

The New Hampshire Civil Engineer

New Hampshire Section of the American Society of Civil Engineers
P.O. Box 4953, Manchester, NH 03108

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Many thanks to VHB, our DECEMBER SPONSOR OF THE MONTH!



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DECEMBER 2015 PRESIDENT'S MESSAGE



So here we are almost in December already. Thanksgiving will soon be come and gone and has been overlooked and ignored as usual by the holiday season propaganda engine. The stores have replaced Halloween decorations and candy with Christmas decorations and candy. There are no Thanksgiving decorations, pilgrim peeps or turkey

M&Ms. My wife was watching the Christmas Holiday Baking Championship the day after Halloween! What happened to the Thanksgiving shows? I often think of thanksgiving as the Civil Engineer of the holidays. Thanksgiving is very simple and efficient; make food, eat food, drink, sleep and repeat. There are no frills, no special lights, no stressful shopping, no credit card debt, just good food and football games. It gets the job done without putting you in debt or sending you to your psychiatrist for depression meds. Civil Engineers are very similar, they just want to do their job with the least amount

of notoriety and stress as possible. They don't want to be thanked and usually prefer to be kept out of the lime light. This is both good and bad, we do our jobs but don't get the credit we deserve. We feel more comfortable in the land of misfit toys rather than at Fezziwigs' party.



Well maybe things are changing a little bit. As you may or may not know the house of representative passed a bipartisan six-year, \$325 billion surface transportation reauthorization bill. The [Surface Transportation Reauthorization & Reform \(STRR\) Act of 2015](#) cleared the House by a vote of [363-64](#)!. Not bad for a bunch of misfit toys! Maybe the lack of sunshine and over consumption of refined sugars has distorted my perspective but it feels like legislatures and the public are starting to listen to us about the importance of infrastructure. Maybe not, but that's what I tell people who dare to listen. So what's the next step? Since the Senate passed a bill with only three years of funding, the House and Senate need to work to negotiate a compromise before the looming deadline. For more information on what ASCE is advocating on your behalf, follow ASCE Government relations on Twitter [@ASCEGovRel](#) and [Save America's Infrastructure Facebook page](#).

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What's Inside?

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..... and more!

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Details on website.

*All newsletter submissions must be received
by the 10th of the month prior to publication.*

Next deadline

**(For January 2016 issue):
December 10, 2015**

Newsletter Publisher

Town & Country Reprographics, Inc.
Concord, New Hampshire

Free Stuff

I wanted to highlight an ASCE service that you may not know about. If you renew your ASCE membership, you can select up to five on-demand continuing education webinars that are available through ASCE. I renewed and selected five webinars that interested me or that I could use to train fellow staff. For instance, I selected "Earthwork 101" and set up a webinar in the conference room for a couple of our new geotechnical engineers as well as fellow environmental engineers and ecological scientists who either needed a PDH or wanted to be cross trained. The best part is that it cost nothing which made the boss happy. Typically webinars cost \$250-\$350. Check it out.

Upcoming Events

The next dinner meeting is a great one that you don't want to miss. Yoram Eilon, P.E. the senior vice president of WSP/Parson will be presenting the design and construction of the Freedom Tower in New York City. We've been talking about it for a while but it is just around the bend so sign up soon! We also have booked our breakfast meeting with the new NHDOT Commissioner Victoria Sheehan on Wednesday January 6th. It will be a great opportunity to meet the new commissioner and find out what her plans are for the NHDOT.

Suzy's Waltz (Great song)

Finally I would like to thank Suzy Sheppard (Hoyle Tanner) for her six years of volunteer work with ASCE. Suzy helped maintain, update and keep our website and other media outlets running smoothly. Unfortunately, Suzy is moving on but she is leaving us in a better place. Before she started, the website was a confusing mess of missing links and buried information, but now it is clean, efficient and working. The highlight of her tenure (other than working with me) was winning the ASCE best section web site award in 2011. On behalf of the section, I would like to thank Suzy for her hard work and dedication. THANK YOU SUZY!

That is all for this month, if you have any ideas or suggestions please drop me an email at jay.hodkinson@gza.com. Enjoy the holidays!

Jay Hodkinson, P.E. is a Senior Project Manager with GZA GeoEnvironmental, Inc. He earned his B.S. degree in Civil Engineering from the University of Massachusetts-Lowell. He lives in Londonderry, New Hampshire with his wife, Chrissy and his children Andy and Lindsey.

