

Message from the President



Greetings. To start with a pleasant note, I wish to again extend my congratulations and appreciation to Ray Streib, Ed Meehan and the Younger Member Committee for the success of the annual indoor golf event held last month. The result of their effort was a contribution of about \$7,000 to the scholarship fund (best ever). It is no small task to plan the golf outing and the enthusiasm of these individuals is the reason the night has been so much fun. I would also like to thank all of those who contributed either by playing, sponsoring holes or both. We can all be proud of what we have been able to do for our scholarship recipients.

Early in March, I attended the District 5 Council meeting. District 5 consists of the National Capital, Delaware and Maryland Sections. Brought to our attention were two major issues receiving ASCE National attention. One, which I have mentioned in previous messages, is the First Professional Degree. ASCE

National is continuing to support the position that individuals should have a Masters Degree before being licensed. This appears to be a hotly contested issue within ASCE. It was evident from the attendees at the District 5 meeting that there is a disagreement with the need for a Masters Degree. We questioned our Director as to how the Sections had a voice in the decision. If given an opportunity, I will be happy to voice the opinion of the members of the Maryland Section from whom I have heard.

The second major issue was the ASCE Report Card. On March 8th, ASCE held a news conference announcing the results of their report card on the condition of the infrastructure of the United States. The cumulative rating for the Nation was a D+ . Reported in the news release was the "Causes for such a dismal grade include: Explosive population growth and school enrollment which outpace the rate and impact of current investment and maintenance efforts, local political opposition and redtape which stymie the development of effective solutions; and the growing obsolescence of an aging system". Closer to home, the Report Card included these comments about Maryland.

- "27% of Maryland's roads are in poor or mediocre condition.
- 30% of Maryland's bridges are structurally deficient or functionally obsolete.
- 67% of Maryland's schools have at least one inadequate building feature.
- 65% of Maryland's schools have at least one unsatisfac-

- tory environmental feature.
- Maryland's drinking water infrastructure needs \$1.28 billion over the next 20 years.
- Maryland's wastewater infrastructure needs \$1.7 billion over the next 20 years.
- There are 57 high-hazard dams in Maryland"

Looking at the statistics above, one would have a negative reaction, however, according to ASCE National, these numbers are very good compared to the rest of the Nation. ASCE's goal with the Report Card is to demonstrate to our lawmakers that more funding is needed for our infrastructure. While the goal of ASCE is noble, as far as Maryland is concerned, the timing may not be ideal. Our Governor has recently allocated a

tremendous amount of money to improve the infrastructure. From a funding perspective, everything is being done to improve our infrastructure. Being a transportation engineer, and driving through other states, I believe Maryland has some of the best maintained roads and bridges in the Country. I feel proud of what we have accomplished in this State. If you would like to see more of the Report Card look at ASCE's website www.asce.org/reportcard.

Finally, Our Geotechnical Committee will be the sponsor of this month's meeting. Jim Wheeler, the Committee chairperson always presents very interesting topics at this meeting. I hope to see you there.

Mike Krupsaw
President

SOIL MIXING FACILITATES FOUNDATION CONSTRUCTION AT "THE GRANITE WORKS"

By Andrew F. Brengola, P.E. and James R. Wheeler, P.E., Hayward Baker Inc.

Custom granite kitchen counter tops have become a very popular part of the 21st century kitchen. Often cut from magnificent pink stone quarried in Brazil, demand for these countertops continues to rise. However, most of the granite used to create these luxurious, long wearing surfaces, has been traditionally cut into slabs overseas before shipment to North America. That is until recently, when a new granite-cutting mill opened its doors here in Baltimore!

The Granite Works, operating in the former Bethlehem Steel "Buffalo Tank" building near the I-895 Harbor Tunnel is now actively importing granite block and cutting it into custom-sized slabs for the local market using a newly installed Granite Cutting Saw. However, difficult subsurface conditions at the site required special care to design and construct

(continued on page 2)

SOIL MIXING FACILITATES FOUNDATION CONSTRUCTION AT “THE GRANITE WORKS”

(continued from page 1)

the foundation for this intricate piece of vibration-sensitive equipment. Of particular concern were:

- Future significant consolidation of the loose site soils under the heavy static and dynamic loads that would be imposed.
- Excavation below the groundwater table through permeable soils.
- Temporary excavation support during foundation construction.

