

Foundation DRILLING



MAY/JUNE 2017

**Posillico, Moretrench
and Mueser Rutledge
Design and Construct a Bathtub
for New York City Transit's
46th Street Vent Plant**

**A Selfie of IAF Trustee
Jim Melcher**

**ROC: Excavating
the Impossible**

**33 Congress Square
A Case Study and
Call For Code Restrictions
By Hub Foundation**

**13th International
Workshop
on Micropiles**

**Obtaining Safety
Intervention Grants**

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Posillico installed a modular road decking system supported by a secant pile wall support of excavation. This allowed for low headroom excavation and bracing while maintaining traffic and access for emergency vehicles.

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The project consisted of the interior of four structures that were selectively demolished to allow for the internal addition of a new concrete core plus a 7-story glass curtain wall addition on top of the existing 11-story buildings. The foundations of the new office building will be supported on high capacity drilled micropiles.

51 13th INTERNATIONAL WORKSHOP ON MICROPILES

The International Society for Micropiles (ISM) in alliance with ADSC: The International Association of Foundation Drilling and Deep Foundations Institute held its 13th International Workshop on Micropiles in Vancouver, BC, Canada on March 29-April 1, 2017.

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Scherzinger Drilling provided this informative article in the hope that other contractors will research this type of program in their area.

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—ABOUT ADSC—



The International Association of Foundation Drilling

Impacting the Industry for Over Half a Century

ADSC: The International Association of Foundation Drilling has served the industry for over 60 years. ADSC is a leading professional trade association, comprised of companies and individuals who work together to advance all aspects of the industry, including conducting research, placing special emphasis on quality assurance and quality control, all while stressing the importance of providing a safe working environment.

ADSC members design, construct, and provide equipment and services for drilled shaft foundations, anchored earth retention systems, and micropiles; for buildings, highway bridges, power plants, dams and similar structures. Our members' expertise covers the entire spectrum of foundation engineering, from design through construction including confirmation testing.

The ADSC promotes ethical business practices, quality products, and quality services. This is what sets ADSC specialty subcontractors, engineers, manufacturers and suppliers ahead of the rest in the industry.

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ADSC and NCCCO, In It for the Long Haul

By Michael D. Moore, ADSC CEO

At a time when you thought it could not get any busier; think again, it did! To say there is an abundance of activity currently taking place within the ADSC would be a huge understatement. In fact, it has gotten so calendar crazy there is concern among membership that it is next to impossible to keep up with all the activities and events that center around the multitude of association initiatives, let alone the matters that impact our industry in general.

One of the most important industry initiatives requiring our involvement at this particular time is the Foundation Drill Rig Operator Certification program. ADSC recently took the next step forward in this process by participating in a task force meeting with National Commission for the Certification of Crane Operators, which will ultimately create a certification program for drill rig operators. In April, a group of over forty member and non-member subject matter experts (SME), primarily represented by owners, contractors, and manufacturers, gathered in Grapevine, Texas, for a kick-off meeting that began the long and tedious process of working towards the development of this program.

There were many great things that came out of that meeting, however, perhaps one of the most prolific outcomes was that the program will address foundation drill



ADSC CEO, Mike Moore and ADSC President Lance Kitchens accept appreciation plaque from Denny Smith, NCCCO.

rigs in general. Up to this point, it was assumed the program would focus on rigs specifically utilized for the installation of drilled shafts; however, after a great deal of deliberation and

consideration the task force determined the program scope would expand to include all

(continued on page 8) ►



NCCCO's Denny Smith leads a discussion group at the Grapevine, Texas meeting.

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Member and non-member subject matter experts (SME), primarily represented by owners, contractors, and manufacturers, gathered in Grapevine, Texas, for the ADSC/NCCCCO kick-off meeting.

foundation drill rigs, thus incorporating all drilling technologies endorsed by the ADSC.

The expanded scope creates a broader appeal to ADSC membership as a whole than was first anticipated; **and as a result it is important for you to know that it is not too late to join the task force.** This is done by first completing and submitting the application, which can be found on the ADSC website, then submit to NCCCCO, who will lead us through the process to develop foundation drill rig certification. ADSC chose to enter into partnership with NCCCCO due to their expertise and experience. ADSC is highly involved in this process mainly to provide subject matter experts, and the benefit to this is the ability to protect the best interest of ADSC contractor and associate members.

Currently there are seven, 2-3 day, task force meetings scheduled. Tentative dates and locations are as follows:

1. June 27-29, Conroe, Texas (confirmed)
2. August 15-17, Indianapolis, Indiana

3. September 19-21, Salt Lake City, Utah
4. November 14-16, TBD
5. January 30-February 1, TBD
6. February 13-15, TBD

As stated earlier, this is a process! It will take an estimated eighteen months to accomplish the goal. It is a marathon; not a sprint! At the

end of the day the goal is to assure the production of a quality product that is constructed safely. In taking this path, the opportunity exists to be influential in something that is likely to greatly impact the way in which you conduct business in the future.

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PRESIDENT'S MESSAGE



Safety for ALL

By Lance Kitchens, P.E., ADSC President

The past few years we have witnessed the development of several buzz phrases. Many in the country have debated over which lives matter. It has also been discussed in education circles that no child be left behind. I would suggest that when it comes to safety in the workplace, **all lives matter and no worker should be left behind.**

Safety in the workplace; or at least the desire

to be safe, has improved over the years. Many factors have contributed to an increase in safety awareness.

- OSHA's (Occupational Safety and Health Administration in the United States) and CCOSH's (Canadian Centre for Occupational Health and Safety) efforts to educate and enforce standards has contributed.

- Insurance companies tying premiums to safety records has contributed.

- Owners requiring contractors to maintain satisfactory safety records in order to work on their site has contributed.

- Company owners recognizing the expense associated with accidents and working diligently to prevent them has contributed.

- The rapid spread of news and the stigma associated with having an accident has contributed.

In today's environment, an accident in the morning is known worldwide the same after-



What's wrong with this picture?

noon. This means OSHA/CCOSH, your insurance company, your clients, your competitors... all know about your accident. And while there are outside forces that contribute to improved safety; ultimately, safety needs to be a collective effort – supported and reinforced by leadership and owned by employees. It is the desire of the business owner to protect their employees that has the most impact.

Within the U.S., there is still room to improve.

(continued on page 12) ►

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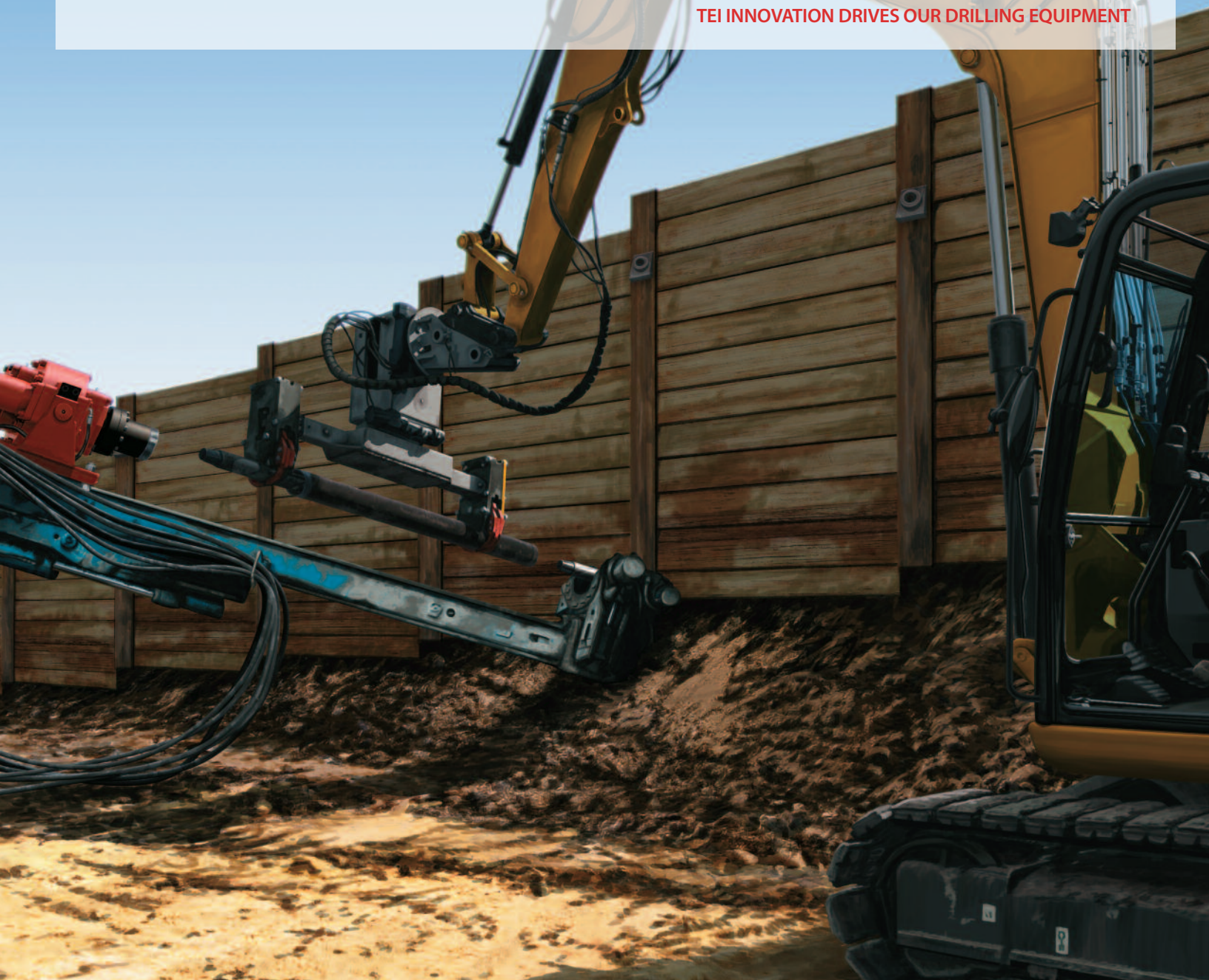
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From OSHA's own website; the United States Congress created OSHA, a national public health agency dedicated to the basic proposition that no worker should have to choose between their life and their job. The OSHA law makes it clear that the right to a safe workplace is a basic human right. However, Congress chose to exclude public workers from the law. While less than half of the states have a state administered OSHA program; over half of the states have no safety standards for their public employees. There are thousands of workers who are being left behind on safety education, making it appear their lives don't matter.

Not only do ADSC members work for public agencies, but often times public agencies self-perform the same work as ADSC members. It can be difficult for private sector contractors working for public agencies to implement and adhere to safety standards. The public employees don't recognize or

fully understand the benefits of the required safety protocols. It is not uncommon for a public employee to walk onto your job site with zero PPE (hard hat, reflective vest, safety glasses); and that's the minimum safety standard. It's not the public employees fault, they haven't received safety education from their employer and they aren't held accountable for adhering to any safety standards.

ADSC continues to invest in safety initiatives to advance the safety protocols for the industry as a whole. Perhaps our members have suggestions or recommendations on how ADSC can play a role in improving safety awareness for the public employee sector. If so, please contact ADSC Safety Director Rick Marshall at rmarshall@adsc-iafd.com.

In the meantime, be safe.

ADSC

YOUR COMMENTS

ADSC's BD Smith Receives Praise

Sherry,

Just wrapped up another WCC Annual Meeting. Joe and I are staying two extra days, which we've not been able to do before because we had to get back to Bogey. The resort is lovely and the weather is good!

It sure was great having BD here, he was such an amazing help. BD anticipated what I needed done without my asking. He was a ton of help, is an absolute joy to work with, and several members mentioned how happy they were that he was there to help us and how much we appreciate the support of ADSC.

Thank you,

Becky Patterson, ADSC West Coast Chapter Administrator

Recent *Lost in Engineering* Article Praised

The article *Cutting Out the Middle Man, Not Really* by ADSC Technical Advisor, Peggy Hagerty Duffy on page 73 in the April issue of *Foundation Drilling* receives praise. (Editor)

My Dear Peggy,

Terrific article in the April issue of *Foundation Drilling* regarding engineers / manufacturers / contractors. You really are an excellent communicator. Great quote by Terzaghi.

One help is pre-bid constructability review by engineer and contractor, although some think this gives the collaborator an edge in bidding. A refinery asked if we could access and do what he wanted. After a site visit, I said difficult but doable. We were not the low bidder and our competitor showed up – said he could not do it – they changed the job. The refinery heard from me about that.

Warmest regards,

Dale C. Biggers, P.E., Vice President
Boh Bros. Construction Co., L.L.C.

P.S. We will hire the next shoeless orphan who shows up at our door.

ADSC



The banner features the ADSC logo (The International Association of Foundation Drilling) in the top left. The background is a silhouette of the Montreal skyline against a blue and orange gradient sky. The word 'Montreal' is written in a large, white, cursive script across the middle. Below the skyline, the text 'Summer Meeting 2017' is prominently displayed in a large, bold, black font. Underneath this, in a smaller black font, is 'Hyatt Regency Montréal • Montréal, Quebec, Canada'. Below that, in a bold, italicized black font, is 'August 1-3, 2017'. At the bottom, in a large, bold, black font, is 'Register Now www.adsc-iafd.com'.

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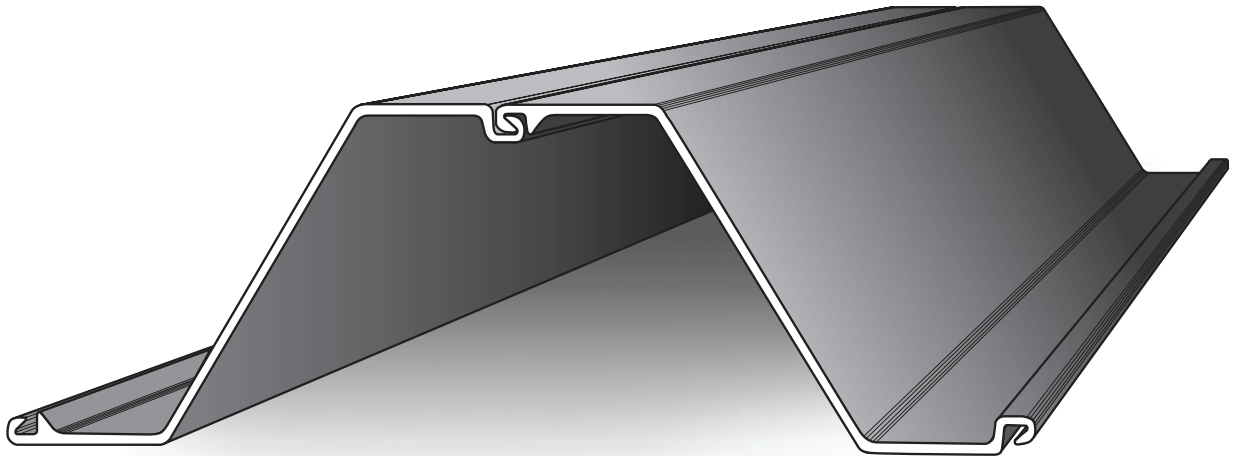
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A Selfie of IAF Trustee Jim Melcher

This is the fourth in a series of articles about the ADSC Industry Advancement Fund (IAF) trustees, with the goal of familiarizing ADSC members with those who manage and direct the fund. In this issue, Chairman Jim Melcher (Tri-State Drilling, Inc.) gives us a brief personal look into his background and the path that brought him to his position with the Fund. (Editor)

Tri-State Drilling, co-founded by my father, Bob Melcher, joined the ADSC way back in the early 1970s. My parents attended the 1975 summer ADSC meeting at Tan-Tar-A Resort in Lake of the Ozarks, Missouri but I had just started working summers for Tri-State, so I did not join them. It was not until 1985 that I had my first professional exposure to the ADSC, at a drilled shaft and anchored-earth retention workshop in Seattle. There I met ADSC Past-President Don Morin as well as Dr. Michael O'Neill, Jack Watson and Scot Litke. I had only been working full-time for Tri-State for just over a year, so I was pretty green. A treasured memory of that trip is Jack Watson sizing me up and informing me, "Kid, you're not as dumb as you look." (Anyone who knew Jack will recognize that as a high compliment. At least, that's how I decided to take it!)

Along about 1987, I was privileged to attend my first ADSC annual meeting, an equipment show down in San Antonio, with the "Colonel," Bill Guinn presiding as President. Equipment shows were so much smaller back then. I remember there being only a handful of rigs, and a small row of display tables in a tent. Most memorable for me at that meeting was the armadillo race. Being an armadillo lover from way back, my wife, Ruth, was the first one to volunteer to launch one down the track. I don't recall that our armadillo won, but I was proud that Ruth got in the spirit of things at her first meeting.

My folks, Bob and Lorraine Melcher, had nine children and it's lucky they did. It took at least seven (I was the seventh) to get one fully committed to the family business. I also followed Dad's lead into the ADSC. By 1987, he was on the ADSC Board of Directors, and was soon to do a stint as Treasurer. Dad's affection and enthusiasm for the ADSC was—and still is—infectious. The ADSC has been an important part of my life for all of my professional career—33 years and counting.

Being a younger member of a large family often put me in the position of being an interpreter of opinions and acting as diplomat. I am used to being in a crowd, with folks on all sides expressing their views. Because of this, I think I've developed a desire to help give differing perspectives a fair hearing and make them clearly understood.

Maybe it was this tendency that brought me to the attention of the ADSC board leadership at the earliest ADSC meetings I attended. I don't think I contributed anything particularly original, but just by speaking up, the leadership noticed me and, soon after Dad left the board, I ran for a seat myself. I was elected in 1992, the year the late Tom Buzek became ADSC President. I remember Tom immediately asking me what committee assignments I would prefer. "IAF Research and IAF Scholarships," I quickly responded. Coincidentally, Tom was just exiting those committees, so he appointed me to the seats he was vacating. From that early involvement to the present day, of all our association comprises, the IAF has always been the closest to my heart.

I served on the Scholarship Committee for six years, eventually becoming chairman. Reading through the applications every year was a difficult and time-consuming, but rewarding task. We were presented with 50 to 70 applications, which we narrowed down to the top 20. Then we ranked them. It's amazing to me how each committee member's rankings are unique, and yet everyone seems to name the same core of six or seven candidates some-



Jim Melcher

where in their top 20. It's actually more difficult to agree on numbers 19 and 20 than the top ten. Best of all, I never tire of what I consider to be the great honor of meeting, at the annual meeting, the outstanding students we were privileged to pick and award scholarships. Over their careers, many of our scholarship winners have become influential members of the geo-engineering community, something of which we should all be very proud.

While serving as the Research Chairman, I had the honor of being involved in the FHWA "Effects of Freefall Concrete"

research project along with our researchers at STS, including ADSC Outstanding Service Award winner, Clyde Baker. The report from this project has had a great impact on our industry, and it exemplifies the best of what the united dedication and foresight of this association can accomplish.

Those in this association who know me well know I am a process guy—I am most comfortable when the rules are clearly stated and everybody follows them. (That's another trait easily developed in a large family.) So it's no surprise to me that I was tasked with drafting the first version of the IAF Funding Request Procedure. It's been amended many times over the years, but I still have a sense of pride and ownership for it.

In 1995, ADSC President Richard Millgard appointed me Treasurer. Both Richard and his successor, my friend and fellow Trustee, Bruce Long, were kind enough to support my advancement to Vice President, but I decided to take a year off after six years on the Board. Ruth had been raising our two young children, Gus and Greta, and it made sense to back off just a bit and help her out more.

When I returned to the Board in 1999, Ty Savage was President, and I worked as Vice President under his wing for a year until I became President in 2000. The next two years went by in a flash. Although I had prepared myself for the office by joining Toastmasters and studying parliamentary procedure, the presidency itself was more formative than I had anticipated. As I told the Board in my "farewell address," I felt I had grown substantially during those two years. In fact, I felt that I had gained more from the organization than it had from me, so much so, that I felt I owed the ADSC my gratitude and service.

So I stayed engaged. In 2007, my father, who had been serving for several years as an IAF Trustee, stepped down from that post. I agreed to serve when the Trustees nominated me to fill the seat. I have been Chairman of the IAF Trustees for the past seven years.

Over the coming months, these columns will detail more of the important work the Association has been accomplishing through the Industry Advancement Fund. There is so much important work still to be done. Our businesses greatly benefit from the successful completion of the research projects the IAF undertakes, and I thank everyone for their past support.

This year, the Industry Advancement Steering Committee has launched a fund drive to ensure that we are able to accomplish the important work to come. I urge you to participate in this effort. You can donate at the new IAF website (www.industryadvancementfund.org) or respond through the contribution requests currently going out to all members with the annual dues invoices.

If you have any questions, please call the ADSC office at (469) 359-6000 or feel free to contact me or any other IAF Trustee, including our latest addition, Jim Maxwell of Hub Foundation Company.

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In The Dry – Installing the lower level of bracing. Moisture on the secant pile wall give an indication as to the height of the groundwater table.



Introduction

One of the most admired men in the New York City foundation business, Mel Febish of Urban Foundations, said to me a long time ago, "kid, if you never make a mistake, you'll never win a bid." I can also say that, in my personal experience, the things I know best, I know from the mistakes I have made. And, I think, it's also generally true that in the engineering/contracting industry we have chosen, we are loathe to discuss our mistakes – sometimes even prohibited from discussing them because of legal implications. Well this job starts with what might be viewed as a tactical error in the bid process and then, as a result of "winning" the bid based on this tactical "mistake," we did what we engineers often do: *our best work with our backs against a financial wall.*

60 Feet Across – The new vent plant extended from face-of-building on one side of 46th Street to face-of-building across the street. The homes remained occupied and the businesses remained open.



COVER FEATURE

Posillico, Moretrench and Mueser Rutledge Design and Construct a Bathtub for New York City Transit's 46th Street Vent Plant

By Andrew Burns, P.E., Posillico*

In 2014, Posillico was the low bidder on a public "rip and read" bid to construct a new below-grade emergency vent plant for New York City Transit (NYCT) at 46th Street and Northern Boulevard in Long Island City in the borough of Queens. The project called for a contractor-designed support of excavation (SOE) and groundwater cutoff system or a "bathtub." The bathtub was to be constructed so as to adjoin an active subway structure and within close proximity to private commercial and residential properties. Posillico priced the job based on a preliminary design utilizing ground freezing for both SOE and groundwater cutoff. Due to the stringent specified tolerances for vibration, settlement, and groundwater drawdown, Posillico hired ADSC Technical Affiliate Member Mueser Rutledge Consulting Engineers (MRCE) to design the SOE and cutoff system and charged them with getting that system approved by NYCT.

MRCE had experience with ground freezing and strongly advised against it due to concerns about heaving ground causing damage to the adjacent structures on shallow foundations. Now it should be mentioned that Posillico was low bidder by less than one half of one percent...and the original bid drawings showed an SOE "concept" featuring a secant wall drilled a hundred feet deep down to bedrock. Posillico chose the ground freezing because it was cheaper and faster than the secant wall. So, here is Posillico with a great contract opportunity won through a competitive sealed bid process being told that the right way to build the job is with a secant wall that is not in their budget. Time to put on the thinking cap!

After examining many options, Posillico, working with MRCE, came up with a plan to install secant piles to the minimum depth required for SOE and install a permeation grout curtain wall from the bottom of the secant piles down to bedrock. Posillico subcontracted with ADSC Contractor Member Moretrench to furnish and install the permeation grout curtain ground water cutoff.

The Program and Site Conditions

The purpose of the new vent plant is to evacuate bad air and replace it with fresh air in the event of an emergency inside the subway tunnel. The new below-grade vent plant occupies a 40 foot tall chamber approximately 50 feet wide by 120 feet long built underneath 46th Street and Northern Boulevard. In order to function, the vent plant needs to be connected to the subway tunnel. The E/M/R subway line runs under Northern Boulevard. In plan-view, the new facility occupied an entire short city block from almost face-of-building to face-of-building across the street and also crosses Northern Boulevard.

The project presented some major challenges including a relatively small site, with private adjacent properties supported on shallow foundations,



Detail of the Decking Construction – Most of the excavation and all structural concrete work and mechanical installations were performed below a panelized decking system supported by the secant pile wall.

(continued on page 20) ➤

POSILICO, MORETRENCH, MUESER RUTLEDGE Contd.

a very busy thoroughfare, numerous active utilities, a high water table, and very dense glacial till with cobbles and boulders – and an aggressive schedule. Additionally, the contractor-designed SOE and groundwater cutoff system needed to severely limit settlements of adjacent structures and groundwater drawdown while minimizing exposure of the subway tunnel



Big Boulder – “Drilling in this part of Queens can be challenging, with multiple boulders per hole and some as much as 13 feet thick, this site lived up to the area’s reputation,” says James Myers, P.E., Project Manager for Moretrench.

to construction vibration. It was a contract requirement to maintain traffic along Northern Boulevard as well as to maintain and protect various utilities including active 48-inch diameter water and sewer mains as well as an oilstatic power transmission line running beneath Northern Boulevard.

It was also a contract requirement that uninterrupted access be maintained to the adjacent buildings – which included several businesses and



Inches to Spare – Posillico’s Delmag RH34 on Northern Boulevard with the Manhattan skyline in the distance.



private homes. Since the homes remained occupied and businesses remained active, it was necessary to provide emergency vehicle access when

work was not going on. The buildings themselves are supported on shallow foundations at the top of a 20 foot thick medium dense silty sand layer. Below the silty sand, lay a thick deposit of dense glacial till with cobbles and boulders down to bedrock. Bedrock lay at a depth of approximately 100 feet below existing grade.