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Who We Are

VHB's dynamic team of professionals include engineers, scientists, planners, and designers who partner with public and private clients in the transportation, real estate, institutional, and energy industries—as well as federal, state, and local governments. Together, we work to improve mobility, enhance communities and economic vitality, and balance development and infrastructure needs with environmental stewardship.

Making a Difference

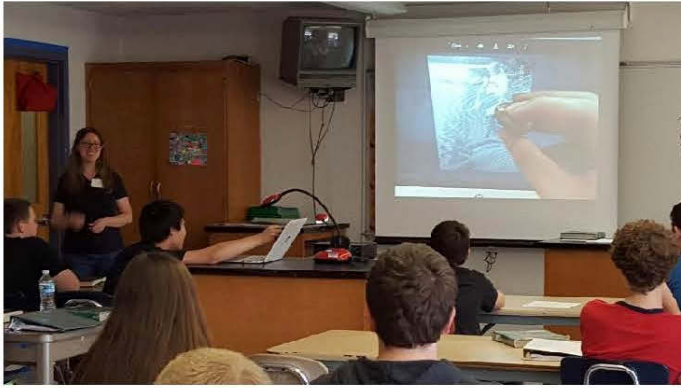
Delivering safe and implementable solutions that help businesses and communities thrive together is a priority for VHB. From municipal transportation efforts to the redevelopment of I-93 service areas in Hooksett—and from the Merrimack Premium Outlets to the NHDOT's highly visible I 293 Exits 6 and 7 improvements project—VHB is helping to shape New Hampshire in positive ways.

Join Our Team

We are VHB: We're passionate about making meaningful contributions to our communities through the work we do. Our Bedford office is always looking for talented, bright individuals to become a part of our team. If you're interested in making a positive impact on the world, having opportunities to grow personally and professionally, and meeting smart new friends—we'd like to have you join us. Discover more about the exciting work we do, learn about our benefits, and view open opportunities on www.vhb.com.



University of New Hampshire Teacher-Engineer Summer Scholar Academy (TESSA) Promoting STEM to Manchester Middle Schools



Earlier this spring, UNH reached out to multiple professional engineering organizations seeking engineer volunteers for TESSA. The purpose of the Academy is to form a relationship between the engineering profession and middle school education on a personal level to promote engineering problem solving based on fundamental math and science principles and practices. Educational teams of 2-3 practicing engineers are paired with a middle school teacher (math or science) to support the development and integration of engineering education standards in the middle school

classroom. The goals of this academy include:

- Familiarize teachers with engineering practices as set forth by the Next Generation Science Standards.
- Provide resources for the incorporation of engineering practices into the middle school curriculum that aligns with the Next Generation Science Standards.
- Create supportive partnerships between teachers and engineers such that engineers will serve as yearlong resources for teachers as they implement engineering practices into their classes.

Bob Rotier (New Hampshire Society of Professional Engineers [NHSPE] Student Outreach Chair and retired chemical engineer) and Thalia Valkanos (ASCE President-Elect, NHSPE State Director, and environmental engineer at GZA) enthusiastically volunteered for this program. Bob and Thalia were assigned to an eighth grade science teacher from Southside Middle School in Manchester. The engineers and teacher met over the summer to plan for the 2015-2016 school year.



Last month, Bob, Thalia, and an additional geologist volunteer from GZA, Tanya Justham, spent a day at Southside talking to the students about their experiences as engineers and scientists. They described a typical workday as an engineer/scientist, shared stories of how they became involved in the profession, and strongly encouraged the students to pursue a STEM career. Student asked the volunteers many questions, ranging from "How many explosions have you seen?" to "How much do you get paid?" – the students were satisfied with the answers!

Bob, Tanya, and Thalia are currently working together to develop a program for the students to reduce, mitigate, or treat surface water contamination, combined with a lesson plan on source identification/quantification, and treatment options. The lesson additionally includes a stormwater sampling lab, where students will collect samples during their classes, submit their samples to a certified laboratory, analyze the results, and graph the results using Microsoft Excel and GIS. The lesson is scheduled for the late winter months and will continue through early spring.

Bob and Thalia also hope to plan a special event for the students during Engineers Week. They are currently seeking volunteers to participate in the event.

ASCE 2015 NATIONAL CONVENTION



– NEW YORK CITY



ASCE-NH sent a committee member and a UNH EWRA student board member to the ASCE National Convention in New York City. The NH section sent these two individuals to represent the NH section and to reward them for their leadership and active participation in the section. The following is an interesting summary of their experience from a student member's perspective and a professional's perspective.