These concerns were simultaneously and economically resolved through the use of a single ground improvement technique – Soil Mixing.

Unusual Foundation Requirements

The proposed granite saw foundation was to be constructed inside the existing building, requiring excavation to a maximum depth of 16 ft across the 25-ft. by 60-ft. foundation footprint. Areas of deep excavation were required to accommodate an access stairwell to slurry pump wells beneath the saw. Two, 30-ton granite blocks are carried into the saw’s cutting area on a flat rail car. The rail car runs beneath multiple reciprocating steel bands that grind steel shot into the granite, cutting numerous slices into the granite block. The steel shot is continually circulated by keeping it suspended in a slurry during the 24-hour period required to simultaneously cut two granite blocks into multiple, 1.25-inch thick countertop slabs.

Specifications for the Italian-made saw required that foundations extend to sound bearing soils to limit vibrations and differential settlement. Vertical loads were expected to range between 760 and 2120 psf. Dynamic loading was anticipated to reach to 110,000 lbs, cycling between $\pm 11^\circ$ from horizontal.

Difficult Ground Conditions

The geotechnical report, prepared by Marshall Engineering, Annapolis, MD showed 5 ft of loose sand fill overlaying 20 ft of very loose to medium dense clayey, silty sand. Beneath this was a stratum of loose clayey sand extending to meet overconsolidated clayey silt at 30 ft. Groundwater was encountered at 5 ft.

Given this soil profile, and the static and dynamic loads to be imposed, Marshall Engineering concluded that 10 to 12 inches of settlement should be anticipated if the structure was constructed on conventional shallow foundations. With the cost of deep foundations determined to be prohibitive, foundation construction alternatives were evaluated. As part of this evaluation, Hayward Baker proposed a soil mixing solution that would provide increased soil strength (and lower compressibility) and reduced permeability. This solution effectively addressed all three construction issues of settlement control, temporary lateral earth support and groundwater cut-off in one operation.

Design Team Approach

Once it was apparent that soil mixing would provide the best solution both technically and financially, the owner assembled a design/build team tasked with finalizing an efficient design and completing construction prior to arrival of the granite saw. Marshall Engineering and Independent Consultants & Engineers, Inc. reviewed geotechnical issues related to loads and earth retention. The owner, responsible for foundation excavation, reviewed column layout to ensure full encapsulation of the excavation by the soil mix treatment such that water infiltration and excavation support would not be an issue. Hayward Baker reviewed constructability issues and provided mixing parameters to meet

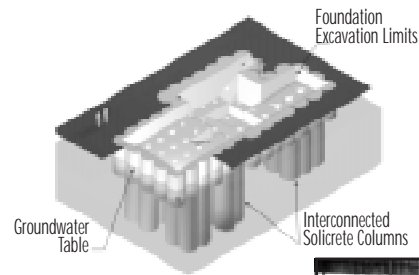


Figure 1: The Soil mixing process stabilized the soil mass below the granite saw foundation, creating a “bathtub” barrier around the irregularly shaped excavation.

Figure 2: Excavation completed through stabilized ground, below groundwater level.



the design criteria. Working together, the design team was able to expedite the final design and optimal column layout shown in Figure 1.

Balanced Grout Mix Design

With three distinct requirements to meet on the project, the cement content of the grout additive was critical. Too much cement would yield a very strong soil/grout product that could be difficult to excavate. Too little cement would yield a product too weak to provide excavation support and groundwater control. Based on previous project experience, an appropriate cement and grout additive mix was selected so that, when mixed with the soils, would result in a soil/grout product that would meet all project requirements. To ensure that the optimum cement content was maintained, the specific gravity and flow rate of the cement grout and the mixing tool penetration rate were carefully monitored throughout the soil mixing operation.

Soil Mixing Operation

Following removal of the floor slab and excavation of the upper 4 ft of soil in the area to be treated, the 74 soil mix column locations required to provide temporary excavation and a permanent foundation support were pre-augered to reduce the large volume of liquid spoil inherent with this technique. The 6-ft diameter columns extended from 11 ft to 30 ft depths, as measured from the top of the existing floor slab, to effectively encapsulate the zone to be excavated and transfer foundation loads to the competent soils below.