Design Alternatives

Although the SOE and groundwater cutoff systems were to be contractor-designed,

Competing for Space – Drilling secant piles, permeation grouting, and pumping concrete all at once.

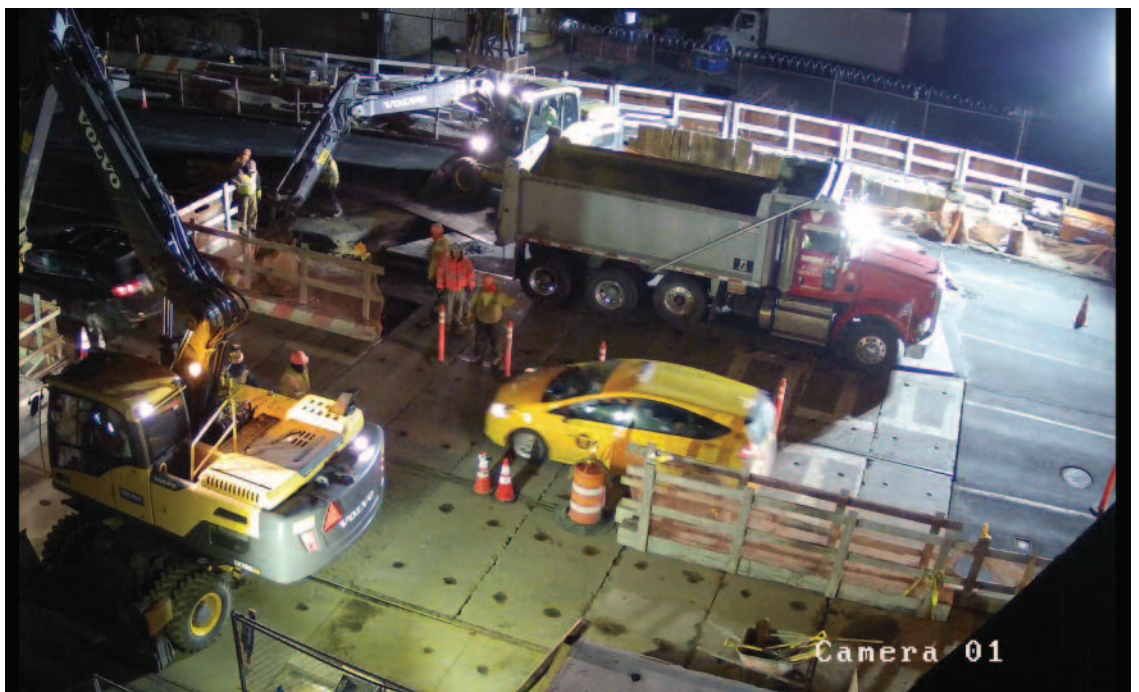


Inching Across Northern Boulevard – The underground structure crossed Northern Boulevard – a main commuting thoroughfare – so the work from up top had to be performed in narrow work zones while traffic passed on either side.

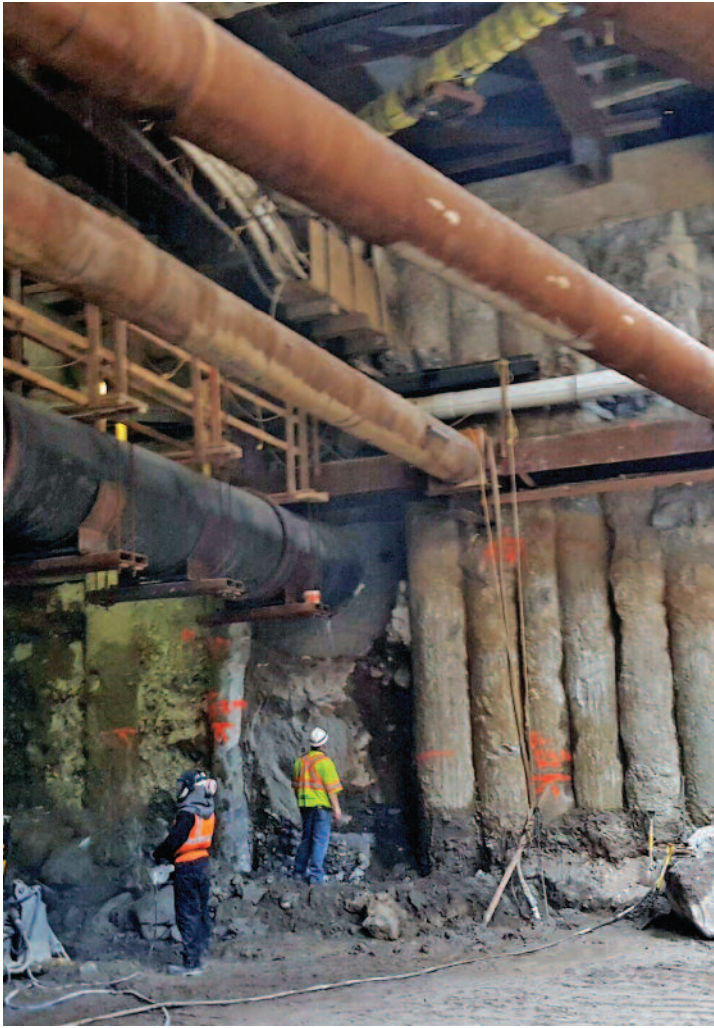
the bid drawings schematically showed a secant pile wall installed from existing grade down to bedrock to provide both SOE and groundwater cut-off. This would have made the secant piles approximately 100 feet deep with the bottom 70 feet through the glacial till. Due to proximity to the subway tunnel and strict settlement and vibration criteria, it was necessary to drill the 1000 mm diameter secant piles with a Kelly bar and conventional tools (augers, buckets, and barrels) with a large high-torque drill rig. Posillico, having experience with secant wall construction and difficult drilling conditions, knew the cost and duration of such construction – including the cost of repairs to damaged expensive tooling and temporary double-wall segmented casing. This knowledge lead Posillico to look for a different design approach and alternate means and methods during

the bid process. As mentioned, Posillico carried the cost of soil freezing in the bid price but decided against it after being awarded the contract.

(continued on page 22) ➤



Night Work – This photo of night work on Northern Boulevard, shows the decking system in place.



Inspecting the Jet Grout – In the middle of this photo, a worker inspects the jet grout (serving as both SOE and groundwater cutoff) below an active black 48-inch diameter sewer main.

Secant pile walls are very stiff and, thus, are capable of providing excellent control of settlements. Posillico and MRCE examined alternate designs which featured shorter secant piles. Utilizing a shallower secant wall – to the depth required for the structural SOE, they explored the option of a concrete tremie plug with soil anchor tie downs. This was determined to be less economical than a permeation grout curtain wall drilled and grouted from the base of the secant pile wall and down to the top of the bedrock.

Three factors likely led to this conclusion. First, sleeves could be installed through the secant piles to speed up installation of the tube a manchettes required for permeation grouting. Secondly, the glacial till would either be dense and of low permeability or have voids and be extremely groutable. Soil conditions could vary from location to location but, either way, permeation grouting was expected to be effective. Lastly, the project required jet grouting to provide closure between the secant pile wall and the subway tunnel as well as to provide both SOE and groundwater cutoff around the major utilities, so the permeation grout mobilization cost was absorbed in that of the jet grouting.

Once the determination was made to pursue the secant pile wall and permeation grouting option, computer modeling was employed to analyze the soil structure interaction and groundwater drawdown. Results suggested that construction would be possible with this system while keeping both settlement and drawdown within the strict project limits.

Construction Sequence

The schedule necessitated two large drill rigs on the small site for secant pile installation. In the **secondary** secant piles (which receive the core beams which act as soldier piles for the SOE system), steel pipe sleeves were attached to the core beams to facilitate drilling of the holes for installation of the tube a manchettes for permeation grouting. Secant pile wall construction requires a detailed installation sequence of installing alternate piles. This leads to each rig requiring enough room to keep working efficiently and, along with laydown of the core beams and drill tools and casing not to mention access for concrete trucks, space was at a premium.

Drilling secants through the cobbles and boulders slowed progress greatly. Tools required constant repair and replacement. The same was also true for the starter casings. In some cases, a newly rebuilt starter would last one hole – and then require a complete rebuild before being used again.

Piezometers were installed just outside the secant wall so as to test the effectiveness of the system to limit the drawdown of groundwater outside of the bathtub. Early in the secant wall construction process, once two walls of sufficient horizontal length were installed, a groundwater pump test program was conducted by Moretrench to verify the cutoff effectiveness of the grouting. A jet grout test program was also used to verify that the jet grout would satisfy the strength and imperviousness requirements. It should be noted that Moretrench's work required small diameter drilling through the same cobbles and boulders in the till layer. To make this drilling more productive without the risk of causing settlement of adjacent structures, Moretrench employed the use of down-the-hole water hammers.

The secant pile wall also acted as a foundation support for the temporary road decking system required to keep the traffic flowing down Northern Boulevard and keeping 46th Street open for emergency vehicle access during off-hours, as previously mentioned. This meant the excavation had to be performed and SOE bracing elements had to be installed beneath the decking system in restricted headroom. Numerous utilities had to be maintained and supported off the SOE system. Posillico installed drilled micropiles as soldier piles for portions of the work involving the 48 inch diameter sewer main.

Conclusion

While the secant drilling was brutal, slow, and costly – one expert driller I have worked with for almost twenty years suggested it was the toughest



Worn Out Starter – It was not uncommon to have to rebuild a segmented double wall starter casing after drilling one hole.

soil he had ever drilled in his career – the system worked. Vibration and settlements were monitored with a real time data acquisition system installed and monitored by MRCE. Settlements were detected but were kept within limits such that no damage was caused to the adjacent structures. It is speculated that the settlement which did occur, occurred as a result of removing cobbles and boulders during the advancement of the temporary casing during secant pile installation. During the project, in an effort to reduce the duration of secant pile wall construction as much as possible, the primary piles were shortened to the minimum depth required to act as lagging between the secondary piles and additional permeation grouting was performed to seal up the windows between the secondary piles.

As excavation proceeded *in the dry* to a depth of 20 feet below the water table, maintained outside the secant wall with negligible draw-down, it became apparent that the entire system performed beyond the best possible expectations. It is calculated that not drilling the secant piles down to bedrock probably shortened the duration of the project by as much as six months or more. It's hard to imagine what the cost of that drilling would have been since, as the readers of this publication know well, the bottom 35 feet would have been, by far, more expensive per foot than the 65 feet installed.

Posillico, despite the inauspicious conditions surrounding the "winning of the bid" for this project, working together with ADSC fellow members Moretrench and Mueser Rutledge succeeded in installing one tough bathtub.

Myers, P.E., of Moretrench, and David Sposito, P.E., of Posillico in contributing to this article.

**Andrew Burns held the position of Chief Engineer of NYC Operations for Posillico during the work performed in this article. (Editor)*

Project Team

Project Owner:	New York City Transit
General Contractor:	Posillico Civil
Geotechnical Design Consultant (to Posillico Civil):	Mueser Rutledge Consulting Engineers*
Secant Pile and Micropile Subcontractor:	Posillico Drilling*
Permeation and Jet Grouting Subcontractor:	Moretrench*

**Indicates ADSC Member*

Acknowledgements

I would like to acknowledge the efforts of Sitotaw Fantaye, P.E., and Lisa Papandrea, P.E., of Mueser Rutledge Consulting Engineers, James

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ROC Equipment: Excavating the Impossible

By Peggy Hagerty Duffy, P.E., D.GE, ADSC Technical Advisor



Differing sites drilled in the 1960s.

Island Mystery

Scientific breakthroughs typically occur in what appears to be a natural rate of progress. Sometimes, a serendipitous action will turn into an earth-shattering discovery, but most technological developments are in sync with the maturity of the society around them. Skyscraper construction took off with the advent of the mass production of steel and the use of mechanized hoisting equipment after stone and masonry construction methods had plateaued. Transportation of goods and people exploded in volume when the high pressure steam engine was invented that would power a locomotive; early steam engines were not robust enough to power a vehicle the size of a train.

But some accomplishments in history have appeared to be anachronistic with respect to the apparent technology needed to perform the work. Speculation has run amok about the possible method the Egyptians employed to build the Pyramid of Giza. The stones used to construct the monument were much too large for the hoisting means thought to be available at the time. The stone blocks at the Pre-Columbian temple at Tiwanaku, in western Bolivia, show no chisel marks or other evidence of how they were shaped. And the Nazca Lines, in the high desert of Peru, cover huge distances and depict shapes that only could be seen from high above; these features were created at a time when air travel was but a distant dream.

Subsurface features at Oak Island, on the Atlantic Coast in Nova Scotia, Canada, appear to follow this pattern of structures that shouldn't have been possible at the time they were built. However, the wrinkle at Oak Island is that no one is certain exactly what the structures are.

(continued on page 27) ►





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Many people have attempted to solve this mystery over the past 200 years, and ADSC Associate Member ROC Equipment, of Salt Lake City, Utah, was fortunate to have been invited to share in the adventure.

Oak Island consists of about 140 acres of relatively level ground with a high point about 36 feet above sea level. The island was called by many names after it was populated by European settlers, most stemming from the names of property owners. But the land was heavily forested, and the name Oak Island eventually persisted from colloquial usage.

During the late 1600s and early 1700s, the small islands in this area of Nova Scotia became favored havens by pirates preying on ships traversing the heavily traveled shipping corridors leading to Boston, Massachusetts, and other nearby ports. In fact, Oak Island lies only about 200 nautical miles from Boston; the lure of such uninhabited, heavily forested land was strong for pirates who were looking for safe locations to stow their illegally obtained hauls. As a result, treasure lore was common currency in the Oak Island area by the late 1700s.

In 1795, a young teenager on a nearby island noticed unexplained lights on Oak Island in the middle of the night. Curious, he visited the following day and found a depressed circle on the ground surface not far from the southeastern edge of the island. The circle was about 13 feet in diameter and was ringed by the stumps of oak trees that had been cut down. He was aware of the rumors of pirate treasure in the vicinity, and he could not resist the allure of a possible cache right in his own back yard. So he and a few friends used pick axes and shovels to dig into the depressed zone, certain they would find vast riches just below the surface.

“Subsequent treasure hunts were made by way of crude augers drilled down to below the depth where water made advancement by workers impossible.”

However, the boys' excavation efforts did not yield the easy return they hoped. Although they encountered a layer of stones just below the ground surface, the underlying void was ringed in soil

with no sign of the gold they anticipated. They kept digging, uncovering a layer of rotting timbers at a depth of about 10 feet. The timbers had been driven into the sidewalls of the hole, apparently stabilizing what had been an opening. At this point, the diameter of what now appeared to be a shaft had decreased to about 7 feet. A void was present below the timbers and was about 2 feet deep, below which was loose soil. Ten feet below the first set of timbers another set of timbers was found, similar in orientation. This sequence continued to a depth of near 25 feet, at which point the boys gave up their quest.

Numerous groups of treasure hunters attempted to advance the effort over the next 50 years, moving the excavation down to a depth of near 90 feet. But a devilish system of tunnels repeatedly flooded the shaft, making excavation beyond that depth impossible. The tunnels eventually were found to be tied to discharge/inflow points along the shoreline quite a distance from the shaft. Pumps available at the time could not accommodate the inflow, and odd water flow characteristics complicated all endeavors to reach an imagined treasure chamber. Subsequent treasure hunts were made by way of crude augers drilled down to below the depth where water made advancement by workers impossible. Each team uncovered what were perceived to be finds of importance, including the presence of coconut fibers which



Birmingham's flying lead used in conjunction with ROC's C1500T oscillator.

pointed to the likelihood that the persons who built the subsurface features had journeyed to places where pirates were known to frequent. During this time, the feature became known as the Money Pit.

None of the expeditions were able to make significant headway toward recovering any treasure below the surface, in part because the shaft and flood tunnels appeared to have been constructed with means not available at the time they likely were built. Team after team were thwarted by the complex configuration of the shaft and tunnels and the use of water as a barrier to accessing the supposed subsurface chamber in which the "treasure" was assumed to be kept. In fact, exploration activities led to the collapse of most of the shaft structure below 30 feet, making the ultimate goal even more elusive and giving

(continued on page 28) ►



ROC Equipment's Vanessa Lucido operating ROC's C1500T oscillator.

credence to the idea that the feature was booby-trapped.

Various discoveries, including a heavy, etched stone tablet recovered from the shaft at about 90 feet, suggested that a treasure chamber, if present, likely existed at a depth of 130-200 feet below the current ground surface elevation. Many of the exploratory operations were thwarted by the difficulties of drilling at that depth with water inflow and random obstructions.

Present Day Drama

The History Channel commissioned a reality television show in 2013 based on the efforts of current site owners Marty Lagina and Rick Lagina to explore the Money Pit using modern excavation technology. In 2016, they approached Irving Equipment, a general contractor, to discuss providing drilling services that could be used to target specific locations and depths while working around the previously encountered complications, such as water from the flood tunnels. Irving teamed with ADSC Associate Member Birmingham Foundation Solutions, who

contacted ROC to discuss equipment needed to fit the very particular needs of the project.

Advancing a deep exploratory hole without allowing water in the subsurface to flood and destabilize the hole was the most obvious requirement for this more modern expedition. In addition, the Lagenas had specified that they wished to be able to retrieve items from the drilling spoils without those items being damaged or destroyed. Furthermore, the location and verticality of the shafts was extremely critical to be able to document specific conditions relative to other discoveries at the site in the past.

Louis Fritz of Birmingham knew ROC Equipment had extensive knowledge in the casing oscillator method and recommended that ROC be involved with the shaft placement by means of oscillator and grab instead of a traditional Kelly bar-operated drill rig. An oscillator works by turning casing back and forth rather than by rotating a Kelly bar attached to an auger. The stiffness and size of the casing oscillator allows for more precision in location and less deviation from verticality when inconsistent subsurface conditions are encountered. Tests reported by industry sources on shafts advanced using a casing oscillator have shown deviations from vertical in the range of 0.35% to 0.5% in 200 feet, versus 1.5% for traditional Kelly bar drilling techniques. In addition, spoils can be removed using a grab without the disturbance associated with an auger and cased shafts provided more control over water issues. The use of a casing oscillator theoretically also provided the possibility that shafts could be entered after completion. The reality of that option would depend on conditions during drilling and applicable Canadian workplace safety and health regulations.

Tools for the Task

The project team determined that a crane-mounted casing oscillator would be most appropriate for the needs of the site so that a grab could be used to remove spoils. Due to project schedule and final shaft diameter, a BUMA drill-mounted oscillator was used. In order to use this oscillator with a crane, it was necessary to fabricate a special bridge to connect it to the crane. The team worked together to design a bridge that Birmingham was able to fabricate out of drill leads to save money on the project budget. The bridge needed to be strong enough to resist the torque generated by the oscillator and to allow clearance to operate the grab for excavation of the shafts.

“The team worked together to design a bridge that Birmingham was able to fabricate out of drill leads to save money on the project budget.”

Planning for the venture took several months, but the project itself lasted approximately six weeks. ROC Equipment sent a team of

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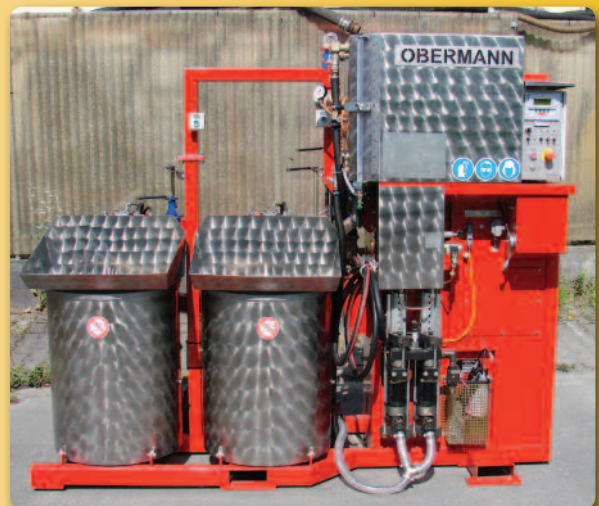


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ROC's drilling consultants Vanessa Lucido and Kent Petersen checking depth of the first excavated shaft.

personnel to assist Irving Equipment and Bermingham with equipment modifications, setup and shaft installation.

The casing oscillator allowed several different methodologies to be executed in order to successfully install the requested shafts. First, casing was telescoped to the desired depth. ROC's team installed 1500mm temporary casing to a depth of 120ft, placed reduction inserts into the oscillator, and then installed 1092mm permanent pipe inside the larger casing to a depth of 200ft. Then the team installed temporary casing down to 150ft, at which depth a flying lead drill provided by Bermingham was attached to the oscillator support bridge to drill into rock below the casing. Finally a basic cased shaft was excavated using a grab. The oscillator installed the temporary casing the entire length of the shaft while being excavated by means of a BUMA hammer grab. It was a unique project in that it called for installing four shafts with three different methodologies, all of which were performed successfully.

While previous expeditions had experienced difficulty with excavation activities, the Irving-Bermingham-ROC team was able to advance four holes up to depths of 200 feet with precision and efficiency. However, the previous teams did not have to deal with several new problems that cropped up, (at least in the minds of the drilling team): timing work to coincide with the schedule of a film crew; attempting to speak into a microphone during drilling; and trying to maintain a profanity-free construction site for the History Channel audience. (This last feat was considered more difficult than any excavation challenges that might be presented). Vanessa Lucido stated that working on an iso-

lated island 3,400 miles from ROC's facility yard posed significant unknowns at the start of the project but didn't prove to present problems when work actually took place. Spoil retention was worth noting on this project because of the unique documented constituents of the subsurface and the possible small and/or delicate materials that could

“While previous expeditions had experienced difficulty with excavation activities, the Irving-Bermingham-ROC team was able to advance four holes up to depths of 200 feet with precision and efficiency.”

be present amidst large amounts of wet soil. All eyes on the site went up each time the grab came out of the shaft. Every bucketful was inspected thoroughly, and as the shaft advanced closer to the target depth, team members held their breath in collective anticipation of what the jaws might hold.

The four shafts advanced were placed to provide information in two vertical columns where drilling had taken place previously and evidence of possible treasure chambers had been found. Previous drilling in those spots was performed using methods that obtained samples from a much smaller cross-sectional area. Wood, concrete, and loose metal had been encountered in the exploratory borings in the past, but the drilling methods had limited the condition and type of materials that could be retrieved from the subsurface.

What Did They Find?

No real treasure was encountered in the shafts advanced by the team, but significant materials were found to perpetuate the hope of the treasure hunters, thanks to the efforts and careful planning of key

(continued on page 32) ➤

ROC Contd.

team members, Andrew Folkins of Irving Equipment, Louis Fritz of Bermingham Foundation Solutions, and Dawn Walters and Vanessa Lucido of ROC Equipment. In general, the shafts completed by the team

“Most importantly, the operation provided ample evidence that the drilling methodology utilized was the best means to-date to overcome the particular obstacles at the Money Pit site.”

assisted in eliminating some areas for potential future exploration and confirmed that more drilling is needed in other areas. Most importantly, the operation provided ample evidence that the drilling methodology utilized was the best means to-date to overcome the particular obstacles at the Money Pit site.

The mystery of how such an apparently complex, deep subsurface structure could have been constructed well before modern drilling and excavation shoring methods were available probably will persist even after the site is fully explored. But the chance that whatever is present down below will be found increases with every advancement in specialty drilling and excavation. In most projects, the “treasure” is a well-constructed foundation system. The same high quality means and



Shafts were excavated by means of a BUMA hammer grab. The oscillator was attached to the crane by a custom bridge by Bermingham.

methods that provide foundations for structures all over the world may someday bring in treasure in a more literal sense at the Money Pit on Oak Island. Stay tuned.

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33 Congress Square: A Case Study and Call For Code Restrictions By Hub Foundation

By Anthony C. Barila, P.E. and John R. McKinnon, Hub Foundation

Introduction

The structural components that are utilized in the current micropile market consist of relatively low cost but high strength pipe manufactured for the oil drilling industry. The yield stress of the pipe ranges from 80 ksi (551.8 MPa) to 140 ksi (965.3 MPa). This pipe is used for both the permanent drill casing seated into stable rock and for the core pipe to increase the overall capacity thru portions of the pile length. In addition, continuously threaded bars with yield stress of 75 ksi (517 MPa) to 150 ksi (1034 MPa) are in-



Photo 1: The DK-525 low headroom drill rig hoisted into the building through a small hole in the street.

cluded to provide additional compression and tension capacity. The current codes (IBC and/or local codes) only allow a fraction of the yield stress of the steel components, up to 32 ksi (220 MPa). One recent project in Boston, Massachusetts, illustrates why revisions should be made to the codes and standards.

Project Information

The interior of four structures that were annexed to form the original headquarters of the Fidelity Investment Company at 82 Devonshire Street in Boston, Massachusetts, will be selectively demolished to allow for the internal addition of a new concrete core plus a 7-story glass curtain wall addition on top of the existing 11-story buildings. The foundations of the new office building will be supported on high capacity drilled micropiles. There will be 51 micropiles to support the new super columns, 67 micropiles to support the core of the new structure plus 19 micropiles to support the tower crane foundation. In addition, 8 micropiles were required to underpin two columns immediately next to a support of excavation (SOE) system that will allow access to the core mat foundation.