Alyssa Aligata
EWRA Board Member UNH Student Chapter

The 2015 ASCE Convention in New York, NY was a great experience, especially as a college engineering student. I started out convention by participating in a community service project in Queens, NY. I joined a team to help put together tables and chairs for a patio area at an elementary school. We also painted lines for a volleyball and foursquare court for the children to play in. This may seem like a small impact, but it was a very rewarding experience because I know how much it means to the teachers and children at the school. Another big part of the ASCE Convention consisted of civil engineering related talks. Topics covered by the talks that I attended were efficient green infrastructure, managing the risk of coastal disasters, history of electricity and Niagara Falls, and the current state of diversity and inclusion in civil engineering. It was interesting to learn about real and current applications of green infrastructure because it is something I have learned about through my coursework. I also really enjoyed the talk about diversity and inclusion in the field because it was interesting to hear how companies approach this issue. During some of the meals, awards were given to outstanding engineers for their hard work and dedication to the



Statue of Liberty from the Dinner Cruise

New Hampshire Section ASCE

field. I was amazed by their accomplishments and they have inspired me to make a difference through my career. I was also able to attend the Manhattan Dinner Cruise with ASCE, where I was able to meet other engineers and engineering students while viewing the city and statue of liberty. I offer my thanks to NH-ASCE for making this opportunity possible for me and also to the new friends I made for making the 2015 ASCE Convention an amazing event.



Networking on Dinner Cruise



Painting Court for Community Service



Engineers Doing Community Service at the Convention

Fred Douglas
OCEA Committee Chair

From October 11 to October 14 I attended the 2015 Annual Convention. There were almost 900 members from around the world attending this convention. During the convention I attended eight sessions and each of these sessions were well presented and educational. I attended the Opening Plenary Session, Building the Brooklyn Bridge, Managing the Risks of Coastal Disasters, The New NY Bridge to Replace the Tappan Zee Bridge, Goethals Bridge: Case Study on PPP Project, When Cars Talk to Each Other, ASCE Response to Natural Disasters Hurricane Sandy, World's Fair and Transportation Innovation. There were three sessions that were particularly educational and piqued my interest as follows:

- Opening Plenary Session was presented by Luke Williams an international best-selling author of "Disrupt: Think the Unthinkable to Spark Transformation in Your Business". This was a presentation on turning ideas upside down. For example you know socks are sold in pairs. Why not three different socks to children 5-12 years old? (Throx a very successful endeavor and presented on Shark Tank.) We must maintain an instinct for change.
- When Cars Talk to Each Other was presented by Blaine Leonard. This session was very relevant since traffic and crashes concern all of us. Currently Google has a self-driven car on the road today. This vehicle comes equipped with LiDar, cameras, GPS and radar sensors. They have driven this car several million miles and it has experienced 12 crashes, all caused by driver error in other vehicles. These vehicles follow all rules of the road. Therefore, encounters a stopped or parked vehicle in a no parking zone and the road has a double yellow line, he will be waiting until the parked vehicle has been moved. When this technology is implemented in new cars, vehicles will be able to draft (gaining 5-7% gas mileage), reduce crashes and save on air pollution. This technology is currently being tested throughout the country at six locations including Virginia, Michigan, Tampa, Wyoming, California and Manhattan.
- World's Fair and Transportation Innovation. This session was a presentation of selected World's Fairs and a detailed presentation of the 1939 NY Exposition presented by William Sproule and Reuben Hull. There have been 100 Expositions/World's Fairs since the first Exposition in London in 1851. The Bureau of International Expositions was formed in 1928 with major events every 5 years and minor events in between. Several innovations were presented at each of these events. These include the zipper in 1893, first moving walkway and the Chicago L was constructed to the 1893 Chicago Exposition. William McKinley was assassinated at the Buffalo Exposition. The 1904 Exposition unveiled hot dogs, hamburgers and Doctor Pepper. The 1939 NY Exposition introduced televisions, electric typewriters and the view master. The 1964/65 Fair was not accepted as a World's Fair since there was too much advertising by the US major auto makers. This Fair introduced the Mustang to be driven at Ford's Magic Skyway. There have been several fairs since 1964 including this year's World's Fair in Milan Italy which has a food theme and the US is presenting food trucks. The second presentation was on the 1939 NY Exposition and how this event changed the city when 1200 acres of land in Flushing Meadows was constructed from 1936 to 1939. Seven million cubic yards of ash was removed. Robert Moses was the driving force behind the site and construction. In 15 days the 1200 acres were taken, 300 buildings constructed, 17 miles of highway constructed with a 40,000 car parking lot and 10,000 full grown trees were transplanted to this site. Several transportation improvements were completed including the Bronx Whitestone Bridge, establishment of the NYC Transit Authority, LaGuardia Airport. This was a project that took a dump to glory.



