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**ASCE Illinois Section**

# News

Vol. 63, No.1  
Spring 2022

## PM Interaction Diagram of Reinforced Concrete-Filled Steel Tubes (RCFTs)

*Written by Mark Converse, P.E. and Peer Reviewed by Duncan Paterson, Ph.D., P.E.*

**I**ntroduction: A reinforced concrete-filled steel tube (RCFT) is not a new discovery. In fact, the application has been around for several decades and is increasing in popularity in both bridge and

optimizing the flexural design. As such, RCFTs are suitable for combined axial and bending loads and are typically used as columns or piles in bridge and building structures.

Computing the strength of an RCFT sub-

**Reinforced concrete-filled steel  
tubes (RCFTs) are gaining  
popularity in construction  
projects.**

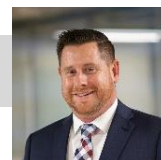
building structures. An RCFT behaves as a composite structural member and has numerous advantages. The inner core of reinforced concrete constrains the local buckling of the steel tube while the steel tube provides confinement for the concrete which increases its compressive strength and improves seismic performance. The steel tube also prevents spalling of concrete, acts as natural formwork when the concrete is being cast, and is positioned furthest from the centroid where the moment arm is greatest, thereby better

**Computing the strength of an  
RCFT subjected to axial load and  
uniaxial bending can be difficult  
with several factors complicating  
the analysis. PSDM and SCM are  
the two primary methods for  
computing P-M Interaction  
diagram of an RCFT.**

jected to axial load and uniaxial bending can be difficult with several factors complicating the analysis. An RCFT contains 3 different components with varying stress-strain curves and behavior. Various (Continued on page 6)

## President's Notes

Andrew D. Walton, P.E.



Lots of excitement is abound for the Illinois Section (IS) as we move into Q2 2022. The IS and affiliated Institutes have cautiously returned to in-person meetings and events with the first in-person monthly IS board meeting in April 2022, 24-months following our last in-person meeting at the beginning of the COVID-19 pandemic.

In support of E-Week last month, the IS participated in student scholarship visits across local Chicagoland universities to discuss the benefit of continued ASCE membership and remind students of the \$17.5K in available scholarship funds. E-Week concluded with the presentation of the 2022 Washington Award to Dr. John A. Rogers, Ph.D., whose professional attainments have preeminently advanced the welfare of humankind. This event also recognized hundreds of students from 3<sup>rd</sup> to 12<sup>th</sup> grade participating in a variety of STEM program competitions up through E-Week. IS Members were involved in selection of the 2022 Washington Awardee and in some of these student competitions and award selections.

The IS will be hosting the President-Elect / Student Scholarship Dinner on April 14<sup>th</sup> in Chicago. We have officially confirmed the in-person attendance of ASCE President-Elect Maria C. Lehman and are planning a day of activities to engage with the ASCE student chapter leaders leading up to the presentation of the scholarship awards.

Right around the corner is the release of the 2022 Report Card for Illinois' Infrastructure. The IS has procured a PR firm to assist with

the Launch and rollout of this important tool for infrastructure advocacy. Mark your calendars for April 28<sup>th</sup>. Also, check out the March 13<sup>th</sup> edition of 60-Minutes with Secretary Buttigieg to see the impact ASCE and the Report Card have made to influence public policy for infrastructure investment.

On the advocacy front, the Illinois and St. Louis Sections recently participated in the 2022 Legislative Lobby Day in Springfield, IL and the 2022 ASCE Fly-In held in Washington, D.C., where meaningful conversations were held with both State and National legislators, in addition to the IDOT Secretary of Transportation. Overarching themes included the need for appropriating authorized funding, workforce challenges for public agencies and the private sector, keeping Illinois graduates in Illinois, opposition to gas tax relief legislation, and preparing for the release of the 2022 IL Report Card.



Lastly, we would be remiss not to address the turmoil in Ukraine. On behalf of the IS, we encourage your support and advocacy for the safety and protection of the Ukrainian people during this challenging time. We must stand in support of freedom and democracy and oppose unjust invasive intrusion, both at home and abroad.

Thank you for reading and look forward to seeing you soon!

## ASCE Illinois Section News

### ILLINOIS SECTION NEWSLETTER

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Yours sincerely,

Andrew Walton, P.E.

ASCE Illinois Section President  
2021-2022

# Do We Need a Geotech?

Written by Andrés Matos

**A**s a Geotech myself, I would say “Definitely YES!” but in some instances the need for a Geotechnical Engineer comes into question. Sometimes the client doesn’t want to pay for it or other disciplines deem it “unnecessary”. Many factors can steer the decision of hiring a Geotech or not. To decide if we need the “soils people” we need to understand what they do and the results their work yields. After that, we can look at some of the factors that influence the inclusion of the Geotechnical Engineer in the team.

**In general, a Geotechnical Engineer investigates, analyzes, classifies, and reports the composition and mechanical behavior of the materials encountered below grade.**

In general, a Geotechnical Engineer investigates, analyzes, classifies, and reports the composition and mechanical behavior of the materials encountered below grade. Knowledge in the areas of materials, chemistry, geology, water resources, soil and rock mechanics, and other science branches are key for Geotechs to perform their work. Geotechnical Engineers take samples of the soils at a specific location and using their expertise in these disciplines, report the expected behavior of the material under specific conditions and make recommendations for a

successful construction. A Geotech will test and analyze the soils, using a wide variety of tests and resources to delineate the capacity of the soils on site. With that information, they will provide bearing capacities and settlement calculations based on the loading conditions provided by the structural designer.

