



eNewsletter

National Capital Section
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FHWA's Turner-Fairbank Highway Research Center and Emerging Transportation Technologies

Presented by Michael F. Trentacoste, Associate Administrator, Federal Highway Administration (FHWA) Office of Research, Development, and Technology

A century ago, research and technology played a primary role in the conversion of unpaved to paved roads using asphalt and concrete pavement materials, an innovation that led to greater and safer mobility on our Nation's highways.

We see the value of research in the development of large and small innovations in materials, designs, policies, operations, and safety of the highway system. Deployment of those innovations enables the highway system to move people and freight more efficiently and safely while also contributing to the economic success of the United States. Today, as in the past, researchers and inventors continue to develop innovations and solutions to transportation challenges.

The FHWA Turner-Fairbank Highway Research Center (TFHRC) plays a key role in leading the national transportation research needed to meet the challenges now and in the future. Please join the American Society of Civil Engineers-National Capital Section (ASCE-NCS) on **Tuesday, February 16**, as Michael Trentacoste, Associate Administrator,



Source: FHWA
The RABIT™ bridge deck assessment tool.

FHWA Office of Research, Development, and Technology, discusses FHWA's TFHRC and emerging transportation technologies.

The TFHRC is a federally owned and operated national research facility in McLean, Virginia that engages in long-term planning of highway research and collaborates with other national laboratories, governmental agencies at all levels, and with the private sector, to provide the world highway community with research and development related to new and existing highway technologies. Housing more than 20 laboratories, data centers, and support facilities, the center conducts applied and exploratory advanced research in such vital areas as vehicle-highway interaction, nano-technology, safety, pavements, highway bridges and structures, human-centered systems, operations and intelligent transportation systems, and materials.

Research conducted at FHWA's TFHRC is improving our roads and bridges, saving lives, reducing congestion, and advancing economic growth. From

Join us **Tuesday, February 16, 2016**, at the Hilton Arlington, 950 North Stafford Street, Arlington, VA, on the second floor in the Gallery Ballrooms. Parking is available at the hotel (\$10), at the Ballston Mall garage (\$1 after 6 pm), and on the street (free after 6 pm). The Hilton is on the same block as the Ballston Station on Metro's Orange and Silver Lines. Registration and networking will be from 6-6:45 pm, followed by dinner. The program will end by 8:30 pm. The cost is \$45 for those preregistering, \$10 for students, and \$55 for walk-ins, as space allows. One Professional Development Hour is available to attendees. For questions, please contact [D. Scott Wolf](#). Please click [HERE](#) to register by **February 11**.

Note that no-shows will be charged the full registration fee. We welcome walk-ins, including any registrations made after the guaranteed number of guests is provided to the hotel. However, the cost for walk-ins is higher because the Section is charged accordingly by the hotel for late registrations.

connected vehicles and vehicle-to-infrastructure communications, road and bridge design, policy decisions requiring quality transportation data, human factors studies, environmentally sustainable roads, and robotic infrastructure assessment tools, this is a time of boundless opportunity. Our imagined highways of the future are quickly becoming a reality.

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Source: FHWA
Aerial view of FHWA's TFHRC.

President's Corner

The 100th year of the NCS is off to a great start! January was a busy month for NCS members participating in the various meetings of the Construction, Geotechnical, History and Heritage, and Transportation Committees, our monthly dinner meeting focusing on the Anacostia River restoration efforts, and networking through the Younger Members Forum happy hour event.



On January 14, ASCE released the inaugural [Report Card for DC's Infrastructure](#) at a news conference on the site of DC Water's First Street Tunnel Project. While the report card is not one we would want our kids to bring home, DC's overall C- grade point average is slightly above the national D+ average reported in the [2013 Report Card for America's Infrastructure](#). Having an assessment of our infrastructure is the first step toward improvement and NCS members' current involvement in several projects will help improve many of the grades in the years to come. I extend thanks and appreciation to Ranjit Sahai and Chris Manalo, who championed the Report Card Committee, as well as to the dozens of volunteers who worked diligently over the past year to

make this inaugural *Report Card for DC's Infrastructure* a reality.

February is shaping up to be just as eventful. Several NCS leaders will be attending the 2016 Multi-Region Leadership Conference for Regions 1, 2, 4 and 5 in Pittsburgh, Pennsylvania, on

February 12-13. This month's dinner meeting on February 16 will feature a presentation on the history of the Federal Highway Administration's Turner-Fairbank Highway Research Center and emerging transportation technologies. National [Discover Engineers Week](#) is February 21-27 and is full of activities to both celebrate the engineering profession and to inspire the next generation of engineers. The events section of the newsletter lists the events welcoming your involvement, from luncheons and banquets, to [Discover E's Global Day of the Engineer](#), [Girl Day](#), and [Family Day](#).

Next month, we will recognize outstanding civil engineering students from local universities as well as the contributions of NCS members at our Annual Awards Banquet. The excitement continues, as students from fourteen schools will descend upon George Washington University for

Virginia's Regional Student ASCE Competitions for Steel Bridge and Concrete Canoe. Please plan to attend these events and show your support of talented engineering students.

Lastly, our Centennial Committee remains hard at work planning Centennial themed meetings, tours, events, and celebrations for our members to enjoy in the year ahead. Our Centennial Commemorative Book highlighting over a century of local civil engineering accomplishments is getting its final additions, and planning for our Centennial Conference on June 3 is in high gear. More information on upcoming events and opportunities for you to participate is available in the Centennial Committee section of the newsletter and on our [website](#).