ASCE National Convention Presentation at Times Square



News from around the engineering community

SANBORN, HEAD & ASSOCIATES, INC.



Sanborn Head's Matt Poirier joins ACEC New Hampshire's Board of Directors

As Sanborn, Head & Associates, Inc.'s (Sanborn Head's) Executive Vice President, Matthew R. Poirier, P.E., has spent the better part of his career tackling Solid Waste, Geotechnical and Environmental Engineering projects in New England. With more than two decades of engineering design experience, as well starting and growing Sanborn Head's Vermont office, Matt is in a position to really make a difference as a Member of the American Council of Engineering Companies of New Hampshire (ACEC-NH) Board of Directors.

ACEC-NH is the leading business practice and policy advocate for consulting engineering firms in New Hampshire. Matt is honored to serve on this prestigious Board, supporting and fostering the development of the engineering community throughout New Hampshire.

To learn more about ACEC-NH, visit <http://www.acec-nh.org/>.

Matthew R. Poirier, P.E. has a B.S. in Civil/Environmental Engineering from University of New Hampshire. He can be reached at mpoirier@sanbornhead.com.

★ BOARD MEMBER OF THE MONTH ★

Drew Vardakis NH-ASCE Clerk



Hi everyone,

My name is Drew Vardakis and I am currently serving as the Clerk for the 2015-2016 ASCE-NH Board of Directors. As Clerk of the Board, my major responsibilities include documenting Board of Director meetings, providing communication throughout the Board, participating in Board votes. I'm also involved in the Golf Committee and Program Committee which organizes the monthly Section events.

During my first several years of professional membership, I only attended various ASCE meetings and events. But with the guidance of colleagues, I began to get more involved in the Section by participating in the Younger Member Group activities and eventually taking on a board position. Over the last several years I've held the position of Junior & Senior New England Delegates and Clerk, while also attending several leadership conferences.

I thoroughly enjoy giving back to the engineering community by working with students and peers on various committees, and I urge others to do so as well. It is a very rewarding experience, as you get exposed to the many facets of engineering here in New Hampshire (and beyond), and the people that drive our profession forward. If you're interested in getting involved in ASCE-NH, whether by attending or helping plan a meeting, attending a younger member outing, or taking a larger role on the Board of Directors, please feel free to contact me or any other Board member. We'd be happy to discuss more with you how we function as a Board and a Section that strives to do the most we can for our membership. Andrew.vardakis@amecfw.com

Drew is a senior engineer with Amec Foster Wheeler in the Environment & Infrastructure Group based in Chelmsford, MA. He holds his PE in New Hampshire and has 10 years of experience in many civil and environmental engineering projects throughout New England. Drew graduated with a BS in Civil Engineering from the University of New Hampshire in 2005 and has been an ASCE member ever since. Drew currently resides in Stratham, NH with his wife Gayle, 2-year old son Reid, and golden retriever, Rye. There they enjoy many activities around the seacoast, including golf, hiking, kayaking, the beach, and following New England sports teams.



