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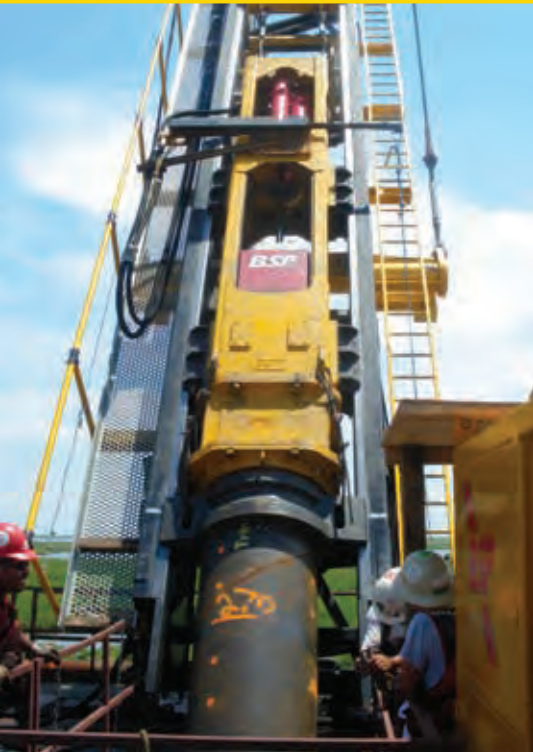
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Cover photo courtesy of American Piledriving Equipment, Inc.



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PILEDRIVER

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Key to Career Success

By Rusty Signor, President, Pile Driving Contractors Association

Have faith in your success

In my last message, I ended with a different, more positive view on the news in our current world situation. This time, I am going to do another first: a book review. The book is *Seven Men and The Secrets of Their Greatness* by Eric Metaxas. Certainly advice on engineering techniques, safety practices and legal tips are very important for our pile driving business; however, personal character development is also something to consider for most. You may or may not know of all the seven men in this book, but the ones you thought you knew are viewed from a very different standpoint than how you probably learned about them in school. The book focuses on their complete reliance on their spiritual calling. Since this is not a government publication, I can use the word God.

For instance, everyone knows about George Washington and the story of the cherry tree. However, did you know that he was a deeply religious man and that he relied on his faith in helping him make

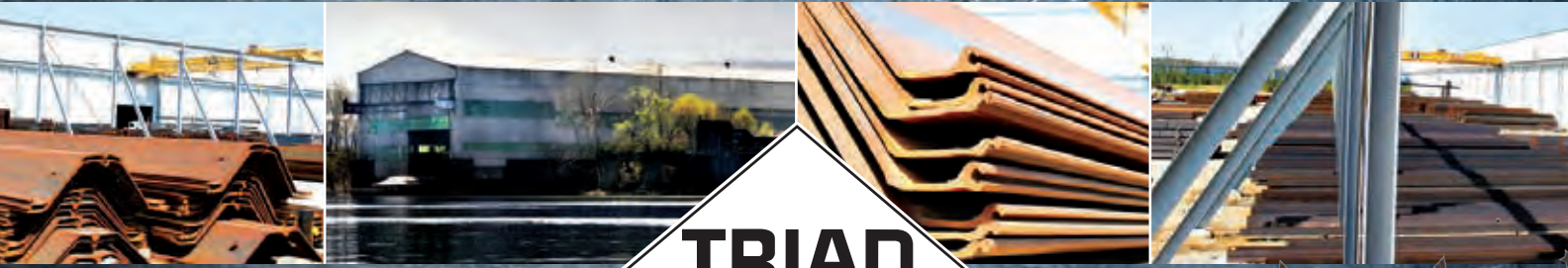
decisions? He prayed on his knees several times a day with a Bible before him. Washington believed that God had a special purpose for his life and that providence saved him from being killed. In one battle alone, three horses were shot out from under him and he had bullet holes through his hat and clothing. He empowered his men with God-filled inspiration and they would follow him anywhere. I bet you never read that in grade school.

Another man mentioned is Jackie Robinson, who broke the color barrier in Major League Baseball. I recently watched the movie about his story, *42*. Again, the movie didn't really focus on Robinson's critical reliance on his faith in God to be able put up with and finally put down all the Jim Crow nonsense. He had extraordinary athletic talent in basketball, football, baseball, tennis and track and field. Robinson also had a tendency for anger explosions dealing with racial injustices. His mother and preacher led

(continued on page 6)



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to a deeper faith that controlled his anger and allowed him to see that the path to justice would only be won with restraint and love. The manager for the Brooklyn Dodgers was an extremely religious person who was looking for this sort of man: someone talented in baseball, but who also had a strong, Bible-based character. Everyone knows the rest of the story, but generally not the one centered on God.

In the business world, sometimes we get too caught up in our challenges with competition, problems with equipment, governmental codes, etc. We just need to stop and look up like these men did – to result in your success and happiness.

Shifting gears: weather report

On a separate sidenote more in relation to our pile driving industry, there is a major cold front coming into the Pacific Northwest, the Atlantic Coast is having heavy rainfall and Central Texas will be experiencing flying pigs!

Let me explain this unusual phenomenon. Several years ago, I was in South Carolina talking with past PDCA

In the business world, sometimes we get too caught up in our challenges with competition, problems with equipment, governmental codes, etc.

President, John King. He told me that a geotechnical engineer had just called him to apologize that a foundation project had gone to drilled shafts even though he had specified an option of driven piles. My immediate thought at the time was, "If pigs had wings, they would fly before I was to get a call like that apologizing for not using piles in Central Texas, the heart of drilled shaft country."

Now a little backtracking.. after several decades of driving piles in Central Texas, my son received his Master's Degree in geotechnical engineering. For the past five years, we have been putting on "lunch and learns" to structural and

geotechnical firms. The count to date is around 30 firms and over 200 engineers. This endeavor has proven successful so far, as we have acquired many designed pile jobs from these lunches. We actually received our first report specifying driven piles several years ago that we have framed in our office.

Well, it happened; a geotechnical engineer called me and apologized as he had specified driven piles on a job and it went to drilled shafts. So, John foretold the future very accurately to me, and I expect flying pigs to be in the immediate forecast as predicted. ▼



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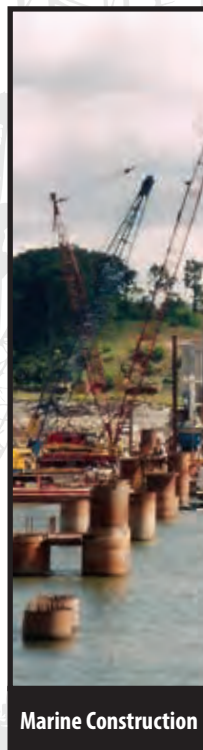
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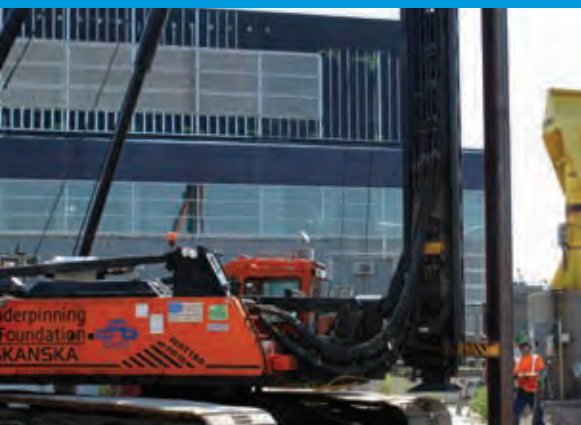
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Wrapping up 2013

Some thoughts to conclude the year and move our industry into 2014

By Stevan A. Hall, Executive Director, Pile Driving Contractors Association

Once again, I have the privilege of saying, "Hello!" to all of you who take the time to read *PileDriver* magazine and my message, in particular. As *PileDriver* has grown over the years – now reaching over 3,000 industry professionals – I have had the pleasure of hearing from so many of you who have expressed your overwhelming approval of the direction and content of PDCA's magazine. For those less inhibited in speaking out about improvements you'd like to see, your voice has not gone unheard and your comments are always appreciated, for "as long as we may think as we will, and speak as we think, the condition of man [and *PileDriver*] will proceed in improvement," as Thomas Jefferson said (with only a slight modification).

As we're already into Quarter 4, this is the last issue we will produce for 2013. It has become somewhat of a tradition on my part to express my appreciation to those who are an integral part of each edition of *PileDriver*, those who work month-in and month-out defining and refining the successful progression of your association's magazine and the only magazine dedicated to our industry – pile driving!

Every edition of *PileDriver* begins with a collaborative effort on the part of each member of the Communications Committee. The committee is led by Pollyanna Cunningham (ICE®), who has been in that role for four years. Her leadership, innovation and insistence on quality and diversity of content are unmistakable and have led to a publication that is more successful each quarter. She is supported by a cast of committee members that work equally as hard digging for articles, which include company profiles or project spotlights, identifying industry Young Guns or Industry Pioneers to feature or unearthing the latest news on industry technology, safety or business.

As *PileDriver* goes from editorial conception to a finished magazine, the collaborative effort continues between the

Communications Committee and Lester Publications, publisher of *PileDriver*. PDCA continues to have a remarkable relationship with Lester Publications thanks to the professionalism of their publishing, editorial, design and advertising staff. Special thanks goes to Sean Davis, vice president and publisher, for his support over the past many years, as well as to Jill Harris, our editorial director, whose hands-on approach along with her enthusiasm, attention to detail and all-around expertise as an editor provide continuity and unsurpassed quality of our magazine.

PDCA also appreciates those of you who have written articles for *PileDriver*, whether it was an article on your company, your company's project, a feature, legal article or if you responded to a question on "Ask PDCA," which we use for the "Did You Know?" section of *PileDriver*. This magazine would not exist if not for your support and participation.

Getting into *PileDriver*

As *PileDriver* moves into 2014, I want to remind everyone that you can contribute to the magazine while promoting your own company. As mentioned, *PileDriver* reaches more than 3,000 subscribers. Conservatively, that equates to about 9,000 readers – industry experts would say 10,500, to be exact. Did you know that your company could be profiled in *PileDriver* at absolutely no cost to you? It doesn't matter if you are a contractor, supplier, manufacturer, service provider, engineer or individual. PDCA and Lester Publications will even provide a professional writer to work with you to produce the article – again at no cost to you, except the time it takes to conduct a phone interview with the writer.

Do you have a completed pile driving project? We want those stories, too! Same policy applies to projects – there is no cost to you and we can provide all the help you need, if any, in



If you have an idea about an article for *PileDriver* – no matter the topic, length, ability to write it or not – **PDCA wants to hear from you!**

writing the article. You cannot find cheaper marketing for your business anywhere on Earth! The only ones who should not take advantage of showcasing their business through this PDCA member benefit are those in a witness protection program or being sought by the IRS.

If you have an idea about an article for *PileDriver* – no matter the topic, length, ability to write it or not – PDCA wants to hear from you!

New PDCA staff

Have you heard a new voice answering the phones at the PDCA office? If you have called us, you have probably spoken to Stephanie Kerr, PDCA's new administrative assistant. Stephanie joined PDCA on September 6, 2013. She studied graphic design at the Art Institute of Jacksonville and brings her design talents along with strong administrative credentials

to her new position. The next time you call the PDCA office, please welcome Stephanie to the PDCA crew. Stephanie can also be reached via email at steph@piledrivers.org.

Looking forward to 2014

Once this Quarter 4 edition of *PileDriver* hits the streets, 2013 will be coming to an end and 2014 will be just around the corner. All of the 2013 PDCA programs will have concluded and we can begin looking forward to 2014.

The PDCA 18th Annual International Conference & Expo 2014 will be held at the Hyatt Regency St. Louis at The Arch, in St. Louis, Mo. from April 2-4, 2014. I hope all of you will schedule this special event on your calendar and make early plans to attend. PDCA and the Market Development Committee (responsible for everything at the conference but the general sessions – the Education Committee does that) is busy making some subtle changes to the overall program that will make a significant, enjoyable and worthwhile difference in your conference experience. PDCA and the Market Development Committee don't yet have a lock on all the ideas for the annual conference, so let us hear from you – what are your ideas? You can let us know by calling the PDCA office at 888-311-PDCA (7322) or call a committee member – all contact information can be found in your new PDCA Membership Directory. As an FYI, the Education Committee is looking for industry presentations associated with the pile driving industry that will support the conference's general session program. PDCA is seeking presentations on the latest in pile driving technology, engineering, innovation, unique case histories or other relevant topics to our industry. If you have an idea or recommendation, please share! ▼



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MEMBERSHIP BENEFITS

The Pile Driving Contractors Association & You

Governance, Board of Directors, Committees and Chapters PDCA Governance, Committees and Chapters

The PDCA's direction, growth and success is a direct result of an involved membership. The association is directed by a dedicated Executive Committee and Board of Directors, who establish PDCA's short and long-term goals and objectives through a comprehensive Strategic Plan. The Strategic Plan is reviewed and revised each year by the Executive Committee and Board of Directors during the Annual Tactical Meeting.

Implementation of the Strategic Plan Focus and Strategies is a team effort between the Board of Directors, Committees and staff.

Governance

Executive Committee: The Executive Committee consists of the Association's Officers, including the President, Vice President, Secretary, Treasurer and Immediate Past President. The Executive Director serves on the Executive Committee in an Ex-Officio, non-voting capacity.

Board of Directors: The Board of Directors consists of the Association's Officers and nine elected member Directors. Directors can be Contractor, Associate and Engineering Affiliate members.

Committees

PDCA Committees include the following, as well as the function they perform:

Education: Responsible for the development of all educational programs, including annual conference general sessions, seminars and workshops. Responsible for development and maintenance of relations with educational institutions. Responsible

for promoting driven pile research and technical papers and the presentation of such information at appropriate venues.

Technical: Responsible for technical information and applications impacting the driven pile and deep foundations industry. Responsible for developing and maintaining relations with public and private entities involved in issues impacting driven pile or deep foundations. Responsible for developing and maintaining PDCA-produced design and installation specification documents.

Communications: Responsible for establishing editorial guidelines, acquisition, assembly and review of all editorial content of *PileDriver* magazine, annual directory and calendar. Responsible for the functionality of the PDCA website and distribution of the PDCA E-Letter.

Membership: Responsible for membership development and member retention and issues impacting the continued growth of the association.

Market Development: Responsible for promoting the different pile types and monitoring trends in the market. Responsible for site selection of the annual conference sites, assembly of social programs for the annual conference and promotion of conferences.

Safety: Responsible for the dissemination of information relevant to safe work practices. Responsible for monitoring and reviewing regulations and legislation impacting the driven pile industry.

Environmental: Responsible for environmental issues related to pile driving, including, but not limited to, noise, vibration, biofuels, brownfield sites and marine life.

PDCA members are encouraged to participate on one or more committees. Participation is voluntary, but committee

members are encouraged to participate on a consistent basis.

Those members desiring to serve the association at the Executive Committee and/or Board of Director levels are offered the opportunity as existing members rotate off.

PDCA Chapters

The PDCA encourages the formation of local PDCA Chapters. Local chapters provide regional representation and advocacy for the driven pile industry and those companies doing business within the chapter's jurisdiction.

Chapters also provide an opportunity for its members to network through business meetings, educational programs and social activities.

Current PDCA Chapters include Northeast, Mid-Atlantic, South Carolina, Florida, Gulf Coast and Pacific Coast. As of 2012, Texas is organizing a state chapter.

Education and Networking

PDCA Education: Conferences, Seminars and Workshops

The PDCA offers relevant, topical and cutting-edge educational programs throughout the year.

Annual Conference: The PDCA Annual Conference is held each year, generally in April. This internationally-recognized conference provides a forum for experts from industry, private business, government and academia to discuss key trends and issues within the driven pile industry with those who rely on information and technology to improve their business.

Design and Installation of Cost-Efficient Piles (DICEP): Held each fall since 2000, this exclusive PDCA program presents modern approaches to maximize



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Efficiency, Effectiveness and Economy (E₃) of driven piles through a series of engineering focused presentations. DICEP is designed primarily for geotechnical, structural and civil engineers, but presents relevant information for contractors and other firms or individuals who support, conduct business or are associated with the deep foundations, earth retention and/or the driven pile industry.

Professors' Driven Pile Institute (PDPI): This intensive week-long program is designed to instruct engineering educators in all aspects of driven pile installation, design and quality control. This program blends practical, real world construction knowledge with academics. The PDPI has been attended by more than 150 university and college representatives who teach driven pile applications in an academic environment. The program is held at Utah State University every other year and is funded 100 percent by the PDCA and its members.

Deep Foundation Testing and Analysis Seminar and Workshops: The PDCA, in collaboration with Pile Dynamics, Inc. conducts several Deep Foundation Dynamic Testing and Analysis seminars and workshops annually. Each seminar or workshop generally includes information on deep foundation integrity testing, wave equation analysis (GRLWEAP), high strain dynamic foundation testing (PDA and CAPWAP). This course is designed primarily for individuals involved in the design, construction and specification of deep foundations; as well as PDA and CAPWAP users, foundation testing professionals, professors and students already familiar with the basic concepts of deep foundation dynamic testing and analysis.

The PDCA also provides the Dynamic Measurement and Analysis Proficiency Test designed to reflect the user's level of knowledge and ability, which is then indicated in a "Certificate of Proficiency." Individuals who qualify to support dynamic measurement and analysis testing are listed on the PDCA website as a reference for end-users.

Pile Driving Inspectors Course: This one-day course is designed for those who inspect pile-driving operations during construction of foundations and major structures. The course presents information on the inspector's role, hammers and installation equipment, pile types, contractor's submittal and review process, establishing PD criteria, record-keeping and

monitoring and common problems. This program is supplemented by state DOT personnel and their local practices in the state in which the program is offered.

Dynamic and Static Pile Load Test Options: This one-day course discusses the benefits of a well thought out, quality load test program to provide an overall economic advantage and provide data to maximize the efficiency and effectiveness of a pile load test schedule. The seminar concludes with presentations by manufacturers of the various dynamic and static pile load testing options available in today's industry.

Driven Pile Load Resistant Factor Design (LRFD) Design and Construction Workshop: The application of the Load Resistant Factor Design (LRFD) platform is now required for use by bridge and structure designers using federal funding. This policy requirement applies to all surface transportation features including bridges, tunnels, earth retaining structures and miscellaneous ancillary structural features. The goal of this workshop is to improve and enhance the competitiveness of driven piles by communicating and demonstrating the correct and appropriate application of the current (5th Edition) AASHTO LRFD design and construction specifications for structural and geotechnical limit states.

Joint seminars and cooperative support: PDCA works with other organizations such as the Edmonton Geotechnical Society, the Calgary Geotechnical Society, the GeoInstitute of American Society of Civil Engineers, DFI and ADSC.

Communications, Business Networking and Client Development

Communications

PileDriver Magazine: Produced on a quarterly basis and distributed to over 3,000 subscribers, the magazine provides current industry trends, the latest in technology, case histories and legal topics relevant to the pile driving industry. *PileDriver* also features member "Company Profiles" and company completed projects through "Project Spotlights". The PDCA encourages article submissions and is always at no cost to the author.

www.piledrivers.org: The PDCA website is an expansive resource to anyone seeking information about the PDCA, PDCA members or the pile driving industry in general. The site includes information

on the benefits of driven pile, membership (new and renewals), advertising, leadership and committees, chapters, events, publications, gallery, reference links, news and the PDCA Store. Visitors to the site can search for member companies or services and products by State or Region; visitors can also download data on Noise and Vibration and the PDCA Installation Specification for Driven Pile (PDCA Specification 103-07 – Private Work).

E-Letter: The PDCA distributes an electronic newsletter on a monthly basis. The E-Letter is designed to keep you up-to-date on all PDCA upcoming activities and events. It also includes a "Members On the Move" section that reports "press release" type information on PDCA member companies.

Membership Directory: Produced annually, the Membership Directory provides a listing of all PDCA member companies, including the company name, main and optional employee contacts, address, phone, fax, email, website and a description of work performed by the company. Companies can also elect to have their logos included with their company information.

Calendar: Produced annually and distributed in November with pages from December to December, the calendar lists all upcoming PDCA activities that have been scheduled at the time of printing.

Business Networking and Client Development

Membership in the PDCA offers numerous opportunities to conduct business networking and client development at every conference, educational program, committee meeting and social function with individuals who share a common interest – pile driving and the pile driving industry. Networking opportunities exist not only between PDCA member-to-member, but also relationships developed between PDCA and public agencies, such as FHWA, AASHTO, Corps of Engineers and State DOTs. The PDCA also maintains liaisons with other industry associations, working with them on issues of mutual concern.

Whether it is member-to-member or member-to-guest, through conferences, educational programs or committee participation, the opportunity to develop new client relationships is ever-present. The chance to strengthen relationships with old clients or just re-connect with old friends is also part of the PDCA experience. ▼



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www.jp/PDCAonFaceBook



Follow us on LinkedIn
www.jp/PDCAonLinkedIn

THE PILE DRIVING CONTRACTORS ASSOCIATION 2013 MEMBERSHIP APPLICATION



Step 1: Company Information

Company Name: _____

Contact Name: _____

Address: _____

City: _____ State / Province: _____

Zip / Postal Code: _____ Country: _____

Phone: _____ Fax: _____

Company Website: _____ Contact Email: _____

Step 2: Select Membership Type - Check the box that corresponds to your "Membership Type".

Contractor Member – General or Specialty contractor who commonly installs driven piles for foundations and earth retentions systems.

- | | |
|---|-----------------|
| <input type="checkbox"/> Contractor I Member Company – Annual volume > \$ 2 million | \$850.00 |
| <input type="checkbox"/> Contractor II Member Company – Annual volume < \$ 2 million | \$425.00 |

Associate Member – Firms engaged in the manufacture and/or supply of equipment, materials, or services to PDCA members or the pile driving industry in general.

- | | |
|--|-----------------|
| <input type="checkbox"/> Associate I Member Company – Annual volume > \$ 2 million | \$850.00 |
| <input type="checkbox"/> Associate II Member Company – Annual volume < \$ 2 million | \$425.00 |
| <input type="checkbox"/> Local Associate Member Company –
Small Company desiring membership in a single local chapter. A firm that only serves the chapter's geographical area and whose interest is to support the local chapter. Membership must be approved by the PDCA Executive Committee | \$100.00 |

Engineering Affiliate – Any Engineering company or individual (Structural, Geotechnical, Civil, etc.) involved in the design, consulting, or other engineering aspect associated with driven piles, deep foundations or earth retention systems.

- | | |
|---|-----------------|
| <input type="checkbox"/> Engineering Affiliate – 1-5 Offices or an Individual | \$100.00 |
| Engineering Affiliates may list up to 5 individuals per office at no additional charge. | |
| <input type="checkbox"/> Engineering Affiliate – 6-11 Offices | \$90.00 |
| Engineering Affiliates may list up to 5 individuals per office at no additional charge. | |
| <input type="checkbox"/> Engineering Affiliate – 12+ Offices | \$80.00 |
| Engineering Affiliates may list up to 5 individuals per office at no additional charge. | |

Individual Member – **\$50.00**
Any individual employed full-time by an university or college and teaching Undergraduate or Graduate courses in engineering; or an individual employed full-time by a Government entity.

Retired Industry Member – **\$50.00**
Any retired individual who has left active employment and wishes to remain a member. This is a non-voting membership category.

Student Member – **\$20.00**
Full-time student enrolled in a Bachelor, Master or Doctoral degree program in construction or engineering at an university or college.

Affiliate Labor Organization Member – **\$100.00**
Concerned with pile driving for the purpose of gathering and sharing information. This is a non-voting membership category. Must be approved by the PDCA Executive Committee.

Step 3: Membership Options

- | | |
|---|-----------------|
| <input type="checkbox"/> Professors' Driven Pile Institute Contribution – | \$200.00 |
| Through the PDPI (Professors' Driven Pile Institute), the PDCA provides the nation's leading engineering professors with the expertise to teach engineering students about driven pile advantages. Without question, this program is the standard by which all "teach the teacher" programs are judged and is the best way to ensure the continued progress and strength of our industry for the coming years. The PDCA funds virtually all expenses for the professors, which means a program such as the PDPI is expensive to conduct, but worth every dollar invested. This is a WIN/WIN program. 100% of your contribution goes to help fund this important industry program. | |
| <input type="checkbox"/> Optional Employee/Office: Associate & Contractor Members Only (Per Office/Employee Listing) – | \$100.00 |
| All optional employees/offices receive all of the benefits and services provided to the main contact, including a listing in the annual directory and website. | |
| <input type="checkbox"/> Premium Upgrade – | \$225.00 |
| Your Company Logo and Website linked from your PDCA website Company Profile listing. | |
| <input type="checkbox"/> Company Logo on Website Profile – | \$25.00 |

Step 4: Member Information - Check only the services/products under the Membership type for which you are applying.

Contractor Members – check all services that your company provides:

- | | | |
|--|--|---|
| <input type="checkbox"/> Bridge Buildings | <input type="checkbox"/> Docks and Wharves | <input type="checkbox"/> Marine |
| <input type="checkbox"/> Bulkheads | <input type="checkbox"/> Earth Retention | <input type="checkbox"/> Pile Driving |
| <input type="checkbox"/> Deep Dynamic Compaction | <input type="checkbox"/> General Contracting | <input type="checkbox"/> List Other Services: |
| <input type="checkbox"/> Deep Excavation | <input type="checkbox"/> Highway and Heavy Civil | <input type="text"/> |

Associate Members – check all products and/or services that your company provides:

- | | | |
|--|---|--|
| <input type="checkbox"/> Air Compressors & Pumps | <input type="checkbox"/> Hydraulic Power Packs | <input type="checkbox"/> Piles, Synthetic Material |
| <input type="checkbox"/> Coatings & Chemicals | <input type="checkbox"/> Leads & Spotters | <input type="checkbox"/> Piles, Timber |
| <input type="checkbox"/> Consulting | <input type="checkbox"/> Lubricants & Grease | <input type="checkbox"/> Rigging Supplies |
| <input type="checkbox"/> Cushions, Hammer | <input type="checkbox"/> Marine Drayage | <input type="checkbox"/> Safety Equipment |
| <input type="checkbox"/> Cushions, Pile | <input type="checkbox"/> Marine Equipment | <input type="checkbox"/> Sheet Piles, Aluminum |
| <input type="checkbox"/> Cutter Heads & Drill Bits | <input type="checkbox"/> Materials Testing | <input type="checkbox"/> Sheet Piles, Steel |
| <input type="checkbox"/> Design | <input type="checkbox"/> Other Structural Materials | <input type="checkbox"/> Sheet Piles, Vinyl |
| <input type="checkbox"/> Dock & Marine Supplies | <input type="checkbox"/> Pile Hammers | <input type="checkbox"/> Structural Steel |
| <input type="checkbox"/> Drilling Equipment & Supplies | <input type="checkbox"/> Pile Monitoring | <input type="checkbox"/> Surveying |
| <input type="checkbox"/> Drive Caps & Inserts | <input type="checkbox"/> Pile Points & Splices | <input type="checkbox"/> Testing |
| <input type="checkbox"/> Equipment Rental | <input type="checkbox"/> Piles, Composite | <input type="checkbox"/> Trucking |
| <input type="checkbox"/> Equipment Sales | <input type="checkbox"/> Piles, Concrete | <input type="checkbox"/> Vibration Monitoring |
| <input type="checkbox"/> Freight Brokerage | <input type="checkbox"/> Piles, Steel H List | <input type="checkbox"/> Other Services: |
| <input type="checkbox"/> Hoses & Fittings | <input type="checkbox"/> Piles, Steel Pipe | <input type="text"/> |

Engineering Affiliate – check all products and/or services that your company provides:

- | | | |
|-------------------------------------|---------------------------------------|---|
| <input type="checkbox"/> Analysis | <input type="checkbox"/> Geotechnical | <input type="checkbox"/> List Other Services: |
| <input type="checkbox"/> Civil | <input type="checkbox"/> Surveys | <input type="text"/> |
| <input type="checkbox"/> Consulting | <input type="checkbox"/> Structural | <input type="text"/> |

Step 5: Geographic Areas Where Services and Products Are Available – (Check all that apply)

- | | | | | | | | | |
|--|---------------------------------|-------------------------------|--------------------------------|-----------------------------|-----------------------------|-----------------------------|---------------------------------|---------------------------------|
| <input type="checkbox"/> All States | <input type="checkbox"/> AK | <input type="checkbox"/> AL | <input type="checkbox"/> AR | <input type="checkbox"/> AZ | <input type="checkbox"/> CA | <input type="checkbox"/> CO | <input type="checkbox"/> CT | <input type="checkbox"/> DC |
| <input type="checkbox"/> DE | <input type="checkbox"/> FL | <input type="checkbox"/> GA | <input type="checkbox"/> HI | <input type="checkbox"/> IA | <input type="checkbox"/> ID | <input type="checkbox"/> IL | <input type="checkbox"/> IN | <input type="checkbox"/> KS |
| <input type="checkbox"/> KY | <input type="checkbox"/> LA | <input type="checkbox"/> MA | <input type="checkbox"/> MD | <input type="checkbox"/> ME | <input type="checkbox"/> MI | <input type="checkbox"/> MN | <input type="checkbox"/> MO | <input type="checkbox"/> MS |
| <input type="checkbox"/> MT | <input type="checkbox"/> NC | <input type="checkbox"/> ND | <input type="checkbox"/> NE | <input type="checkbox"/> NH | <input type="checkbox"/> NJ | <input type="checkbox"/> NM | <input type="checkbox"/> NV | <input type="checkbox"/> NY |
| <input type="checkbox"/> OH | <input type="checkbox"/> OK | <input type="checkbox"/> OR | <input type="checkbox"/> PA | <input type="checkbox"/> RI | <input type="checkbox"/> SC | <input type="checkbox"/> SD | <input type="checkbox"/> TN | <input type="checkbox"/> TX |
| <input type="checkbox"/> UT | <input type="checkbox"/> VA | <input type="checkbox"/> VT | <input type="checkbox"/> WA | <input type="checkbox"/> WI | <input type="checkbox"/> WV | <input type="checkbox"/> WY | <input type="checkbox"/> Canada | <input type="checkbox"/> Mexico |
| <input type="checkbox"/> South America | <input type="checkbox"/> Europe | <input type="checkbox"/> Asia | <input type="checkbox"/> Other | <input type="text"/> | | | | |

Step 6: Payment

- | | |
|--------------------------|-----------------|
| Membership Type | \$ _____ |
| PDPI Contribution | \$ _____ |
| Optional Employee/Office | \$ _____ |
| Membership Upgrades | \$ _____ |
| TOTAL: | \$ _____ |

Type of Payment

- I am making payment in full by: Check Visa MasterCard American Express Discover
- Card Number: _____ Expiration Date: _____
- Name on Card: _____ CVV Code: _____
- Statement Billing Address: _____
- Signature: _____

**Please complete this application and mail to:
PDCA – 1857 Wells Road - Suite 6, Orange Park, Florida 32073 or Fax to: 904-215-2977**



Did *You* Know?

What are pile driving cushions?

There frequently exists some confusion about pile driving cushions; what they are, the purpose they serve and whether or not they are really needed. To answer these questions, it is necessary to understand that there are basically two different types of cushions used in pile driving – hammer cushions and pile cushions. All cushions are similar in that they act as shock absorbers to protect elements of the driving operation and they are consumables. Beyond that, they are different, depending on their type and what they are intended to protect.

Hammer cushions

Hammer cushions are provided primarily to protect impact hammers from destructive forces during operation and to permit the maximum amount of useable energy to be transmitted to the pile while preventing damaging energy from being rebounded to the hammer. With only a few exceptions, almost all impact hammers – air/steam, diesel and/or hydraulic hammers – require the use of cushion. Manufacturers, in the design of their hammers, make engineering decisions regarding the amount and type of cushion required for the various models in their product line. Specific types and sizes of cushioning, once determined, are provided for in attachments to the base of the hammer, directly under the point of impact and usually in

conjunction with the drive cap design and attachment. Using the wrong size or thickness of hammer cushions or poor cushion maintenance can cause considerable damage to the hammer and, in extreme cases, expose the crew and immediate area to the possibility of injury or damage due to failing (and falling) pieces of the hammer. Hammer cushions are consumables and over time get “used up,” failing to provide adequate shock absorbercy.

This is due to compression of the cushions’ materials or due to charring or burning. For this reason, cushions should be checked frequently for condition and changed when necessary.

Pile cushions

Pile cushions, as the name implies, are primarily protection for the pile – specifically, precast concrete piles. Pile cushions protect the ends of the pile from spalling damage that would occur when the hammer blow impacts the pile.

The cushion also provides attenuation of the blow during driving, reducing tensile forces acting on the pre-stressed pile as it is driven. Pile cushions are provided in various thicknesses and sizes to accommodate the pile and the drive cap, and are determined by the driving conditions as dic-





There are basically two different types of cushions used in pile driving – hammer cushions and pile cushions.

tated by the size of the hammer and the soil. As each project is different, so are the cushions unique to the particular project at hand. Cushion requirements are best determined by wave equation analysis, which takes into consideration the particulars of the pile, hammer characteristics and the soil composition. Materials used for pile cushions are most frequently plywood or hardwood. Many engineers prefer and specify the use of plywood due to the consistency of the manufactured materials. As in the case of hammer cushions, pile cushions are consumables and lose their effectiveness during driving.

For this reason, many specifications and the “PCI recommended practices” recommend the use of a new cushion at the start of driving of each pile. When compared to the cost of the pile they are provided to protect, the cost of the cushion is usually very small and it is frequently false economy to try to use a cushion beyond its useful life. The possible damage to the pile, cost of a re-drive or unscheduled downtime changing a cushion on a partially driven pile are all reasons to be conscious of the condition of the cushions when driving concrete piles.