Owners or developers often decide that they don’t want to pay for a Geotechnical Investigation for their project site. This decision puts the structural designers in a difficult position: they can either assume values for design based on their own research or hire a Geotech from their own budget. Assuming values for the soil parameters may not necessarily be the wrong decision, but it inherently introduces an additional level of risk to the design. The high uncertainty of those assumptions leads to an exponentially higher variability in the final product. Predictions such as settlement (allowable, differential, etc) might or might not be properly addressed, which could adversely affect the performance of the structure. Potentially even more problematic, the impact of the proposed structure on adjacent sites or buildings may not be properly characterized without an investigation.

Based on their knowledge and experience and the site-specific testing results, a Geotechnical Engineer will recommend the most feasible foundation type based on the loads, type of structure and proposed use. By assuming soil

parameter values, you might end up recommending “142ft deep rock socket caissons for a 10ftx10ft chicken coop.” Hiring a Geotech could present an upfront

**Owners or developers often decide that they don’t want to pay for a Geotechnical Investigation for their project site. This decision puts the structural designers in a difficult position: they can either assume values for design based on their own research or hire a Geotech from their own budget.**

financial impact but will likely reduce the risks and provide more accurate information for the design. It could also help to make the design more efficient and provide recommendations for any required remediation of the soil. In some cases, it is possible to include mid-depth solutions that provide the capacities needed by the design team and significant savings to the client.

A common refrain from penny-pinching clients is “...the building right in front was built 20 years ago and the soils were good, we don’t need no Geotech!” or the all-time classic “...I have been building things around here for 30 years and nothing have failed, soils are good!” While adjacent site history (Continued on page 8)

# 50<sup>th</sup> Anniversary of the Clean Water Act of 1972

*Written by Jerome McGovern, P.E.*

This year will mark the 50th anniversary of the Clean Water Act of 1972 which greatly expanded the power of states and the federal government to regulate the pollution of rivers, lakes and other bodies of water. The Act was the culmination of public awareness of the dangers of water pollution that grew out of the environmental movement of the 1960s. This movement was propelled by the publication of the book *Silent Spring* by Rachel Carson in 1962. Carson's book revealed the health dangers of the pesticide DDT. Additional print journalism stories such as those by the Chicago Tribune describing the pollution of Lake Michigan ("Save our Lake", 1967) and Time Magazine's story about the Cuyahoga River in Cleveland catching fire (1969) helped to sway public opinion that water pollution was a

**This year will mark the 50th anniversary of the Clean Water Act of 1972 which greatly expanded the power of states and the federal government to regulate the pollution of rivers, lakes and other bodies of water.**

threat to public health and needed to be addressed. The Santa Barbara oil spill, also in 1969, demonstrated the cost of water pollution on marine



*1969 Santa Barbara Oil Spill, Source: UC Santa Barbara Library, Department of Special Research Collections*

wildlife caused by unregulated offshore drilling for oil.

Previously, people were willing to tolerate pollution for the sake of economic development and jobs. As the middle class expanded in the 1950s and 1960s, people felt more secure economically and public opinion began to turn against businesses and industry who recklessly polluted the environment. Public opinion turned into political action which led to the creation of the United States Environmental Protection Agency in 1970.

In 1972, the United States Congress passed legislation that would greatly strengthen the Clean Water Act of 1948. This legislation was known as the Clean Water Act of 1972 (CWA). The legislation was vetoed by President Richard M. Nixon who objected to the potential costs of the bill. Congress overrode Nixon's veto and the bill became law. The law required every state to issue permits for all point discharges of pollution to a waterway or lake within the United States. This led to the creation of the National (Continued on page 9)



# Illinois Section of ASCE Annual Membership Committee Update

Written by Tom Borges, P.E.

While the world continues to deal with emerging COVID-19 variants as we approach the third year of the global coronavirus pandemic, it really feels like we are finally turning a corner and can soon return safely to in-person networking and socializing events – a big reason a lot of our members have joined ASCE in the first place. In 2021, we got very close to returning to an in-person Annual Awards Dinner format. Once again, however, the tough decision to move to a virtual, pre-recorded format had to be made at the last minute much to the frustration and disappointment of those who worked hard all year to plan the would-be event. Luckily, just prior to this cancellation, the Section was able to host its sole in-person event of 2021 in the form of an outdoor picnic in early August. The Summer Social Picnic was held on August 7th at Busse Woods Forest Preserve in Schaumburg and had around 50 individuals in attendance, which included a mix of current and prospective ASCE members as well as family members of all ages. It was great to finally see one another in person after months and months of communicating primarily through virtual meetings, even if it meant having to endure the mid-summer heat to do so. Attendees enjoyed games and activities such as cornhole and tie dye stations, and two lucky individuals went home with raffle prizes consisting of Cubs tickets

and cash. Cold beverages and a smorgasbord of catered BBQ from Chuck's Southern Comforts kept

**The Member-Get-A-Member program is a great way to help increase our Section's membership and provides current members great incentives for successful referrals**

everyone's minds off the 90-degree heat, with leftover food being donated to the City of Evanston Police Department. It was really great being able to catch up with everyone in person and we hope to finally get more events on the calendar for our membership soon.

The 2022 Membership Committee consists of current Membership Chair Tom Borges (Bloom Companies, LLC), former Membership Chair and current Secretary Matt Huffman (Christopher B. Burke Engineering, Ltd.) and Director Steve Randolph (Horner & Shifrin, Inc.). The committee is always looking to identify new membership-related initiatives including ways to retain existing members and inform them of the various benefits that come with being a valuable part of our Illinois Section. One primary goal, however, remains: to attract new members! One way you, as a reader of this article, can help boost our

membership base is by referring friends and colleagues through the *Member-Get-A-Member* program ([www.asce.org/mgam](http://www.asce.org/mgam)). Simply refer individuals that are not currently ASCE members and receive a \$50 Amazon gift card for every new professional member that joins due to your referral. ASCE will reach out to these members on your behalf to outline the benefits of becoming a member and offer them 50% off their initial membership dues. A \$500 Amazon gift card will also be awarded to the member with the most successful referrals nationwide throughout 2022. Now would be a good time to take a break from reading this article and get referring!