(continued on page 37) ►



Photo 2: The Casagrande C-8 entering the building off Quaker Lane. A hole was created in the outer wall just big enough for the C-8 to enter. The length of the mast had to be factored into the required clearance when walking down the ramp to 25 feet (7.3 meters) below street level.



Photo 3: Drilling support of excavation piles in the demolished center of the structure which will be the future location of the core.



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The MAIT logo is displayed in a large, bold, red font in the top right corner of the image. The letters are slightly stylized, with the 'A' having a unique shape. The background of the entire image is a photograph of a MAIT 'BABY DRILL' machine on a construction site. The machine is white with yellow and black components, mounted on a track. It has a long vertical mast and a drilling bit at the bottom. The machine is positioned on a dirt area with a wooden retaining wall behind it. In the background, there is a residential area with houses and trees, and a blue body of water under a clear blue sky. The text 'Sometimes it's ok...' is written in black on a white background on the left side of the image. The text '...to be a Baby!' is written in black on a white background on the right side of the image. The MAIT logo is also visible on the side of the machine's mast and on the side of the engine housing.

Sometimes it's ok...

...to be a Baby!

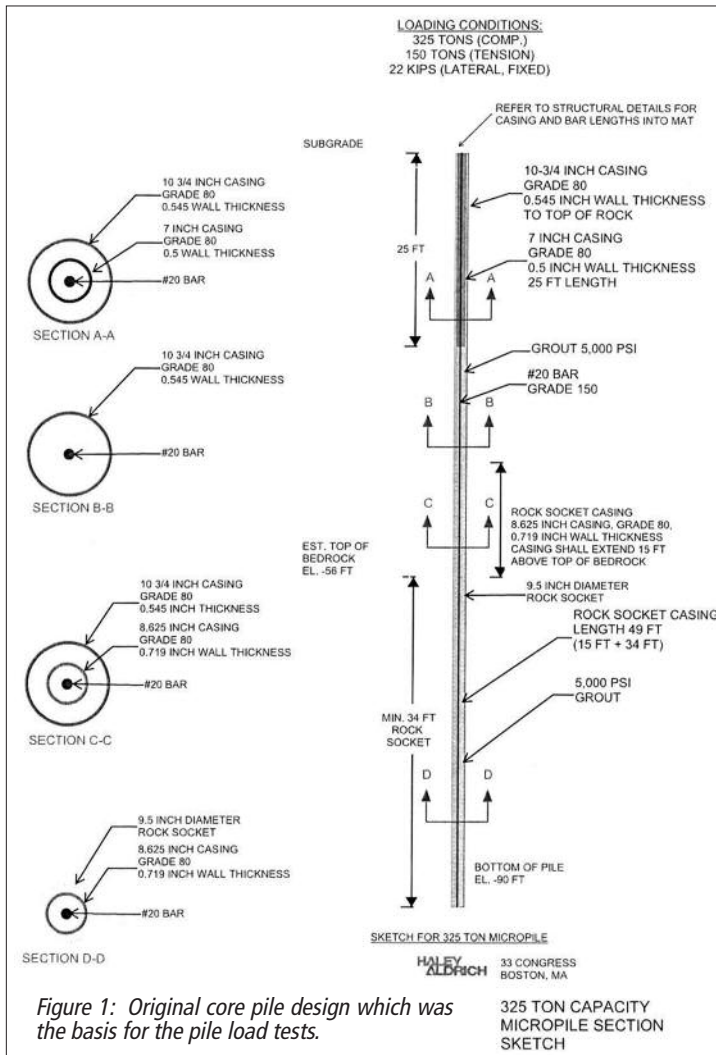


Figure 1: Original core pile design which was the basis for the pile load tests.

The critical component of the SOE is 15 micropiles that will act as soldier piles. This presentation will focus solely on the core piles.

Two pile load tests were performed prior to construction, one in compression to a maximum test load of 1010 tons (8.9 MN) and one in tension to a maximum test load of 458 tons (4.1 MN). Based on these results, the geotechnical engineers agreed to reduce the rock socket length by 32%.



Photo 4: Dk-525 drilling compression test pile.

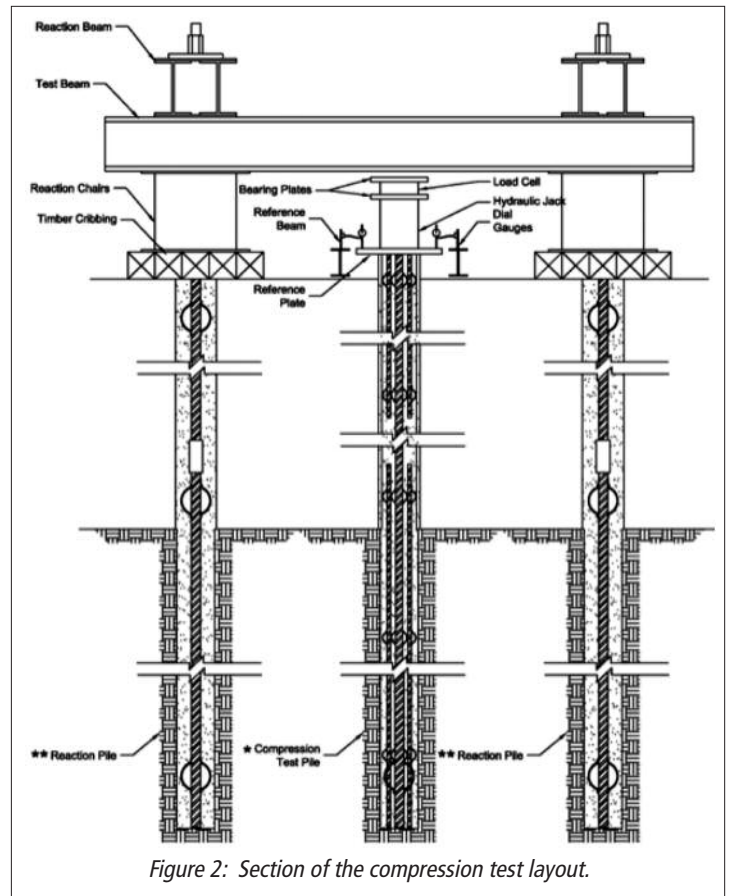


Figure 2: Section of the compression test layout.

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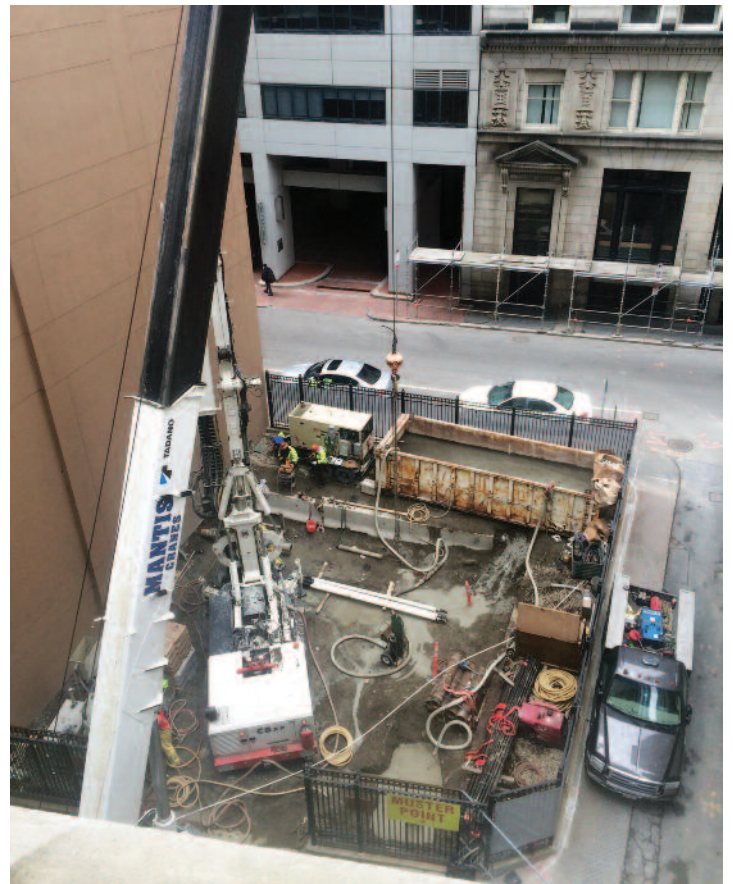


Photo 5: Casagrande C-8 drilling reaction piles.



Photo 6: Setting up the test frame.



Photo 7: Test frame setup complete.

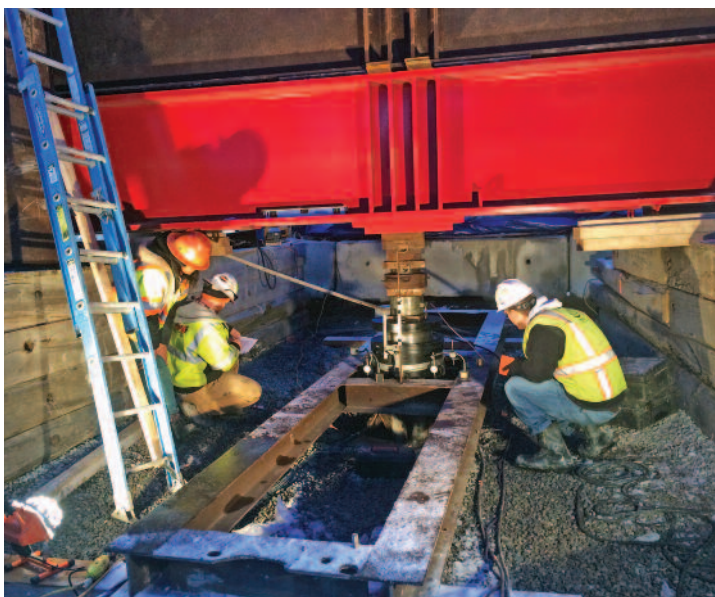


Photo 8: Recording pile movement during the pile load test.

Hub Foundation was contracted jointly to the Consigli Construction Company (project construction manager) and Related Beal (the project developer). The structural engineer was MacNamara Salvia. Haley & Aldrich was the geotechnical engineer.

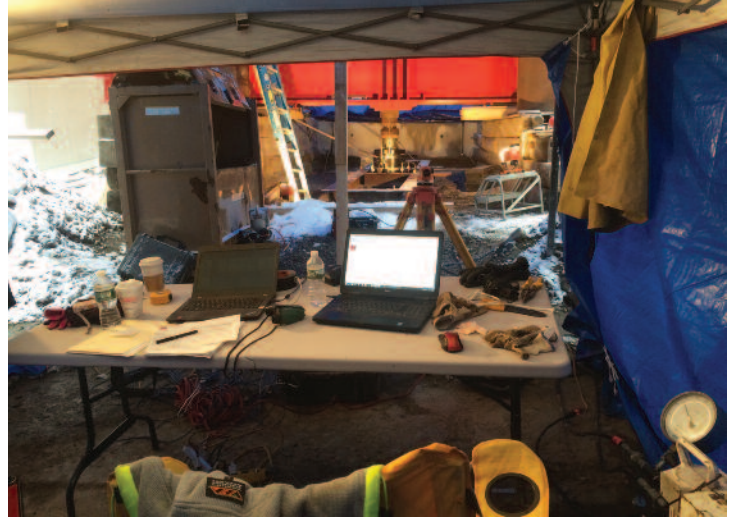


Photo 9: Test frame covered during the test to protect the instrumentation from the elements during the test. A data logger and laptops were utilized to monitor and record the instrumentation installed within the test pile.

Site Conditions and Schedule

Two pile load tests were performed from March 28 to April 6, 2016 prior to the completion of the overall structural design. The tests were performed in a very tight open area adjacent to the project structures. The core piles were installed from January 6 to February 11, 2017. The piles were installed from a level about 25 ft. (7.62 m) below street level. The piles were installed with two different drill rigs. Eight of the piles were installed with the Davey-Kent DK-525 drill rig at an area with only 10 ft. (3.1 m) of headroom. This drill rig was lowered to the drill locations via a hoist hatch next to an alley. Photo 1 shows the DK (without the mast) being lowered. After significant demolition of the existing structures was completed up to the roof level, a Casagrande C-8 drill rig was utilized for the remaining 59 piles. This drill rig entered the building from one of the main streets that surround the buildings. The rig walked inside a portion of the building and down a ramp (cut at the SOE) to access the drill level for the remaining piles. Photo 2 shows the C-8 crawling through the opening and down the ramp to the work level.

The majority of the micropiles were installed while heavy demolition of the existing structures was in full swing. The work areas resembled a "war zone" during this process. Photo 3 shows the "scars" of the demolition process as the core area is redeveloped up to roof level.

Original Design

The original design loads for the micropiles were 325 tons (2.9 MN) in compression, 150 tons (1.3 MN) in tension and 11 tons (97.9 kN) lateral. The micropile design consisted of the following:

- a 10 3/4 in. (273 mm) OD; 0.545 in. (13.8 mm) wall casing drilled down into stable rock;
- a core pipe [8.625 in. (219 mm) OD; 0.719 in. (19.8 mm) wall] to reinforce the rock socket plus 15 ft. (4.6 m) above the casing tip;
- a core pipe [7.0 in. (179 mm) OD; 0.50 in. (12.7 mm) wall] in the

(continued on page 41) ►

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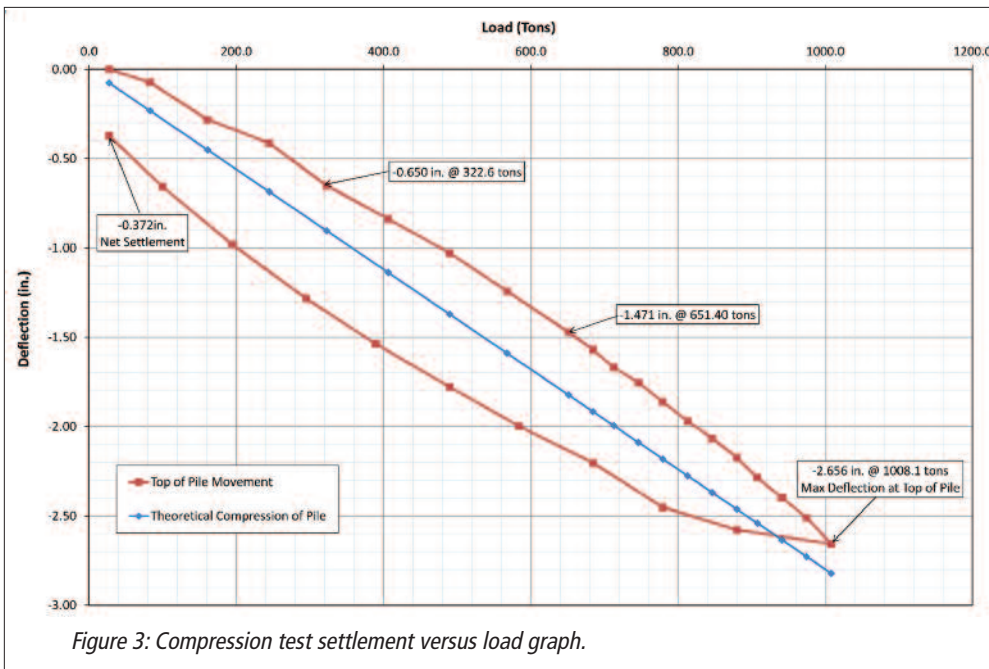


Figure 3: Compression test settlement versus load graph.

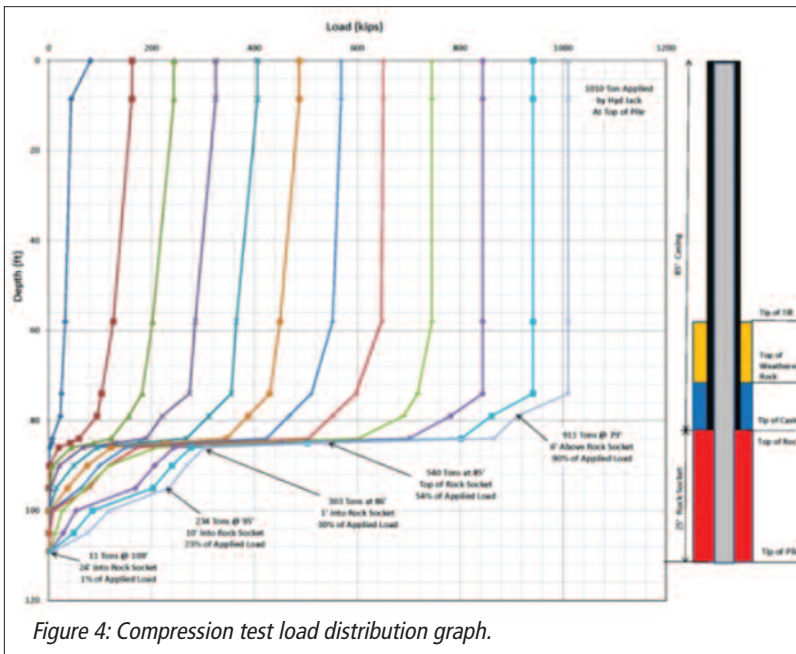


Figure 4: Compression test load distribution graph.

upper 25 ft. (7.6 m) of the micropile to sustain the bending moment due to the lateral load at the top of the pile;

- a 2.5 in. (63.5 mm) Grade 150 bar to support the tension load; and
- 5000 psi (34.4 MPa) grout.

The length of the rock socket was specified by the engineers to be 25 ft. (7.6 m) long. Refer to Figure 1 which shows the above details.

Pile Load Tests

Two pile load tests were performed - one in compression to 1010 tons (8.9 MN) and one in tension to 458 tons (4.1 MN). The pile load tests were performed about three months before a wind tunnel study was performed which reduced all the design load components. The final micropile design is provided in a separate section below.

Compression Test

Figure 2 shows a cross-section of the test pile arrangement which consisted of four (4) reaction piles and the test pile in the middle. Photos 4 thru 9 show drilling of the test pile and the reaction piles, setting up the test beams and the final test pile setup. Note that the test pile was drilled with a low headroom drill rig (DK-525) to provide drill rates for the casing to simulate the low headroom conditions anticipated for the production piles inside the buildings. The reaction piles were drilled with a Casagrande C-8 drill rig.

Figure 3 shows the plot of pile settlement versus load for the test pile. The "curve" is essentially linear for the entire loading schedule. The total settlement of the pile was 1.471 in. (34.36 mm) at 650 tons (5.8 MN) and 2.656 in. (67.46 mm) at 1010 tons (8.9 MN). The net settlement after unloading from 1010 tons (8.9 MN) was only 0.372" (9.5 mm). The total creep movement at 1010 tons (8.9 MN) from 1 minute to 90 minutes was only 0.032 in. (0.813 mm).

Figure 4 shows the distribution of the test load throughout the full depth of the test pile. A total of 13 strain gauges were attached to the 2.5 in. (63.50 mm) Grade 150 bar. Geokon 4911 "sister bars" were utilized. Nine of the strain gauges were placed within the 25 ft. (7.6 m) rock socket.

(continued on page 42) ➤

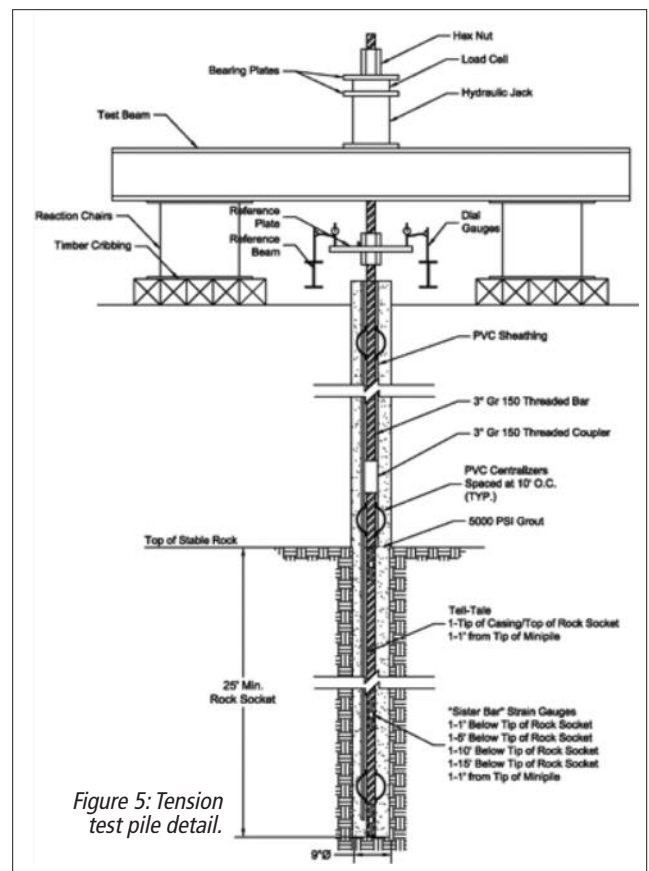


Figure 5: Tension test pile detail.

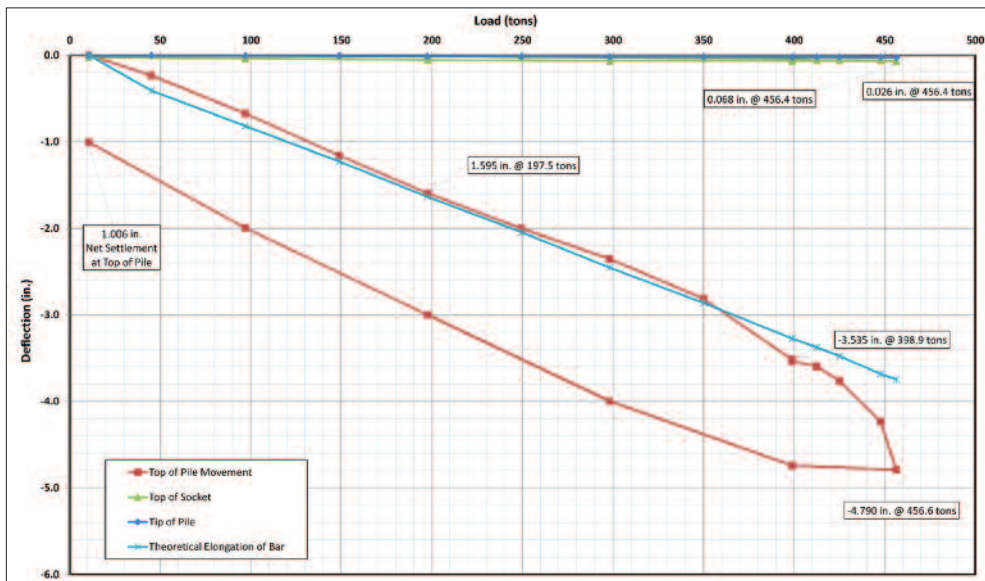


Figure 6: Tension test elongation versus load graph.

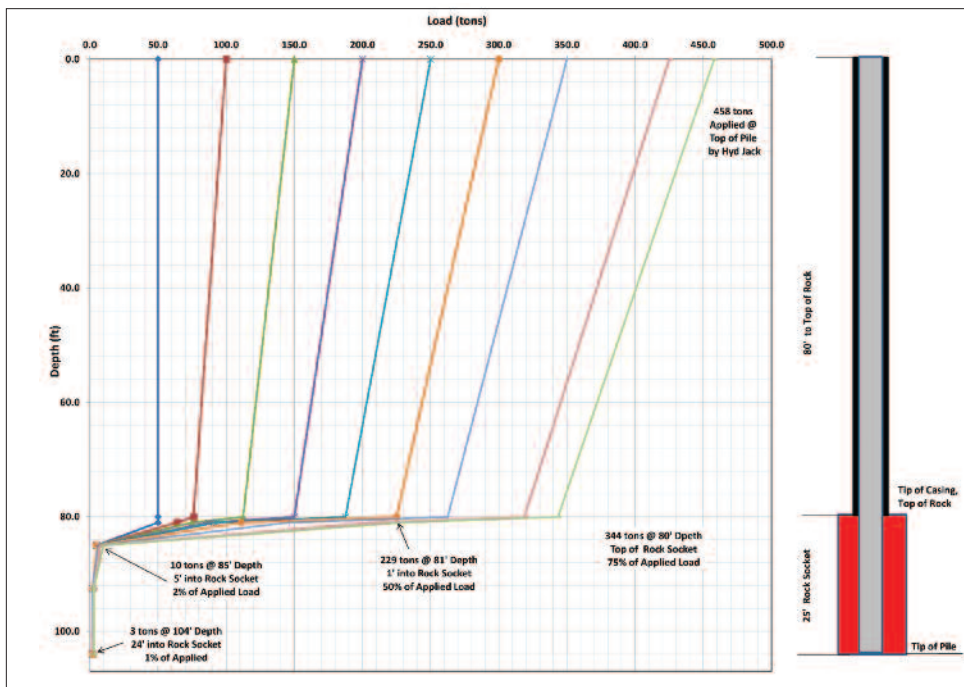


Figure 7: Tension test load distribution graph.