Again, it is an exciting time to be a civil engineer and a member of the NCS. I look forward to seeing you at upcoming events and your engagement in making this a great and successful year.

D. Scott Wolf, PE, PLS, F.NSPE
ASCE-NCS President (2015-2016)

FHWA's Turner-Fairbank Highway Research Center and Emerging Transportation Technologies

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About the Speaker: Michael F. Trentacoste has been the Associate Administrator for the FHWA Office of Research, Development & Technology, since January 2009. He leads and directs a comprehensive national research,



Source: FHWA

development, and technology program designed to meet the needs and goals of the highway community and the nation's highway transportation system. He also serves as the Director of the FHWA's TFHRC, and is responsible

for \$70 million of new infrastructure, operations and safety research and development annually. Michael Trentacoste is a civil engineering graduate of Manhattan College and received a Master of Science in Transportation from Northwestern University. He is a registered Civil Engineer in New York. ■

Newsletter

Rachel Schneider, Editor

March 2016 Issue Deadline: February 15, 2016

To Submit Articles: newsletter@asce-ncs.org

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Please refer to the [NCS website](#) for a current list of NCS committees and chairs.

An Interview with Deborah J. Goodings, PhD, P.Eng., F.ASCE, Diplomate Geotechnical: Centennial Engineer of the Month

Editor's Note: Beginning October 2015, the NCS began publishing interviews of prominent members of our Section, asking them to reflect on their career and profession. The NCS Centennial Committee, including Dr. Phillip Melville, PE, PhD, F.ASCE, and Ms. Lucy Menon, PE, M.ASCE, of the Dream Big Subcommittee, have organized the interviews. We hope you enjoy reading these interviews and gain insight from these leaders in civil engineering.

Our Centennial Engineer of the Month for February 2016 is Dr. Goodings, Director, Division of Civil, Mechanical & Manufacturing Innovation, Directorate for Engineering, National Science Foundation. While serving at the National Science Foundation, she is on leave from George Mason University, where she is a professor of geotechnical engineering. Dr. Goodings joined the Department of Civil, Environmental, and Infrastructure Engineering in the Volgenau School at George Mason University in 2009 as the Dewberry Professor and Department Chairman. Her prior appointment was as Professor of Geotechnical Engineering in the Department of Civil and Environmental Engineering at the University of Maryland (UMD). In addition to her teaching and research accomplishments, Dr. Goodings launched and co-directed, with the School of Public Policy, the Master of Engineering and Public Policy program; and initiated and led the award-winning UMD student chapter of Engineers Without Borders-USA.

Dr. Goodings earned her Bachelor's degree in Civil Engineering at the

University of Toronto and her Ph.D. in Geotechnical Engineering at Cambridge University. She is a Professional Engineer (P.Eng.) licenses in the Province of Ontario. She has published more than 60 technical papers. She is a registered professional engineer in Ontario; and a By-Fellow of Churchill College, Cambridge University. Awards include the Transportation Research Board's Fred Burggraf Award; the Outstanding Civilian Service Medal from the Department of the Army; and the Distinguished Service Award from the U.S. Universities Council on Geotechnical Engineering Research, following her service as its President. The ASCE-NCS is proud to present such a distinguished member of our engineering community and NCS member designated as our Centennial Engineer of the Month.

What experience(s) have you found most memorable and/or rewarding in your career?

I have invested in the development of the civil engineering profession by teaching over 2,000 engineering students studying for their BS, their



MS, their PhD at UMD and later at George Mason University, in addition to students studying for their Master of Engineering and Public Policy at UMD. I was also the founding faculty advisor for Engineers Without Borders at UMD, creating an unparalleled opportunity for approximately 200 students and over a dozen local, practicing engineers to become involved firsthand with simple infrastructure engineering projects in Asia, Africa, and South America from 2004 to 2009.

How did you come to decide on studying civil engineering?

My father is a civil (environmental) engineer and I was deeply impressed as a girl by an engineer's critical

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leadership role in designing water treatment systems and bringing them to reality. I wanted to contribute in the same way.

What guidance or recommendations do you have for younger civil engineers or those considering entering the profession?

Do not embrace the expectation that you will work your entire career with one company. Build your experience and your CV with different positions, especially in your first ten years. Network and be ready for change, which is sometimes not of your own making. Learn about and be inspired by the career paths of people you admire who may or may not have started as engineers. Consider taking career directions outside of engineering that may or may not lead you back to engineering. Be global in your outlook in the largest sense: engineering is an amazing profession, and engineering education an excellent and

highly respected beginning for many non-engineering careers, too.

What challenge(s) do you feel are most pressing for civil engineers to address in the future?