Wet soil mix samples were obtained during each shift and prepared for 3, 7 and 28 day unconfined compressive strength testing to ensure that the design requirement of 100 psi was being met. Based on the first few 3-day test results, initial mixing parameters were adjusted to optimize design and construction requirements of the soil mix. During excavation and following installation of the foundation and granite saw, the improved soils performed as designed, providing the needed excavation support, groundwater cut-off and settlement control (see Figure 2). As a result of this unique foundation construction, high quality, granite countertops can now proudly display the seal ‘Made in America, with Pride’.

The ASCE Engineering News is a monthly publication, except July and August, published by the Maryland Section of the American Society of Civil Engineers and is provided free to Section, life and student members. Comments or questions should be directed to the Editor.

April MD Section ASCE Newsletter

Younger Member News

by Kelly Brennan, Younger Member Co-Chair

<http://www.asce.org/gsd/sections/mdasce/ym.htm>
brennank@pbworld.com for more details.

Hello Younger Members!

We have lots of exciting events planned this month and we hope a lot of you will be able to participate! We're also still looking for volunteers for the outreach committee. Thank you to those of you who volunteered, but we still need lots of additional help. If you're interested, you can read more about it below. The upcoming events are as follows:



Annual Boy Scout Service Project

Saturday, May 5th

This annual service project involves doing much needed work at a local Boy Scout Camp. More details will be available in the near future. Contact Mandy Cody at acody@jmt-engineering.com for more details.



First Annual Spring Hike

Sunday, May 13th

Get your hiking shoes ready! ASCE YM's are going to do a short hike at Oregon Ridge Park followed by a picnic lunch. Get outside to enjoy the warmer weather and meet some new friends! Wives, husbands, and significant others are welcome too! Check the web site for more details!



May Outreach at Perry Hall Middle School

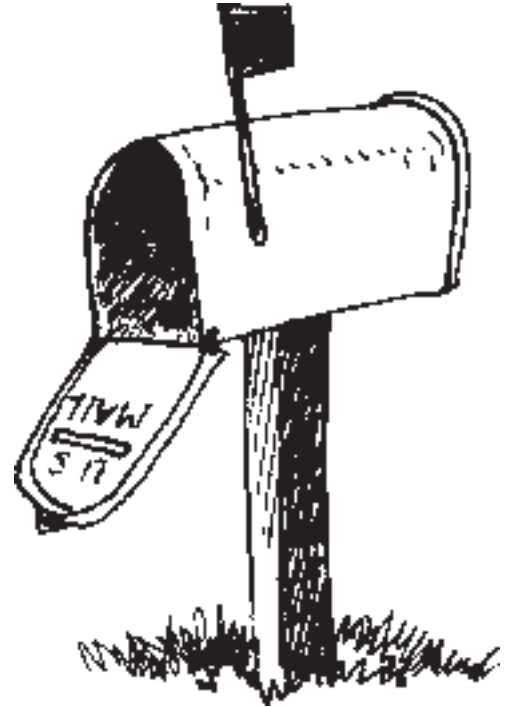
We are lucky enough to have Mr. Doddo at Perry Hall Middle School volunteer to be our "guinea pig" for the middle/high school outreach program. We are looking for a structural engineer (or someone who's interested in helping kids build stick/straw bridges) to help out for one class session sometime in May. We will loan Mr. Doddo the "Building Big" videos to show to his 8th grade class and he is going to teach a unit on structures and building bridges. The students will have the chance to apply what they learn in a bridge building challenge and they'd love some help from a practicing engineer. If anyone is interested, please contact Kelly Brennan at

Younger Member Outreach Committee

Contact: Kelly Brennan, brennank@pbworld.com

We are going to be forming a Younger Member Outreach Committee for all of those interested in doing any sort of volunteer activities. The main focus (at least initially) will be on elementary and high school outreach programs. Kelly Brennan (brennank@pbworld.com) will be the chair of this committee and we are looking for other interested members to volunteer. Volunteers to this committee can simply attend committee sponsored events or they can help see them out and plan them. Also, participating in outreach events is not limited to YM's. We encourage everyone to get involved! The time you wish to devote to the committee is up to you!