SENH/ASCE DECEMBER MEETING ANNOUNCEMENT

- NEXT MEETING: Thursday, December 17, 2015
- PRESENTATION: **One World Trade Center**, by **Yoram Eilon, P.E.** The presentation will discuss the design and construction of One World Trade Center (1WTC), which is the tallest of the four buildings planned as part of the Ground Zero reconstruction master plan for lower Manhattan. It is also the tallest building in the Western Hemisphere. The overall height of the tower from the ground level to the top of the spire reaches 1776 feet (541 meters) as a tribute to the "freedoms" emanating from the Declaration of Independence adopted in 1776. One World Trade Center's program includes 3.0 million square feet of new construction above ground and 500,000 square feet of construction of new subterranean levels. The tower consists of 71 levels of office space, and eight levels of MEP space. It also includes a 50-foot high lobby, tenant amenity spaces, a two-level observation deck at 1,242 feet (379 meters) above ground, a "sky" restaurant, parking, retail space and access to public transportation networks.
- SPEAKER: **Yoram Eilon, P.E.**, is a Senior Vice President with WSP/Parsons Brinckerhoff. Since joining the company in 1999, he has completed various projects through all engineering phases from feasibility studies and initial conceptual design to production of contract documents and construction administration. He is an award winner of AISC 2014 Special Achievement Award. Mr. Eilon has more than nineteen years of experience in the design of high-rise commercial, office and residential towers, stadiums, and industrial structures. His work experience covers the entire spectrum of building types ranging from high-rise buildings to long-span structures and includes new construction as well as rehabilitation and alteration of existing structures.
- PLACE: Manchester Country Club
180 S River Rd, Bedford, NH 03110
- AGENDA: 5:30 pm-6:30 pm Registration/Social Hour
6:30 pm-7:15 pm Dinner
7:15 pm-7:30 pm Business Meeting
7:30 pm-8:30 pm Presentation
- DINNER: Buffet with choice of Baked Haddock, Sundried Tomato Chicken or Beef Bourguignon.
- COST: SENH/ASCE Member: \$60.00 Non-Member: \$65.00 Full Time Student: \$15.00 - 'no-shows' will be billed at full amount.
- RSVP: by Monday, December 7, 2015. There will be a \$5.00 late fee for anyone wishing to RSVP past this date. Please signup/pay online at:
<http://events.constantcontact.com/register/event?llr=nfvkd8kab&oeidk=a07ebnh95o6be2a22c6> or send check payable to "ASCE-NH" to:
- ASCE NH Section
Attn: Nick Golon, Treasurer
PO Box 4953
Manchester, NH 03108-4953
ngolon@tfmoran.com
- NOTE: 2.0 PDHs have been assigned for attendance to this program. Attendees are responsible for ensuring their check-in on the attendance list upon arrival at the meeting.

UNH-EWRI Panel Discussion

By: Drew Vardakis

Each semester, the UNH Student Chapter of EWRI (Environmental & Water Resources Institute) holds several panel discussions with various themes (i.e. grad school, types of engineering jobs, research at UNH, HR reps, etc.). On the evening of November 9th at UNH's Gregg Hall, the Chapter hosted a panel discussion with professionals and students on the topic of professional development organizations. Individuals from six different organizations volunteered their time for the discussion, which included approximately 30 students and the following professionals:

New England Women In Energy and Environment
Muriel Robinette from NEWIEE, Terracon

New England Water Works Association (NEWWA)
Jim Malley from NEWEA, UNH

New Hampshire Society of Professional Engineers (NHSPE)
Dirk Grotenhuis, NHSPE, AECOM

New Hampshire Pollution Control Association (NHPCA)
Peter Goodwin from NHWPCA, Ted Berry Co.

American Society of Civil Engineers (ASCE-NH)
Drew Vardakis, Amec Foster Wheeler

New England Water Environment Association (NEWEA)
Nate Little from NEWWA, Woodard and Curren

All of the representatives provided an overview of their respective careers, organizations, and the advantages of networking and being active in professional development. The panel provided a great opportunity for students and professionals to meet and discover what professional activities are available for students and recent graduates. By all accounts it was a very successful event!



P.E. REFRESHER COURSE FOR CIVIL ENGINEERS

SPONSORED BY THE ENGINEERING EDUCATION COMMITTEE

TENTATIVE DATES

STARTING January 12, 2016

LOCATION: NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION – CONCORD

The P.E. refresher course will be offered on Tuesday evenings from 6:00 p.m. to 8:00 p.m. beginning January 12, 2016 (tentative) and will run for 12 weeks. The course will focus mainly on problem solving and discussion in the following areas:

Transportation	Traffic
Hydraulics	Sanitary
Soil Mechanics	Structural Design
Construction Engineering	

The course will finish prior to the P.E. exam, providing additional time for individual review and preparation. The upcoming exam is scheduled for April 15, 2016. Visit the Joint Board of Licensure's

website for exam information and applications:
<http://www.state.nh.us/itboard/home.htm>

The course book is the latest edition of the Civil Engineering Reference Manual from Professional Publications (14th Edition). NHASCE has setup an account with Professional Publications so the students can purchase their course books directly and get approximately 15% off at the following website.

<http://www.ppipartner.com/SK876>

A complete schedule of all lectures and instructors will be available at the first session. Please submit your applications by January 5, 2016.