Additional information

Both hammer cushions and pile cushions have been subjects of previous articles in *PileDriver* magazine. The article on hammer cushions can be found in the Summer '04 edition and the pile cushion article in the Winter '05 edition.

Back issues of the magazine can be found on the PDCA website, www.piledrivers.org. Additionally, manufacturers and some associate members of PDCA can be sources of information about cushions. Many of these can also be found in the “Members” section of the website or in your PDCA Membership Directory. ▼

Model GK-405 Vibrating Wire Readout

The Model GK-405 Vibrating Wire Readout is designed for use with all Geokon vibrating wire sensors. It comprises a battery-powered readout unit that communicates, via Bluetooth®, with a Handheld Field PC running the GK-405 application. The Model GK-405 can also read the thermistors included with most Geokon vibrating wire sensors, and display the temperature directly in °C.

All readings can be stored and exported to a number of different file formats. Syncing to a host computer is simple and straightforward, allowing project folders and data files to be easily saved. The Model GK-405 Readout is available with or without the Handheld Field PC because the Model GK-604-6 Field PC, provided with Geokon's GK-604 Inclinometer Readout, is compatible with both systems.

For more information, please visit:
www.geokon.com/GK-405



Model 4900
Geokon Vibrating Wire Load Cell



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www.geokon.com

Geokon is
ISO 9001:2008
registered



New PDCA Members



The following is a complete list of all members who have joined PDCA in 2013*. The association welcomes everyone on the list!

Contractors

American Pile and Foundation LLC

Eugene J. Merlino
One Commerce Street
Somerville, NJ 08876
Phone: 908-534-7430
Fax: 908-534-7431
www.americanpilellc.com

Britton Bridge, LLC

Jerry Britton
2836 John Deere Drive
Knoxville, TN 37917
Phone: 865-595-0363
Fax: 865-595-0365

CEPCO Foundations, LLC

Zachary Collier
4863 Coastal Drive Southeast
Southport, NC 28465
Phone: 910-619-1725
Fax: 910-363-4257

Chris-Hill Construction, LLC

Craig Christenbury
4749 Pleasant Run Road
Memphis, TN 38118
Phone: 901-767-6312
Fax: 901-767-1323
www.chrishillconstruction.com

EIC Associates, Inc.

Leo Pflug
140 Mountain Avenue
Springfield, NJ 07081
Phone: 973-315-0200
Fax: 973-315-0218
www.eicassociates.com

Ferreira Construction Co., Inc.

Casey Cass
100 Southeast Salerno Road
Stuart, FL 34997
Phone: 772-286-5123
Fax: 772-286-5139
www.ferreiraconstruction.com

Group Contractors, LLC

Shane Kirkpatrick
15055 Jefferson Highway
Baton Rouge, LA 70817
Phone: 225-752-2500
Fax: 225-752-2552
www.groupcontractors.com

Hayward Baker, Inc.

Gilberto Limon
208 Little Santee Road
Colfax, NC 27235
Phone: 336-668-0884
Fax: 336-668-3259
www.haywardbaker.com

IMCO General Construction

Kathryn Blair
2116 Buchanan Loop
Ferndale, WA 98248
Phone: 360-671-3936
Fax: 360-671-8808
www.imcocostruction.com

JCF Bridge & Concrete, Inc.

Patrick Henney
1300B Gatlin Creek Road East
Driftwood, TX 78619
Phone: 281-733-4187
Fax: 281-966-1568
www.jcf-bridge.com

Macro Enterprises, Ltd.

Brian Morris
25 East Chestnut Street
Massapequa, NY 11758
Phone: 516-799-3434
Fax: 516-799-3845
www.macroenterprisesltd.com

Manson Construction Company

Mark Openshaw
4309 Pablo Oaks Court
Jacksonville, FL 32224
Phone: 904-821-0211
Fax: 904-992-0811
www.mansonconstruction.com

Massman Construction Co.

Steve Macon
8901 State Line Road, Suite 240
Kansas City, MO 64114
Phone: 816-523-1000
Fax: 816-333-2109
www.massman.net

McLean Contracting Company

George Bosjmajian
6700 McLean Way
Glen Burnie, MD 21060
Phone: 410-553-6700
Fax: 410-766-3860
www.mcleancont.com

McLean Contracting Company – Chesapeake

Clayton Jenson
100 Republic Road
Chesapeake, VA 23324
Phone: 757-543-1676
Fax: 757-543-1670
www.mcleancont.com

Orion Marine Construction, Inc.

Cory Butz
5440 West Tyson Avenue
Tampa, FL 33611
Phone: 813-839-8441
Fax: 813-831-7498
www.orionmarinegroup.com

Piling, Inc.

Chris Pennington
P.O. Box 1847
Texas City, TX 77592
Phone: 409-945-3459
Fax: 409-945-4318

Pomerleau, Inc.

Eric Carboneau
500 Rue Saint-Jacques
Montreal, QC H2Y 0A2
Canada
Phone: 514-789-2728
Fax: 514-789-2288
www.pomerleau.ca

Richard Goettle, Inc.

Brian Heck
12071 Hamilton Avenue
Cincinnati, OH 45231
Phone: 513-825-8100
Fax: 513-828-8107

Russell Marine, LLC

Robert Andrews
16828 Market Street
Channelview, TX 77530
Phone: 281-860-0011
Fax: 281-860-0118
www.russellmarinellc.com

Shinn & Gregory, Inc.

Eldon Gregory
P.O. Box 344
Stephenville, TX 76401
Phone: 254-965-7585
Fax: 254-965-7053

Sun Pile Foundations, Inc.

Ron Houston
35322 Bayard Road
Frankford, DE 19945
Phone: 302-539-6756
Fax: 302-539-606

Underpinning & Foundation Skanska, Inc.

Stanley Merjan
46-36 54th Road
Maspath, NY 11378
Phone: 718-786-6557
Fax: 718-786-8824

Thomas Trochalides
Phone: 718-786-6557
Fax: 718-786-8824

Craig Meltzer

Phone: 718-786-6557
Fax: 718-786-8824

Associates**3M Infrastructure Protection Division**

Michelle Latham
6801 Riverplace Boulevard
Austin, TX 78726
Phone: 512-984-7801
Fax: 512-984-4871
www.3m.com/corrosion

Aggregate Technologies, Inc.

Ronnie Wills
10700 Tower Oaks Boulevard
Houston, TX 77070
Phone: 281-579-7229
Fax: 281-579-8578
www.aggregatetechnologies.com

Greg "Tex" Leggio
Phone: 281-579-7229
Fax: 281-579-8578

American Equipment & Fabricating Corp.

John Zito
100 Water Street
East Providence, RI 02914
Phone: 401-438-2626
Fax: 401-438-0764
www.american-equipment.com

American Hose Company

Bobby Waller
301 Warehouse Drive
Matthews, NC 28104
Phone: 704-821-8200
www.hydraulicchase.com

American Piledriving Equipment Inc.

Paul Kuzik
401 Hartle Street
Sayreville, NJ 08872
Phone: 732-432-6604
Fax: 732-432-6608
www.a pevibro.com

Jim Casavant
1345 Industrial Park Road
Mulberry, FL 33860
Phone: 863-324-0378
Fax: 863-318-9409

Ed Corbett
50 Gerber Industrial Drive
St. Peters, MO 63376
Phone: 636-397-8400
Fax: 636-278-4278

Jimmy Deemer
500 Newtown Road
Virginia Beach, VA 23462
Phone: 757-518-9740
Fax: 757-518-9741

Steve Cress
2985 Loomis Road
Stockton, CA 95205
Phone: 209-942-2166
Fax: 209-942-2455

American Pole and Timber

Eric Lincoln
12317 Alameda Road
Houston, TX 77045
Phone: 713-434-8008
www.americanpoleandtimber.com

Composite Components

Dan Winters
P.O. Box 14295
North Palm Beach, FL 33408
Phone: 561-848-2050
Fax: 561-842-7209
www.ecanet.com

Crane Tech LLC

Tony Dotto
6037 Winthrop Commerce Avenue
Riverview, FL 33578
Phone: 800-521-7669
Fax: 813-248-4820
www.cranetech.com

Bo Collier
Phone: 800-521-7669
Fax: 813-248-4820

CZM Foundation Equipment

Lucas Lemos
364 Socrates Mariani Bittencourt Avenue,
Cinco, Contagem
Minas Gerais, 32010-010
Brazil
Phone: 55 31 2111-6200
Fax: 55 31 2111-6202

Dieseko Group B.V.

Harry van der Starre
Lelystraat 49
3364 AH Sliedrecht
Netherlands
Phone: 311-844-1-0333
Fax: 311-844-1-1386
www.pve-holland.com

Edgen Murray Corporation – Colorado

Chad Vogt
 8000 East 96th Street
 Henderson, CO 80640
 Phone: 800-360-5840
 Fax: 303-289-6491
www.edgenmurray.com

Edgen Murray Corporation – Florida

Linda Plavchak
 3595 Highway 60 West
 Barton, FL 33830
 Phone: 863-869-9716
 Fax: 863-869-8520

Edgen Murray Corporation – Missouri

Mike Kelly
 488 Paul Avenue
 St. Louis, MO 63135
 Phone: 866-520-2468
 Fax: 314-524-3110

Jason Bernsen
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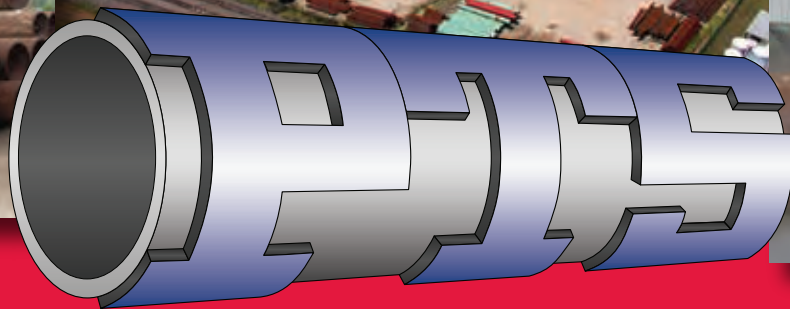
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Member News



▼ NEWS FROM WAGNER KOMURKA GEOTECHNICAL GROUP, INC.



Wagner Komurka Geotechnical Group, Inc. (WKG²) has recently added Michael D. Frede, P.E. to the organization as a senior geotechnical engineer. Frede has over 30 years of experience man-

aging projects, departments and consulting firms, and brings his experience to WKG² to serve national clients and assist with a focused effort to expand WKG²'s driven pile design services to all regions of the U.S.

WKG² is dedicated to increasing optimal use of driven piles through utilizing and teaching unique cost-effective design principles. Working closely with pile driving contractors is a primary component of the WKG² marketing plan and company vision. Frede hopes to leverage the strong relationships and reputation WKG² has within the industry to benefit contractors, design professionals and owners.

On July 9, 2013, Van Komurka presented "What Pile Driving Contractors Wish Everyone Knew" to the members of the PDCA of Texas Chapter at their dinner meeting in Houston, Texas.

Komurka has also presented other topics relevant to the driven pile and deep foundations industry at various PDCA conferences and seminars as well as other industry forums. Other presentations have included "Economics of Driven Pile Foundations," "Incorporating Set-up into Driven Pile Design and Installation," "Field Testing Comparison of Four Driven Pile Types" and "Driven Pile Test Programs – Paying Off With More Than Just Information," to name a few.

If you would like to speak to Michael or Van about scheduling a presentation for your PDCA Chapter or other event, please contact their office at 262-376-2001 for more information.

▼ BIRMINGHAM FOUNDATION SOLUTIONS PROVIDES PILE DRIVING EQUIPMENT FOR A CONTAINER TERMINAL IN PAITA, PERU



In April 2010, Omar Segura of Frontier Endeavors was contacted by Motal Engil for the purpose of sourcing equipment for a large-scale project in Paita, Peru.

The project involved building a new container terminal in Paita (located in northwestern Peru). Paita is the leading seaport in the region and among the top five ports of Peru. Involved in the scope

of the project was to drive 988-mm pipe piles a length of 35 meters (112 feet).

Two years later, the project became a reality and Frontier Endeavors, Inc. contacted Bermingham to provide equipment for the piling portion of the job. Bermingham manufactured and supplied a total of 42 meters (134.4 feet) of L-27 Vertical Travel Lead system and a custom hydraulic retrofit kit for the customer's HC-275 crane. Mike Christensen and his team were invaluable as they built, in very short order, a hydraulic retrofit kit for the customer's crane and L-27 system.

Edward Christensen and Omar Segura went to the job site to supervise the assembly of the L-27 system, hydraulic retrofit kit and power pack on the customer's crane. Edward trained local personnel in assembly, operation and maintenance and to commission the lead system to drive the piles.

The project started in March 2013 and is estimated to be completed in November of the same year. Luis Lopez was the project manager for Mota Engil responsible for piling and he commented very highly of Bermingham equipment.

"Without the versatility of the L-27 we wouldn't be able to drive our piles as quickly and efficiently. The VTL system enables us to drive 988-mm diameter and up to 35-meter long piles in any orientation; that is, vertically, aft and fore batters with superior speed and precision," said Lopez.

▼ JUNTAN'S FIRST PURPOSE-BUILT PILING RIG PM20 REACHES 30-YEAR ANNIVERSARY



Junttan's first 10 piling rigs were built on excavators during the period 1979-1983. The excavator-based piling rig was and still is a

compromise in many ways, but it was rather efficient compared to standards at the time. Compared to a purpose-built piling rig, the excavator-based rig had many operational restrictions in areas like pile handling, hydraulic output and stability, partly because of the dimensions of the machine and partly because of the basic structure. The transportation dimensions were quite large; the machine was tall and the tracks had to be wide to achieve adequate stability.

To eliminate these difficulties, Junttan ended up building its first purpose-built fully hydraulic pile driving rig, PM20. The new rig had a telescopic leader with side inclination cylinders that made it more stable than ever to accomplish the most demanding piling

jobs. The PM20 had a hydraulic system that was optimized for the hammer and produced enough energy to run all the required functions simultaneously. This meant maximized working efficiency, which was a huge upgrade to the excavator-based rig. The new rig had hydraulically extendable tracks that brought a new level of stability to working conditions and also reduced the transportation width significantly. Another factor that minimized the transportation dimensions was the structure of the uppercarriage frame that was open from the middle. In addition to the telescopic leader, horizontal boom and a movable counterweight, the PM20 had pile arms that made pile handling easier and more efficient than ever. The purpose-built rig didn't need any other machines on the job; it could easily unload the piles, haul them and lift them securely up to the hammer with its telescopic leader and winches. As a final touch, the ergonomics in the cabin were tested with wooden and cardboard mockups to make it unprecedentedly strong to protect the driver in accident situations.

The first PM20 was introduced in the fall of 1983 after a production time of nine months. The buyer for this prototype was Mr. Armas Kallio, who was an independent contractor from southern Finland. He already had a Junttan no. 5 based on an excavator, which he had been very satisfied with.

Junttan started its export with the PM rigs and delivered the first ones to Denmark and Sweden as early as 1983. Today, Junttan has manufactured over 700 PM rigs and they are now working in over 50 countries on all continents. In 2013, Junttan's latest version of the PM20, the PMx20, has a basic structure that remains rather similar to its prototype from 1983. If you looked at a 30-year-old earthmoving machine in 1983 from a technical perspective, it would have been out-of-date, whereas if you look at a 30-year-old Junttan PM piling rig, you'll notice the difference compared to a modern machine is actually quite minor. The abbreviation PM stands for Paalutuksen Mestari (in English, "Master of Piling"), which describes the pioneer the PM20 was for the entire modern pile driving industry.

In 2010, Junttan introduced the X-series pile driving rigs, which offer the unsurpassed features its legendary predecessor PM20 did. In addition, it provides great added value for overall rig operation and maintenance, making pile driving rig ownership much more convenient and profitable than ever before. Besides the upgraded features in mechanical structures, a completely renewed hydraulic system and an undercarriage that ensures high levels of



Junttan's fully hydraulic PM20 pile driving rig
Photo courtesy of Junttan Oy

stability and easy transportation, the PMx rigs also have a unique, purpose-built piling rig control system, the Junttan X control system, which controls all the vital rig functions, and provides plenty of useful features for adjustments, operation and maintenance. Thanks to the X-system, a Junttan rig is more fuel efficient and environmentally friendly than ever. Accompanied by the new Tier 4-certified engine, the carbon footprint for driven pile foundations made by Junttan rigs is basically off the charts.

The first thoroughbred Junttan is still working on a daily basis in the Netherlands after 30 years of piling and with a meter showing over 40,000 operating hours. When it comes down to



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determining the lifespan of Junttan's machines, no one really knows – they just keep running.

About Junttan Oy

Junttan Oy specializes in the design, manufacture, marketing and service of hydraulic piling equipment and excavator-mounted rock drills. Junttan is one of the few independent manufacturers in its product range. Founded in 1976 and located in Kuopio, Finland, Junttan has been the leading company in its segment since inventing the concept of the fully hydraulic PM20 pile driving rig.

Read a full company profile about Junttan, starting on page 74.

▼ CONGRATULATIONS TO KEVIN SHANNON OF LINDE-GRIFFITH CONSTRUCTION COMPANY

PDCA would like to congratulate Kevin and Courtney Shannon on the birth of their fourth child, Bridget Catherine Shannon, who was born on Thursday, October 3, 2013 at 6:07 a.m. Bridget weighed 6 lbs., 4 oz. Both mom and Bridget are doing well and Kevin took the week off to help get Bridget settled in.

Congratulations to your expanding family, Kevin, from everyone at PDCA!

▼ CORRECTIONS

BIM technology for the Jefferson Memorial seawall repair

In the Quarter 3 2013 issue of *PileDriver*, we included an image of BIM modeling with the member profile on Underpinning & Foundation Skanska. Please note that the project was, in fact, completed by Clark Foundations, LLC and the image represents work performed by Clark Foundations. *PileDriver* regrets the error.

Skyline Steel logo in 2013-14 PDCA Membership Directory

In the 2013-14 PDCA Membership Directory, please be aware that the logo appearing over Skyline Steel's listings is no longer correct. Please note that the correct company logo is what appears here. ▼



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Remembering Fred Cavin

Fred Cavin passed peacefully on June 27, 2013 at the Veterans Affairs Medical Center in Livermore, Calif. He was born in Hawkins County, Tenn., the third of four boys. When Fred was six months old, his family moved to Florida. In 1941, World War II interrupted Fred's education at the University of Florida and he joined the Navy to serve as a Corpsman (medic). He received the Navy Air Medal for air-sea rescue work in the South Pacific. Fred was recalled to the Navy during the Korean Conflict and served with the First Marine Division making the Inchon Landing and the Chosin Reservoir Trek. He received Presidential Unit Citations from both the United States and the Republic of Korea.

After being discharged from the Navy, Fred began his pile driving career as a job site clerk with Raymond Concrete Pile Company in Oakland, Calif. He quickly rose through the ranks to a field superintendent before becoming an estimator, and in 1965 was named Raymond's district manager with full responsibility for their Northern California pile driving efforts.

In 1971, he fulfilled a lifelong ambition by starting his own pile driving company with three partners. They formed Foundation Constructors and got to work with a single 30-ton truck crane, affectionately named Pinky. Today, the company owns a fleet of over 67 cranes of all types and sizes, as well as several specialty machines used in alternative pile driving. Fred's outlook on life and his manner of conducting business resulted in a company with a reputation for fairness and quality work by knowledgeable, innovative and dedicated people.

Fred was active in the Associated General Contractors

(AGC) of Northern California for over 40 years, serving on the Executive Committee and as Chairman of the Highway and Heavy Engineering Division Board of Directors. He received the AGC of California Contractor Achievement Award in 1995. In 1998, Fred's career was highlighted by receipt of his industry's prestigious Golden Beaver Award for Service.

He was a member of ASCE, Structural Engineers Association, Club Curry, SAME, Chosin Few and fraternally a member of Masonic Lodge Acacia #243 in Hayward, and the Scottish Rite of Free Masonry 32nd degree. He was a past president of the April Club and PDCA. He was a member of Asbury United Methodist Church and a former member of Asbury's Board of Trustees.

Fred is survived by his wife of 43 years, Beverly; daughter, JoAnne Conklin of Portland, Ore.; stepson Eric Johnson of Livermore, Calif.; grandson Sean Conklin; granddaughters Tarah Cash, Kristine Cavin and Suzanne Cavin-Meckes; and four great-grandsons. He was preceded in death by his son, Terry.

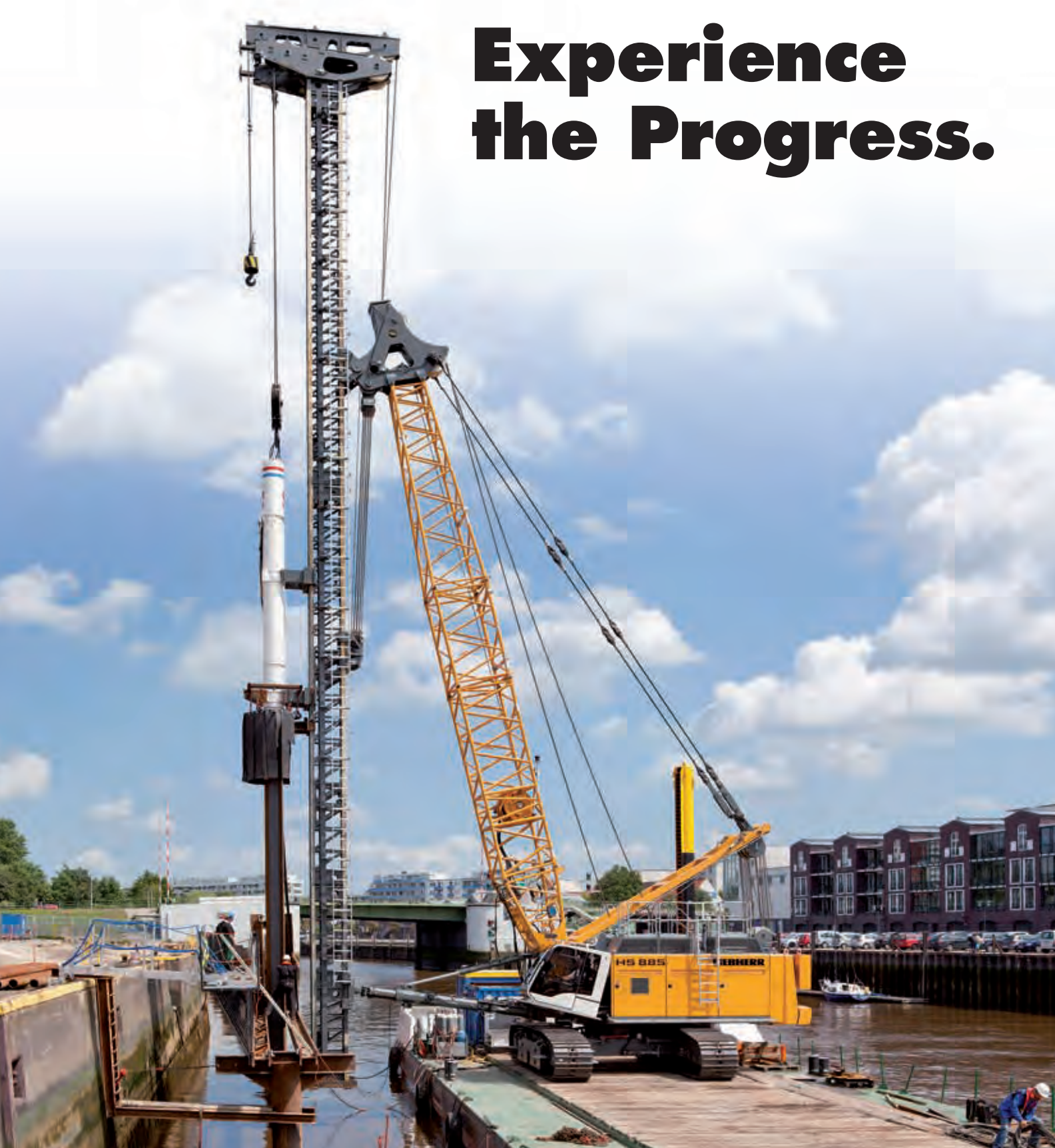
The family would like to thank the dedicated staff at the Veterans Affairs Medical Center whose tender and compassionate care made the last months of Fred's life so comfortable. Their kindness will always be remembered.

In lieu of flowers, donations may be made to the American Heart Association or the Alzheimer's Association.

To all who knew and loved him, Fred will forever be remembered as "a man of faith – a kind and decent man."

On behalf of its membership and staff, PDCA offers the sincerest of condolences to Fred's family and friends. Rest in peace, Fred. ▼

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The Group

Advocating Knowledge

PDCA advises its members to get more involved in industry research initiatives

By Stevan A. Hall, Executive Director, Pile Driving Contractors Association

I recently attended a conference in Montreal, Canada as a representative of PDCA to further our strategic plan to increase our presence in front of an international audience. The conference was hosted by the Canadian Geotechnical Society, International Association of Hydrogeologists and the North American Geosynthetics Society. While PDCA presence was beneficial, based on the general session subject matter, pile driving was somewhat a fringe industry for these folks.

However, there were a few papers presented during the technical sessions that were directly related to the driven pile industry. What I found interesting was that most, if not all, presentations that dealt with pile driving were based on empirical evidence from “lab” or “model” studies, and not a result of actual field studies. Two cases in point were presentations titled “Contact Pressure and Stress Distribution in Piled Raft Foundation Subjected to Vertical Loading” and “Attenuation of Ground Vibration Due to Vibratory Pile Driving Using EPS (Expanded Polystyrene Geofoam) Wave Barriers.”

Do lab or model studies (associated with pile driving) provide results that directly correlate to results that one would find under actual driving conditions? To what extent do studies conducted under controlled lab situations influence the selection of foundation methods? While I am certain that the methodology used to conduct the experiments was carefully controlled and conclusions were (most likely) arrived without bias, this research would likely – in my non-scientific and humble opinion – be of greater value to engineers,

design consultants and the industry in general if the results were based on actual field results as well as lab or model results. Don't misunderstand me – I am not discounting models or lab research, I am just advocating the importance of field work that gives us good quality, quantifiable results that we can use to support our position. What do you think? I'd like to know.

PDCA members getting involved

Members of PDCA should be taking tremendous interest in any research that has the potential to impact how, when and where we conduct our business – be it positive or negative.

Currently, the PDCA of the Gulf Coast Chapter is supporting research by LSU, titled “An Integrated Computational and Experiment Study of Driven Pile Set-Up in Soft Clays.” This research consists of evaluating pile set-up for PCPS concrete piles driven in clayey soils. The project includes installation of a five-pile group and one single pile at two separate sites, New Orleans and Baton Rouge. This project is being funded by the Board of Regents



– Industrial Ties Research Subprogram (ITRS) and members of the PDCA of the Gulf Coast Chapter. The project conclusions will be based on actual field results and will provide real-life information for future industry consideration on the advantages (or disadvantages – trying to stay unbiased) of considering set-up in driven pile designs.

The PDCA of South Carolina Chapter supported research by Auburn University involving lightweight aggregate concrete. An article on the conclusion of that research was written for the Quarter 1 2013 issue of *PileDriver*, on page 99.

PDCA Research Foundation Committee

PDCA has a vehicle to support research by chapters and members through the PDCA Research Foundation Committee. This PDCA program has not been off to a roaring start. To an extent, this can be attributed to not having the end-users of the resulting research involved on the committee. End-users – such as contractors, manufacturers and suppliers – are needed on the committee. This collec-

tive group within our industry holds the key to what kind of research is needed to promote the business of pile driving in a positive manner.

PDCA has discussed research opportunities with United States Universities Council on Geotechnical Education and Research (USUCGER), a group that provides advocacy for the continued development and expansion of high quality geotechnical engineering research. USUCGER has the ability to take PDCA member- (or PDCA Research Foundation Committee-) recommended research projects and pair the idea with an interested researcher who has all or some of the funding necessary to proceed with the research. This requires PDCA member involvement to help define the research purpose, hypothesis, procedure and conclusion and potentially in-kind contributions. Imagine – a research project that significantly changes a misconception or negative attitude towards driven pile design that puts your business at a distinct advantage when it comes to a foundation design. And, it was the result of your participation and involvement. The impor-

tance of a relationship between research and industry cannot be overstated. PDCA members can provide ideas, support the researchers and obtain a conclusion, based on real-life field results instead of conceptual models.

Do you have an idea, and are you willing to step up and be an active participant in the advancement of your business and industry through research? To paraphrase, the industry helps them who help themselves. PDCA is here to help you, but this association is dependent upon your involvement – in everything we do – so be involved. If a research idea gives you purpose and gets you excited, then do whatever it takes to help accomplish that vision – and PDCA will do whatever it can to support you. If a research idea is not your forte, then I encourage you to find out what is – but get involved in your industry. The final results will only help you, your business and the industry that supports your livelihood – and I'll bet in the end, you'll feel really good about yourself.

To get involved with the PDCA Research Foundation Committee, call the national office at 888-311-PDCA (4771). ▼



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Hiring Student Interns

Bringing on engineering students helps your business and our industry

By Rusty Signor, President, Pile Driving Contractors Association

Our company, TX Pile, has benefited in many ways from hiring engineering student interns the last several years.

Everyone always has lists of things to do whenever they get a break. Well, that seems like a good plausible excuse for really just not getting those things done. I bet I am not the only one that uses this generally non-successful approach.

Student interns solved this problem. For instance, we had them contact commercial contractors to get us added to their bidder list. As they were engineering students, they could answer technical questions on driven piles and then refer them to someone in the office who could

give them more details. We had been putting off getting a company brochure made, logos for company shirts, piling logs, plus a number of things that an intern was able to help take care of. We also took an intern to our local PDCA Chapter meeting to hear Van Komurka's talk about how to quantify support cost per ton, which the intern thought was very beneficial.

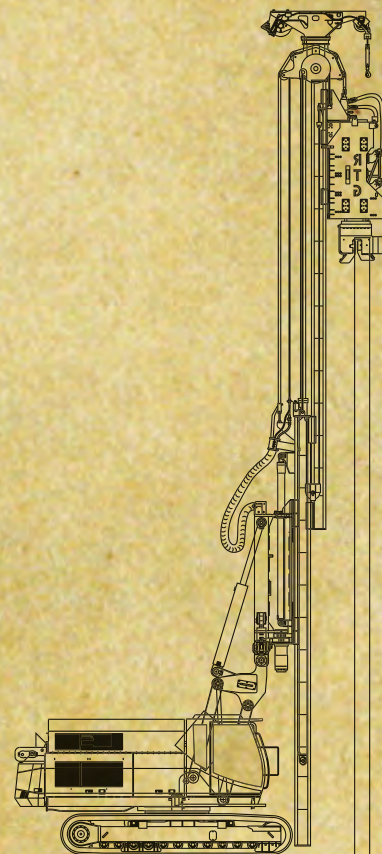
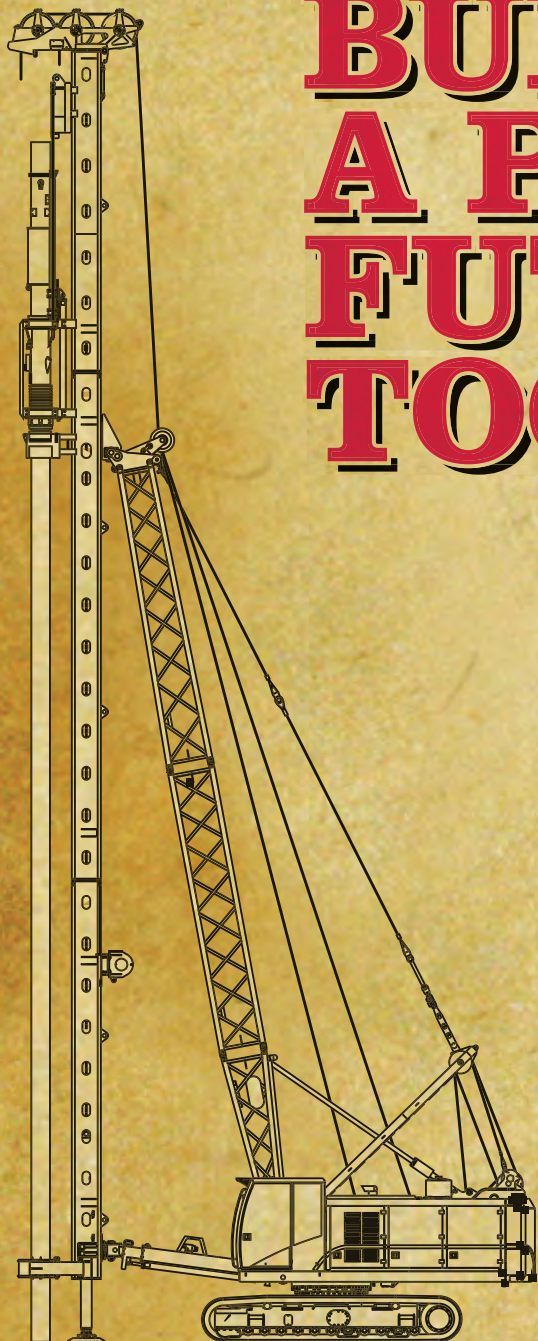
Also, we had him helping us monitor field piling tests. This hands-on experience is something he can take back to his classes and actually inform other engineering students how a driven pile is a tested pile. Our interns both said that their engineering classes only spent a very

small amount of time discussing driven piles. This commitment to increase education on driven piles is so important to our industry and the payback is far greater than the intern's summer salary.