**ASCE has implemented key changes to the Student Member transition process over the past year, including the automatic upgrade to professional membership upon graduation**

Approximately 20% of the Illinois Section membership is made up of student members from over 90 different universities; it is very important that we recognize how valuable they are to our membership and explore ways to not only retain (Continued on page 10)

# PM Interaction Diagram of Reinforced Concrete-Filled Steel Tubes (RCFTs)

(Continued from page 1)

empirical methods and parametric studies exist for development of a simplified P-M interaction diagram, but each vary significantly. The aim of this article is to discuss the two primary solving methodologies of RCFT's and the applicability of each methodology as it relates to either Railroad, Highway, or Building design.

**PM-Interaction Primer:** For any arbitrary section subjected to an axial load ( $P$ ) and uniaxial bending moment ( $M$ ), there are two equilibrium equations ( $\Sigma F=0$  and  $\Sigma M=0$ ). Both equations involve  $c$ , an unknown variable for the location of the neutral axis, that is solved to satisfy both equilibrium equations simultaneously. Thus, the axial load capacity and moment capacity are interdependent, and as such, a direct solution for a general case is not practical. Instead of solving the problem for a specific axial force and moment, the general approach is to compute a discretized range of axial force and moment capacities. When plotted, this is commonly referred to as a P-M Interaction Diagram.

**P-M Interaction of an RCFT:** In the case of an RCFT, the computation of P-M interaction diagram is more complex than standard reinforced columns due to the presence of the outer steel tube. There are two primary methods of computing the P-M Interaction diagram of an RCFT. The first is the Plastic Stress Distribution Method (PSDM). As the name suggests, the method assumes that the entire

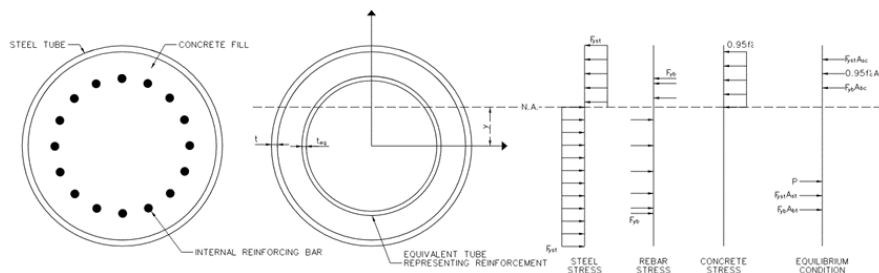


Figure1: PSDM Model for an RCFT

section has yielded into plasticity. A closed-form solution using the PSDM has been derived in AASHTO 9<sup>th</sup> Ed. C6.12.2.3.3 for an RCFT with a singular row of internal reinforcement. This derivation is closed form for an assumed axial load and will result in a single neutral axis for each assumption of  $P$ , or vice versa. To achieve the full P-M Interaction diagram requires solving the problem at various assumed neutral axis locations (or axial load) and then connecting the dots to achieve the P-M interaction shape.

The second method is known as the Strain Compatibility Method (SCM) (Fig. 2). This method is more in line with how ACI suggests computing ordinary RC strengths. But, unlike the PSDM there appears to be limited to zero

literature demonstrating the strength of an RCFT subjected to combined axial and bending using

**The SCM method yields more conservative results compared to the PSDM method.**

the SCM method. The SCM is fundamentally different than the PSDM in that the assumed strain in the furthest reinforcement fiber is assumed rather than assuming the neutral axis location. Once the strain distribution is known, the neutral axis location can be easily computed. In case of an RCFT, the steel tube can be idealized as an array of discrete "reinforcement" segments and henceforth, (Continued on page 7)

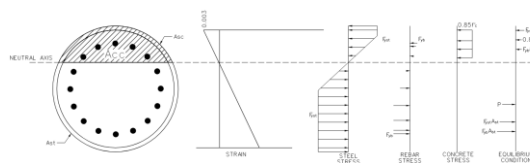


Figure 2: SCM Model for an RCFT

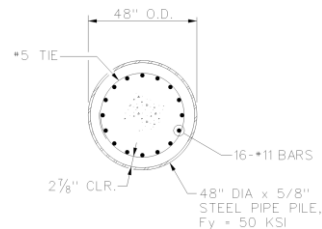


Figure 3: Case Study RCFT

# PM Interaction Diagram of Reinforced Concrete-Filled Steel Tubes (RCFTs)

(Continued from page 6)

computing axial and flexural strengths ensues by application of standard RC design theory where the ultimate compressive strain in the concrete is typically limited to 0.003 (standard RC design assumptions apply such as linear strain distribution and perfect bonding of concrete and steel). For an RCFT, the ultimate compressive strain of 0.003 might be conservative due to the triaxial stress state of the confined concrete. Additionally, various research has been conducted to provide a numerical approximation of a modified ultimate compressive strain for confined concrete, but in reviewing the literature, these methods have not found their way into the common U.S. codes of practice. Instead, the common approach uses a modified phi factor for confined concrete. However, modifying the phi factor whilst not modifying the assumed linear strain distribution within the SCM is not intuitive, and produces conservative approximations of the RCFT strength.