For further information, contact Michael Mozer, P.E. at (603) 391-0854, or Michael.mozer@hdrinc.com

*** REGISTRATION FORM * P.E. REFRESHER COURSE ***

*** April 2016 Exam ***

Name

Telephone No. (W) & (H)

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Fax No.

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E-mail Address

Company

*ASCE Membership No.

Course Fee: ASCE Members - \$150.00 (Course Book Not Included)
Non-Member - \$300.000 (Course Book Not Included)

Make checks payable to: **New Hampshire Section, ASCE**

Send registration form with fee to: **Michael Mozer, P.E.**

HDR

250 Commercial Street, Suite 3007

Manchester, NH 03101

*Your ASCE membership no. can be found on the address label on your issues of [ASCE News](#) or [Civil Engineering](#) magazine.



65th Annual Engineers Week Awards Banquet & Exhibition

Thursday, February 25, 2016
SERESC Conference Center
29 Commerce Drive
Bedford, New Hampshire

PRELIMINARY AGENDA

Educational Sessions – to be determined

2:00-3:00 pm
3:00-4:00 pm
4:00-5:00 pm

Exhibition & Awards Banquet

2:00 to 4:30 pm Exhibit set-up
5:00 to 6:30 pm Exhibits open
5:00 to 6:15 pm Social hour
(Cash bar & Hors d'Oeuvres)
6:15 to 7:45 pm Dinner
6:15 to 7:00 pm Presentation of Awards
7:45 to 8:30 pm Keynote Speaker

If you have questions about the event or wish to sponsor and/or participate in the Trade Show, please contact Larry Dwyer, P.E. 603-206-1115 or by email at Ljdwyer@terracon.com.

For More information on National Engineers Week and the National Engineers Week Foundation, visit <http://www.eweek.org/Home.aspx>.



SAVE THE DATE!!!
February 25, 2016

Registrations will open in January

National Engineers Week (E-Week) is celebrated around the country every year in February to commemorate the birth of engineering, *beginning with the first US engineer and President, George Washington*. This year our Annual Awards Banquet will be once again held at the **SERESC Conference Center** - 29 Commerce Drive in Bedford, NH.

In celebrating 65 years of National Engineers Week, there will be an afternoon of educational sessions with special guest speakers for 3 Professional Development Hours (PDHs) for our NH Engineering Professionals.

In addition, this year we are pleased to have as our keynote speaker, Mr. Andrew Card, President of Franklin Pierce University. Among his numerous achievements in federal service, many of you may recognize that President Card was the Chief of Staff to President George W. Bush from 2000 through 2008 and lived through 9-11 firsthand. After his distinguished political career, Mr. Card served as dean of the Bush School of Government and Public Service at Texas A&M University before being named the 5th President of Franklin Pierce University. What many of you may not know about Mr. Card, is his educational background as an engineer. We invite you hear his story.

You can learn more about Pres. Card at the following link: <http://www.franklinpierce.edu/about/president/>

New Class of State Advocacy Captains Complete Training



Pictured above: Elizabeth Ruedas, Joe Meads, William Arneson, Tanner Hartranft, Daren Williams, Maria Matthews, Aaron Castelo, Nedra Davis, Travis Barnett, Darren Benoit, Chris Warren, Tor Anderzen, Dennis Richards, and Bob Lamoreaux

ASCE's Government Relations Staff completed its second day-long training session for State Advocacy Captains at ASCE's office in Washington, DC. The program is meant to help ASCE's Sections and Branches become more effective in advocacy at the state level. Participants learned about the resources and tools available from ASCE to assist with advocacy efforts. The session also provided in-depth information about the government relations program at ASCE and the efforts on ASCE's strategic priorities at the state level. In all, 23 State Advocacy Captains from 19 states have been trained since the program launched earlier this year.

UPCOMING EVENTS

ACEC-NH and ASCE-NH will host a joint breakfast meeting with **NHDOT Commissioner Victoria Sheehan** on **Wednesday, January 6, 2016**.

Watch for official announcements!

Did you know?

You can view this and past issues of "The New Hampshire Civil Engineer" on our website. Visit us at www.ascenh.org and click on the current newsletter or "Past Newsletters".

We are going green!

You can receive your issue of "The New Hampshire Civil Engineer" via e-mail the same day it becomes available to our members! - OR - You can continue to receive a paper copy of the newsletter, but you MUST let us know which delivery method you prefer.