Take action and follow through

The PDCA Chapters need to invite engineering students to their meetings. Pile driving contractors need to invite engineering classes to visit their job sites and to monitor piling tests. Also, don't put off doing stuff until you get a break – hire an engineering student intern to make things happen. From personal experience, I highly recommend it. ▼

BUILDING A POSITIVE FUTURE TOGETHER

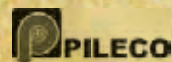


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This knowledge and demonstrated success has placed our employees and equipment in crucial roles when and where they are needed the most. Like the widening projects on the Pennsylvania and New Jersey Turnpikes, Ground Zero, levee restoration in the Gulf after Hurricane Katrina, and the post-collapse replacement of the Mississippi River Bridge in Minneapolis. Stadiums? We have had our equipment on basically every major stadium built east of the Mississippi. Environmentally sensitive projects? We have solved customer problems where local emission standards have exceeded Federal EPA standards or where the use of biodegradable and synthetic oils are required.

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PDCA Chapter News



Keep up-to-date about what's going on with your local PDCA chapter. For information about how to get active in PDCA chapters, contact the national office at 888-311-PDCA (7322), or be in touch with any chapter representative below.

▼ PDCA OF SOUTH CAROLINA CHAPTER

The South Carolina Chapter held their third quarter meeting at the Town and Country Inn in Charleston on August 27. The featured speaker was Jill Harris of Lester Publications, the publisher of *PileDriver* magazine. Jill spoke about her work with Lester and *PileDriver* as editorial director. While in South Carolina, Jill toured Cox Industries' pile treating facility in Eutawville to learn how timber piles are selected and prepared for use, Parker Marine Contracting's casting yard in Charleston for a first-hand look at how prestressed concrete piles are manufactured and two job sites where driven piles are making a difference in the Charleston area.

Read Jill's full recap of the trip, starting on page 114.

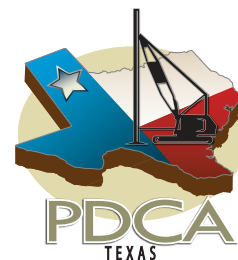


A group of Chapter members went to the University of South Carolina vs. the University of Georgia football game in September. Sitting: Frank Burns, Taylor and Burns. Standing from left to right: Jim Challenger, Skyline Steel; John Parker, Parker Marine Contracting; Trey Ford, Ford Pile Foundations; John King, Pile Drivers, Inc.; Richard Gilbert, Skyline Steel.

Photo courtesy of John King

▼ PDCA OF TEXAS CHAPTER

The Texas Chapter hosted a meeting the evening of Tuesday, October 22 at the Sheraton North Houston in Houston, Texas in conjunction with the Annual Design and Construction of Cost-Efficient Driven Piles Conference. The featured speaker was Tony Dotto of Crane Tech. Tony spoke on the new crane regulations in OSHA 1926.1400, Subpart CC with an emphasis on certified vs. qualified operators and interpretations pertaining to the new testing and certification requirements.



▼ PDCA OF FLORIDA CHAPTER

The Florida Chapter conducted their fourth quarter meeting at the Ramada Inn in Jacksonville, Fla. on Thursday evening, October 10. The featured speakers were Dean Sims of Sims Crane and Bryan Stone, Safety Director at Superior Construction. Dean spoke on the new crane regulations in OSHA 1926.1400, Subpart CC. His presentation included discussions on operator, rigger and signalperson qualifications, as well as lift directors and controlling entities and the responsibilities of each. Bryan spoke on pile driving safety procedures from the contractor's perspective, starting with the delivery of the pile onsite continuing through pile cut-off.



▼ PDCA OF THE NORTHEAST CHAPTER

The Northeast Chapter met Wednesday, October 9 at Iberia Restaurant in Newark, N.J. Silas Nichols of the Federal Highway Administration was the featured speaker.



▼ PDCA OF THE GULF COAST CHAPTER

The Gulf Coast Chapter hosted a booth at the recent 2013 Louisiana Civil Engineering Conference & Show at the Ponchartrain Center in New Orleans, La. on September 25 and 26. Chapter president Devon Overall of Coastal Bridge Company reported that chapter members made good contacts at the event and took the opportunity to promote the benefits of driven piles.



The chapter's fourth quarter meeting will be held November 21 at Messina's in Kenner, La.



PDCA of the Gulf Coast Chapter's booth at the 2013 Louisiana Civil Engineering Conference & Show



From left to right: Michael Kelly, Gulf South Piling and Construction; Devon Overall, Coastal Bridge Company and Gulf Coast Chapter President; Kenny Wolf, Cajun Deep Foundations



From left to right: Michael Kelly, Gulf South Piling and Construction; Rich Northfield, Lally Pipe and Tube

▼ PDCA OF THE PACIFIC COAST CHAPTER

The Pacific Coast Chapter hosted their 2nd Annual "Day at the Races" on Friday, October 25 at Golden Gate Fields in Berkeley, Calif. All proceeds from the event benefited the PDCA of the Pacific Coast Chapter Scholarship Fund.



On the calendar for later this year, the Pacific Coast Chapter will host their Annual Holiday Luncheon at the Hotel Mac, 50 Washington Ave. in Richmond, Calif. on December 6, 2013 at 11:30 a.m.

PDCA of the Pacific Coast Chapter Scholarship Awards

This year, the PDCA of the Pacific Coast Chapter is proud to announce that they were able to provide seven college students with financial aid for the upcoming school year.

To obtain a scholarship, each recipient was required to submit an application with letters of recommendation and a statement about how pile driving and construction have influenced them, or will affect them, in their chosen career path. The criteria also



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required that the students be involved in a construction-related program and be enrolled in the appropriate courses at their chosen school.

The Chapter's Board of Directors reviewed the applicants, and chose the ones most suitable to receive the available scholarship dollars.

All winners are either related to Pacific Coast Chapter members, or have worked or interned for Chapter member companies. With these scholarships, the Pacific Coast Chapter aims to reward the members of their construction "family" and promote the pile driving industry to younger generations.

A scholarship of \$1,000 was given to each of the following students to use during the upcoming school year at their chosen college or university.

Adrian Godby – Attending California Polytechnic State University at San Luis Obispo

Alexander Kung – Attending California Polytechnic State University at San Luis Obispo

Ethan Peper – Attending California Polytechnic State University at San Luis Obispo

Harrison Davis – Attending California State University at Chico

Josh Mouzakis – Attending University of California at Davis

Tyler Gallegos – Attending California State University at Chico

Vitaly Leshchik – Attending California State University at Sacramento

The scholarship recipients, accompanied by a family member and the Pacific Chapter's Board of Directors, all recently met at the Dead Fish Restaurant in Benicia for refreshments and dinner. Following a great meal, the presentation of the scholarships was made by the Chapter's president, Dermot Fallon from Foundation Constructors.

Funds that make these scholarships available are generated by member donations and from the proceeds from our Chapter activities, like the Annual Day at the Races (scheduled for October 25, 2013) and our Annual Holiday Luncheon.

The Pacific Coast Chapter has issued a "friendly throw-down" for other PDCA Chapters by saying, "We challenge all other PDCA Chapters to match or beat our scholarship successes!" ▼



PDCA 2014 "PROJECT OF THE YEAR" AWARD CALL FOR ENTRIES

General requirements

The competition is open to all PDCA contractor member projects completed from January 2013 through December 2013. Entries must be submitted by or with the permission of the principals or officers of the firm. The dollar categories for project entries are based solely on the dollar volume of the piling contract. Entry categories include Land-Based and Marine-Based projects. Each category is divided into four contract dollar volumes: Less than \$500,000 / \$500,000 - \$2M / \$2M - \$5M / Greater than \$5 Million.

Every entry must include

Complete Entry Form. Use original form or download and print one from the PDCA website, www.piledrivers.org.

Fee: \$100.00 per entry and must accompany entry form.

A Project Narrative is to be submitted no later than Jan. 17, 2014. This narrative needs to explain, in reasonable detail, why the project should receive a Project of the Year Award in its category. It should also include how the entry meets three or more of the following criteria:

- Meeting the challenge of a difficult job
- Innovation in construction techniques, equipment and/or materials

- Unique application of piles or design considerations
- Construction problems and creative solutions
- Cost saving measures such as value engineering
- Innovative project management
- Design changes from other deep foundation or earth retention systems to driven piles
- Management or mitigation of environmental considerations

How to submit

All entries must be submitted as an electronic copy.

Entries should include color photos (300 dpi at 3x5 or larger). Photos should highlight the construction process including the finished product and pile driving/project progression. These photos must be titled and have an accompanying document explaining each photo.

Entries may also include letters of recommendation, list of accommodations earned, media and web coverage or other supplemental material as you feel appropriate.

Putting Excellence to the Test!

PDCA encourages each member to consider submitting a project worthy of this prestigious PDCA award. The **2014 Project of the Year Award** entry deadline is:

Friday, January 17, 2014

All entries will be displayed at the PDCA Annual International Conference & Expo 2014, April 2-4, 2014 in St. Louis, Mo.

Winning entries will be announced at the 2014 PDCA Annual Conference Business & Awards Luncheon.

Sophistication of the presentation is not part of the judging, but completeness in addressing each of the criteria outlined in this form is essential.

PDCA 2014 "PROJECT OF THE YEAR" AWARD

CALL FOR ENTRIES

awarded at the
PDCA 18th Annual International Conference & Expo 2014
April 2-4, 2014, St. Louis, Missouri

Project Submitted:	<input type="checkbox"/> Land	<input type="checkbox"/> Marine			
Project Value:	< \$500,000	\$500,000 - \$2 Million	\$2 Million - \$5 Million	> \$5,000,000	
Project Title:	_____				
Project Submitted w/Approval by:	_____				
Title:	_____				
Entry Submitted by:	_____				
Company Name:	_____				
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City:	_____	State:	_____	Zip:	_____
Telephone:	_____	Fax:	_____		
Email:	_____				
Project Owner:	_____				
Contract Amount (Pile Driving Contract Only):	\$ _____				
Project Start Date:	_____	Completion Date:	_____		
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Submit Entry Form, Narrative and Payment to:
PDCA, Project of the Year Awards
1857 Wells Road, Suite 6, Orange Park, FL 32073.
Entries must be postmarked no later than January 17, 2014.

Pile Driving Contractors Association

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18th Annual International Conference & Expo 2014

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April 2-4, 2014

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St. Louis, Missouri

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Harry Tracy Water Treatment Plant Long-term Improvements

Foundation Constructors, Inc. took home a 2013 PDCA Project of the Year Award

By Chris Jalowiec, Foundation Constructors

The Harry Tracy Water Treatment Plant Long-term Improvements project included the addition of a 240-foot diameter, 11 million-gallon water tank to replace two existing smaller tanks that no longer met seismic requirements. This new tank will serve as critical water storage for the City of San Francisco during water shortages. The multi-phase project had Foundation Constructors, Inc. (FCI) installing 807 HP14x117 steel piling as well as completing the pile to pile-cap connection fabrication work.

During the early stages of the project, prior to installing production piles, FCI installed 50 indicator piles and performed a pile dynamic analysis (PDA) testing on half of those. At the conclusion of the indicator program, FCI extracted each pile, allowing excavation of the tank pad for subgrade drainage and backfilling with engineered material. Even with the extensive indicator program that FCI provided, the sloping hillside bedrock profile was very difficult to fully map for all 807 pile locations.

Because of its inherent mobility, FCI elected to use a Link-Belt LS338 with pogo leader and a D30-32 to drive the piles. As a result of the project being located on a hill, piles varied in length from 10 feet to up to 75 feet. Additional equipment supporting the

driving crane during pile splices, cut-offs and cap connection work was a Manitowoc 2900, Pettibone Super 20 forklift and a SkyTrak extend-a-boom forklift.

Challenges

FCI tackled multiple obstacles when completing the Harry Tracy Water Treatment Plant Long-term Improvements project. The project was located in a residential neighborhood and busy morning commute corridor, which resulted in all deliveries being switched to non-commute hours and the need for pilot car escorts to and from the freeway. The site was limited to a single point of entry for all construction work and had no material storage areas. FCI staff had to coordinate each pile delivery truck individually to insure the correct mixture of material lengths would arrive from the storage yard – 50 miles away – for the following days' work. The piles supporting the 96-inch intake and outflow pipes needed to be installed while the site was being backfilled after the subgrade drainage was installed. This required all slab piles that penetrated pipe support concrete to be installed a phase early, dividing the site and further limiting access.



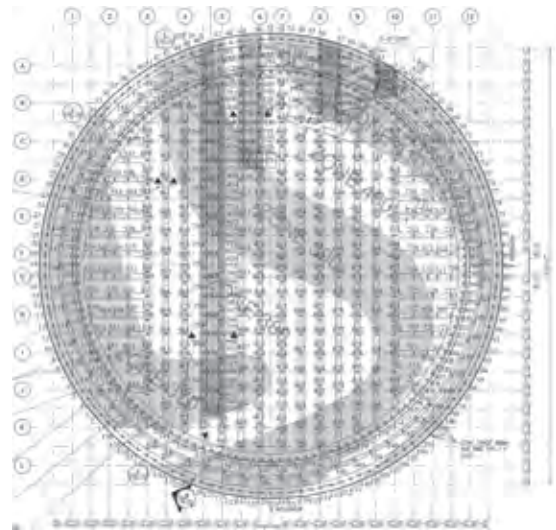
“As of October 4, 2013, I am proud to say that FCI has completed 2,149 days without a lost time incident, and the Harry Tracy Water Treatment Plant was no exception.”

– Dermot Fallon, President, FCI

Construction techniques

Innovative and unique construction techniques also played a huge role on the project. To best utilize the strong axis of the H-pile, the web of each pile in the circular tank walls had to be parallel with the wall. Using offsets from the hubs provided, FCI made an arched pile rotation template to insure every wall pile had the correct rotation. Since each pile was rotated and repositioning of the crane was not feasible, a round bonnet was used to facilitate pile rotation while maintaining piles per day production rates. The heavy loading on the pile cap connection plates required accurate locating and welding in the field. FCI fabricated C-clamped cap plate templates and used them to insure that each plate was placed and welded in the required location. Additionally, the piles only extended 18 inches from grade, which created difficult overhead welding scenarios that were performed on the pile cap plates. To help prevent fatigue and over-stress on the welders, neck and back supports were developed and built by FCI.

Innovative project management was applied to provide maximum cost savings and maintain the aggressive construction schedule. The original connection design showed a combination of



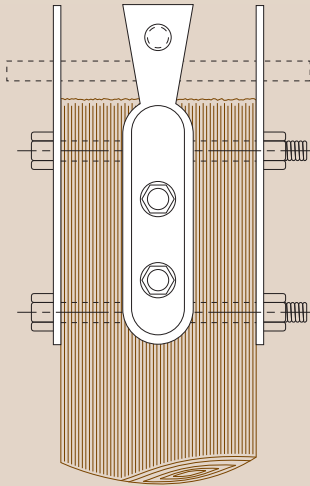
Above: 807 HP14x117 steel piling were installed

Below: Each pile had to follow the tank wall radius



FCI installed the steel piling as well as completed the pile to pile-cap connection fabrication work

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Even though FCI spent over 8,000 man-hours on the project from July 2011 to November 2012, the crews stayed committed to creating and maintaining a safe work environment

L-channels, high-strength threaded bars, nuts, washers and seven different plate sizes, creating over 30 different fixed head pile cap connections. However, due to the congested footing reinforcement, the standard method of embedding a fixed head pile into the pile cap could not be used. FCI designed a pile connection detail that could be installed at all 807 pile locations, which in turn mitigated field coordination and material delivery mistakes while increasing the crew’s production rates.

“Each pile had to follow the tank wall radius. We completed this task by creating a template to maintain the pile radius to the tank wall. The crews followed the plan of the template, which allowed the piles to be installed utilizing the strong axis of the H-beam while staying within a one-inch tolerance,” said John Honaker, VP of Operations at FCI.

Supporting values

“As of October 4, 2013, I am proud to say that FCI has completed 2,149 days without a lost time incident, and the Harry Tracy Water Treatment Plant was no exception,” said Dermot Fallon, President of FCI. Even though FCI spent over 8,000 man-hours on the project from July 2011 to November 2012, the crews stayed committed to creating and maintaining a safe work environment to ensure everyone was sent home each day to their families and friends.

FCI also used extreme environmental impact mitigation during pile installation activities. All pile cut-off material was salvaged and recycled from the Harry Tracy Water Treatment Plant Long-term Improvements project. The use of mobile drip pans under all equipment protected the soil and insured complete compliance with the project Storm Waste Water Protection Plan (SWWPP) requirements. FCI also worked in full compliance with the California Air Resource Board requirements and completed the job with no environmental violations.

FCI was proud to be a team member on this project with Kiewit Infrastructure West Co., Geotechnical Consultants, Inc. and the San Francisco Public Utility Commission. ▼

Photos courtesy of Foundation Constructors, Inc.

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Using BIM in the Redesign for John F. Kennedy International Airport Terminal One

Checked Baggage Inspection System (CBIS)

By Alexander Filotti, P.E., M.B.A.,
Underpinning & Foundation Skanska, Inc.

Building Information Modeling (BIM) is defined as “the process of creating and using digital models for design, construction and/or operations projects” (*McGraw Hill Construction 2008*).

The advance in the computer technology – primarily the drop in price of memory and computing speed, as well as advanced graphic interfaces – has made possible the development of 3-D complex model of buildings correlated with data bases containing project schedule and materials.

These BIM models have opened new avenues in optimizing the design of structures, collaboration of various design disciplines, eliminations of conflict from design phase or preconstruction phase, modeling of the construction site step by step for the duration of the job and last, but most important, improving communication between all project stakeholders. All these improvements are direct contributors to a safe and profitable project.

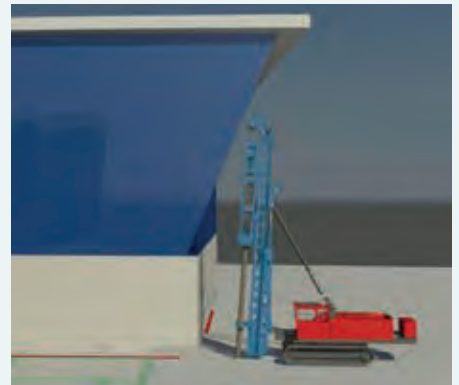


Fig. 1. BIM model of the rig in driving position



Fig. 2. Rig in driving position

In March of 2012, Underpinning and Foundation Skanska (UFS) entered in a contract to drive the piles for a new baggage inspection structure for the Terminal One at JFK airport. The original design of the pile foundation consisted of 152 each, 12.75-inch diameter w/0.5-inch wall, close-end pipe piles with a design capacity of 70 tons and an estimated length of 70 feet.

The building extension is located along the east side of the original structure on a 70 by 130-foot site. The glass fascia of the existing building has a variably inclining protrusion that overhangs a number of the new pile caps and reduced the overhead clearance for 42 piles to as little as 25 feet (Fig. 4 and Fig. 5). In order to drive pipe

piles as planned, it would have been necessary to use pipe segments as short as 10 feet to reach the anticipated 70-foot depth with negative consequences for the quality of the piles, the cost and, most importantly, for the schedule of the job.

First step in mitigating this situation was to redesign the foundation for Tapertube™ piles. The redesign was prepared by Stanley Merjan, P.E., D.GE, Senior Consultant with UFS. The number and the capacity of the piles were maintained the same as in the original design with a substantial reduction in the pile length from 70 feet to 45 feet due to the superior performance of the Tapertube™ piles in loose to medium-dense granular soils.

The redesign paved the road to the second mitigating step – driving of the 42 piles located under the overhang of the building glass cladding in two battered segments.

Using 3-D modeling, UFS managed to convince all project stockholders that the above mentioned piles can be driven battered in two segments, safely, without compromising the existing piles and/or damaging the terminal. UFS received approval to drive these piles on a slight batter (1:10), using a shortened leader and two 25-foot-long segments for the Tapertube™ piles. The photo in Fig. 3 exemplifies why UFS had to convince the owner and its representatives of the safety of the operation.

The BIM models shown have the following color legend:

- + Red – existing piles and foundation of the Terminal One structure.
- + Green – future foundation of the CBIS structure
- + Gray – piles driven by UFS

Determining with precision the positioning of the rig and the mast inclination at every pile location resulted in efficient and safe driving of the critical piles, ending the job three weeks ahead of schedule. It was advantageous that the structure's foundation had a BIM representation, so the time for UFS to develop in 3-D the driving operation was without consequence to the schedule and the project budget.

The substitution of Tapertube™ piles instead of pipe piles and the use of the



Fig. 3. Driving a battered pile next to the terminal

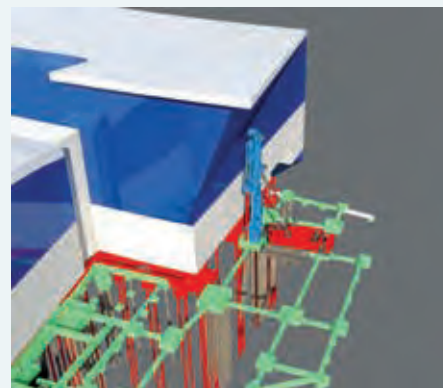


Fig. 4. BIM model of the rig in driving position overlaid on the BIM model of the foundation



Fig. 5. BIM model of the rig in driving position on the south side of the terminal

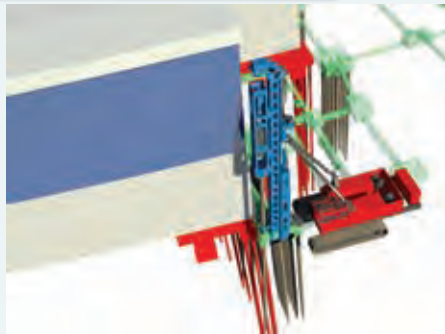


Fig. 6. BIM model of the rig in driving position on the east side of the terminal

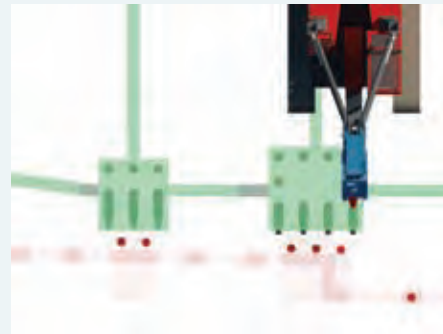


Fig. 7. BIM model of the rig in driving position on the east side of the terminal, showing the clearance between the existing and future foundation

moderately inclined piles in the low-overhead area resulted in savings of more than \$215,000 and shortened the job schedule by three weeks.

Another aspect of the redesign and BIM implementation was the reduction in the carbon footprint of the project. Using a shorter pile reduced the steel and concrete use by approximately 30 percent, and the project duration reduction by 15 days further lessened the carbon footprint by cutting the carbon emissions related to the job site activities by 60 percent.

The field operation team, led by project executive Craig Meltzer, was instrumental in the successful application of the

redesign and has maximized the advantages of using BIM in the preconstruction phase. A Junttan PM20UFS pile driving rig equipped with an HHK 7/5SL hammer was used to drive the Tapertube™ piles. The battered piles were driven with the same equipment with a reduced mast length.

The following individuals composed the project team or had notable contributions to the success of this project:

- + San Merjan, P.E., D.GE, Senior Consultant – redesign, estimating and executive coordination of the job
- + Craig Meltzer, Project Executive – coordination and management of the field operations

- + Alexander Filotti, P.E., M.B.A. – Project engineering, BIM designer and technical coordinator
- + Larry Trapp, Commercial Manager – contract negotiations and commercial aspects
- + Victor Berezniysky, Job Superintendent
- + Scheddie Russell, Project Engineer – BIM equipment modeling
- + John Melero, Dockbuilder Foremen
- + Kevin Kennedy, Foreman – coordination of the team of mechanics that modified the driving rig on the job site ▼

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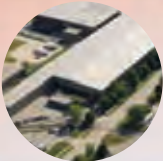
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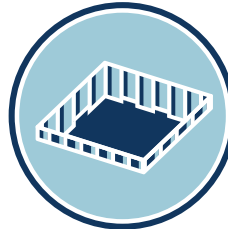
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Design-build Harry Lundeberg Maryland Seamanship School Waterfront Restoration

By Marty Corcoran, *Corman Marine Construction*



In addition to solving critical problems, the aesthetics of the area were greatly increased

Constructing the project on the water during low and high tides and working around an active school campus were challenges that had to be overcome.

The Seafarers Harry Lundeberg School of Seamanship at the Paul Hall Center for Maritime Training and Education, founded in 1967, is a vocational school dedicated to preparing students for successful careers as U.S. merchant mariners and offers classes for experienced seafarers wanting to upgrade their skills.

The school is sprawled across a 65-acre waterfront campus in Piney Point, Md. on the St. George Creek, just off of the Potomac River. It is also home to the Joseph Sacco Firefighting and Safety Training School, the Paul Hall Library and Maritime Museum, marine simulation equipment and the Seafarers Training and Recreation Center. Hands-on training is conducted on the John F. Fay, a vessel docked at the campus' waterfront.

This waterfront restoration project replaced structurally deficient bulkheads and a main pier, constructed a brand new floating marina and a new stone breakwater to protect the school's new bulkhead and marina.

Constructing the project on the water during low and high tides and working around an active school campus were challenges that had to be overcome. The work completed enhanced the scenic backdrop for the new 36,000-square-foot office building recently approved for construction.

Meeting the challenges of a difficult job

Although some project components were essentially on land, all demolition and construction had to be performed on water using barge-mounted cranes. One

task was safely removing an old, immobile practice crane from the school's property, which was demolished using Corman Marine's 100-ton crane barge, the "Xavier." This took precise preplanning and assembling an experienced crew where there was no room for error to accomplish the job.

Approximately 325 feet of old existing timber piers and marina were also demolished with a barge-mounted crane and crane bucket working from the water. Materials were unloaded onto land, cut into pieces and then quickly transported for disposal. Debris was kept out of the water by a turbidity curtain installed around the perimeter of the work area.

Working with the advantage of low tides and the challenge of high tides, Corman Marine constructed over 800 LF of sheet pile bulkhead and then poured concrete cap on top. Installed floating sections transformed into the new, highly anticipated floating marina. 18-inch pipe piles were skillfully driven with a vibratory hammer into the brand new structure without damaging it. Serving a dual purpose, the pipe piles secured the floating sections tightly in place and then became the mooring piles after the new marina was completed.



The top of Main Pier 45 was removed, damaged sections were restored, timber pile and caps were replaced, new steel girders were set on top and a pre-cast deck was installed



Corman Marine won a 2013 PDCA Project of the Year Award for the project

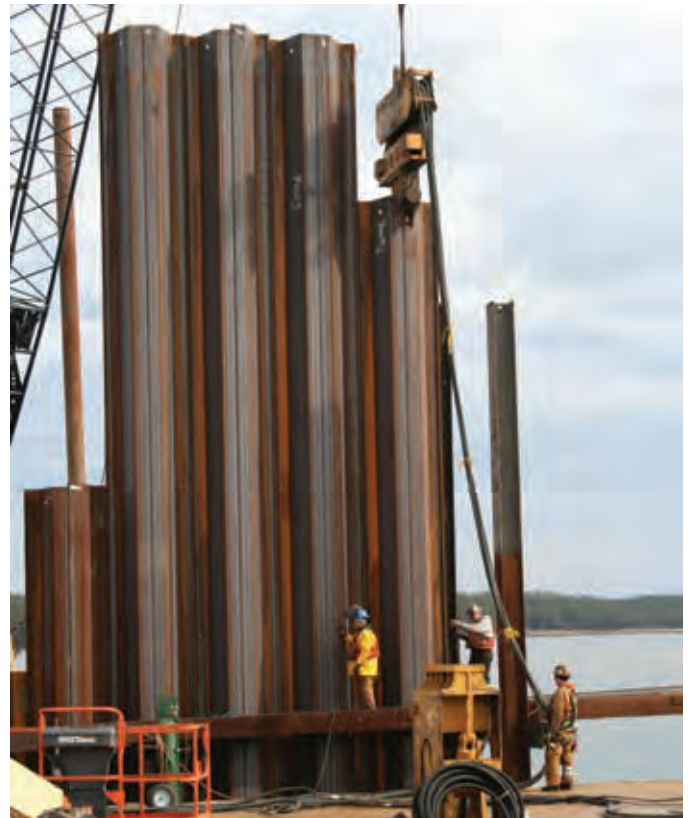
The top of Main Pier 45 was removed, damaged sections were restored, timber pile and caps were replaced, new steel girders were set on top and a pre-cast deck was installed. New fender piles around the 800-foot new bulkhead were installed with vibratory pile hammers on barge-mounted cranes without any damage to the concrete.

Constant communication with the existing lifeboat station and working around their training sessions and activities enabled the new lifeboat station and small rescue boat station to be successfully constructed. 14-inch H-piles were driven with a diesel hammer to firmly support the new structures.

Unique application of piles for design considerations, construction problems and creative solutions

The school's maintenance shop and two electrical transformers are housed right next to the pier, which is in close proximity to the water. To protect the structures from the ground "sloughing" due to waves crashing on land, sheet pile was driven through existing piles and/or bulkhead after removing the pier to stabilize the foundation, undermine the maintenance shop, and kept debris from falling in the water. To minimize cost and at the same time provide a quality project, after inspecting the pier's foundation, questionable piles were removed and replaced, eliminating the need to replace the entire structure.

The project was completed at the end of July in 2012. ▼



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The Great American PYRAMID

Problem-solving with innovative pile driving solutions by Chris-Hill Construction

By Jim Chliboyko

It's not every day that a construction or piling company based in the Lower 48 gets to do some work on the site of an actual pyramid. But Tennessee-based Chris-Hill Construction received such a chance when they successfully bid on a seismic retrofit for what used to be known as the Great American Pyramid.

The Pyramid project was unique in another way, as well; it won the company the first ever Members' Choice Award at PDCA's Project of the Year Awards this past April.

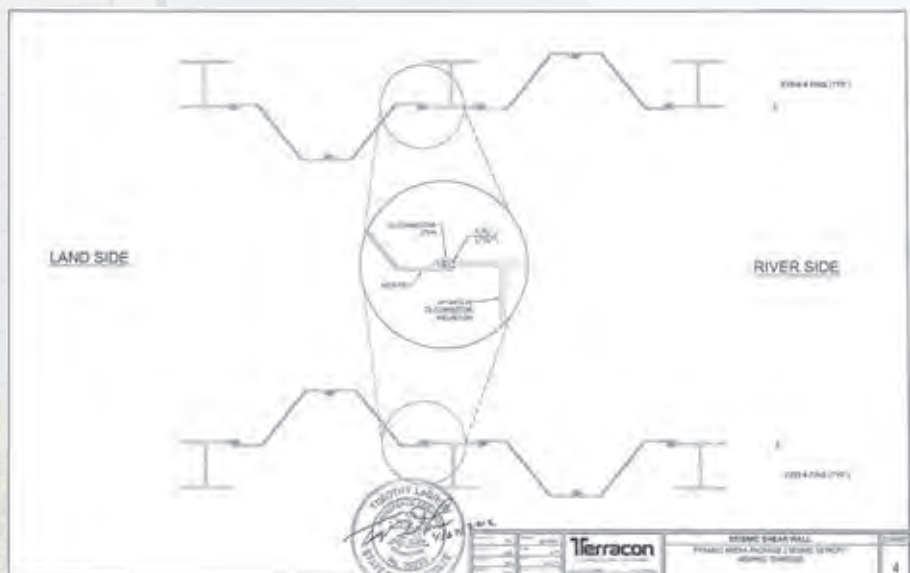
Memphis, Tenn., is, of course, named after the city of Memphis in Egypt, and back in 1989 ground was broken for a new project that would act as a symbol for the younger Memphis. It was to eventually be a 20,000-seat NBA-ready stadium once a team was acquired, a venue shaped like a gleaming pyramid. It opened in late 1991, and hosted the Memphis Grizzlies when the team moved from Vancouver (but only for three seasons). It was soon eclipsed by the new FedExForum, which opened in 2004. By the new century, the Pyramid needed a new purpose. And then Bass Pro Shops stepped in with a plan to purchase the Pyramid (currently the world's seventh largest) for a destination store.

But before the Pyramid Arena became part of the Bass Pro Shops empire, there

was some work that was needed to be done, especially in the Pyramid's seismic considerations. The Pyramid had been constructed prior to IPC 2007 seismic codes. While not lying in as hot an earthquake spot as various places on the Pacific Rim, Tennessee is vulnerable to activity from the New Madrid fault line, which has produced earthquakes in Memphis itself, most notably around the early 19th century. There are some other geographic challenges, too, with the project,

not the least of which is the nearby presence of the grand Mississippi River itself.

The Chris-Hill proposal offered a "belowground seismic construction package that ensured the Pyramid would not move laterally during an earthquake or fail due to instability of the adjacent Mississippi River bank," wrote Craig Christenbury, chief manager at Chris-Hill in an outline of the project to PDCA. City of Memphis engineers had determined that there was



Project plans



Installing the pile



Sheet pile

a threat of the Pyramid (or parts of the Pyramid) actually moving west upon a seismic event, due to lateral spread and a potentially unstable riverbank.

In their request for proposals, the city mentioned they expected to be presented with fairly typical solutions for below-ground issues. But they also specified that there would be no limitations on what types of work they'd be open to.

"Fortunately, (the project) was laid out to us with a wide canvas," said Christenbury, in a phone interview with *PileDriver*. "It was a weird design/build; there were only three bidders. We had to compete with the big boys."

Wrote Christenbury, "Soils beneath the Pyramid are mostly silts and sands from soft to medium stiffness. The owner outlined the following construction techniques as potential solutions to the problem: jet grouting, deep soil mixing, drilled shafts and ground anchors." Christenbury went on to emphasize that any work involving driven piles, or anything else driven, did not come up in the call the city put forth.