**PSDM vs SCM Comparison:** For comparison, assume an RCFT section with concrete, reinforcement, and tube strengths equal to 5ksi, 60ksi, and 50ksi, respectively. The geometry is shown in Figure 3.

A comparison of the results for the two methodologies is presented in Figure 4. The PSDM follows the applicable code provisions of AASHTO 9<sup>th</sup> Ed. C6.12.2.3.3, whereas the SCM method follows the applicable code provisions of

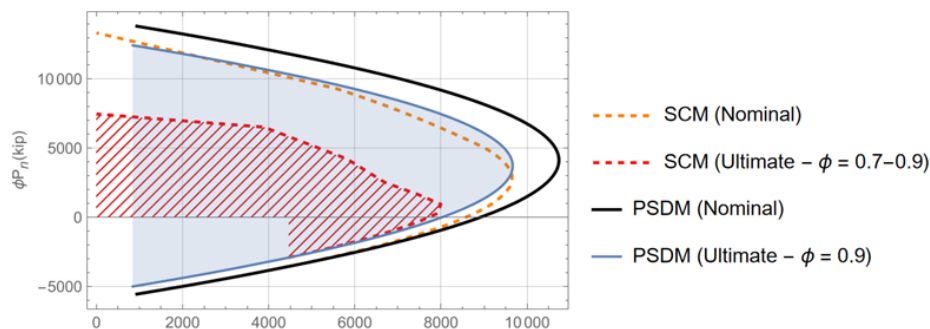


Figure 4: PSDM vs SCM Comparison

AREMA 2019 Ch. 8 Art. 2.32.5. The equivalent rectangular stress block for concrete compression followed the guidance of AREMA 2019 Ch. 8 Art. 2.31.1f. A notable takeaway is that the SCM method using AREMA guidance yields considerably lower strength estimates compared to the PSDM method using AASHTO provisions. When comparing SCM vs PSDM in Figure 4, the ultimate strengths are not a useful comparison because the phi factor is not consistent between methodologies. The nominal strengths offer a better comparison because both use a phi factor of one (1.0). However, the equivalent stress block of concrete is slightly different ( $0.85f'_c$  vs  $0.95f'_c$ ). The difference in results is not related to ASD/LFD vs LRFD methodology. Rather, it's

mostly related to the plastic vs elastic assumed material behavior.

**Applicability Discussion:** Highway bridge design using AASHTO provisions and building design using AISC provisions tend to be a bit more design-aggressive compared to railroad bridge design using AREMA guidance. In highway and buildings, design provisions consider the plastic range for ultimate design whereas in railway, most design is still limited to serviceability and stays within the elastic range. A summary of criteria that determines which methodology to use in developing the interaction diagram for common USA codes is summarized in Table 1.

(Continued on page 8)

Table 1: Design Methodology Chart for RCFT

METHODOLOGY	AASHTO 9 <sup>th</sup> Ed.	AISC 15 <sup>th</sup> Ed. (see note 1)	AREMA 2019
PSDM	$\frac{D}{t} < 2.0 \sqrt{\frac{E}{F_y}}$	$\frac{D}{t} < \frac{0.15 E}{F_y}$	--
SCM	$2.0 \sqrt{\frac{E}{F_y}} < \frac{D}{t} \leq 8.8 \sqrt{\frac{E}{F_y}}$	$\frac{0.15 E}{F_y} < \frac{D}{t} \leq \frac{0.31 E}{F_y}$ (see note 2)	ALWAYS

# PM Interaction Diagram of Reinforced Concrete-Filled Steel Tubes (RCFTs)

(Continued from 7)

Noting the limitations for both AASHTO and AISC, it may be incumbent upon designers using AREMA to limit the D/t ratios to conform with the ranges of applicability in the table.

**Concluding remarks:** PSDM and SCM are two numerical methods that require iterating over several neutral axis assumptions, or reinforcement strain assumptions, respectively, to compute the full P-M Interaction diagram. Both PSDM and SCM methods are valid approximations to solving combined axial + bending analysis, but the results can vary significantly depending upon the applicable code provision. Designers should pay attention to several key elements. First, it's important to verify the local buckling classification

(compact, noncompact, slender) which will ultimately drive the design methodology. Note that buckling due to pile driving may govern the tube thickness. Second, if relying upon composite behavior, be cognizant of the tube diameter and concrete admixtures (several industry guidance documents discuss composite behavior and is too broad to cover in this article). Low shrinkage admixtures are preferable to ensure contact stress friction at the concrete-to-tube interface is maintained, but this is generally only a concern for tubes over 24" O.D. Third, the P-M interaction diagrams described above do not account for buckling, secondary moments or P- $\delta$  effects. Designers need to account for these effects, particularly for tall columns/piles. Although it's possible to modify

the Ultimate P-M Interaction diagram to account for these effects, it might be simpler to account for the effects within the load demands using approaches such as moment magnification outlined in ACI.

***Disclaimer:** The contents of this article are provided for discussion purposes only. This article does not constitute a standard, specification, or regulation of any kind.*

**Author Bios:** Mark Converse, P.E. is a Railroad Bridge Engineer at Benesch in Chicago and currently serves as Secretary for the Structural Engineering Institute, Illinois Section. Duncan Paterson, Ph.D., P.E. is Technical Manager II at Benesch in Chicago and has 20 years of advanced structural design and research experience.