For either choice, please fill out this form:

I enjoy getting my copy of the newsletter! Please send my copy:

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Company _____

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Clip out this form and mail to:

Fran Weaver, Newsletter Editor
c/o Hoyle, Tanner & Associates, Inc.
150 Dow Street
Manchester, NH 03101

Cranium Challenge

December 2015

Let's hear a big THANK YOU! To Thomas R. Selling, P.E., who has offered to try his hand at providing Cranium Challenge puzzles for the time being!

This is an enjoyable column and I'm very happy that someone has stepped up to fill the shoes left when Justin Lowe became unable. Thank you so much to Justin for all the great Challenges you provided the last couple of years!



December Puzzle:

Alice came across a lion and a unicorn in a forest of forgetfulness. The lion lies every Monday, Tuesday and Wednesday and the other days he speaks the truth. The unicorn lies on Thursdays, Fridays and Saturdays, and the other days of the week he speaks the truth.

Lion: Yesterday I was lying.

Unicorn: So was I.

Which day did they say that?



Send your guesses to Thomas Selling via e-mail: Thomas R. Selling thomas.selling@prodigy.net

Correct answers received by December 31st and names of correct guessers will be published in a future edition of "The New Hampshire Civil Engineer."

POROUS PAVEMENT HELPS PROTECT BEACH WATER QUALITY

By Catherine A. Cardno, Ph.D.

Beach closures due to contaminated storm water have all but ended in one Massachusetts seaside town thanks to the use of porous pavement in its main roadway.

When people daydream about their perfect seaside summer vacation, they rarely include visions of beaches closed due to storm water-related contamination. But such situations can significantly impact summer vacations at America's seashores, and in turn, the seasonal income of beachside towns.

So one popular beach town, Provincetown, Massachusetts, is seeking to combat bacterial and nonorganic contamination of its beaches from untreated storm water runoff head-on. The city is replacing the traditional pavement along approximately 1.5 mi of Commercial Street, the town's main street extending parallel to the harbor from downtown to the beachfront, with porous pavement. Water that would have previously traveled along the impervious asphalt into storm drains and eventually through beach outfalls, or traveled over land directly to the ocean, is instead filtering through the porous pavement and subsurface soils, from which it can be absorbed into the groundwater.



Provincetown, Massachusetts, a seaside town located at the tip of Cape Cod, is installing porous pavement along a 1.5 mi section of Commercial Drive, its main thoroughfare, to combat beach closures due to contaminated storm water runoff. GHD

"We are very excited about the Provincetown project, as they have had excellent results from it, as seen by the reduction of beach closures," said Sandra L. Tripp, P.E., BCEE, a senior project manager and environmental engineer at the Hyannis, Massachusetts, office of GHD Inc, who wrote in response to questions posed by *Civil Engineering* online. "It's been a very successful project on many fronts," Tripp said.

The 2,700 ft section that comprised phase one of the project was completed in 2012; the successful outcomes that resulted by 2013 prompted the city to undertake a second phase, comprising an additional 2,200 ft, which was completed in spring 2014. The city again experienced positive results, so it embarked on a third phase, covering 2,000 ft, which is now under way. Design has been completed and the city expects to begin construction in 2016, pending funding.

Prior to the installation of the first section, the city's beaches experienced an average of more than 10 closures per summer between 2003 and 2011, according to a paper for which Tripp was the primary author, "[Provincetown Storm Water Program Revitalized Downtown and Improves Water Quality](#)" (*Journal of the New England Water Environment Association*, Summer 2015 issue). In 2013, after the opening of the first section of porous pavement on Commercial Street, no beach closures occurred, according to the paper. In 2014, three closures occurred at the outer edges of the project, prompting the decision to complete the phase-three extension.

But the storm water improvement and roadway reconstruction project in Provincetown is not the first step that the town has taken to eliminate beach closures, according to Tripp. Prior to 2003, there were on average 20 beach closures a year in the downtown area. So in 2003, a new wastewater treatment plant was opened to replace an aging sewer system and antiquated septic systems within the town. A public campaign to educate full- and part-time residents on the importance of picking up pet waste was also undertaken.

Provincetown's year-round population of approximately 3,400 swells to upward of 100,000 at its summer season peak in August, according to Tripp. During that peak season, the downtown roads effectively become pedestrian and bicycle thoroughfares as tourists swarm to the beaches. "Water percolates extremely fast, upwards of 1,000 in. an hour, if not more—so more than any rain event will ever produce," said Russ Kleekamp, a project manager at the Hyannis, Massachusetts, office of GHD, who wrote in response to written questions posed by *Civil Engineering* online.