Instead, Chris-Hill came up with a solution that was both less intrusive and much cheaper than what the city might have suspected. In concert with their design/build engineer Terracon, the team came up with a potential solution involving driven steel combi-walls. It was the bid that was eventu-

ally awarded the job, which, Christenbury said, took three months over the course of the autumn of 2012 to complete.

"The main challenge to the problem was not the design itself, since steel piling inserted 80 feet in the ground easily improved the ground enough to support Pyramid soil spreading; it was the selling of the driven pile concept to the owner's engineer who was following conventional wisdom regarding deep soil mixing, jet grouting or 'anything drilled' as the only viable soil-modification/soil reinforcement technologies," wrote Christenbury.

By going with what the Chris-Hill bid was suggesting, they would bypass a lot of the issues usually associated with the traditional solutions for working below ground. To Christenbury's way of thinking, massive belowground soil mixing is more invasive, needs more space, more money and more testing than what Chris-Hill was proposing.

There were some other benefits with the Chris-Hill/Terracon solution. The drainage of the site, for instance, became a factor in the bid. A 72-inch wide, 15-foot deep reinforced concrete pipe travelled the length of the site, draining an area of four square miles. The two other drilled soil bids necessitated the removal of the pipe and the installation of temporary standby pumping as well as the eventual replacement of the pipe. Chris-Hill's didn't. Thus, it was a cheaper, less invasive job. (The Chris-Hill bid was priced at \$7.2 million, versus \$13.9 million and \$13.2 million for the other two bids.) Environmentally, too, by avoiding the use of pumps, they avoided the production of any diesel air pollution associated with pumps.

There were some challenges that emerged during the course of the job, however, including how to do what they were actually proposing.

"Our ICE® 416L vibratory hammer would not drive the 70-foot long AZ-19-700 (furnished by Skyline Steel) due to ever-increasing friction between the sheet piling and the HP 14x89 guide piles (also furnished by Skyline)," wrote Christenbury. "We opted for driving the combi-walls with an ICE® I-30 diesel impact hammer. The tight spaces on the project required the use of only one pile rig so we were forced to switch pile caps between H-pile helmets and sheet pile helmets frequently. Fortunately, the 32-inch hammer leads could be rotated to drive sheets as doubles as opposed to single sheets."

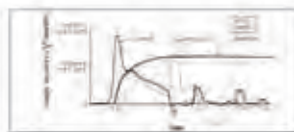


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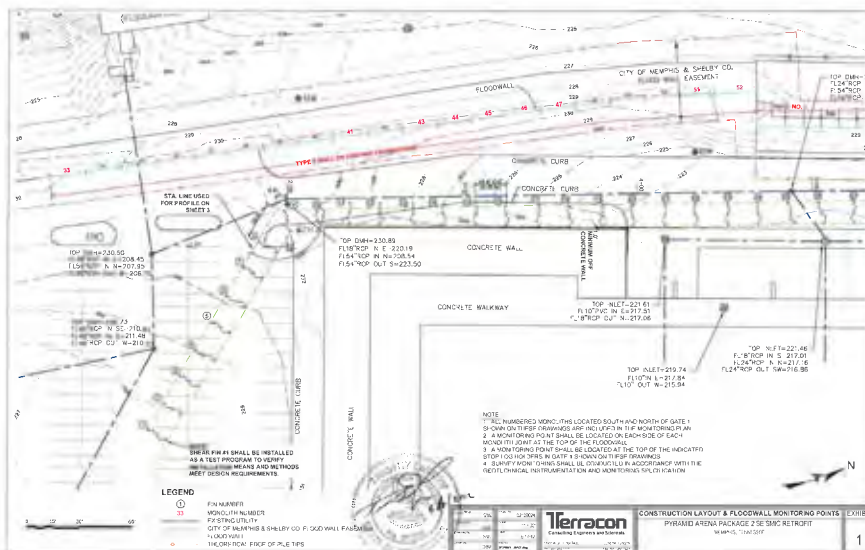
Another initial concern was the potential depth of the job.

“The biggest concern was the depth of the design and the methods utilized to drive piles to what started as 120 feet deep. Once our designer ran time history studies using finite element seismic analysis techniques and determined that the weak soils were not necessarily 120 feet deep, but somewhat shallower, only then did driven piles become the most feasible alternative. We knew we could drive piles 80 feet deep (10-foot cut and 70-foot pile depth) even if we were forced to pre-drill 80-foot-deep holes.”

It was a crowded site, too, with the work occurring about 50 feet away from the Pyramid itself and 25 feet from a US Army Corps of Engineers floodwall. Of course, the team had to make sure the floodwall was not compromised during the job.

Eventually, 46 shear fin panels were used in the project.

And while this novel approach to stabilizing the soil got them the job, the team thinks that what they came up with is a potential new wrinkle to explore in a world that is seriously reconsidering its approach to seismic upgrades. Along with perhaps making life in earthquake zones potentially



The above plan shows the relationship between the Pyramid and the shear fins – basically, perpendicular to the Pyramid wall safer, it is a solution that would obviously benefit the piling industry.

Wrote Christenbury, “This unique application of steel piles is novel, sophisticated in its design and deserves a hard look from the academic community on its future use across the world. As you can probably tell from our excitement in having the opportunity to present this project, we may be onto something here.”

Combined, all these factors eventually led Christenbury to think that it may be able to compete for the award that they eventually won. He says that aside from PDCA, he hasn’t heard from many others about the unique project. Not yet, anyway.

“It’s a very new soil technique at very minimal cost,” said Christenbury. “That’s why I thought that PDCA would (be as excited about it as we are).” ▼

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Whatever Needs to be Done

Hasse Contracting Co. has been providing quality service for three generations

By Barb Feldman



Hasse performs foundation work for solar arrays

Hasse Contracting Company Inc. (HCCI) provides a range of services that includes general contracting and sub-contracting, bridge-building, earth retention, shoring and pile driving from solar array foundations to deep foundations. Located in Albuquerque, N.M., the company works with federal, state and local governments, commercial builders and private customers, and teams up with consulting engineers for design-build projects such as bridges and drainage structures

for private landowners throughout the state and surrounding regions.

Before founding his company in 1976, William Hasse Senior worked his way up through one construction company and helped start another after returning from his service in Korea, recalls his son, William (“Bill”) Hasse Junior, now HCCI’s president.

Both the Oriental-style font that spells “Hasse” on the company’s website



HASSE
CONTRACTING CO. INC.

and the company’s unusual logo – stylized Japanese symbols for “Ha” and “Se” –

honor the family name and some of its history: William Hasse Senior’s father, who died in 1943, a decade before Bill Junior was born, had come to California as a child in the late 1800s from Japan. The German family who cared for him added the additional “s” to the English spelling of his name,

which was pronounced Ha-Se in Japanese.

Bill himself wanted to be a park ranger, park designer or landscape architect, and he graduated from Colorado State University with a degree in forestry. He hadn't planned to go into the construction business, but when his job with a landscaper ended in the winter, "my father took me out on the job and put me to work," he said. "I was able to get on with Dad and I just stayed."

When William Hasse Senior retired in 1995, Bill assumed control of the company along with his sister Linda, who for a while took over their mother's tasks in the front office. She also assumed his mother's role of making sure Bill knew how things were done.

"She would remind me by saying, 'That's not the way your dad would do it!'" said Bill, laughing. "Any time there's a generational change in a company, that's pretty typical, I would think."

After Bill was diagnosed with cancer seven years ago, his own sons, Travis, 33, a licensed engineer, and Christian, 29, decided that they had "to get in here and help the old coot out," said Bill, and they became more heavily involved in the company. Today, after treatment, Bill is thankful to be in full remission.

The company was able to weather the 2008 recession as well.

"It didn't seem to hurt us," said Bill. "Financially, we'd always kept pretty lean, so we did better while some of our competitors were hurting because of the niche we'd worked ourselves into in the industry: providing quality service and doing whatever needed to be done. We stayed with piling

structures and no job was too small."

The company has been subcontracted to build drainage elements of bridges, concrete box culverts and curb/median drop inlets and has made minor repairs to and refurbishments of the structural elements of bridges and drainage structures for the New Mexico Department of Transportation. HCCI's workforce ranges from 25 to as many as 80 or 90 employees, depending on the time of year.

"We're predominantly a structure and bridge contractor, and some of our work can't be done during the winter, even in New Mexico," explained Bill.

He estimates that pile driving comprises about five per cent of the company's business, more or less, depending on the year.

"Right now we're doing a lot, basically sticking steel posts in the ground," he said, talking about their foundation work for solar arrays over flat terrain, noting that the number, size and spacing of the posts depends on the design of the panels. For the 1.6 MW Large Scale Solar Photovoltaic Project at the Silver City Wastewater Treatment Plant about 100 miles west of Las Cruces, HCCI recently installed 264 W8x13 piles driven 11 feet below grade.

"In the spring of 2013, we had three installations and 700 to 800 piles. In the month of August, we put in somewhere in excess of 13,000. For September, we should have another 10,000 to 12,000," noted Bill.

New Mexico now ranks 11th in the U.S. in installed solar capacity, according to the Solar Energy Industries Association, and solar panels already produce enough electricity in the state to power 40,300

homes, an amount per capita almost equal to California, which ranks first.

To make matters a little more difficult, ground conditions are extremely varied in New Mexico, with more soil types than in any other state in America, he adds.

"You might find deep sand up to 120 feet, and then two miles down the road, you have to drill 15 feet through solid rock to put in a 20-foot pile," he explained.

Geotechnical reports are very important, he notes, and the company has to be prepared for different types of driving.

HCCI started out with single-impact diesel pile hammers and has since acquired vibratory and hydraulically actuated hammers from around the world, including a HPSI vibratory rig, a Pileco hammer and a single-acting diesel ABI pile hammer.

"We look for whatever is out there. I'm in contact with the Berminghammer representative down in Houston on a regular basis. This last year, we purchased an ABI from Hammer & Steel, and out on the solar fields we're using Vermeer and Enteco, made in Italy," said Bill. "They call them pile hammers but they're just post drivers."

He's also been noticing some shifts in the industry over the past few years.

"I notice that we're going back to more traditional piling for bridge substructures. There seem to be more sheet piling projects, that sort of thing," said Bill, who said that in the 30-plus years that he's been involved in New Mexico, "we have driven only one bridge with concrete piles and one with timber piles."

In a FEMA-funded project to protect land owners along the Rio Mimbres in

Steel posts for solar arrays



Faywood, N.M., the company placed two sheet pile walls of light-gauge steel sheets – driving 18-foot piles along 400 feet of one side of the riverbank and a wall of 12-foot piles along 450 feet on the opposite shore – to redirect flash flood waters and prevent loss of property and homes.

“You know what you’re getting when you put that piece of steel in the ground,” he said. “A driven pile is a tested pile!”

Bill has been a member of PDCA for more than a decade, and enjoys going to the association’s annual convention when he can. He appreciates the opportunity it

affords to network and “to see how people are doing work in other parts of the nation and around the world.” He also appreciates the interesting activities arranged for spouses and family members, “which makes it a whole lot easier to go!”

Bill is also a member of the Associated General Contractors of America and the Associated General Contractors’ New Mexico Building Branch. Both he and his father have served as president of the Associated Contractors of New Mexico, and Bill anticipates that at least one of his sons will be nominated to the board this year. ▼

Photos by Hasse Contracting Co.



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“The whole process is very developed here. It’s the people, piles, pile manufacturing, transportation, splicing and, of course, the equipment. All these must be streamlined as a whole to be efficient. I’m not sure if modern pile driving as a whole process is well known enough in North America.”

– Tommi Lähteinen, Director, Marketing and Distribution, Junttan Oy



The advanced technology of Junttan Oy

By Jill Harris and Kristy Rydz, Lester Publications, LLC

Introduction

If you haven't been to Finland, we suggest you add it to your destination list. The Nordic country, located in Scandinavia, or Northern Europe, is a beautiful landscape brimming with thickly treed forests and lakes. Commonly cited as one of the world's countries with the highest quality of life for its inhabitants, Finland is also known for its industrialized export industries – for

example: timber, pulp and paper, electronics (think Nokia) and steel. The country is also home to one of the biggest names in piling equipment in the world – Junttan Oy.

Back in June of this year, Junttan invited the two of us to travel around the world to their headquarters, based in Kuopio, Finland, so that we could share our experience of their technologically advanced piling machines with readers of *PileDriver*.

While those involved in any aspect of the deep foundation construction industry anywhere in the world will undoubtedly know the Junttan name, the Finnish company wants to further assert themselves in North America.

Besides being the most gracious of hosts, our Junttan guides knew their company and their industry inside out. Tommi Lähteinen (Director, Marketing

FINNISH FIRST



JUNTTAN

Sed ut perspiciatis unde omnis iste

Every Junttan machine is built in Kuopio, Finland, the only Junttan factory in the world.

and Distribution), Olli Inkinen (Area Sales Manager, North America) and Miia Moisanen (Marketing Assistant) answered every question with undeniable belief in the Junttan brand and product.

Piling in Scandinavia

More than 80 percent of all piling in Scandinavia is driven piling, and that's regardless of the challenging ground con-

ditions and frost. This impressive statistic is thanks to the continuous research and development on methods and equipment by companies like Junttan. All equipment used for driving piles is modern, hydraulic pile driving rigs, with Junttan dominating as the most common brand.

"The whole process is very developed here. It's the people, piles, pile manufacturing, transportation, splicing and, of course,

the equipment. All these must be streamlined as a whole to be efficient. I'm not sure if modern pile driving as a whole process is well known enough in North America. There might be a lot of knowledge about pile driving with diesel hammers but everybody knows that they lack efficiency and controllability... It's not so easy to pile [with them] when you have difficult ground conditions," Lähteinen explained.



Upper Photo: A rig moves through six stations during its assembly on the production floor at the Junttan factory. Lower Photo: A PM25H in the Junttan yard.

Upper Photo: The Junttan brand is one of the most well known in the pile driving industry. Lower Photo: About 65 percent of all piles driven in Scandinavia are pre-cast, non-prestressed concrete piles.

“But doing it like we do it here with modern overall methodology, equipment and versatile education of people involved, it’s the fastest and the most economical way and also environmentally friendly. There’s only one rig with two guys. It’s very fast.”

As the complete pile driving process – from designer’s desk via equipment manufacturing to PDA verifications – is highly developed as a whole in Finland, there are no other piling methods that can seriously compete with pile driving except for very rare sites. The question in Finland is more so whether the piles driven should be concrete or steel. Currently, about 65 percent of driven piles are pre-cast, non-prestressed concrete piles and about 30 percent are steel.

The industry even has the public on board with pile driving in Scandinavia, an

area of concern in North America.

“As pile driving is a total process considered to be a modern and fast way to accomplish deep foundation works, it is very well accepted here,” said Lähtheinen.

Inside an industry giant

Pentti Heinonen founded Junttan in 1976 and the company has continued to grow throughout the years. Today, the company employs a workforce of 135 people and operates globally, with over 95 percent of its production exported outside of Finland. There are distributors in over 20 countries, with Junttan equipment working in more than 45 countries.

“It’s a very international business,” said Tommi Lindbom, Junttan’s managing director. “The biggest market so far has been Russia with almost 200 rigs. We’ve

produced more than 700 complete rigs in total, so almost one-third of our rigs are there. Canada and the U.S. are very important markets as well. In addition, we have produced more than 2,000 separate hydraulic hammers and power packs for crane suspended applications, etcetera.”

Junttan moved into new facilities in October of 2008. The new factory, located in Kuopio, is the only Junttan factory in the world.

“I think it’s absolutely one of the most modern factories in this market area,” Lindbom noted.

After a tough year in 2010, Junttan is on a continuous upswing. In 2012, they defined a strategy to acquire the component manufacturing operations for their more critical machine parts to oversee all of their own manufacturing and further ensure top quality in every Junttan product in every step of the manufacturing process.

The Junttan machine

Currently, the Junttan products and services line includes the following:

- ✦ Pile driving rigs
- ✦ Multipurpose piling rigs
- ✦ Deep stabilization rigs
- ✦ Hydraulic hammers and power packs
- ✦ ExcaDrill rock drill attachments
- ✦ Customer care and parts, service and training

The pile driving rigs and hydraulic hammers are Junttan’s calling card for now, but they have plans to grow their other product lines, as well.

Junttan hydraulic hammers

Junttan has three hammer models in their lineup: the HHK-A, HHK-S and SHK.

With about 97 percent of the rated energy delivered to the pile (compared to diesel hammers, in which energy transfer is around 60 percent), Junttan hammers are incredibly efficient in their design. The hammers are also easier on the environment as there is no smoke and much less pollution when using a hydraulic model. Compared to diesel hammers, and even other models of hydraulic hammers, Junttan models offer low noise levels, which helps to minimize the public’s negative association with pile driving work. As with all of Junttan’s products, the hydraulic hammers the company offers are of the utmost quality, backed by the most advanced technology available.

The HHK-S is the more popular ham-

mer model in North America as steel piles are more commonly used here, and the HHK-S is primarily used for driving steel piles.

Junttan piling rigs

Junttan's comprehensive line of pile driving rigs is the centerpiece of the company's collection of deep foundation equipment.

In addition to standard models, Junttan takes pride in their ability to produce specialized, on-demand products.

"We make quite a lot of custom-tailored rigs," Inkinen said. "Certain markets have certain needs and we can manufacture the right equipment to meet them."

The wide range of models embodies Junttan's commitment to extensive research and development as demonstrated through the construction of the machines, but also through the company's technical planning and analysis.

"We know exactly what the capacity of our rigs are. We have a very special simulation software, where we know if we put this kind of rig, for example, with this kind of leader and this hammer with this pile size, we can very accurately calculate how much it can take," Lahteinen explained.

"If our customers need something very special, if they need to know capacity tables for something which is not standard, we can calculate very accurately how you can do it and what position the cylinders have to be in and at what inclination the pile can be at to make it safely. It is one essential part of what we do."

The lightweight yet durable machines are manufactured with a low center of gravity, allowing for 360-degree turns and easy transport from one worksite to another.

Thanks to self-erecting leaders and other advanced technical aspects that allow all parts on the machine to be movable, all Junttan rigs can be set up and ready to work in a matter of minutes, typically ranging from five to 15, depending on the model.

Another factor that sets all Junttan rigs apart is the need for only two people, an operator and a groundsmen, to run them at any given time. This not only makes any job efficient but also inherently safer, as the machine does all the heavy lifting, from unloading the piles to picking them up, moving into position and, ultimately, driving them into the ground.

As for longevity, Junttan can't say how long their machines will last – yet.

"We don't yet know what the life cycle

is for our machines because the first one we've built is still working after more than 30 years," Inkinen explained.

This fortunate reality can be partially attributed to the dedicated service provided by Junttan.

After 10 years in the field, machines are brought into the main factory in Finland or one of their dealership partners on other continents for a complete overhaul, including re-wiring, upgrades and a thorough review of all components.

Making it in America

The U.S. is an important market to Junttan, and the company aims to get the notice of more contractors here. So far, the reception of the machines has been overwhelmingly positive.

John King, estimator at Pile Drivers, Inc., has been relying on a Junttan machine ever since the company took ownership of one in October of 2007. Their PM16 has been on over 300 jobs in the time they've had it.

Despite the hefty price tag, Pile Drivers, Inc. knew they were making a smart investment.

"It was the ease of moving it, setting it up and how much fuel we could save," said

King about why the contracting company, based out of Charleston, S.C., bought the rig in the first place.

And they were right. In the time they've had their Junttan, King says it was definitely the best choice.

"The only thing we're disappointed in is that we didn't buy it 10 years earlier," he said. "We're able to do the job and get there cheaper, get it done quicker and customers just love that machine. And it's environmentally friendly, because we use way less fuel."

King easily recommends Junttan machines to other pile driving contractors, but with one stipulation.

"I definitely recommend it, but not in my area," he joked. "I don't want anyone else to have them! Owning a Junttan gives a hell of a business advantage."

Respecting Ground

With a mission to develop and produce piling machines and services that are able to help their customers work better, Junttan holds safety in the highest regard.

From the beginning of the process, Junttan products are designed to ensure the security of those working with them.

Below: Junttan representatives from left to right: Tommi Lahteinen, Miia Moisanen, Olli Inkinen. Bottom Photos: Junttan products are known for their efficiency and ease of use.



“On the jobsite, safety comes from the machine,” said Lahteinen. “The machine is designed for the job so there are no mistakes. There are no compromises and it is very safe in all aspects.”

Further, Respecting Ground is not just a tagline for Junttan, but another one of the core values by which the company proudly operates. Environmental friendliness as well as products and methods that support sustainable development are top priorities at every level for Junttan.

“We’ve been forward-thinkers in pile driving as a manufacturer and a developer,” said Inkinen. “We want to bring the best technologies and methods and, of course, green technology to the forefront of the industry.”

The Junttan way

In addition to its commitment to safety and the environment, Junttan promotes its Finnish origin as well as openness, reliability, honesty and determination in their company values and day-to-day operations.

Those who work closely with company representatives see those characteristics reflected not only in the quality of their products, but also the way in which staff promote the Junttan brand.

“We make quite a lot of custom-tailored rigs. Certain markets have certain needs and we can manufacture the right equipment to meet them.”

— Olli Inkinen, Area Sales Manager, North America, Junttan Oy

“They’re pretty honest, straight-up people. Just nice and direct. Even though it’s a large company, they’re still a small, family-minded company at heart,” said Bruce Patterson of Canadian Pile Driving Equipment, based in Alberta, Canada. “Even though they’re corporately owned, they have a family feel to them – similar to the ways of the past. They’re very hospitable.”

King of Pile Drivers, Inc. echoes a similar statement.

“I’ve always had a good relationship with Junttan,” he said. He even travelled to Finland with a few other PDCA members to experience the company first-hand in 2009.

While employees, like Lahteinen, enjoy the current size of the company, he can also

appreciate the challenges the growing company experiences in such a narrow market.

“Compared with some big companies, it’s totally different. We can be more custom-oriented and flexible for our customers because of our size. If we need to make some decisions or work on some new designs, it’s quite easy to do, to get all the right people together to discuss it,” he said.

“Also it’s quite interesting and challenging. Being our size of company working globally in a very niche business area and working with machines that are quite expensive has not been an easy task.”

However, it is a task that the company takes on and uses to successfully challenge itself. Their goal is help revitalize the driven pile in North America by showcasing the most technologically advanced, efficient equipment in order to make pile driving more alluring to incoming industry engineers and contractors.

“It’s hard to take a step forward to get modern techniques at the forefront because some people are afraid of change,” Lahteinen explained. “They want to promote what is being used right now on job sites. But they need to understand that pile driving is not that smoking, ancient looking thing. To be attractive and well accepted, new generations and the public must have a feeling that it’s a modern, fast and green way to pile – as it really is! But you need to have the whole process.”

And that process is precisely Junttan’s specialty.

“The Finnish people have been very diligent in design, changes and improvements throughout the years,” said Patterson. “It’s not a second line to them or just a product, it’s what they do and they do it very well.”

For more information about Junttan products, contact their U.S. dealers and service partners:

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It took about three minutes for the PMx20 to pick up the concrete pile, move into position and drive to bedrock

a Junttan rig model PMx20, the first model in the “x” series. All piles were to be driven to bedrock, which is at varying depths throughout Scandinavia.

From pick-up to final blow, it took approximately three minutes for the Junttan rig and hammer to drive each pile.

A Junttan PM20LC rig with an HHK 5a hammer was used to drive steel tubes for a housing development complex in Helsinki



It only takes a matter of minutes to pick up the steel tube and move it into position for driving

Job Site #1 – Jyväskylä

About 270 kilometres north of Helsinki, Jyväskylä is one of the largest cities in central Finland and growing. This project was for a housing development on the outskirts of the city.

All piles were 250-millimetre square concrete piles and varied in length from six to 11 metres, with the 11-metre piles most common. 117 concrete piles were to be driven over two days (rig in, right out) using

Job Site #2 – Helsinki

A large project constructing a housing development complex by the sea in Helsinki proved slightly more complicated.

Background photo: www.junttan.com



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This project involved the use of both steel tubes and concrete piles. The 508-millimetre steel tubes with a 12.5-millimetre wall thickness and 14-metre length were being driven using a Junttan PM20LC rig with an HHK 5a hammer. The steel tubes had rock shoes and were to be reinforced with both steel and concrete after being driven.

The entire area had large piles driven into the ground in a row by the sea to keep the area from moving, and the steel piles in the job site were required to minimize movement around the foundation. Concrete piles would be driven throughout for the main foundation, a common practice in Scandinavia.

The slated time for the pile driving was three weeks.

The rig operator explained that the rig he was using had 18,000 hours of work on it, and was due to be refurbished. His company purchased and will receive a new rig in October; they currently own four, all PM20s.

"They should be buying more of these in North America," said the operator.



The PM20 rig was over 20 years old and had been overhauled in 2012. The short piles had to be spliced together once unloaded off the truck.

Job Site #3 – Espoo

A different residential area underwent foundation construction using concrete piles.

The rig onsite, a PM20, was over 20 years old and had been overhauled and rebuilt at the Junttan factory in 2012.

270 piles were needed and the contractor ordered three- to four-meter lengths in order to splice them together upon arrival to form eight- to 12-meter lengths. ▼

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“GeoQuip became a member of PDCA for one simple reason: to assist in the promotion and use of driven piles... At the end of the day, this business is still about relationships and that is a very good thing.”

— Gary Terwilliger, President, GeoQuip

GeoQuip Inc.

In business for more than 25 years, this Virginia company has emerged as one of the largest suppliers of foundation equipment on the East Coast

By Lisa Kopochinski

Founded on the basic principal of exceeding customers' expectations with quality, reliability and on-time performance, Gary Terwilliger has achieved what he set out to do when he founded GeoQuip Inc. in 1987.

For 26 years, the Chesapeake, Va.-based company has emerged as one of the largest suppliers of foundation equipment on the East Coast, providing all types of pile hammers (impact, hydraulic and diesel, vibratory), hydraulic augers, leads, crane rental, machine shop service and heavy fabrication.

Situated in a 30,000-square-foot shop on 11 acres in Cavalier Industrial Park, Terwilliger attributes GeoQuip's success to “providing the highest quality equipment available on the market and backing it up with service that is unmatched in the industry. Most of our 50 employees have been with us for 10 years or more, and several of our key people have been with us over 20 years.”

The bulk of the company's clients are long-time customers, some of which are large national contractors or joint ventures, as well as many smaller contractors that have become friends of GeoQuip throughout the years.

“From a small start-up in 1987, we now have one of the largest rental fleets of high-quality pile driving equipment on the East Coast,” said Terwilliger. “In addition, our large machine and fabrication shops are unique in the market and substantially increase our service capabilities.”

It was 26 years ago that the owners of HPSI and Pileco/Delmag talked him into relocating his business from the Gulf Coast area.

“At the time, the oil crash in the mid '80s had hurt most small businesses and between Loran Freeman of HPSI and Otto Kammerer of Pileco, they convinced me that the East Coast was the place to be. I'm glad I listened, but sadly both these men have passed on and are sorely missed in our industry. They were my friends and my mentors. I am lucky, though, to have two young key people – Matt Williams and Chris Lowe – who work hard and treat our valuable pile driving customers with 'old school' service and quality equipment.”

High profile projects

GeoQuip (whose name is a derivative of the words 'geological equipment') has been involved in numerous high-profile projects including the Woodrow Wilson Bridge, Escambia Bay Bridge, Chesapeake Bay Bridge, Indian River Bridge, Turtle River Bridge, Blue Plains Treatment Plant and APM Terminals.

The company is also a key player in the Midtown Tunnel project in Portsmouth, Va. with SKW Constructors (a joint venture of Skanska, Kiewit and Weeks Marine).

“We became the major supplier of pile driving equipment with 13 pieces of equipment,” Terwilliger explained. “To date, we have supplied six vibratory hammers HPSI models



GeoQuip President Gary Terwilliger with Matt Williams (left) and Chris Lowe (right)

500/300/250/80E, three Dawson Impact hammers 6500 and 4500, IHC Hydrohammer S130 and S150, Hydraulic Auger HPSI H35VT and a Pileco diesel hammer D62. As the major supplier of pile hammers for SKW Constructors, our service department, machine shop and fabrication capabilities have been able to help SKW Constructors keep their pile driving on schedule. This is a mega project for Virginia and we are proud to be a part of it.”

Challenges over the years

In today’s tough economy, it is quite an accomplishment to have stayed in business successfully for more than 25 years. When asked what some of the largest challenges have been, Terwilliger doesn’t hesitate.

“I would say competing against cheaper priced equipment has – at times – been a short-term problem. But retaining quality personnel, both at the job site and in our shop, has been the key to satisfying our customer’s needs and remaining competitive.”

As for how the pile driving industry has changed since 1987, he says that in some ways, supplying equipment has become easier for his company.

“Through the years we’ve developed close relationships with our longtime customers. Each year that goes by, we seem to add a few more customers and that base is what keeps us profitable. We still have work to do, but growing too fast or flashy has been the downfall of many equipment dealers and manufacturers. If you grow too quickly, you run out of service and, as an independent dealer, the capital requirements can be huge.”

PDCA and the future

Terwilliger says that joining the Pile Driving Contractors Association has also been very beneficial and that GeoQuip became a member for one simple reason: “to assist in the promotion and use of driven piles.”

As for the future, immediate plans for the company include expanding its equipment yard and adding another 20,000 square feet to its shop.

“The permitting process through the Corps of Engineers and the City of Chesapeake has taken 18 months to date and this has shown us firsthand the problems our customers face trying to get permits and projects underway. This additional capacity will allow GeoQuip to do more major rebuilds of major construction equipment. For instance, last year the company remanufactured/restored three American cranes, several large pile hammers, a Giken Silent Piler and are doing more and larger service jobs on contractors’ equipment. At the end of the day, this business is still about relationships and that is a very good thing.” ▼

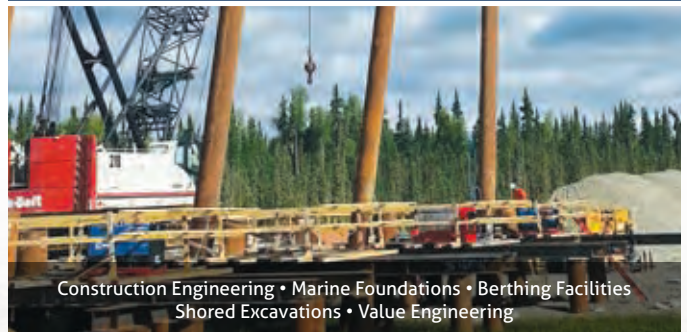


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Great or small

**American Piledriving Equipment
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By George R. Compton III, Construct Marketing LLC

American Piledriving Equipment, Inc. (APE) is now 20 years old. That may be hard for many to believe, but the one-time industry upstart has been around since the days of Windows 3.1 and *Wayne's World*. Since then, the Kent, Wash. manufacturer has been on the largest and the smallest projects in deep foundations. 20 years in, the company still acts like the hungry start-up every day. Large job or small, the approach is the always the same: quality and service.

A longtime customer of APE illustrates:

"It was a small, single span bridge project in Mayport, Fla. in Duval Country. We had to move a 100-ton crane into the public right away with three piles to go on the job. We got two piles down and on the last pile, the hammer wouldn't get capacity," said Wayne Waters of Ed Waters & Sons Contracting Co. Inc. of Jacksonville, Fla. "All of a sudden, the hammer went out on us. Some issue with the rings."

APE Southeast's Wally Brumsey recalls that day.

"I got a call from Wayne Waters one day who was stuck with a down diesel hammer and one pile to go on a bridge job," said Brumsey. "We had a hammer just come back from a job and we were getting it ready for the next job in a few days. The service guys took the situation under control and

had the hammer on a truck that afternoon."

Waters affirms the story. "At 7 a.m. the next morning, a truck pulled up with a substitute hammer and we drove that pile home. Wally's shop was about 200 miles away, and he's been known to come in a pinch with parts or a service tech, but a new hammer? You can't ask for much better service than that. Everybody can match price but it's hard to match good service," he said, adding, "That's the most recent example, but there have been many."

Good service has been a cornerstone of APE's progression over the years.


"The branches in Stockton, Calif., St. Peters, Mo., Sayerville, N.J., Mulberry, Fla., Conroe, Texas, Gonzales, La., Virginia Beach, Va., the headquarters in Kent, Wash. and the people that work in those branches are the key to APE's success," said APE president, Dan Collins. "Counting service managers and offices in Asia, Europe, South America, the Caribbean, Canada, Mexico and the U.S., APE can get a tech with a wrench on a job anywhere in the world in no time. We're quite proud of that."

Expanding further

New branches in Edmonton and Brazil opened in 2013. In Edmonton, the APE Canada Branch will be lead by 20-year APE veteran Larry Mulanax, previously APE's

Continued on page 87





“You can’t underestimate the value of PDCA. The opportunity to cross paths with our clients off the job site and discuss their contractor’s perspective gives us the opportunity to see things from a different point of view.”

— Dan Collins, President, APE

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equipment manager in the Kent headquarters. The branch will be on the north side of Edmonton, Alta., at 9004 Yellowhead Trail.

The Brazil branch just opened this fall in São Paulo. With 30 years of work in pile driving and deep foundations, 10-year APE veteran Jim Casavant continues his work in South America and has been named as the Brazil branch manager and South America sales manager.

In early 2013, APE signed a deal with Grupo Trasca of Mexico to provide better reach and service to the deep foundations “contratistas” in Mexico. APE Mexico will continue to be present on job sites in Ecatepec, Zapopan, Culiacán, Mexico City and across Mexico as they have for the past several years. The agreement with Trasca opens a new channel to market and provides APE Mexico a chance to spend more time in the field and less time in the office. Director de Ventas Mexico, Franki Segura, is certainly pleased about the opportunities the partnership brings.

