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Truly Thinking About It, Not Much Changes!

By Herbert "Buck" Darling

By now, you may have found out who your new President is. Perhaps you haven't. One of the reasons you may not have heard this is the process that PDCA uses to transition its governance each year. Let's face it. We all subscribe to the theory that "no news is good news" at least in some form. In this case, not only is that correct, it is desired. I am happy to announce that I am leaving office a happy man. I have served the membership, a group of people that I truly believe in and like a lot. Nothing horrific happened while I was in office. The Board of Directors, the Executive Committee, the Executive Director Steve Hall, and all our committees have brought forth good ideas and have made some changes internally to better prepare PDCA for the future. We have helped some people along in their research efforts. We have been pulling off many and varied educational programs with great success, all the while planning for even more. Our committees and their Chair people have been operating very successfully, quietly carrying out their tasks mostly behind the scenes, and with great effect. The staff has been working tirelessly to assure the smooth day to day running of our organization as well as all of its events. Perhaps most importantly, despite tremendous downward pressure from all directions, I am extremely pleased to be able to tell you that your PDCA remains a viable and vital organization both financially and operationally,

ready to take on whatever is in store for us over the coming years.

As most everyone knows, none of this happens due to the efforts of any one person. I have a huge number of people to thank for making my time as your President such a meaningful and fulfilling experience. First, to Don Dolly and John King, past presidents both, to whom I looked up (and still do) and looked to as models for a successful term. Don, thank you especially, for giving me a great shotgun start at the beginning of my term with a perfectly functioning organization. Executive Director Steve Hall, there are not words enough or even existing to express my appreciation for everything you have done for the PDCA and for me personally. Without you, this could have been a very confusing and difficult year. Thanks for sorting it all out and thanks for your patience while doing so. To Lori and Laurel, our dedicated behind the scenes staff, it was a pleasure knowing that with one phone call, I could get just about any problem taken care of. No matter who answered, it was always a pleasant voice on the other end and a task well done. I want you to know how much that meant to me. To Lori especially, thanks for taking care of Steve. Without you "mothering" him into doing some load-shedding, and without you always picking up the ball and running, he would not have had the time to see to anything other than the day to day tasks. He is a better Executive

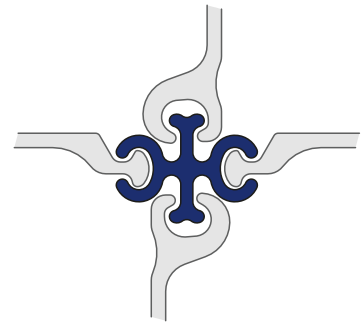
It was always about being a part of the bigger picture and giving back to the industry that has given so much to me and my family.

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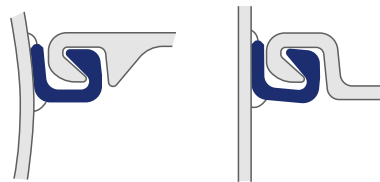


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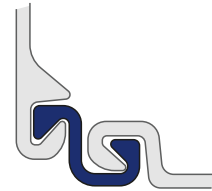


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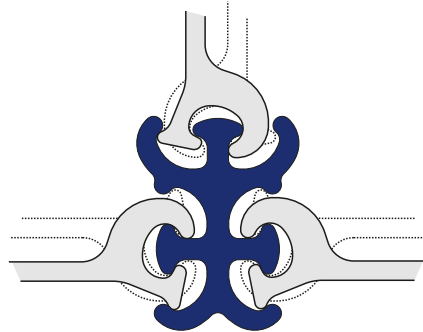


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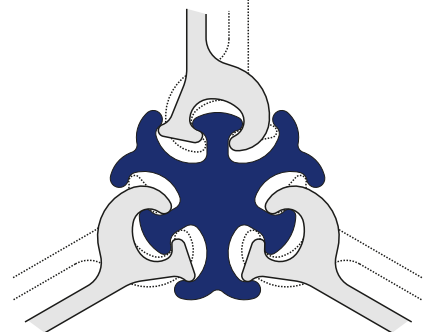


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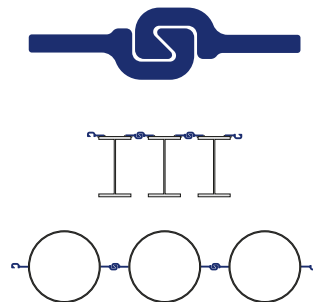


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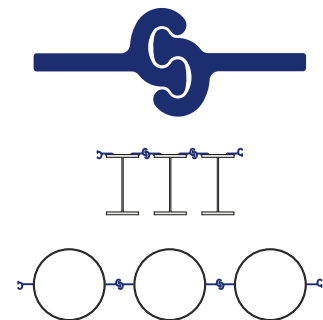


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Director for your efforts. To the Board of Directors and the Executive Committee, you have done yourselves proud over the last year. Our meetings were very timely and efficient. The many and varied personalities never once clashed over a single issue. The greater good was sought after and achieved at every turn. Your value to the PDCA cannot be overstated, nor can I overstate the friendship and cooperation that I felt at all times.

I have always told anyone who would listen why and how I came to be a member of PDCA. It was always about being

a part of the bigger picture and giving back to the industry that has given so much to me and my family. Without so many people's influence on me before I came to be President, I could have never even entertained a thought of doing so. I would like to say a final thank you to everyone who has shown faith in me and for letting me know that they thought I could help out the organization. Without you all, I would not have had this experience, and gained the knowledge that I did over the past year.

I truly need to thank my wife Inger, and my corporate partner and brother-in-law Tom Weaver (both true S/BIL's to me) for their parts. Inger picked up all the slack at home when I wasn't there; she was my trusted and knowledgeable proof-reader for everything I wrote (you can't put the blame on her for the content!) and my

sounding board on more than one issue. Tom picked up the corporate ball and ran with it during my absences or while I was taking care of other PDCA business. Without both their efforts, mine for the PDCA would have been much diminished.

I am very much looking forward to my continued involvement in PDCA activities. I can now concentrate on rejuvenating the Environmental Committee, and as the Board liaison to the Safety Committee, I hope to be able to see increased activity there as well. My new post as immediate past President will see me active in other areas of the organization as well. This is a good thing. It is all part of our legacy plan for the PDCA. Further, I cannot imagine life without the PDCA, nor do I want to after all it has given me. In the immortal words of Marv Levy, the former head coach of the Buffalo Bills, "Where would you rather be than right here right now?" Honestly? Absolutely and irrefutably, nowhere else. Please accept my many thanks to everyone for the cool ride. It was my great pleasure. ▼



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So Who is the New Guy?



By Dave Chapman, President,
Pile Driving Contractors Association

As the incoming President, I would like to answer a question I assume many of you have: So who is the new guy? My dad and I own a medium-sized heavy construction firm in Branford, Connecticut. The firm, Blakeslee Arpaia Chapman, Inc., is the successor of the C.W. Blakeslee Company, founded in 1843. We are a heavy and marine contracting company, working primarily in Southern New England and the New York and New Jersey waterfront.

We joined PDCA several years ago. One of our steel suppliers called us up and said "You really got to get involved in this organization," so we did. We had done an unusual project at the historic Mystic Seaport, so we entered the PDCA Project of the Year and we won! I was later invited to serve on the board and started to meet a lot of the members.

I joined the Technical committee, and was awed by the abilities of the members. Every meeting I felt I had learned something new. I served as secretary and vice president, going to DICEPs and Conventions, meeting more and more people in the organization. I learned that the PDCA is comprised of a large group of individuals from all over the country, in many different aspects of piling, be it contracting, supplying designing or inspecting. Yet everyone was excited by the industry and wanted to make piles the deep foundation solution of choice. But I also learned that beyond the commercial aspects of the organization there is a close camaraderie that develops among the members.

As an example, one guy I met was Buck. A little while ago we were looking at some work that required rock anchors,

which we subcontract. Buck mentioned that they were doing their own. I asked him a bunch of questions, and he said "We will be doing some shortly, why don't you come up to see?" I flew up to Buffalo, he picked me up, and I stayed at his house. He and his lovely wife Inger took me out for dinner. The next day we drove out to the job, and spent the day watching the process, while I asked a boatload of questions, and got a ton of information. I truly appreciated Darling's generosity. That trip really drove home what it means to be in the PDCA.

I want to thank Buck for all his hard work last year and for leaving me an organization that is in great shape. I also want to point out that everything that happens at PDCA happens because Steve, Lori and our newest member, Laurel, make it happen.



Go to the website, find a committee and get involved. Whether it be Marketing, Communications, Technical, or any of the others, *there is a committee for you* where you not only can add to the party, but learn a lot in return.

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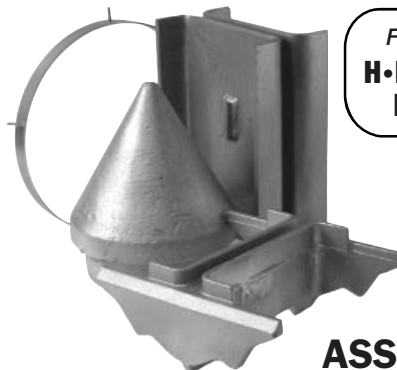


I look forward to my year of service as the President. I will help PDCA continue to promote driven pile as the best deep foundation solution. However, I think we all see very challenging times ahead. That is why PDCA has added more business-related seminar topics to the Annual Convention Program. We will continue to look for opportunities to promote the industry. I hope I have pointed out that PDCA is not the type of organization where you pay your dues and hope the organization does something worthwhile. This is really a hands-on organization with a lot of people wanting to share knowledge. Go to the website, find a committee and get involved. Whether it be Marketing, Communications, Technical, or any of the others, there is a committee for you where you not only can add to the party, but learn a lot in return. Most meetings are by phone once or twice a month for an hour to an hour and a half. You can submit a Project of the Year entry, or contact the staff if you had an interesting project and would like it highlighted in *PileDriver* magazine. And above all, be sure to make your reservation for Albuquerque this April. See you there. ▼

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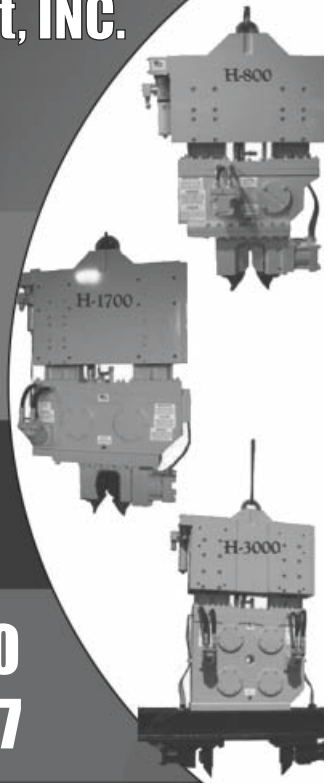
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Highlighting the PDCA 16th Annual International Conference and Expo 2012



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

The opportunity to reunite and re-ignite

I hope you are reading this in the comfort of your Mountain View room or discussing *PileDriver* and pile driving issues with colleagues and friends at the Bolos Saloon or McGrath Bar and Grill in the Hyatt Regency at the PDCA 16th Annual International Conference and Expo 2012, in Albuquerque, NM.

If you are, you are one of many who are attending and supporting the PDCA's annual conference. We are glad you're here and want you to know that the PDCA has put together a great program of events and entertainment for you and your spouse or guest.

We begin this year's annual conference with our traditional Opening Reception, providing everyone with an opportunity to visit with conference exhibitors, get reacquainted with old friends, enjoy a variety of foods, from our carving stations and heavy hors d'oeuvre to the hot and cold buffet items. Pace yourself, drinks are on the PDCA and the bar is open all evening. Don't forget to ask the Exhibitors about their raffle prize and be sure to visit the Silent Auction tables to view the items and begin submitting your bids.

The conference Opening Ceremony is an event you won't want to miss. It features Garrison Wynn, a leader in bridging the generational gap from Gen Y to Baby Boomers. Why a Keynote Speaker on generational issues? Because the issue is relevant to your business, our industry and the PDCA. For the first time in American history we have four different generations working side-by-side in the workplace and roles today are all over the place and the rules are

being rewritten daily. Older generations are preparing for retirement and the younger generation is positioned to take over operations. How will that transition work if generational differences affect everything we do including communicating, dealing with change, motivating, managing, and maintaining and increasing productivity – just to name a few? Research indicates that people communicate based on their generational backgrounds. Each generation has distinct attitudes, behaviors, expectations, habits and motivational buttons. Learning how to communicate with the different generations can eliminate many major confrontations and misunderstandings in the workplace and the world of business.

This year, the PDCA Education Committee mixed up the General Session presentations just a little – with a combination of case histories, a presentation by NMDOT, information on social media – advancing another generational



Louisville, Kentucky

Photo by Todd Taulman/ Photos.com



issue, business management (tax reduction, asset protection, and estate planning), and two international project presentations.

The PDCA 5th Annual Golf Tournament and Luncheon will be hosted by the University of New Mexico's Championship Golf Course just a few short minutes from the hotel with transportation provided.

The PDCA's Companion's Program, a time-honored part of the conference that brings old friends together again will feature a variety of exciting, educational and fun-filled activities throughout the conference dates. Don't forget that Companion Program participants are welcomed at all events, whether scheduled under the Companion's Program or not.

The PDCA Business and Awards Luncheon on Thursday will feature a presentation of the 2012 Project of the Year Award entries with winning entries being announced during the luncheon. The PDCA will also present the Presidential Award for Distinguished Service, Professional Engineers Service Award and introduce the members of the PDCA 2012 Board of Directors. On Friday, you are invited to join all the Exhibitors for lunch. Be sure and tell them how much you appreciate them supporting the conference and promoting their products and services.

The conference will conclude on Friday with the traditional and always fun Annual Reception, Dinner and Entertainment. This year, we (again) have changed things up just a little. The reception and dinner will be fairly familiar with light hors d'oeuvre

and an open bar (throughout the evening) and a triple entrée buffet. However, the entertainment has changed. The PDCA Market Development Committee dispensed with the band and dancing as the entertainment program for the evening and came up with an idea that should appeal to everyone. During the reception, you may notice a gentleman walking around performing magic – hang onto your watch – this is Jeff Smith, a magician and master hypnotist. After dinner, you will be entertained by the Cellicion Traditional Zuni Dancers from the Pueblo of Zuni and then back on stage with Jeff Smith, who will invite willing participants to be hypnotized, convincing them they are on an amazing trip to the North Pole, watching a funny movie, an actor or singer or driving a motor vehicle.

I hope you took advantage of the hot air balloon ride and enjoyed it as a unique addition to this year's annual conference.

If you did not attend the annual conference, you missed a tremendous opportunity to learn about the latest advances in your industry, business trends designed to help make your business more efficient, effect and productive, exchange of ideas and information, business and social networking opportunities and much more, all at a very reasonable price.