The large number of strain gauges within the socket were utilized to confirm that a significant amount of the test load would be “shed” at or just below the casing tip. Note that 145 tons of the maximum test load was transferred above the casing tip within the weathered rock. There was 540 tons (4.8 MN) at the casing tip (54% of the test load) and only 303 tons (2.7 MN) at a depth of 1.0 ft. (0.3 m) below the casing. This is only 30% of the applied test load. Hence, 263 tons (2.3 MN) was “shed” in one foot below the casing tip and 562 tons from one foot above the casing to one foot below the casing. At 10 ft. (3.04 m) below the casing tip, 234 tons (2.1 MN) remained, or 23% of the max. test load.

Tension Test

One of the four reaction piles for the compression test was utilized to perform a pile load test in tension. Figure 5 shows the test pile consisting of:

- a 3 in. (76.2 mm) Grade 150 bar;
- a rock socket length of 25 ft. (7.6 m);
- location of three strain gauges and two tell-tales within the rock socket.

Note that the bar was debonded with a PVC pipe close to the top of the rock socket. The depth to stable rock was 79 ft. (24 m).

Figure 6 presents the plot of test load vs elongation. The “curve” is essentially linear up to about 400 tons (3.6 MN) which is close to the minimum yield strength of the bar [~ 420 tons (3.7 MN)]. The bar begins to show plastic deformation beyond this point which accelerates between 450 tons (4.01 MN) and 458 tons (4.08 MN). The net “settlement” after unloading is 1.006 in. (25.55 mm) which is very close to the actual total movement at 458 tons (4.07 MN) less the theoretical elongation of the bar, if it were fully elastic at that load. The recorded elongation during the test was strictly due to the elongation of the bar, as evidenced by the recorded small movement [only 0.026 in. (0.661 mm)] at the tip of the pile.

Figure 7 presents the test load distribution thru the test pile. Note that all the drill casing had been extracted after the bar was installed and grouted. Also, the PVC sheathing that was utilized to debond the bar was installed to a depth of about 5 ft. (1.5 m) above the top of rock (project managers wanted to be 100% certain that the sheathing did not extend into the rock socket). The combination of both items explains why some of the test load was transferred above the top of rock. This resulted in 344 tons (3.1 MN) or 75% of the max. test load being transferred to the top of rock which is still significant. Approximately 115 tons (1 MN) were transferred one foot into the rock socket. Only 10 tons (89 KN) was recorded at a depth of 5ft. (1.5 m) into the rock socket. Hence, a

total of 334 tons (3.1 MN) was transferred in the upper 5ft. (1.5 m) of the rock socket. This is 73% of the maximum test load. Note that the creep at the maximum test load was only 0.022 in. (0.558 mm) from 1 to 10 minutes.

Evaluation of Test Results

The significance of the test results is as follows:

- 1) The plot of settlement v test load and the creep results at maximum test load for the compression test clearly indicate that this test pile could have been subjected to a significantly higher load. If the reaction piles and the test beams had a higher overall capacity, this pile could have been tested to 2000 tons (17 MN) without any significant increase in total movement and creep.
- 2) The compression test pile and many others that Hub Foundation

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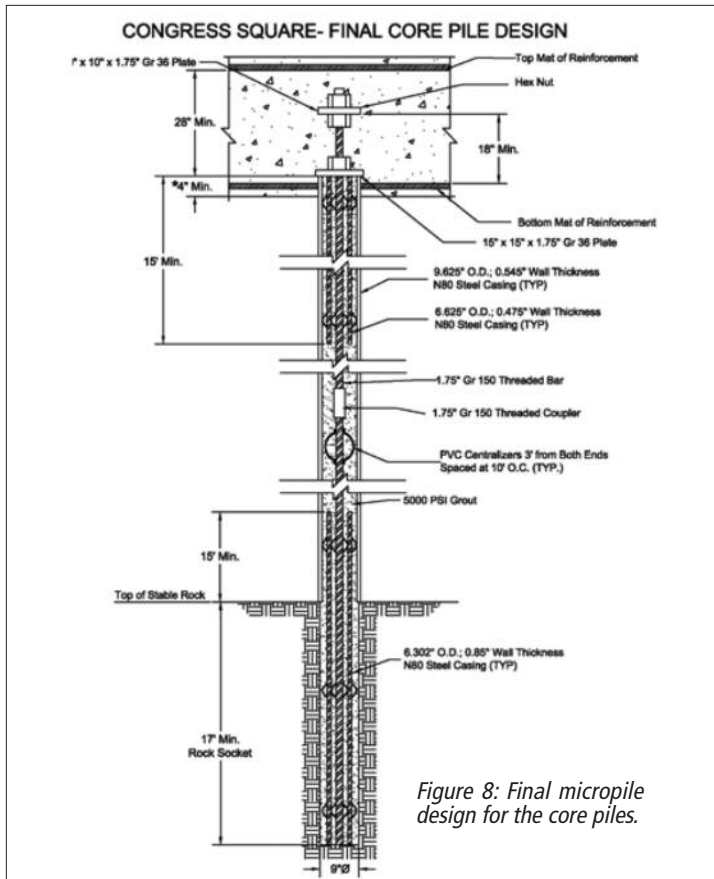
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has performed to high loads show that a significant portion of the test load is transferred to the tip of the casing and is supported in compression by the combination of the rock and grout column directly below the casing. In addition, the majority of the balance of the test load is transferred within the upper 5 ft. (1.5 m) of the rock socket.

3) The plot of elongation versus test load of the tension test was essentially elastic within 267% of the design load or 400 tons (3.6 MN). The recorded elongation was solely that of the bar with only a minor movement within the rock socket.



Photo 10: Casagrande C-8 drilling core piles within the central core while a snow storm hammered Boston outside.

The above evaluation and test results plus other similar tests can be utilized to develop the basis for changes to the overall design of high-capacity rock-socketed micropiles.

Final Design

After the pile load test was completed, the project performed wind tunnel modeling of the structure to attempt to reduce the lateral loadings on the core of the new structure. The results of these model studies were extremely beneficial, thereby, reducing the loadings on the core piles, such that, a smaller diameter pile could be utilized.

The final design capacity of the core piles was 280 tons (2.5 MN) in compression, 120 tons (1.1 MN) in tension and 8.1 tons (72 KN) lateral. Internal core pipes were utilized to provide the structural requirements within the rock sockets and at the upper portion of the piles to take care of the bending moments from the lateral loads. Refer to Figure 8 which provides a sketch of the micropile design.

The micropiles for the core consist of the following:

- 9.625 in. (244 mm) OD; 0.545 in. (13.8 mm) wall casing drilled down into stable rock;
- a core pipe [6.302 in. (160 mm) OD; 0.85 in. (21.6 mm) wall] to reinforce the rock socket plus 15 ft. (4.6 m) above the casing tip;
- a core pipe [6.625 in. (168 mm) OD; 0.475 in. (12.1 mm) wall] in the upper 15 ft. (4.6 m) of the micropile to sustain the bending moment due to the lateral load at the top of the pile.
- a 1.75 in. (44 mm) Grade 150 bar to support the tension load; and
- 5000 psi (34.5 MPa) grout.

The length of the rock socket was evaluated from the pile load tests and was reduced to 17 ft. (5.2 m) long.

Pile Installation

The micropiles for the core of the structure were installed with two different drill rigs. Due to physical restraints and the omnipresent demolition process, Hub could only drill with one rig at a time.

Photos 10 thru 12 provide a view of the extreme difficulty of installing the low headroom micropiles within confined surroundings. Although about 25 ft. (7.6 m) below street level and in an "hostile" environment, the installation of the micropiles with unlimited headroom proved to be a much smaller challenge. Photos 13 thru 15 provide views of this process.

Conclusion

Test results obtained from this project provide evidence as to why consideration should be given to form a committee to review the current code provisions and make recommendations to increase the allowable stress for the steel components in micropiles. This point was the emphasis of a recent technical paper, "Design with High-Strength Steel Reinforcement in Micropiles - Clearing up the Misconception in Strain Compatibility," by Terence P. Holman, John R. Wolosick and Thomas D. Richards. (*Foundation Drilling*, August/September 2016). The current strain compatibility model ($F_y = 0.003$ Esteel) is based upon unconfined sections in axial compression or combined compression and flexure. Studies reported in this paper cite results that indicate that ultimate strain levels can be up to 10 times higher in confined

(continued on page 47) ►

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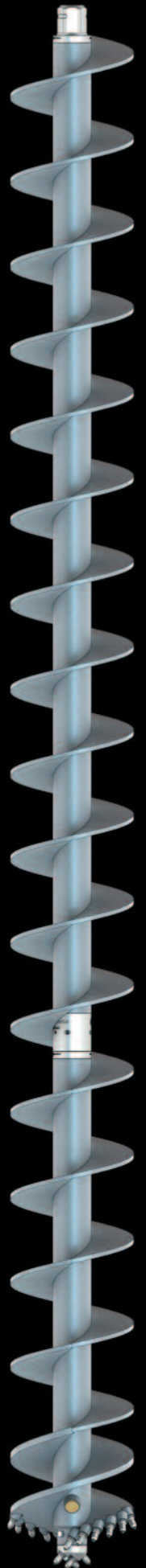




Photo 11: Drilling in tight places with minimal access.

columns. Based upon these results and the recommendations made by Holman, et al, allowable stresses in steel can be safely increased from 0.4 Fy to 0.5 Fy, up to 60 ksi (413 MPa). Note that the industry designs tension elements with allowable stresses of 60% of ultimate stress. This is 90 ksi (621 MPa) for 150 ksi (1,035 MPa) bars and 162 ksi (1,035 MPa) for 270 ksi (1,863 MPa) strands. Tension elements face a much more challenging environment than steel in compression in a confined environment within grout and rock. Also, the allowable stress in the grout should



Photo 12: Drilling in a narrow corridor.

be increased from 0.33f_c [up to 1600 psi (11 MPa)] to 0.4f_c. Note that the grout mixes that are now utilized in micropile installations have 28-day compression strengths of at least 6000 psi (41.3 MPa) and up to 8000 ps (55.1 MPa). The maximum allowable stress for grout in a confined condition should be increased to a minimum of 2000 psi (13.8 MPa). Note that these recommendations will only apply to permanently cased micropiles into dense tills and rock.

The current evaluation of determining the length of rock sockets should be modified to account for the path of the load distribution that has been demonstrated by numerous pile load tests in rock. The concept that load transfer within the bond length of micropiles is solely in friction needs to be revisited. The test data that Hub Foundation has developed over the past 5 years for high capacity micropiles show that a significant percentage (55% to 90%) of the applied test load is supported by the steel casing (the stiffest member of the pile) and transferred to the tip of the casing. This load is supported in compression by the rock and the confined grout column below the casing.

The majority of the balance of the test load is, typically, transferred



Photo 13: Installing pile reinforcing with a fork truck while piles are drilled elsewhere.

within the upper 5 ft. (1.5 m) of the rock socket. The industry continues to ignore this critical factor and continues to design these high capacity micropiles with the only transfer being a uniform bond valve between the

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Photo 14: Casagrande C-8 drilling core piles.

grout and the full rock socket. Depending upon the level of conservatism that is utilized in determining the bond value of the rock (based upon rock type and quality), this, typically, results in excessive rock socket lengths.

Another possible modification to high capacity rock-socketed micropiles is the structural design within the rock sockets. If only 10% to 45% of the maximum test load is transferred into the socket, why do we design these long rock sockets for 100% of the design load? This is a very critical question, especially for low headroom micropiles where the size of couplers and the acceptable level of grout cover have the greatest impact on the design capacity.

In conclusion, the biggest impediment to the growth of the micropile industry is the design of the rock sockets for high capacity micropiles. Hub Foundation intends to continue with the application of high and higher capacity micropiles to be utilized to solve critical constructability issues with deep foundations. The



Photo 15: Casagrande C-8 working its way out of the core.

company is planning for 400 tons (3.6 MN) to 500 tons (4.5 MN) micropiles on future projects. The data from these tests will be made available to any committee or groups striving to achieve code reform.

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13th International Workshop on Micropiles

By Mary Ellen Bruce Large, P.E., D.GE | Technical Lead, International Society for Micropiles

The International Society for Micropiles (ISM) in alliance with ADSC: The International Association of Foundation Drilling and Deep Foundations Institute held its 13th International Workshop on Micropiles in Vancouver, BC, Canada on March 29-April 1, 2017. The event exceeded past workshop records with over 150 delegates attending the two and a half days of technical paper sessions and discussion. Even with the large number of attendees, the event retained its workshop spirit of open sharing that is the hallmark of ISM. Delegates and companions enjoyed a full social program, rekindled long friendships and established new ones. This year's workshop marked the 20th anniversary of the first ISM Workshop held in Seattle, Washington in 1997 under the auspices of DFI and FHWA.

Crux Subsurface, Inc. of Spokane, Washington served as the Host Company, led by Nick Salisbury. Dan MacLean, P.Eng. of Geo-Foundations Contractors, Inc., served as the Program Chair. The organizers greatly appreciate the generous support of the Platinum, Silver and Bronze Sponsors. (see the sidebar on page 55). Delegates represented 13 countries, including Australia, Austria, Canada, China, Colombia, Germany, Italy, South Korea, Sweden, Taiwan, United Kingdom, United Arab Emirates, and United States.

The welcome reception was held in the beautiful atrium of the Fairmont Waterfront Hotel in downtown Vancouver. Acting Chair Allen Cadden, P.E., D.GE, Schnabel Engineering, Inc. and Honorary Chair Dr. Donald Bruce, C.Eng, D.GE, Geosystems, L.P., surprised Horst Aschenbroich of Con-Tech Systems, Ltd. with a plaque recognizing his 20 years of support and dedication to ISM. Horst has been active and consistent in providing technical contributions and financial sponsorships for ISM's thirteen international workshops, and he's attended at least eleven workshops



ISM Honorary Chair Donald Bruce (left) and Allen Cadden recognized Horst Aschenbroich of Con-Tech Systems (center) for 20 years of dedication to ISM.

around the world.

The technical program included delegate presentations covering all aspects of micropile technology, and highlighting innovations, new de-



Technical Program Chair Dan Maclean (left), Lizzi Scholarship Winner, Maged Abdrahem (center), and Lizzi Lecturer, John Wolosick (right)



Allen Cadden (Acting ISM Chair, left) and Dan MacLean (Incoming ISM Chair).

sign techniques, construction advances, and case histories. The theme of the workshop was *Micropiles: Resisting and Remediating the Effects of Mother Nature*. Related presentations covered micropile applications in challenging conditions including karst, wetlands, and seismic, wind and water loading. Quick, 10-minute case history presentations showcased particularly challenging applications. Dr. James Mason, P.E. of U.S. National Park Service presented Joint ADSC-DFI Micropile Committee-sponsored research on a reticulated micropile database, which expands the ISM existing micropile document listing available at www.ismicropiles.org. The database will be made available shortly and will include a summary of the contents of fundamental papers describing design and construction of reticulated micropile networks.

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Local organizers (from left) Chantal Torabi, Zahra Mamdani and Nick Salisbury (Crux Subsurface, Inc.).

The technical sessions began with the presentation of the 9th Lizzi Lecture *Loading Effects on Battered Micropiles: Are Most Pile Caps Designed Correctly?* by John Wolosick, P.E., D.GE of Hayward Baker, Inc. covered bending moments on battered micropiles. Nadir Ansari of Isherwood Associates provided his introduction with a colorful and intimate portrayal of our colleague and long-time friend, including photographs of his beloved family, baseball teams, and cars. We then welcomed Maged Abdlahem, Ph.D. Candidate from Western University, who delivered the 7th Lizzi Scholarship presentation about his research on the lateral performance of hollow bar micropiles in cohesionless soils. Abdlahem presented the results of a full-scale lateral load test on a hollow bar micropile and numerical analyses compared with software predictions.

The second World Cup provided an exciting two days of good-natured ribbing between the defending champions from North America, Crux Subsurface, Inc., and their competitors. Workshop delegates selected PCA Contracting representing Australia as winners of the coveted World Cup, for their project, Life Extension of 132kV Lattice Tower Foundations in Townsville, Australia. The project involved retrofitting 26 transmission



Dan MacLean (Incoming ISM Chair) and Jim Bruce (Outgoing ISM Chair).

tower foundations, many of which were originally installed either just before or just after World War II. Piles and brackets were installed within the existing grillage foundations, under challenging conditions: no soil information was available, strict geometric tolerances were enforced, and no power outages were allowed. The project was completed with a spotless safety record, two weeks ahead of schedule, with a 25% cost savings over concrete foundations.

World Cup Competitors included Crux Subsurface (Blue Lake Hydroelectric Expansion) from North America, IB-Brandner (10 Person Gondola Dorf-bahn Middle Station – Gerlos/Tyrol) from Europe, and University of Los Andes Colombia (Alluvial Anker Micropiles as Alternative Foundation in Tropical Soils) from South and Central America. More details on these projects will be published on the ISM website at www.ismicropiles.org.

(continued on page 55) ➤



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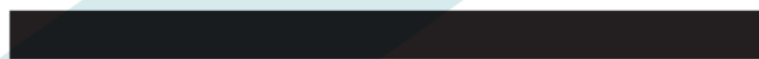


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For the first time, the technical program also featured a live webinar of the ISM Experts of the World panel discussion, including Donald Bruce and John Wolosick from the United States, Nadir Ansari, of Isherwood from Canada, Paul Woodfield of Geotechnik Ground Solutions from Great Britain, and Bjorn Ischebeck of Fried. Ischebeck GmbH from Germany. The panel session spurred lively discussion on international practices, including grout testing, corrosion protection and design and construction

issues. Over 80 attendees participated in the webinar, which was broadcast around the U.S.

The Workshop Awards Dinner was held aboard the Pacific Yacht cruising the Vancouver Bay. In addition to recognizing the Lizzi Lecturer and Scholarship winner, Cadden recognized the enthusiasm and support of outgoing current Chair Jim Bruce, P.Eng., Geo-Foundations Contractors, Inc., who was unable to attend the workshop in person. Bruce is another long-standing committed member of the ISM delegation, and his service as ISM Chair was gratefully acknowledged. ISM welcomed Dan MacLean as the new ISM Chair. The ISM Steering Committee, which leads the activities of ISM, welcomed new member, Dr. Changho Choi of the Korean Institute of Construction Technology in South Korea.

A group of delegates enjoyed a relaxing walk and culinary excursion of Vancouver's Gastown on the Saturday afternoon following the final technical sessions. The group enjoyed the international cuisine and local brews of the historic and colorful cobblestoned food district, one of Vancouver's oldest neighborhoods.

The ISM workshop proceedings are available for purchase through the ISM website, ADSC Technical Library (www.adsc-iafd.com) and the publications page on the DFI website (www.dfi.org). See the ISM's new website at www.ismicropiles.org for more information and member news and updates. ISM is reinstating its dues structure for 2017, so please renew your ISM membership for 2017 through the website. Please contact Mary Ellen Bruce Large, ISM Technical Lead, at melarge@dfi.org for more information.

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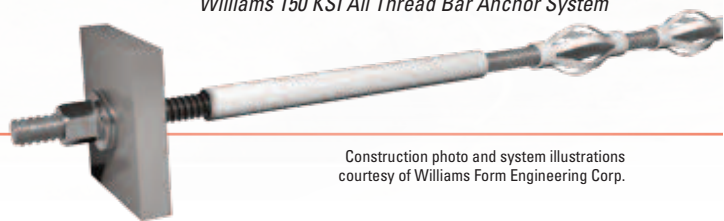


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Obtaining Safety Intervention Grants

By Michael Moeller, Scherzinger Drilling, Inc.

ADSC Contractor Member Scherzinger Drilling provided this informative article in the hope that other contractors will research this type of program in their area and take advantage of these opportunities in order to work more efficiently and more importantly, to work Safer. (Editor)



Klemm Rod Handling System purchased with safety grant funds.

Benjamin Franklin once said, "To succeed, jump as quickly at opportunities as you do at conclusions." One such opportunity arose for us at Scherzinger Drilling with the discovery of Safety Intervention Grants available through the Ohio Bureau of Workers' Compensation. This program allows for private and public employers to apply for a grant of up to \$40,000 in matching funds (3-to-1) to put towards implementing an approved intervention that would reduce or eliminate the chance of injuries/illnesses occurring in the workplace.

The perfect scenario for enhancing the safety of our employees presented itself with regard to the way we install tiebacks. Prior to the discovery of this program, workers would manually lift heavy tieback rods to and from the machine to be installed or removed. This practice opened the door to significant strain on the body, particularly back and neck. In order to remove this risk altogether, we decided to look into purchasing a rod handler arm, which would connect to an excavator and leave the heavy lifting to the machinery. Using this machine also opened the door to the task being completed more efficiently, improving both our time spent on a job and our bottom line in the process.

The first step to the program was to run this idea by our local BWC consultant. After meeting both on a job site and in office to review the current problem and subsequently how the intervention would work, we received the green light from BWC to submit the formal application. The application entailed compiling baseline data and summarizing the problem, outlining the proposed intervention and how it would make the work force safer, and creating a complete budget of costs associated with the future purchase. Once the application was submitted and approved, we received a check for the funds to be put toward the rod han-

dler and then officially purchased the equipment. Now that the rod handler has been implemented, BWC requires a brief report submitted quarterly for the next two years, as well as a short case study after the equipment has been in service for one year.

Thanks to the Safety Intervention Grant program from Ohio BWC, we were able to proactively change one of our most labor-intensive tasks to create a safer way for our workers to get the job done on tieback projects. The application process was painless, and the longest part from beginning to end was shipping the equipment stateside from overseas. We hope that the information gathered by BWC through the implementation of this intervention will allow for other employers to address similar issues and help keep workers safe. We also hope that other companies become more aware of the existence of these types of programs and take advantage of the funds that may be available to them.

Programs Available

North Dakota Workforce Safety and Insurance (WSI) -
<https://www.workforcesafety.com/employers/safety/grants>

Washington Safety & Health Investment Projects (SHIP) Grant Program - <http://www.lni.wa.gov/safety/GrantsPartnerships/SHIP/>

Missouri Employers Mutual - <http://www.mem-ins.com/public/Safety/Safety+Grants.page?>

Ohio BWC Safety Intervention Grant Program -
<https://www.bwc.ohio.gov/employer/programs/safety/empgrants.asp>

Wyoming Safety Improvement Fund - <http://www.wyomingworkforce.org/businesses/workerscomp/sif/>

Minnesota Workplace Safety Consultation - Safety Grant Program - <http://www.dli.mn.gov/wsc/grants.asp>

Massachusetts Safety Grant Program -
<http://www.mass.gov/lwd/workers-compensation/safety/grant-program/safety-grant-program.html>

Oregon OSHA Grant Programs -
<http://osha.oregon.gov/edu/grants/Pages/default.aspx>
Utah Labor Commission Workplace Safety (WPS) Grant -
<https://laborcommission.utah.gov/services/WorkPlaceSafety/grantappguidelines.html>

Alberta Occupational Health and Safety Innovation and Engagement Grants Program - <http://work.alberta.ca/occupational-health-safety/ohs-ie-grants.html>

Manitoba Research and Workplace Innovation Program -
<https://wcb.mb.ca/research-and-workplace-innovation-program-0>

Michigan OSHA Safety Grants
http://www.michigan.gov/lara/0,4601,7-154-11407_15317_15346,00.html

New York Hazard Abatement Board -
<https://www.labor.ny.gov/hab/>

BAUER Applies Technology to Deliver Cost Savings

By Benjamin Dutton, President of Equipment Corporation of America

Thanks to the internet, today's consumer has a huge advantage when it comes to making a purchase. One or two clicks allows several options to appear on the screen. The identical product may offer several different prices, and perhaps free shipping, bonus points, or other consumer enticements to keep the consumer coming back to the successful website. This is a great way for the consumer to save money, but it does not necessarily apply when purchasing business goods, industrial products, or construction equipment. The key questions the industrial buyer must ask are:

- What does the price represent?
- What is the long-term cost of the investment?
- Are there any hidden costs that may undermine the initial purchase price?
- Are there any features or assets that may enhance or improve the initial purchase price?

With this challenge in mind, Bauer Maschinen of Schroebehausen, Germany has always focused on justifying its position as one of the most expensive drill rig manufacturers on the market. Yes, bigger, better, stronger, more efficient designs have helped Bauer establish itself as an industry leader in high quality, high-priced drilling equipment. However, if they expect to compete in a market where consumers have become accustomed to one click lowest price, they must incorporate design features into their machines with tangible assets and measurable cost justification.