“Trasca has 22 branches across Mexico. This distributor agreement is a different approach for APE, but when we looked at what the APE customer in Mexico required, it was clear that service

and accessibility was the primary need,” he said. “Our partnership with Trasca allows us, APE Mexico, to put the focus where it is needed most – on the job site.”

One-stop shop

APE has transformed itself into a veritable hardware store for deep foundations contractors over the past 20-plus years, offering diesel hammers and vibros, wick drain

equipment and hydraulic impact hammers, low-headroom and restricted-access pile drivers, drills, augers, rigs, leads, parts and more.

“We have customers with a pure pile driving mindset. We love ‘em. We will have every answer and tool and part they require to install driven piles, or we won’t rest till we find it,” said APE vice president, Steve Cress. “We have customers that perform design-build and take on large-scale jobs and require a larger toolbox. We’ve got what they require as well and the know-how to go with it. We want them to succeed as well. Large or small, if you’re installing deep foundations, you’re our industry – you’re our people. We can be a tremendous resource.”

APE also makes it clear that everything they do is with their customers and client base in mind.

“We have developed so much of what makes APE equipment distinct by listening to our customers in the field – from how we hang our Powerpack doors to how we shut off fuel and configure electronics, route our hoses and choose components,” continued Cress. “Maybe that’s why we spend so much time there talking to contractors, field guys and pilebucks. Maybe that’s why we run the Piledrivers School out of APE’s branches for the apprentices and journeymen, too. We learn way more from them than they do from us.”

Industry organization involvement

APE also credits PDCA and other industry organizations with a large contributing factor in its success.



APE P66



The first pile for the Hong Kong Macau Zhuhai Bridge in China. Inset: The final pile for the Hong Kong Macau Zhuhai Bridge being transported to the drive location. APE won a 2012 PDCA Project of the Year Award for their innovative Octa-Kong system.

“You can’t underestimate the value of PDCA,” said Collins. “The opportunity to cross paths with our clients off the job site and discuss their contractor’s perspective gives us the opportunity to see things from a different point of view. That is something we can bring to every relationship with every client. PDCA affords us the opportunity to listen and learn with our full attention.”

New products

The J&M product line was introduced under the APE banner in 2003 to meet a need.

“APE is a premium product,” said Cress. “Our customers realize a better onsite experience with APE equipment. It is manufactured with premium materials and strict QA/QC guidelines, and that requires time. Our production quality is second to none and APE equipment includes design features that other equipment does not. The J&M equipment still maintains APE’s

commitment to premium materials and strict QA/QC, but the design is oriented to value and comparability to other industry machines. We felt our customers needed that option.”

The recent introduction of APE’s HD drill line makes possible the fast installation of high strength piles in all ground conditions. The direct drive motor drills are a powerful, versatile addition to the toolbox. On one configuration, the 200,000 ft-lbs motor is driving 11-inch steel pipe with a flight into sands; upon another, it’s using a down-hole hammer to drum through rock. The HD drill can be run with or without a powerpack.

“This is something we’re very excited about because of the versatility it gives our customers,” said Collins. “This equipment

is going to have an impact on a lot of jobs.”

Among the larger jobs APE has taken on in the past few years is the Hong Kong Macau Zhuhai Bridge project. Building on their experience with the Quadtong (four vibros linked physically by a drive shaft to sync the eccentrics, and through a single hydraulic circuit), APE developed the Octakong, a massive vibratory pile driver comprised of eight APE Model 600 vibratory pile hammers. The 500-ton piles were 72 feet in diameter, which required 4,480 tons of drive force to get down. Installed in circumference, 60 such piles formed the bulk work for each manmade island in the South China Sea, which will serve as the tunnel mouths to transition the seaway from the tunnel to the bridge spans. (For the complete project spotlight, see *PileDriver* magazine, Quarter 3 2012,

“Large or small, if you’re installing deep foundations, you’re our industry – you’re our people.”

– Steve Cress, Vice President, APE

Vol. 9, No. 3.) APE won a 2012 PDCA Project of the Year Award for their work and ingenuity on the project. It was this project that allowed APE to proudly say, “APE drives the largest

piles in the world.”

Working for their customers

On any given day, APE equipment is involved in creative adaptation to the needs of their customers’ jobs. Sometimes, this means linking together eight vibros to drive 500-ton, 72-foot diameter piles; sometimes it means hanging vibros off of air cranes and running piles through specially designed “heli-templates,” which double as power unit transports for remote access and sensitive areas.



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Last year in Wisconsin, American Transmission Company (ATC) could not access construction for new tower sites on Pine Island on the Wisconsin River when conditions did not freeze as expected. Flying APE 150s and heli-templates hit Wisconsin and drove steel cans 35 feet into the ground, saving ATC hundreds of thousands of dollars.

This year, more airborne APEs flew to the rescue on a Georgia Power transmission line project with contractor Irby Construction outside Savannah. In the saltwater and freshwater environmentally sensitive wetlands, Irby used APE 150 vibros suspended with specially designed sling to prevent spin and APE's heli-templates to greatly reduce impact from construction access. No downtime on any APE equipment was recorded on the eight-day, dawn-to-dusk job.

Another specialty of APE's, the tandem vibro, was the answer in California this fall when a pier in Richmond, Calif. required seismic retrofit. The contractor was required to cut the concrete deck, and install eight 66-inch steel pipe pile. The presence of the existing structure ruled out impact install, requiring a beast of a



Sky cranes

vibro. When fully assembled, the behemoth pile driver, nicknamed "Tandem-Kong," weighed in at 115,000 pounds, and was powered by two CAT C32 engines, combining for 2,400 horse power. Tandem-Kong boasts 23,000 inch pounds of eccentric moment, and at its rated frequency of 1,400 VPMs, has a driving force of 640 tons. GC Power Engineer of Alameda, Calif., is running the install from a barge

and is no stranger to APE equipment. At the time of the writing this article, Tandem Kong has four down and four to go.

Those "sexy" jobs make good copy, and APE obviously loves to sink their teeth into a challenge. However, it won't matter if you don't bring the same passion and commitment to service to every job, even to one little pile on a single-span bridge job in Duval County, Fla. ▼

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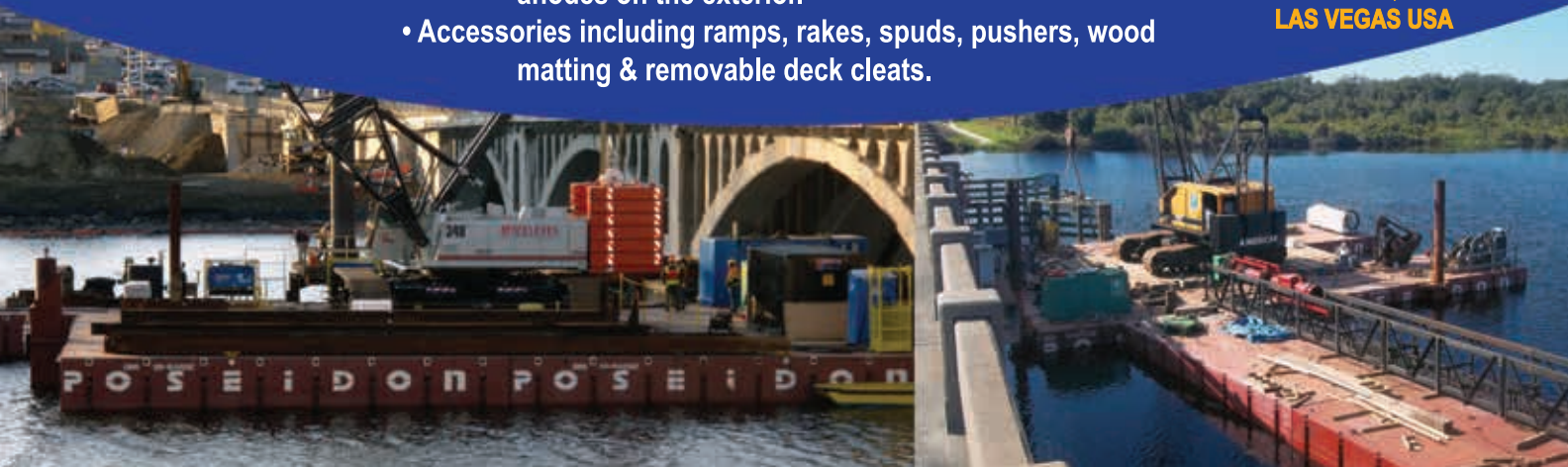
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Submitted by Florida Bridge and Transportation

Who do you call when you have a pile out of tolerance or other non-conforming construction? What about when you have a cost- or time-saving idea on your construction project that must be submitted to the owner for approval?

"We do a lot of design work for contractors," said Mark Niedermann, president of Florida Bridge and Transportation (FBT). "We design bridges all day long for the state and other clients within traditional contracts, but the really challenging projects are when we get phone calls from contractors asking us how we can help them reduce time and costs on their projects, or

how we can help them resolve an issue with non-conforming construction. That is when we get to really stretch our ingenuity."

He went on to say, "Often, we have to really sharpen our pencil and use sophisticated analysis techniques to achieve the contractors' goals. Some of our clients jokingly call us 'the cleaners' because we make their problems go away. Naturally, our solutions are based on solid engineering principles, and we never sweep things under the rug. Most of the time we determine the as-built construction is acceptable and can remain



as-is, or it can remain in place with little modification to meet the intent of the original contract plans. However, sometimes we have to deliver the bad news and tell the contractor the retrofit is going to be quite expensive."

Niedermann says it really bothers him to make that phone call to the contractor to deliver bad news.

"We enjoy being the cleaners, and we hate it when the only resolution is expensive."

That scenario happened recently on a mile-long bridge project across the

Continued on page 95

“We have a very good understanding of how to save time and money. A significant portion of our revenue is derived from redesigning other engineers’ work to make it more economical given the contractors’ equipment and abilities.”

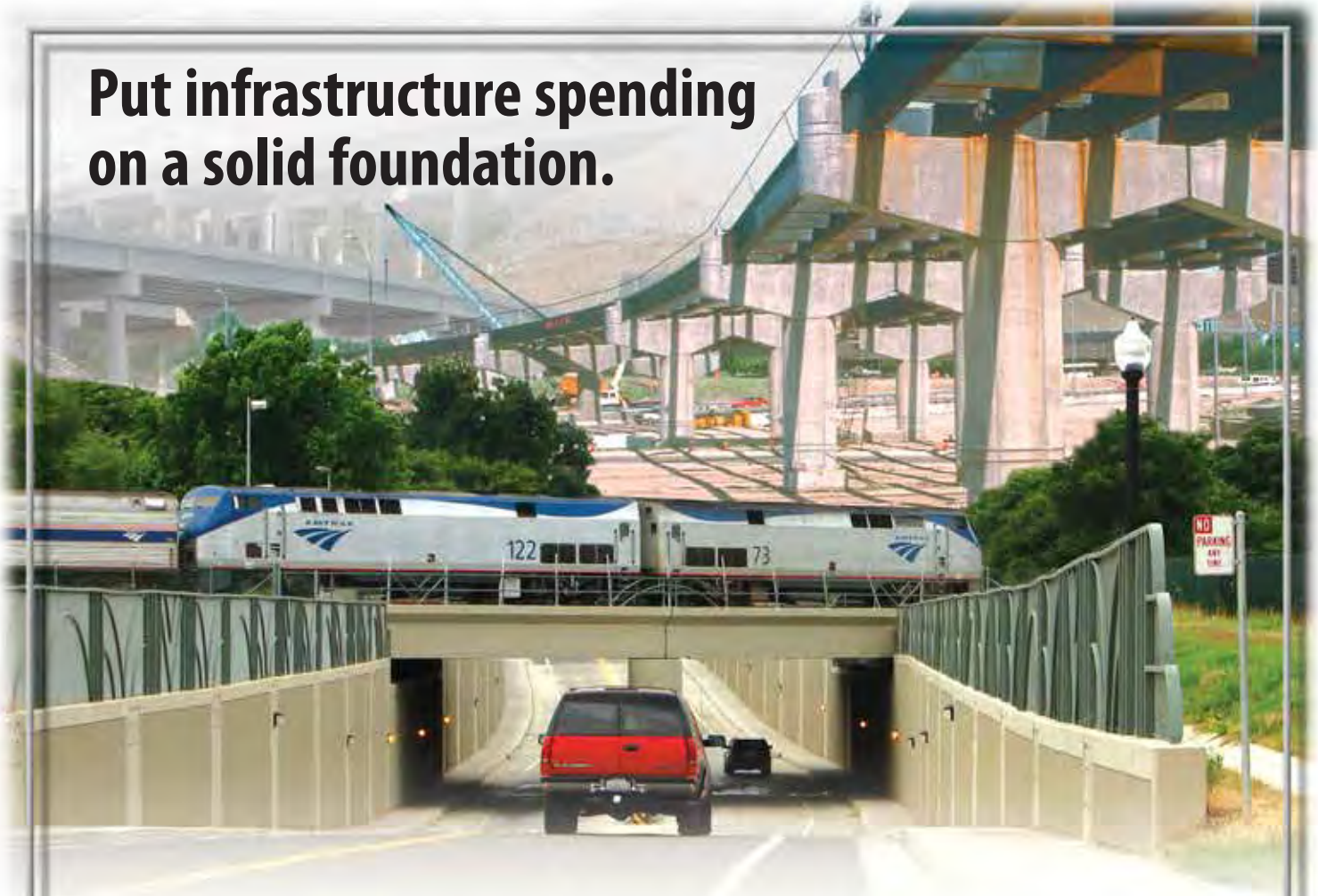
– Mike Hebert, Vice President, Florida Bridge and Transportation



FBT checked the foundation and substructure design for a runway expansion project.

Photo courtesy of Mark Niedermann

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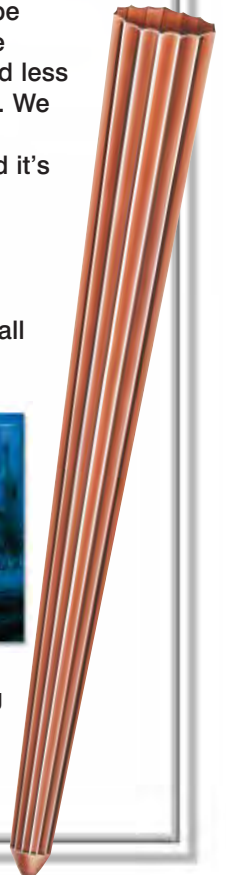
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FBT designed the cofferdam for the repairs to this historic swing bridge over the St. Mary's River

Photo courtesy of Mark Niedermann

Everglades. It was determined through dynamic testing during the pile driving that one of the piles must have crushed at the tip while driving through the dense limestone. Ultimately, the issue had to be resolved by driving two new piles perpendicular to the intermediate bent at the damaged pile to form a cross in the pile cap in order to support the load at the damaged pile.

"Typically, we can use the results from the dynamic testing to determine what load the pile can carry through skin friction above the damaged area, then perform calculations that show the particular pile will not receive more load than it can resist," explained Niedermann. "The required pile loads in the plans are for the worst-case location, and other piles within that bent will never experience that maximum load. Through sophisticated analysis techniques, we can prove that a very small amount of movement in the pile cap will shed the load to the adjacent piles. That is the benefit of the inherent redundancy in driven pile foundations. You can't achieve that result as often with drilled shafts due to the lack of redundancy, and the reduced number of foundation units within a given substructure unit."

Who they are

FBT is a civil engineering consulting firm that specializes in the design of transportation-related structures. They have been in business since 2005, and are located in Orlando,



FBT designed the temporary trestle and the bridge replacement at CR 245 over Olustee Creek.

Photo courtesy of Leware Construction Company

FBT redesigned a 400-foot-long bridge as a value engineering change proposal.

Photo courtesy of Mike Hebert

Fla. They are in the center of the state, but they cover the state from Key West to Pensacola.

"We enjoy traveling to the coastal projects. We always travel with our fishing poles in case our part of the project finishes early," said Mike Hebert, vice president of FBT. "All joking aside, being centrally located has worked out very well for us that

we can take on projects anywhere in the state with a quick response time."

FBT has a total of seven employees, most of whom are registered professional engineers. Their employees gained valuable experience working on challenging mega projects while at large national and regional firms prior to joining FBT.

"It is the best of both worlds," said

Hebert. “We have the experience base of the large national firms, but we have the agility of a small firm. This enables us to make decisions on the spot. We don’t have to get clearance from the home office in another state.”

This flexibility has factored into their significant success as a company.

“Not all of our design work is addressing non-conforming construction,” said Hebert. “We have redesigned many bridges and structures through the value-engineering process as a change proposal. That is another benefit of doing so much work directly with contractors. We have a very good understanding of how to save time and money. A significant portion of our revenue is derived from redesigning other engineers’ work to make it more economical given the contractors’ equipment and abilities.”

Recently, FBT worked with a contractor to redesign the foundations for a bridge replacement project on SR 79 south of Vernon, Fla. where the soil conditions were highly variable. The use of steel piles in lieu of concrete piles reduced the time and risk associated with the potential need for splicing concrete piles.

“We determined there would be a



FBT designed the cofferdam for the crane surcharge load for a bascule bridge on the Miami River

significant savings by changing the span lengths and the pile loads to take advantage of the foundation redesign,” explained Hebert. The bridge was completely redesigned in a short period of time, and the owner approved the change proposal.

Being proactive

“Many contractors approach us with proactive planning early in the schedule,” said Niedermann. “We help the contractors develop their approach to the construction. Recently, we helped a contractor with

design-related issues as they planned the construction of a bascule bridge replacement on the Miami River. We helped design a relieving platform so the loads from a 300-ton crane would not overstress an existing seawall that was to remain in place. We also designed the temporary cofferdams for the bascule piers so the same 300-ton crane could sit right behind the cofferdam to reduce the reach during pile driving. The layout of the project site was so tight, there was no other place to put the crane but right behind the cofferdam. The result was greatly increased earth pressure acting on the land side of the cofferdam as a result of the crane with the heavy lift.”

On a different project for this same contractor, FBT helped design the cofferdam system for the repairs on a historic swing bridge, which was built in 1925 over the St. Mary’s River on the Florida-Georgia State Line just south of Kingsland, Ga. The bridge was founded on spread footings on the limestone river bottom, which was over 25 feet below the water surface, making the installation of sheet pile cofferdam very challenging. Further complicating the construction of the cofferdam, the sheet pile could not be driven on one side of the pier under the fixed span approach. The contractor conceived an innovative means of floating in the side of the cofferdam under the fixed span, and FBT designed ground walers top and bottom to brace that side. Additional bracing was designed to hold down the seal concrete by using the existing pier as a reaction point. This enabled the contractor to dewater inside the cofferdam and perform the concrete repairs to the pier.

FBT has performed numerous design projects with Lucas Marine Acquisition Company doing construction in a marine environment. These projects include bridge

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FBT designed the cofferdam for the crane surcharge load for a bascule bridge on the Miami River

Photo courtesy of Mark Niedermann

crete piles at six-foot centers in a triple row in most locations.”

A recent project with Leware Construction Company involved a 450-foot-long bridge replacement in an environmentally sensitive area. In order to build the project, FBT worked with Leware to design a temporary trestle so the bridge could be built with top-down construction. The temporary trestle consisted of two 24-inch steel pipe piles per bent, with three W33x141 beams under each crawler track supporting timber mats.

“We reverse engineered the temporary trestle to work with the steel sections that

Leware had in their yard,” said Hebert. “In the end, it was a very economical solution.”

Relationships with contractors are one of the most important aspects of FBT’s success.

“We wouldn’t call ourselves the contractor’s best friend, but I know a lot of contractors have us on speed dial. I believe that at least makes us the contractor’s friend. Especially when we show up on the job site with coffee during night work,” Niedermann joked. “We have learned so much from them over the years, and we are very grateful for how they have included us in their projects.” ▼

replacements, elaborate timber boardwalks, port facilities and jetty extensions. An example project is the Boynton Beach Inlet at the Atlantic Ocean. In order to economically gain access to extend the jetty at the inlet, FBT worked with Lucas Marine to design a trestle that straddled the existing jetty with 24-inch diameter pipe piles and used a work platform over the top. This allowed Lucas Marine to walk along the jetty with a relatively small crane, not have to fight the currents at the inlet and have longer reaches with larger cranes while working from barges. On another typical project, FBT worked with Lucas Marine to design a ramp trestle with a movable section at Ft. Pierce Marina so Lucas could load barges by driving a front-end loader over the seawall to the anchored barges for a reef construction project. The ramp trestle ensured the existing sea wall would not be overstressed, and to avoid impacts to sea grasses near the dock.

Juan Valenzuela, FBT’s senior engineer, discussed an example of another unique project by stating, “FBT provided design review of the foundations and substructure units for a large runway expansion project at an international airport. The runway extension included spanning over a state highway and a railroad next to the airport property. The design for these highly skewed bents and piers included a complex design due to the extreme loads. The design of the runway included a 100 percent dynamic allowance from an A380-800 Airbus load, which is over 1 million pounds. Certain spans were designed with life-safety provisions similar to tunnel criteria due to the overall width of the runway, and included continuous wall-piers, which were three feet thick due to the significant loads. They had 24-inch prestressed con-



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A Canadian Specialist

MEG Consulting Limited offers its expertise around the world

Submitted by MEG Consulting Limited

MEG Consulting Limited (M+EG) is a specialist consultant based in Richmond, B.C., Canada. Their areas of expertise are related to marine and earth geosciences, the first letter of each explaining the company's name.

M+EG was established in 1997 with the objective of providing geotechnical expertise for both onshore infrastructure and offshore oil and gas projects. Much of the work the company performed initially was overseas; however, since 2004, M+EG has actively developed a local presence in the Lower Mainland of British Columbia and has been fortunate to have worked on some of the most prestigious projects that have been developed in the region. At present, their workload is generally distributed between both Canadian and overseas projects.

M+EG is an employee-owned company, with 15 full-time staff and a number of additional contract personnel. Their geotechnical testing laboratory is also in Richmond.

M+EG has a group of engineers with a varied background of experience and qualifications.

All senior personnel have Ph.D.s and have over 25 years of geotechnical experience. Principal

engineers have more than 20 years of practical experience in a wide range of engineering projects both in the Lower Mainland and overseas. They also have a group of talented intermediate and junior engineers who have experience working on diverse and challenging projects, whose technical acumen is regularly honed by attendance at conferences and courses.

Through links with a wide range of consultants and contractors, M+EG is able to offer comprehensive services for a complete range of geotechnical projects. They have agreements and partnering relationships with leading industry experts on a project-by-project basis, as well as with other similarly structured consultants and contractors.

M+EG has developed a flexible approach to its method of operation to meet client's demands by multi-level partnering. Based on this, they have been able to participate in many projects that would not normally be within the reach of a smaller-sized company. Project teams can be assembled to match specific technical and managerial requirements for individual projects.

In addition to working as an independent geotechnical consultant, M+EG has provided services in a number of different capacities as required by specific clients; the major component of the workload is where M+EG has carried out technical analysis and design for projects as a direct consultant for clients, being responsible for all geotechnical-related aspects of the projects being developed.

M+EG has developed a flexible approach to its method of operation to meet client's demands by multi-level partnering. Based on this, they have been able to participate in many projects that would not normally be within the reach of a smaller-sized company.

M+EG has also provided services as client's representative for offshore/onshore geotechnical investigations including project control, technical specifications, field and laboratory supervision and technical design review.

MEG Technical Services (MTS) is a division of M+EG that provides a geotechnical testing capability for projects being developed. MTS is able to offer the full suite of geotechnical tests ranging from basic classification and index tests, through to static triaxial and consolidation testing. All the strength and deformation testing equipment in our geotechnical laboratory is automated and computer controlled. They are also able to offer state-of-the-practice cyclic/dynamic testing of soil by means of resonant column and cyclic simple shear equipment. The cyclic simple shear equipment is fitted with bender elements for the measurement of both shear (S) and compression (P) wave velocities.


In addition to performing lab testing for M+EG's projects, MTS also performs advanced testing for other geotechnical consul-

ants. Projects involving stress-path triaxial, resonant column and cyclic simple shear testing have been performed for projects worldwide (north to south from Alaska to New Zealand, and east to west from Belgium to Chile).

MTS also provides PDA testing for steel and concrete piles, as well as instrumentation and monitoring for field studies.

M+EG has worked on a variety of projects, both in B.C. and around the world and has extensive geotechnical experience on projects that vary in both size and complexity. M+EG is proud to have been involved in several large prestigious projects in the Lower Mainland of B.C. and have been contracted by some top national and international consultants and clients.

In 2003-4, M+EG performed the site inspection, laboratory testing and engineering analyses for a large geotechnical and geophysical investigation for the development of 49 offshore platforms sites in the Gulf of Mexico. Over a period of several months, the staff grew to over 50 contract engineering staff.



Cape Horn Interchange looking east towards the existing Port Mann Bridge; new CP Overpass, under construction by Kiewit/Flatiron, in the foreground

Ongoing/recent projects

- ✦ Port Mann/Highway 1 Design-Build project – Cape Horn Segment, B.C. (as part of H5M design team working with Kiewit/Flatiron). Over 100 surcharge layouts were used in the central segment of this project to control settlement of structures built over soft organic soils and peat. Where surcharging was not possible, lightweight fills of EPS and pumice were incorporated into the design. A total of 14 bridges and approach fills, stone-column and timber-pile ground improvement, numerous walls (MSE, anchored, EPS), pile design and PDA testing were included in the scope of work within a section just over one kilometer long. Geotechnical earthquake analyses involving FLAC 2D were performed for several design levels of earthquake shaking.
- ✦ M+EG is presently working as Owner's Engineer for the Evergreen Rapid Transit Line (ELRT) and as consultant to the Concessionaire for the South Fraser Perimeter Road (SFPR), both projects in the Lower Mainland of B.C.
- ✦ LNG Terminal, Quebec – Pre-front end engineering design (FEED) and FEED for a LNG Marine Terminal in Quebec related to geotechnical aspects for several foundation design options, ground improvement requirements and seismic design considerations. Ice and earthquake loading were key design parameters for caissons on soft clay foundation.
- ✦ Windsor-Essex Parkway (WEP) Project, Ontario – Scope considers an 11-kilometer highway infrastructure project to improve traffic flow at Canada's premier trade gateway between the Province of Ontario and the U.S. The WEP Highway includes a six-lane below-grade freeway as an extension of Highway 401 and a four-lane at-grade service road network as an extension of Highway 3. M+EG was requested to provide geotechnical support to the Concessionaire – Windsor Essex Mobility Group (WEMG) – by reviewing the contractor's submittals such as geotechnical investigation and design reports, design drawings and calculations in relation to the general approach for using surcharges to control post-construction settlements along the high-embankment section of the highway.
- ✦ Underpasses at 36th/64th, Delta, B.C. – South Fraser Perimeter Road. Design contract with the Province of B.C. for the design of overpass structures in Delta on thick, soft sediments with inter-bedded potentially liquefiable sands. Surcharging of soft soils and shallow stone column ground improvement were used to provide a foundation for approach fills up to about 10 meters high. Pile design was based on API design methods combined with setup analyses and PDA testing.
- ✦ Pitt River Bridge – Geotechnical earthquake engineering analyses for abutments and approach fills at river crossing, which included the design of ground improvement to mitigate liquefaction and control lateral spread affecting the bridge foundation.
- ✦ Golden Ears Bridge – Foundation analyses for TCH/Barnston Underpass, including retaining wall and pile design.

Areas of specialization in geotechnical engineering are related to:

- ✦ Site investigation and soil characterization
- ✦ Bridges and highways
- ✦ Foundation engineering
- ✦ Marine terminals
- ✦ Offshore oil and gas infrastructure
- ✦ Earthquake engineering and soil dynamics
- ✦ Slope stability
- ✦ Ground improvement
- ✦ Retaining walls
- ✦ Soil-structure interaction
- ✦ In situ testing and instrumentation
- ✦ Field monitoring, including PDA testing
- ✦ Arctic geotechnics
- ✦ Technical review

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In addition to the above Canadian projects, they have been involved in a variety of projects around the world where geotechnical engineering and the application of cost-effective engineering design has been critical to the development of infrastructure, both onshore and offshore. A summary of projects:

- Foundation engineering for two large offshore gravity platforms in Russia
- Geotechnical investigation for LNG terminals in Canada, Peru and Mexico
- Geotechnical evaluation of foundations for wharf upgrade in Norway
- Peer review for various onshore and offshore foundation design projects
- Foundation engineering for mine plant facilities, B.C. and overseas
- Rock-socketed piles for marine terminals in Russia
- Dynamic laboratory testing for seismic zonation project in Venezuela
- Stability assessment for fill/stockpile on thick soft clay profiles in Argentina
- Ground improvement techniques for various offshore and onshore projects
- Earthquake engineering analyses for transportation and marine structures
- Onshore and marine ground improvement projects
- Static and dynamic finite element and finite difference modeling of foundations and earth retaining structures including soil-structure interaction



Initial vibratory installation of 1.83-meter diameter open-ended piles, subsequently driven using D-100-42 to design penetration, for flyover foundation on PMH1 Upgrade project

Consulting fees have ranged in value from \$2,000 to over \$6 million for project values up to more than \$2 billion.

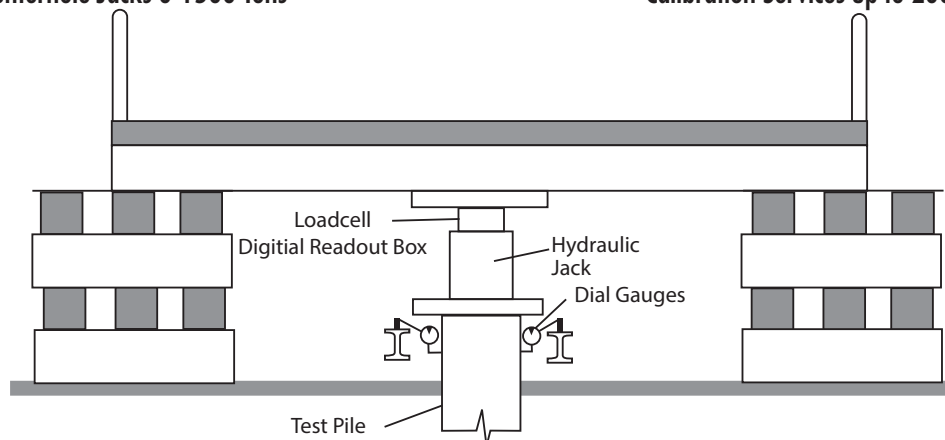
The M+EG geotechnical team can provide expertise for pre-feasibility studies through to design and construction. ▼

Photos courtesy of M+EG

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Safety First

PDCA announces the newly formed Safety Committee

By Van Hogan, PDCA, and Rusty Signor, TX Pile

PDCA is proud to announce the formation of the Safety Committee, something that has been a long time coming. The pushback to establishing this committee was generally due to liability issues that could harm the PDCA organization. The idea, expressed by one of the PDCA Board of Directors, was that if this Safety Committee enabled just one father to come home at the end of the work day who may not have due to a preventable accident, it is more than worthwhile to have the committee in place. This thought should be our motto for safety and accident prevention.

PDCA now has 10 volunteer members, representing each of the seven PDCA chapters. These members are:

- Bo Collier, Crane Tech
- Mike Moran, Cajun Deep Foundations
- James Deemer, American Piledriving Equipment
- Erich Kremer, R. Kremer & Son Marine Contractors
- Kevin Shannon, Linde-Griffith Construction Company
- Dave Coleman, Foundation Pile
- Dermot Fallon, Foundation Constructors
- Stephen Heilker, Cape Romain Contractors
- Rusty Signor, TX Pile
- Matt Houston, RSC BioSolutions

These members are to report directly to their chapters at each of the meetings to share ideas that will be a huge member benefit to pile driving contractors. At the annual Conference & Expo in Orlando this past April, Rick Marshall (Richard Goettle, Inc.) gave a general session presentation on safety. PDCA had the presentation videoed and the final production DVD has been sent to all chapters. Each chapter can distribute them as DVDs, flash drives or through email to their members.

Some of the focus areas for the Safety Committee include devel-

opment of safety guidelines for pile driving, marine safety, crane safety and environmental safety, and coordination with the GeoCoalition for a joint effort to help with developing safety guidelines. Having multiple organization participation will have a greater influence with government agencies.

The first project is to develop and print toolbox safety talk tips to distribute to the seven chapters. This inspirational idea came from our South Carolina chapter. Everyone knows that OSHA requires weekly safety meetings. For the small pile driving and marine companies, which make up the vast majority of PDCA membership, most cannot afford a full time safety coordinator. Generally, at the last minute, as our safety talk subject must be submitted with time sheets, the foreman tries to put something together. He does his best, but we all know how well things get done at the last minute.

These printed toolbox safety talk tips are in a small water-resistant binder that will fit in hip pockets of work jeans. They have over a dozen talking point areas, and a foreman can mark down the date that a particular topic was discussed. These binders will be updated as-warranted by members of the Safety Committee with input from PDCA chapters all over the nation.

Because this is also such a great marketing tool for vendors, we are going to offer them sponsorship opportunities. The national PDCA logo for the safety toolbox talks will be on one side. The other side will have the local chapter logo and the sponsor's ad and contact information. Then, the committee will distribute copies to their chapter.

The Safety Committee looks forward to making sure that they do all they can to keep each of you returning to your families every night. ▼



Some of the focus areas for the Safety Committee include development of safety guidelines for pile driving, marine safety, crane safety and environmental safety, and coordination with the GeoCoalition for a joint effort to help with developing safety guidelines.