The PDCA invites all of you to join us in 2013 when we travel to Louisville, KY for the 17th Annual International Conference and Expo. See you there! ▼

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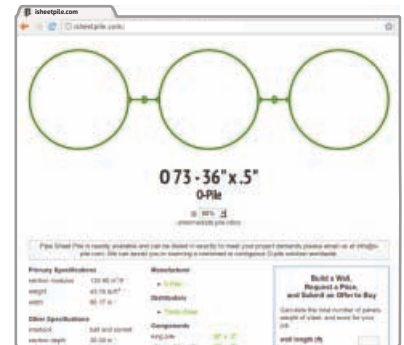
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Contractor Member TX-Pile Finds Real Benefit in PDCA Membership



By Rusty Signor, President TX-Pile
(formerly Signor Enterprises)

A friend has a picture in his office of some vultures in a tree. They are just sitting on a limb and one is starting to fly off and says “Wait, hell, I am going to kill something.” I hate to admit it, but for over a decade, before I joined PDCA, I was one of the ones waiting for “road kill” piling jobs. Looking back, it is hard to believe that I felt justified in doing nothing proactive and relying solely on marine construction to make ends meet. Most of my monthly piling work is now equal to what I did totally in the past year. Even in this recession, last year was one of our best in 30 years of business, all thanks to PDCA. At the onset of the recession we started “lunch and learns” with geotechnical and structural engineering firms along with contractors. Armed with a BBQ lunch and certificates of completion for PDHs, we primarily showed a PDCA based presentation entitled “Benefits of Driven Piles.” This presentation put together by the Communication Committee was a Pile Driving 101 course that

we supplemented with local war stories of difficult underground conditions like developmental fill, expansive soils, and high water table. Combining the average cost per person at \$12 (think BBQ, good sides, and desserts) and a \$800 projector, having one-on-one interaction with 200 engineers was a little more than a yearly Yellow Page advertisement. One job easily paid for these 34 presentations. The down market was actually beneficial because people had time to listen and were more willing to look at a money/time saving alternative to drilled shafts. Central Texas has been called by some “the heart of drilled shaft country,” where driven piles were rarely if ever used for

deep foundations. These “lunch and learns” definitely resulted in additional work, but our first major advance was to be recommended in a geotechnical report which is proudly framed in our office. While a few structural engineers would recommend driven piles, quite a few will never design outside of geotechnical recommendations. Jobs soon followed and with additional local history, more conservative engineers are starting to recommend driven piles too. Along with our presentations, we have put on dynamic pile test demonstrations and branched out to the pile driving community to bring in guest speakers.

During the decade of “resting buzzard” years we would have a couple of engineering students from Texas call for help on a school report. As undergrad-



ate students, most who came to visit our jobs told us that they would get one lecture that would mention pile driving. Now we have a site visit with an entire graduate class several times a year and have made presentations at classes at two universities. I like to think of this as an investment in the future, much like the Professor's Institute sponsored by the PDCA Educational Board.

While I am a member of several other trade associations, there is no comparison to the educational opportunities from being a member of the PDCA. I have a hard time justifying being absent from the two annual meetings. Every time, I come back home with several points that help my business through selling points, new uses, or best practices of driven piles.

For example, at last year's annual convention, a legal seminar offered some incredible advice to add to our contracts to protect against unknowns that have previously have cost us more than the profit on projects. Also, I believe I avoided several lawsuits by being educated on the perception of vibrations, vibration monitoring, and what to look for in adjacent structures pre-construction. On these projects, the general contractor appreciated our educated viewpoint and gladly paid for the vibration monitoring. A contractor friend shared with me a term he uses that comes from costly construction mistakes, "dumb tax." Through the PDCA I have made friends from all over the country who have always given me valuable technical advice to reduce this

dumb tax. These friends have given me some unbiased, practical advice on use of certain equipment which salesmen have a hard time providing.

Recently my son completed his second engineering master's degree as a geotechnical engineer. We are now going back to all the engineering firms we previously presented to and educating them on the results of our dynamic pile tests in expansive clay. We are showing them that driven piles are 3 to 5 times faster than drilled shafts, cheaper, and higher quality controlled. Providing empirical data on a time and cost savings alternative is very attractive, especially in a down economy. Through this process, we are breaking open a market for driven piles that has been written off as solely drilled shafts around the world. Alternatively from having a son to obtaining a geotechnical degree, hire a full time or part time engineer who can help with marketing, as they can provide the technical information that will change engineers' minds. If you cannot talk the talk or have the time to continually address them, geotechnical and structural engineers simply will fall back onto what they have been recommending and designing for years locally--drilled shafts.

Even in the current down market, you should only consider renewing your PDCA membership, attending any of the conferences, and educating your local engineering community on the benefits of driven piles. Otherwise, dumb tax and lost opportunities will far exceed the time and money spent on representing driven piles. ▼

Photos courtesy of Rusty Signor



Swift Reservoir Trestle Installation

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MEMBERSHIP BENEFITS

General Membership Information

We are the premier association for pile-driving contractors

The PDCA was founded in 1995 to promote the use of driven-pile solutions in all cases where they are effective. We strive to build and maintain working relationships among end users, manufacturers, government agencies, educational institutions, engineers and others involved in the design, installation and quality control of the driven pile.

We are dedicated to advancing the driven pile

As the only organization solely dedicated to pile-driving contractors, we know that you understand the superiority of the driven pile in most applications. We are the only association addressing the intrusion of non-driven solutions that take away business from the driven-pile contractor. The PDCA understands that to survive in today's competitive marketplace, a pile-driving contractor must strive to stay abreast of the latest trends and technologies in the industry. That is why we maintain close ties with the

world's leading suppliers to the industry. It's why we provide a broad range of educational programs for university professors, practicing engineers and contractors. And, it's why more and more contractors, engineers and suppliers are realizing that the PDCA significantly increases their value in the marketplace.

We are a direct link to decision makers

Major manufacturers take an active role supporting the PDCA. At our conferences, we bring together the world's leading design manufacturers and technical application experts to assist you in advancing the driven pile as a superior product.

The PDCA works closely with the technical community to format design codes and installation practices. We offer seminars throughout the country for engineers and educators on the capabilities and advantages of the driven pile. We also work with agencies, such as the Federal Highway Administration and state DOTs, which develop specifications for highway building

and other infrastructure projects that use driven piles.

We offer timely, valuable services

The PDCA improves your company's bottom line, as well as your stature in the construction industry, through a variety of programs and services:

Job referrals

We are the only organization that provides contractor referrals to end users of driven piles. You tell us where you will drive piles and we will refer you to end users. We also provide referrals to our supplier and technical members.

Peer-to-peer opportunities

With more than 120 contractor members, the PDCA offers many networking opportunities. Whether at our Annual Conference, DICEP conference, our regional seminars, or by just picking up the phone, you'll develop long-lasting professional relationships and friendships in the industry.



“Through its programs and services, PDCA has presented our company with numerous opportunities to continue our business success. It is certainly a cornerstone for growth in a very competitive business.”

D.R. JORDAN, PRESIDENT AND CEO,
JORDAN PILE DRIVING, INC.

Annual membership directory

As a member, you'll receive PDCA's annual membership directory of our contractor, supplier and technical members. Your company is listed along with the piling solutions you employ and states in which you work. This directory is provided throughout the year to construction users on a complimentary basis.

Educational conferences and meetings

The PDCA offers cutting-edge education for contractors, engineers, geotechs and anyone else interested in the driven pile and its applications at two major conferences annually. Members receive discounts on exhibit and registration fees.

- The Annual Conference, held in early Spring since 1997, is a nationally recognized conference that brings together leading contractors, technical experts and suppliers to the piling industry.
- The Design and Installation of Cost-Efficient Driven Piles Conference (DICEP), held each September since 2000, is a nationally recognized conference that brings together geotechnical and design engineers, college professors and contractors to discuss the latest trends in understanding, analyzing and controlling piling costs.

Industry development

The PDCA continually strives to expand market share for the driven pile. The PDCA sponsors the Professors' Driven Pile Institute, held at Utah State University in Logan, Utah. Up to 25 professors from major engineering schools are invited to

participate in an intensive, weeklong program that presents them with the latest concepts in driven-pile design, installation and quality control. Some of the leading faculty in the deep foundation field have attended the institute to date. The program supplies the educators with the tools and knowledge to be able to teach their students about the advantages of the driven pile. It promises to have a long-term impact on market share for the driven pile.

Publications and reference materials

As a PDCA member, you will receive our quarterly publication, *PileDriver*, which presents articles on issues and trends of interest to our industry. As a member, you'll receive discounts on advertising in the magazine.

PDCA also offers the *Installation Specifications for Driven Pile-PDCA Specification 103-07* as a CD to all new members at no charge.

The PDCA also sells *Driven Pile Foundations, Volume I&II*, an FHWA manual on the design and construction of driven piles.

Connect worldwide at www.piledrivers.org

The PDCA's newly redesigned website at www.piledrivers.org lets you research the latest trends in the industry and find direct links to manufacturers, suppliers, engineers and others. PDCA members receive a free listing in our member search area, which is being used by an increasing number of end users to find pile driving contractors and services. Our forums area makes it easy for you to connect with others to discuss issues and problems.

Leadership opportunities

Membership in the PDCA provides opportunities for recognition and leadership. Positions are available on the PDCA board of directors and various committees that impact the industry. The PDCA recognizes noteworthy contributions to the industry with our Driven Pile Project of the Year Award, giving opportunities for high profile recognition.

Membership is available to you

There is strength in numbers and we at the PDCA need to count your company when telling government agencies, engineers and suppliers that we are interested in keeping your business viable and in growing market share for the driven pile. We need your ideas and efforts in working together toward a common goal: the use of driven-pile solutions. You can contribute your expertise and assist the Association in developing:

- A greater focus on safety.
- The quality of driven pile products.
- The formatting of codes and specifications for the driven pile.
- Support for a program to help educate students in the use of driven piles.

Join today. Be part of a growing and vibrant organization that will play a key role in the future of deep foundations. Support your industry by completing the membership application in this issue.

You will immediately begin to enjoy benefits of membership. ▼



THE PILE DRIVING CONTRACTORS ASSOCIATION 2012 MEMBERSHIP APPLICATION



Step 1: Company Information

Company Name: _____

Contact Name: _____

Address: _____

City: _____ State / Province: _____

Zip / Postal Code: _____ Country: _____

Phone: _____ Fax: _____

Company Website: _____ Contact E-mail: _____

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

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

- Contractor I Member Company** – Annual volume > \$ 2 million \$850.00
- 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.

- Associate I Member Company** – Annual volume > \$ 2 million \$850.00
- Associate II Member Company** – Annual volume < \$ 2 million \$425.00
- Local Associate Member Company** – \$100.00

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

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.

- Engineering Affiliate – 1-5 Offices or an Individual** \$100.00
Engineering Affiliates may list up to 5 individuals per office at no additional charge.
- Engineering Affiliate – 6-11 Offices** \$90.00
Engineering Affiliates may list up to 5 individuals per office at no additional charge.
- 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

- Professor's 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.
- 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.
- Premium Upgrade** – \$225.00
Your Company Logo and Website linked from your PDCA website Company Profile listing.
- 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: | \$ <input style="background-color: #d3d3d3;" type="text"/> |

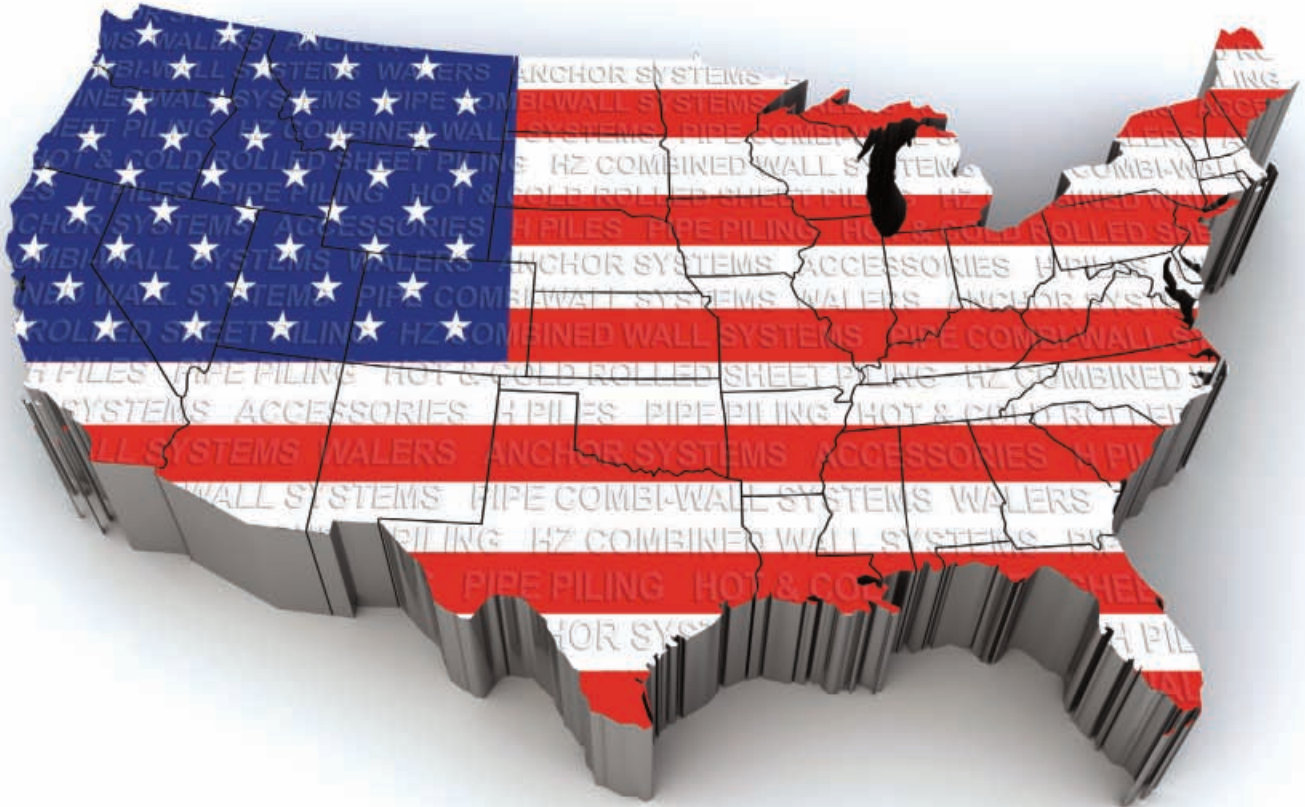
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- I am making payment in full by: Check Visa MasterCard American Express Discover
- Card Number: _____ Expiration Date: _____
- Name on Card: _____ CVV Code: _____
- Statement Billing Address: _____
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PDCA

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2012 New PDCA Members

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

Contractors

C D Perry LLC
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PO Box 866 Ft. of Monroe
Street
Troy, NY 12181
Phone: 518-272-0831
Fax: 518-874-2019

Sea & Shore Contracting
Michael Lally
11 Randolph Road
Randolph, MA 02368
Phone: 781-767-0090
Fax: 781-767-0095

**T.L. Wallace
Construction, Inc.**
William Noffke
P.O. Box 523
Columbia, MS 39462
Phone: 601-736-4525
Fax: 601-736-3401

Engineering Affiliates

ANS Consultants, Inc.
Shah Atulkumar
4405 South Clinton Avenue
South Plainfield, NJ 07080
Phone: 908-754-8383
Fax: 908-754-8633

Bellingham Marine
Roxie Comstock
1323 Lincoln Street
Bellingham, WA 98229
Phone: 360-676-2800
Fax: 360-734-2417

Gannett Fleming, Inc.
Dave Scherer
207 Senate Avenue
Camp Hill, PA 17011
Phone: 717-763-7212
Fax: 717-303-0346

JZN Engineering, PC.
Nejm E Jundi P.E.
51 Swing Bridge Lane
South Bound Brook, NJ
08880
Phone: 732-369-6270
Fax: 732-412-9343

Russell & Russell, LLC.
Kimberly Russell
2766 Bruce Street
Matlacha, FL 33993
Phone: 239-440-2114
Fax: 866-416-0009

Retired

Loftus Contracting Corp.
Michael Loftus
34 Fuskie Lane
Daufuskie Island, SC 29915
Phone: 203-810-8115





presents

The 16th Annual **International Conference and Expo 2012**

The Hyatt Regency Albuquerque
April 25 – 27, 2012





*Herbert F. "Buck"
Darling III
President*



It is my distinct pleasure to invite absolutely, positively, and resolutely, every one of you to the PDCA 16th Annual International Conference and Expo 2012, to be held from April 25th – 27th! This year will see us travel to beautiful Albuquerque, NM, and The Hyatt Regency Albuquerque Hotel. The Hyatt Regency Albuquerque and the City of Albuquerque will be assisting us in pulling out all the stops to provide a fun, informative, and interactive experience that everyone will not only enjoy, but hopefully talk about until we reconvene again in 2013! Once again this year we have a great lineup of speakers and topics for your participation and edification.