Not only was this challenge presented to the Bauer sales team, but the design team was challenged, as well. No more status quo. Give us something measurable with high production capability and lower cost of op-

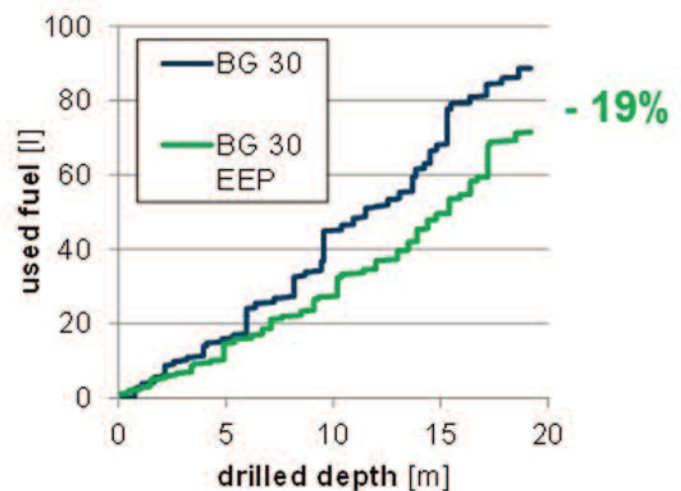
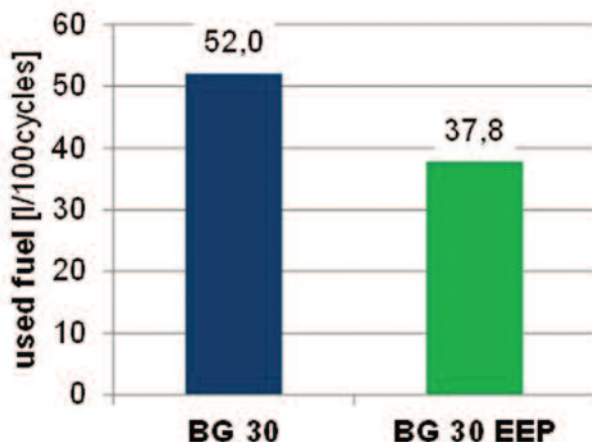
eration. Hence the development of these features is now incorporated into a growing cross-section of the Bauer PremiumLine Drill Rigs.

Consider, for example, Bauer's engine and hydraulic system technology. Now referred to as Energy-Efficiency-Package (EEP), this design will result in fuel savings of up to 30%. Multiple measures to increase energy efficiency are combined in the EEP and coordinated in such a way that a significant increase is achieved in efficiency and, therefore, productivity. Extensive before and after comparisons have proven that up to 30% fuel savings is achieved in the winch operation of rotary drill rigs and up to 20% savings is accomplished in usual practice while drilling.

In addition, the implemented measures also lead to significant noise reduction during operation because the diesel engine and fan are appropriately regulated.

Energy Optimization

The drive system of the rotary drilling rig's main winch, with its significant share in energy consumption, especially during Kelly Drilling, was fundamentally re-engineered. The new system now makes it possible to recover the energy released during the lowering of the tool. Thus, the fuel consumption can be significantly reduced, especially when drilling deep bore holes. Further benefits are increased efficiency during lifting, higher speeds, and independent parallel operation of several functions, e.g. main winch, feed, swivels, and rotary drive. Energy consumption by all ancillary devices, such as fan drives and pressure supply units, was optimized. The already low values of pressure loss in the hydraulic hoses and valves of the Bauer machines were further reduced. A special hydraulic fluid with a favorable viscosity over a wide temperature range further increases the efficiency.



Fuel savings with Bauer BG 30 with and without EEP Technology.

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Bauer BG 39 Drill with 38-Ton Single Layer Winch.

With diesel fuel cost averaging \$2.50 per gallon at the time of this writing, the typical drill rig in production over the course of one year could generate fuel costs upwards of \$45,000 per year. That cost, compared to a feasible 20% fuel savings, could result in an annual \$9,000 cost savings. This could conceivably result in more than \$100,000 over the life of the machine.

Single Layer Winch

One of the more significant design features of the Bauer Premium-Line Drill Rig is the "V" Kinematic design, which is utilized in the higher torque product line. This feature allows the mast to be laid forward for removal and transport. The robust design allows for the rotary drive to operate at full torque over the full length of the mast. By reducing the pivot points of the conventional "layback" mast design from five to three pivot points, the vertical drilling tolerances are significantly improved without sacrificing or limiting the maximum torque capabilities on the mast.

This mast design configuration also created a huge opportunity to relocate the main winch or Kelly winch to the upper house of the base carrier. This winch relocation accomplishes several benefits. Most conventional drill rigs with layback masts locate the main winch at the bottom of the mast. This added weight and huge physical dimension creates several problems:

1. The physical dimensions and the width of the cable drum are limited due to the available mast mounting space.

2. Operational visibility can be impaired due to the location of the winch on the bottom of the mast. This used to be a problem with rear-mounted winches. High-definition cameras and anti-spooling devices;

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Roy Kern, ECA CEO and ADSC Associate Committee Chairman, demonstrates the physical dimensions of the Bauer 45-ton Single Layer Winch.



ECA Sales Team completes Bauer Customer Benefit Training (BCB) at Pittsburgh Headquarters.

however, have eliminated this problem.

3. The increased non-productive and structural weight of the winch on the mast reduces the machine's stability while drilling, crowding, retracting the Kelly bar and swinging the rig with tooling, casing, and drill spoils.

Therefore, by relocating the main winch in a piggy-back feature – mounted on the upper rear of the base carrier – the above disadvantages are eliminated. However, this also allows the designer to seize other opportunities that will lead to cost savings and higher winch capacities while still achieving better stability of the drill rig. With virtually no restraint on the overall width of the main winch drum, the Kelly winch can provide for single layer operation to depths of up to 97 meters. Winch capacities of 27 to 45 metric tons are also achieved as the norm.

So what does this mean in terms of cost savings? It is a loss of single line pull of approximately 8% to 10% per added cable layer. Think about that! The 45-ton winch that you purchased with your drill rig is now 40.5 tons on the second layer of wire rope. If it is necessary to drill to depths that require a third layer of wire rope, that 45-ton winch is now 36 tons. The line pull of the Bauer winch remains constant at 45 metric tons to a depth of 96 meters. Did you get what you paid for?

In addition to preventative maintenance items like engine and hydraulic oils, gear oils and lubrication grease, one of the most expensive wear items is the main winch or Kelly wire rope. When the cable is operating in duty cycle operations, the cable in single layer application can last up to 2 to 3 times longer than when operated in double layer configurations, and up to 10 times longer in a triple layer configuration. ECA has records of single layer wire rope life up to 2,500 hours as opposed to as low as 500 hours of wire rope life in double layer configuration, and as low as 100 hours in triple layer operation. That cost can extend out to a wire rope cost of \$4.00 per hour in the single layer configuration. The hourly cost of wire rope replacement worsens to \$12.00 per hour when

used in double layer and skyrockets to \$100.00 per hour in triple layer mode. These calculations are based on 45-ton winches with 40-mm-diameter wire rope and large diameter tools drilling to depths of more than 100 meters – exactly the production requirements that many drillers require when making significant investments over the duration of the life of the rig and project requirements that may present themselves over that period. The single layer winch could result in wire rope savings in excess of \$200,000 over a 10-year lifespan of the drill.

BAUER Customer Benefit (BCB)

Under the direction of Senior Executive Director of Sales Christian Gress and Deputy Director of Marketing Barbara Wasmuht, Bauer Maschinen has embarked on a training program to educate all technical and sales personnel on the extended features of Bauer drilling products that justify the real cost of investing in its products as opposed to the pricing represented on the proposal. Personnel at Bauer-Pileco Inc. in Conroe, Texas and Equipment Corporation of America/ECA Canada, located throughout the eastern United States and Canada have recently completed this extensive training at their headquarters in Pittsburgh, Pennsylvania. Please contact your Bauer representative to learn how you can save more time through production and more importantly, more money, by understanding the real impact behind the costs and specifications.

Benjamin Dutton is the President of Equipment Corporation of America. Founded in 1918, ECA has become known as a leading supplier of foundation construction equipment. ECA offers full product support including sales, rentals, service and parts, tooling and accessories for the Bauer, Klemm, RTG, and MAT product lines.

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Direct Claims Against Design Professionals and Claims Against Insurance Policies, Two Additional Avenues for Recovery for Delay Damages and Cost Overruns

By Richard D. Kalson, Esq.



This *Legal Tips* column often focuses on innovative ways for a subcontractor to get paid on a construction project. After all, there is never a reason to work for free or for less than payment in full. Collecting payment has been half the battle in the construction industry for at least the last three centuries. As a result, this column has focused heavily on successful payment techniques such as payment bond claims, mechanic's liens claims, and the effective use of state prompt payment acts. This month we will focus on three decisions that were issued in 2017, one case that addresses direct claims against a design professional and two opinions dealing with claims against a construction manager and a subcontractor's insurance for delay damages and cost overruns.

I. Insurance Claims

In *KICC-Alcan Gen. v. Crum and Forster Specialty Ins. Co.*, 2017 U.S. Lexis 37560 (D. AK.), a Federal Court in Alaska earlier this year made a fairly surprising decision when a general contractor/construction manager made a claim for insurance coverage for a subcontractor's three month delay claim and a related acceleration claim totaling nearly two million dollars made by its HVAC, plumbing, and electrical subcontractor. The claim was based on mismanagement of initial delays, a lack of communication by the contractor, a failure to mitigate the effects of the various schedule delays, and unreasonable continuous direction to perform the subcontract work in accordance with the original project schedule which resulted in the acceleration claim.

The subcontractor then filed suit seeking damages resulting from the contractor's failure to pay for the labor and services provided and accepted and incorporated into the project. The contractor sought coverage from its insurance company for a "wrongful act" which was defined in the applicable insurance policy as "an act, error or omission in the rendering or failure to render professional services by any in-



Richard D. Kalson

sured" in its role as a construction manager. The contractor's insurance company denied coverage based on the very plausible argument that the mere fact that the subcontractor sustained additional costs in order to comply with a construction schedule did not transform an uncovered breach of contract claim into a covered negligence claim. Furthermore, the involved insurance policy did not contain an exclusion for contractual liability or all claims arising from the contract. The Court held that under the language of the policy a covered claim existed where the claimed damages were caused by an act or omission in the rendering of professional services, which would include the complaint of mismanagement of the project through communication and scheduling failures.

A far more typical decision was recently reached by a Federal Court in Montana in *Phoenix Ins. Co. v. Ed Boland Constr., Inc.*, 2017 U.S. Dist. Lexis 6654 (D. MT.). Ed Boland Construction ("EBC") was a subcontractor which agreed to perform drilling and pile installation services on a Federal bridge repair and reconstruction project in Glacier National Park. Within days of its start of construction, EBC notified the project's general contractor that it had encountered differing site conditions that included oversize rip-rap, timbers, and concrete. On the same date, the project owner expressed concern over whether EBC could complete the project in accordance with the governing plans and specifications as it brought equipment to the site that differed from the equipment that it represented would be utilized on the project. After a notice to cure was issued to EBC, EBC was terminated for default. A delay then occurred while a replacement contractor was sought.

Not surprisingly, the contractor then sued EBC seeking compensation for delays and excess replacement subcontractor costs. EBC turned the complaint over to its insurance company to defend under its Comprehensive General Liability ("CGL") policy. EBC's CGL policy only provided coverage for property damage and personal injury caused by an occurrence. The Court held that the claimed project delays did not constitute property damage. While other courts had found

that project delays could constitute insured property damage when such delays resulted in situations where defective workmanship caused damage to a structure that resulted in delay, such was not the case here. Instead, there was not any defective work, and therefore, coverage did not exist.

II. Direct Claims Against Design Professionals

In recent years, more and more states have expanded the remedies for a contractor or subcontractor who desires to make a direct claim against a design professional for a defective design. The theory behind allowing a subcontractor or contractor to make such a claim despite the fact that it does not have a contract with the design professional is that the design professional knows that the contractor and subcontractors will rely upon the design information that they provided when assembling a bid and will be damaged if such information is inadequate. These claims have been particularly successful in states such as New Jersey, Pennsylvania, and West Virginia, as well as in Ohio and Texas under certain circumstances.

In *Balfour Beatty Infrastructure, Inc. v. Rummel Klepper & Kahl, LLP*, 155 A. 3d 445 (Ct. App. MD. 2017), a surprisingly contrary result was recently reached. The Court of Appeals of Maryland held that a contractor could not bring a lawsuit directly against the engineer for alleged deficiencies in the engineer's design that caused economic losses to the contractor on a government project in the absence of a direct contract, property damage, or personal injury. Evidence of a design failure that led to project delays and poor scheduling work were not sufficient to allow a contractor to proceed directly against a design professional under Maryland law. The Court additionally reasoned that the contractor had the opportunity review the engineer's design, ask for clarifications, and submit a bid detailing how much it would cost to build the project.

Richard D. Kalson, Esq. of Benesch law is the Chair of the ADSC's Governance Committee and a member of the ADSC's Northeast Chapter Board of Directors. Rick can be reached at rkolson@beneschlaw.com or at (614) 223-9380. Please send Rick any ideas for legal topics to be covered in Legal Tips.

Hot enough for you?

By Rick Marshall, ADSC Director of Safety

Every year we experience the phenomenon of summer and the accompanying rise in ambient temperature. Come early spring, we all tend to welcome the warmer weather. We get to see the last remaining snow melt away, trees begin to bud, you consider firing up your motorcycle or hot rod for the first time of the new year. However, very soon, we all start to complain about how hot it is. The inevitable summer heat will soon be upon us, so now is the time to prepare for it – **safety wise**.

Most everyone is aware that working outdoors in warmer temperatures can cause some heat related illness to many workers. Some symptoms are very minor – sweating, possible minor cramping, a slowing down of the work pace. Most workers quickly overcome these symptoms with a long drink of water, a minor stretch or two, and continue to work throughout the shift without any consequences.

As the temperature increases, the potential harmful effects of heat related illness become more hazardous to the exposed worker. The risk increases for those who are new to the workforce – employees returning to work after a long layoff, young employees with little or no experience with working in the summer heat, and perhaps some of your older employees who have long experience with summer heat, but now have other health issues that the high temperatures exacerbate the symptoms.

If you have a regular workforce, one can perhaps more easily identify those individuals who may be at risk for heat related illness. If, however, you work in many different locations using local hires, you have little or no idea of the new employee's susceptibility to the heat.



Rick Marshall

Is heat related illness really that serious? According to OSHA, in 2014 alone, 2,630 workers suffered from heat illness and 18 died from heat stroke and related causes on the job. So, it is time to once again review the signs and symptoms of heat related illness.

For the most part, heat-related illnesses begin with heat rash, moves on to heat cramps, heat syncope, progresses to heat exhaustion, and finally on to heat stroke, if not recognized and addressed correctly. One way the body cools itself is by sweat-

ing and allowing that sweat to evaporate. However, this requires enough fluid in the body to make sweat, air circulating across the skin, and a low enough air humidity to allow that sweat to evaporate. When the air temperature is close to or warmer than normal body temperature, cooling of the body becomes more difficult. Blood circulated to the skin cannot lose its heat. But sweating is effective only if the humidity level is low enough to allow evaporation, and if the fluids and salts that are lost are adequately replaced.

Relative humidity is a measure of the amount of moisture in the air. Sweat does not evaporate as quickly when the air is moist, as it does in a dry climate. Since evaporation of sweat from the skin is one of the ways the human body cools itself on a hot day, high humidity reduces our natural cooling potential and we feel hotter. Low humidity can also be a problem for outdoor workers in hot, desert-like climates. Sweat evaporates very rapidly in low humidity, which can lead to severe dehydration.

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if a person does not drink enough water or suitable liquids throughout the day. Therefore, it is important to pay close attention to the heat index, and understand how it can negatively affect an employee working outside – day or night.

For more details, go to the OSHA Heat Index Guide at: https://www.osha.gov/SLTC/heatillness/heat_index/index.html

The U.S. Centers for Disease Control (CDC) identifies the following five main types of heat illness:

Heat Stroke: Heat stroke is considered the most serious heat-related illness, occurring when the body can no longer regulate its temperature. The body temperature quickly rises and the ability to cool off by sweating often fails. Heat stroke can cause death or permanent disability in the absence of emergency treatment.

Symptoms: Hot, dry skin; hallucinations; chills; throbbing headache; high body temperature; confusion/dizziness; slurred speech.

First Aid: Call 911 and notify supervisor; move affected worker to shaded area; take steps to cool the individual (in an air conditioned area, spraying with water and fanning).

Heat Exhaustion: As a response to excessive loss of water and salt, the body may experience heat exhaustion. Those who are elderly or have high blood pressure are particularly vulnerable.

Symptoms: Heavy sweating; extreme weakness; dizziness/confusion; nausea; clammy skin; pale complexion; muscle cramps; slightly elevated body temperature; fast, shallow breathing.

First Aid: Have worker rest in a cool or shaded area, preferably in air conditioning; give worker plenty of water and have them take a cool bath, if possible.



Heat Syncope: Heat syncope is an episode of dizziness or fainting that can occur with prolonged standing or from suddenly standing from a sitting position. This can occur because of dehydration or a lack of acclimatization.

Symptoms: Light-headedness; dizziness; fainting.

First Aid: Have affected worker sit in a cool place once they feel symptoms, in addition to slowly drinking water or a sports beverage.

Heat Cramps: Heat cramps typically are a result of low salt levels in

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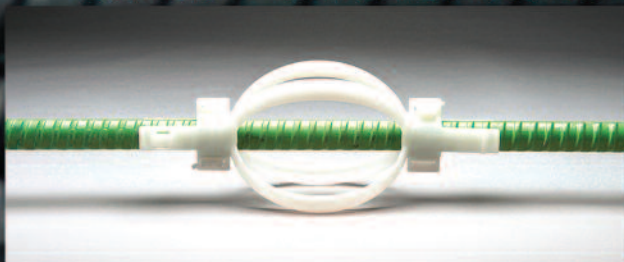


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muscles because of excessive sweating. They also may be a symptom of heat exhaustion.

Symptoms: Muscle pain or spasms, usually in the abdomen, arms or legs.

First Aid: Stop activity and sit in a cool place; drink clear juice or a sports beverage; abstain from strenuous work for a few hours; seek medical attention if the worker has heart problems or the cramps don't subside after one hour.

Heat Rash: Heat rash is a skin irritation caused by excessive sweating.

Symptoms: Appears as a red cluster of pimples or small blisters; likely to occur on the neck, upper chest, groin, under the breasts and in elbow creases.

First Aid: Keep worker in cooler, less humid environment; keep affected area(s) dry; use dusting powder, if available.

Heat exhaustion can rapidly progress to heat stroke when the body's temperature regulation fails. If the body cannot get rid of excess heat, it will store it. When this happens, the body's core temperature rises and the heart rate increases. As the body continues to store heat, the person begins to lose concentration and has difficulty focusing on a task, may become irritable or sick, and often loses the desire to drink. So aside from the physical symptoms, what is the employee doing while they are suffering from them? Could a mistake be made shooting grade while feeling nauseous? If you were lightheaded, might you be more likely to stumble and fall? If you had a bad cramp in your leg, could you move away from the skid-steer backing up next to you? When you sweat, your palms get wet – which may lead to a loss of grip on a hand tool. **Hey Boss, not every drill rig has an air-conditioned cab ya know.** Could your operator make a mistake and injure someone? Your safety glasses may tend to fog up, restricting vision. We could go on, but I think you get the picture.

If the symptoms of heat exhaustion - nausea, vomiting, dehydration and muscle weakness – are not quickly recognized and the person is left in a hot environment, there can be a progression of symptoms which may lead to heat stroke. The person develops a change in mental status, becomes confused, lethargic and may have a seizure. The skin stops sweating, and the body temperature may exceed 106 F (41 C). **This is a life-threatening condition and emergency medical attention is needed immediately.**

To prevent heat related illness and fatalities:

- Drink water or other suitable liquids every 15 minutes, even if you are not thirsty.
- Rest in the shade to cool down.
- Wear a hat and light-colored clothing.
- Learn the signs of heat illness and what to do in an emergency.
- Keep an eye on fellow workers.
- "Easy does it" on your first days of work in the heat. You need to get used to it.

I am often asked "Does OSHA have a rule against working above or

below a certain temperature?" Federal OSHA does not have a specific standard that covers working in hot environments. Nonetheless, under the OSH Act, (i.e. The General Duty Clause) employers have a duty to protect workers from recognized serious hazards in the workplace, including heat-related hazards. As such, an employer must:

- Provide workers with **water, rest and shade.**
- Allow new or returning workers to gradually increase workloads and take more frequent breaks as they acclimatize, or build a tolerance for working in the heat.
- Plan for emergencies and train workers on prevention.
- Monitor workers for signs of illness.

However, California employers are required to take these four steps to prevent heat illness:

Training

Train all employees and supervisors about heat illness prevention.

Water

Provide enough fresh water so that each employee can drink at least 1 quart per hour, or four 8 ounce glasses, of water per hour, and encourage them to do so.

Shade

Provide access to shade and encourage employees to take a cool-down rest in the shade for at least 5 minutes. *They should not wait until they feel sick to cool down.*

Planning

Develop and implement written procedures for complying with the *Cal/OSHA Heat Illness Prevention Standard*.

The Washington State Legislature states that employers of high risk outdoor workers follow regulations to prevent heat stress, and Minnesota Administrative Rules state that indoor ventilation and temperature are regulated to prevent heat stress. Additionally, the U.S. Army *EM 385-1-1 30 Nov 14 Safety and Health Requirements Manual* has a section 6.J that addresses *Heat/Cold Stress Management*.

Employees and supervisors should know the warning signs of heat-related illness and how to respond to each situation, including heat cramps, heat exhaustion and heat stroke. Have plenty of water and ice packs available on the job site to help cool employees in case of an emergency. Make sure that workers immediately report any incidents to supervisors so they can take proper steps, including recording the incident. Review the site emergency action plan at least once a week. The right clothing can help workers be more effective in the heat. They should wear light-colored, lightweight clothing that allows for airflow. Clothing with SPF built in can help, too. Hats should provide enough shade to protect the face and neck without blocking vision; a cooling neck bandanna (now becoming in vogue) is another smart way to stay cool.

OSHA has a smart phone app which allows workers and supervisors to calculate the heat index for their worksite, and, based on the heat

(continued on page 69) ►

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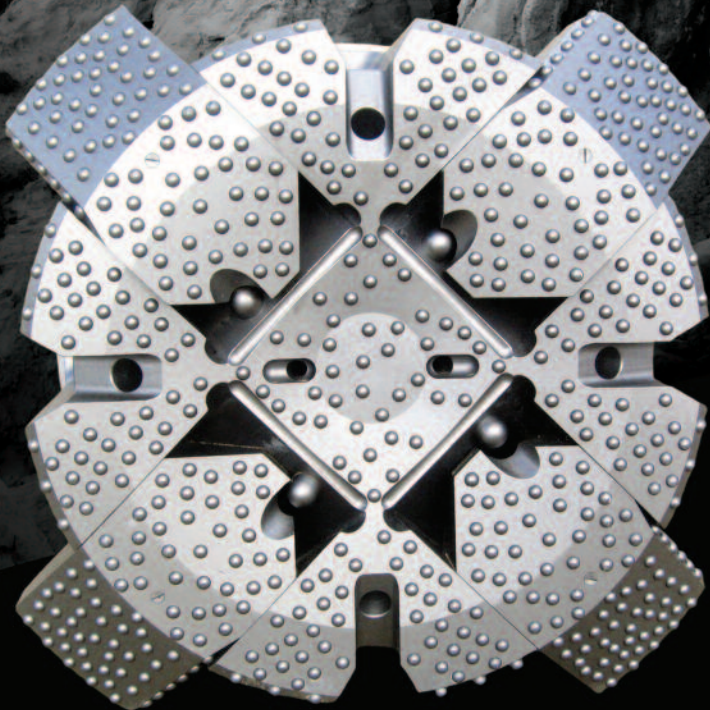
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index, displays a risk level to outdoor workers.
(https://www.osha.gov/SLTC/heatillness/heat_index/heat_app.html)

Heat Index	Risk Level	Protective Measures
Less than 91°F	<u>Lower</u> (Caution)	Basic heat safety and planning
91°F to 103°F	<u>Moderate</u>	Implement precautions and heighten awareness
103°F to 115°F	<u>High</u>	Additional precautions to protect workers
Greater than 115°F	<u>Very High</u> to <u>Extreme</u>	Triggers even more aggressive protective measures

The Canadian Centre for Occupational Health and Safety (CCOHS) has a webpage offering information regarding extreme hot or cold temperature conditions, and the provinces which have regulations governing these conditions. The ADSC is a member of CCOHS.

(http://www.ccohs.ca/oshanswers/phys_agents/hot_cold.html)

One might be inclined to scoff a bit at these "requirements" for the protection of employees exposed to outdoor heat. After all, the older guys in the crew think nothing of it – they just "deal with it." We never used to have to put up a shelter (are you kidding me?) or mandate rest breaks for the field crews. Heck some still are appalled that they must provide water (year-round, not only in the summer months). This is especially true of employers who work in typically warmer climates (i.e. southern U.S.). Well when you see one of your crew members go down from heat exhaustion, when you see the look on their face, when you see how it stops the job progress, when you see how it changes the morale of the crew, then perhaps you will "see" the importance of keeping your employees safe from the effects of heat.

As Director of Safety and speaking for the ADSC Safety Committee, we welcome input from all ADSC members on safety related topics which need to be addressed in our industry. This article expresses only one viewpoint. Perhaps you have a different one. Please feel free to contact me or the ADSC at (469) 359-6000 or by email (rmarshall@adsc-iafd.com).

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Your Seat at the Table

By Peggy Hagerty Duffy, P.E., D.GE, ADSC Technical Advisor

What influences your everyday work world? Certainly federal, state, and local laws affect items such as wage requirements, expenditures and time needed for safety provisions, and transportation restrictions for loads traveling to and from jobsites. Economic factors govern the volume of available work and the types of structures being built. Demographics influence work force characteristics. And local conditions can add unique constraints – we don't get much done in Louisville during Derby Week because concrete trucks can't get around town. (Plus, everyone is somewhere drinking bourbon, but that's not the official story).