Engineering today is not the same as it was 40 years ago, and it will not be the same 40 years from now. Global forces, technology, and IT are reshaping our world and civil engineering practice. If civil engineers at all stages of their careers fail to stay abreast of these changes and incorporate them into engineering practice, we will cede leadership to others: to computer scientists, to mechanical and chemical engineers, to data scientists, to politicians. The

result can be a degraded and reduced role for civil engineering practice, and with that, a failure to attract to, and retain in, our profession the most innovative, forward-looking people. A workforce with breadth of experience and interests outside of engineering is more likely to lead to imaginative approaches to, and opportunities for, civil engineering practice. Recruitment, retention, and advancement of a diverse workforce are key, and we are not accomplish-

“Engineering today is not the same as it was 40 years ago, and it will not be the same 40 years from now. Global forces, technology, and IT are reshaping our world and civil engineering practice.”

ing that. Look around us: it is no coincidence that America’s economic leadership in the world is positively affected by our diverse population; see, for example, <https://hbr.org/2004/09/diversity-as-strategy>. ■

NCS Annual Awards Banquet – March 22, 2016

Jordan Pitt, PE, M.ASCE, NCS Vice President

Join us at the Hilton Arlington on the evening of Tuesday, March 22, for the 2016 NCS Annual Awards Banquet, as we recognize and celebrate local excellence for those who have contributed to the civil engineering profession and our community! For our Centennial year, the NCS will be turning its focus to the one thing that makes our Section

so great: our Members. The Section will recognize Outstanding Graduating Seniors from each of the five local civil engineering universities, and recipients of the NCS Student Scholarship Awards will be announced. Other individuals to be recognized include the Meritorious Service and Community Service Award winners, the President’s

Appreciation Awards, and those members of the NCS who have achieved Life Member or Distinguished Member status during the past year. Help us celebrate the excellence of our students and members by joining us at the Banquet in March! ■

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BUILD ON US

Call for 2016 ASCE-NCS Outstanding Civil Engineering Project of the Year and Sustainability Project of the Year Award Nominations

The NCS is actively seeking nominations for the Outstanding Civil Engineering Project of the Year and the Annual Sustainability Award. This year, the awards will be bestowed at the Section's Centennial Conference to be held on June 3, 2016, at the National Press Club. All NCS members are encouraged to nominate projects for one of the awards.

Outstanding Civil Engineering Project

This award recognizes a civil engineering project within the National Capital region that demonstrates the greatest civil engineering skills and represents the greatest contribution to civil engineering progress. The project must have been substantially completed within the preceding three years. The Awards and Nominations Committee considers the contribution to the well-being of individuals, the resourcefulness in planning, the solution of design problems, the pioneering use of materials and methods, innovations in construction, impact on the physical environment, unusual aspects, and aesthetic values. In 2015,

the NCS awarded the outstanding civil engineering project to Tyson's Corner Center – Office Tower and Residential Center Phase I designed by Cardno Haynes Whaley.

Sustainability Award

The NCS Sustainability Award recognizes private-industry outreach initiatives and projects or public legislation/programs in the metropolitan Washington, DC area. The project shall advance or promote the responsible and sustainable development of infrastructure, the built environment, or the conservation of natural resources. Sustainable development is the challenge of meeting human needs for natural resources, industrial products, energy, food, transportation, shelter, and effective waste management while conserving and protecting environmental quality and the natural resource base essential for future development. This requires a long-term view, cognizant of the triple-bottom line of Environmental, Social, and Economic implications while emphasizing the impact of choices made now

on succeeding generations. In 2015, DC Water's innovative \$400 million biosolids program at the Blue Plains Advanced Wastewater Treatment Plant received the sustainability award.

Projects/initiatives shall be based within the geographical limits of the NCS, i.e., the jurisdictions of Montgomery County, Prince George's County, Loudoun County, Fairfax County, City of Alexandria, Arlington County, or the District of Columbia. Winners receive an award plaque, naming the project and the firms or agencies involved.

Please provide a succinct description of the project or initiative (100 word limit), include the public or private entity responsible for the program (include point of contact information), and describe how the nomination meets the criteria outlined above. Nominations should be submitted by either e-mail or traditional mail to [Chris Manalo](#) and received no later than **April 22, 2016**. The nominating individual must provide his/her name, affiliation, telephone number, and e-mail address. ■



FEBRUARY 21-27, 2016

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2016 Report Card for D.C.'s Infrastructure Reveals C- for Grade

Ranjit S. Sahai, PE, F.ASCE, Chair, DC Infrastructure Report Card Subcommittee, NCS

Washington, D.C. (January 14, 2016):

The unimpeded rays of sunlight penetrating the frigid overnight air at D.C. Water's First Street Tunnel Project had warmed the air enough that ungloved hands would stay comfortable. While some rubbed their hands to keep them warm and all had winter coats on, the gathering of civil engineers at the unveiling of the Report Card for D.C.'s Infrastructure did not seem to care about the cold air. Their conversation was not focused on the weather; it was congratulatory. "My heartiest congratulations to the Section for culminating this vital effort today," Dr. Efimba from Howard University was overheard saying.

Scott Wolf, President ASCE-NCS (2015-16) welcomed the audience and noted, "We are responsible for the design, construction, operation and maintenance of our core infrastructure, such as roads, bridges, water pipes and levees. With that responsibility comes the obligation to periodically assess the overall state of the infrastructure, report on its condition and performance, and advise on steps to improve it."

Ranjit Sahai, Chair of the 2016 Report Card for D.C.'s Infrastructure Committee thanked Chris Manalo, Vice-Chair, and each of the more than one dozen active technical members of the committee for their role in bringing the 15-month long process for the development of the Report Card to conclusion. In sharing the findings of the Report, Ranjit noted



that D.C.'s Infrastructure received a "mediocre" C- grade. Because infrastructure has a direct impact on our lives every day, from the water quality delivered to our homes, to the condition of children's school buildings, and the condition and capacity of the roads and rails we travel, D.C.'s infrastructure is vital to our economy, security, recreation, and safety.