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Over the last few years, you have talked to us about the Conference and how it could be made better than it already is. PDCA leadership has listened! The golf event will be held this year at the University of New Mexico Golf Course in Albuquerque, NM on Wednesday, the first day of the Conference. This will allow everyone to make travel plans according to their wishes. Depending on your travel distance, you can come the day prior, or early enough on the first day, ready to enjoy a relaxing (for some of us anyway!) round of golf. Otherwise, you can shake off the dust and relax by taking in the sights and venues provided by our host city prior to the conference start. If you are not a golfer, and wish to limit your time investment to the really important part of the conference, then come later on Wednesday ready to enjoy the opening session and opening reception Thursday morning.

We also heard loud and clear that traffic to and through the exposition portion of our Conference needed to be increased to offer added incentive to our Contractor and Associate members to exhibit their services and products.

They provide a unique and large part of the overall experience, and we would be much worse off without them. To that end, we have provided a one-day pass option to entice the local area contractors to attend. We will also be undertaking a local advertising effort to further forward this goal. At this point, I need to thank our regular exhibitors who are always there for us, and hope to see you as well as some new faces at the Conference.

Finally, I would encourage everyone to take advantage of our sponsor opportunities. These options help you to increase your exposure at the Conference and assist us in keeping the cost of the Conference down. Sponsorships are offered at many different financial levels, hopefully making your participation possible, and your attendance even more pleasurable. From a cost cutting effort, the PDCA and the Hyatt Regency Albuquerque have negotiated an outstanding room rate offer at just \$139.00 per night. We hope that you can see that we are addressing those things that make for a quality conference that all of our members will enjoy.

So please, come one, come all and help us make the 16th Annual International Conference and Expo 2012 edition our best one yet. I look forward to personally meeting as many of you as I possibly can. I am in the contractor portion of the directory under "H" for Herbert F. Darling, Inc. Please feel free to contact me.

With sincere hope that you will attend and warmest regards,

Buck Darling

Generations Working **Better Together**



Garrison Wynn
Featured Guest &
Keynote Speaker

“If you can’t manage the future, you don’t have a future.” – Garrison Wynn

The PDCA is proud to present Garrison Wynn as the Featured Guest and Keynote Speaker at the PDCA 16th Annual International Conference and Expo 2012 Opening Ceremony.

To learn more about Garrison Wynn please visit:
www.wynnsolutions.com

Opening Ceremony, 9:00 AM
Thursday, April 26

Don’t miss this informative and relevant presentation!

Garrison is a leader on bridging the generational gap from Gen Y to Baby Boomers. With four generations in the workplace, and five or more in the marketplace, Garrison’s message delivers results.

His message combines the keys necessary to effectively communicate and reach all generations. He provides real-life examples and tools to close the gap between generational communication errors, work ethic, management styles, and technology barriers.

One generation of employees exhibit maturity and steadfast loyalty, while workers of a younger generation who show brilliance and application have an exit strategy ready if boredom or dissatisfaction sets in.

Population booms and generational differences in mind-set combine to create adverse conditions that will gradually worsen, creating a perfect storm that can spell disaster for employers without the proper knowledge and tools to handle this adversity.

About Garrison

Garrison Wynn helps people learn how to make the jump from being great at what they do to understanding and developing the qualities it takes to be chosen for the job. He gets them to understand why their products, services, or leadership styles—or those of their competitors—are selected. As he says, “If the world agreed on what’s best, everybody would choose the best and nothing else would be considered. Decision making doesn’t work that way.”

As a speaker, advisor, author, and entertainer, Garrison has worked with some of the world’s most effective corporate leaders and business developers, from multi-billion-dollar manufacturers to top New York Stock Exchange wirehouses. He has a background in manufacturing, entertainment, telecommunications, and financial services. In his teens, Wynn worked with

Magnavox and baseball legend Hank Aaron to promote the world’s first video gaming system, and by age 27, he became the youngest department head in a Fortune 500 company’s history. He researched and designed processes for 38 company locations nationwide and developed and marketed products still being sold in 30 countries. An experienced actor in films and a former professional stand-up comedian, Garrison has hosted television specials and national radio programs. His new top-selling book, published by McGraw-Hill and available in bookstores worldwide, blends a decade of research and Garrison’s candid, laugh-out-loud delivery to finally spill *The Real Truth About Success*. His additional writing credits include business journal articles, weekly contributions to *The Washington Post* and has co-authored with Stephen R. Covey, Ken Blanchard, and Jack Canfield.

Daily Agenda

Wednesday, April 25

7:00 AM	Registration – Exhibitors Only
7:00 AM	Exhibitor Set-up
7:30 AM	Executive Committee Breakfast
8:00 AM	Executive Committee Meeting
10:45 AM	The PDCA 5 th Annual Golf Tournament and Luncheon – Transportation Departs for University of New Mexico Championship Golf Course
11:00 AM	PDCA 5 th Annual Golf Tournament Luncheon
12:00 PM	PDCA 5 th Annual Golf Tournament (Pre-Registration Required)

4:00 PM	Registration Opens – Full Conference Passes Only
6:00 PM	Exhibit Hall Opens Conference Opening Reception Silent Auction Begins
7:30 PM	Board of Directors, Past Presidents, Committee Chairs and Spouses Dinner

Thursday, April 26

7:00 AM	Registration Opens – Exhibit Hall Opens
8:00 AM	Opening Ceremony Breakfast
9:00 AM	Opening Ceremony Presentation of Colors, Pledge of Allegiance Welcome and Opening Remarks – Buck Darling, PDCA President Keynote Speaker: Garrison Wynn
10:45 AM	General Session
11:15 AM	Companion's Program – Transportation Departs for Seasons Rotisserie & Grill
11:30 AM	Companion's Program – Luncheon at Seasons Rotisserie & Grill with Featured Speaker Mo Palmer
11:40 AM	Exhibit Hall Opens
12:15 PM	Business & Awards Luncheon
1:30 PM	Companion's Program – Self-Guided Tour, Old Town Albuquerque
2:10 PM	General Session
3:00 PM	Exhibit Hall Opens
3:40 PM	General Sessions
4:00 PM	Companion's Program – Transportation Departs for The Hyatt Regency Albuquerque
5:00 PM	Exhibit Hall Opens
6:00 PM	Evening Reception

Friday, April 27

6:30 AM	Hot Air Balloon Ride – Transportation Departs
7:30 AM	Registration Opens – One Day Passes Only Exhibit Hall Opens Continental Breakfast
8:30 AM	Companion's Program – Breakfast
10:00 AM	Committee Meetings – Education, Communication, Safety
10:45 AM	Companion's Program – Transportation Departs for Pueblo of Acoma – Sky City and Lunch
11:15 AM	General Session
11:45 AM	Exhibit Hall Opens Exhibitors Luncheon – Exhibit Hall
1:20 PM	General Sessions
3:00 PM	Exhibit Hall Opens Companion's Program – Transportation Departs for The Hyatt Regency Albuquerque
3:30PM	Committee Meetings – Technical, Environmental, Market Development
4:30 PM	Board of Directors' Meeting
6:30 PM	Annual Dinner Reception
7:00 PM	Annual Dinner and Entertainment Silent Auction Ends
8:30 PM	Cellicion Traditional Zuni Dancers
9:15 PM	Silent Auction Winners Announced
9:30 PM	Evening Headlining Entertainment

Speakers Forum

Meet your 2012 Convention Speakers



Thirty-year-old Piles Used to Support Dulles Extension of Washington Metrorail Project

Kenneth R. Bell, Ph.D., P.E., D.GE

– Bechtel Power Corporation

When the construction of the new Silver Line to Washington Dulles International Airport was recently undertaken, a detailed subsurface investigation was planned and carried out. At the location where the elevated guideway for the new Silver Line ties into the existing Orange Line, a soil boring was planned at or near each proposed large diameter drilled pier location. However, at several of these proposed locations existing H piles were found at or just below grade. As it was later determined these piles were driven in the 1980s as part of foundation structures to support the then original proposed aerial guideway for the Silver Line. It was decided that these existing H piles should be incorporated into the final design and construction of the Silver Line. As no records could be located for these piles, the decision to use them would be contingent on testing and inspec-



tion to meet the Dulles Transit Partners (DTP) requirements for load, settlement, and potential for corrosion. This presentation will present the steps that were undertaken to qualify these 30 year old existing piles for use as part of the foundation for the new construction and eliminating the need for the drilled piers.

About Ken

Dr. Ken Bell joined Bechtel's in-house geotechnical group in 1980 after completing his Ph.D. at the University of Maryland. Over this period he has worked mainly for Bechtel's Power Global Business Unit (GBU), but has also worked for three other of Bechtel's GBUs, including overseas assignments in Hong Kong for Bechtel Civil on a rail project New Caledonia for Mining and Metals building a processing plant for nickel extraction, and in Trinidad for the Oil, Gas, and Chemical division as the lead field geotechnical engineer for the construction of a Liquefied Natural Gas (LNG) Facility.

Dr. Bell is currently teaching a graduate Foundation Design class at George Mason University. He is also a Fellow in ASCE and a Diplomate, Geotechnical Engineer with The Academy of Geotechnical Professionals.

What Every Business Owner Needs to Know About Asset Protection, Tax Reduction, and Estate Planning

G. Kent Mangelson, CFP, Author, Senior Advisor

Discover the tools pile driving professionals can use to become invisible to lawsuits, save thousands in taxes, and achieve financial peace of mind. By the end of the presentation participants will know how to protect 100% of your personal and professional assets from lawsuits and avoid common asset protection mistakes. Learn five tax reduction strategies most people fail to utilize which could save you more than \$10,000 each year in taxes. Learn how to avoid probate and eliminate all estate taxes and effectively use corporation, trusts, wills, and family limited partnerships. It takes a lifetime to accumulate assets. Take fifty minutes to protect them.



About Kent

G. Kent "GK" Mangelson is an expert in the area of lawsuit protection and tax reduction strategies. He has authored and co-authored several publications and training manuals on the subject including The Advanced Tax and Asset Protection Training Manual and The Asset Protection Bible. As one of the nation's top asset protection advisors he has spent over 30 years helping professionals properly structure themselves for lawsuit protection, tax reduction, and estate planning. Mr. Mangelson is a nationally recognized speaker who has trained thousands of professionals at hundreds of conventions, conferences and seminars across the country.

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On April 27, 2011 our Decatur, Alabama plant was struck by 200 mile per hour winds and was virtually destroyed. We have started the rebuild in Decatur and shifted what production we could up to our Northern Divisions in Chicago and Marseilles, Illinois. First and foremost, we want to thank our employees, customers and suppliers for their incredible patience and support during this difficult time.

So what's next? While we are having to rebuild the plant from the ground up again, we are taking the time during this temporary set-back to increase our round size capabilities in Decatur to 14" OD and 16" OD with walls up to .625". New tooling has been purchased and modifications are being made so we will be able to manufacture these two new sizes when Decatur opens early next year.

In addition, we have purchased tooling and are now making 8.625" OD, 10.750" OD and 12.750" OD in our Marseilles, IL Division. As a result, when our Decatur, AL Division is operational again, we will be able to make these A500 ITC50 Pipe Sizes and A252 Pipe Piling sizes in two locations with quicker cycle times to get the product to you when you need it.

What's next? Stay tuned.



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Getting on Track with Social Media

Wendy Forbes – Wendy92, LLC

How to jumpstart business networking, lead generation and customer service with social media. What are the benefits of using social media? What social media accounts are right for you? What tools can be used to fit social media into your daily business routine? You'll learn the fundamentals of using social media effectively and efficiently to promote your business and engage your customers.



About Wendy

Wendy Forbes has a broad background in all facets of communications including social media, journalism, public relations, advertising and film. Most recently, she has consulted for clients in hospitality, tourism, arts and culture through her social media strategy company Wendy92, LLC. She has become a sought after social media speaker and trainer for corporations, small business organizations and professional associations.

New Mexico DOT Driven Piles Practices

Bob Meyers, P.E., M.S.C.E. – New Mexico DOT State

This presentation will include discussions on current NMDOT pile design philosophy and procedures, implementation of AASHTO LRFD, common pile types and hammers used, specifications requirements, testing, two case histories, and lessons learned.



About Bob

Bob Meyers, P.E., M.S.C.E., New Mexico DOT State Geotechnical Engineer, received his B.S.C.E., M.S.C.E. (Geotechnical) at the University of New Mexico. He is a Registered Professional Engineer in New Mexico and Registered Structural Engineer in Arizona. His professional background includes NMDOT State Geotechnical Engineer from 2001 to 2011; NMDOT State Foundation Engineer from 1988 to 2001. He also has prior experience in consulting engineering firms in civil, structural, geo-environmental and geotechnical engineering.

Navarre Beach Pier – A Case History

Eric Prendergast – Ed Waters & Sons Contracting Co., Inc.

The Navarre Beach Pier is located in Santa Rosa County along the Florida Panhandle on the Gulf of Mexico. This project consisted of the demolition of an existing pier damaged by hurricanes and the construction of a new, longer and taller pier along with renovations to the existing pier building. During the course of the 13 month schedule, many challenges unique to the pile driving industry were faced and overcome. Now, at 1,545 feet long the new pier currently holds the record for the longest pier in the State of Florida and on the Gulf of Mexico and is a large part of the economic engine that fuels Santa Rosa County. Ed Waters & Sons Contracting Co., Inc. is pleased to have been a part of this reward-



About Eric

Eric Prendergast has been a Project Manager with Ed Waters & Sons Contracting Co., Inc. for five years and has over 15 years of General Contracting and Construction Management experience. After graduating with Honors with a Bachelor's degree in Building Construction from the University of Florida in 1996, Eric was employed by one of the largest privately owned general contracting companies in the country where he managed a diverse portfolio of projects that spanned multiple sectors of the market. The bulk of his experience resides in commercial building construction and real estate development. At Ed Waters & Sons he is the third generation of his family to be involved in the pile driving & marine contracting industry.

ing project and we look forward sharing its unique challenges and attributes during the PDCA 16th Annual International Conference & Expo.

In Water Above Piles

Bassam N. Ghanem M.S.C.E.

Using a crane or a jackup barge to drive piles in open water is usually the most common method contractors use to drive piles. A redesigned method could assist marine contractors to install piles in open water more efficiently in locations where waves and wind effect play a critical role in the ability to generate production. A contractor in the Middle East decided to construct a large crane platform supported on top of driven piles in the middle of the water. The piling crew should be able to drive piles around the platform and subsequently lift part of the platform from behind the crane and place it in front and continue driving forward. This presentation will detail the challenges encountered



in designing and using a movable crane platform and will highlight the efficiency, time saving and cost saving to the contractor in adopting this method to drive the piles versus a barge or a jack up barge.

About Bassam

Mr. Bassam Nasrallah Ghanem M.S.C.E. is a Geotechnical engineer and a graduate of Case Western Reserve University, Cleveland, Ohio. He has extensive experience on some of the world largest projects focusing his attention to management and design of large-scale piling projects from the preliminary design to the end user key delivery. Currently he is project manager of piling at E. Pihl & Søn A.S., Denmark and he is responsible for planning, design and subsequently the execution of marine piling of large size tubular steel piles at the Port of Beirut, Lebanon.

Wacker Manufacturing, Steel Piles vs Drilled Shaft

Douglass Ford – Skyline Steel

This presentation will walk through the foundation design process. It will explain why the original design calling for drilled shafts was replaced by steel piles. The natural conditions as well as the financial aspects all helped to make the H pile the preferred choice.



About Douglass

Douglass Ford is a Business Development Manager for Skyline Steel. Doug received his Bachelor of Science from the University of Toledo. Prior to assuming a business development role he practiced for four years as a civil engineer with Landmark Engineering. As a Business Development Manager, Doug is responsible for technical support to structural engineers, government agencies and contractors on Skyline Steel products.