And the porous pavement does more than just allow water to percolate to subbase layers before eventually reaching the groundwater. "The porous asphalt is very good at treating bacterial sources, as infiltration is one of the best ways to treat it," Kleekamp said.

Three major groups of contaminants were considered, according to Kleekamp: such bacteria as e-coli and fecal coliform, which can close beaches; such hydrocarbons as gas and paint; and such nutrients as fertilizers. While infiltration works to treat bacteria, it only filters and marginally reduces the concentrations of hydrocarbon and nutrient-based contamination. But contamination from bacteria was one of the major reasons for beach closures in Provincetown.

Installing the new roadway required a design that worked with the idiosyncrasies of the town's main street, which evolved from a 19th-century packed-sand footpath. The street varies between 16 and 22 ft in width and its existing 4 ft wide sidewalks are often set directly against buildings. The roadway was in poor condition due to aging, the installation of the new sewer system, and standard utility repairs, so it was a candidate for replacement regardless of any storm-water considerations, and location atop packed sand made it an excellent candidate for the use of porous pavement.

While in the past porous pavement has not typically been installed on heavily-used roadways, "the use of porous [pavement] is becoming more and more accepted by municipalities as they see it becoming a more viable option," said Kleekamp. "Early applications lacked the strength to hold up against plowing and traffic but as the technology advanced, the use of fiber to add strength to the mix has greatly helped."

Kleekamp says that the fibers are much like spiders' webs, helping to hold the aggregate together while at the same time maintaining the necessary pore-to-material ratios that create the voids that allow the water to quickly percolate through the pavement.

For Commercial Street, the pavement installation includes a 4 in. layer of porous asphalt, underlain by an 18 in. deep subbase that acts as a reservoir bed. This is placed atop proof-rolled native sands. "A big concern of the town was that we did not want to flood basements if we were planning on infiltrating water within feet of an existing structure," Kleekamp said. The subsurface flow was thus angled on a 2 percent grade to a centralized infiltration trench measuring 4 ft wide and 2 ft deep and located under the centerline of the roadway and beneath the subbase. This trench creates space for the infiltrating water and keeps it from migrating under nearby sidewalks and walls until it has time to infiltrate.

For the same reason, impermeable barriers measuring 4 ft in length have been placed along the edges of the roadway. These 30 mm impermeable polyvinyl chloride (PVC) liners extend to the same depth as the pavement and subbase and curve around the bottom edge of the installation to further protect nearby basements.

Porous pavement can be useful for keeping roads dry in the wintertime, as well. "The ice on roads is a function of ponding water, usually during freeze-thaw cycles over winter days," Kleekamp explained. "The porous mix simply does not allow for any ponding water due to its infiltration rate, so ice is not a concern."

"In fact, if ice is observed on porous asphalt, then something went wrong," he noted. "So as long as the snow is properly removed, ice is not an issue as any standing water will rapidly infiltrate into the mix." In Provincetown, the pavement has held up well to plowing, he said.

In terms of cost, porous pavement compares positively with traditional asphalt, although there is variability depending on the type of job. "A general comparison is usually that the mix itself is 10 percent to 15 percent more than regular mix, Kleekamp said. Although there are fewer fines in the porous asphalt, more asphalt is required, he explained. Kleekamp explained that for new construction, porous pavement is typically less expensive than traditional asphalt because storm-drain systems do not need to be built. But for repaving, the cost is typically more because of the depth of the required subbase. "For the porous asphalt to work right, the entire layering of asphalt, subbase, and filter courses does get expensive," he said. "But you also don't have to install drainage structures with the porous asphalt, because it serves as both drainage and driving infrastructure."

The new pavement in Provincetown has proven durable, without raveling or rutting, withstanding average daily summer foot traffic of 40,000 people, as well as the regular weight and sharp turns of large delivery trucks and numerous parades, according to Tripp. The town vacuums the streets every night in the summer season to remove trash and debris, and this also works to maintain the long-term hydrological functionality of the roadway.

As part of the roadway reconstruction, the town's aged brick sidewalks and curbing have also been replaced. The storm-drain system was also replaced as an emergency overflow system in case the pavement ever becomes clogged and unable to filter the water. But for now, the pavement—like the ocean—is fine.



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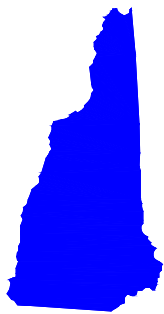
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