continued success of the Illinois Section!

**September 2016**

In an effort to inform Illinois Section members of the discussions at the monthly Board meetings, the Section Secretary contributes this quarterly article to the newsletter. Any questions or comments on the Board activities are welcome by contacting John Lazzara, at [John.Lazzara@hdrinc.com](mailto:John.Lazzara@hdrinc.com). Please note that there was no monthly meeting for July.

■ **Treasurer’s Report**

▲ A treasurer’s report was presented at the June and August meetings. All reports were approved.

■ **Highlights from Illinois Section Activities and Group Reports.**

▲ **Steel Bridge National Competition** – The IL Section helped sponsor the IIT team and representatives from IIT gave a presentation on the National Competition. There were 48 teams competing this year and IIT took 15<sup>th</sup> place overall!

▲ **Dream Big** – ASCE will be releasing the I-MAX film on civil engineering during Engineers Week February 19-25, 2017. Look for a special IL Section event focused around the movie.

▲ **Annual ASCE IL Section Annual Dinner Gala** – The Annual Dinner Gala is confirmed for the Intercontinental Hotel on October 13<sup>th</sup>. It will be an extra special event this year since the IL Section’s 100 year anniversary will also be celebrated. Please consider attending and purchasing your tickets before the event is sold out.

▲ **Region 3 Assembly (August 12<sup>th</sup>/13<sup>th</sup>)** – This year’s Region 3 Assembly was held in Chicago. Thought-provoking presentations were given on topics including engineers getting involved in politics, ASCE’s Grand Challenge, sustainability, Lucas Museum, ASCE’s Geographic Services Department, and innovation solutions in Peoria. The meeting was wrapped up with an inspirational speech by ASCE Past President Bob Stevens talking about engineers continuing to be problem solvers.

▲ **Sustainability Committee** – A Sustainability Workshop is planned for September 20<sup>th</sup> focused on transportation topics.

▲ **100<sup>th</sup> Anniversary Events** – Centennial Summer Social Gathering was held at the Schaumburg Boomers game on June 3, 2016 with about 40 people attending. The Centennial Civil Engineering Boat Tour took place on August 12<sup>th</sup> with over 115 people enjoying the unique Chicago experience.

▲ **Illinois Infrastructure Report Card** – Work will begin in 2017 for an updated Illinois Infrastructure Report Card to be issued in 2018.

The Illinois Section Board Meetings are held every first Monday of every month with the exception of holidays. The next board meeting is scheduled for September 12, 2016 at 5:30pm at HNTB office located at One S. Wacker Drive, Suite 900, Chicago. Future meetings will be held on October 3<sup>rd</sup>, November 7<sup>th</sup>, and December 5<sup>th</sup>.

*By John Lazzara  
John.Lazzara@hdrinc.co*

**ASCE IL Section EWRI Chapter Board Meeting**

Date: Tuesday, September 13  
 Time: 5:30 pm - 6:30 pm  
 Place: V3 Companies  
 308 W. Erie Street  
 Chicago, IL

**ASCE IL Section Geo-Institute September Dinner Meeting**

*Terzaghi's observational method and Bayesian updating*  
 Date: Tuesday, September 13  
 Time: 5:15pm Cocktails & Appetizers  
 6:15pm Dinner  
 Presentation following dinner  
 Place: Pazzo's at 311  
 311 S. Wacker Drive  
 Chicago, IL 60606  
 (312) 913-1600  
 Cost: \$45 General  
 \$35 Education/Government  
 \$25 Students  
 \$50 At the door OR After  
 RSVP date

RSVP: <https://www.123signup.com/register?id=njbcp> by Monday, September 12<sup>th</sup>  
[GI September Dinner Meeting Flyer](#)

**ASCE IL Section EWRI Advanced HEC-RAS Two-Day Course**

Date: Thursday & Friday, September 15 & 16  
 Place: O'Hare Plaza-Conference Room  
 8755 W. Higgins Road  
 Chicago, IL 60631  
 Cost: \$850 ASCE/EWRI members  
 \$900 non-members  
 \$800 Government employees and students.