The History of Coatings used for Steel Piles

Steve Harrison, Sr. Market Manager – Carboline

This presentation will cover the corrosion issues affecting steel pilings, previous research done on this subject, and the history of coatings used for corrosion protection of steel pilings. Information will be presented on a 33-year-old study conducted by the Corps of Engineers. Finally, newer technologies will be discussed that may have a future fit for steel piling protection.



About Steve

Steve Harrison is the Senior Market Manager for Carboline Company in St. Louis, MO, a firm he has been with for 34 years. Steve holds a B.S. Chemistry from the University of Missouri – St. Louis along with an MBA in Marketing from Lindenwood University – St. Louis. His previous positions include: Technical Service Manager, Sales Manager, Product Line Manager, Director of Quality, and Marketing Director. His professional affiliations include the Society of Protective Coatings and the National Association of Corrosion Engineers.

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E45 Highway project in Gothenburg

TC Heller, VP Sales, Central US – Liebherr Nenzing Crane, Co.

The presentation consists of a jobsite within the expansion of the double-track railway and highway between Gothenburg and Trollhattan, both Port Cities on the West coast of Sweden.

The job entailed driving pre-cast concrete piles.

Used as an aid with the project was a data logging system where the bearing pressure for each pile was pre-programmed and the Machine's GPRS System was used to remotely send the contractor's office the individual pile results from the E45 Highway project for review and documentation.

About TC



TC Heller is the Factory Representative for Liebherr Nenzing Crane Company for the Central US with responsibility for product awareness, education and facilitation of end use and customer acquisition for the following product groups manufactured by Liebherr; Piling and Drilling Rigs, Liebherr BVV Tools & Attachments, Duty Cycle Cranes,

and Lift Cranes. Educated at the University of Arkansas in Business Administration, TC has been involved in Sales Marketing and Management for over the past 34 years. TC is an active member in the PDCA, DFI, SC&RA, ADSC and currently resides in Overland Park, Kansas with his lovely wife Sally.

Attend All PDCA
 General Sessions:
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 Development Hours

Note: Attendance for
 PDHs will be verified
 by scanning
 attendees' QR Codes

The PDCA 5th Annual Golf Tournament and Luncheon

University of New Mexico Championship Golf Course
Wednesday, April 25, 2012



The PDCA would like to thank our sponsors and players for their participation in the PDCA 5th Annual Golf Tournament and Luncheon at the University of New Mexico Championship Golf Course.

Appropriate golf attire is required, including collared shirts, Bermuda-length shorts or slacks for men and appropriate attire for women. No T-shirts, tank tops, cut-offs, sweat pants, bathing suits, athletic shorts, denims, or other attire deemed inappropriate by the golf course staff will be permitted. The course is a soft-spike only facility.

Tournament format will be a "Captain's Choice" with no handicaps. The play format is called "Red, White, Blue" and is played as follows:

All teams will hit from the White tee box on your first hole. If your team pars that hole, the team hits from the White tee box on the second hole. If your team birdies the first hole, then the team hits from the Blue tee box on the second hole. If your team

bogies (or scores higher than bogie), then the team hits from Red tee box on the second hole. This pattern is continued throughout play for all 18 holes.

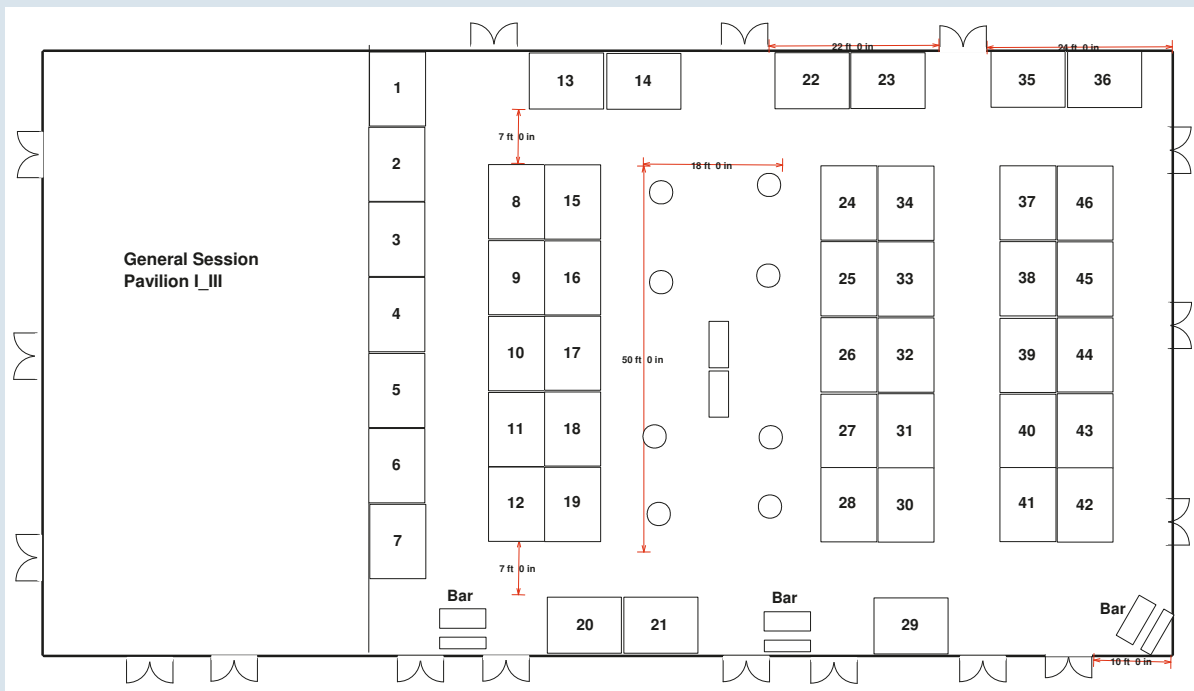
Tournament prizes are as follows:

- ✦ First Place Foursome
- ✦ Longest Drive
- ✦ 4 Closest-to-the-Hole (Pin in place)

Tournament prizes will be awarded on Thursday, April 26 at the PDCA Business and Awards Luncheon. Winning team and individual winners must be present to accept prizes.



Conference Floor Plan



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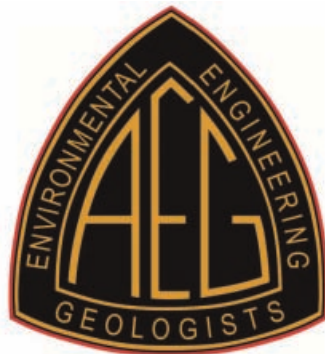
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Companion's Program Schedule at a Glance

The PDCA will host another exciting Companion's Program with special activities throughout the conference. This PDCA tradition brings spouses and guests together once again to renew old friendships and create new ones.

Wednesday, April 25

- All companions and guests are welcome to participate in the PDCA's 5th Annual Golf Tournament and Luncheon
- Opening Reception – Exhibit Hall, The Hyatt Regency Albuquerque

Thursday, April 26

- Opening Ceremony Breakfast
- Opening Ceremony with Featured Guest and Keynote Speaker, Garrison Wynn
- Lunch at Albuquerque's Famous Seasons Rotisserie & Grill with Featured Speaker, Mo Palmer – Columnist, Albuquerque Historian and Teacher
- Old Town Shopping – Featuring local and Native American shops, museums, art galleries, and science centers
- Evening Reception



Friday, April 27

- Companion's Program Breakfast
- Lunch at Yaak's Cafe
- Tour of the Haak'u Museum
- Tour of Pueblo of Acoma – Sky City – the oldest continuously inhabited city in the United States; roughly 5 million acres occupied for over 800 years
- Afternoon on Your Own
- Annual Reception and Dinner

Annual Reception and Dinner Entertainment

The PDCA 16th Annual Reception and Dinner will be held on Friday, April 27. This year's entertainment will include two fun and exciting events. First, listen and watch as the Cellicion Traditional Zuni Dancers from the Pueblo of Zuni perform their time-honored music and dance.

Native Dance Entertainment

The Cellicion Traditional Zuni Dancers



from the Pueblo of Zuni, New Mexico performs music and dances that preserve and reflect the 1000 year-old Zuni culture. They have been performing for more than 28 years and are internationally renowned. Some of the dances being performed are The Eagle Dance, The Pottery Dance, The Zuni Turkey Dance, The Deer Dance, The Star Dance, The White Buffalo Dance, The Rainbow Dance, The Harvest Dance and The Cloud Dance.

After the dancers, Jeff J. Smith, a full-time professional comedy magician and master stage hypnotist, will entertain the crowd with his hilarious show. Jeff has been entertaining for over 15 years with a corporate clean show, guaranteed to be an event you will remember. During the Annual Reception portion of the evening, Jeff will mingle through the crowd performing close-up magic with cards, coins and borrowed objects. Then, after dinner, he will present

a 90 minute comedy state hypnosis show. Jeff's show will begin with a 15 minute "warm up", where he will give a brief background of hypnosis, answer questions and perform some audience participation tests to determine which people would make good subjects. The 15-20 volunteers will be brought up on stage to be induced into a trance. Jeff will then place the volunteers into a trance and begin group skits. Some skits will include flying an airplane, becoming cold then hot, watching a funny, then sad movie, conducting an orchestra, betting on a horse race, milking cows and more. After the skits, Jeff will work with individuals, getting them to do such things as forget their name, sneeze on cue, speak Martian and sing like Elvis.

The show is always in good taste and no one will be embarrassed, so make your plans to attend and be ready to have a great evening of entertainment and fun.



Jeff Jay

Magician & Hypnotist



Jeff Jay is a full-time comedy magician & stage hypnotist who specializes in fun-filled shows for schools, colleges, military groups, corporate events & private parties. Since 1992, Jeff has performed hundreds of shows nationwide and has entertained over 41,281 people plus his dog. He first saw a hypnosis stage show while attending college and decided to make the study of the psychology of persuasion his life's goal. Jeff worked as a Fortune 500 sales trainer and as a corporate spokesperson prior to becoming what he calls, "an enter-trainer."

Jeff is a master hypnotist whose hilarious shows are guaranteed to make your events more memorable! The audience will be amazed when their friends and colleagues sing like Elvis, dance like Madonna, Michael Jackson and even as The Village People. Special guests might even arrive from Mars! His performances are 75 minutes of fun designed to make audience members the "stars of the show". It will be the best time they never remember!

Additionally, Jeff is a skilled magician who does baffling tricks with cards, coins, candy, and more. You won't believe your eyes as miracles happen close-up right at your table! ▼



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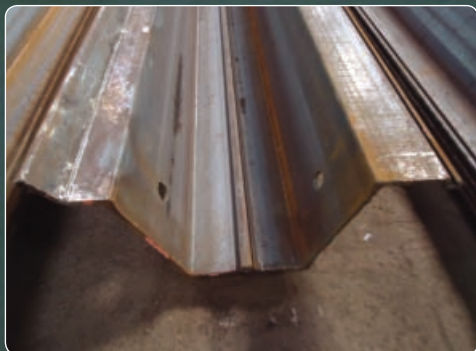




Dura-Bond Industries

Diverse business supports the piling industry while building an empire made of steel

By Heather Hudson



Far left: Fabrication of Steel piling in any configuration (example).

Left: In addition to the seal welding, Dura-Bond fabricated the templates to maintain spacing on these king piles.



We're a one-stop-shop for piling contractors seeking piles, pile-splicing, pile-tips and protective coating.

-BRAD NORRIS, VICE-PRESIDENT, DURA-BOND INDUSTRIES

The Norris brothers of Pennsylvania have a number of markets covered.

Their company, Dura-Bond Industries is the hub of five thriving businesses: Dura-Bond Steel Corp., Dura-Bond Pipe, LLC, Dura-Bond Coating Inc. and Turtle Creek Industrial Railroad. And let's not forget their pipeline products division.

"We build bridges, docks, piers, retaining walls, catwalks... any type of steel fabrication that would require also a protective coating is our best niche," said Vice-President Brad Norris.

"We also support contractors who drive pile by offering miscellaneous-type fabrication. We're a one-stop-shop for piling contractors seeking piles, pile-splicing, pile-tips and protective coating."

Brad, along with his older brother Wayne and younger brother Jim are the men behind the company that has gradually transformed into a small empire. Though the brothers grew up in and operate out of Export, PA, they also have plants in Duquesne, Steelton and McKeesport Pennsylvania.

Dura-Bond Pipe, LLC

In Steelton, they manufacture and coat API straight-seam DSAW pipe in diameters ranging from 24" to 42" in grades up to X-80 and lengths up to 80'. They also apply protective coating and fabricate miscellaneous piling components, including caps, wales and connections. Though the focus of this plant is on the pipeline industry, Norris says they've been known to use this mill for oversized spliced pipe piling.

"Once in awhile, we have overruns on our 24, 30, 36 and 42-inch diameter pipe and we'll sell those as pipe piling. We can also manufacture large piling orders. If the pipe pile order is large enough we'll take it on. If it's maybe 50,000 to 100,000 lineal feet of pipe, we'll entertain manufacturing the pipe itself."

Dura-Bond Coating Inc.

The McKeesport and Duquesne plants apply fusion bond epoxy, X-Tec extruded polyethylene, dual layer fusion bond, Powercrete® abrasion resistant overcoating, tape systems and internal linings to

Background photo: Provided the corrosion coating in addition to fabrication of fendering systems to protect driven piles.

Continued on page 49

MANDAL PIPE

NEW CARQUINEZ BRIDGE

FCI Constructors and Cleveland Bridge began joint venture construction on the New Carquinez Bridge on Interstate 80 spanning the Carquinez Straits north of Oakland California in June of 2000. This bridge was the first suspension bridge erected in the United States in nearly 30 years and the largest construction project ever bid in California at the time.

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Dura-Bond supplied the fabrication provided the seal welding on sheet and king piles for Mystic River project.



Application of corrosion coating to existing structurally fabricated steel.

large and small diameter steel line pipe. Customers include major airports, transmission pipeline companies and gas utilities.

“We also apply protective paint and coating systems to non-fabricated structural steel such as pipe piling, steel piling and H-Beams for the construction market. We offer a complete line of coating options from coal tar epoxy to specialized zinc/epoxy/urethane systems when high gloss and color retention are a requirement,” said Norris.

Dura-Bond Steel Corp.

Meanwhile, back in their hometown of Export, PA, a 60,000 sq. ft. facility fabricates complex steel structures, piling, wale systems, tie back systems, soundwalls, retaining walls, railing systems and other marine applications. It includes an A.I.S.C. approved paint department that applies most liquid coating systems to customer-specified and customer-provided material.

Turtle Creek Railroad

Dura-Bond purchased the Turtle Creek Industrial Railroad in Pennsylvania in 1982 when Conrail abandoned it. The decommissioned line runs from Export down to the Turtle Creek Valley until it joins Norfolk Southern Railway at Trafford, PA. Today, the track is used to haul heavy and long steel products to their Export plant.

Humble beginnings

Success has been a long, steady climb since their father, J.M. Norris established Dura-Bond back in 1960. It started out as a coatings applicator for manufacturers of steel products at customers’ facilities. In time, the senior Norris bought his first coating plant and branched out to coating other products, including fabricated steel and internal linings of underground storage tanks, all while nurturing a working relationship with various steel manufacturers and suppliers.

In the 1970s, Dura-Bond opened two satellite facilities in Buffalo, NY and Jacksonville, FL. Neither were runaway successes but their sales did infuse the company with capital for more sustainable growth in Pennsylvania.

“In Florida and then later with a facility in Greensboro, NC, the real estate became more valuable than the plant itself. Buffalo and another facility in Allentown, PA went the same way. They were businesses that were started, sold and we were able to turn for a profit,” explained Norris.

The three junior Norrises learned everything they needed to know on the job and under the tutelage of their father. “We

worked with him right out of high school and basically had our work ethic and education all in one spot.”

When their father passed away in 1990, the brothers banded together and continued to grow operations. Today, Wayne handles pipe manufacturing and exterior pipe coating for gas line and oil industry. Brad handles all steel fabrication and liquid coatings. Jim is in charge of plant operations.