Needless to say, there are lots of volunteer opportunities available. We need help developing our Outreach Program from other YM's like you. If you are interested in any of the above activities, please contact Kelly Brennan at brennank@pbworld.com. I will compile a list of interested volunteers and we'll try to set up some new activities. Also, if you'd like to take a more active role such as being in charge of the "West Point Bridge Designer" or "School Visitations" that would be great!



NATIONAL ASCE NEWS

ASCE Launches New Web Site: If you've visited ASCE's web site (<http://www.asce.org>) recently, you may have noticed that ASCE has launched a re-designed site. The web site has been re-organized into sections by communities of practice, ASCE member resources and information, and public audiences.

You can find public policy information in the "Professional Community" section under "Professional Issues." While much of the information remains from the previous web site, the new site has a few additions, such as on-line discussion groups like the Government Relations Discussion Forum. If you have any questions or comments about the government relations and public policy section of the new web site, please contact us at govwash@asce.org.

ASCE SECTION ANNOUNCEMENTS

KCI Technologies, Inc., a Hunt Valley, Md-based engineering firm, has appointed James M. Gellenthin, PLS, and Joseph J. Pfeiffer, Jr., PWS, to the position of vice president. Gellenthin heads KCI's surveying division in North Carolina. Pfeiffer leads the company's environmental planning and construction operations in the Southeast.

Gellenthin joined KCI in 1995 and quickly expanded the office's surveying team of three to a profitable regional division with five, three-person crews. In the past year, he helped launch a subsurface utility engineering (SUE) business unit that uses minimally invasive technology to locate and map underground facilities. With more than 12 years of experience, Gellenthin has worked extensively with the Department of Defense and with private and public sector clients on Federal, State, and local projects. He maintains professional survey licenses in North Carolina, Florida, and Tennessee and is a member of the North Carolina Society of Surveyors.

Pfeiffer joined KCI in 1988, and worked at corporate headquarters until 1996, when he became the senior environmental scientist in the Raleigh Office. As a licensed professional wetland scientist, Pfeiffer brings a unique blend of technical expertise to wetland mitigation, watershed analysis, and stream restoration projects in both the design and construction divisions under his direction. Pfeiffer attended Towson University in Maryland, where he earned a bachelor's degree in natural science and a master's degree in environmental planning. He is a sustaining member of the Society of Wetland Scientists.



The Consulting Engineers Council of Maryland (CEC/MD) presented its Grand Award for Engineering Excellence to the team of KCI Technologies, Inc., of Hunt Valley, MD, and Parsons Brinckerhoff Quade & Douglas of Baltimore, MD, for the Baltimore-Washington Maglev Project. The council also recognized

the engineering achievements of eight other projects and presented its inaugural Excellence in Journalism Award to Paul Samuel of *The Daily Record* and President's Award to Emil Kordish, PE, retired partner of Rummel, Klepper & Kahl, LLP. Sam Carnaggio, PE, director of the Office of Engineering, Federal Transit Administration, served as master of ceremonies for the 2001 Engineering Excellence Awards banquet, held at the Engineers Club in Baltimore, MD.

CEC/MD also presented the following awards:

HONOR AWARD

Whitman Requardt and Associates, LLP, Baltimore, MD for *Scarborough Road in Dover, DE*

MERIT AWARD

James Posey Associates, Inc., Baltimore MD, for the *Geothermal Heat Pump System, Piney Orchard Elementary School, Odenton, MD*

ACHIEVEMENT AWARDS

- Century Engineering, Inc., Towson, MD, for *US 113 Modified Design-Build, Worcester County, MD*
- HNTB Corporation, Annapolis, MD, for the *Downtown Expressway Rehabilitation, Richmond, VA*
- Leach Wallace Associates, Inc., Baltimore, MD, for the *Washington Hospital Center, Washington, D.C.*
- URS Corporation, Hunt Valley, MD, for the *Baltimore-Washington International Airport, Runway 28 Deicing Facility*
- URS Corporation, Hunt Valley, MD, for the *Clifton Avenue Bridge Replacement over Windsor Mill Road, Baltimore, MD*
- Whitney, Bailey, Cox and Magnani, LLP, Towson, MD, for the *Delaware I-95 Reconstruction*