RSVP: Space is limited, so register online at [123Signup](#) soon!  
[Course Flyer](#)

**ASCE IL Section 6<sup>th</sup> Annual Sustainability Seminar**

Date: Tuesday, September 20  
 Time: 8:00 am to Noon (Check-in 7:30am, continental breakfast provided)

Place: Schaumburg Prairie Center for the Arts  
 201 Schaumburg Court  
 Schaumburg, IL 60193  
 Cost: \$30 Government Employees and ASCE/APWA/ACEC Members  
 \$35 Non-ASCE/APWA/ACEC Members  
 PDHs: 4 PDH/CM  
 RSVP: <https://www.123signup.com/event?id=nxnrp>, deadline 9/13/16  
[Sustainability Seminar Flyer](#)

**ASCE IL Section SEI September Dinner Meeting**

*I-90 Fox River Bridge: Traffic Needs Drive Innovative Bridge Reconstruction*  
 Date: Wednesday, September 28  
 Time: 5:30pm Cocktails  
 6:00pm Dinner  
 Presentation following dinner  
 Place: Elephant and Castle  
 111 W. Adams Street  
 Chicago, IL  
 Cost: \$50 with reservation  
 \$35 Education/Government  
 \$25 fulltime students-with reservation  
 \$5 fee-without/late RSVP  
 Make checks payable to ASCE Structural Group  
 PDHs: 1 PDH

RSVP: Jessy Rojas, [asce.il.struct@gmail.com](mailto:asce.il.struct@gmail.com) by Sept. 23, 2016  
[SEI September Dinner Meeting Flyer](#)

**ASCE IL Section T&DI - Engineering Successful Proposals Writing Workshop**

*With Steve Schultz, Ph.D.*  
 Date: Thursday, September 29  
 Cost: \$75 Early Bird  
 \$95 After 9/16/16  
 PDHs: 3 PDH  
 RSVP: [Register here](#) by Monday, September 26<sup>th</sup>

**ASCE IL Section EWRI – MWRD's Ultraviolet Light Disinfection Facility Tour**

Date: Thursday, October 6  
 Time: 1:00pm - 3:30pm  
 Place: O'Brien Water Reclamation Plant  
 3500 West Howard Street  
 Skokie, IL  
 RSVP: Jerry McGovern  
[jeromemcgovern@att.net](mailto:jeromemcgovern@att.net)

**ASCE IL Section 2016 Annual Awards Dinner Gala**

Date: Thursday, October 13  
 Time: 6:00pm-7:00pm Cocktails  
 7:00pm-8:30pm- Dinner/Awards  
 8:30pm-10:00pm- Networking/Dancing  
 Cost: General \$125 (\$150 Oct. 1<sup>st</sup>)  
 Educator/Government \$95  
 Student \$75 (Limited seating please contact [illinoissection@isasce.org](mailto:illinoissection@isasce.org) to check availability)  
 RSVP: <https://www.123signup.com/event?id=ntxhx>  
**Please consider sponsoring this event.**  
[Sponsorship Flyer](#)

**ASCE IL Section UPDG Permitting Seminar (Save the Date)**

Date: Thursday, November 10  
 Time: TBD (Full Day Seminar)  
 Place: Chandler's Schaumburg, IL  
 401 N. Roselle Road  
 Schaumburg, IL 60194

**For all Section, Group and Committee events, check out the Section website at:**

[www.isasce.org/web/section/calendar.html](http://www.isasce.org/web/section/calendar.html)

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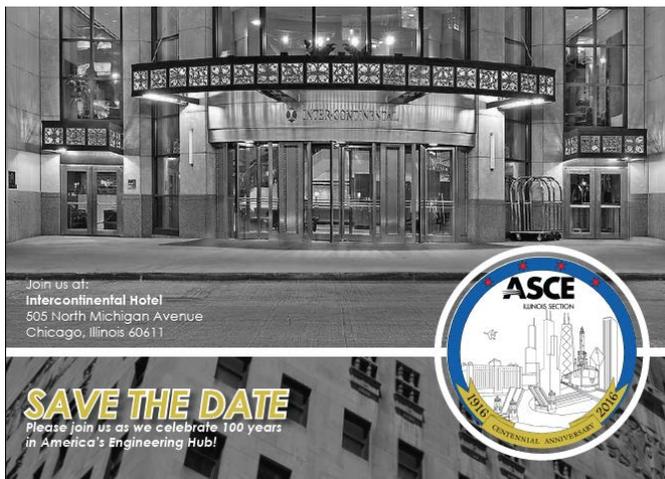
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2016 Annual Awards Dinner Gala
Thursday, October 13, 2016
Intercontinental Hotel Michigan Avenue
Cocktails ... Dinner ... Awards ... Networking ... Dancing

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