A Tested Professor is a Driven Professor

A professor who attended the PDPI program shares his experience

By Dr. Malay Ghose Hajra, P.E., Civil and Environmental Engineering, University of New Orleans

Every other year, PDCA organizes a six-day workshop to teach university educators about the complexities of driven piles. About 25 selected assistant to full professors from all over the world assemble at Utah State University (USU) in Logan, Utah to learn, discuss, debate, share and test their knowledge of driven piles. Known as the Professors' Driven Pile Institute (PDPI), the concept was the brainchild of Dr. Joe Caliendo at USU and Dr. George Goble with Pile Dynamics, Inc. (PDI) back in 1991. The 2013 PDPI workshop was held June 23-28 at the beautiful USU campus amidst near-perfect weather conditions.

Most of the attendees travelled to Logan, Utah on Saturday (June 23) and were warmly greeted by Dr. Joe Caliendo at the reception area of the University Inn. The evening "icebreaker" gathering at the hotel was our first chance to meet with fellow weeklong classmates, colleagues and teachers, many of whom started a long-lasting, professional relationship beyond the timeline of the workshop. The next several days of the workshop also gave us an opportunity to make new friends, learn about new cultures and discuss collaboration opportunities on research projects and journal publications.

The workshop program included classroom instructions related to design and analyses of driven piles as well as field demonstrations pertaining to testing and monitoring of driven piles. Among other topics, the instructors discussed geotechnical con-

siderations of driven pile design, pile driving equipment, driven pile design process, axial and lateral static load testing, dynamic measurement and testing of driven piles, dragloads and down-drag of driven piles, soil/pile set-up and economic considerations of driven pile foundations. The attendees also used GRLWEAP and FB-PIER software programs to work on multiple real-world driven pile projects. The classroom presentations were informative and engaging, with ample opportunities for exchange of ideas and personal experiences by university and industry professionals.

During the latter part of the week, the student professors were introduced to field demonstrations covering design, installation, testing and monitoring of a driven pile foundation. Several professional staff members of A Cache, Inc., ConeTec, Inc., Desert Deep Foundations, Inc. and International Construction Equipment (ICE®) volunteered their time and resources to demonstrate site characterization procedures including drilling and sampling, Cone Penetration Testing (CPT) and energy measurement during Standard Penetration Testing (SPT) in the field. We witnessed the installation of a new steel pipe pile into the ground using a pile driving rig equipped with a diesel impact hammer. The student professors were encouraged to participate in the performance of axial and lateral static load tests, thereby gaining valuable insight about this important field procedure. Experienced staff members from Campbell Scientific, S&ME,



The group enjoyed a catered picnic in Cache National Forest during the program

As the program came to an end, most of us agreed that it was one of the best and most productive workshops we have ever attended.



The professors observed axial and lateral static load testing as well as dynamic measurement and testing of driven piles during the weeklong program

Inc., PDI and Global Check were present at the site to exhibit Pile Integrity Testing (PIT), instrumentation during pile load testing, monitoring of piles during driving as well as dynamic testing of driven piles. The results obtained during field testing and monitoring were shared and discussed with the professors on the final day of the workshop. The field demonstration segment gave the professors an appreciation for the effectiveness of a robust and structured testing and monitoring plan associated with driven piles. We were able to witness and document different aspects of the field operations, which we promised to pass along to our students in the classroom.

In summary, the workshop provided the university professors with information, literature, manuals, software knowledge and PowerPoint slides needed to teach an undergraduate or graduate level course on pile foundations. Dr. Caliendo even supplied us with an example university course syllabus on this topic. PDCA, its professional partners and the instructors did a fantastic job in stocking the university professors with a variety of tools to succeed at their universities as an effective educator, communicator and lifelong mentor to the future generation of engineers. The learning experience was definitely enriched by fancy dinners at USU Skyroom and Elements restaurant, a picnic at Cache National Forest, a cookout at the Old Main Hill, hiking to the origin of the Logan River and the Great China Wall and a daily treat of free ice cream at the Aggie Ice Cream shop.

This year's workshop was planned and conducted in a very organized, professional – but highly enjoyable – fashion that included many extracurricular activities and fun events. PDCA officers, USU administrators, professional partners and instructors were always present to provide guidance, share a personal experience related to driven piles or encourage us to be better mentors to our students. The learning professors benefitted from years of experience of their peers and mentors as well as from the

knowledge conveyed to them by the instructors. As the program came to an end, most of us agreed that it was one of the best and most productive workshops we have ever attended.

PDCA's slogan states that "A Driven Pile ... Is a Tested Pile"™. Based on my experience at the workshop, I can comfortably say that *A Tested Professor is a Driven Professor*. ▼

About the author

Dr. Malay Ghose Hajra, P.E. is an Assistant Professor in the Civil and Environmental Engineering department at the University of New Orleans (UNO) in Louisiana. He teaches undergraduate and graduate level courses in Geotechnical Engineering, Foundation Engineering and Sustainability principles for Engineers. His research interests include pile foundations, energy geotechnology, coastal geotechnology and geothermal energy piles. Dr. Ghose Hajra can be reached at mghoseha@uno.edu.



Students in the classroom at USU

Crane Safety:

The Path to Certification



Crane Tech explains the OSHA 1926 Subpart CC Crane and Derrick Rule

By Bo Collier, Crane Tech

The path to operator certification

Crane Tech recently completed a NCCCO Certification training program for TX Pile LLC. The overwhelming success of this program resulted in Rusty Signor suggesting the OSHA 1926 Subpart CC Crane and Derrick Rule and the path to operator certification would be a timely topic for an article in *PileDriver* magazine.

There is a great deal of confusion regarding the certification process and questions regarding implementation that have arisen over the new rule. When a PDCA member recently said in my presence, “Just choose one of the certifying agencies out there, they are all the same,” I took a step back and realized I had work to do.

Let’s start with what crane operator certification means, who is required to be certified and then look at some of the details that will ensure your path to certification is trouble-free.

OSHA released the Cranes and Derrick final rule (OSHA §1926 Subpart CC) August 9, 2010 with an effective date of November 8, 2010. This long-awaited rule came after more than 40 years of industry working with an outdated §1926.550 regulation held together by multiple interpretations. The new rule requires crane operators involved in construction to be certified by an accredited crane operator testing organization prior to November 10, 2014. OSHA defined the term “Accredited crane operator testing organization” in Section 1427(b)(1) as an organization that performs five functions:

- ♦ *Be accredited by a nationally recognized accrediting agency*
- ♦ *Administers written and practical tests*
- ♦ *Have procedures for operators to re-apply and be re-tested*
- ♦ *Have testing procedures for re-certification*
- ♦ *Have its accreditation reviewed by the national recognized accrediting agency*

As of this writing there are four crane certifying agencies in the United States that meet this requirement: NCCER, CIC, IUOE and NCCCO. You can already see where the confusion begins.

I have my reasons for focusing on The National Commission for Certification of Crane Operators (NCCCO, aka CCO).

Key facts about the NCCCO:

- ♦ First certification organization in this field to be recognized by OSHA and internationally accredited to ISO 17024
- ♦ Most experienced certification organization (since 1995)
- ♦ An independent, not-for-profit organization
- ♦ Largest certificated population with over 800,000 written and practical examinations to more than 150,000 operators in all 50 states
- ♦ Broadest range of crane-related certifications with 20 certifications in 10 categories
- ♦ Only certification proven to be effective in reducing accidents, deaths, injuries
- ♦ Independent of, and unaffiliated with, training in order to provide a completely unbiased assessment
- ♦ Most rigorous and effective quality assurance (QA) and audit program
- ♦ Most experienced industry experts writing and reviewing test items for soundest psychometric integrity
- ♦ The NCCCO partnered with one of the most prestigious credentialing organizations in the nation, International Assessment Institute (IAI). IAI played a crucial role in the development of the NCCCO program and continues to assist in the administration and further development of NCCCO written and practical examinations.
- ♦ Recognized by more industry associations than any other certification body

Continued on page 111

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Crane Tech put its support behind the NCCCO in 1996. We became actively involved in the early 2000s and in 2003, gained an elected seat on the Mobile Crane Written Exam Management Committee (WEMC). Since that time, our staff has volunteered on practically every committee beginning with task force through committee development. My experience of working with hundreds of dedicated NCCCO volunteers to improve safety for the material-handling field is one of the highlights of my career.

Before providing a guide to certification, there are a few additional facts that should be known about the NCCCO.

Type and Capacity – Controversy between OSHA and the NCCCO: During the early development of mobile crane operator certification, many NCCCO committee members, like me, believed operators should be certified by type and capacity. Prior to 2003, telescopic boom crane operator certification was divided by a 17.5-ton rating. In those days, you had large telescopic cranes, those with a gross rating equal to or greater than 17.5 tons, and small telescopic cranes, those with a gross rating less than 17.5 tons. Early RT cranes that had fixed cabs were generally much smaller than swing cab cranes and the 17.5-ton rating seemed to be a common separating point. As the years passed, changes in crane physical size as compared to capacity changed dramatically. The WEMC, assisted by IAI’s psychometric testing data, determined that capacity had little to do with evaluating a candidate’s ability to operate safely. In 2003, capacity was removed as a category component for telescopic boom cranes and the designation for **type** became Fixed Cab and Swing Cab.

Why this matters: Soon after OSHA released the new rule, there was concern that OSHA had misinterpreted the Cranes and Derricks in Construction Negotiated Rulemaking Committee’s (C-DAC) intent for certification. In section 1926.1427(b)(2), OSHA states, “An operator will be deemed qualified to operate a particular piece of equipment if the operator is certified under paragraph (b) of this section for that **type and capacity** of equipment or for higher-capacity equipment of that type.” During conversations with several members of the original C-DAC committee, some of whom have long served on NCCCO committees, I learned it was never C-DAC’s intent to require certification by *Type and Capacity*. Yet,

when you notice how many test methods and practices OSHA borrowed from the NCCCO, and consider that C-DAC had a strong NCCCO influence, it’s easy to see how this item simply got lost. In response to the outcry from industry, OSHA held an informal three-day stakeholders meeting in April of this year that resulted in OSHA announcing their “intent” to extend the compliance date to November 10, 2017 and to reopen rulemaking. You can be assured the NCCCO took a tactful, professional stance on this matter and held firm to the psychometric data.

NCCCO influence on OSHA: Appendix C of the final rule contains Technical Knowledge Criteria that OSHA defines as the “developing criteria for a written examination to test an individual’s technical knowledge relating to the operation of cranes.” Compare this list of topics to the NCCCO Core and Specialty Examination Outline and you will find it matches word for word, for the most part. It took NCCCO volunteers more than 15 years to develop this outline.

Calculators: There was controversy over the use of a calculator during exams. One certification company ran negative ads against the NCCCO attesting their use of calculators was correct and anyone who did not allow calculators just didn’t understand the needs of the candidate, or something to that effect. The NCCCO did not allow the use of calculators based on two separate official ASME B30.5 interpretations that “the use of calculators does *not* meet the B30.5’s requirement for crane operators to demonstrate the ability to perform the basic math necessary for accurate load chart interpretation.” According to Graham Brent, NCCCO executive director, “To have allowed calculators is a direct violation of the American National Standard.” While other testing agencies decided to ignore the ASME B30.5 interpretation and allow



Photographer: jupiterimages / Photos.com



There is a great deal of confusion regarding the certification process and questions regarding implementation that have arisen over the new rule

Photographer: Swajjeric/Photos.com

calculators during testing, the NCCCO held firm of their non-use. When the ASME B30.5 committee decided to make calculators a non-issue, the NCCCO granted their use.

So, how do you navigate through the NCCCO certification process?

The first step is to decide if you plan to have your own staff accredited as NCCCO practical examiners or if you plan to use an outside provider. If you choose to have one of your staff perform practical examinations, they must first be a certified NCCCO operator and then successfully complete a practical examiner's workshop. The next step is to decide if your company will provide your employees prep training or use an outside third-party training provider.

If you plan to use a third-party provider, you should reach out to other companies that have used an outside source for recommendations. We are acutely aware of how disappointing it is when a training provider fails to live up to their promise. Rusty Signor told me he previously hired a training provider, and later found they were not knowledgeable of lattice boom cranes or friction cranes. At that point it was too late; money was wasted and the time lost by his operators could never be recovered. So this time, he reached out to someone he knew and one of our clients, Cajun Deep Foundations LLC of Baton Rouge.

When a prospective provider says they can teach your personnel how to pass the tests, you should move on. It's not about learning how to pass a test! It's about operators passing their exams because they have the required knowledge and skill.

Be leery of providers who advertise exceedingly high pass rates for NCCCO certification. Every third party training provider is just that, a third party outsider. It takes years for a provider to know how to prepare for every eventuality to meet a client's needs. With over 35 years in the crane and rigging training business, I've seen plenty of operators with many years of seat time, but can't demonstrate more than basic skill. Sometimes, owners believe an operator's skill is a qualifier for having necessary techni-

cal knowledge. Your provider must be able to jump in the seat to demonstrate proper technique and be respectful to your operators who may need extra coaching on load chart calculations or other technical aspects of the trade.

Your provider should have someone on staff dedicated to help you navigate what could otherwise be a maze of application submissions, test site preparations, written tests and the practical test requirements. If testing is planned at your site, the provider should know what's required at every step for written and practical exams. Written exam issues such as registering your site, making sure there are a sufficient number of tables during written tests to keep candidates properly spaced and showstoppers such as not having a clock in the testing room, adequate bathroom facilities, proper lighting and a controlled access room for written exams must be considered in advance all while being constantly aware of application deadlines.

The process of written exams requires that every candidate take a general knowledge core exam. Specialty exams are required for the type of crane certification sought. Specialty exams are divided into four categories: Lattice Boom Crawler (LBC), Lattice Boom Truck (LBT), Telescopic Boom Swing Cab (TLL) and Telescopic Boom Fixed Cab (TSS). If your operators only operate lattice boom crawler cranes, they will need to pass the core and LBC written exams. Proper study materials, available from your provider, and self-study prior to the program go a long way to improving a candidate's success.

An experienced training provider should give you a fair appraisal of what to expect and be able to quickly answer your questions. For the practical exams they must be able to provide advice regarding site restrictions, crane set-up, practical exam materials, the test weight and information on the practical exam process.

Crane selection is an important decision. Lattice boom cranes must have a boom length of 120 feet (plus or minus 10 feet). Anything shorter will result in a restricted short boom certification and there are further details to be aware of.

For practical tests, you will need a CAD drawing provided free of charge from NCCCO for your crane showing the practical test set-up. When practical exams cannot be completed at the job site, a common mistake is leaving your crane on the job site and using a rental crane for the practical tests. Because CAD drawings are serialized to a specific crane, it's difficult for any rental company to guarantee a specific crane for one or two days 30 days in advance, and you cannot substitute another crane at the last minute. Place the rental crane at the job site and schedule your crane for the practical exams.

Practical and written exams may be taken in any order, but once a candidate starts the process, they have one year to successfully pass the other exams.

For scheduling flexibility, the NCCCO has established more than 300 computer-based test sites around the country. These sites administer written exams and use the same materials and time allotments as pencil and paper exams.

When only the best will do

I have seen other accredited certification providers advertise, "Just like the CCO." Are they just letting us know where they stand? There are many horror stories of companies whose certification credentials were not recognized by their customer, and that just doesn't happen with the NCCCO. The reason I put our company squarely behind the NCCCO is because they are the premier certification provider. The NCCCO has a quality control process that exceeds all others and allows us to guarantee every customer their certifications will never be denied. It's a bit self-serving – I know. ▼

If you have questions regarding certification of operators, feel free to send me an email at bcollier@cranetech.com.

Special thanks to Tony Dotto, vice president at Crane Tech, for assistance in this article.

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South Carolina

A whirlwind of information from the PDCA of South Carolina Chapter

By Jill Harris, *PileDriver* magazine

Wherever this issue of *PileDriver* is finding you right now, I hope your day is going well.

To introduce myself very quickly, my name is Jill Harris, editorial director at Lester Publications and the editor-in-chief of *PileDriver* magazine. Based out of Winnipeg, Man., Canada, Lester is the official publishing partner of PDCA.

At the end of August, I had the distinct pleasure of traveling to Charleston, S.C. to visit with members of the PDCA of South Carolina Chapter and they were so kind as to invite me to speak at their quarterly chapter meeting about *PileDriver*.

On August 25, I flew from Winnipeg to Charleston and was picked up at the airport by John King of Pile Drivers, Inc. John is also a director for the PDCA of South Carolina Chapter, and it was his idea to invite me down and show me a little bit about the industry that *PileDriver* and PDCA represent. John gave me a “nickel tour” of the city, showing me various buildings that were built on piles as well as more common attractions like the Battery, Rainbow Row and the market. For dinner that night, we met John Parker of Parker Marine and his wife, Meg, in Mount Pleasant; in an effort to experience some real Southern cuisine, I ordered

shrimp and grits. (For those unaware, Winnipeg is located right in the middle of North America, and the only option for seafood is that which has been frozen and on a truck for three days. We also don't have grits.)

At dinner, it became exceedingly clear how tight-knit the pile driving community is in that area. The theme carried through the entire few days I was there.

On Monday morning, John and I made the drive to Eutawville, S.C. to take a tour of the Cox Industrial Division Plant. There, I was welcomed into their beautiful office building by Andrea Edwards, Don Surrency and Michael Runey of Cox and also met up with Steve Hall and Van Hogan of PDCA. I was introduced to everyone in the office, and then Don gave us a brief overview of Cox's history, the company's different plants and how timber piles are processed and treated before being ready for use.

We were then given an extensive tour by the plant manager, Roger. He showed our group the kilns and explained the drying process to remove moisture from the southern yellow pine timber lengths. We also were able to see the treatment and quality testing facilities, the stockyard and branding tools. It was a wonderful experience to see



Cape Romain Contractors are currently working on a multi-bridge replacement project



Van Hogan, PDCA, and Sonny DuPre, Cape Romain Contractors

Bound



The yard at Cox Wood

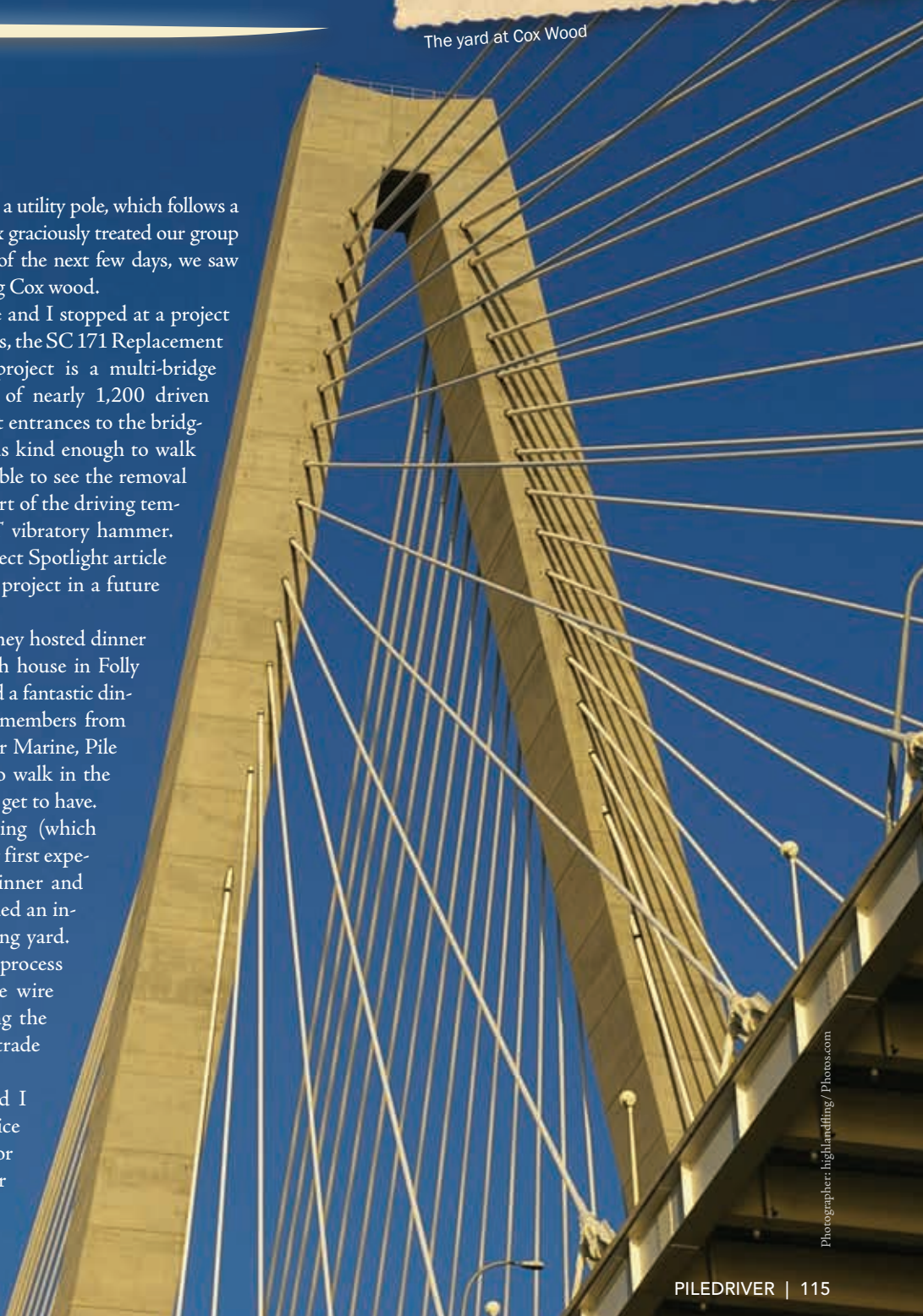
firsthand how timber becomes a pile (or a utility pole, which follows a very similar process). After the tour, Cox graciously treated our group to lunch and throughout the duration of the next few days, we saw several homes built on timber piles using Cox wood.

That afternoon, John, Van, Steve and I stopped at a project underway by Cape Romain Contractors, the SC 171 Replacement Bridge Over the Folly River. The project is a multi-bridge replacement undertaking, consisting of nearly 1,200 driven H-piles and pipe piles for the east-west entrances to the bridges. Sonny DuPre of Cape Romain was kind enough to walk us through the project, and we were able to see the removal of several H-piles that were used as part of the driving template for the pipe pile using an MKT vibratory hammer. Please be on the lookout for a full Project Spotlight article detailing Cape Romain's work on the project in a future issue of *PileDriver*.

On Monday evening, Michael Runey hosted dinner for several PDCA members at a beach house in Folly Beach. Michael's wife, Martha, prepared a fantastic dinner for the group that included staff members from Cox, Cape Romain Contractors, Parker Marine, Pile Drivers, Inc. and PDCA. I was able to walk in the ocean, which isn't an experience I often get to have.

After breakfast the next morning (which included fried green tomatoes, another first experience for me), John Parker, John Skinner and Marty Swain of Parker Marine provided an in-depth tour of their concrete pile casting yard. Marty and John Parker explained the process of preparing the beds, tensioning the wire strands, pouring, finishing and testing the piles. (I was even made privy to some trade secrets that I shall take to my grave!)

In the afternoon, John King and I stopped at the Pile Drivers, Inc. office before heading back to Charleston for the quarterly Chapter meeting. After



There are stereotypes surrounding the concept of Southern hospitality, but after experiencing it firsthand, I can personally vouch for the truthfulness to that notion.



Casting piles at Parker Marine

a southern-style dinner, I spoke to the crowd about the publishing process of *PileDriver*, including how more members can get involved and included in the editorial by highlighting their com-

panies, projects or staff members, as well as how the magazine has grown – both editorial-wise and advertising revenue-wise – since its inception in 2001.

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The sincerest of gratitude

There are stereotypes surrounding the concept of Southern hospitality, but after experiencing it firsthand, I can personally vouch for the truthfulness to that notion. I have never met so many wonderful, thoughtful people who demonstrated that they truly cared about one another and truly cared about showing me a great time.

My biggest thanks to John King, who chauffeured me around for several days, stopping whenever I wanted to take a picture or to show me something unique to Charleston or related to a pile driving job. He explained various southern customs to me, and still makes fun of me to this day for not knowing how to order tea at a restaurant. (In Canada, tea is just tea. You don't need to specify "hot" tea or "sweet" tea. It's just an understanding, and all iced tea is sweet.) I am only slightly apologetic for using you as comic relief during my presentation. You've forgiven me, *eh?*

And thank you to everyone else who went out of their way to share information with me and who opened their businesses and homes while I was in Charleston. *Y'all* are some of the nicest and most genuine people I have ever had the fortune of meeting. I appreciate the time you took to make me feel at home and for giving me that knowledge and insight into the industry *PileDriver* represents.

It was such a pleasure to be in an area that is so passionate about driven piles. The relationships between members of the PDCA of South Carolina Chapter are an amazing thing to witness: the coming together of a variety of companies – competitors, in many cases – to advance the use of driven piles wherever possible. This sharing of knowledge and information to support that common cause is what PDCA is all about. ▼

Photo courtesy of John King



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Midtown Tunnel

PDCA members joined forces for a massive joint venture project

By Lisa Kopochinski

When completed in 2016, the new \$2-billion Midtown Tunnel project in Portsmouth, Va. will provide substantial economic benefits to residents. With 500 project-direct jobs and more than 1,500 indirect jobs expected to be created, regional productivity will increase by \$250 million annually due to improved traffic flow and increased connectivity to port facilities and businesses in the region.

This increase in travel options will offer greatly improved accessibility to jobs, medical services, educational facilities, recreational activities and more. There will also be reduced emissions and congestion, resulting in a saving of fuel costs. Additionally, with the opening of the Midtown Tunnel, there will be two lanes going east and two lanes flowing west, thereby increasing the capacity for both emergency response and evacuation readiness.

The mega design-build project is an ongoing partnership of the Virginia Department of Transportation (VDOT), Elizabeth River Crossings (ERC) and a joint venture of PDCA members Skanska, Kiewit and Weeks Marine – known as SKW Constructors.

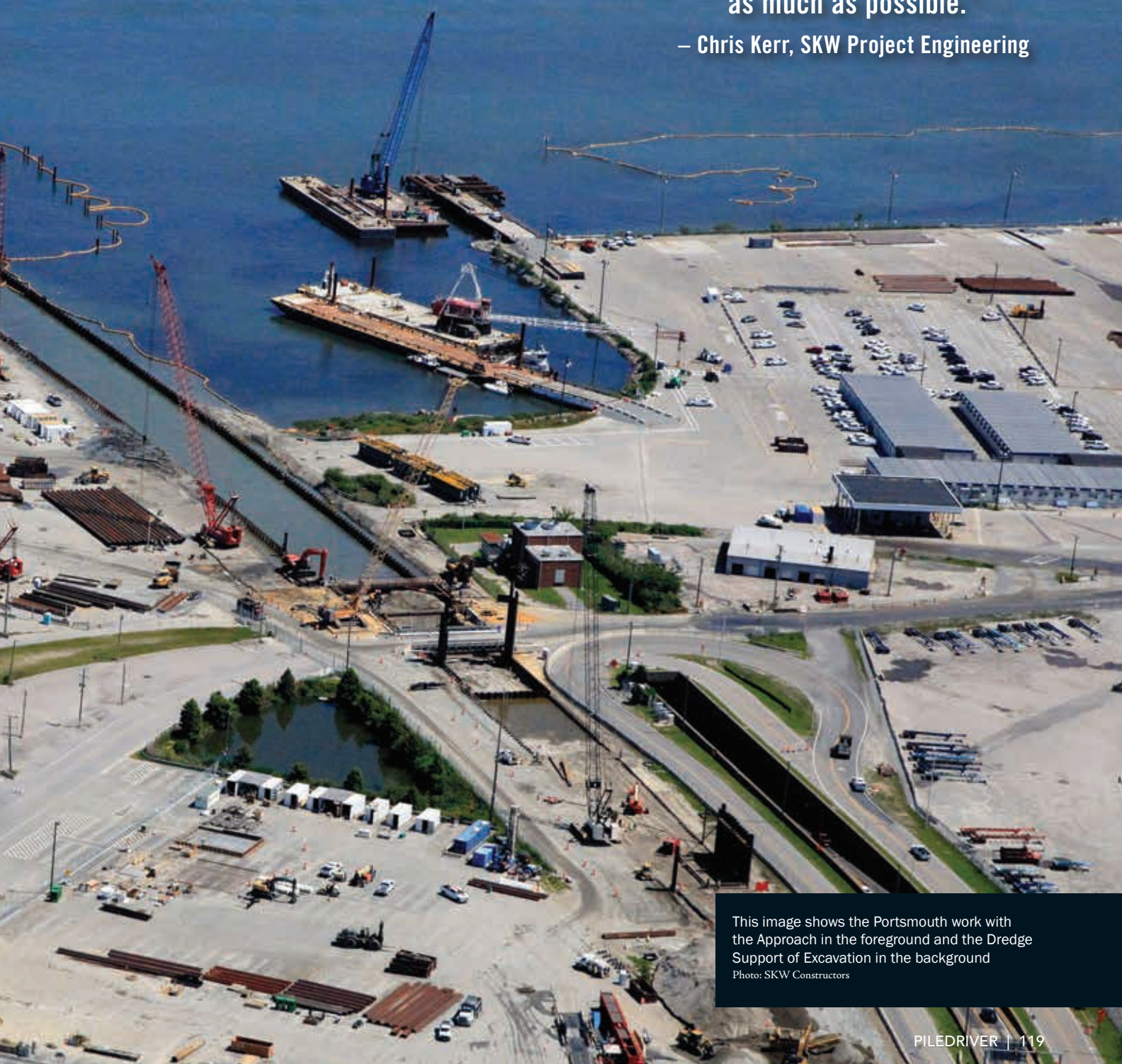
Located between the cities of Portsmouth and Norfolk, the new Midtown Tunnel will be a reinforced concrete, immersed tube tunnel (ITT). The new structure will consist of the Portsmouth Approach and Norfolk Approach, connected by a 3,800-foot ITT under the Elizabeth River. The ITT segments will be cast at an offsite facility, towed to the project site and immersed in the new alignment. The deepest cut is approximately 100 feet below sea level. This section of the Elizabeth River is a federal channel navigated by the United States Navy, ocean freighters and pleasure craft, and is part of the Intracoastal Waterway.



Triumphs

“The design was tailored to protect existing infrastructure as much as possible.”

– Chris Kerr, SKW Project Engineering



This image shows the Portsmouth work with the Approach in the foreground and the Dredge Support of Excavation in the background
Photo: SKW Constructors



A view of the king pile template

PileDriver writer Lisa Kopochinski recently sat down with the following contributors who shared their thoughts and experiences on the project: Chris Kerr, Stephen Van Essendelft and Pamela Monastra from SKW Project Engineering; Tom Fulton, Jim Hummel and Carla Coulsey from SKW Approach Group; Norm Mitchell, Rob Gianna and Matt Capell from SKW Marine Group; Leila Rice and Doran Bosso from ERC; and Karen Meyers and Lauren Hansen from VDOT.

► ***PileDriver*: What is SKW's role in this mega project?**

Chris Kerr: Skanska Infrastructure Development (Skanska ID) and Macquarie Infrastructure and Real Assets (MIRA) jointly developed this Public-Private Transportation Act (PPTA) project with VDOT to produce an exceptional transportation system that enhances quality of life while promoting planned growth and positive regional development. Skanska ID and MIRA formed ERC, which along with VDOT developed the Comprehensive Agreement and Technical Requirements, outlining ERC's responsibilities for the finance, design, construction, operations and maintenance of the Elizabeth River Tunnels Project.

Doran Bosso: The project consists of a second Midtown Tunnel, an extension of the Martin Luther King (MLK) Freeway to Interstate 264, rehabilitation of the existing Midtown and Downtown Tunnels and 24/7 operations and maintenance of the Downtown and Midtown tunnels and associated roadways. While VDOT maintains ownership of all facilities, ERC began operations and maintenance responsibilities on July 13, 2012 and will continue for 58 years through 2070. ERC serves as the concessionaire, while SKW Constructors is the design-build contractor. SKW Constructors is specifically responsible for the design and construction of the new Midtown Tunnel, MLK extension and rehabilitation and upgrades to the existing tunnels. Parsons Brinckerhoff is the designer of record for the design-build work.

► ***PileDriver*: How did SKW become involved in this project?**

Chris Kerr: On April 5, 2005, the VDOT commissioner recommended that the department pursue the procurement for the development and operation of a new two-lane tunnel under the Elizabeth River between the cities of Portsmouth and Norfolk in the Commonwealth of Virginia, and the maintenance, safety and operational improvements to the existing Midtown Tunnel, the existing Downtown Tunnels and the extension of the MLK Freeway from London Boulevard to Interstate 264. SKW Constructors pursued the design-build component of the project for six years, culminating with the signing of the design-build contract on December 5, 2011.

► ***PileDriver*: Please tell our readers about the design of the new Midtown Tunnel project.**

Chris Kerr: It is a curvilinear design with the new approaches and tunnel portals immediately adjacent to the existing portals. This alignment ensures the dredge cut does not influence the stability of the existing tunnel and eliminates the need for the support of excavation (SOE)



Photos: SKW Constructors

The installation of sheet pile between king piles

for five of the 11 ITT elements to be placed. The ITT portion of the tunnel will be founded on a screeded gravel bed, placed at the bottom of a dredged trench. Due to the proximity of the alignment of the new tunnel and the existing Midtown, a SOE system was developed to support the trench, mitigate settlement of the existing tunnel and resist movement of the existing tunnel structure. Vibration monitoring equipment was installed inside the existing tunnel. An in-house design team of professional engineers from SKW Constructors, as well as a geotechnical design firm, designed the SOE system utilizing a combination wall of HZ king piles and sheet piles. Marine excavations of up to 80 feet deep within the SOE, and a portion of the SOE wall being open sided, required a bracing system including walers, pipes struts and a tie-back system comprised of 36-inch pipe pile ("raker" pile). A 42-inch sanitary force main (SFM) on the north side of the open SOE wall was a major consideration in the design of the tie-back system.