George Hawkins, CEO, and General Manager of DC Water spoke next. He

felt that ASCE's Report Card initiative is independent, fair, and trustworthy. Mr. Hawkins is proud of D.C.'s Drinking Water and Waste Water's C+ grades as those have climbed up from the earlier D- and are better than the national averages. DC Water is committed in its unwavering focus on continuing the climb up the infrastructure grading scale.

For more details on the report card, visit the [Report Card Special Features](#) section of the Section's website at www.asce-ncs.org, or visit www.infrastructurereportcard.org/dc. ■



Several D.C. Infrastructure Report Card Committee section leads attend unveiling. From left: Hari Aamidala (Bridges), Piers Causton (Drinking Water), Chris Manalo (Committee Vice-Chair), Todd Graham (Wastewater), Scott Wolf (NCS President), Kari Kubista (Levees), and Ranjit Sahai (Committee Chair). Other section leads, Carol Bailey (Energy), Veronica Davis (Parks), Sebastian Guerrero (Roads), Ryan Carey (Solid Waste), and Robyn Jackson (Transit) could not attend.

Employment Clearinghouse

The NCS provides the Employment Clearinghouse as a free service to its membership. The Clearinghouse allows members to post short notices for available positions or candidates seeking employment. All employers listed herein are equal opportunity employers. If you have questions, are seeking employment or would like to post a position please contact the [newsletter editor](#) and visit our [jobs page](#).

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NCS Committee News and Updates



Younger Members Forum

Monthly Happy Hours. The NCS Younger Members Forum (YMF) holds monthly happy hours in Arlington, VA or Washington, D.C. Happy hours are typically held the first Wednesday of each month unless a holiday falls during that week. The NCS YMF held their January Happy Hour at The Green Turtle in Arlington, VA on January 6. Approximately 25 members attended the event.



The next monthly happy hour will take place at [Bluejacket Brewery](#) in the Navy Yard at 6pm on Wednesday, February 3rd. On March 2, join the YMF at [Ireland's Four Courts](#), Arlington, VA. Celebrate St. Patty's Day early with the younger members group. Look for an email announcement with more details. Look out for emails with specific locations for future monthly happy hours!

Stay Connected! Check out photos and stay up-to-date with YMF events by visiting the new YMF Facebook page: <http://www.facebook.com/ASCENationalCapitalYMF>. Also, follow us on Twitter (@asce_ncsYMF) at https://twitter.com/asce_ncsYMF.

Get Involved! Are you interested in getting involved with more Younger Members activities? Do you have ideas for social events or volunteering activities? Would you like to be a board member? The NCS Younger Members Group is always looking for new members! Let us know if you are not already on our mailing list!

If you would like to become more active with the YMF or would like more information on our events, please contact the YMF President (ncsymfpresident@gmail.com).

Centennial Committee: Engineering the Nation's Capital And the Celebration Continues

By Victor Crawford, PE, M.ASCE, Chair, NCS Centennial Committee

Last month we kicked off 2016 at our dinner meeting by displaying the Proclamations we received from the Commonwealth of Virginia, the District of Columbia, and the State of Maryland. These Proclamations reflect the recognition our Centennial Celebration brings to the NCS and our civil engineers that have been engineering the Nation's Capital since 1916. During the Dinner, we also honored Centennial Engineer of the Month Lieutenant General (LTG) Thomas P. Bostick, PE M.ASCE. I highly recommend reading about LTG Bostick's experiences as the 53rd U.S. Army Chief of Engineers and Commanding General of the U.S. Corps of Engineers in the January Newsletter.

This month, we are honoring Dr. Deborah Goodings for her many accomplishments, including teaching over 2,000 engineering students pursuing their BS, MS, or PhD at the University of Maryland and at George Mason University. Her interview answers provide excellent insight on why she chose civil engineering and how the next generation should view the profession.

Once the weather warms, we plan to have you on the water as we tour several area bridges. The unique perspective allowed by our tour boat will show the construction of the bridges and the design required as we enjoy a cruise on the Potomac. This will be an excellent educational experience, so bring your future civil engineers with you. We are also continuing to develop our interactive map that will be a useful tool for the public interested in our engineering accomplishments in the Nation's Capital. As mentioned last month, this internet-accessible map will allow the public to obtain descriptions of our engineering achievements along with photos and fun facts. The map also meets a key goal of the Centennial Celebration, i.e., student outreach, since the map provides a way for parents and students to see the benefits obtained from the work of civil

engineers and for their consideration in joining our profession.

This April, we will be at the USA Science and Engineering Festival at the Washington Convention Center. This major Science, Technology, Engineering, and Math event provides us an outstanding opportunity for student outreach. We will have numerous activities and demonstrations to show the benefits and satisfaction obtained from pursuing a degree in civil engineering to the next generation as they tour the many exhibits at the Festival. Therefore, we need your help in highlighting what we do as civil engineers to the thousands of students and their parents attending the Festival so we can ensure our profession continues to grow.

The Centennial Commemorative Book will be a lasting tribute to our Centennial by showing a wide range of engineering accomplishments over the years in the DC area. We are so proud of the Book that we have even obtained a grant from ASCE Headquarters in order to publish additional copies to present to public libraries as part of our Centennial outreach.