## Do We Need a Geotech?

(Continued from 3)

is an important factor in geotechnical design, no site is identical to the next one. A pocket of organic material, a layer of soft clay, buried structures or tanks, abandoned pipelines, archeological relics or any other kind of surprise could be hiding just beneath the ground surface. All project stakeholders benefit from discovering these obstacles prior to construction, rather than risking a significant work stoppage (or worse yet, a failure) down the line. Subsurface investigations cannot physically sample all the soil beneath a site, but a

proper investigation can provide enough information to minimize the risk of surprises during

**The Geotechnical Engineer, beyond bringing mud and dirt stuck in their boots to the meeting, will bring an expert perspective to give the project team confidence that their structure will be properly supported.**

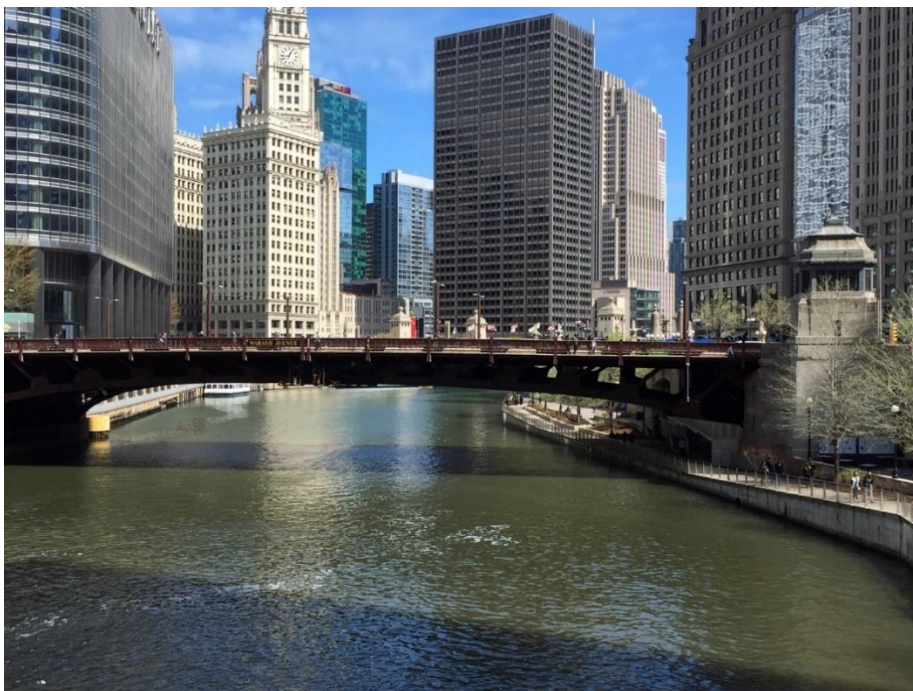
construction or operation of the structure.

There are cases where the City or State codes require a Geotechnical Investigation. This makes the decision of hiring a Geotechnical Engineer much easier. But regardless of code requirements, all site developers benefit from a Geotechnical Investigation prior to final building design or construction. The Geotechnical Investigation might sometimes seem "expensive and unnecessary", especially when the (Continued on page 12)



# 50<sup>th</sup> Anniversary of the Clean Water Act of 1972

(Continued from page 4)



*Chicago River at Adams and Wabash*

Pollution Discharge Elimination System (NPDES) Permit. The law

**As the middle class expanded in the 1950s and 1960s, people felt more secure economically and public opinion began to turn against businesses and industry who recklessly polluted the environment.**

also provided grant funding to states for the construction and expansion of wastewater treatment plants and sanitary sewer systems. The federal government would provide 75% of the cost of design and construction with the state or local agency picking up the remaining 25%. The CWA had ambitious goals. Every municipal

wastewater treatment facility would have secondary treatment by 1977. That goal was not achieved until 1996. All Waters of the United States would be fishable and swimmable by 1983. This goal has not yet been achieved.

For those who work in underground construction where differing site conditions and unforeseen utility conflicts can and do occur, Nixon's concerns were proven correct. Cost overruns eventually led to the elimination of the grant program and the creation of State Revolving Loan Funds in 1987. According to an economic study of the CWA (a link is provided at the end of this article) the cost of improvements to wastewater facilities under the CWA was \$650 billion in 2014 dollars.

Today the rivers and lakes of the United States are much cleaner than they were in 1972. Wetlands are viewed as a positive for biological diversity instead of a nuisance to be filled in. Still, unresolved issues remain. The definition of Wa-

**Today the rivers and lakes of the United States are much cleaner than they were in 1972. Wetlands are viewed as a positive for biological diversity instead of a nuisance to be filled in.**

ters of the United States remains unsettled 50 years later as legal arguments go back and forth over ephemeral streams and other issues. Non-point pollution such as agricultural runoff into waterways remains a problem. The creation of a continuous and reliable source of funding to maintain and improve the existing water/wastewater infrastructure remains an issue. Hopefully the next 50 years will see continued progress and the resolution of these issues.

*Link to The Quarterly Journal of Economics, February 2019 article; Consequences of the Clean Water Act and the Demand for Water Quality.*

<https://academic.oup.com/qje/article/134/1/349/5092609>

**Author Bio:** Jerome McGovern, P.E. is a retired Principal Civil Engineer for the Metropolitan Water Reclamation District of Greater Chicago (MWRD).

# Illinois Section of ASCE Annual Membership Committee Update

(Continued from page 5)

them as members as they begin their professional careers but also to help them get the most out of their membership. Previously, our committee had established a *Student Member Initiative* with the goal of improving their transition to professional membership and informing them of the countless benefits and ways they can get involved. Last year, ASCE's Board of Direction implemented several changes to the student transition process nationwide that addressed many of the flaws and complications we had identified at the local level. Beginning in August 2021, all student members will be automatically upgraded to affiliate, associate or member grade one month before their graduation date. Furthermore, the first full year of membership is free and society dues are now discounted at 50% off for all members under the age of 28 regardless of membership grade, a great improvement on the graduated scale that was previously used. As a young professional, hefty membership dues can seem intimidating if employers do not offer reimbursement; the automated transition combined with discounted dues will help lessen the financial burden as they embark on this intimidating new chapter of their lives. Students will receive an email from ASCE 90

days prior to graduation to inform them of the auto-upgrade process, request updated contact and graduation information, and provide them with an opportunity to opt out of their professional membership.