How many times have you complained about a code provision that makes your job more difficult and decreases efficiency on the project? When was the last time you didn't get to bid on a job because over-conservative design engineers made the technology provided by your company uneconomical?

Thousands of codes, standards, laws, myths, and common misconceptions exist throughout the United States and Canada in the design and construction worlds. Each of those constraints can have a profound effect on the success of a contractor's work. As such, it is important to be conscious of the origins of pertinent rules and standards so that a contractor can have a role in reforming erroneous and/or inappropriate practices, where possible. Many contractors believe that most codes and design requirements are etched on stone tablets and brought down from lofty mountain peaks where they will be administered in perpetuity, regardless of whether they are flawed. But laws, codes, standards, and even common design practices and assumptions all are created by people and reflect the state of an issue at the time they originate. Therefore, in theory, people also can argue for change and can be instrumental in implementing a new standard that is more effective and appropriate.

Lobbying for a change in an established procedure or rule is no different than any other sales pitch. The person requesting the change must show why the change is needed and must also provide supporting information to back up their claims. More importantly, that same person must have an understanding of why the rule or standard was implemented. More specifically, it is critical to know why the requirement was enacted originally and what is the risk that the standard is trying to avoid. Along those lines, it is extremely invaluable to have some insight into the forces driving the persons creating and upholding the rule.

Building codes and other laws that govern construction practices have been put into place to protect the public health and welfare. They may have been enacted to prevent collapses and corresponding death and injuries, or they may have evolved to reduce the risk of large scale economic losses by the public through deterioration or failure of structures.

In many cases, particularly in local codes and ordinances, regulations and standards have been the direct result of a single incident. Why do coffee cups have 4,000 warnings about the coffee being hot, even though the average marginally intelligent person knows that hot coffee is hot? Because one old lady spilled coffee on herself, sued an international corporation for millions, and won. Similarly, engineers now can be charged with criminal offenses in the event that their negligence causes



Peggy Hagerty Duffy

death or serious injury because a couple of engineers did not review their shop drawings thoroughly and a bunch of people at the Hyatt Regency in Kansas City died when part of the structure collapsed. On a local level, that requirement for a 5-foot probe hole at the bottom of every rock socket may have been put in place because in 1963 the mayor's dog fell into a sinkhole that developed in the basement of a building and died and the mayor developed a paranoia about karst features. This seems extreme and unlikely, but contractors and engineers everywhere can

tell stories of even more outrageous origins for odd local code requirements.

Most code enforcement and code writing officials are driven by a single factor: risk. Local, state, and federal agency representatives also are guided primarily by the need to minimize risk to the public. Risk can

mean irresponsible expenditure of funds, but most often it means the possibility of injury or death to persons using or constructing a structure. While many contractors and engineers believe that most state and federal agencies are most concerned with controlling cost, in fact officials at these agencies have risk to the public at the tops of their priority lists.

Engineers are similarly guided, because the engineering code of ethics states that an engineer is bound to protect the public health and welfare. Engineers also often have inherently cautious personalities and don't want even the smallest

chance of a failure. Ripples extended through the engineering community for years after Hurricane Katrina because investigations suggested that some of the damage from the storm was caused by failure of flood control measures to handle the storm surge. No engineer wanted to be similarly accused, so dam and levee design became VERY conservative.

To make changes to public policy and law governing design and construction, a contractor needs first to identify with whom the standard originated. He then should determine what is the policy concerning amendments to the regulation in question. Any effort to make a change should be made armed with extensive information, both technical and anecdotal, supporting the argument in question.

Effecting change in this manner typically is difficult. Laws and regulations are protected by elaborate procedures for making changes so that it is not possible to make frequent edits based on the whims of a small group of people.

So is there an easier way to make a difference? Of course, changing current standards always will be time-consuming and will have a low probability of success. But future codes and rules and practices may be easier to influence if a contractor becomes active with those organizations that make policy.

The Federal Highway Administration (FHWA), for example, routinely solicits commentary from industry representatives when guidance is being formulated for construction practices and design methods. Your

(continued on page 72) ►



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schedule is full, you're still looking for a decent oiler to replace a veteran who retired, and you get a migraine when you read 500-page research reports. Your inclination is to let your friendly competition down the road jump into the discussion and get updates from her. She just loves reading graphs in 7-point type anyway, and you don't want to take away her joy, do you?

But this is your chance to be part of the discussion going forward.

“Participation and willingness to spend time and money to address policy questions go a long way toward establishing your credibility and proving that you deserve a seat at the table.”

Once you have inserted your opinion into the maelstrom of perspectives, you are now part of the issue. You have a legitimate right to make comments going forward, and you will be privy to small details during development of the ultimate position on the issue. These small pieces of data may prove to be instrumental in your efforts to move the approved opinion in the direction you want. Furthermore, when the final opinion or standard is given, you won't be that annoying party guest who shows up late and asks why there's no guacamole.

As a contractor, you might be asked to contribute labor and materials to conduct tests to answer questions that will affect the ultimate policy decision. Engineers often are requested to provide time and brainpower to research issues and evaluate data produced by those tests you donated. Only you can decide whether you have the resources to complete

the needed tasks. You also must assess whether the issue is of sufficient importance to warrant the company resources you'll have to commit to finish the work. But, where practical, being involved in policy-making that affects your business on a day-to-day basis is always advisable.

Participation and willingness to spend time and money to address policy questions go a long way toward establishing your credibility and proving that you deserve a seat at the table. It has long been said in the United States that if you don't vote, you can't complain about the outcome of the election. Participation in industry policy-making is your vote. Whenever the success of your company depends on the outcome of a rule-making process, you should strive to maximize your participation within the practical constraints of your company resources. The guacamole disappears quickly – put your shiniest shoes on and get to the party early.

ADSC

About the Author

*Peggy Hagerty Duffy is President of Hagerty Engineering, Inc. Peggy serves as Technical Advisor to the ADSC, managing the progress of ongoing research, assisting in realizing the project goals of the ADSC committees, and contributing technical articles for **Foundation Drilling** magazine.*

ADSC looks forward to future issues featuring her engineering technical expertise peppered with her witty remarks. Continue to read her articles...you are guaranteed to find them both informative and humorous. (Editor)

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This department covers member projects in process or just completed from ADSC Contractors, Associates and Technical Affiliates. As the title states it is "Not the Hole Story" but short stories providing **Foundation Drilling** readers an example of the projects in the industry. Publishing your project here is a **complimentary member-only benefit**. All member companies are invited to contribute to this department. To submit contact **Foundation Drilling** Editor, Sherry Epperson at sepperson48@gmail.com.



Nicholson Piling Up CSO Jobs Across The Country

Pittsburgh-based geotechnical specialty contractor Nicholson Construction Company recently began work on the Missouri River Waste Water Treatment Plant (MRWWTP) in Omaha, Nebraska.

The plant is undergoing an expansion that includes the construction of a new chlorine contact basin located along the Missouri River. While the plant actually serves approximately 125,000 residents in Omaha, the industrial and domestic flows to the plant give it the equivalent population of 600,000 people.

Nicholson was awarded the contract to install a four-foot thick reinforced concrete diaphragm wall, which will act as support of excavation for the new chlorine basin building, a water cut-off barrier and will become a permanent part of the basin foundation. The wall will reach depths of approximately 82 feet and will be excavated using a hydraulic clamshell. Additionally, augercast piles will be installed to provide increased deep foundation support and as deep foundation elements for the odor control duct support.

Aging combined sewer overflows are a water pollution concern for more than 770 cities in the United States, per the Environmental Protection Agency. Nicholson has been a part of many of the country's biggest remediation projects, including The Dugway Storage Tunnel in Cleveland and the Maline Creek CSO in St. Louis. Both projects included the installation of secant pile walls at multiple site locations, and both wrapped up in December of 2016.

"It's been great to draw on Nicholson's extensive CSO experience for this project," said Jewels Redding, Project Manager. "Our team has

worked on these types of projects across the country over the years, but we always learn something new to apply to the next one. We're looking forward to another successful project here in Omaha."

Nicholson's portion of the work will wrap up in early summer of 2017.



Secant pile wall at Dugway Storage Tunnel in Cleveland.

(continued on page 74) ➤

NOT THE HOLE STORY Contd.

kV Structures Uses TR150 to Install Shoe-fly Line 6 Feet Up

by Debby Keegan, Marketing Manager, Bay Shore Systems, Inc.



LAD400 reach and stability make it ideal for restricted access utility projects.

Pouring rain, hot distribution and transmission, foundation six feet off the ground in a planter box and pre-Christmas mayhem, made the Missouri Flat – Gold Hill 230kV drilling project in El Dorado Hills, California an attention-grabbing project for kV Structures, Inc., a utility contractor builder specializing in foundations for the power industry.

kV was hired by Wilson Construction Company to upgrade 12.5 miles of shoe-fly line, to temporarily handle power when the transmission line is rebuilt later in 2017. The shoe-fly consisted of 200 locations with light duty steel or wood poles being set to complete the shoe-fly. The transmission line has 62 new tubular steel poles being installed on new foundations. kV worked on both the shoe-fly and the transmission line foundations in 2016.

The entire project required four different drill rigs to get the highest performance in specific situations for the job. A custom-built Bay Shore limited access LAD400-45 was used on the replacement poles while the distribution was still hot for its high torque and low overhead requirements. The LAD400 has 40,000 ft-lbs. of rotary torque, drill speeds of up to 60 RPM,



TR150 and concrete mixer on tracks.

and attachment height of just 11 feet.

A Bay Shore TR150-60 was the rig used on the transmission line to accommodate the rocky soil conditions and to put in the most challenging of the foundations 6.5 feet x 20 feet deep in a planter box that was 6 feet high and 11 feet away from the wall. The TR150 had to be elevated 3.5 feet so the counterweight would clear the retaining wall. This was all happening in a busy grocery store parking lot just prior to Christmas. kV reduced the time it took to mobilize onto the site, drill the foundation, and return the section of the parking lot to the grocery store by 25% because of the performance capabilities and productivity of the TR150.

Two other Bay Shore rigs were used on this project: a truck mounted TR70-70 for added flexibility of moving to different structures without traffic control and a DH60-60 with BSS Round Locking Kelly bars (RLK) for dealing with the rock.

The biggest surprise on the project was Mother Nature itself. October typically has average rainfall of less than one inch but October 2016 was one of the wettest on record with 8.97 inches of rain.



TR150 elevated 3.5 feet to clear retaining wall.

El Dorado County does not allow traffic control when the pavement is wet so that also caused logistical challenges. kV was not able to move into locations that required traffic control to load and unload when the pavement was wet so were forced to work out of sequence or use the TR70 truck in places that would be better suited for TR150. Once the rain hit, concrete delivery had to be considered because the trucks couldn't leave the pavement without getting stuck so matting had to be laid down or the concrete had to be transferred into 4-cubic yard concrete mixers on tracks.

Managing the effects of bad weather on the project was key for protecting worker safety, completing the project on time and on budget, preventing costly damage to the worksite, materials, and equipment, and ensuring that the quality of the project was not compromised.

From October until the project completed in January 2017, the kV crew was working seven days a week and the employees were getting worn down. 2016 marked the end of seven years and over 145,000 man hours without a lost time accident. With all the challenges of the weather and long hours it was a real testament to kV employees looking out for one another and making sure everyone went home safely each day.

Ultimately the success of this project in the face of bad weather came down to how well the project was planned, employee dedication, and using drilling equipment that provided the best performance, productivity, access and reliability for the job.

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The Moles 2017

ADSC CEO Michael D. Moore, Andrew Burns and Terrence Holman Inducted Into The Moles

It is with great pride that we announce that ADSC CEO Michael D. Moore, Andrew Burns of ADSC Contractor Member Underpinning & Foundations Skanska and Terrence Holman of ADSC Technical Affiliate Member Turner Engineering Group were inducted into The Moles, in New York, May 3, 2017. They were welcomed into the Association by fellow Moles at a dinner at the New York Hilton.

The Moles, a fraternal organization of the heavy construction industry, is the most prestigious organization of its kind in the world. Moles members are leaders in their profession who are dedicated to promoting the industry and supporting their colleagues through outreach programs and networking opportunities.

The purpose of the Association is to promote better acquaintance among those individuals engaged in the heavy construction industry to the end that past and future friendships among the members be fostered and cemented; that meetings and other gatherings be held to exchange

construction information, and promote good fellowship among the members; that advancement of the heavy construction art be achieved, and outstanding performance be recognized through Awards; and that, in the public interest, standards of construction be raised both as to engineering and as to business ethics.

The Membership of the Association is comprised of individuals now or formerly engaged in the construction of tunnel, subway, sewer, foundation, marine, subaqueous or other heavy construction projects. A new member must be recommended by a current member. Five reference letters are then required. After this has been done the prospective member must be elected by Moles members.

Moore, Burns and Holman have all contributed greatly to raising the standards and safety of the construction industry. In addition, they have encouraged young people, through education programs and outreach to participate in heavy construction and its related fields. Their goal, as is ADSC's, is increasing the industry standard of quality control and quality assurance with an emphasis on assuring safe practices.

ADSC congratulates them on this honor.

Atlas Copco Receives Prestigious Red Dot Design Awards

Atlas Copco, an ADSC Associate Member announced that two of its Portable Energy products, the 8 Series range of portable compressors and the HiLight H5+ LED light tower, have been recognized in the prestigious Red Dot Design

Awards for 2017.

Peter Lauwers, President of Atlas Copco's Portable Energy division, said: "We're delighted to have once again achieved this renowned global prize for outstanding design. The 8 Series and HiLight H5+ are in-house designed products that we are very proud of. When designing new products, we focus on the strategic triangle of performance benefits for the customer, efficiency,

in terms of both fuel and service needs, along with environmental benefits; both these products excel in all three categories."

The 8 Series portable compressor range has set new standards across a number of design categories, from size and weight to efficiency and performance. This includes a new version of Atlas Copco's tough and aesthetically pleasing Hard-Hat® canopy, building upon the Red Dot Design Award the HardHat first received in 2006. Further improvements include a smaller size, with the 8 Series up to 15 percent smaller than comparable models and consuming up to 12 percent less fuel.

The light weight of the 8 Series is another key design feature, with each portable compressor weighing less than 750 kg. The compact and lightweight design of the 8 Series is even more remarkable considering it can be equipped with a built-in generator and still be below 750 kg.

Atlas Copco's second Red Dot Design Award of 2017 was bestowed upon the HiLight H5+ LED light tower. Design features include directional optic lenses that maximize practical light coverage while minimizing dark spots. The HiLight H5+ was designed to provide optimum efficiency, which is illustrated by the fact that just a single light tower can illuminate an area of up to 5,000 m²; providing an average brightness of 20 lux. Additionally, the HiLight H5+ LED light tower can offer a run time between refueling of 260 hours and consume less than 0.5 liters of fuel per hour.

For detailed information on either of these products please visit the Atlas Copco website, www.atlascopco.com.

Professor Dr. Peter Zec, founder and CEO of the Red Dot Award said: "The Red Dot winners are pursuing the right design strategy. They have recognized that good design and economic success go hand in hand. The award by the critical Red Dot jury documents their high design quality and is indicative of their successful design policy."

The award appraises the best products of the year based on submissions from manufacturers and designers around the world. This year, entries were received from 54 countries, with each individually assessed by an independent and international jury of experts. The selection criteria were based on many factors, including innovation, formal quality, functionality and ecological compatibility.

Nicholson Restructures Regional Offices

In an effort to better serve its major markets, ADSC Contractor Member Nicholson Con-

struction Co. recently consolidated several offices to form two new main regions.

The Central Region, led by **Dan Thome**, will include offices and shops in Salt Lake City, Denver, Chicago and Kalamazoo. In his 16-year career with Nicholson, Dan has held many positions, including his most recent as Vice President of the company's former Midwest Region.

Nicholson's Eastern Region will include offices in Pittsburgh and Newark and will be led by **Stephane Bourillot**, a 25-year veteran of Soletanche Bachy, Nicholson's parent company. Stephane most recently was responsible for all of Soletanche's construction in the southern half of France and has previously held leadership positions for the company in the French West Indies and South East Asia.

"This reorganization enables us to concentrate on our most important regions," said **Steve Scherer**, President, Nicholson Construction. "By focusing our technical and operational strengths in these regions, we'll be able to serve our clients in a more efficient manner."

Nicholson is a versatile geotechnical contractor specializing in deep foundations, earth retention and ground treatment. As the North American subsidiary of Soletanche Bachy, one of the world's leading geotechnical contractors, we are part of a global network of geotechnical resources and expertise. We work in a wide range of industries and environments, from power plants and dams, to bridges and skyscrapers. Headquartered in Pittsburgh, Nicholson has offices around the country to address each region's unique geotechnical construction needs.

McKinney Drilling Company Winner of National Safety Excellence Award

ADSC Contractor Member **McKinney Drilling Company** has been named the winner of a National Safety Excellence Award from Associated Builders and Contractors (ABC). **Larry Fowler**, District Manager of the McKinney Winston-Salem location, and **Jodi Martin**, McKinney Corporate Safety Administrator, were on hand to receive the award March 1st during the 27th annual Excellence in Construction® Awards at Workforce Week '17 in Fort Lauderdale, Florida.

"Associated Builders and Contractors is thrilled to honor McKinney Drilling, whose world-class safety processes and safety culture has created an environment where every employee understands that the wellbeing of those around them is everyone's responsibility," said 2017 ABC Na-



tional Chair **Chuck Goodrich**, President of Gaylor Electric Inc., Indianapolis. McKinney Drilling Company's impressive safety record shows the clear difference that an uncompromising, top-down commitment to safety makes in a contractor's performance and we are proud to call them an ABC member."

The National Safety Awards are presented in three major North American Industry Classification System (NAICS) code categories: NAICS 236 – Construction of Buildings; NAICS 237 – Heavy and Civil Engineering Construction; and NAICS 238 – Specialty Trade Contractors.

ADSC congratulates McKinney Drilling Company on receiving this Award.

Drilling Service Company Receives Safety Award



ADSC Contractor Member **Drilling Service Company** proudly announced the honor of receiving the ASA Safety Award from the ASA Mid-

west Council for the third year.

Drilling Service's Executive Vice President, **Jeffrey Murphy** expressed thanks to the Council for the Award, "but more important we thank the project owners, construction team partners, and our own employees who work safely every day." He said, "Number one in 'Murphy's Laws,' the creed under which we operate is: Always put the safety of everyone on the jobsite first."

It's only a good day when Everybody goes home Safe.

ADSC congratulates Drilling Service Company on once again receiving this Award.

Deep Foundations Receives 2016 Outstanding Safety Culture Award



Operating with the highest regard for safety continues to be ADSC International Contractor Member **Deep Foundations Contractors, Inc.** primary corporate value. Year-over-year improvement in safety performance begins with the Senior Management team's active involvement in extensive employee training and education including pre-job planning which is a cornerstone in developing a safe work site. Prior to starting work at the job site, the crew completes a Daily Risk Assessment (DRA) form identifying all the hazards associated with the tasks for the day and implements necessary control measures. As part of our training, every new worker is paired with a mentor and both the new worker and the mentor are identified on each job site.

Deep Foundations spends time collaborating with our clients and the various teams to arrive at the best possible solution for any potential issues. In fact, at the beginning of 2014, our internally developed work permit for utility interferences and work platform was adopted by other firms.

(continued on page 78) ➤

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Our annual safety week, now safety month, provides valuable direction and motivation to our employees to help reach and maintain the milestone of zero lost time injuries. It also provides an opportunity to facilitate discussions to identify areas for improvement and foster a team building culture. Taking the initiative of creating new and safer equipment to protect employees and the public has resulted in the invention of a patented pile driving spotter with an on-board computer which prevents torsional loading of the lattice boom.

Deep Foundations was also one of the committee member's involved in reviewing the Ontario Construction Regulation to determine the importance of mandatory training requirements for drill rig operators. Our firm reinforced commitment to work safety by becoming members of the League of Champions and has been awarded the 2016 Outstanding Safety Culture Award by the Toronto Construction Association (TCA) as well as the 2016 Outstanding Safety Award by the International Association of Foundation Drilling (ADSC) in fact, Deep Foundations has won this award five times in the last six years.

Jeffrey Machine, Inc. Opens New Texas Location

As ADSC Associate Member Jeffrey Machine, Inc. celebrates 40 years in business, they are expanding their services and parts operation with a new office in Euless, Texas. Located in the previously owned Voss Parts & Supply building at 2214 West Euless Boulevard. The new facility will focus on selling consumables such as pilots, adapters, teeth, holders and shaft spacers; and will also carry items such as Slurry Products, Poly-bore, Quick Gel and EZ Mud Plus so that customers can access quickly and directly. In the future, Jeffrey Machine plans to expand to offer a full line of stock tools at this location. **James Bowen** will serve as the Jeffrey Machine sales representative for this new venture.

Since its founding in 1977, Jeffrey Machine's approach to success has always been to listen carefully to its customers and use their feedback and suggestions to continually improve both their products and service. In answer to customer requests for a parts location in the southwestern U.S., the company made the decision to expand



to this part of the country. Customers will have the option to order and pick up parts from the Euless location, or have them shipped directly to them.

For more information about the complete line of Jeffrey Machine tooling, visit JeffreyMachine.com.

(continued on page 81) ►



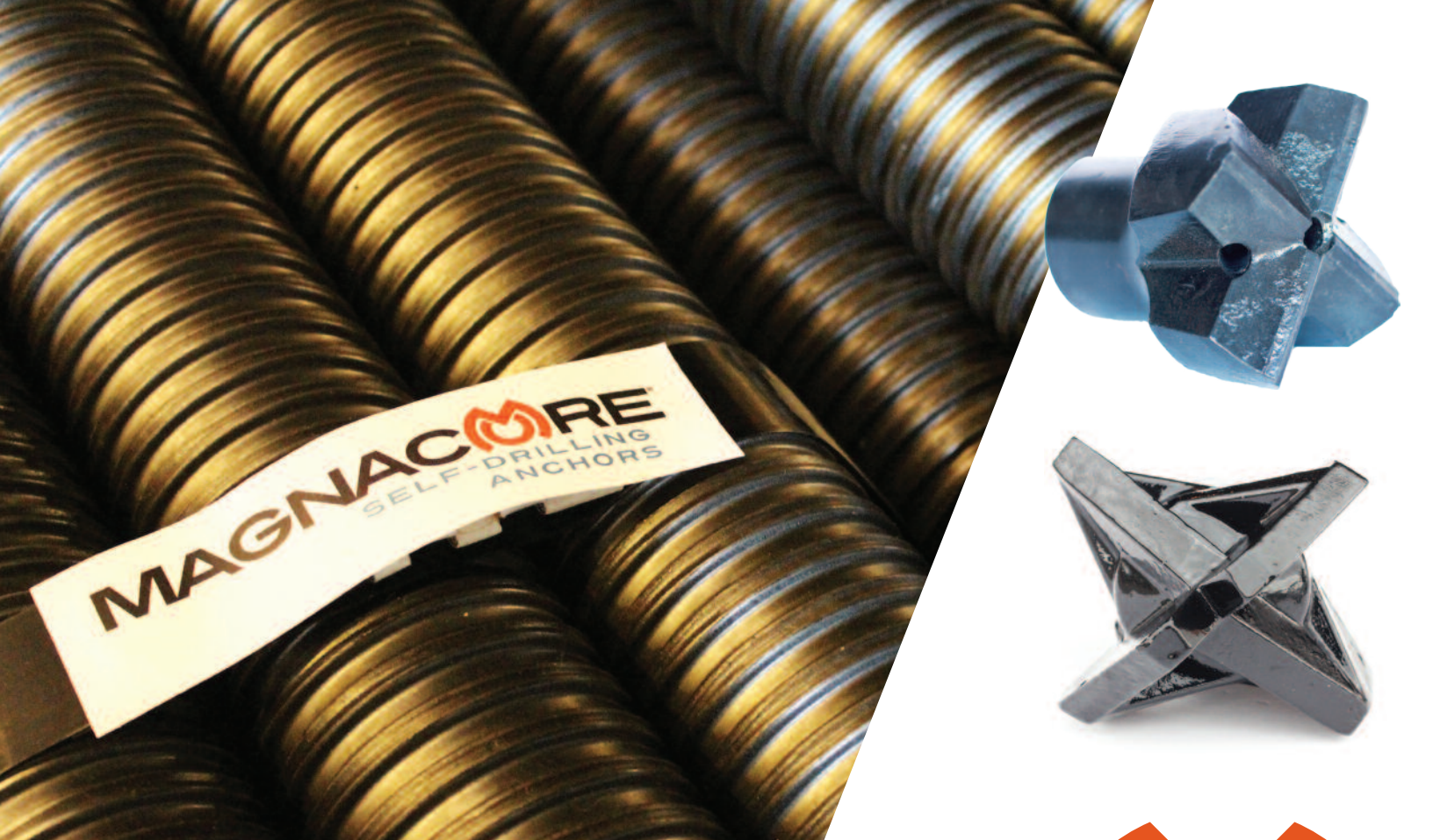
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Equipment Corporation of America Receives Bauer 2017 Sales Partner of the Year Award

One day before ADSC Associate Member **BAUER Maschinen Group's** traditional in-house exhibition opened its doors, their Sales Partner of the Year was awarded. This year, BAUER Maschinen GmbH's Sales Partner for Eastern North America and Canada, is **ADSC Associate Member Equipment Corporation of America (ECA)**. ECA is proud to have won this much sought-after award. In addition to being selected as the Bauer Sales Partner of the Year, ECA was also awarded the Bauer prestigious Regional Service Center Classification. At the present time Bauer has only three dealers with this classification. This was a tremendous recognition and honor for the employees of ECA. The presentation of these awards was witnessed by 15 ECA employees and 21 of their guests. ECA was founded in 1918 and has been BAUER Maschinen GmbH's sales and service partner for the last 14 years.