► ***PileDriver*: What have been the design challenges so far?**

Chris Kerr: The alignment of the new tunnel passes through an active marine terminal, crosses existing port access roads and a rail line as well as descends to the river bed just north of the existing Midtown Tunnel. The approaches for the new tunnels are in close proximity to an existing 42-inch SFM and an existing 30-inch raw waterline. The design was tailored to protect existing infrastructure as much as possible.

► ***PileDriver*: Can you discuss the pile driving challenges encountered so far?**

Norm Mitchell: The pile driving activities for the Portsmouth SOE and approach foundations have concluded, with the exception of raker pile installation. Regarding marine work, the dredge SOE system consists of HZ king piles, with sheet piles driven in pairs to fill the space between kings. To install the kings, a two-tiered template was designed and fabricated. The template was capable of holding up to 10 single king pile or eight double king pile per setup. To use in a marine application, additional components were added, thus adding weight to the template. A single-tier template was utilized in some marine applications to reduce weight. King piles were driven by a land-based Manitowoc 999, a barge-mounted Clyde 32 derrick and a barge-mounted American derrick. Impact hammers and vibratory hammers were utilized to drive kings and sheets. King pile lengths ranged between 75 feet and 108 feet, weighing up to 619 pounds per foot. Sheet piles ranged between 69 feet and 95 feet and were typically driven in pairs.

Rob Gianna: The tie-back system consists of 36-inch pipe piles driven on a batter behind the sheet pile component of the SOE, and is connected to the SOE through threaded rods and walers. 36-inch pipe piles, called "rakers," will be driven on batters of 1.75V and 1H. A leads system has been designed to drive the rakers their full length of 125 feet to 162 feet, without splicing. In most locations, the raker piles are tension piles and are connected by a waler system. However, the open

Continued on page 122



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Aerial view of the interface of the Approach SOE (dry) and Dredge SOE (wet). The temporary vehicle bridge is installed in the lower right corner of the picture.

face wall tie-back system is connected by an A-frame with dywidag rods. This area of the system is offset due to the existing 42-inch SFM.

Matt Capell: SOE components were delivered via ocean freighters, which required offloading in a controlled area under jurisdiction of the Department of Homeland Security. After offloading from the vessels, SKW transported the kings and sheets onsite with extended flat-bed trailers. An inventory system and large staging area with diagrams were created to efficiently locate and manage components of the SOE.

► **PileDriver:** What types of piles were used in this project, as well what equipment (hammers, cranes, etc.)?

Chris Kerr: The pile components of the project are distinguished by two separate areas: the Dredge Support of Excavation (DSOE) and the approach sections. Both areas have common components such as king piles and sheet piles. The approach sections distinctly have the 18-inch and 24-inch concrete piles in addition to the SOE. King piles vary in length from 75 feet to 108 feet, with some double king piles weighing up to 619 pounds per foot. Sheet piles range between 69 feet and 95 feet, including multiple AZ and PZ sizes. The raker piles are 36-inch diameter, spiral weld pipe, between 125 feet and 162 feet in length. Concrete piles range between 50 feet and 80 feet in length and are either 18-inch or 24-inch square.

Matt Capell: The DSOE land equipment used for driving king and sheet pile includes a Manitowoc 888, 999 and 14000. The DSOE marine fleet includes a Clyde 32 derrick (Weeks 541), and the 150-ton American derrick (Skanska Rig 20). The floating rigs' duties include driving king pile, sheets and raker pile. Pile hammers include an IHC S-150 Hydrohammer; Dawson 4500 and 6500 impact hammers; ICE® 44 and 66C vibratory hammers; and HPSI 300 and 500 vibratory hammers.

Tom Fulton: The approach group equipment includes a Liebherr 895 with fixed leads for driving concrete pile and an HC 230 for installation of sheet piles. Hammers include an HPSI 500 vibratory hammer, Delmag D62, 33 inch x 100 feet fixed leads, 42-inch swinging leads (80 feet) and a 50,000 ft-lb Auger (50 foot x 36 inches). Custom followers were built for both 18-inch and 24-inch concrete piles.

► **PileDriver:** What are the planned milestones for this project over the next few years?

Chris Kerr: Final completion of the entire scope of the design-build contract is scheduled for August 2018. The substantial completion date of the new Midtown Tunnel is December 24, 2016. As of September 2013, SKW has completed the Portsmouth Approach 18-inch and 24-inch piles, as well as the SOE. The Portsmouth DSOE is complete, with the exception of raker piles, which are scheduled to be complete during the fourth quarter of 2013. Work began at the Norfolk Approach in July 2013, and is expected to be complete during the second quarter of 2014. ▼

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Burnside Marine Terminal Expansion

Boh Bros. and GRL Engineers team up in Ascension Parish, La.

By Jon Honeycutt, Brian Mondello, P.E., GRL Engineers, Inc. and Ron Brylski, Anthony Jacob, Grant Closson, Boh Bros. Construction Co., LLC

Impala, a global warehousing and logistics company (a wholly-owned subsidiary of Trifigura), specializes in the transportation and storage of bulk commodities such as metals, minerals and coal. Impala stores, blends and delivers the commodities using state-of-the-art storage and warehousing facilities around the world.

To expand their network, in 2011 Impala acquired Ormet's Burnside Terminal located on the lower Mississippi River in Ascension Parish, La. Reportedly, more than \$250 million have been committed for upgrades of the facility. The most significant upgrades include construction of a state-of-the-art bulk terminal for coal, bauxite and aluminum. High performance handling equipment such as a 20,000-ton Gottwald floating crane and ship loaders will be used for loading bulk solid materials into and from marine vessels on the river. Once fully operational, the Burnside Terminal will be the fourth of its kind on the Mississippi River and the only one with the possibility of both rail-to-vessel and barge-to-vessel capabilities.

The Impala acquisition has substantially increased business and economic activity locally, including hiring local residents and using local Louisiana-owned service companies and contractors. Among the various contrac-

tors performing work at Burnside, Boh Bros. Construction Co., of New Orleans, La. was awarded the West Yard Conveyor and Tower Foundations project in addition to the complex Wharf Superstructure Foundation upgrade project (Figure 1). Armed



Figure 1 – Ringer crane barge at wharf superstructure



with over 100 years of piling experience and a company-wide philosophy of quality, dedication and safety, Boh Bros. quickly mobilized to the site with numerous piling crews and heavy equipment in support of the rigorous project demands.

Boh Bros. has earned a reputation for delivering projects on time and the current Impala Burnside expansion is no exception. Since the 1950s, Boh Bros. has developed extensive pile driving experience along the Gulf Coast and lower Mississippi River, working on large projects in the refining and petrochemical industries such as Chevron's Pascagoula, Miss. plant to Texaco's Convent, La. plant when these projects were first built. Boh Bros. was the first heavy contractor in the area to acquire a 300-ton barge-mounted ringer crane and now has a fleet of four 300-ton and one 600-ton ringer barges. Boh Bros.' large marine fleet enables the driving of piles 200 feet long in one piece and weighing up to 200 tons to deliver a faster and safer project.

GRL Engineers of Louisiana was selected by Boh Bros. to be the foundation testing team for the project. The dynamic testing program confirmed the foundation design requirements and expedited the construction process.

Pre-construction GRLWEAP studies

The terminal upgrades required numerous and extensive preliminary wave equation studies be performed across the landside and waterside geologic limits of the site. In preparation for the

potentially difficult pile installations, accurate modeling of the soil, pile and hammer systems was required for proper equipment selection and stress control evaluation.

Driveability studies were performed using the GRLWEAP program to evaluate selected air, diesel and vibratory pile driving hammers. Numerous pile types were analyzed ranging anywhere from 60-inch diameter pipe piles to the new HP 18 x181 HP sections (Table 1). Maximum pile lengths of 195 feet were evaluated for the project. In all, based on the GRLWEAP output, seven pile driving hammers were approved for installing six pile types to the required tip elevation across the construction site (Figure 2).

<i>Hammer Class</i>	<i>Manufacturer & Model</i>	<i>Pile Type</i>
Vibratory	ICE 44 B	36" x 0.5" OEP
External Combustion	Vulcan 010	HP 14x89
	Vulcan 012	24" x 0.5" OEP
	Vulcan 512	24" x 0.5" OEP
Open-End Diesel	Delmag D46	36" x 0.5" OEP
	APE D62	HP 18x181
	PILECO D100	36"x0.5", 42"x0.5", 60"x0.75" OEPs

Table 1 – Approved hammers based on driveability studies



Figure 2 – PILECO D100 installing pipe piles to tip elevation on the Mississippi River

Field testing & analysis of dynamic measurements

To accommodate the dynamic testing requirements of the project, GRL used a Pile Driving Analyzer® (PDA) Model PAX manufactured by Pile Dynamics. PDA Wireless radio technology proved to be a valuable asset when multiple piling crews required “back-to-back” dynamic testing (initial driving, restrike or combination thereof). As a potential time saver, GRL was equipped with the capability to collect dynamic data for multiple piling crews from either a single location on the construction site or remotely from the office using their proprietary SiteLink® system (Figure 3). This remote system has the advantage of enabling testing at the convenience of the contractors’ schedule and eliminates any waiting for the test engineer to arrive onsite. Test data is sent remotely from the PDA onsite to the engineer in the office via a broadband internet link. The engineer has no idle time onsite and can fully observe the testing from his office, reducing travel time and expediting the reporting process.



Figure 3 – Wireless and remote capabilities of PDI’s PAX

Wireless and remote capabilities of PDI’s PAX

The wireless data acquisition technology was greatly appreciated by the onsite safety teams. The technology allowed for sensor attachment prior to lofting the piles and consequently eliminated the need for piling crew members to climb the leads prior to a dynamic test (Figure 4). Just prior to testing, hard foam “gage protectors” provided an extra “insurance” when the crews lifted and placed larger diameter pipe piles into the hammer leads.

Over the course of the project, dynamic restrike testing with the PDA was performed for all pile types. Interestingly, the restrike time duration for piles in the testing program ranged from three to 47 days, which provided the owners’ engineers a nearly complete picture of pile “setup” capacity within the site perimeter.



Typically, the ultimate static shaft capacity was determined to be 1.6 to 3.2 times the shaft capacity measured at the end of drive, with the individual setup factors converging to a value near 3 after about a one-month time period. The average site setup factor was 2.2 (Figure 5).

Figure 4 – Wireless sensor gage protector use

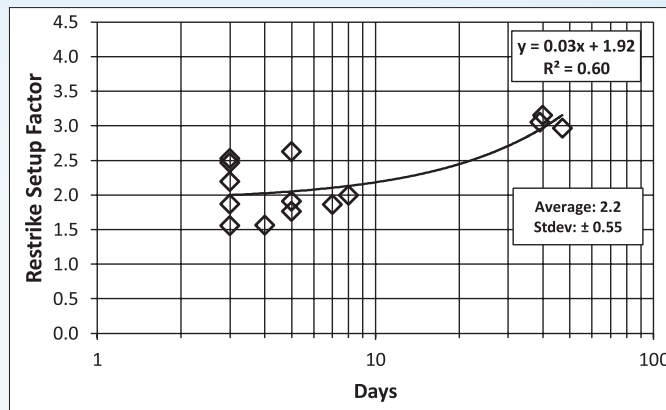


Figure 5 – Restrike setup factors for representative HP and pipe piles

The inherently critical nature of the restrike testing also required that quality measurement data be collected. As such, eight channels of data acquisition were recorded for testing the pipe piles to obtain average force and acceleration measurements over the cross section while supplying backup for crucial restrikes. The traditional four channel data acquisition proved ideal for the HP pile installations.

Following the field testing and data acquisition, the numerical signal matching program, Case Pile Wave Analysis (CAPWAP®), analyzed a hammer blow from each restrike test. Force and velocity measurements (Figure 6 top plot) are input into CAPWAP to obtain the ultimate mobilized static capacity and soil resistance distribution along the pile length and toe. The simulated static load vs. pile top and toe displacement plot is seen in the bottom plot of Figure 6.

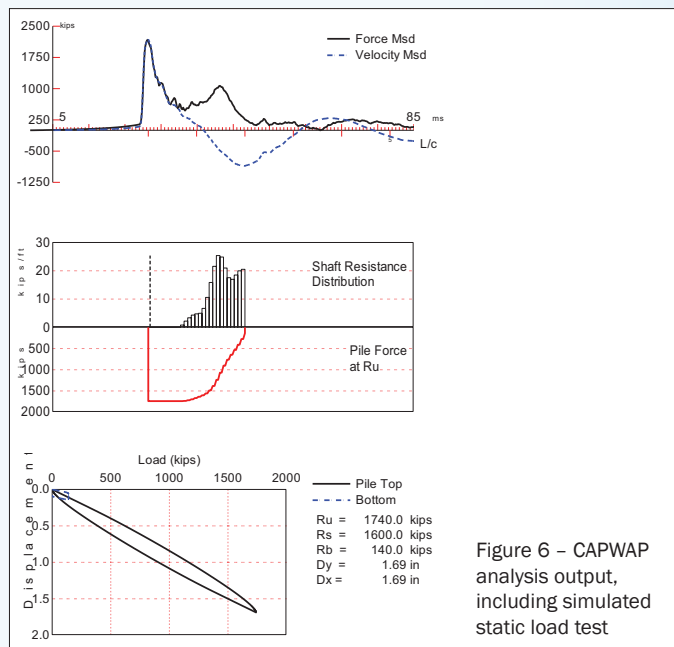


Figure 6 – CAPWAP analysis output, including simulated static load test

The Burnside Marine Terminal dynamic pile testing program resulted in considerable savings in cost and contract days to the owner compared to a conventional full-scale static load testing program of similar magnitude. Mobilized ultimate capacities exceeding design requirements for the project were obtained through this type of testing. Additionally, the selection of the dynamic testing method economically allowed for more piles to be tested across the site, allowing improved site variability assessment and providing a greater degree of confidence to the overall quality of the newly installed foundations. ▼



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Replacement of Mile Brook Bridge

Steel piles used to mitigate slope stabilization concerns for fast-paced MaineDOT design-build bridge project

By Wayne A. Chadbourne, P.E., Erin F. Wood, P.E., and Peter A. Krakoff, P.E., Haley & Aldrich, Inc.

The original Mile Brook Bridge, constructed in 1947, was a 350-foot long, three-span structure that carried Garland Road across the Outlet Stream in Winslow, Maine. As part of their annual bridge rating program, the Maine Department of Transportation (MaineDOT) determined that the bridge was structurally deficient and required replacement. The scope of the replacement project included a 325-foot-long, two-span replacement bridge along with modifications to the approach embankments, including changes in vertical roadway profile necessitating raises-in-grade of two to four feet.

Due to the relatively small size of the project, MaineDOT decided to deliver the project using a low-cost, design-build approach. Four teams were shortlisted based on qualifications and the contract was awarded to the shortlisted team that had the lowest responsive lump sum price proposal. The selected design-build team was led by CPM Constructors of Freeport, Maine. The bridge designer was Vanasse Hangen Brustlin, Inc. of Bedford, N.H. and the geotechnical engineer was Haley & Aldrich, Inc. of Portland, Maine.

Subsurface conditions

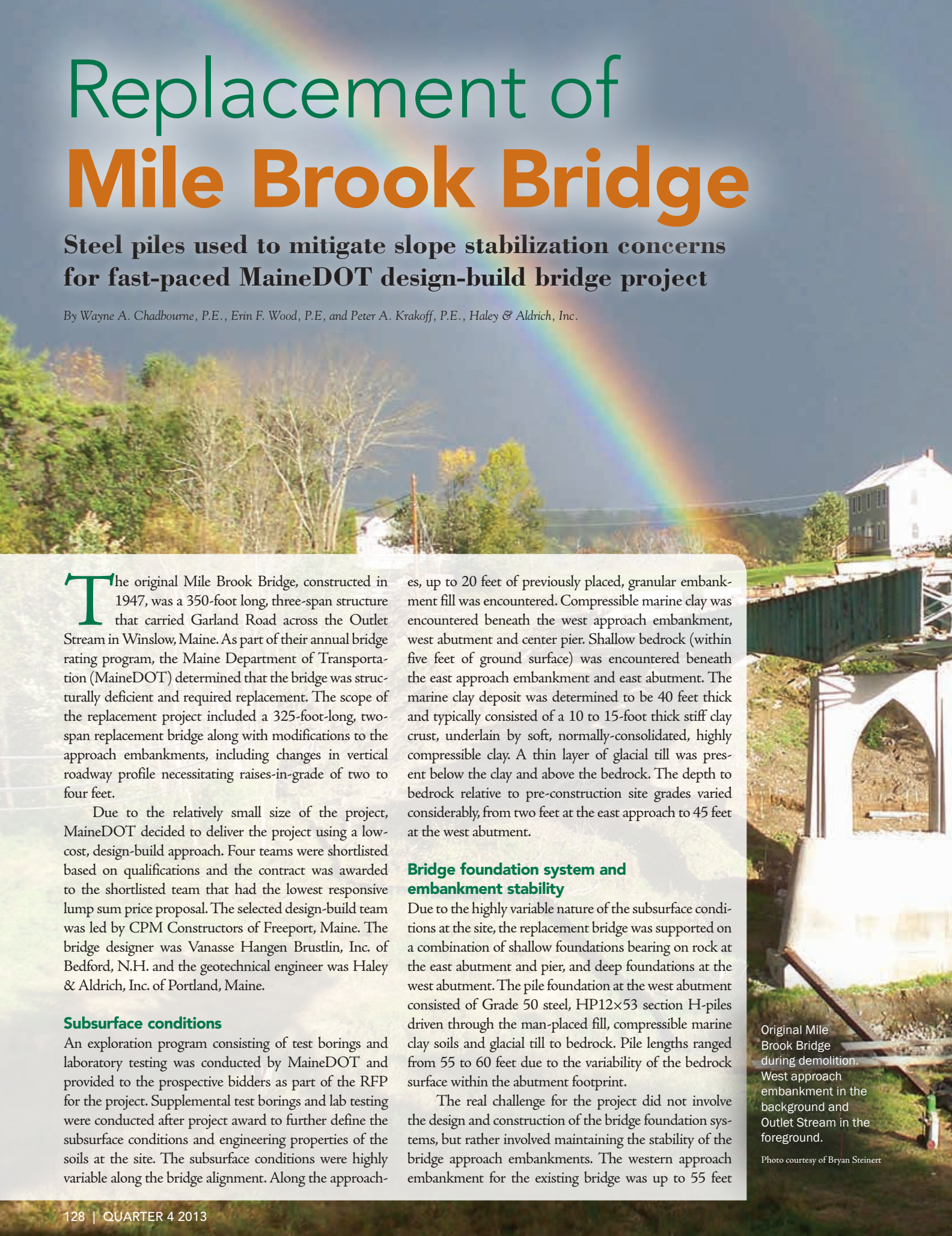
An exploration program consisting of test borings and laboratory testing was conducted by MaineDOT and provided to the prospective bidders as part of the RFP for the project. Supplemental test borings and lab testing were conducted after project award to further define the subsurface conditions and engineering properties of the soils at the site. The subsurface conditions were highly variable along the bridge alignment. Along the approach-

es, up to 20 feet of previously placed, granular embankment fill was encountered. Compressible marine clay was encountered beneath the west approach embankment, west abutment and center pier. Shallow bedrock (within five feet of ground surface) was encountered beneath the east approach embankment and east abutment. The marine clay deposit was determined to be 40 feet thick and typically consisted of a 10 to 15-foot thick stiff clay crust, underlain by soft, normally-consolidated, highly compressible clay. A thin layer of glacial till was present below the clay and above the bedrock. The depth to bedrock relative to pre-construction site grades varied considerably, from two feet at the east approach to 45 feet at the west abutment.

Bridge foundation system and embankment stability

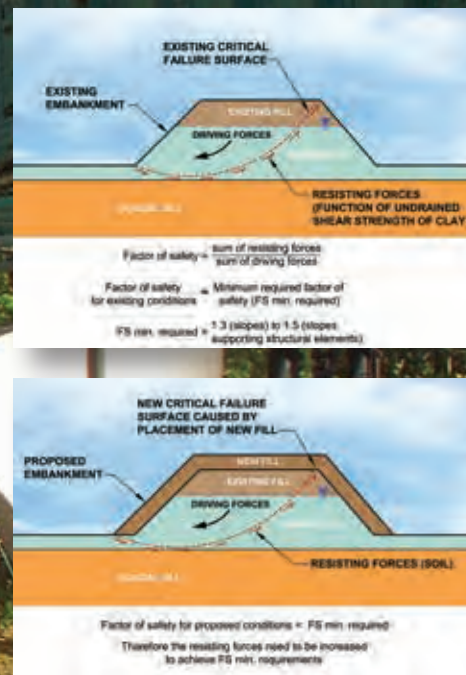
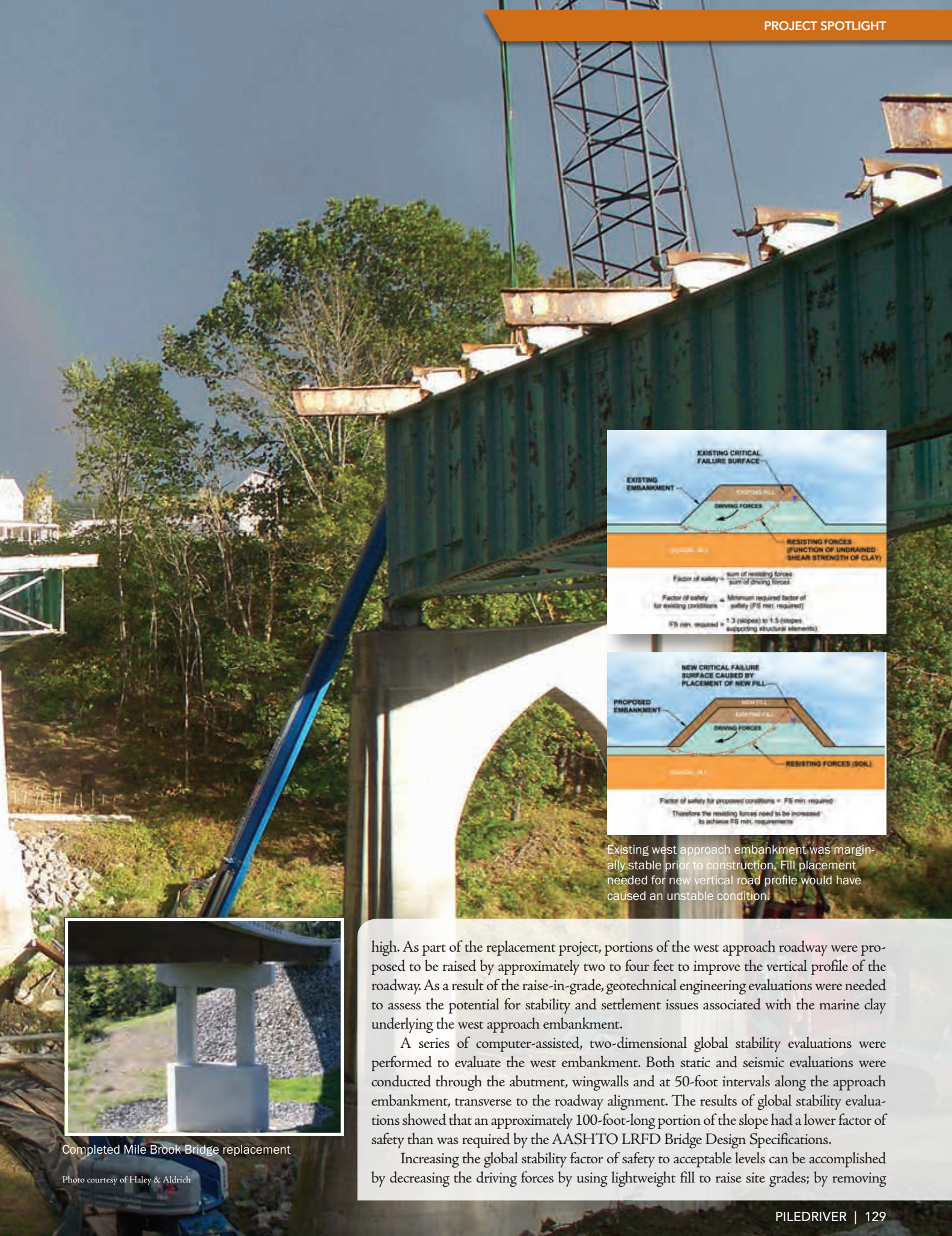
Due to the highly variable nature of the subsurface conditions at the site, the replacement bridge was supported on a combination of shallow foundations bearing on rock at the east abutment and pier, and deep foundations at the west abutment. The pile foundation at the west abutment consisted of Grade 50 steel, HP12×53 section H-piles driven through the man-placed fill, compressible marine clay soils and glacial till to bedrock. Pile lengths ranged from 55 to 60 feet due to the variability of the bedrock surface within the abutment footprint.

The real challenge for the project did not involve the design and construction of the bridge foundation systems, but rather involved maintaining the stability of the bridge approach embankments. The western approach embankment for the existing bridge was up to 55 feet



Original Mile Brook Bridge during demolition. West approach embankment in the background and Outlet Stream in the foreground.

Photo courtesy of Bryan Steinert



Existing west approach embankment was marginally stable prior to construction. Fill placement needed for new vertical road profile would have caused an unstable condition.



Completed Mile Brook Bridge replacement

Photo courtesy of Haley & Aldrich

high. As part of the replacement project, portions of the west approach roadway were proposed to be raised by approximately two to four feet to improve the vertical profile of the roadway. As a result of the raise-in-grade, geotechnical engineering evaluations were needed to assess the potential for stability and settlement issues associated with the marine clay underlying the west approach embankment.

A series of computer-assisted, two-dimensional global stability evaluations were performed to evaluate the west embankment. Both static and seismic evaluations were conducted through the abutment, wingwalls and at 50-foot intervals along the approach embankment, transverse to the roadway alignment. The results of global stability evaluations showed that an approximately 100-foot-long portion of the slope had a lower factor of safety than was required by the AASHTO LRFD Bridge Design Specifications.

Increasing the global stability factor of safety to acceptable levels can be accomplished by decreasing the driving forces by using lightweight fill to raise site grades; by removing

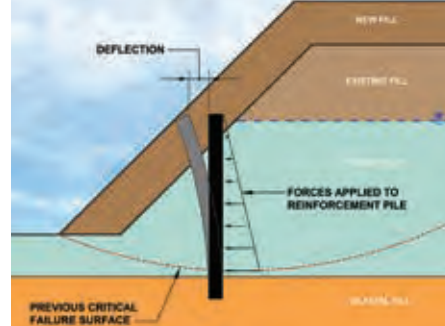


Stabilization piles advanced to depth so that failure surface shifts down below the bottom of the piles into dense glacial till. New deeper critical failure surface has acceptable factor of safety.

soil and constructing retaining walls; or by increasing resisting forces by conducting ground improvement, installing soil reinforcement elements, or constructing a resisting berm at the toe of the embankment slope. The technical feasibility and cost impact of each of these options was considered during design development. Although construction of a resisting toe berm was determined to be technically feasible and the most cost effective alternative, it was dismissed as it would have caused both right-of-way and environmental impacts. Therefore, slope stabilization piles were selected by the team as the most cost-effective alternative to alleviate the stability concerns, particularly since pile driving equipment and pile materials were already going to be used to support the bridge construction. The alternative had the shortest installation time of all the options, which was another critical factor as the project schedule developed by MaineDOT was aggressive.

Slope stabilization pile design

Slope stabilization using reinforcement piles had not previously been used by MaineDOT, but Haley & Aldrich had used the technique successfully on projects outside the State of Maine. The following design



Courtesy of Terri McElaney

Lateral pile evaluations were used to determine spacing and sizing requirements of stabilization piles such that deflections are limited to maintain pile stability (i.e., fixity at bottom of pile)

methodology was used to develop the design criteria for the slope stabilization piles:

1. Determine the minimum stabilizing force needed to increase the factor of safety to the minimum required (static 1.3, seismic 1.0) using the results of the two-dimensional global stability evaluations without reinforcing elements
2. Conduct lateral pile evaluations to determine the loads and moments in the stabilization piles when the minimum stabilizing force calculated in Step 1 is applied to the piles
3. Determine the minimum section modulus, pile size and pile spacing needed to resist the minimum stabilizing force using the results of the lateral pile evaluations in Step 2

Based on the results of the evaluations, the following general design requirements were established for the slope stabilization piles:

- H-piles need to be manufactured from minimum grade 36 steel
- Slope stabilization piles need to be installed approximately 50 feet north of the roadway centerline, near the mid-point of the slope. Reinforcing elements also need to be installed immediately behind the west abutment to provide stabilization of failure surfaces through the abutments and wingwalls
- The reinforcing elements need to be advanced to the top of the glacial till deposit
- The reinforcing elements could be installed using either vibratory or impact equipment, as long as the tip of the pile advances a minimum of two feet into glacial till. Load testing of the pile is not required.
- The center-to-center spacing of H-piles can be no greater than four times the pile diameter
- The stabilizing elements need to be installed plumb and oriented with the strong axis perpendicular to the alignment of the row of reinforcing elements

Continued on page 132



Plan limits of HP12x53, slope stabilization piles along the north side of the west approach embankment and behind the west abutment

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- Several different size and spacing options met the design requirements. The final pile size and steel grade was selected by CPM based on cost and availability

Installation

Because the west abutment was designed to be supported on HP12x53, ASTM 572 grade 50 steel piles, CPM decided to use this same pile type to reinforce the embankment (although grade 50 steel was not required). The piles were purchased from Skyline Steel Corporation of Pittsburgh, Pa. A total of 32 piles were installed to stabilize the west approach, 26 piles along the north side of the west embankment and six piles behind the west abutment and wingwalls. The piles were spaced

four feet center-to-center, driven through the marine clay and into glacial till. The reinforcing elements were installed near the mid-point of the slope and behind the proposed west abutment.

Prior to installation, CPM Constructor's earthwork crew constructed a bench along the embankment slope to provide a level work area to install the piles. The piles were installed using an H&M 1700 vibratory hammer supported by a Link Belt LS-318 crawler crane. Minimum installation depths of reinforcing piles were determined prior to installation based on the supplemental test boring obtained after project award and prior to final design. Determination of whether piles had achieved the required installation depth was based on observations made by Haley & Aldrich during construction. ▼



Installed HP12x53 stabilization piles along the north side of the west approach embankment



Installation of HP12x53 stabilization pile by CPM Constructors using an H&M 1700 vibratory hammer supported by a Link Belt LS-318 crawler crane



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New Veteran and Disabled Hiring and Employment Requirements for Federal Contractors

By Emily O'Leary, Foley & Lardner LLP

On August 27, 2013, the Department of Labor announced the issuance of new updated rules designed to further implement the Vietnam Era Veterans' Readjustment Assistance Act of 1974¹, related to the employment of veterans, and Section 503 of the Rehabilitation Act of 1973², related to the employment of persons with disabilities³. These new rules impact the hiring, employment and recordkeeping practices of all businesses that have contracts with the federal government of any significant size⁴. In addition, those affected contractors may be required to flow down certain of these requirements to their subcontractors, and so that these new rules will affect many in the construction industry working on federal government projects.

These updated rules expand upon the provisions of these two laws, which since the 1970s have prohibited discrimination of – and required federal contractors to affirmatively recruit, hire, train and promote – protected veterans and individuals with disabilities at all levels of employment. The updates set certain new numeric targets that federal contractors will have to meet in their hiring and employment of protected veterans and people with disabilities. The rules will become effective 180 days after their publication in the *Federal Register*, which at the time this article was written had not been done. Nonetheless, federal contractors can expect that both rules will likely be effective in May 2014⁵.

This article is intended to provide an overview of certain key highlights of the rules' updates and the impact that they may have on the hiring and employment practices of federal contractors. However, due to the vastly different factual circumstances that can arise between different employers, this article should not be relied upon as legal advice and an attorney should be consulted for specific legal advice specifically applicable to the new requirements. Additionally, the changes to both rules are extensive and this overview should not be considered an exhaustive list of every change.

New requirements related to veterans

Hiring benchmarks

Under the Department of Labor's changes to the Vietnam Era Veterans' Readjustment Assistance Act ("VEVRAA"), federal contractors will be required to have a written affirmative action program ("AAP") that establishes its annual hiring benchmarks for protected veterans. These hiring benchmarks notably are not meant to be "rigid and inflexible quota[s] which must be met"⁶. The OFCCP has stated that the benchmarks are not intended to be "goals"⁷. Instead, the hiring benchmarks "provide[...] a yardstick

against which contractors can measure the success of their efforts to recruit and employ qualified protected veterans"⁸.

In creating these benchmarks for federal contractors' AAPs, the rule has set forth two methods from which federal contractors must choose. The first method requires federal contractors to set a hiring benchmark that is equal to the national percentage of veterans in the civilian labor force. This national percentage will be published and updated annually by the OFCCP.

The second method allows federal contractors to create their own benchmarks that are based upon their own unique hiring circumstances and data that will be posted in a Benchmark Database from the Bureau of Labor Statistics and Veterans' Employment and Training Service/Employment and Training Administration. In doing so, a federal contractor may take into account five factors: (1) the average percentage of veterans in the civilian labor force in the state where the contract is located over the preceding three years, as posted in the Benchmark Database on the OFCCP website; (2) the number of veterans, over the previous four quarters, who participated in the employment service delivery system in the state where the contractor is located, as posted in the Benchmark Database on the OFCCP website; (3) the applicant and hiring ratios for the previous year; (4) the contractor's recent assessments of the effectiveness of its outreach and recruiting efforts; and (5) any other factors, such as the nature of the job or its location, that would affect the availability of qualified protected veterans.