**If you have not already renewed your membership, please note that the ASCE membership renewal grace period lasts through March 31st.**

Please remember to keep your ASCE account up-to-date with your latest employment and contact information by logging into your [online ASCE account](#) and navigating to the *Manage My Account* page. It is also very important to remember to pay the Illinois Section dues (\$30) when renewing your 2022 membership, as these dues account for a majority of our Section income which we rely on to fund outstanding programs and events such as the Illinois Infrastructure Report Card, Annual Awards Dinner, Legislative Lobby Days in Springfield and Washington DC, and various community service and student outreach activities. If you have not already renewed your membership, please note that the ASCE

membership renewal grace period lasts through March 31st, at which point your membership will be dropped and you will no longer receive benefits such as *Civil Engineering Magazine*, on-demand continuing education webinars and the quarterly Illinois Section eNewsletter.

The state of membership within the Illinois Section of ASCE begins 2022 with 2,626 active members. The makeup of our Section consists of 1,332 Members (51%), 604 Associate Members (23%), 536 Student Members (20%), 92 Affiliate Members (4%), 59 Fellows (2%) and 3 Distinguished Members. The Illinois Section also has 508 Life Members (19%) who have made a lifetime commitment to ASCE and the profession by maintaining membership over the length of their career.

Please contact Tom Borges, the Illinois Section Membership Committee Chair, with any membership-related questions at [tborges@bloomcos.com](mailto:tborges@bloomcos.com).

**Author Bio:** Tom Borges, P.E. is the Illinois Highways and Roads Design Manager at Bloom Companies, LLC.

# Utility Engineering & Surveying Institute (UESI) in Illinois

*Written by Steve Rienks, P.E., PMP & Andrew Walton, P.E.*

Are you involved in utility engineering or surveying? Are you interested in getting more involved with ASCE to grow your network of industry professionals and advance your technical, business, and professional expertise? Well then, your timing is spot on, because the Illinois Section of ASCE (IS-ASCE) is looking to develop a Utility Engineering and Surveying Institute (UESI) chapter locally, and we would like to invite you to be a part of it!

Discipline-specific institutes, such as the UESI, bring together volunteers from around the world to advance the profession. Knowledge, experience, and best practices are shared through conferences, workshops, peer-reviewed journals, books, manuals of practice, seminars, webinars, and consensus standards.<sup>1</sup> The IS-ASCE currently represents five (5) of the nine (9) technical institutes along with an active Younger Member Group (YMG) and the Urban Planning & Development Group (UP&D). But the utility engineering and surveying disciplines are not represented here locally – we think they should be. The UESI offers professionals working within the utility, pipeline engineering, and surveying/geomatics communities the opportunity to network with others and shape the future of the industry by participating in technical activities, conferences, and the development

of internationally recognized standards.<sup>2</sup>

## Vision

The Utility Engineering & Surveying Institute (UESI) is the worldwide leader in generating products and services that promote and reward excellence in the engineering, planning, design, construction, operations, and asset management, for utility infrastructure and engineering surveying.<sup>3</sup>

## Mission

Deliver value to our members, and advance utility engineering and surveying professionals.<sup>3</sup>

## What is Utility Engineering?

Utility Engineering is a branch of Civil Engineering that focuses on the planning, position, design, construction, operation, maintenance, and asset management of any and all utility systems, as well as the interaction between utility infrastructure and other civil infrastructure.

## What is Engineering Surveying?

Engineering Surveying may be regarded as a specialty within the broader professional practice of engineering. Per ASCE Policy Statement 333, Engineering surveying is defined as “those activities involved in the planning and execution of surveys for the planning, design, construction, operation, and maintenance of civil and other engineered projects.

Engineering surveying excludes the surveying of real property, for the establishment of land boundaries, rights of way, easements, and the dependent or independent surveys or resurveys of the public land survey system”.<sup>4</sup>

## Divisions

**Pipeline** - Advance pipeline engineering, relative to transmission of liquids gases or solids by pipelines

**Utility Risk Management** - Provide leadership related to utility investigations, coordination, design, and data management and security.

**Surveying and Geomatics** - Provide leadership for the acquisition and management of spatial data, encourage the advancement of geomatics and professional development.

**Asset Management** - Advance and disseminate knowledge related to the holistic life-cycle asset management of utility infrastructure.

## Goals

- Provide a national and international forum for exchange of technical and professional ideas.
- Identify and disseminate developing technologies and research.
- Develop and promote asset management best practices.
- Enhance collaboration with ASCE’s technical, professional, and educational groups.

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# Utility Engineering & Surveying Institute (UESI) in Illinois

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- Develop partnerships with national and international organizations that are similar in nature to the Institute.
- Identify, reduce, and manage uncertainty in surveying and utility infrastructure.
- Assist in the development of associated public policy.

For more information on the Utility Engineering & Surveying Institute (UESI), please visit the following ASCE webpage: <https://www.asce.org/communities/institutes-and-technical-groups/utility-engineering-and-surveying-institute>. If you are interested in getting involved at the creation level of the Illinois

Section chapter of UESI, please reach out to Mr. Steve Rienks ([s.rienks@americansurvey.com](mailto:s.rienks@americansurvey.com)) or Mr. Andrew Walton ([awalton@orionengineersllc.com](mailto:awalton@orionengineersllc.com)) and we'll loop you in.