Just six months away, our Centennial Conference on June 3, 2016, has reached the stage where a separate write-up has been included in this Newsletter in order to cover all the benefits in attending the event that celebrates our first hundred years.

The NCS represents ASCE in the Capital Area. Therefore, the Centennial Celebration Committee strives to promote our civil engineering profession and honor the civil engineers from our area that have not only played key roles building infrastructure in the Washington, DC area but also around the world. Please join us on the Centennial Committee, where your participation will allow promoting our profession, steering students into civil engineering, and recognizing our members' accomplishments. We have many activities where your assistance will help make the Centennial Celebration a success. So, whether you are a Young Member, a Life Member, or somewhere in between, we need your help. Please join us by contacting the Centennial Committee at vicris51@verizon.net.

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Construction Committee

By Jeff Tan, PE,
PMP, LEED AP, Chair,
NCS Construction
Committee



Professional Development Session.

The Construction Committee held its second education session in Lanham, MD, on January 16, from 2:30 – 3:30 pm. Dr. Ching-Tzone Tien, PE who is currently Division Chief of the Groundwater Discharge Permit Division of the Maryland Department of the Environment (MDE), discussed the topic of Water Reuse – Engineering Principles and Public Policy. Dr. Tien was the principal author of the Maryland Sewerage Facilities Guidelines (1978) and helped to develop guidelines regarding groundwater discharge in Maryland including the MDE Land Treatment Guidelines (2003) and Draft Water Reuse Regulations (2009). Dr. Tien has authored or co-authored 32 research papers, book chapters, conference proceedings, and governmental publications. He was also an instructor at the University of Maryland, College Park.

Construction Committee Meeting.

The NCS Construction Committee held its committee meeting at la Madeleine Country French Café, McLean, VA on Thursday, January 7. Committee members in attendance are pictured below (L-R): Jeff Tan, Gerald Himes, Abdullah Hijazi, and Dennis Quinn.



Members discussed the upcoming committee events and shared the recent construction project experiences. The Construction Committee will meet on March 3, at 5pm at [Cosi](#) in Washington, DC. NCS members interested in participating in the Construction Committee are highly encouraged to attend. Please contact [Jeff Tan](#) if you are interested or would like further information.

Survey. Please take a few minutes and complete this survey to help your Construction Committee plan for 2016: <http://goo.gl/forms/zkt9YrWkzd>. Thank you in advance.

Transportation Committee Focuses on Non-Destructive Inspection Technologies

By Shri Yamijala, PE, M.ASCE & Ranjit S. Sahai, PE, F.ASCE, Chairs, Transportation Committee

University of the District of Columbia (UDC) (January 11, 2016):

A group of approximately 30 people, both young and old, gathered at UDC for the NCS Transportation Committee meeting. A civil engineering student was overheard asking, “How much load should a bridge be designed to carry?” The answer he received from an engineering practitioner helped guide his thoughts away from the “should” to the determination of design loads through planning activities. The intermingling of students, practitioners, and educators while dining over pizza indeed delivered several insights of value to attendees.

Larry Olson of Olson Engineering, widely known for his expertise in nondestructive evaluation (NDE) and performance monitoring of civil infrastructure including dams, bridges, buildings, foundations, pavements, and tunnels presented the topic “Assessing Concrete Decks: [Ground Penetrating Radar] GPR & Impact Echo Scanning.” His skill and experience as a trainer was evident. He kept the audience engaged by pausing to ask questions when he

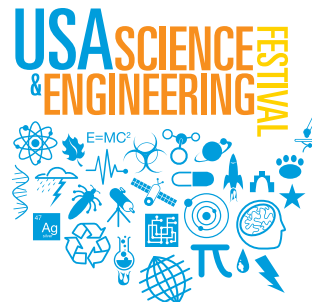


saw attention wavering and adjusted his content delivery. His key message was that a deck evaluation method that is both comprehensive and economical is the use of non-destructive evaluation techniques that can look well below the surface. He showcased GPR and similar NDE techniques, such as Impact Echo Scanning. He noted that when armed with the results of such evaluations, engineers can develop appropriate mitigation strategies more confidently and cost effectively.

The next presentation by the Transportation Committee will be held on March 8. The speaker, Hugh Weaver, PE is an expert on aviation pavement with over 30 years of experience at airports across the country and will be presenting on “Recent Innovations in Airport Pavement Design.” Please look for details about the meeting on the [NCS website](#). ■

Celebrate Science at the 4th USA Science & Engineering Festival, the Largest STEM Education Event of its Kind in the United States!

On Saturday and Sunday, April 16 and 17, the NCS and ASCE World Headquarters will sponsor a booth at the [USA Science & Engineering Festival](#) at the DC Convention Center, Washington, DC. The Convention Center is located at the Mt. Vernon Square/7th Street Convention Center Metro stop on the Yellow Line.



This year, the ASCE booth will be located in the Building Sciences Pavilion and our child friendly activity will be a bridge building with stress testing. Over 350,000 visitors attend the weekend event and volunteers are required throughout the day.