As ECA President **Ben Dutton** and CEO **Roy**



ECA was awarded Bauer Sales Partner of the Year 2017. From left to right: Dieter Stetter, Chairman of the Management Board of BAUER Maschinen GmbH, Ben Dutton, President ECA, Roy Kern, CEO ECA and Christian Gress, Executive Director Sales BAUER Maschinen GmbH.

Kern stated, they were absolutely surprised, thrilled, and honored by the award. The company has six service locations and three sales

offices in the U.S. and Canada. With their comprehensive spare parts stocks and well-trained

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Jim Harmston, ADSC Emeritus Member and Ben Dutton, President of ECA discuss the features of the RTG Model RG19T Piling Rig with Dirk Himborg, RTG North American Sales Director.

service staff they can easily service 375 BG drill rigs in their sales territory. According to Ben Dutton, the success of their role as a Bauer Sales Partner is based on the completeness of

Bauer's foundation equipment line, the exciting, continuous technical innovations, and the dedicated people. Ben and Roy agreed that all this together make Bauer equipment great to sell.

GZA Named Grand Award Winner by ACEC

ADSC Technical Affiliate Member GZA, a leading geotechnical and environmental consulting firm, has been named a Grand Award winner of the 2017 American Council of Engineering Companies 50th Engineering Excellence Awards for their foundation design of the \$3.98B New NY Bridge, which is the largest highway-bridge project currently underway in the U.S. The project was selected from 162 entries from around the entire country. In March of this year, the project was a Gold Award winner at the ACEC/MA Excellence Awards.

This Design-Build project consists of two, 3-mile long bridges that carry I-87/287 across the Hudson River between Tarrytown and Nyack, New York.

The foundation design resulted in significant cost savings to the taxpayers of New York, and was a key factor in winning this landmark project.

The project team overcame complex ground

conditions along the bridge route, including a compressible clay layer up to 750 feet deep. In this area, the team used steel pipe piles up to 360 feet long, having capacities of 2,100 tons, which is unprecedented for the soft soils within the Hudson River Valley. In addition, there were nearly 400 fewer piles than proposed by other competitors, resulting in eliminating the cost of several thousand tons of steel, and the associated reduction in carbon emissions.

The bridge was designed and is being constructed by Tappan Zee Constructors, LLC (TZC), a consortium of Fluor, American Bridge, Granite, and Traylor Bros. HDR was the lead designer; major subconsultants included GZA, Buckland & Taylor and AECOM.

GZA served as the lead geotechnical engineer and had primary responsibility for developing the foundation design during the Tender Design Phase, performing subsurface explorations, and developing the final foundation design and the pile load test program.

"We congratulate our project team on their foundation design that resulted in a significant construction cost savings. The innovative foundation design also advanced the state of the practice in geotechnical and foundation engineering relative to the behavior of long, large diameter piles in soft soils and will benefit other designers on future projects", said **William Hodge**, CEO of GZA. "In addition, the greater spacing of foundation piers reduced the impact on the sensitive marine environment."

GZA Opens New Boston Location at 31 State Street

GZA has announced their new Boston location at 31 State Street, 8th Floor. The new downtown Boston office location offers more flexible space to adapt to the company's needs as well as convenient meeting space for clients. The space provides "hot desking" for employees. Already, many GZA staff who live in the inner core of the Metro-Boston area are making use of the space. The new Boston office manager, **Bruce Fairless, P.E.**, indicated that the new office provides a convenient location for employees to commute via public transportation or bicycle from their homes. The location also keeps GZA close to many of its downtown clients in the commercial, legal, and government sectors.

Donald T. Goldberg and William S. Zoino, two colleagues at the Massachusetts Institute of Technology, founded GZA in 1964 as Goldberg Zoino and Associates. Today, the company provides

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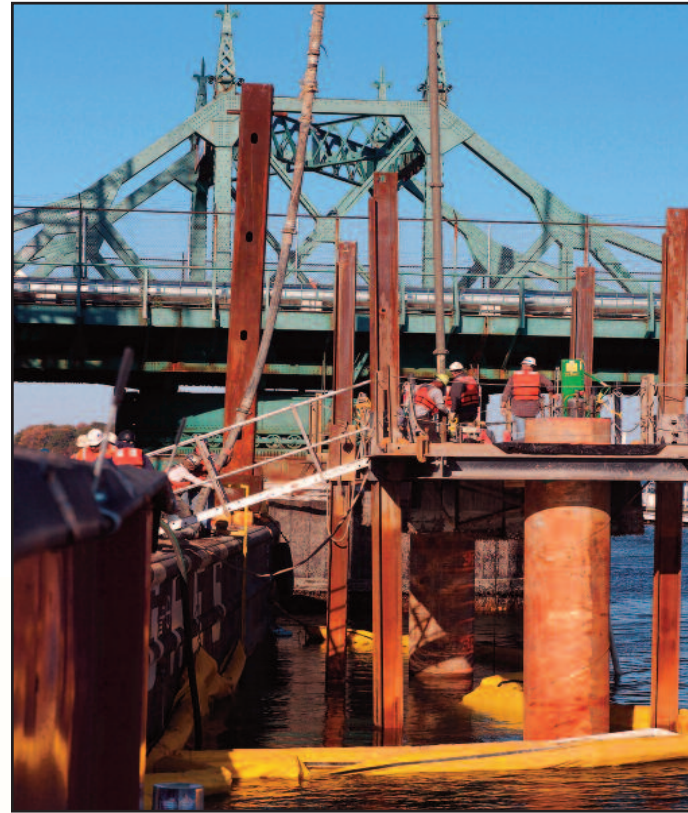
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services in five core areas: geotechnical, environmental, ecological, water, and construction management. The staff consists of approximately 600 technical and administrative professionals in 28 offices in New England, the Mid-Atlantic, the Appalachian and Great Lakes Regions.

"We are pleased to move into this new building which abuts the historic Old State House in Boston," said **William Hadge**, CEO of GZA. "Our roots are here in the city and we look forward to working with our clients in the new space."

Senior Project Manager Helen Robinson Joins GEI's Exton Office

ADSC Technical Affiliate Member GEI Consultants, Inc., one of the nation's leading geotechnical, environmental, water resources, and ecological science and engineering firms, announced the hiring of **Helen Robinson, P.E.** Helen joined GEI's Exton office as a Senior Project Manager.

Helen brings to the team more than 15 years of experience in providing design, analysis and construction management services for geotechnical projects. She specializes in design of micropiles, tiebacks, soil nails, drilled shafts, sheet pile cofferdams, retaining walls, braced excavation support and grouting and ground improvement methods. Her experience also includes site investigations, soil classification, laboratory testing, load testing field support and interpretation, and instrumentation.

Helen is a co-author of Geotechnical Engineering Circular No. 7, "Soil Nail Wall Design Manual" for the Federal Highway Administration (FHWA) as well as a co-author for the "Evaluation and Guidance Development for Post-Grouted Drilled Shafts for Highways," a synthesis report and testing program recently completed for FHWA. She has authored or co-authored over 20 publications on practical technological applications and design in geotechnical engineering. Helen earned an M.S. and B.S. in Civil Engineering from Pennsylvania State University, University Park. She is Chair of



Helen Robinson

DFI's Women in Deep Foundations Committee.

GEI's multidisciplinary team of engineers, scientists, and planners deliver integrated water resources, environmental, ecological, geotechnical and waterfront engineering solutions to diverse clientele nationwide. The firm has provided a broad range of consulting and engineering services on over 35,000 projects in 50 states and 22 countries. GEI was ranked #94 on the 2016 *ENR Top 500 Design Firms* list. For more information on GEI, please visit www.geiconsultants.com.

Martin McDermott, P.G. Joins Moretrench

ADSC Contractor Member Moretrench is pleased to welcome **Martin McDermott, P.G.**, who joins us as a Division Manager for our Geotechnical Group. Mc-

Dermott has more than 30 years of geotechnical construction experience, with a particular area of expertise in the field of drilled shaft construction. He holds a Masters degree in Engineering Geology from Drexel, a B.A in Geology from LaSalle, and is a licensed Pennsylvania Professional Geologist. He is a seasoned, goal-oriented and proactive professional and brings a wealth of underground construction knowledge to his new position, particularly in the area of deep foundations.

He is also actively involved in several professional organizations, formerly serving as Vice President and Treasurer of ADSC: The International Association of Foundation Drilling and as a member of its National Board. He is a member of The Moles, the Deep Foundations Institute (DFI), the American Society of Civil Engineers (ASCE), and the General Building Contractors Association (GBCA).

McDermott's primary focus will be the company's drilled shaft/secant pile wall operations in the Northeast and New England regions. He will be based in the company's Philadelphia area office which will also offer the full range of Moretrench's services.

(continued on page 86) ➤

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Clint Weber Appointed New Vice President and General Manager for Terex Utilities

Terex Utilities a subsidiary of ADSC Associate Member Terex is pleased to announce the appointment of **Clint Weber** to Vice President and General Manager. In this role, Clint will have overall responsibility for leading the worldwide Terex Utilities business.



Clint Weber

Clint joined Terex in 2006, and most recently held the position of Vice President/General Manager of the Aerial Work Platforms (AWP) business in Greater China. While there, Clint was instrumental in driving acceptance and market growth for Aerial Work Platforms while increasing production volumes and business performance. Prior to that he held a variety of leadership roles within the AWP business based in Redmond, Washington.

"I'm excited to be a part of the Terex Utilities team and to help provide innovative and productive solutions that help our customers keep

the lights on for millions of people across the nation," Clint said.

"We are very pleased to welcome Clint to the Utilities team," said **Steve Filipov**, President, Terex Cranes. "Terex Utilities is an important part of Terex and Clint will continue to lead the business focusing on listening, responding and delivering innovative solutions with speed to our customers."

Clint will be based from the Terex Utilities facilities in Watertown, South Dakota.

For additional information about Terex Utilities products and services, visit www.terex.com/utilities.

team. As Territory Manager, he will play a key role in account management and the expansion of the existing distributor market served by Stucchi. We know he will do a great job heading up our efforts in Texas."

Hulsey has an extensive business background, having previously worked in outside sales, management, as a field service technician and in the United States Army. Hulsey holds a Bachelors in Business Management and Manufacturing from the University of Phoenix.

Please visit www.stucchiusa.com for more information.

Stucchi Adds to Sales Team, Names Brent Hulsey Texas Territory Manager

ADSC Associate Member **Stucchi Inc.**, a global leader of hydraulic quick coupling products, is pleased to introduce the newest member of their sales team. **Brent Hulsey** has joined Stucchi as Territory Manager for Texas.

Scott Rolston, President of Stucchi Inc., said, "We are happy to have Brent join the Stucchi

BAUER Maschinen Group Hosts 21st In-House Exhibition

Visitors from all over the world, innovations as far as the eye can see, and a unique family atmosphere – the in-house exhibition of ADSC Associate Member the **BAUER Maschinen Group** is always something special. From May 6-8th, the event took place in the courtyard of Bauer's headquarters for the 21st time. Not surprisingly, a certain routine had set in over the

(continued on page 89) ►



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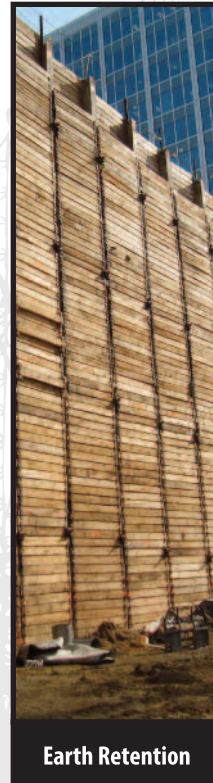
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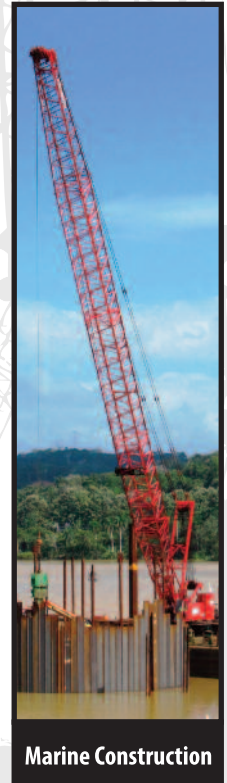
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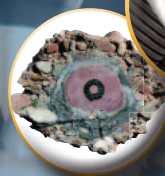
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years. But this year there was something new. The idea was to be even closer to the customer. Or to put it another way: The idea was to bring the customer even closer to the machines.

"Drilling deep and aiming high" – for the first time ever, the BAUER Maschinen Group had a slogan for an in-house exhibition. It was a common theme throughout the Expo. But what was it all about? "Aiming high" refers to the fact that the BAUER Maschinen Group, as a global market leader, together with its customers, is always striving to be at the forefront of technology and achievement. All the Group's activities are focused on delivering the highest quality. But "Aiming high" was also a reference to one of the Premium Line BGs on display. Together with its CSM unit, it was approximately 42m tall. The slogan also referred to the CBC 30 compact cutter being exhibited. With its modern low-headroom configuration, it guarantees mixing depths of up to 80m, although it is only 8.7m tall.

Probably the most impressive manifestation of the slogan, not to mention an absolute highlight of the show: a skywalk up to 8m in height. It af-



forded visitors a panoramic view so they could take in every last detail of the rigs. In this way, the skywalk offered an impressive change of per-

spective, enabling visitors to look out over the entire exhibition area. The steel frame was

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developed by Peri GmbH, one of the largest manufacturers and suppliers in the sector.

The BAUER Maschinen Group gave guests the opportunity to visit the Bauer plant in nearby Aresing and participate in live demonstrations as well as join two full-day excursions. A professional slackliner showed off his skills on a rope,

which was just a few centimeters wide, stretched across the exhibition grounds. There was also a scavenger hunt around the machinery, which inspired visitors to tour the exhibition. And at the traditional Bavarian Evening party, guests from all over the world were treated to a healthy dose of Bavarian lifestyle with a variety of culinary de-

lights and live music. By the way, one other thing was new: This year, the in-house exhibition ended with the white-and-blue conviviality of the Bavarian Evening.

The BAUER Group was founded in 1790 and is based in Schrobenhausen, Bavaria. In 2016, it employed about 10,800 people in around 70 countries and achieved total Group revenues of EUR 1.6 billion. BAUER Aktiengesellschaft is listed in the Prime Standard of the German Stock Exchange. More information can be found at <http://www.bauer.de>.

All images: ©BAUER Group

WSP | Parsons Brinckerhoff to Operate as WSP USA in the United States

ADSC Technical Affiliate Member WSP | Parsons Brinckerhoff, a global engineering and professional services firm, is now WSP worldwide effective May 10. In the United States, the firm will operate as WSP USA.

Parsons Brinckerhoff, a leading transportation engineering and management organization founded in 1885 in New York City, was acquired in 2014 by WSP, a global professional services consultancy. For the past two and a half years, the firm has operated as WSP | Parsons Brinckerhoff in the U.S.

"We have shaped the transportation infrastructure and skylines of American cities with some of the nation's tallest buildings and the public transit systems of New York, Atlanta, San Francisco, Los Angeles and Seattle. Now, we're moving forward as WSP USA, offering our clients the expertise to conceive and deliver the infrastructure communities need to prosper," said **Gregory A. Kelly**, President and Chief Executive Officer. "Although our name has changed, our commitment to technical excellence and client service will never change."

WSP/Parsons Brinckerhoff 2017 Winner of ACEC/MA Gold Engineering Excellence Award

The American Council of Engineering Companies of Massachusetts (ACEC/MA) has named **ADSC Technical Affiliate Member WSP | Parsons Brinckerhoff** as a winner of its 2017 Gold Engineering Excellence Award for work on the National Museum of African American History and Culture project.

The 2017 Engineering Excellence Awards were

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announced at the recent ACEC/MA Engineering Excellence and Awards Gala with emcees Carol Gladstone, Commissioner of the Division of Capital Asset Management and Maintenance and Commissioner Leo Roy of the Department of Conservation and Recreation.

WSP | Parsons Brinckerhoff was retained by the Smithsonian Institution to provide a sustainable building design for the National Museum of African American History and Culture (NMAAHC) located on the National Mall in Washington, DC.

The 425,000-square foot, \$500-million museum is a cultural and architectural landmark. The NMAAHC represents best practice in sustainable building design and has been designed to achieve LEED [Leadership in Energy and Environmental Design] Gold certification from the USGBC.

"The winning projects exemplify ingenuity and professionalism and represent the breadth of engineering's contribution to our everyday lives," said ACEC/MA President Mark S. Bartlett PE, Senior Associate at Stantec, Inc. "They are outstanding examples of how engineers connect communities, provide safe and reliable water and energy, and make our buildings safe and efficient. The professional engineers and their colleagues at our member firms are dedicated to working on quality infrastructure, which wouldn't otherwise exist. These outstanding projects are but a few examples of the quality work designed by Massachusetts engineering firms."

The American Council of Engineering Companies of Massachusetts (ACEC/MA) is the business association of the Massachusetts engineering industry, representing over 120 independent engineering companies engaged in the development of transportation, environmental, industrial, and other infrastructure. ACEC/MA is undertaking an awareness campaign to educate the public on the many contributions engineers make. For more information on ACEC/MA, visit their website at www.acecma.org

Archie Manning, Football Legend, 2017 Hal Hunt Lecturer DFI 42nd Annual Conference

Archie Manning, a renowned football player, author and public relations consultant, is delivering the 2017 Hal Hunt Lecture on Communications during the DFI 42nd Annual Conference on Deep Foundations, being held in New Orleans, Louisiana, October 24-27, 2017. His presentation is titled, "The Manning Playbook for Communication and Leadership."

Manning attended the University of Missis-

sippi where he was named an All-American Quarterback and his number is retired. He was voted Mississippi's Greatest All-Time Athlete in 1992 and was named Mississippi's Most Popular Athlete of the Century. He was elected to the 50-Year All-South Team (1940-1990) and named one of the Top 25 Athletes of the Century in Louisiana.

The annual Hal Hunt Lecture is a highlight of the Annual Conference, and is named in honor of Hal Hunt, one of the initial organizers of DFI. The lecture was established in 1989 to recognize notable communicators.

More information on the DFI Annual Conference is available at www.deepfoundations2017.org.

DFI and PFSF Host Successful Conference in Australia

The inaugural conference on Piling and Ground Improvement Technology for the Modern Building and Infrastructure Sector in Melbourne, Australia, was a resounding success. The two-day international event on March 21-22, 2017, was hosted by the Deep Foundations Institute (DFI) and the Piling and Foundation Specialists Federation (PFSF). More than 200 attendees participated.

"There was a tremendous energy and buzz throughout the entire conference," says Theresa Engler, Executive Director of DFI. "The interaction between the audience and the speakers was very dynamic and resulted in in-depth and valuable discussions on the design, construction and performance for piling and ground improvement techniques for building and infrastructure works."

Keynote presentations included "Challenges in the Design and Construction of Deep Foundations for Transportation Infrastructure Projects," presented by DFI President and ADSC Technical Affiliate Member Dan Brown, Ph.D., P.E., D.GE, of Dan Brown and Associates; "Geotechnical Design Considerations for Rock Socketed Piles," delivered by Chris Haberfield, Ph.D., principal geotechnical engineer of Golder Associates in Melbourne; "Designing Piles for Seismic Events," by Harry Poulos, Ph.D., P.E., consultant with the Coffey Group; and "Ground Improvement by Dynamic Replacement within Intertidal Mangrove Mud Environment Ichthys LNG, Darwin," by Philippe Vincent, managing director at Menard Oceania.

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Northern CA Local 3 Drill Rig Operator Training Class April 13th & 14th, 2017

By Will Gehrke, Case Pacific Company



Peter Faust Teaching Drilling techniques, rebar and Concrete placement.

The ADSC West Coast Chapter (WCC) in cooperation with the Northern California Operating Engineers Local 3 Union put together a two-day **Drill Rig Operator Training Class** for both ADSC WCC Contractor Operating Engineers and Local 3 Apprenticeship Operating Engineers. The class was held on April 13th and 14th of 2017 at the Local 3 Training Facility in Rancho Murrieta, California.

The training class is in its 8th Edition and has continued to be a success over the years. The class is designed to train Drill Rig Operators and introduce the drilling industry to Apprentice Operating Engineers. The student experience levels ranged from apprentice to seven years in the industry.

On day one, the class started out with introductions and a brief overview of what to expect over the next two days. Day one continued in the classroom with presentations and lectures from Peter Faust and myself. We covered topics which included:

- History of Drilled Shafts
- Drill Rig Types, Characteristics and Components
- Drill Rig Safety
- Soil Types and Drill Tooling
- Drill Tool Maintenance
- Understanding Geotechnical Reports
- Construction Mathematics
- Utility Damage and Prevention
- Dry/Wet Hole Drilling Methods
- Rebar and Concrete Placement

We had a very enthusiastic Safety presentation and discussion with Nick Noradoun of Malcolm Drilling. A special thanks to him for keeping the students interested and involved in safety.

After a long day of great discussions about drilling, we wrapped up day one with a Drilling Slurry Presentation from John Tuttle of Sinclair Well Products.

I have been an instructor for three of the ADSC WCC LOCAL 3 training classes, I can say that Peter Faust and I try our hardest to make things as interesting as possible for a long day in the classroom. Throughout the day, we take multiple breaks from lectures to have discussions with the students about their experiences and of ours related to this industry. This is where the students are most involved when real life discussions about our industry are held.

Year after year of being an instructor, the students really prove to me that we have a great future ahead for operating engineers in the Drilled Shaft Industry.

Day two started with an informative presentation on Drill Rig Maintenance in the classroom and then out to the field where the real hands on learning begins.

Students really shine in the field and show their skills as the future operators in this industry. The focus and excitement of the students is great to watch as they

step out of the classroom and into their element.

The field training is split up into smaller groups and sent to the various drill rigs that the ADSC members have brought. Each Drill Rig has a knowledgeable instructor and the augers start spinning. A special thanks to Dave Lamont, Wayne Broughton, and Randy Virdell for teaching the tricks of the drilling trade to the apprentice operating engineers. The drill instructors have many years of experience and they remember where they started many years ago.

The students are not only learning how to operate the equipment safely, they are also learning the importance of drill rig maintenance, documentation and quality of work.

Dry hole methods, wet hole methods and drill tool selection is also gone over in detail during day two in the field. After a long day in the

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Ron Tate and John Tuttle presenting on polymer slurry.

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mud, the students have been introduced to the exciting and important position as a Drill Rig Operator.

At the end of the two-day class, students are excited and thankful to the ADSC Drill Rig Operator Training Class and its trainers.

The West Coast Chapter thanks all the companies who donated time, personnel and equipment to make this Drill School successful, Case Pacific Company, Malcolm Drilling Company and Sinclair Well Products.

Much gratitude to the Operating Engineers Local 3 for their support and partnership in this valuable education session!

Administrator

Jason Malcom (Malcolm)

Classroom Instructors

Will Gehrke (Case Pacific)

Peter Faust (Malcolm)

Nick Noradoun (Malcolm)

Drilling Slurry Presentation

John Tuttle and Ron Tate, (Sinclair)

Field Instructors

Randy Virdell (Case Pacific)

Dave Lamont (Malcolm)

Wayne Broughton (Malcolm)

John Tuttle (Sinclair)

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Rancho Murrieta Training Facility, Drill Rigs Provided by Case Pacific Company and Malcolm Drilling.



Randy Virdell (Case Pacific) instructing students on the art of drilling.



John Tuttle (Sinclair) Field discussion on mixing polymer slurry.



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Carolinas Chapter Holds 6th Annual Golf Tournament

By Jeff Harmston, Equipment Corporation of America

The 6th Annual ADSC Carolinas Chapter Golf Tournament was held April 30th and May 1st at the Grandover Resort and Conference Center in Greensboro, North Carolina. The European inspired Grandover is one of the finest golf resorts in the southeast and offers 36 holes of championship golf by world renown golf architects, David Graham and Gary Panks. The event began with a cocktail reception Sunday evening for all guests and ADSC members. On Monday, we had the biggest turnout in tournament history with more than 100 contractors, associates and engineers in attendance.

The Board of Directors of the ADSC Carolinas Chapter would like to thank everyone who attended.

We encourage everyone to mark your calendar for our tournament next year, April 29th & 30th, 2018. If you would like to learn more about the tournament, or sponsorship opportunities for 2018, contact Jeff Harmston with ECA - Greensboro at 336-854-1220.

Tournament Winners

Congratulations to the team of David Ard and Patrick Bliss (Valiant Steel & Equipment) along with Larry Fowler (McKinney Drilling) and Mike Moore (ADSC) who won with a score of -16 under par. The team of Casey Roberts, Drew Sheorn, Chris Wood and Darrell Ledbetter came in second place with a score of -15 under par; and the team of Duane Shaw, Ron Shaw, Jim Challenger and Chris Broderick came in third place with a score of -14 under par.