## Footnote References:

1. <https://www.asce.org/communities/institutes-and-technical-groups>
2. <https://www.asce.org/communities/institutes-and-technical-groups/utility-engineering-and-surveying-institute/about>
3. <https://www.asce.org/-/media/asce-images-and-files/communities/institutes-and-technical-groups/utility-engineering-and-surveying/documents/uesi-strategic-plan-28-april-2020.pdf>

4. <https://www.asce.org/advocacy/policy-statements/ps333--engineering-surveying-definition>

## Author Bios:

**Steve Rienks, P.E., PMP**, is the Director of Engineering at American Surveying & Engineering, P.C., and serves as a member-at-large of the Illinois Section's Transportation & Development Institute (T&DI).

**Andrew Walton, P.E.**, is the Vice President of Transportation at Orion Engineers, PLLC, and serves as 2021-2022 President of the Illinois Section of ASCE (IS-ASCE).

# Do We Need a Geotech?

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soil profile turns out to be good or very similar to adjacent sites. On the other hand, when the soils are "not good", it is better for all parties involved to understand these conditions prior to construction and preferably, before final design. The Geotechnical Engineer, beyond bringing mud and dirt stuck in their boots to the meeting, will

bring an expert perspective to give the project team confidence that their structure will be properly supported.

In summary, having a Geotechnical Engineer as part of your team will save you headaches, time, money and unpleasant surprises. So, YES, you need a Geotech!

**Author Bio:** Andrés Matos is the Junior Engineer at Flood Testing Laboratories (FTL) in Chicago, IL. He currently serves as the Co-Chair of the IS-ASCE Geo Institute.



**Spring 2022**

To inform Illinois Section members of the discussions at monthly Board meetings, the Section Secretary contributes this article to the newsletter covering January 2022 and February 2022. Due to COVID-19 all Illinois Section Board meetings have been held via MS Teams. Any questions or comments on the Board activities are welcome by contacting Matt Huffman at [mhuffman@cbbel.com](mailto:mhuffman@cbbel.com).

**■ Treasurer's Report**

▲ A treasurer's report was presented and approved at the January 2022 and February 2022 meetings. The December 2021 and January 2022 Board Meeting minutes were approved.

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

▲ **2022 Illinois ASCE Infrastructure Report Card Update** – The IS Report Card Committee has been actively making progress and a draft 2022 Illinois Infrastructure Report Card has been completed. Comments from ASCE HQ were received and final edits are being made. The targeted report card release is being planned for late April 2022. Morreale Communications will be assisting the IS with public relations support for the report card release. More information will be provided to IS Membership about the release of the report card when available.

▲ **Government Relations (GR) University** - The IS planning on

hosting the GR University as a lead item to the Illinois Infrastructure Report Card Release on April 8, 2022. More information will be provided to IS Membership about location and time once a venue has been confirmed. The event is planned to be in-person.

▲ **ACEC / ASCE / ITE / WTS Charity Challenge: Professional Clothing Drive** – Approximately 1,000 items were donated, with ASCE contributing over 350 items. ASCE won the award for most items donated during the clothing drive!

▲ **Utility Engineering & Survey Institute** – The ASCE IS is exploring starting a Utility Engineering & Survey Institute (UESI) and is holding a meeting with UESI Director Swecker in March 2022. If you, or if you know of anyone interested in the UESI, please contact IS President Walton. There are currently 17 active UESI chapters nationwide within ASCE.

▲ **President-Elect / Student Scholarship Dinner** – The President-Elect / Student Scholarship Dinner is planned to be held in-person on April 14, 2022, at Maggiano's downtown Chicago location. More information will be provided to IS Membership once a final date has been confirmed with President-Elect Maria C. Lehman.

▲ **Student Chapter Interaction** – The IIT, Northwestern, and UIC ASCE Student Chapters each made a visit to the January or February IS Board Meeting to provide an update on their recent activities

and future outlook. All three student chapters will be participating in the Western Great Lakes ASCE Student Symposium being held at UIUC April 7<sup>th</sup> – 9<sup>th</sup>, 2022. The concrete canoe and steel bridge competitions are the main events.

▲ **Region 3 Assembly** – The ASCE Regional 3 Assembly will be held in Cleveland, Ohio from June 23-25. The three new directors to 2023 (Irsilia Colletti, Steve Randolph and Tina Revzin) are planned to attend on behalf of the IS.

▲ **2022 ASCE Legislative Fly-In** – The 2022 legislative fly-in was held on March 2<sup>nd</sup> thru March 4<sup>th</sup> in Washington D.C. Multiple Illinois Section members attended both virtually and in-person.

▲ **ACEC-IL / IS-ASCE Legislative Lobby Day** – ACEC-IL organized a legislative lobby day on February 23, 2022 in Springfield. The IS-ASCE participated in the event.

▲ **Construction Institute (CI)** – The CI held their Board meeting on January 13<sup>th</sup> and February 10<sup>th</sup>. An April luncheon is being planned for CMAR Concept at O'Hare. For more information or if interested in joining this institute, please contact CI Chair Muhammad Ali at [Muhammad.Ali@exp.com](mailto:Muhammad.Ali@exp.com).

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# Secretary Report

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▲ **Environmental & Water Resources Institute (EWRI)** – The EWRI held their Board meetings on January 11<sup>th</sup>, February 8<sup>th</sup>, and March 8<sup>th</sup>. EWRI is helping plan a celebration for the 50<sup>th</sup> anniversary of the Clean Water Act. Please contact EWRI Chair Saki Handa with any questions or for information about EWRI activities at [Saki.handa@optimatics.com](mailto:Saki.handa@optimatics.com).