Contact [Dean Westman](#) to volunteer or for additional information. ■

January Meeting Recap – Past, Present, and Future of the Anacostia River

Sara DeGroot, PE, M.ASCE, Chair, NCS Water Resources Committee

At the January Section meeting, the NCS continued its Centennial year theme with a presentation on the past, present, and future of the Anacostia River. The Anacostia River, once pristine, is now degraded, mainly due to the history of agriculture, industrialization, and urbanization throughout the watershed. The main sources of pollution in the river are legacy toxics, raw sewage from the combined sewer system, stormwater runoff, and upstream sources from Montgomery and Prince George's Counties in Maryland. Jeff Seltzer, PE, Associate Director for the Stormwater Management Division at the District Department of Energy & Environment (DOEE) focused his presentation on stormwater runoff. Two-thirds of the District is serviced by a separate storm sewer system. Mr. Seltzer discussed the goals of stormwater improvements in the District, to turn back the clock on



development and retrofit impervious surfaces with green infrastructure.

Next, Mr. Seltzer discussed the Stormwater Retention Credit (SRC) Trading Market as part of DOEE's stormwater improvement incentive programs. Land-disturbing activities must retain the first 1.2-inches of rainfall, the 90th percentile storm, and interior renovation projects must retain the first 0.8-inches of rainfall. Projects can choose to meet up to 50% of these

retention obligations off-site by participating in the SRC Trading Market or paying an in-lieu fee. DOEE certifies practices for up to 3 years' worth of SRCs for eligible retention capacity. Mr. Seltzer discussed how trading maximizes sustainability, provides a creative solution that leverages public funds to maximize cost savings and flexibility for regulated sites, provides powerful tools for tracking and communicating stormwater management efforts, and projects significant progress toward pollutant load reductions. By 2040, approximately 30% of the area covered by the separate storm sewer system is expected to retain the 90th percentile storm, which will result in significant load reductions for all waste load allocations on the Anacostia River. Please visit www.ddoe.dc.gov/src for more information on the SRC Trading Program and www.dcstormwaterplan.org for more information on the Anacostia River TMDL Implementation Plan. ■

ASCE-NCS Centennial Conference: Celebrating Our First Hundred, Preparing for the Next Hundred

Lucy Menon, PE, M.ASCE, Chair, Dream Big Subcommittee, and Education Committee, ASCE-NCS

"Celebrating our Past, Engineering the Future" is the theme of the Centennial Conference. The Conference will feature a keynote speaker and top industry leaders with in-depth knowledge of the major and regional civil engineering projects that have contributed to improve our daily lives. The goal of the Conference is to address topics that matter to you and to inspire and empower the civil engineering community to carry on the tradition of outstanding work that will continue into the next 100 years.

The Conference program will consist of a Students & Engineers Breakfast, Opening Welcome and Keynote, Centennial Luncheon, technical sessions, and exhibits designed to provide a learning and networking environment for students, young professionals, civil engineers, and managers. You can:

- Network with industry movers and shakers.

- Meet experts with years of experience and knowledge in every category of civil engineering.
- Touch base with colleagues, greet old friends, and make new ones.
- Interact with exhibitors to learn about industry technologies and become acquainted with leading edge technologies.

The Conference will open with a high-level keynote address highlighting some of the contributions and achievements by the NCS's civil engineers that have promoted regional economic growth and the civil engineering profession.

The Students & Engineers Breakfast will provide opportunities for students to network with professional engineers, learn about the engineering sub-disciplines, and career opportunities. The technical sessions will feature high profile projects and current and



future projects in transportation, water resources, construction, structures, and sustainability.

ASCE's newly released report card gave an overall C- for DC based on eleven categories that impact on our daily

lives, such as water, transportation, public facilities and energy. The Conference's "Engineering to Raise the Grade" technical session will use thought leaders to engage audience members through their valuable insights and ideas for identifying ways to raise DC's grades. Discussion may include comparing DC's grades with those of other states, lessons learned, and success stories nationwide.

The Centennial Luncheon will be a phenomenal treat, not to be missed. There will be a reception following the technical sessions, and more networking opportunities. Tune in for the latest exciting news on the Centennial Luncheon in the next issue of the NCS Newsletter. ■

A Picture is Worth a Thousand Words: Demystifying the Shear Force and Bending Moment Diagrams

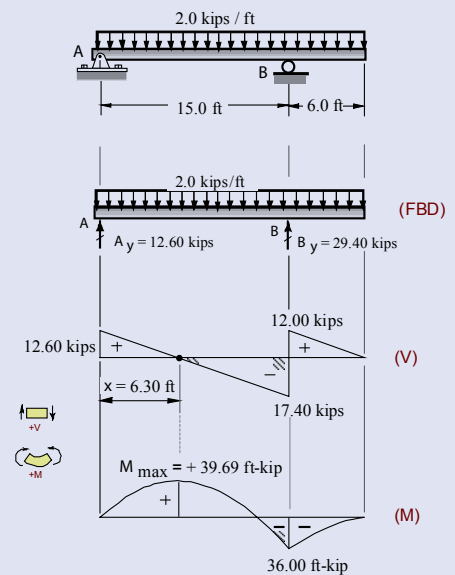
It is no secret that I received all my degrees from Istanbul Technical University (ITU), founded in 1773. ITU is one of the premier engineering schools in Europe, and back in the early 1970s, we had about 150 full-time faculty members and support staff in our Civil Engineering department. For my doctoral research, I was working on a highly mathematical problem on vibrations of plates and one of my Ph.D. advisors was a professor who worked with the well-known scientist Richard Edler von Mises at Harvard University while completing his PhD. Some of my readers may also remember von Mises who defined the yield criterion that suggests that the yielding of materials begins when the second deviatoric stress invariant J_2 reaches a critical value. As I reflect on my 40-year career in structural engineering, it is remarkable to see how the landscape has changed, while some knowledge and educational tools that I learned from my mentors are priceless and I use them in my classes every day. Today we will focus on shear force (V) and bending moment (M) diagrams. Many students struggle when they try to draw their first shear and moment diagrams.