ASCE NATIONAL CONGRESSIONAL FELLOWS PROGRAM

ASCE is recruiting a new Congressional leader. Applications are now being accepted for the 2001-2002 ASCE Congressional Fellow. The Fellowship is an opportunity to spend a year on Capitol Hill working as a staff member either on a committee or for an individual member of the U.S. Senate or House of Representative. This is an opportunity to gain hands-on knowledge of the congressional decision making process.

Congress makes important decisions on a multitude of technical issues, many of which directly impact how Civil Engineers conduct their professional practice. Congress will make these decisions with or without technical expertise. The ASCE Congressional Fellows program works to ensure that sound technical advice is available.

David Westerling, ASCE's fourth Congressional Fellow, recently completed a very successful year. He was heavily involved in the debate on environmental issues. ASCE's current fellow, Yumei Wang, is working on environmental and infrastructure issues with Senator Ted Kennedy.

The selection process is getting underway for the next ASCE Congressional Fellow. The Fellowship year begins on September 1, 2001 and runs through August 31, 2002. Applications are due no later than April 6, 2001, with the selection of the Fellow by early June. ASCE will provide a stipend and some relocation expenses.

If you have questions or would like an application, please contact Martin Hight in the ASCE Washington Office by phone at 202-789-2200 or toll-free at 1-800-548-2723 ext. 5125 or by E-mail to mhight@asce.org.



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For further information contact:

Tel.: 301-405-0362

email: enpm-program@eng.umd.edu



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<http://rongo.ce.jhu.edu/ascemd>

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DATED MATERIAL INSIDE

– MEETING NOTICE – AMERICAN SOCIETY OF CIVIL ENGINEERS

Date: Wednesday, April 11, 2001
Time: 6:00 P.M. — Social Hour
7:00 P.M. — Dinner
8:00 P.M. — Technical Program
Place: The Engineering Center; 11 W. Mount Vernon Place
Speaker: Mr. S. Trent Parkhill, Vice President
Haley & Aldrich, Inc., Boston, MA

Program: 150 Years of Geotechnical Design and Construction
Abstract: Take a captivating visual tour through 150 years of geotechnical design and construction. Mr Parkhill will illustrate major advances in underground design methods and the evolution of underground construction equipment. He will also show how historical events have driven the development of this field. Specifically, the presentation will concentrate on 1) "pre-Soil Mechanics" foundation design practice; 2) the evolution of foundation construction equipment and methods; and 3) the evolution of Soil Mechanics and post-Soil Mechanics foundation design practices. Hundreds of rare old photographs will be used to illustrate the development of all aspects of geotechnical practice. This presentation is based on the 1999 Clemens Herschel Award winning paper and should be of interest to all types of practicing engineers and contractors interested in the evolution of construction equipment and anyone else interested in the interaction of history and the development of civil engineering.

Member	\$27.00
Spouses:	\$35.00
Guests:	\$35.00
Non-Members:	\$35.00
Non-Dues Paying Members (MD Section):	\$35.00
Students:	\$14.00

Reservations: _____ (Total Members & Guests)

- Reservations will be considered firm and billed unless cancelled by not later than Monday noon prior to meeting.
- Cancellations must be submitted via mail or fax.
- Reservations can only be held until 6:45 p.m.
- Seats will be available for dinner after 6:45 on a first-come first-serve basis.
- If you are unable to attend dinner, you are welcome to attend the meeting at 8:00 p.m.
- Checks should be made payable to:

Engineering Society of Baltimore, Inc.

- All reservations and cancellations should be sent to:

Engineering Society of Baltimore, Inc.

11 W. Mount Vernon Place, Baltimore, MD 21201-5190

Fax (410) 539-3047

email: stephanie@esb.org

Attention: Ms. Stephanie Hill

Name: _____ Phone: _____

Guests: _____

Mail, fax or email by: April 9, 2001, 12:00 noon

FUTURE MEETING DATES:

May 9, 2001

June 13, 2001