“We have enough business where everyone has their own niche,” said Norris.

That doesn’t mean that they don’t meet daily at their office in Export to discuss the direction of the business and where expansions will be. With more than 425 employees and growing, there’s a lot to talk about.

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With a flourishing business and growth on the horizon, it's a good thing both Wayne and Brad have three sons who are already actively involved in the company. In fact, according to Norris, Reader's Choice named Dura-Bond Industries the Best Family Run Business in Pennsylvania.

"We have a very strong sense of family here and everybody gets along very well. Everybody is paid fairly and does their job. There are no issues in regards to being uncooperative with each other."

He credits their trouble-free working relationship to the rags to riches growth of their business and the strong vision set out by their father. He remembers many years of "only work and no money" and the struggle that fueled them all. Sitting next to his dad in a broken down Chevrolet Chevelle at 10 years old, he looked on in awe as his dad pointed to the baseball field across from their house, explaining, 'Brad, someday I'm going to buy that land and start a business.'

"We were pretty poor at that time so it was almost unimaginable, but he did it," said Norris. "You develop a closeness in remembering your roots when you start from the ground up. Hard times and financial issues are now gone but we never want to be complacent and we don't want our sons to be either."

With five thriving businesses and counting, there's little chance of that. ▼

Photos courtesy of Dura-Bond Industries



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Hydraulic Power Systems, Inc.

From Local to Global
– Building on Quality
and Innovation

By Margaret Anne Fehr



History shows that there's always the need for building the industry equivalent of a better mousetrap. Hydraulic Power Systems, Inc. (HPSI) is one such company that has accomplished just that over the last 33 years, providing the technology and tools that have set new standards in an industry that is always demanding more production with less time while meeting ever stringent pile driving requirements. HPSI has focused its efforts on providing top flight augers and vibratory hammers designed to custom standards for its diverse customer base.

HPSI was incorporated in 1979 by founders Bob Kissick and Loran Freeman in Kansas City. The partners brought the initial HPSI product to market a year later with the introduction of top drive augers for pre-drilling and auger cast piles along with custom power packs and winch systems for mainly barge type fabrications.

Kurt Winters, HPSI President, and Bob Zimmerman, Chief Engineer, have seen the company grow exponentially in the last 20 years since coming on board and share a collective viewpoint of the company's early years.

"One of the main purposes of founding HPSI was to build custom construction equipment for specific jobs for customers who were using hydraulic power to perform the work," says Zimmerman. "As a result, HPSI's first standard products included hydraulic auger systems and hydraulic winch systems."

The early '90s proved a pivotal period for the company as Kissick and Freeman grappled with achieving a higher product and sales plateau for HPSI. "That was when they asked Bob and me to join the company as partners and to get the company up and growing," says Winters. "My background was in the design of vibratory hammers and Bob's talent resides in engineering-structural designs of all our products including specialty products."

"Bob Kissick and Loran Freeman had a very strong customer base that was involved in drilling and pile driving," says Zimmerman, "and these customers were all screaming for a reliable vibratory hammer at that time. The vibratory hammers simply beat themselves to death back then."

After years of manufacturing hydraulic power units for HPSI's augers and for vibratory driver/extractors built by numer-



Background image and lower right image:
The Hayes Drilling bridge reconstruction
under President Barack Obama's plan.

ous other foundation construction equipment manufacturers, HPSI designed its own version of a vibratory driver/extractor in 1991 and the rest, as they say, is history. From 1991 onwards, sales grew exponentially, confirming that HPSI's better mousetrap had indeed fulfilled an industry need.

Product reliability became the company's signature strength. "We built our machines for rental services anticipating a lifetime of 15 years, but our products are now closing in on 20 years of service in the field. Where before we were building hundreds of vibros our production now is in the thousands," says Winters.

Product diversity is another company linchpin. "We make vibratory hammers for driving vinyl sheet piling and fiberglass reinforced polymer known as FRP that's available in two sizes. We have a four-model line of excavator mounted vibros as well as 20 different models of the conventional vibros from small to large. Our largest hammers are 200 times larger than our smallest hammers and feature 25 models," says Winters.

"We currently hold a patent on a design for a variable movement, high-frequency vibro which we built 10 years ago that's

unique to the market. We can get by with half the moving equipment that our competitors can because of our patent."

HPSI designs innovative products for different markets. "Any model you need or want, any configuration or specialty; we'll modify any of our products to suit whatever the customer needs," says Zimmerman.





The reconstruction in Fortescue Missouri from the flooding in 2010.

Research and development is a huge part of what HPSI does. Work continues on the expansion of the variable movement vibros. “We’re proud that we were the first to develop a top side auger with variable torque. The first one we built 28 years ago is still operating today. The first vibratory hammer we built 20 years ago is still in operation today.”

The company does a lot of design/build, Zimmerman adds. “For example, we’ve custom built vibratory hammers to unique specifications and configured them as the customer requested. We’ve also designed and manufactured bridge launching systems, rail yard hoisting systems, tower and mining winching packages, and custom positioning devices for all types of foundation work. We also have a patent on a safety device for handling spud winch cables on barge decks. So, we do a lot of custom things.”

“We are in the process of coming up with a completely different hydraulic impact hammer that’s going to hopefully change that industry. Its design is completely different to anything that exists in the market. We expect it to be a game changer because of the different types of fluids it can operate on.”

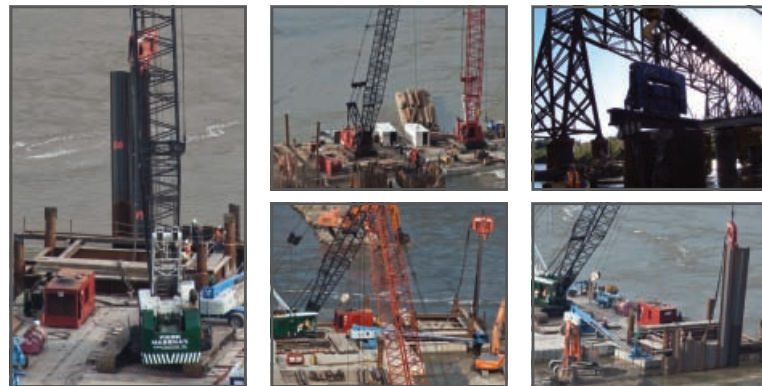
HPSI has always been true to its Kansas City and Midwest roots while also being actively engaged in pushing its boundaries outward into the global marketplace.

“We started in the UK with Balfour Beatty,” says Winters. “We delivered the first machine over there and wound up selling two or three into a rental company that represented us. We started building the big vibratory hammers for drilling for driving big caisson work in 1998.”

Continued on page 58

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The reconstruction in Fortescue Missouri from the flooding in 2010.



Kurt Winters



Bob Zimmerman

The HPSI website displays 48 world flags that represent dealer locations within countries as diverse as the United Kingdom, the United Arab Emirates and Singapore.

Natural disasters have called upon HPSI to provide its technology within the borders of far flung nations, including the last earthquake in Japan prior to the 2011 event as well as projects in Peru and Nigeria.

Closer to home, the company was the supplier to the first stimulus project for bridge reconstruction under the Obama plan. “We also provided all the equipment in Iowa, Nebraska and Missouri that suffered major flooding last year. Our involvement included eight machines working 24 hours

a day, seven days a week until the flooding danger subsided,” says Winters.

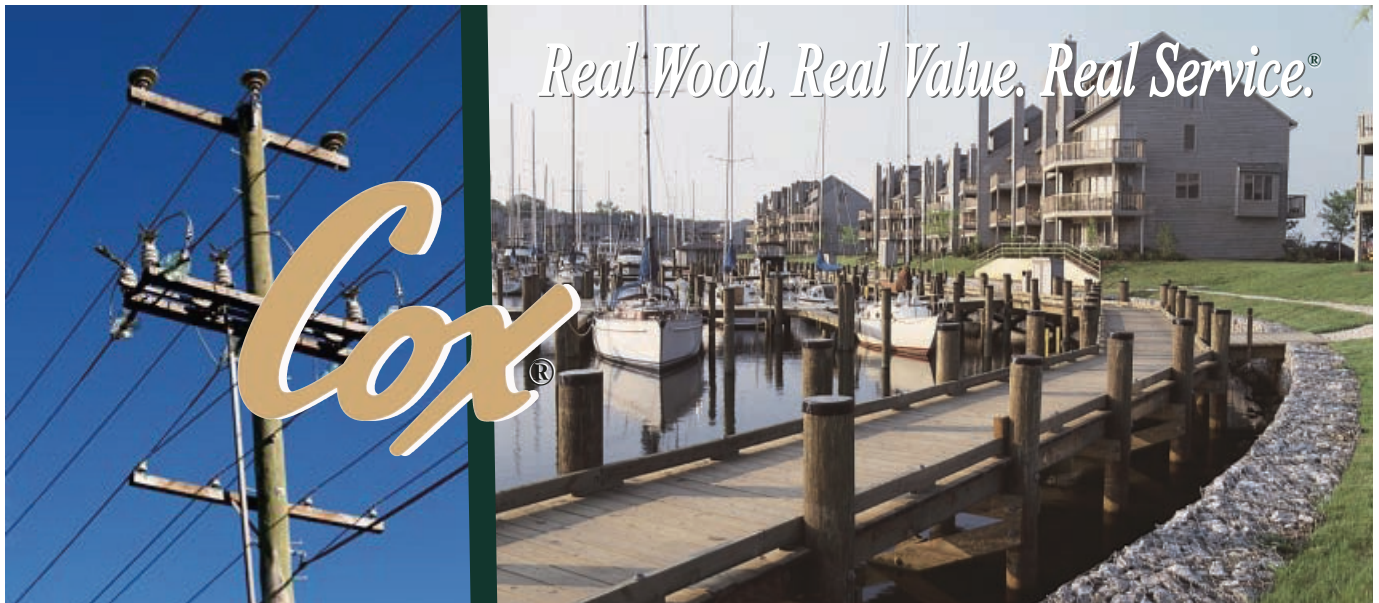
Made in the U.S.A., North Kansas City specifically, is HPSI’s modus operandi. The company has 23 employees in their plant and machine shop with another 15 staff members in the fabrication shop. All other components are manufactured in Kansas City and are assembled in the HPSI factory where multiple products can be assembled at the same time. HPSI has another location in Florida that deals with sales, finance and administration.

The company has strong affiliations in the pile driving industry through its associations with Deep Foundations Institute

(DPI), Pile Driving Contractors Association (PDCA) and the International Association of Foundation Drilling (ADSC).

While resting on previous laurels runs contrary to HPSI’s track record, Zimmerman concedes that the company takes pride in a couple of achievements. “We’ve established our reputation as one of the highest quality machines in today’s market and seem to be the one to beat. We’re also proud of our loyal customer base that we can count on for repeat business. It’s the reliability of our products and the loyalty of our customers that make us who we are.” ▼

Photos courtesy of Hydraulic Power Systems, Inc.



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Pile Driving Formulas

By Garland Likins, P.E., Bengt H. Fellenius, P.Eng., Dr.Tech., and Robert .D. Holtz, Ph.D., P.E., D.GE

Dynamic formulas were commonly used in the early 1900s to estimate driven pile capacity, and many comparisons were then made with static loading tests. A look at the past is often helpful in understanding what should (or should not) be done in the present.

ASCE formed a Committee in 1930 to review dynamic formulas. After a decade long study, the “Committee on Pile Driving Formulae and Tests” produced two reports in May 1941 and sparked a remarkable series of 28 discussions in the ASCE Proceedings by Terzaghi, Casagrande, Peck, Tschebotarioff, and Proctor to mention only a few (Likins et al., 2012).

Considering the current search by some agencies to find a better dynamic formula, primarily to increase the LRFD resistance factor to make pile designs more economical, it is prudent to review what these geotechnical “giants” thought about pile driving formulas, when they were widely used and “the only trick in the book”.

Formulas evolve

First consider the then prevailing conditions. Pile sizes were typically twelve inches or smaller. Wood piles were common. Drop hammers or single-acting steam hammers dominated. The diesel hammer, common today, had not yet been introduced to America. Hydraulic hammers had not been invented. Soil mechanics was still in its infancy. There were no accepted standards for conducting static loading tests or interpreting the resulting data.

The first documented formula use in America was by Major John Stanton in 1851 for timber piling to support Fort Delaware. The 6,000 piles, driven to a sand layer, took three years to install using a 2,000 pound drop weight.

In December 1888, Arthur Mellen Wellington published a formula in *Engineering News*. This ‘*Engineering News*’ formula, designed for drop hammers and timber piles (Chellis, 1951), was widely used for decades. Wellington was a realist, however, and stated:

“In so very uncertain a matter, it is wrong in principle to start from high ultimates, which are certainly unsafe as a unit, and allow foolish men to deceive themselves with the notion that they are being cautious,





when they divide it by three or four, when they are really running great risks.”

A. Hiley published a formula in 1925 that was more “complete”, trying to account for various “losses”. Additional formulas arose after 1940, such as the Gates formula promoted by the U.S. Bureau of Public Roads (now Federal Highway Administration). R.D. Chellis lists more than 30 different formulas in his 1951 textbook *Pile Foundations*, but noted that actual factors of safety “may vary from as low as 1/2 to as high as 16 or more”.

Since there were many formulas already in use, the primary goal of the ASCE Committee was to determine which formula to recommend. Some defended the more complete or extensive formulas, while others essentially said, “Why bother with complexity?” and suggested that the simpler formulas were just as accurate, or just as unreliable.

Terzaghi writes in his 1942 discussion, “The use of the (dynamic) formula in the design of pile(d) foundations is unsound on both economical and technical grounds.”

Terzaghi also wrote in the preface of his text book “Theoretical Soil Mechanics”, published in 1943: “In spite of their obvious deficiencies and their unreliability, the pile formulas still enjoy a great popularity among practicing engineers, because the use of these formulas reduces the design of pile foundations

to a very simple procedure. The price one pays for this artificial simplification is very high. In some cases, the factor of safety of foundations designed on the basis of the results obtained by means of pile formulas is excessive and, in other cases, significant settlements have been experienced.”

SUMMARY of the 1941-1942 DISCUSSIONS

The following summary of the 1941-1942 Excerpted discussion quotes (*in italics*) illustrate the position of each discussor. A copy of the complete original discussion can be obtained from the second author.

Discussion terms “dynamic analysis”, “dynamic test”, or similar, refer to the now common term “dynamic formula” since modern dynamic testing (e.g. ASTM D 4945) with a Pile Driving Analyzer® and signal matching CAPWAP® software, as well as “wave equation analysis” (e.g., GRLWEAP) were still decades into the future. The terms used of “load testing” or “loading tests” or simply “tests” similarly refer to “static loading tests” (e.g. ASTM D 1143).

September 1941 issue

Greulich (Carnegie-Illinois Steel Co.) “The use of formulas, without a thorough knowledge of all factors at the site that might influence pile behavior and without check tests, may lead to serious error – either by an unsafe or a very

Continued on page 63

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uneconomical and extravagant design. The writer would be opposed to the publication of any formula unless the dangers and pitfalls of its use are made very clear.”

Engel (Modjeski and Masters) discusses “set-up” for timber piles in Louisiana. “Any dynamic formula would assign totally different allowable loads to these piles before and after their rest periods, and it would seem the wisest course, therefore, to use no dynamic formula for friction piles.”

Watson (Assistant Professor, Duke University) “Report B recommends nothing except (static) load testing of piles to failure. The writer wishes further to deplore the moribund attitude that prompted other members of the Committee to prepare ‘Report A – Pile Formulas’. Although they may fervently wish to have a formula for the ready solution of their problems, they should not ask the Society to fulfill their prayer by promulgating a Committee formula, unless they can prove their case in court.”