Other Tournament Winners

Ron Shaw (Lee Carolinas) - Closest to the Pin Hole #3
Toby Anderson (ECA) - Closest to the Pin Hole #5
Kevin Day (Axiom Foundations) - Longest Drive Hole #6
Mary Pohlman (Jeffrey Machine) - Straightest Drive Hole #9
Jim Challenger (Skyline Steel) - Closest to the Pin Hole #11
Tim McGinnis (DrillTools) - Longest Drive Hole #12
Casey Roberts (Chandler Concrete) - Closest to the Pin Hole #15



Lunch and awards presentation – sponsored by ECA and CZM.

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We would like to extend a special thanks to all our sponsors for their generous donations and support.

(continued on page 100) ➤



Jim Harmston (The GodFather), Roy Kern (ECA) and Jim Cahill (Case Foundation).



Jim Challenger (Skyline Steel), Chris Broderick (CMC Rebar), Ron Shaw (Lee Carolinas) and Duane Shaw (Lee Carolinas).



Dean Hardister (NCDOT), Scott Webster (GRL), Marc Plotkin (ECS Carolina's) and Steve Geiger (ECS Carolina's).



Bernie Murphy (Brayman Construction), Brian Land (Consolidated Pipe & Supply), Kevin Cook (Brayman Construction) and Steve Scott (SAS Stressteel).



Harold Gathers (McKinney Drilling), Mike Robinson (McKinney Drilling), Tyler Sherman (CZM) and Justin McCall (McKinney Drilling).

Carolinas Chapter to Hold Engineering Summit November 7-8, 2017

Mark your calendar for the upcoming 2017 ADSC Carolinas Chapter Engineering Summit: Highlighting design, construction, and legal aspects of deep foundation and earth retention systems for the benefit of the design and construction community. This is an opportunity to give back to the engineering and construction industry by sharing case studies related to deep foundations and earth retention, providing design pointers, and addressing some of the legal pitfalls inherent to the consulting community. Speakers will include a variety of industry leaders in the construction and engineering community.

The summit will take place at Hilton Garden Inn - Concord, North Carolina, Thursday, November 8th and begins with an evening reception for

all attendees Wednesday, November 7th from 5:30 – 8:00pm. **As an expression of our gratitude, the program is free to all attendees and developed to further educate the community.**

We hope you will join us in this event, which will serve to advance knowledge of these topics from both a technical and practical perspective. The focused nature of the subject matter, along with the experienced array of speakers will make for an interesting and informative day.

We would like to thank the design community for their continued support in the deep foundation industry and consequently supporting each and every ADSC member.

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Atlas Copco Introduces New WEDA+ Dewatering Pump Range

Atlas Copco Portable Energy has added to its family of medium and large submersible dewatering pumps with the launch of the WEDA+ plug-and-play range. The new range has undergone a top-to-toe design overhaul, resulting in innovative new pumps that offer up to 20 percent overall reduction in power consumption compared to previous models; combined with greater efficiency, simplified maintenance and increased capacity.

The WEDA+ range comprises five models: the WEDA 50, with normal and high head variants, and the WEDA 60+, available in normal head, high head and super high head configuration. Delivering enhanced performance and extreme portability, the top-of-the-range Super High Head WEDA 60+ is 15 percent smaller and 20 percent lighter than other pumps in its class. The latest pumps offer flow rate capabilities of 1020 to 2425 l/min (61 to 146 m³/h) and a maximum head of up to 69 meters.

Atlas Copco has introduced rotation control and phase failure protection across all WEDA+ models to prevent the risk of the impeller rotating in the wrong direction; which stops the pump in the event of phase failure. In addition, the entry system can accommodate a wider range of cable configurations, with an advanced motor design offering higher efficiency and reduced start current. Meanwhile, the drive train features double row bearings for improved lifetime service. For added durability, all models are constructed with an improved aluminum alloy that provides high corrosion resistance in even the toughest applications.

"The new WEDA+ pumps are easy-to-move and install in a wide range of dewatering applications," explains Wim Moors, Vice-President Pumps, Atlas Copco Portable Energy. "We have taken our portable and powerful electric submersible offering to the next level by focusing on efficiency and new features that will simplify the customer experience and enhance their productivity."

Simple service is another feature of the new range. The modular construction simplifies separation of principal components and all stainless-steel fastenings are the same size. This effectively means that one tool can be used to change all seals, impellers and other parts; in just a matter of minutes.

All the new WEDA+ models incorporate the proven features associated with the long-established WEDA range of medium and large pumps, including an advanced sealing system, optional automatic level control, adjustable wear-resistant nitrile rubber diffusers and hardened high chrome clog-free impellers.

For more information visit www.atlascopco.com.



(continued on page 107) ►

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Small but Mighty CZM Introduces the EK65 and EK160

CZM Foundation Equipment, a leading manufacturer of American-made foundation drilling equipment, builds each CZM model with the same goals in mind – to help ensure the success of every contractor that uses one of our CZM products, minimize downtime on the job site, and maximize each contractor's return on investment. This same philosophy holds true from our largest, most powerful machine, the EK300, to our newest and lightest rigs, the EK65 and EK160.

CZM recently expanded its comprehensive line of drill rigs with the innovative new EK65. Designed to be transported in one load built on the CAT 316F base, the EK65 is offered in both standard and short masts. It also has the versatility to convert efficiently from long to short mast by simply replacing the top mast assembly and Kelly bar. When equipped with a standard mast it drills to a depth of 90 feet and it has a transport/operation weight of just 61,000lbs. When equipped with the short mast it has a transport/operation weight of 54,000lbs a working height of 18ft, a drilling diameter of 5ft and drilling depth of 40ft. The EK65 is CZM's lightest, most mobile, compact model to date.



EK65

The new EK160 was engineered in response to customer demands for a machine with the power of a larger model, and the ease of greater mobility. The EK160 is available in standard and short masts and has transport weights of 101,000lbs/91,000lbs with the Kelly bar in tow. Built on a CAT 330F base with an installed 242 horsepower, the EK160 delivers an impressive maximum effective torque force of 151,000lbs. The hydraulic functions in the cabin of this rig allow the Kelly bar to follow the raising and lowering of the mast due to the positioning of the hydraulic cylinders for the rotary head and A-Frame. Given the excellent stability and strength of the EK160, it has max drilling diameter of 11ft and is designed to be transported in one load.



EK160

CZM products are recognized for their high quality, superior after-sales service, and innovative design which incorporates the CAT base. Our customer-oriented philosophy relies on qualified professionals to provide services including corrective and preventative maintenance, commissioning, parts, tools, and accessories sales.

For more information, call 912-200-7661, or visit CZM-us.com, Facebook, or LinkedIn to view the full line of CZM machines. As with all CZM machines, the EK65 and EK160 models are mounted on Tier IV CAT bases, and in keeping with CZM's customer-focused philosophy, are supported by the extensive Caterpillar® service network – the largest in the nation.



**EK160
Shortmast**

(continued on page 108) ➤

ICC-ES Report Issued to Expand Number of Bar Sizes of DYWIDAG Grade 100 THREADBAR® and Confirms Superior Strength and Performance

DYWIDAG-Systems International USA, Inc. (DSI) announced today that its DYWIDAG Grade 100 THREADBAR® report has been reissued by the International Code Council Evaluation Services (ICC-ES) to now incorporate bar sizes #11, #14, #18 and #20.

DSI produces and offers its' full size range (#6 through #20) in GR100 and has now secured this important ICC-ES report for the key sizes for vertical reinforcing applications where Grade 100 reinforcing is seeing growing acceptance in the construction industry. Also, the report confirms that DYWIDAG dGrade 100 THREADBAR® has minimum 100ksi yield strength in both tension and compression - a feature unmatched by any competing, approved threaded reinforcing bar product in the industry.

The DYWIDAG Grade 100 THREADBAR® is the only Grade 100 bar product conforming to both acceptance criteria AC237 and specification ASTM A615-15 and therefore offers unmatched benefits in terms of strength, sav-

ings associated with the use of high-strength bars, and quality.

The advantages of using DYWIDAG Grade 100 THREADBAR® are significant, including lower fabrication, installation (both labor and crane time) and freight costs due to the lower overall weight as fewer reinforcing bars are required. All of this results in reduced overall cost and shortened construction schedule.

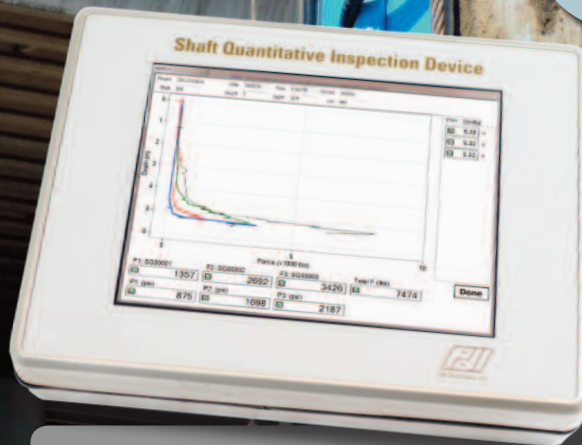
Kerry Allen, President and CEO of DYWIDAG-Systems International USA, Inc. says: "We are excited to be able to offer this product line which is superior to anything currently available in the market and which will allow owners and designers a fully domestic option to improve their design and performance while also reducing over-all construction costs."

DYWIDAG Grade 100 THREADBAR® is designed for maximum performance and is produced under an exclusive partnership with Gerdau in their St. Paul Minnesota mill facility by United Steel Workers of America union members and using fully domestic USA steel thus conforming to all Buy America requirements.

For additional information visit www.dsicanada.ca.

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Great Leaders Keep Employees Uncomfortable

By Peter Barron Stark

Ensuring a positive and engaging work environment is a key leadership responsibility. But, when people confuse this responsibility with keeping everyone happy and base their decisions solely on this goal, problems arise.

A manager needs to move her team off the company's server to cloud-based software. The implementation of the cloud-based software will allow the team to lower costs and be much more efficient. But, the manager is facing challenges. The team members are experts on the software they currently use (some have been on the team using the same software for over 15 years) and are not happy with having to learn a very complex new technology. Two team members have even threatened to retire over this forced software change. This manager has been implementing the change very slowly, trying to keep everyone positive and happy.

Unfortunately, and perhaps surprisingly, managers who prioritize keeping their people happy and comfortable usually have poor long-term job security. These managers are secure for a period of about three to five years before they are either let go or moved to a less significant position in the organization.

There's a good reason for replacing or moving these managers to positions of less influence. While they were focused on keeping their people happy and comfortable, the world was rapidly changing around their department and organization. As the world moved forward, their department didn't. Because these managers didn't get their departments up to speed, major problems in the areas of customer satisfaction, quality, timeliness, or cost-competitiveness occurred.

To be a successful leader in today's world, your focus needs to be on getting your people to handle rapid change as it comes along. And the problem with rapid change is it usually makes people feel uncomfortable, and possibly unhappy and fearful.

The following seven recommendations can help keep your people uncomfortable and help ensure your department or firm's long-term success.

Read the writing on the wall. Today, there

is much writing on the wall about where the world is heading. New technologies. Artificial Intelligence. Robots. Five Generations in the workforce at the same time. Higher customer demands. Faster service requirements. Increasing quality standards. More employee demands. All of these changes are going to have a significant impact on your department or organization's success.

Raise the bar! What are you doing to raise the bar for each one of your employees in areas such as learning new technologies, improving customer and employee satisfaction, quality, response time, etc.? If you don't significantly raise the bar, who will? To not raise the bar, even for one year, means the world around you moved forward during that slice of time...but your team did not.

Over-communicate the need for change. One of the reasons that managers and leaders usually see the need to change before the general workforce is because they have more available information from which to make decisions. The more information you can provide to your people regarding the economy, environment, and your customers, the more people will understand the need to change.

Implement fast change – not slow change. All our research demonstrates that fast change is easier to implement and be accepted by employees rather than slow change. The easiest way to get people to change is not to give them a choice. As one CEO recently stated when faced with the need to rapidly realign the needs of her firm to the competitive environment, "The people are going to change or we are going to change the people."

Hold people accountable for results. When it comes to change, many people like to blame others. Don't give people the opportunity to blame others for not achieving results. Ensure that everyone is clear about what results are expected from them and in what time frame.

Re-define loyalty. In the past, a loyal employee was one that worked for you for a long time. In fact, some organizations had an informal corporate motto that went like this: "Keep your nose to the grindstone and don't make waves." If you lived this motto, you were guaranteed a long career. In today's new environment, the employee who is out there chopping the water—making us all feel uncomfortable

about what we should be doing but are not doing fast enough—is the loyal employee. The individual who complains that we are not changing fast enough to keep up with the times is now the loyal employee. The old definition of loyalty will put us out of business. We must get excited about change and "chopping the water."

Get passionate and excited about change. If you really care about your organization's long-term success, you will encourage employees to change the way you do business...even when they don't want to make the change because it's uncomfortable. Talk to customers; talk to the employees on the front line; talk to people in industries different from the industry you are in; read books that talk about the future; and go out and talk to your competitors. All this will result in an information base to help you become more confident, passionate, and excited about the need to change and stay competitive.

Great leaders keep their employees on their toes. They expect more from team members because they know they are capable of more. To stay successful in today's economy, we all have to get comfortable with being uncomfortable.

Peter Barron Stark Companies is a nationally recognized management consulting firm that specializes in employee opinion surveys, executive coaching, and leadership and employee training. Peter Barron Stark Companies may be contacted via email at info@peterstark.com for more information about how they can help you create an organization where your employees love to come to work and your customers love to do business.

ABSC

7 Ways to Fail Your Way to Success

By Peter Barron Stark

When we think about success, failure isn't the word that usually comes to mind. And yet, success rarely happens without multiple failures along the way.

Most people we would consider to be highly successful have failed while climbing the ladder of success. We will always remember Steve Jobs for product blockbusters like the Mac Computer, iPad, iPod, Apple TV and the iPhone. What we don't associate with Steve Jobs are the products that failed: Newton; Apple Lisa; NeXT; Apple III; Twentieth Anniversary Macintosh; Mac G4 Cube and MobileMe.

Abraham Lincoln ran for just about every possible office – and lost – before he was elected President. Lincoln once commented about his failures, "Always bear in mind that your own resolution to succeed is more important than any other."

Steven Spielberg, one of the wealthiest and most influential movie makers in Hollywood, became an A List director after Jaws, Close Encounters of the Third Kind and E.T. But Spielberg was rejected from attending movie school three times before moving on to another school and then dropping out to become a director. About failure, Spielberg stated, "Failure is inevitable. Success is elusive."

Michael Jordan, maybe the greatest basketball player of all time, was cut from his varsity team at Laney High School in Wilmington, NC. In the NBA, Jordan went on to miss more than 9,000 shots and lost over 300 games. Twenty-six times he was entrusted to take the last shot and win the game...but missed. But when asked about failure in his famous Nike commercial, Jordan said, "I have failed over and over, and that is why I succeed."

Jordan is right; the opposite of success isn't failure. The opposite of success is not trying. If you seldom fail, there's a good chance you are playing it too safe or not trying to innovate and excel. J.K. Rowling became one of the wealthiest people in the world with the Harry Potter series. Rowling stated, "It's impossible to live without failing at something, unless you live so cautiously that you might as well not have lived at all."

The following seven tips will help you to push the envelope of failure and truly be the leader who can lead your team to be one of the most admired in your company or industry.

Outlearn your competition: If your goal is to be a leader, you need to remember leaders are out in front. You will need to be thinking about and learning new ways to do things. Maybe it will be to improve a process, provide even higher levels of service to customers, or introduce a new product. Think, learn, and then put the outcome of what you have learned into action. Action will turn your vision into a reality and can potentially change the world.

Be willing to take a risk: Figuring out new things and finding what will work or not work is fun. But, you need to be willing to take a risk and grow both knowledge and passion from the experience.

Create and Innovate: To create and innovate, you need to set aside time to think. If you spend all your time doing tasks that take little thought and hold a high chance of success and accomplishment, you leave very little of your time to be creative and strategically think. Creation and innovation means change. With change, there is a good chance

that some of those changes will lead to failure.

Fail faster and more often: Google Research Director, Peter Norvig, when asked about failure at Google said, "We do it by trying to fail faster and smaller. The average cycle for getting something done at Google is more like three months than three years. And the average team size is small, so if we have a new idea, we don't have to go through the political lobbying of saying, "Can we have 50 people to work on this?" This is such a great point. If you set a goal to fail more often and faster, there's a good chance that the potential impacts of failure won't be all that negative.

Be resilient...fall forward: Unless you are lucky and everything thing you do and touch turns to gold, you will encounter failure in your life. When you ask successful people about adversity, most times they will tell you that it is the adversity and failure that has propelled them to success. Tom Hopkins, the great sales trainer said it best, "I never see failure as failure but only as the negative feedback I need to change my course of direction." Make a note about what you learned, get excited, and move forward quickly.

Have a sense of humor: If you have the ability to laugh at yourself and your failures, you will create an environment where others will be comfortable making a mistake or trying something that might not work.

Celebrate success and failure: Celebrating success is easy. Celebrating what didn't work takes guts. In fact, most leaders think that the best way to handle someone else's failure is to not say anything about it. But, when a leader has the guts to say, "I wanted to bring some special recognition to Sandy in today's meeting. A lot of you know that Sandy spent the last month developing a new process for our software. We implemented it last week and many of you know it didn't work as planned. But, I want to recognize Sandy for three reasons. First, she had a vision to improve our system. Second, she had the guts to try a new idea that we had no guarantee would work. And last, after it failed, she came into my office and said, "I'm not giving up. It didn't work this way but there has to be a way that will be significantly more efficient for us to operate." Sandy, you make me proud and let me know what else you need from me or the team to make this work."

Putting these seven tips into action will help you be a leader who encourages growth and rewards failure when team members are willing to try new things. Failure can be seen as a bad thing until you understand that the people who have been wildly successful just failed more often than people who played it safe. To rise to a level of greatness, you cannot see failure as failure; it is merely an opportunity to find even better ways to do things.

Peter Barron Stark Companies is a nationally recognized management consulting firm that specializes in employee opinion surveys, executive coaching, and leadership and employee training. Peter Barron Stark Companies may be contacted via email at info@peterstark.com for more information about how they can help you create an organization where your employees love to come to work and your customers love to do business.

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2017 CALENDAR

ADSC Events

CONFERENCES/MEETINGS

June 22, 2017 – SOUTHEAST CHAPTER, "Day at The Ballpark," Sun Trust (Braves) Stadium. More details to come.

June 26, 2017 – ADSC OHIO VALLEY CHAPTER 17th ANNUAL ADSC OHIO THOMAS A. BUZEK SCHOLARSHIP GOLF OUTING, Traditions Golf Club in Hebron, KY.

July 10-11, 2017 – EASTERN CANADIAN CHAPTER 3rd ANNUAL GOLF TOURNAMENT AND CHAPTER MEETING, Glenn Abbey Golf Course, Oakville, ON L6M 4G2, Canada

July 21, 2017 – SOUTH CENTRAL CHAPTER SUMMER MEETING, Fort Worth, Texas

August 1-5, 2017 – ADSC SUMMER MEETING, Hyatt Regency Montreal, Montreal, Canada.

August 2, 2017 – EASTERN CANADIAN CHAPTER MEETING, Held in conjunction with the ADSC Summer Meeting, Hyatt Regency Montreal, Montreal, Canada.

August 10, 2017 – ROCKY MOUNTAIN CHAPTER MEETING & GOLF TOURNAMENT – 11PM @ Fossil Trace Golf Course.

August 30-31, 2017 – MID-WEST CHAPTER FALL MEETING AND GOLF TOURNAMENT, Ameristar Casino in St. Charles, MO / Golf outing at Missouri Bluffs Golf Club at St. Charles, MO. For more information and registration contact Melvin Radke at melvin.radke@skylinesteel.com

September 17-22, 2017 – ADSCAMPIS, Fleming Collage/Frost Campus, Lindsey, ON, Canada.

September 20-21, 2017 – ADSC WESTERN CANADIAN CHAPTER GOLF TOURNAMENT and SAFETY SEMINAR. Golf tournament will be on the 20th, Followed by the official NAIT / ADSC drill rig operators program launch and volunteer appreciation evening on the 21st. The official launch on the drill rig operator training program will be held at the new 165 Acre NAIT crane operator training facility.

September 26-27, 2017 – PILE 2017, INTERNATIONAL CONFERENCE ON ADVANCEMENT OF PILES TECHNOLOGIES, Kartika Plaza, Bali, Indonesia. Supported by ADSC and DFI. For more information: www.pile2017.com

October 13, 2017 – ROCKY MOUNTAIN CHAPTER MEETING LUNCH & LEARN: Geo Legal 101 – 12PM @ Lakewood Country Club.

October 24, 2017 – FALL BOARD OF DIRECTORS MEETING, Held in conjunction with the DFI Annual Meeting, New Orleans, Louisiana.

November 2, 2017 – EASTERN CANADIAN CHAPTER MEETING, Markham, ON

November 7-9, 2017 – ADSC SLURRY SCHOOL, Clearwater, Florida.

November 8-9, 2017 – CAROLINAS CHAPTER ENGINEERING SUMMIT. "Save the Date!" There is no charge to attend. PDHs will be awarded.

ADSC 2018 CALENDAR

March 5-10, 2018 – IFCEE 2018, Buena Vista Palace Resort & Spa, Orlando, Florida.

ADSC Meeting Contact

Jan Hall, Director of Meetings – jhall@adsc-iafd.com

2017

January							February							March							April						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7				1	2	3	4				1	2	3	4							1
8	9	10	11	12	13	14	5	6	7	8	9	10	11	5	6	7	8	9	10	11	2	3	4	5	6	7	8
15	16	17	18	19	20	21	12	13	14	15	16	17	18	12	13	14	15	16	17	18	9	10	11	12	13	14	15
22	23	24	25	26	27	28	19	20	21	22	23	24	25	19	20	21	22	23	24	25	16	17	18	19	20	21	22
29	30	31					26	27	28					26	27	28	29	30	31		23	24	25	26	27	28	29
																					30						
May							June							July							August						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6				1	2	3							1			1	2	3	4	5	
7	8	9	10	11	12	13	4	5	6	7	8	9	10	2	3	4	5	6	7	8	6	7	8	9	10	11	12
14	15	16	17	18	19	20	11	12	13	14	15	16	17	9	10	11	12	13	14	15	13	14	15	16	17	18	19
21	22	23	24	25	26	27	18	19	20	21	22	23	24	16	17	18	19	20	21	22	20	21	22	23	24	25	26
28	29	30	31				25	26	27	28	29	30		23	24	25	26	27	28	29	27	28	29	30	31		
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September							October							November							December						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
					1	2	1	2	3	4	5	6	7			1	2	3	4							1	2
3	4	5	6	7	8	9	8	9	10	11	12	13	14	5	6	7	8	9	10	11	3	4	5	6	7	8	9
10	11	12	13	14	15	16	15	16	17	18	19	20	21	12	13	14	15	16	17	18	10	11	12	13	14	15	16
17	18	19	20	21	22	23	22	23	24	25	26	27	28	19	20	21	22	23	24	25	17	18	19	20	21	22	23
24	25	26	27	28	29	30	29	30	31					26	27	28	29	30			24	25	26	27	28	29	30

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INDUSTRY Events

July 9-12, 2-17 – Geo Grouting 2017, Grouting, Deep Mixing, and Diaphragm Walls, Honolulu, Oahu, Hawaii, www.groutingconference.org.

September 26-27, 2017 – Pile 2017, International Conference on Advancement of Piles Technologies, Kartika Plaza, Bali, Indonesia. Supported by ADSC and DFI. For more information: www.pile2017.com

October 24-27, 2017 – DFI 42nd Annual Conference on Deep Foundations, New Orleans, Louisiana. Registration www.deepfoundations2017.org.

July 15-19, 2017 - GeoMEast 2017 International Congress and Exhibition, Workshops and Short Courses "Free of Charge." More details and updates are available on the website: <http://www.geomeast2017.org>.

July 23-25, 2018 – GeoChina International Conference, 5th GeoChina International Conference 2018, Hangzhou, China, <http://geochina2018.geoconf.org/>

October 24-27, 2017 – DFI 42nd Annual Conference on Deep Foundations, New Orleans, Louisiana. Registration visit www.deepfoundations2017.org.

Foundation DRILLING

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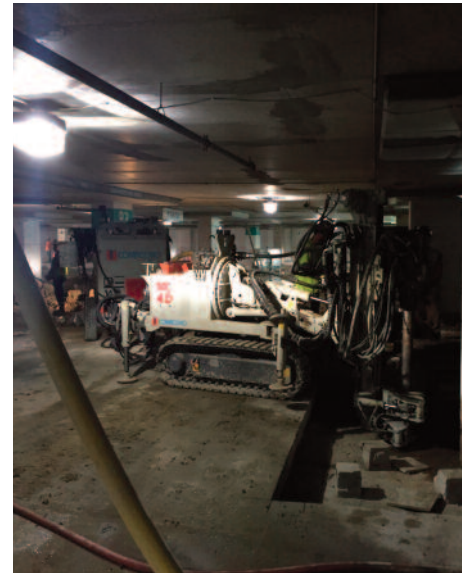
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