Document retention

The new rule also sets forth certain requirements regarding maintenance of records by federal contractors. Specifically, federal contractors will be required to document and update annually certain data about the number of veterans who apply for jobs and that are ultimately hired. These records, along with other specifically identified records, will need to be maintained for three years. The OFCCP must be provided access to certain compliance-related documents, and at the OFCCP's option may review the documents either on-site or off-site.

Invitation to self-identify

Additionally, the new rule requires that federal contractors ask applicants to self-identify as protected veterans both before and after an offer has been made in the application and hiring process. This requirement is a change from the earlier version of the rule, which only required that federal contractors invite applicants to self-identify as a protected veteran post-offer.

New requirements related to persons with disabilities

Goals

Under Section 503 of the Rehabilitation Act, federal contractors will be required to set a goal of having at least seven percent of each of their job groups, or their entire workforce if the contract has one hundred or less employees, be made up of individuals with disabilities in their AAPs. Like with the hiring benchmarks required under the VEVRAA, the goals are not meant to be “rigid and inflexible quota[s] which must be met”⁹. But, they differ slightly in that these goals “not only serve as yardstick to measure the success of outreach and recruitment efforts, but [they] . . . also provide[...] an equal opportunity objective, based on the availability of members of the protected group in the labor force, that should be attainable if the contractor complies with its affirmative action program”¹⁰.

Document retention

The new rule also sets forth certain new requirements regarding maintenance of records by federal contractors. Federal contractors will be required to document and update annually certain information regarding hiring and employment of individuals with disabilities. Specifically, federal contractors must record (1) the

total number of applicants for employment, and the number of applicants who are known individuals with disabilities; (2) the total number of job openings, the number of jobs filled and the number of individuals with disabilities hired; and (3) the total number of job openings, and the number of jobs filled. Similarly, these records must be retained for three years.

Invitation to self-identify

The new rule also requires that federal contractors ask applicants to self-identify as individuals with disabilities both before and after an offer has been made in the application and hiring process. This requirement is a change from the earlier version of the rule, which only required that federal contractors invite applicants to self-identify as an individual with a disability post-offer. Even further, the updated rule requires that federal contractors invite current employees to voluntarily inform the contractor if s/he believes that s/he is an individual with a disability every five years, and at least once during these five-year intervals the contractor must remind its employees that they may voluntarily update their disability status.

Conclusion

The changes made to the rules for VEVRAA and Section 503 will require updates and changes to federal contractors’ AAPs,

Those affected contractors may be required to flow down certain of these requirements to their subcontractors, and so that these new rules will affect many in the construction industry working on federal government projects.





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practices and policies for hiring and for current employees as well as document retention policies. Given the breadth of these new requirements, as well as the potential time, effort and cost needed to adjust practices to comply, it is vital that federal contractors be aware of these new rules and requirements, and act proactively to begin preparations to comply, including seeking the advice of an experienced attorney as necessary to assist in appropriate development of compliant practices and policies. ▼

About the author

Emily O'Leary is an attorney with Foley & Lardner LLP practicing in Jacksonville, Fla. O'Leary is a member of the firm's Business Litigation & Dispute Resolution Practice, where she focuses her practice on varied types of complex business litigation and disputes. She may be contacted at eoleary@foley.com or (904) 359-8750.



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1. Vietnam Era Veterans' Readjustment Assistance Act, as amended (VEVRAA) at 41 C.F.R. Part 60-300.
2. Section 503 of the Rehabilitation Act of 1973, as amended (Section 503) at 41 C.F.R. Part 60-741.
3. Press Release, United States Department of Labor, US Labor Department announces final rules to improve employment of veterans, people with disabilities (August 27, 2013) (on file with author).
4. The VEVRAA and rules regarding veterans apply to employers with federal government contracts or subcontracts in excess of \$100,000. 41 C.F.R. Part 60-300.1. Section 503 and rules regarding individuals with disabilities apply to employers with federal government contracts or subcontracts in excess of \$10,000. 41 C.F.R. Part 60-741.1.
5. At the time they are effective all aspects of the new rules must be complied with, aside from certain Affirmative Action Program (AAP) requirements that the OFCCP is providing federal contractors additional time to comply with. 41 C.F.R. Part 60-300; 41 C.F.R. Part 60-741; Frequently Asked Questions Vietnam Era Veterans Readjustment Assistance Act (VEVRAA) Final Rule, United States Department of Labor (September 13, 2013) (on file with author) ("FAQ VEVRAA"); Frequently Asked Questions Section 503 Final Rule, United States Department of Labor (September 13, 2013) (on file with author) ("FAQ Section 503").
6. 41 C.F.R. Part 60-300.45.
7. FAQ VEVRAA, *supra* note 4.
8. *Id.*
9. 41 C.F.R. Part 60-741.45.
10. FAQ Section 503, *supra* note 4.

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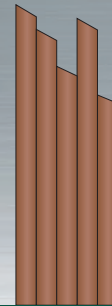
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The Early Days of PDCA

Charlie Ellis, past PDCA president and an original member, helped introduce the PDPI program

By Andrea Geary

When in college, Charlie Ellis worked as a summer intern with a highway department and watched in amazement as piles were driven into place using a steam hammer. However, that technology was about to change, and Ellis later realized he'd glimpsed the last of an era as the use of diesel hammers became widespread.

The process of accurately driving piles caught Ellis' interest, although it took many more years for him to become actively involved in the industry.

After earning a degree in mechanical engineering from the University of Nebraska, he worked in manufacturing and for the state government before accepting a job with Beatrice Construction Company in Beatrice, Neb.

"I finally honed in on what I thought my walk through life should be," said Ellis, now 78 years old.

The company was often hired to build bridges, with pile driving required on these projects. Ellis became aware of how vital correctly placed piles are to a bridge's structure.

"I enjoyed reading technical literature with regard to pile driving," he said, adding that, at that time, there were no pile driving specialists available.

In his reading, Ellis came across material written by Dr. George Goble, so he contacted him. Dr. Goble invited Ellis to join a group of about nine who met on a regular basis in the early 1970s to discuss pile driving technology and ways to make it as efficient and high quality as possible.

Ellis recalls he did more listening than talking at first.

"As time went along, they started asking me to participate in the conversation. I got a kick out of interacting with founders of what would become the Pile Driving Contractors Association (PDCA)."

Served two terms as president

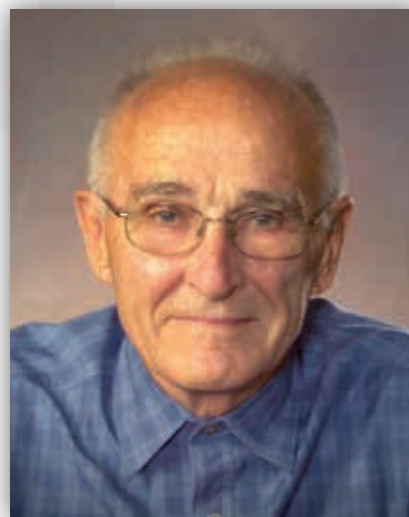
Ellis was pleased to become the first president to serve PDCA in 2000 after the original founders were at the helm. He served a second term in 2001.

"He (Ellis) was a very stable, assuring person," said Randy Dietel of Piling Inc., who also served as PDCA president in 2005. "I think he kept the wheels on in the early stages of PDCA."

It was Ellis' drive to support others involved in the industry that kept up their momentum.

"We continued to strive to offer opportunities for members (of the association) to learn within the dynamics of the pile driving industry," Ellis said.

As well, he felt it was important to teach others about the



"I got a kick out of interacting with founders of what would become the Pile Driving Contractors Association."

– Charlie Ellis, one of the founders of PDCA

industry, and helped to start a professors' course to pass on technical theory to those who would then, in turn, transfer their knowledge to engineering students across North America.

Dietel agrees that the move to transmit knowledge about the industry at the college level through the Professors' Driven Pile Institute was a valuable initiative that has paid off in terms of educating a generation of college students, and ultimately helped develop new technology to improve the industry.

Ellis says that one of the biggest challenges in the industry arises from the need to mold theoretical methods into machinery that can drive piles accurately and efficiently.

Just as he had the chance when younger to learn about the industry from experts in the field, Ellis sees knowledge transfer occurring at PDCA conventions as remaining a vital part of the association's mandate.

"I was very pleased with the willingness of PDCA to periodically make a forum available to anyone who has an interest in the driven pile to share the value of the speakers involved in the convention program."

Ellis retired from BRB Contractors, Inc.'s Topeka division in 1997, and he and his wife returned to Beatrice to live closer to their family. ▼



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Pile Driving Patriarch

Woody Ford is a PDCA pioneer

By Margaret Anne Fehr

The recent mapping of the human genome does not account for a “pile driving” gene but there may be a case to be made when considering the strong tendency that runs through the last four generations of the Ford family.

Woody Ford is the patriarch of Ford Pile Foundations located in Virginia Beach, Va. The septuagenarian’s family tree is filled with branches of numerous uncles in the 1920s and 1930s who installed piling all over the southern U.S., the Caribbean and the Panama Canal Zone, in effect contributing to construction projects that have determined the course of history in the northern hemisphere.

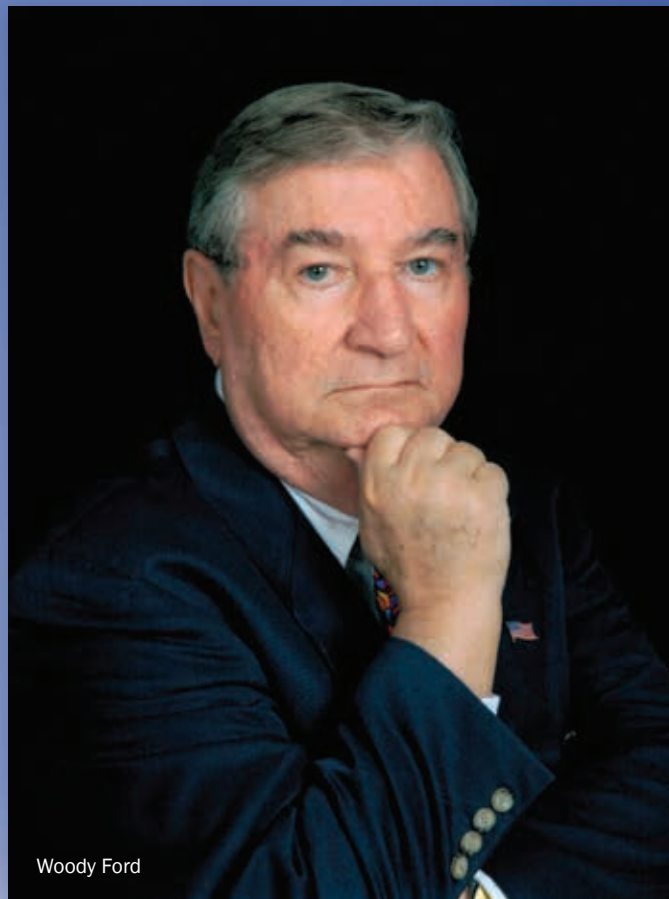
Woodrow Ford, Woody’s father, established Ford Pile Foundations in the mid-1940s and the course of young Woody’s life was set as he literally learned at his father’s knee about what it takes to run a successful pile driving contracting business.

“I was just 15 years old,” said Woody, “but the direction for my life was already in motion.”

Woody’s formal education involved three years at Old Dominion College, a division of William and Mary and Virginia Tech where he focused on math and science, subjects that laid the groundwork for what was to come, as he assumed more responsibilities in the family business.

Woody has witnessed the evolution of an industry in his 60-something year career.

“We’ve seen the piles get bigger to support larger loads. Equipment seemed primitive back then. When I went to work, we were using boilers to power the steam engines, then we switched to air and then to diesel and hydraulic hammers and that’s what



Woody Ford



“Woody knows how each piece of equipment operates; he knows how the field operates; he knows how to find the personnel; he knows how to run an office; he knows how to do accounting. So many times you get companies that hire people in special areas but who don’t have a well-rounded experience level. Woody is one of those people who knows a lot about a lot of things.”

– Wayne Waters, President, Ed Waters & Sons

we use today. It’s been an evolution of materials and equipments.”

Ford Pile Foundations has been a major player in piling driving since its very beginnings.

“We have performed projects in North and South Carolina, Georgia and Florida. Some of our projects include high-rise buildings, power plants, paper mills, hospitals, schools, bridge piling, permanent steel sheet piling and temporary steel sheet piling. We have also installed earth anchors and auger cast in place of piling,” he said. “More recently, we’ve done some large sports and concert venues here including SCOPE Arena and Chrysler Hall in Norfolk, Va.”

The Fords have been involved in projects for many companies over the years, including Turner Construction, Brown & Root, J.A. Jones, Kiewit, Gilbane, Armada/Hoffler and the W.M. Jordan Company.

Woody’s son, Trey, represents the third generation of Ford Pile Foundations but even though Woody has six grand children, he concedes that “you might as well throw your hat up in the air to predict whether any of the new generation will follow into the company. There are so many different options out in the world, but it’s always there for them, if they want it.”

Besides building a leading pile driving contracting company,

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Woody was instrumental, along with other like-minded business associates, in founding PDCA in 1996.

"A dozen of us met in Chicago at O'Hare airport one day and we discussed what we wanted to do to establish an association for pile driving contractors. So we decided to have another meeting and it led up to the eventual formation of the Pile Driving Contractors Association. A number of us chipped in some money to get things started by hiring a director and elected officers."

Nearly 20 years later, there is much satisfaction in seeing PDCA grow to the status of a national organization by fulfilling its role "as a sounding board for a lot of contractors who are in our business. We still have an annual conference every year, and we have speakers in from a vast array of fields. People get answers or can get answers if they talk to the people at the conferences."

He also speaks to the value that PDCA brings to topics of concern and regulations that could affect the driven pile industry.

"Between conferences, there are several forums such as pile testing and things that the U.S. highway administration comes out with that we discuss and give our opinion on and speak with a unified voice on the pros and cons as PDCA sees them."

Wayne Waters, president of Ed Waters & Sons and friend of Woody's since the mid-'80s, comments on the attributes that have served Woody well over the years.

"I was persuaded by Woody to join PDCA back in the day," said Waters. "I'd have to say that persuasiveness is one of his most valuable qualities. I'll never forget the conversation, because I was heavily involved in Associated General Contractors, serving on their board and their committees, and also a young father with children and running a business so I didn't have a whole lot of time for another organization. I explained that to Woody and he very eloquently talked me into helping him out."

Woody's insistence proved to work out for Waters, as well.

"The more I got involved, the more I got interested in making sure PDCA moved forward. So I consequently stayed on the board and Woody got me on some committees and pow, before you knew it, I was president. Woody was pretty much 100 percent responsible for that!"

Waters credits Woody's in-depth knowledge in every aspect of running a business for his uncommon success.

"Woody knows how each piece of equipment operates; he knows how the field operates; he knows how to find the personnel; he knows how to run an office; he knows how to do accounting. So many times you get companies that hire people in special areas but who don't have a well-rounded experience level. Woody is one of those people who knows a lot about a lot of things."

Waters added, "Woody is a no-nonsense guy who doesn't worry about the politically correct side of things. If you want the real, true answer to a question, that's Woody Ford. He'll stand up and he'll tell you exactly what he thinks without any hesitation. He speaks straight from his heart and speaks the way he feels, and lets the chips fall where they may. As a result, his opinion is valued. People listen to him."

As to Woody's current involvement with his company, he maintains a daily presence.

"Maybe I don't stay all day, or come in as early as I used to,"



he chuckled. "Recently, I suggested to my wife that we could retire and she said 'Why?' We're both 74, but we're not ready to roll over and go to sleep. Besides, the office is located just 10 minutes from our home so the commute is easy enough."

Woody has gained an uncommon perspective on an industry that has been good to him and his family and one to which he has reciprocated in kind. His advice to those who are starting out in the pile driving area is succinct.

"Make sure to have a very flexible attitude." Pulling no punches, Woody explained, "We seem to be influenced today by younger engineers who haven't had the experience of doing large projects and of what it takes to get them done. They read things in a book, but you have to take the book and you have to take the man and put them together to make the project work out. You need to have brawn as well as brains."

He also insists that it's never a bad thing to admit what you don't know.

"In this field, you can never pretend that you know it all; it's a learning process every day, just like living. You've got to look to your left and look to your right and behind you and listen to other people. Some of the best ideas we've probably received came from a man working out in the field. You get all these opinions from people who own the business but also from the people who are working for you. Never close your mind." ▼

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My Summer Internship with a Pile Driving Contractor

Working with a specialty contractor provides valuable experience for a future professional civil engineer

By Jeremy Faker, E.I.T.

I am a geotechnical engineering master's student at the University of Texas at Austin (UT), graduating in May 2014. During the summer of 2013, I was an intern at TX Pile, a local driven pile contractor in Austin, Texas.

Originally from San Diego, Calif., I graduated with a bachelor's degree in civil engineering from California Polytechnic State University San Luis Obispo (Cal Poly) in June 2010. After graduating from Cal Poly, I accepted a position as a staff geotechnical engineer at the URS Corporation (URS) in San Diego, a Fortune 500 company and global engineering firm. I worked at URS for two years before beginning graduate studies at UT in August 2012.

At URS, I was exposed to a variety of projects and construction. However, my experience with deep foundations was limited to design and construction observation of traditional drilled shaft or pier foundations. I had little exposure to driven pile foundation design and construction practice. Prior to working at TX Pile, my only experience working with contractors was from the geotechnical engineer's perspective.

After my first year at UT, I was looking for a summer internship and a new experience to develop my competency in, and understanding of, geotechnical engineering and construction practices. Clayton Signor, vice president of TX Pile and a former graduate of the UT geotechnical engineering program, offered me an internship. I thought working for a small specialty contractor would be a great learning opportunity different from my experience working for a global engineering firm inspecting contractors.

As an intern at TX Pile, I had a variety of responsibilities including administrative tasks, cost estimating, assembling bid packages, reviewing plans and specifications, marketing and business development, assisting with dynamic pile tests and performing preliminary designs, among others. A few highlights included participating in dynamic pile testing for a project along the Guadalupe River in Seguin, Texas, performing a preliminary design of a soldier pile and lagging shoring system for a 14-foot excavation for a proposed hotel in downtown Austin, performing quantity takeoffs for custom boat docks, developing an official company brochure and Statement of Qualifications, developing a PowerPoint presentation about pile driving in Central Texas presented at a Structural Engineers Association of Texas – Austin (SEAoT) meeting, sitting in on a meeting with the City of Austin regarding an environmentally sensitive project, and attending a PDCA of Texas Chapter meeting.

I learned many lessons at TX Pile that I will take with me as a future professional civil engineer. Most importantly, I devel-



Jeremy Faker, E.I.T., Summer Intern, TX Pile

oped an understanding of the driven pile design and construction process. I also learned to look outside the box of local engineering design and construction practices and the importance of evaluating every alternative to select the optimal deep foundation design. I believe I now have the capability to consider, evaluate and select the most appropriate and economical deep foundation design (driven pile and/or traditional drilled shaft foundation).

Working at TX Pile has been a great learning experience. I developed an appreciation for the specialty contractor's perspective and expertise. I have enjoyed getting to know and work alongside president Rusty Signor, vice president Clayton Signor, vice president Kevin Krueger, treasurer/secretary BethAnn Signor and office manager Amy Duke. I want to thank Clayton and Rusty for giving me the opportunity to work and learn at their company this summer. I appreciate my time at TX Pile and wish them the best in the future. ▼



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Laying a Career Foundation

Brent Robinson, P.E. of GRL Engineers, Inc. and Pile Dynamics, Inc. shares his story about getting involved in deep foundations

By Brent Robinson, P.E.

I was introduced to the profession of deep foundation engineering when I walked through the door of Frank Rausche's office, interviewing for a co-op position at GRL Engineers, Inc. I was a junior at Case Western Reserve University, studying civil engineering with a bent toward environmental engineering. I wish I remembered more about the interview, but I suppose the results matter most – Frank took a chance, and I found a career.

That co-op introduced me to stress waves, soil mechanics, driven piles, nondestructive testing and the value of international and academic collaboration. It informed my choices for the rest of my undergraduate degree, supplementing the environmental electives with geotechnical courses. Dr. Adel Saada's foundations course was fascinating, difficult and entertaining. In 1999, after completing my degree, I started full-time with GRL doing high strain dynamic pile testing and other nondestructive testing.

I saw pile driving on all its scales. We monitored small diameter closed end steel pipe piles driven with diesel hammers in New York and large diameter open end pipe piles driven with underwater hydraulic hammers offshore Saudi Arabia. We tested timber piles in Ohio, H-piles in California, concrete piles off barges in Alabama and recycled polymer piles in New Jersey. There is tremendous variation in the way our profession designs, constructs and pushes forward driven pile foundations.

While dynamic testing was in my blood, it was also clear further education would broaden my experience. When my wife matched in North Carolina for her medical residency, I went back to graduate school at North Carolina State University (NC State). Under the direction of Drs. Mohammed Gabr and Roy Borden, I learned soil mechanics, foundation design, geosynthetics and how they direct large multi-year research projects. The Constructed Facilities Laboratory's geotechnical and structural efforts in large-scale testing are also making important contributions to the practice.

NC State has a close partnership with the North Carolina Department of Transportation (DOT). With responsibility for a network of roadways from the Atlantic coast to the Appalachian Mountains, there is no shortage of geotechnical problems for the DOT to manage. I helped on projects looking at pile bent design and roadway construction techniques. What really struck me was the larger interactions between the faculty and students at NC State and the engineers at the DOT, and the partnerships that developed to push both the DOT's and the civil engineering department's efforts forward.

Returning to GRL and Pile Dynamics in 2010, I became more aware of how the interaction between universities, state and federal agencies, private engineering consultants and construction firms have significantly improved our practice. As Garland Likins and Frank Rausche described in the Member Profile in



Brent Robinson, P.E. of GRL Engineers, Inc. and Pile Dynamics, Inc.

the third quarter 2012 issue of *PileDriver* magazine, GRL and Pile Dynamics were effectively launched from research projects performed at Case Western Reserve University and supported by the Ohio Department of Transportation, the Federal Highway Administration and many, many patient pile driving contractors. The decade-long shift to design-build projects and LRFD has also created a movement toward foundation systems that increasingly incorporate set-up over time in designs, mostly at the request of designers and contractors pushing to expedite construction. I would also echo Robert Thompson's comments in this space earlier this year, in that the shift toward LRFD and design-build is leading to the driving of greater numbers of large diameter open ended pipes. The design methods and evaluation of load carrying capacity is still catching up to what we can reasonably install, and I have no doubt there will be additional research projects necessary to optimize our design of these foundation systems.

My current position at Pile Dynamics allows me to discuss dynamic testing methods and operations with people all over the country and around the world, in conjunction with PDCA. Again, the applications of the technology to a country or region's typical

construction practices always show surprising new ways of thinking and new applications.

Our efforts to keep GRLWEAP up-to-date also put us into contact with the members of the hammer manufacturing community. They keep us on our toes with their constant improvement and changes to their fleets of hammers. As we redevelop increasingly urban environments, we are seeing these manufacturers adapt to the more stringent construction requirements with variable energy hammers, noise mitigation devices and improved methods of quality control. PDCA has also helped with this, developing noise and vibration databases to help its members fairly evaluate driven piles for potentially tightly controlled sites.

But all that is what I do as an engineering professional. Angela, my wife of almost 10 years, and Sonia and Julia, my six- and one-year-old daughters, share in these experiences directly or indirectly. They tolerate my identification of diesel hammers on road trips and are always happy to see me when I come home after being away for business. We enjoy traveling together, sharing movies and visiting Cleveland's world-class museums and other cultural resources.

All in all, it is my pleasure to be a part of the vibrant and constantly interesting profession of deep foundations. I always enjoy seeing the new situations our clients are encountering on their projects, working out the puzzles of how best to model these situations and trying to convey what we learn to the broader engineer and contractor community. I also appreciate the efforts of those who keep PDCA running, as the volunteer efforts of its members and the significant efforts of its staff require energy and time. I look forward to continuing GRL and Pile Dynamics' long commitment to improving pile driving practice through PDCA. ▼

I saw pile driving on all its scales. [...] There is tremendous variation in the way our profession designs, constructs and pushes forward driven pile foundations.

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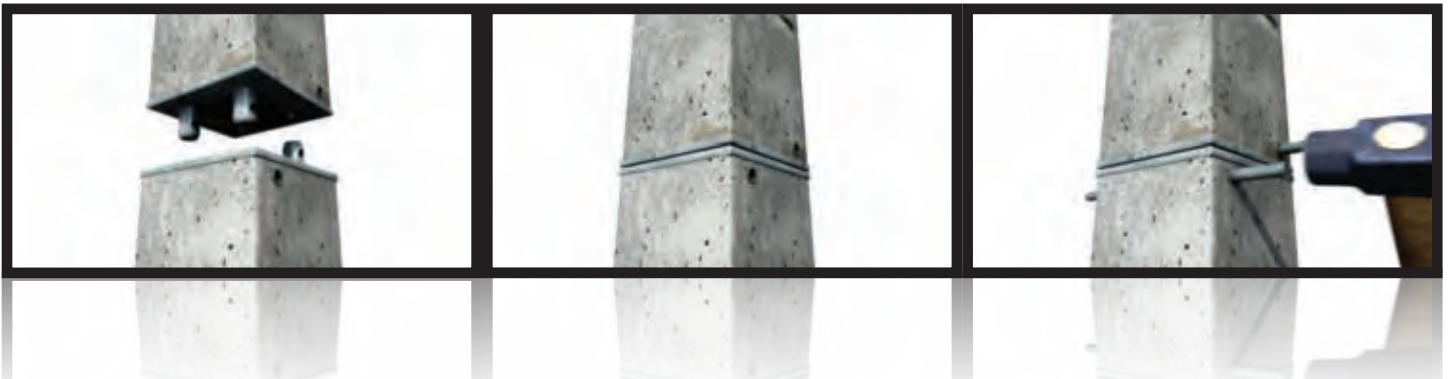


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The Future of the Pile Driving Industry

LPG TANKERS TERMINAL

CIPORT SA, PDCA member since 2001, works on a project for a division of the Ecuadorian Navy

By Francisco Miranda, CIPORT SA

Introduction

Liquid petroleum gas (LPG) is imported to Ecuador in tankers that discharge into a large ship that is at anchor in the Gulf of Guayaquil. The conditions of the Estuaries and the lack of depth does not make it possible for the large gas tankers to berth and moor on a pier. The operation of renting a large cistern ship and have it filled regularly by smaller gas tankers is not only a costly operation, but the country has a reserve of only a few days in case something happens to the supply. It is for this reason that the Ecuadorian government decided to build an LPG gas tanker terminal in Monteverde in the Pacific Ocean, with storage on land

and with a capacity to store enough gas for a 60-day reserve. The gas is pumped from Monteverde via a gas pipe to the city of Guayaquil where it is transported to the rest of the country via trucks.

The marine terminal main contractor

The project in Monteverde was assigned by the government to FLOPEC, a division of the Ecuadorian Navy, and it was their task to contract the design and call for bids for the construction of the gas terminal and the storage plant inland.

The contract to build the terminal was awarded to the joint venture consortium

Belfi-Ciport, formed by CIPORT SA in partnership with Belfi S.A., two marine contractors from Ecuador and Chile.

The total cost of the contract at the end of the project was USD\$62 million and the total time to build the terminal was 30 months.

Description of the project

The gas terminal included an access bridge, 40 feet wide and with a total length of 4,542 feet. It is designed for a live load of a small 10-ton truck, but its main function is to support the gas pipes required for the discharge. These pipes join the operations area with the storage tanks in land.



American 9310 in gantry travel positioning pile prior to driving



Left: Service pier 110-ton crawler crane.

Right: Gantry travel 230-ton crawler crane vibrating pile with ICE® 1412B.



The manufacturing and driving of the 436 piles in 10 months was very demanding.

At the end of the access bridge is an operations platform, which is 197 feet by 132 feet wide, and was built for the installation of the hydraulic unloading arms and the installation of a hydraulic gangway to access the ships.

The terminal has two berthing slips, one capable of receiving gas tankers of up to 75,000 DWT and another for ships of up to 45,000 DWT.

The ships berth on each slip against two breasting dolphins and are moored on two mooring dolphins. Both the mooring and breasting dolphins have 100-ton quick-release hooks (QRH) with the ten-

sions on the lines monitored at the control station.

The terminal has a parallel docking system that is monitored at the control station where information as to the distances and approach velocity of the ship can be observed by the dock master and also in handheld beepers by the captain of the ship. This information is transmitted to the tugboats in charge of the breasting operation, which can guarantee that the approach velocity of the ship is within the ranges contemplated in the design and within the allowable energy absorption of the fender systems.

Continued on page 153

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Driving battered piles



General overview of the terminal (October 2012)

Pile design considerations

Due to the conditions encountered in the soil investigation campaign, the design engineers decided on two options:

a) Drilled shaft piles that would need to be much longer, as they needed to bear on the rock stratum underlying the stiff clay and sand stratums

b) Driven open-end steel pipe piles that could benefit from the skin friction of the stiff clay and tip resistance from the dense sands

The project was decided for the driven piles and the designers estimated nominal

loads in the order of 470 metric tons per pile.

The design established the dimensions of the piles at 48-inch OD, a wall thickness of one inch and lengths that varied from 60 feet to 171 feet.

The start of the project

The construction of the Maritime Gas Terminal of Monteverde, Ecuador was a task that required special and detailed evaluation, planning and execution be done in a way that all risks would be reduced to a minimum due to the characteristics of the

place, the requirements for quality environmental and occupational assurance, and also due to the strategic consideration given to the project. The project was awarded to the Consorcio Belfi-Ciport and the first piles began to be rolled from A588 grade 50 steel and transported from the plant in Guayaquil, Ecuador to the job site, located 94 miles from the city. The piles were trucked in sections of 50-foot and 25-foot lengths. The 25-foot sections were to be used at the splash zone and were coated with epoxy paint. The pile sections were jointed at the job site to maximum

Continued on page 155



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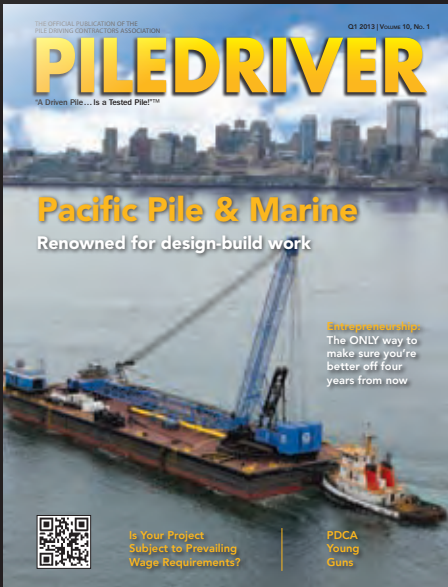
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lengths of 105 feet, and if a longer pile was required, the joint would be done in-situ.

The manufacturing and driving of the 436 piles in 10 months was very demanding. A very tight schedule was established and was met using three work fronts:

The access bridge was built using a 230-ton crawler crane on a Gantry Travel advancing, supported on the previously driven piles. The piles were driven with a PILECO D-62-22 hammer. The Gantry Travel included a template to locate the two piles per bent every 50 feet. This work front was able to drive an average of eight piles per week.

The other two driving fronts were 150-ton crawler cranes over deck barges with capacities up to 1,000 tons. These fronts would position the pile with a floating template. The barges were held in position by anchors. These piles were also driven with a Pileco D-62 diesel pile hammer on offshore leads, and production was also on an average of eight piles per week. Few days were lost due to bad wave climate.

To supply the piles, a provisional pier of 1,050 feet in length was built in order to be beyond the breaking waves and allow the loading of piles and materials. This provisional pier is capable of supporting a HS-25 truck load and a 110-ton crawler crane used for loading materials.

Final pile lengths

Due to the lack of an extensive soil investigation used in the design, it was required to use piles that on average were 40 percent longer than originally spectated. Once the consortium encountered this situation, they performed a peer review of the design and were able to recommend a lower nominal load on the piles, especially in the breasting and mooring dolphins, and by changing the batter on these piles the loads were considerably reduced. Also, the piles in the operations platform were originally all vertical, and due to the much longer length required and considering that the top 40 feet of soil was subject to potential liquefaction during the expected earthquake, it was recommended that these piles be placed at different batters. In this manner, it was not required to use more piles and the deformations of the operations platform were the same as the original design.



Provisional service pier

Pile load tests

A static load test was performed on one of the piles as well as a dynamic load test (PDA) that allowed Belfi-Ciport to establish a close relationship between the static and the dynamic load tests. A total of 81 PDA tests were performed using Belfi-Ciport's own equipment and engineers trained to obtain the information, which was transmitted to the GRL office in Los Angeles, Calif., and they produced a report of the PDA test and included a CAPWAP analysis.

The initial PDA tests indicated nominal capacities of close to 1,000 tons and this allowed for a pile driving criteria to be established in order to optimize the pile lengths and still reach nominal loads within the acceptable load factors. The piles were driven with a criterion of minimum penetration to guarantee the lateral loads and a

blow count of six per inch to guarantee the axial load capacities.

Conclusions

236 piles were driven floating and 200 piles from the gantry travel in 10 months.

The driving of piles at a distance of 1,400 meters offshore is a record for an Ecuadorian marine contractor. It is very important to recognize that all the construction methods were designed with in-house engineering, employing mainly resources found in Ecuador. The labor was mainly recruited from the villages near the project.

For the Belfi-Ciport Consortium it has been a project which has given a great sense of pride and satisfaction for the opportunity of being part of a project that in the future will be considered historical in the handling of LPG in Ecuador. ▼



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