October 1941 issue

Chellis (Stone and Webster) – “Engineering News formula is not the general answer to the problem”. Chellis used the Hiley formula and “found its use very practicable. The older formulas give widely varying results with different types of piles and hammers, entirely out of reason.” He declares “non-validity of a dynamic formula when driving into cohesive soils” and cautions “the formula is very sensitive at small penetrations”.

White (President, Spencer, White and Prentis) “The proposed formula has the failings of all previous pile formulas – it can only give the value at the time of driving (if it can even do that) and not 24 h later. Moreover, the writer’s firm has repeatedly underpinned structures that should not have suffered from settlements – were the Engineering News formula reliable. Furthermore, it would be a calamity for the Society to lend its authority to the promulgation of any pile driving formula as yet described.”

Mason (Bridge Engineer, State of Nebraska) “Pile driving formulas are a necessity.”

Proctor (Moran, Proctor, Freeman, and Mueser) “the large immediate value of this Report is in its warning to designing engineers as to the fallacies of pile formulas and the weaknesses of pile tests.”

Paaswell (Spencer and Ross) “When one persists in the quest for a pile formula, one ignores or merely gives lip service to the science of soil mechanics. Soil mechanics and

the pile formula are essentially incompatible.”

Woolf (Albert Kahn, Inc.) “Terzaghi, in 1925, gave his soil mechanics lectures discussing the validity of pile driving formulas. It was then emphasized that one should be careful with formulas, particularly the Engineering News formula. Report B definitely proposes that no formula be used, but that (static) load tests be resorted to. This proposal is a difficult one to accept, but basically it is sound and correct.”

November 1941 issue

Evans (Bethlehem Steel) “protests against the development or use of any ‘pile driving formula’ as such. It is misleading and unsafe to seek a magic combination of terms, in a formula, that will fit any and all cases regardless, and which is supposed to indicate just what load the pile will support.”

Atwood (Consulting Engineer) “It would seem that there are no formulas of general or even local value unless they are treated with good judgment and corroborated by many tests. If that is true, why try to use a formula? It would seem, with the knowledge now available, that the best the Committee could do would be to make some very general statements as to the unsafeness of using formulas, and the necessity for (static) testing and the exercise of judgment.”

Burmister (Columbia University) “In view of the limitations of any pile driving formula and of the uncertainties involved in the successful application to the installation of pile foundations in any given situation, it is believed that Report B (static tests) represents the better practice. Once a formula has been printed, it takes on a more or less authoritative character, and the assumptions on which it is based and the limitations in its use tend to be forgotten or overlooked. It seems doubtful that any consistent relationship can exist that will be of general application for different types of soil.”

Belcher (United Engineers and Constructors, Inc.) “Neither Report A nor Report B places any reliance on the Engineering News formula. The attempt to introduce a new formula (Report A) is of very doubtful value, as it is based on the same fundamental data that invalidate the Engineering News formula.”

Williams (President, Lehigh University) “A formula having complicated refinements is not consistent with the nature of the problem.”

Krynine (Yale University) “Of the two reports, A and B, the latter (promoting static tests) is preferable”. He then discusses the sensitivity of the Hiley formula to the numerous constants and factors, and then



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states: "All these questions should be clarified in the Manual, if, unfortunately, the Hiley formula is recommended for the general use. The writer sincerely hopes, however, that this will not happen."

December 1941 issue

Dames and Moore (Dames and Moore Inc.) "Dynamic formulas that are restricted to drop hammers and single acting steam hammers will be of limited value at best. The scatter of data is so wide that the only conclusion possible is that the dynamic formulas are unreliable and, in most cases, are likely to lead to unnecessarily expensive construction costs."

Upson (Raymond Concrete Pile Company) "The simplest possible formulas and information should be advocated. Each formula should be accompanied by a clear statement of its usefulness and limitations. It is the writer's apprehension that the presentation of complicated formula such as Eq. 9 (simplified Hiley formula), requiring so many assumptions, may well lead the uninitiated engineer astray."

Tschebotarioff (Princeton University) "Any dynamic pile driving formula is nothing more than a yardstick to help the engineer secure reasonably safe and uniform results over the entire job. The use of a complicated formula is not recommended since such formulas have no greater claim to accuracy than the more simple ones."

Feld (Consulting Engineer) "The true difference between the two reports is whether the design of piles shall be based on a dynamic test (formula) as checked by the static test, or

on the static test alone. Personally, the writer would prefer to have the Manual covering pile driving formulas include a definite formula for granular soils, a definite formula for plastic soils, and a definite formula for such conditions as end-bearing piles in which no lateral restraint or resistance is to be expected. Dynamic (formula) are useless in plastic soil."



January 1942 issue

Mohr (M. ASCE) "After studying the formula derived in Report A and 'worrying' through Mr. Hiley's published work, upon which analysis the proposed formulas are based, it is the writer's firm conviction that their inclusion in the proposed Manual would be a grave mistake. Answers obtained by its use are no more consistent and logical than those obtained by the use of other formulas. Its only obvious advantage to those who wish to be critical of present formulas is the great number of unknowns to which a series of values may be applied until an answer satisfactory to the interested party is finally reached."


Cummings (Raymond Pile Driving Company) "In the writer's opinion, the publication of Report A in a Manual of Engineering

Practice would be a serious mistake. There are only five basic types of dynamic pile driving formulas in use at the present time and all of them can be represented by the formula $Wh = R_s + Q$ in which Q represents all the energy losses that occur during impact. For many years, engineers have been making all kinds of assumptions as to what should and what should not be included in Q . The profusion of pile driving formulas that can be found in engineering literature is simply the result of these assumptions. There is available a very considerable amount of pile driving data from which it is possible to determine indicated bearing capacities by means of a number of dynamic formulas and then to compare these computed results with the actual bearing capacity determined by a load test to failure. When such data are tabulated, it is always seen that some of the computed results are several hundred per cent above or below the actual test results."

February 1942 issue

Terzaghi (Harvard University) "The defects of the pile driving formulas are either due to disregarding variable and vital factors (Engineering News formula), or they are due to the inadequate evaluation of the influence of these factors on the effect of the blow of the hammer (general equation and its derivatives). The formulas of both groups share the defect that they disregard the energy transmission through the pile by elastic waves. The degree of reliability of a formula can be measured by the range of scattering of the ratio between computed and real values about the statistical average. In spite of the waste of material and labor involved in an average factor of safety of 4, an occasional failure is inevitable. Whoever uses the formula is in exactly the same position as the man who tries his luck on a gambling machine. He is at the mercy of the laws of probability".


Peck (Chicago Engineering Dept., later University of Illinois) contributes "Report A carries the implication that pile driving formulas give the results that have some relationship to the ultimate bearing capacity of piles. The validity of some or any of these formulas can be determined only by comparison of ultimate loads found by loading tests and by the formulas. On the basis of the data in Table 2, it can be demonstrated by a purely statistical approach that the chances of guessing the bearing capacity of a pile are better than of computing it by a pile driving formula... The statistical study indicates that the use of a pile driving formula is merely a somewhat inferior method of permitting the laws of chance to operate in the determination of pile capacity".



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Casagrande (Harvard University) “The question of ‘pile formulas’ has without doubt been the most controversial issue in the field of civil engineering for a hundred years. The question of how to treat the chapter on pile formulas is indeed a difficult one, particularly in view of the desired standard expressed in the first paragraph of the Manual manuscript: ‘This manual ... endeavors to enunciate sound principles which are based on established facts, and to avoid stating rules or giving formulas which might lead to its unintelligent use. Rigorous adherence to this desirable goal would eliminate all pile formulas, since they are certainly not based on ‘established facts’; nor can one say that one can recommend any formula and feel reasonably sure that it might not lead to its unintelligent use”.

March 1942 issue

Dunham (Yale University) “A formula which depends upon various and variable coefficients, whose values are subject to guessing and change without notice, is confusing and deluding. Everyone agrees that the results obtained from such a formula are not correct but, if they are reasonably so and moderately conservative, one may as well arrive at the results simply rather than through devious mathematical procedures whose greater value is probably psychological rather than real”.

May 1941 issue

Closure by Admiral Bakenhus (U.S. Navy, Ret.) “Pile formulas’ is the one subject upon which the Committee has reached no definite stated conclusions. Tests (e.g. static) cost relatively little in extensive operations, but may be relatively large and even out of the question with the smaller project. At its best, the pile driving formulas are merely an empirical method for predicting the safe bearing load for a single pile.

Experience has shown that there is no determinable fixed relation between the safe bearing value of a pile and the factors used in the formula. It is, therefore, a dangerous proceeding for an engineer to design or build a piled foundation solely on the information obtained by the usual test of measuring penetration per blow, height of fall, and weight of hammer.” He addresses many of the discussers’ points, but notes they do “not suggest what the engineer in the Midwest prairies should do when he has a total of perhaps twelve piles under some bridge foundation, and when neither funds nor time permit (static) load tests or soil analysis. This is one of the difficult problems before the Committee”. Today, of course, this quandary is resolved by means of dynamic monitoring of the piles.



DISCUSSION

The discussers from the early 1940’s show a clear consensus about the unreliability, unscientific basis, uncertain outcome, and risk for using dynamic formulas. A weakness of any formula is the actual hammer performance of any individual hammer is variable — and unknown. Modern dynamic testing with the PDA clearly shows actual measured energy transfer may vary by a factor of two among supposedly identical hammer models and types. It is no wonder

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that the discussers state that they had experienced poor correlation of dynamic formulas with static test results.

Several discussers note formulas should be restricted to cohesionless soil applications. Chellis (1951) states “a formula can apply only in the case of cohesionless strata, such as sand, gravel or permeable fill”. Yet today this intended restriction is ignored. Current thought equates the long-term set-up gain in cohesive soils to the dynamic viscosity of the soil during installation. This false assumption may be correlated to give the mean formula result similar to the mean static test result, but on any individual site the coefficient of variation may result in gross errors, as explained by Rausche et al. (2004).

Later research further confirms these failings of formulas. Olson and Flaate (1967) studied 93 piles driven in sands with static loading tests. They suggested different “adjusted forms” for the Gates formula for different pile types, which includes individual “constants” (for each pile type) for multiplying the energy term (that differ by almost a factor of two between wood and steel piles; this likely improvement is not used today so results suffer). An argument could be made for using a similar approach with regard to different soil types, but, then, what would be the appropriate formula for layered soils? Combinations of “adjusted forms” for different pile types in different soil types would end in mass confusion.



Lawton et al (1986) made an extensive literature study, including results of nine published correlation studies by others, and a survey of most of the State Departments of Transportation. They found that “the ENR formula, either in its original form or more often in a modified version, is by far the most popular dynamic formula used.” This is alarming since 8 of the 9 correlation studies “found the ENR and modified ENR formulas to be among the worst.” Lawton also found “All investigators were consistent with regard to wave equation

methods. A wave equation analysis of static pile capacity was consistently equal to or better than the best formula predictions, despite old versions of wave equation computer programs being used in many studies in which input information was not always accurate.” They reasonably surmise even better correlations with newer wave equation programs and accurate input information.

Today, the typical pile, pile driving hammer, and pile capacities greatly exceed (by an order of magnitude or more) the capacities in the databases used to develop the formulas. Hannigan (2006) notes for the ‘Engineering News’ formula that with a modern data base “The fact that 12% of the data base has a factor of safety of 1.0 or less is also significant.”

A.E. Cummings in his 1942 discussion was prophetic in his assessment “As a matter of fact, the only new concept that has been introduced into pile driving formula in the past fifty years is the theory of the longitudinal impact of long elastic rods. This theory is not new, as it was developed by St. Venant (1857) and Boussinesq (1885) many years ago. The application of the theory to pile dynamics was first suggested by D.V. Isaacs (1931) and the British Building Research Board in 1938 and demonstrated the fact that the behavior of full size piles under actual field conditions can be predicted with considerable accuracy by means of this theory. The theory is concerned with the question of stress transmission through the pile and, unfortunately, it involves some rather difficult mathematics. However, there is a considerable amount of field evidence available which shows that the stress transmission characteristics of a pile are of great importance not only in determining its behavior during driving but also with respect to its subsequent ability to carry static load. This method of investigating the phenomena of pile driving dynamics is one that deserves the careful attention of all engineers engaged in pile driving work. It is a new and promising field for investigation (authors’ emphasis)”. Fortunately, this method has been further developed in the wave equation (initially developed about that time by Mr. Cummings’ associate at the Raymond Pile Driving Company, Mr. E.A.L. Smith).

The Wave Equation analysis can correctly model the pile and hammer, and the resulting wave transmission. Wave equation soil models account for pile viscosity and soil layers. The largest unknown is then the actual hammer performance and energy transfer.

An even better use of the stress wave propagation theory mentioned by Cummings is now common in dynamic pile testing. Since the mid1970s, dynamic pile testing and signal matching analyses clearly estimated the capacity more accurately at the time of testing, either during installation or during restrrike. (Hannigan 2006).



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If measured results from dynamic testing are considered in a “refined wave equation analysis” (Rausche et al 2009) the resulting bearing graph is even more reliable. Since the more scientific wave equation analysis is readily available, user-friendly, and takes little more time to run an analysis than to make the formula calculation, the question then is why are formulas still in use? Even more incredibly, there are still funded studies for development of new formulas.

J.G. Mason (Bridge Engineer, State of Nebraska) stated in his 1941 discussion “*Pile driving formulas are a necessity.*” From a historical perspective, this was reasonable in 1941. Engineers then needed some way to evaluate when to stop driving the pile. Some today might start with a dynamic formula to preliminarily select the hammer for a certain pile capacity. But it is bewildering to encounter current project specifications that evaluate pile capacity by means of only a dynamic formula. On larger projects, a static loading test is always a good idea. On any project, prudence would suggest a dynamic pile test, or at least a wave equation analysis. Compared with reliance only on formulas, better engineering, including either static or dynamic testing, almost always results in a more economic design at significantly reduced risk.

This brief review of the extensive discussion comments is presented to produce more realistic expectations of what can or cannot be achieved by a dynamic formula. Hopefully this summary of the 1941-1942 discussions will not just provide information of historical interest, but also will encourage more modern engineering of piled foundations.

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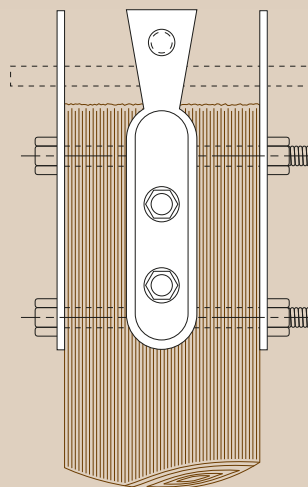
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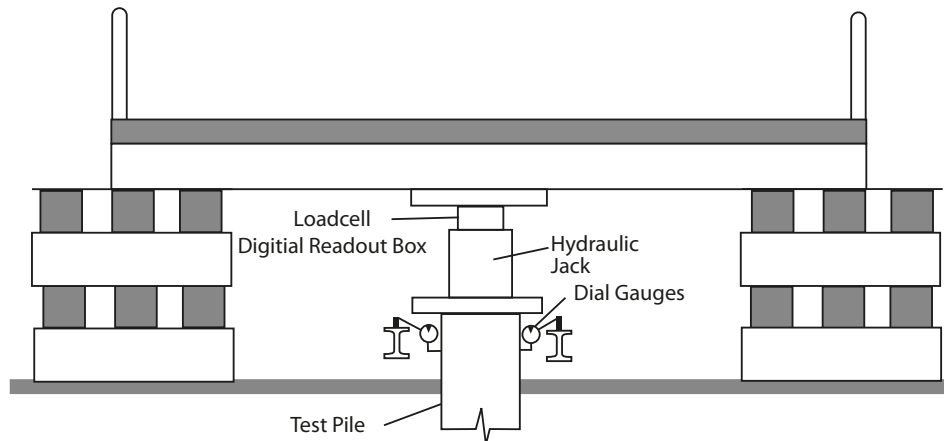
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A General Approach to the Design of Prestressed Concrete Piles for Commercial Structures

Where Does One Begin the Design Process?