In structural engineering, we are interested in the analysis and design of *beams* or structural members supporting concentrated and/or distributed loads that are mostly perpendicular to the axis of the members. In practice, beams are usually long, straight, and prismatic and such transverse loadings would cause only bending and shear forces. When the loads are not perpendicular to the member, they also produce axial forces as well. The concentrated loads may be expressed in newtons (N), pounds (lb), or their multiples, kilonewtons (kN) or kips. Distributed loads are generally expressed in N/m, kN/m, lb/ft or kips/ft. A *shear force* diagram (V) is a graph in which the abscissa (horizontal

reference axis) represents distances along the beam length, and the ordinates (vertical measurements) represent the transverse shear at the corresponding beam section. A *moment diagram* (M) is a graph in which the abscissa represents distances along the beam and the ordinates represent the bending moment at the corresponding sections. Shear and moment diagrams can be drawn by calculating values of shear and moment at various sections along the beam and plotting enough points to obtain a smooth curve. Such a procedure is rather impractical and time consuming.

Right at this point, I remember my Ph.D. advisor's words, "A well-drawn (V) and (M) diagram is like 'poetry' for some of us and you have to feel them without doing any number crunching." My colleague Vagelis did just that for our readers and prepared a dozen beautiful diagrams using his well-known software, Beam-2D as shown in the **problem section** this month.

For the sign conventions, *positive moment* generates a curvature that tends to hold water (concave-upward curvature) or moment creating tension in bottom fibers of beam, whereas *negative moment* causes curvature that sheds water (concave-downward curvature). For the sign of shear, positive shear is the upward shear to left. This is a standardized and universally accepted convention. Because the convention is related to the probable deflected shape of the beam for a prescribed loading condition, it may be helpful to intuitively sketch the beam's deflected shape to help in determining the appropriate signs. With the aid of such diagrams, the magnitudes and locations of various important quantities like M_{max} become immediately apparent. The maximum moment M_{max} occurs at places where shear = 0 or V changes sign. It is convenient to draw these diagrams directly below



the free-body diagram of the beam using the same horizontal scale. Why these diagrams are so important? Because by using these diagrams, an engineer can see, at a glance, the performance requirements of a structural member at every section.

Finally, we have to remind our readers that FE and PE are very fast-paced exams and you will have little time to look up information. Therefore, make sure you are familiar with your reference material and begin with the subject areas you know best. This will give you more time and build your confidence.

Most importantly, stay relaxed and confident. Always keep a good attitude and remind yourself that you are going to do your best!

Until next time,
Ahmet Zeytinci, P.E.
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Discover Engineering Family Day Returns – Become an Engineer for the Day!

Help the NCS teach budding engineers about earthquake effects on tall buildings on Saturday, February 27, at the [National Building Museum in Washington, DC](#). Contact [Dean Westman](#) for more information.

Volunteers are needed from 10 am – 4:30 pm.

Stop by anytime and spend a few minutes or all day with fellow NCS members and friends and the next generation of civil engineers. Celebrate National Engineers Week by participating in this free, hands-on,

and fun-filled festival for all ages. Coffee and donuts will be provided by the National Building Museum in the morning and a pizza lunch and other refreshments will be served. Join NCS members for happy hour after the event closes. ■



Inspire the Next Generation: Present Civil Engineering to Students!

Langston Hughes Middle School's (Reston, VA) Nextgineering after school program is seeking speakers excited about motivating students to pursue careers in all fields of engineering. Having already heard from speakers about space and zero-gravity simulation and aircraft structures design, the students are enthusiastic to learn more at their upcoming February 17 and March 16 meetings. One or two engineers are needed for each session, which will take place from 2:25–3:25 pm. Are you interested in sparking interest in young minds about engineering? If so, contact parent program organizer [Marni Kasprovicz](#). ■

Centennial Engineering Facts

Dean Westman, PE, M.ASCE, NCS Past President

Did you know DC Water's Blue Plains Wastewater Plant is one of the largest advanced wastewater treatment plants in the world?

The year 2016 marks the 100th anniversary of the introduction of full-scale activated sludge wastewater treatment plants in the United States. Activated sludge treatment involves the aeration of wastewater in the presence of microorganisms to feed on organic contaminants. As the microorganisms grow, they form particles (floc) that clump together, which settle at the bottom of the tank, leaving a clear liquid free of the organic material and suspended solids. The resulting settled solids,

or activated sludge, are returned to the tank to begin the process again. Developed in the United Kingdom in 1914, the first American wastewater treatment plants began using the process in 1916 in San Marcos, Texas, but did not become popular in America until the late 1930s. Activated sludge and its many variations are in use today and this wastewater treatment process, developed by civil engineers, has made the U.S. comparatively free of water borne diseases. ■



Example of activated sludge tank at a wastewater treatment plant.