▲ **Geo-Institute (GI)** – The GI held their Board meeting on January 7<sup>th</sup> and February 3<sup>rd</sup> to plan the 2022 Lecture Series. A Joint Technical Meeting was held with Chicago AEG on January 18<sup>th</sup> *Listening to Singapore: Harvesting Urban Noise for Space, Water, and Hazard* with Yunyue Elita Li from Purdue University. The 2022 Chicago Lecture Series is planned for May 5<sup>th</sup> from 7am – 4pm. Please contact GI Chair Alex Potter-Weight with any questions or for information about GI activities at [apotter-weight@menardgroup-usa.com](mailto:apotter-weight@menardgroup-usa.com).

▲ **Structural Engineering Institute (SEI)** – The SEI held their Board meeting on December 16, January 27<sup>th</sup>, and February 16<sup>th</sup>. A webinar was held on February 22 *Ethics Case Studies with Tara*

*Hoke (ASCE Legal Counsel)*. A NHI Bridge Inspection Refresher Course (3-Day) will be held June 7 – 9, 2022. Please contact SEI Chair Patrick Laux with any questions or for information about SEI activities at [Patrick.Laux@wsp.com](mailto:Patrick.Laux@wsp.com).

▲ **Transportation & Development Institute (T&DI)** – The T&DI held their Board meetings on January 12<sup>th</sup> and February 9<sup>th</sup>. An in-person luncheon was held on February 24<sup>th</sup> featuring Carl Schoedel, Director of Transportation for Kane County Division of Transportation. On March 17<sup>th</sup> a luncheon will be held with Secretary Omer Osman with IDOT at Maggiano's in Oak Brook. Please contact T&DI Chair Brian Castro with any questions or for more information at [brian.castro@mbakerintl.com](mailto:brian.castro@mbakerintl.com).

▲ **Urban Planning & Development Group (UP&D)** – A UP&D Board meeting was held on February 17<sup>th</sup>, 2021. Please contact UP&D Chair Saad Khatri with any questions or for more information at [skhatri@gsg-consultants.com](mailto:skhatri@gsg-consultants.com).

▲ **Younger Member Group (YMG)** – The YMG held Board

meetings on January 5<sup>th</sup>, February 2<sup>nd</sup> and March 2<sup>nd</sup>. An in-person board meeting is scheduled for April 6<sup>th</sup>. The YMG is planning on holding a virtual PE Review Course later in 2022. A Professional Skills Series: PM Session 2 was held on November 10<sup>th</sup>. A virtual dinner webinar was held on November 17<sup>th</sup> *Preparing for Connected and Automated Vehicles*. YMG hosted a virtual Holiday Party on December 16<sup>th</sup>. For more information about YMG activities or if interested in joining this group, please contact YMG Chair Kyle Sant at [ksant@sam-schwartz.com](mailto:ksant@sam-schwartz.com).

The Illinois Section Board Meetings are held the first Monday of the month, except for holidays. The next board meeting is scheduled for March 7, 2022, and will be held via MS Teams. If you are interested in attending these meetings, please contact President Andrew Walton at [awalton@orionengineersllc.com](mailto:awalton@orionengineersllc.com).

By Matt Huffman, P.E.  
ASCE Illinois Section Secretary  
2020-2022  
[mhuffman@cbbel.com](mailto:mhuffman@cbbel.com)

## Illinois Section

## Activities

### IL Section University Scholarships Applications Due

**Date:** Monday, March 14

**Information:**

<https://www.isasce.org/scholarships/>

[Scholarship Application](#)

### IL Section ASCE T&DI March Luncheon Event

**Date:** Thursday, March 17

**Speaker:** Omer Osman, Secretary IDOT

**Time:** 11:30am-1:15pm

**PDH:** 1 PDH will be awarded for attending this webinar.

**RSVP:** [IS-ASCE T&DI March 2022 Luncheon - Omer Osman \(constantcontact.com\)](#)

**by March 14.**

**Contact:** Michal Miczek, IS-ASCE T&DI Vice Chair for Programs, 773-380-7907

### IL Section ASCE YMG Trivia Night

**Date:** Tuesday, March 29

**Time:** 7:00 pm

**Place:** Jefferson Tap & Grill  
325 N. Jefferson St.  
Chicago, IL 60661

**RSVP:** Jake Nardulli ([jnardulli@hwlochner.com](mailto:jnardulli@hwlochner.com))

### IL Section ASCE YMG Virtual Webinar

**Topic:** Application of Computational Fluid Dynamics to Improve Mixing and Disinfection for Ozone Contactors

**Instructors:** Srikanth Pathapati, Ph.D., M.ASCE and Carrie L. Knatz, P.E., M.ASCE

**Date:** Wednesday, March 30

**Place:** Virtual

**Time:** 12:00pm – 1:00pm

**PDH:** 1.0

**RSVP:** Rami Hanna [Virtual\\_Technology.YMG@isasce.org](mailto:Virtual_Technology.YMG@isasce.org)

### IL Section ASCE Government Relations (GR) University (SAVE THE DATE)

**Date:** Friday, April 8

### IL Section ASCE President-Elect / Student Scholarship Dinner (SAVE THE DATE)

**Date:** Thursday, April 14

**Place:** Maggiano's  
516 N Clark St.  
Chicago, IL 60654

### IL Section ASCE Report Card Launch (SAVE THE DATE)

**Date:** Thursday, April 28

**Place:** Chicago Union Station