By John B. Kelly P.E.

Many governmental units, i.e. states, counties, cities, etc., have the authority to adopt and have adopted building codes. The International Building Code¹ (IBC) has become a prime building code adopted since the consolidation of a number of other model building codes years ago.

The IBC has included a number of other well recognized references into its document by adoption with certain amendments; those references then became part of the IBC. One example of this is that the IBC has adopted ACI 318² with certain amendments. Those amendments are clearly stated in the IBC.

While the IBC addresses a number of issues related to the design of piles, its adoption of ACI 318 increases the scope of reference material related to the design of prestressed concrete piles. Chapter one of ACI 318 states that the design and installation of

portions of concrete piles embedded in the ground are not governed by the ACI 318 document, except for structures assigned to certain seismic categories. Chapter one of ACI 318, however, does give two references for the design of prestressed concrete foundation piles: ACI 543R-00³ and the PCI Pile Committee Report⁴. These two publications are excellent references for the design of prestressed concrete piles and will form the basis of many of the comments in the remainder of this article.

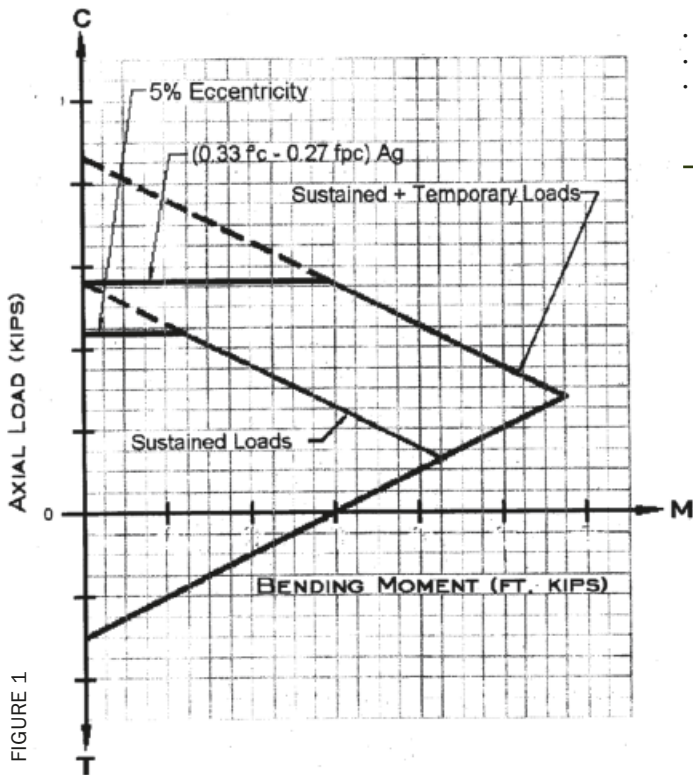
Since around 1970 the allowable stress (f_a) in prestressed concrete piles subjected to primarily axial loads has been limited by many codes to: $f_a < 0.33f'_c - 0.27f_{pc}$, where $f'_c = 28$ day concrete compressive strength, and f_{pc} = effective prestress in the pile. This is applicable for fully embedded and laterally supported piles.

In many cases foundation piles are subjected to service loads that produce not only

direct compression but also tension, shear and bending, which must be considered. References 3 and 4 address these types of loads in pile design.

In addition to a number of “in-place” service loads to which the piles may be subjected, there are a number of other loading conditions a pile may experience before reaching its final position in the soil. Some of these are: handling in the precast yard, transportation to the job site, hoisting the pile into the leads and, of course, driving or installation in the soil. Battered piles may experience bending due to the piles’ cantilever above the template and perhaps the vertical component of some portion of the pile hammer and leads weight. References 3 and 4 address serviceability during the piles’ exposure to these temporary loading conditions.

As one begins the design of a prestressed concrete pile, one of the first things needed is an estimate of the effective pre-



SERVICE LOAD INTERACTION DIAGRAM

Figure 1: Left

- x - 1/2" dia. 270ksi LIR Strands $f' c = 5000$ psi
- Based on allowable compressive stress of $0.45f' c$ (sustained loads) or $0.6 f' c$ (sustained + temporary loads); and allowable tension stress = 0
- Based on $f_{pc} = y$ psi
- Slenderness effects have not been considered
- Ultimate Capacity must be checked to ensure that the required factor of safety is achieved in accordance with ACI318

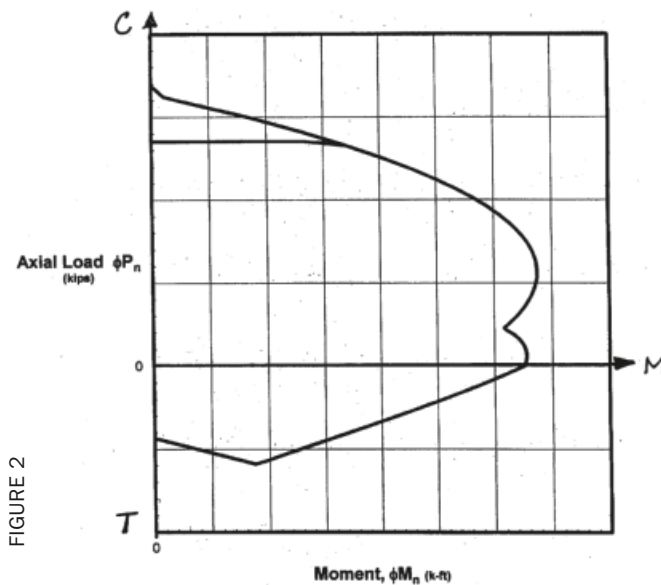


FIGURE 2

STRENGTH INTERACTION DIAGRAM

stress level in the pile. It is always good practice to check with local precasters in the area of the project's location to find out not only what pile sizes are available but also what prestress levels can be achieved in those piles. Many pile forms are "self stressing" whereby the skin of the pile form transmits the prestressing force between the form end jacking plates and therefore have limited prestressing force capacity.

Once all the loading conditions have been established and effects on the pile have been defined one can proceed with the design of the pile. Per references 3 and 4, piles are designed with consideration given to both serviceability and strength. Prestressed piles should have serviceability checks applied to ensure that their service load behavior is adequate. This is accomplished by meeting certain allowable service load stress limitations. Additionally, the required pile strength should be at least equal to the effects of factored loads.

When checking the service state stresses, it may be helpful to develop a service load interaction diagram plotting axial load vs. bending moment (see figure 1). This is

a relatively simple diagram to develop and can be helpful when checking a number of load cases for a pile. It is valid where the prestress is fully effective. Prestress levels in typical pretensioned piles are considered fully effective at a distance of approximately 50 times the strand diameter from the pile ends. It should be noted that some pile manufacturers may have these diagrams for the piles they manufacture.

Checking the pile strength requirement is normally done by ensuring that the factored axial loads and corresponding moments fall within the envelope of an ultimate strength interaction diagram. A schematic of such a diagram is presented in figure 2.

Finally, in some areas of the country it is common for the engineer of record (EOR) to delegate the design of the prestressed concrete piles to the pile manufacturer or its specialty engineer. In this case, it is most important that there be open lines of communication between the EOR, the geotechnical engineer and the pile designer in order for the pile foundation system to function as anticipated by the EOR.

About the author:

John B. Kelly, P. E. is a consulting engineer in private practice located in Ocean Springs, MS. Jack is a licensed professional engineer in several states, a Fellow of ACI, and a Life Member of both ASCE and PCI. Prior to starting his engineering firm in 1990 he spent the previous 20 years in the precast concrete manufacturing business. He can be reached at jbkellype@gmail.com. ▼

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A New Method to Reduce Underwater Pile Driving Noise

By Mark Wochner

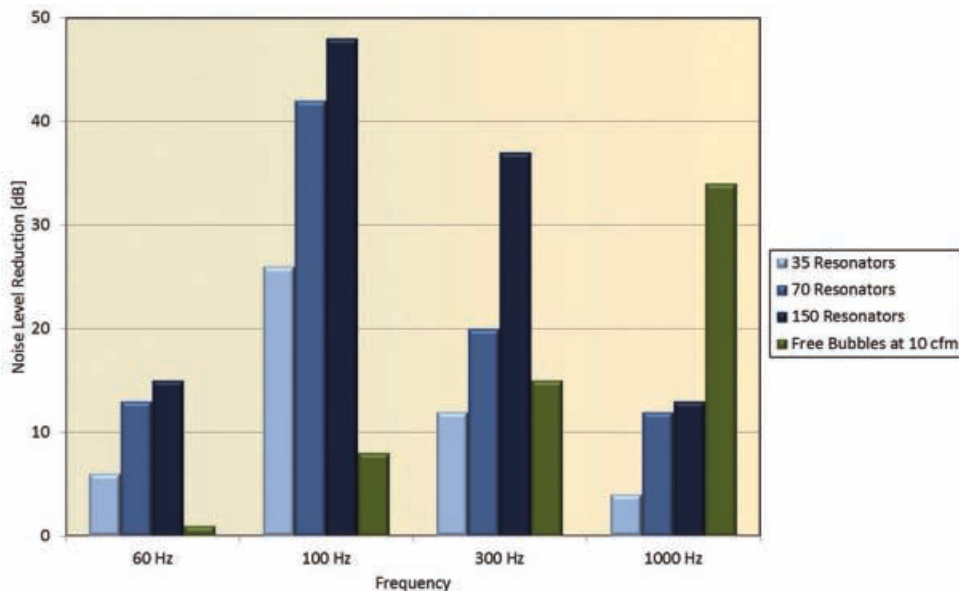
In certain offshore areas, particularly the west coast of the United States, noise regulations can significantly restrict the amount of offshore pile driving operations that can occur throughout the year. These regulations originate from concerns about the adverse effects of this noise on fish such as sturgeon and salmon and marine mammals such as dolphins and whales.

If noise reduction is required in order to gain approval from regulatory bodies, then the current solution is to deploy a bubble curtain system. These systems can vary in complexity, but in essence it employs a compressor and perforated hose or pipe system which releases large quantities of air into the water surrounding the pile. The system works primarily due to the impedance mismatch between

the bubbly liquid and the water: simply put, if the two media are sufficiently different it's difficult to transmit acoustic energy from one medium to the other. This essentially traps the sound in the region around the pile, and it can be successful to a certain extent.

Unconfined bubble curtains, in which air is allowed to rise freely to the surface, often function poorly in environ-





At Applied Research Laboratories, The University of Texas at Austin, a new highly-effective method of underwater noise reduction has been developed and tested in multiple underwater environments. Originally, this system was created to reduce continuous-wave noise from marine vessels which are obligated under regulation to minimize the disruption of marine mammal migratory patterns, but this solution is also able to significantly reduce impulsive noise such as that generated by impact pile drivers.

Rather than utilizing only the impedance mismatch phenomenon described above, bubble resonance phenomenon can also be employed. Bubbles resonate in the water at a particular frequency, known as the individual bubble resonance frequency (IBRF), which is dependent upon bubble size and various other factors.

ments with significant currents because the motion of the water simply pushes the cloud of bubbles away from the pile. Confined bubble curtains, which employ either cofferdams or some other installation which surrounds the pile and keeps the bubbles in place, can be more effective but the cost and complexity of these systems can be considerable.

When an acoustic wave encounters a resonant bubble, acoustic energy at frequencies near IBRF is transferred into heat energy via viscous and thermal effects and is also randomly scattered out of the propagating wave. The end result is an even greater amount of noise reduction compared to the use of non-resonant bubbles and their impedance mismatch effect alone.

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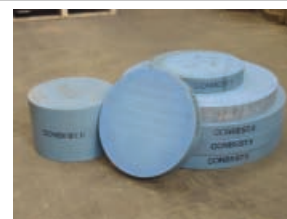


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There are a number of difficulties in realizing this system in a real-world piling scenario, however. First, a system of creating the bubbles must be developed. Freely-rising bubbles are not stable at the large sizes required for low-frequency noise reduction, and beside that fact, the use of large compressors to continually generate these bubbles is unnecessarily complex and cumbersome. The system developed at ARL uses specialized encapsulated air bubbles which still allows for resonant losses, but is rugged enough for marine deployment, is inexpensive to produce, and allows for simple installation. The resonators are then put into a stationary position around the pile in a particular configuration which maximizes its noise reduction capabilities.

Encapsulated bubbles have many advantages to freely-rising bubbles: a continuous air supply is not required, which eliminates the need for large compressors and hoses; currents cannot move the encapsulated bubbles downstream and away from the pile, which eliminate the need for a complex system to contain the bubbles; the resonators can be optimized to reduce noise in a particular frequency range; the amount of reduction can be controlled, so if only a small amount of reduction is required, a simpler system can be used; and since the encapsulated bubbles can be held in a stationary location around the pile, noise from batter piles can be treated as effectively as standard piles.

Experiments performed at ARL demonstrate the system's ability to reduce low-frequency sound compared to freely-rising bubbles. Specifically, the efficacy of both small freely-rising bubbles, such as those in standard bubble curtains, and the resonant noise reduction system described above were studied

for frequencies typically produced at large amplitude by pile driving. Results comparing the two modalities are given in the chart on page 74.

The results demonstrate that although freely-rising bubbles, using a flow rate of 10 cfm, are capable of reducing noise, they do not work as well as the resonators at very low frequencies. For example, at 60 Hz the freely-rising bubbles demonstrated about 1 dB of reduction while the resonators demonstrated about 15 dB of reduction. In this experiment the chosen resonators were large enough to maximally reduce noise at frequencies around 100 Hz (about 48 dB of noise reduction) while still reducing 1000 Hz noise by 12 dB. Noise reduction on the order of 40 dB—50 dB is significant: to put it into perspective, it is approximately the difference in sound pressure level between a busy city street (about 80 dB to 90 dB) and a quiet library (about 40 dB). These results also demonstrate the ability to control the levels of noise reduction, which varies based on the number of resonators used in the experiment.

There are many advantages to this new noise reduction system, as stated above. The peak reduction frequency can be modified to meet the particular needs of the situation, the amount of reduction can be modified, the system does not need a continuous supply of air, it can be applied to batter piles as well as standard piles, and it's simple to deploy and recover.

Mark Wochner PhD is a co-founder of AdBm Technologies, based out of Austin TX. He may be reached at mark@adbmtech.com. ▼






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Figure 7. Owensboro Riverwall, Owensboro, Kentucky (2011)



OPEN CELL® System: 2012

By: Todd S. Nottingham, P.E., PND Engineers, Inc. & Michael N. Huggins, P.E., PND Engineers, Inc.

History & Development

Straw, sticks, and branches to reinforce walls have been utilized since the earliest part of human history. These ancient walls are similar to the mechanically stabilized earth concepts of today that use geotextiles and other materials. The strand-like materials reinforce across zones of failure, and transfer load away from an exposed face. Around 100 years ago steel “zee” sheet piles became prevalent, being used for retaining earth by resisting direct soil pressure as cantilever or tie-back walls. Similarly, “flatweb” sheet piles entered mainstream use in classic closed

circular cell wall construction. During the late 1970s, PND Engineers, Inc. (PND) worked and experimented with developing an earth retention system that combined reinforced earth principles of the near and distant past that utilized high capacity flatweb sheet piles as the primary soil-reinforcing element.