Volunteers Needed!!!

ASCE Student Chapters' Regional Competition: A Coming of Age Event

This coming April, George Washington University will host the 2016 Virginia's Regional Student ASCE Competition. Fourteen schools from DC, Virginia and West Virginia will travel to Foggy Bottom to compete in the Steel Bridge and Concrete Canoe regional competitions. GWU is currently looking for volunteers to help judge the Steel Bridge and Concrete Canoe competitions. The Steel Bridge Competition is to be held Friday, April 1, from 7am – 4pm and the Concrete Canoe competition is Friday, April 1, from 9:30am to 1pm. **If you are interested in helping judge either competition or help with any other volunteer duties, please contact Julian Olin at joliin94@gwmail.gwu.edu.** ■

DISCOVER



GIRL DAY

FEBRUARY 25, 2016

February 3

YMF Monthly Happy Hour, 6–8 pm, at [Blue Jacket Brewery](#), Washington, DC. Join other younger members from the area for while you enjoy free appetizers and drink specials.

February 12–13

Regions 1, 2, 4 & 5 Multi-Region Leadership Conference 2016, Pittsburgh, PA. The conference includes a Workshop for Section and Branch Leaders, Eastern Region Younger Member Council, and the Workshop for Student Chapter Leaders. Visit www.asce.org and look for more information in [January newsletter](#).

February 16

NCS Monthly Meeting, 6–8:30 pm at Arlington Hilton. Michael Trentacoste discusses “FHWA’s Turner-Fairbank Highway Research Center and Emerging Transportation Technologies.”

February 21–27

Discover Engineers Week, Share your enthusiasm for engineering and make a difference in a young person’s life. Visit the website for related events.

February 24

Global Day of the Engineer, Pledge to celebrate and share how engineers make a world of difference. Global Day of the Engineer brings together the international community to celebrate the accomplishments of engineers, give students around the world a chance to experience engineering, and share the amazing innovations engineers create every day.

February 24

Engineers & Architects Day Luncheon, 11:30 am at the Holiday Inn Rosslyn. Join us as we celebrate Engineers Week with the Washington, DC area engineering Community! The event features networking and a buffet lunch, followed by a technical talk by keynote speaker, Dr Sajjad Durrant, Past President of District of Columbia Council of Engineering and Architectural Societies (DCCEAS). \$35 per person; for reservations contact [Thomas Tullia](#) no later than **February 16**.

February 25

Introduce a Girl to Engineering Day started in 2001 as a joint effort between the National Society of Professional Engineers, IBM, and National Engineers Week Foundation. “Girl Day” 2016 marks the 15th year whereby women engineers, and their male colleagues, have the opportunity to introduce more than one million girls and young women to engineering.

February 27

Discover Engineering Family Day, at the National Building Museum in Washington DC, 10 am to 4:30 pm. The NCS and our partner Bechtel will once again conduct the popular “Shaky Ground” demonstration of earthquake induced soil liquefaction in a plastic cup. For our youngest engineering students, Bechtel will provide a sand box loaded with construction equipment. For more information, contact [Dean Westman](#).

February 27

Washington DC Engineers Week Awards Banquet, 6pm at the Sheraton Hotel of Silver Spring. The program includes the DCCEAS awards to local engineering students, Engineer and Architect of the Year awards, and a keynote address by Haden Land, VP, and CTO of Lockheed Martin Information Systems and Global Solutions. Black Tie Optional; \$50 per person; for reservations contact [Thomas Tullia](#) no later than **February 16**.

March 2

YMF Monthly Happy Hour, from 6–8pm, at [Ireland’s Four Courts](#), Arlington, VA. Celebrate St. Patty’s Day early with the younger members group. Look for an email announcement with more details.

March 3

Construction Committee Meeting, 5pm, at Cosi, 1501 K St NW, Washington, DC. Interested NCS members are highly encouraged to attend. Please contact Jeff Tan at sunjeffsun@gmail.com if you are interested or would like further information.

March 8

Recent Innovations in Airport Pavement Design, George Washington University. Hugh Weaver, PE, an expert on aviation pavements with over 30 years of experience at airports across the country discusses modern airport pavement design methods, which provide increased safety, longevity, constructability, and sustainability.

March 8–10

Global Marathon For, By, and About Women in Engineering and Technology provides global and regional opportunities for women and provides a place to put forward ideas, solve common problems and come together.

March 17

ASCE hosts its **2016 Outstanding Projects and Leaders (OPAL) Awards Gala** in Arlington, VA. This is the Society’s annual black-tie event to honor leadership, achievement, innovation, industry advancement of research, and journalism excellence. For nominations and Gala information, email [Jane Moran Alspach](#).

March 22

NCS Annual Awards Meeting, 6–8:30 pm at Arlington Hilton. Do not miss the NCS annual awards meeting, an opportunity to recognize and celebrate local excellence in projects, engineers, and students who have contributed to our society and our community. (See newsletter article.)

March 31–April 2

Virginia’s Regional Student ASCE Competition, George Washington University. For additional information, email [Julian Olin](#). (See newsletter article.)

April 16 and 17

USA Science & Engineering Festival at the DC Convention Center. NCS and ASCE World Headquarters sponsors a booth. The Festival is held every other year and includes hundreds of sponsors and thousands of visitors of all ages. Contact [Dean Westman](#) for more information.