This engineering experimentation resulted in a new type of mechanically stabilized earth (MSE) wall system that is being used throughout North America and gaining application in far-flung reaches around the globe. This patented arrangement – called the OPEN CELL® system, referring to its U-shape – com-

Continued on page 79

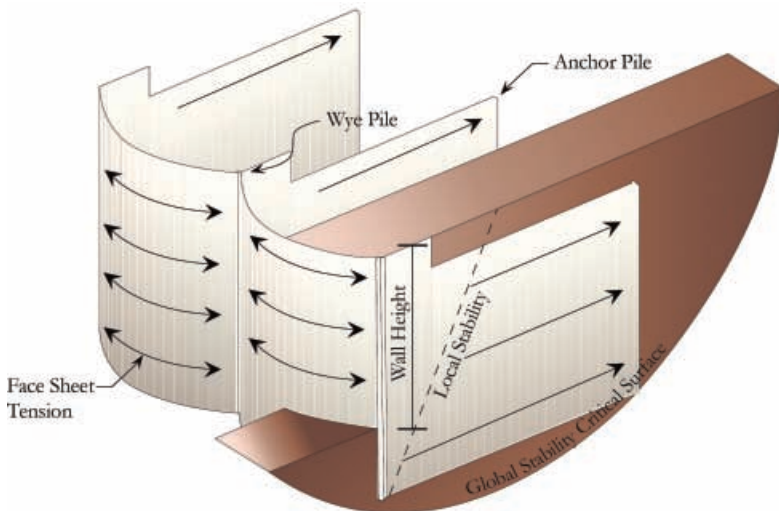


Figure 1. Global & Local Stability Diagram



Figure 2. Interlock Soil Anchors



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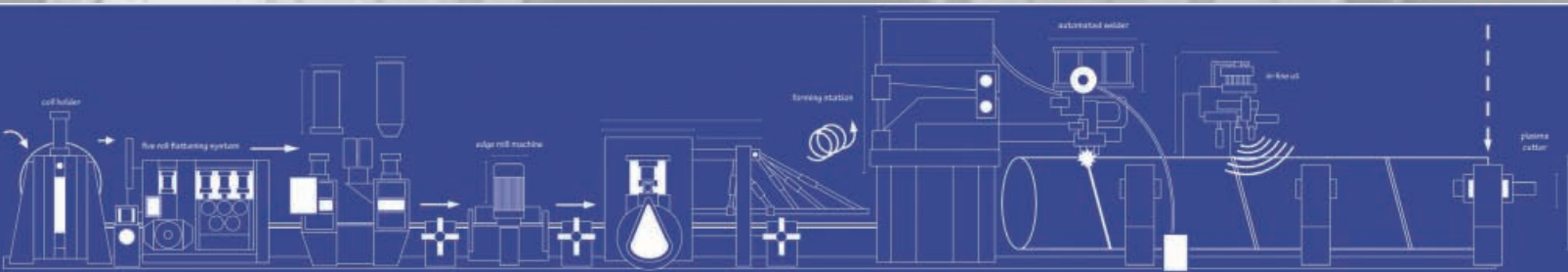
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GRANULAR SOILS:

$R_u = K \cdot A \cdot EOP$, where:

EOP is the effective overburden pressure
K varies with density and other properties (including influence of the "staples" used in the analogy above).
A is the area of the resisting sheet pile.

COHESIVE SOILS:

$R_u = K \cdot A \cdot S_u$, where:

K is the soil related constant.
A is the area of the resisting sheet pile.
S_u is the shear strength of the soil.

Figure 3. Formulas for Sheet Pile Resistance

binest ancient and state-of-the-art technologies into a singularly economical and robust wall system.

The OPEN CELL system was first used by PND in 1980 for bridge abutments in a remote area of Alaska’s North Slope. Since then, further development and refinement of the system and analysis have led to a variety of applications with over 185 structures built. Improvements in the technology for fabrication of sheet pile involving better steel, improved rolling tolerances, greater interlock strength and improved interlock swing have allowed the OPEN CELL system to be deployed in more complex configurations and situations. In addition, improvements in connectors from modern welding processes, as well as extrusions, have provided further opportunities.

Design and Analysis

The key feature in the overall system is the flatweb sheet pile. Figure 1 depicts the overall global and local stability wedges and arcs that are typically investigated for wall stability. This figure also shows the main components of the wall including face sheets, tail wall sheets, the wye pile and anchor pile.

The interaction of driven flat sheet piles, utilized by the OPEN CELL system, mechanically stabilizes filled or in-situ soils. The tensioned hoop of the wall face is anchored by tail-walls that reinforce the present soils, and stabilize the structure. Interlocks between discrete sheet pile in the tail wall act as soil anchors along the entire vertical pile length (see Figure 2). The capacity developed from soil anchor theory allows for shorter development length of the wall beyond potential failure planes than standard steel/soil friction theory on a smooth plane. This distinction is analogous to the effort required in pulling out a sheet of paper from under a stack of encyclopedias. The endeavor gets much trickier if there are many staples distributed evenly over the surface.

By way of illustrative equations, friction resistances for granular and cohesive soils are generally characterized by the formulas in Figure 3.

Use of these pile/soil resistances generally follow applicable guiding principles for MSE wall type analysis where adequate pullout beyond potential failure planes such as an active wedge is desired (see Figure 1). Loading derived from live, seismic phreatic water, fascia loading, scour, etc. are all be critical elements to be contemplated in design of any OPEN CELL wall system.

A review of the OPEN CELL structures constructed in a myriad of conditions led to the development of Figure 4, which depicts total wall materials per foot of retained wall height. In all but the most extreme cases, the structures built to date fall within the material quantity band shown. This graphic can be used to identify the economic potential of the OPEN CELL system on a given application. In general, higher material quantities are needed in extremely soft or high seismic areas. Most applications will trend toward the bottom of the band.

Wall deflections during and after construction due to settlement and horizontal expansion or lateral spreading are addressed during design of any OPEN CELL structure. Vertical deflections of filled bulkheads of several feet can and have

Continued on page 81

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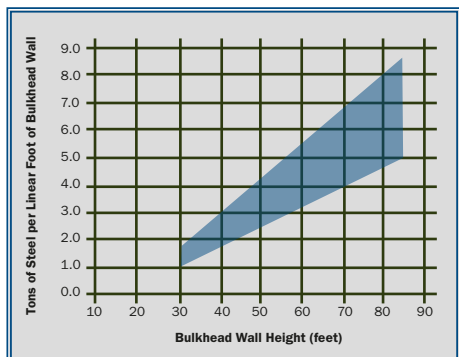


Figure 4. Material Estimate Graph

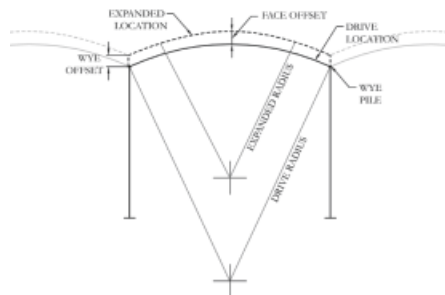


Figure 5. Cell Expansion

occurred and depend upon the underlying soil. The nature of the OPEN CELL system allows for this settlement without loss of stability. Horizontal expansion of the wall occurs due to rigid take up of the driven sheet pile. Flat sheet piles have a relatively loose interlock that will take up similar to a chain link when loaded. *Figure 5* shows typical wall horizontal movements that are calculated/estimated during design.

Construction

Although the learning curve for constructing an OPEN CELL structure can be steep, many contractors who have installed the system agree that the process by which piles are driven makes the OPEN CELL structure easier to install than traditional sheet pile walls. Single level templates are common, though two level templates have been used in areas of deeper driving or higher winds or current. Construction methods usually involve relatively simple templates with more attention paid to alignment and location of face sheets and wye piles—and less focus placed on the exact tail wall locations.

As a matter of common practice, construction of the cells begins near the middle of the wall. The classic effort to “thread and drive” proceeds towards the free ends, or end cells. However, some projects require more elaborate construction methods. For instance, the 1,200-foot-long OPEN CELL bulkhead wall in Umm Qasr, Iraq (*Figure 6*) was constructed with three pile driving crews – two water- and one land-based.

Unlike backfill operations for tie-back and closed cell walls, the OPEN CELL structures utilize classic high volume earth moving methods with associated production rates. Bulldozers are commonly deployed to bulk place fills. Grading proceeds along the tail walls, with face arcs filled last. Fill does not have to be placed with a clam-shell or excavator as is often the case in closed cell construction. Working around and avoiding damage to tie-back wall hardware and anchor blocks is also eliminated and the elaborate sequencing to maintain face alignment as backfill work progresses.



Figure 6. Umm Qasr Seawall, Under Construction (2010)

Recent Example Projects

PND provided design and construction support for the **Owensboro Riverwall** (see *Figure 7*), a redevelopment design-build project for the City of Owensboro, utilizing an OPEN CELL® bulkhead, to support a park-like public terrace overlooking the Ohio River. The wall is 1,600 feet long, up to 40 feet high, and uses 55-foot-long flat sheets. The project origi-

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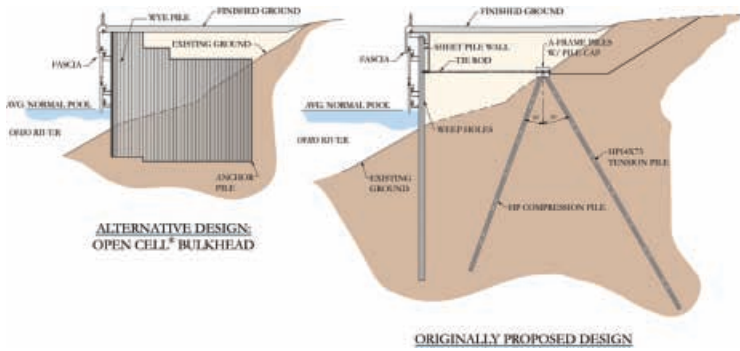


Figure 8. Alternative OPEN CELL® Design and Originally Proposed Design



Figure 9. Cates Landing Dock, 2/2012

nally incorporated a tie-back wall system (Figure 8), but after a value engineering process with alternative bids, the contractor’s (Richard Goettle, Inc. of Cincinnati, OH and Hall Contracting of Kentucky, Inc. of Louisville, KY) proposal to construct the Riverwall using the OPEN CELL approach (Figure 8) saved the City approximately \$13 million on a \$45 million project.

The Cates Landing Multi-Purpose Dock is currently under construction for the Northwest Tennessee Regional Port Authority in Tiptonville, Tennessee. This OPEN CELL bulkhead has wall heights up to 65 feet. Wall construction was performed by C.J. Mahan of Grove City, Ohio. The project is expected to be completed in the summer of 2012. ▼

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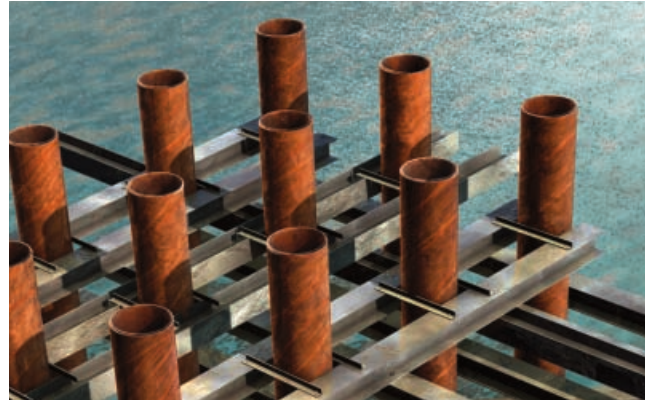
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Developing Production Pile Driving Criteria from Test Pile Data – **A Synthesis of Practice**

By W. Robert Thompson, III, P.E., D.GE, Principal Engineer, Dan Brown and Associates, PC, Sequatchie, TN, USA
rthompson@danbrownandassociates.com

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Introduction

Although exploratory borings and engineering studies during design are an integral part of foundation engineering, the axial resistance of a single driven pile foundation is ultimately determined by the criteria used to decide when to stop driving the pile during construction. The use of test piles for the purpose of developing the pile installation criteria can be instrumental in constructing reliable and cost-effective driven pile foundations.

Dan Brown and Associates, PC (DBA) has recently completed the report *NCHRP Synthesis 418 Developing Production Pile Driving Criteria from Test Pile Data*, sponsored by the National Cooperative Highway Research Program of the Transportation Research Board. The synthesis includes a comprehensive literature review on the range of practices included in test pile programs and their use in developing production

pile driving criteria, the results of a survey of the current practices used by transportation agencies to develop pile driving criteria (with special attention on the use of test pile data), and highlights of useful practices gleaned from the literature and surveys. The information collected indicates that practices used to develop driving criteria can be described as highly variable in terms of the level and sophistication of the testing performed.

Survey Process

The most significant source of information for the synthesis was a two-phased survey of state Department of Transportation (DOT) current practices. The first phase (Phase I) was a written survey developed to gather information on how the surveyed agencies were developing and utilizing pile driving criteria. The surveys were sent to the geotechnical engineer (or equivalent)

Continued on page 87

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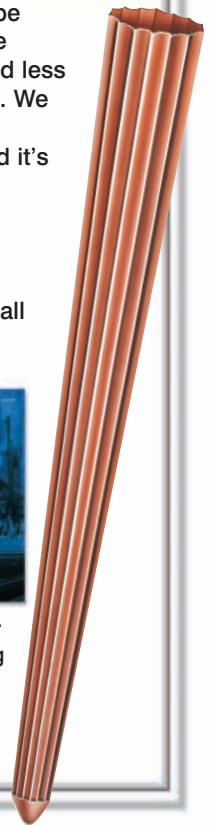
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in all 50 state DOTs, plus the District of Columbia and Puerto Rico. Of the 52 agencies surveyed, 44 provided responses to the survey.

The second phase (Phase II) consisted of telephone interviews of selected agencies based on the responses to the written survey. The person interviewed at each agency was typically the state geotechnical engineer, a senior level geotechnical design engineer, or other design engineer or engineering manager considered by the agency to be responsible for or familiar with the development and/or review of pile driving criteria. The agencies were selected to survey a variety of practices, as well as different geographical and subsurface conditions across the country.

The goals of Phase II were to explore in more detail some of the practices highlighted in the survey responses, obtain more details about the experiences of the interviewees, and to provide information concerning potential problems and difficulties in the interpretation of pile test results and their application to developing pile driving criteria. The interviews were loosely structured to allow the discussions to follow any appropriate course based on the Phase I survey responses of the agency being interviewed or subjects that came up during the interviews themselves.

Common Practices

Practices vary widely nationwide for developing and using production pile driving criteria. Common practices include the following:

1. Use a driving criteria based on a simple pile driving formula or a wave equation analysis without any test piles. This practice is widespread for routine projects or simple situations like steel piles driven to bear on rock or a hard bearing layer.
2. Use production test piles with High Strain Dynamic Testing (HSDT) (ASTM D4985-08) measurements. This practice is most often employed using test piles which serve as production piles and become part of the permanent foundation. The measurements obtained from the HSDT are often used to refine the results of a wave equation analysis so that improved reliability in the driving criteria is achieved. Signal matching analysis is routinely employed to obtain more detailed information about the test pile behavior and the soil response.
3. Use pre-production test piles with HSDT measurements and/or static load tests (SLT) (ASTM D1143-07e1) to develop driving criteria based on a more reliable determination of the axial resistance of a test pile. Rapid load tests (RLT) (ASTM D7383-08) are used on rare occasions in lieu of SLT.

The number and types of test piles, when used, varies according to predominant pile type, ground conditions, size of project, and agency practice. Many agencies evaluate the costs versus benefits on a project specific basis, and this evaluation includes the consideration of the increased values of resistance factor for design that is provided in the AASHTO code.

Issues in Practice

The synthesis identifies important issues with respect to developing pile driving criteria. Some of the more significant issues are summarized here.

Methods for Developing Pile Driving Criteria

Pile driving criteria are often developed using a combination of two or more individual techniques. Common elements, used alone or in various combinations, include: minimum tip elevation, minimum blow count, practical refusal, blow counts correlated to wave equation analysis, and blow counts correlated to field testing (static, dynamic, or rapid).

Methods of Selecting the Driving System

Since different types or sizes of hammers will influence the driving resistance for a given static axial resistance, the selection of the pile driving system will have an influence on the driving criteria. Pile driving formulas or wave equation analysis are the most common methods for establishing the minimum required hammer energy. Wave equation analysis is a common technique to evaluate drivability and productivity of pile/hammer combinations.

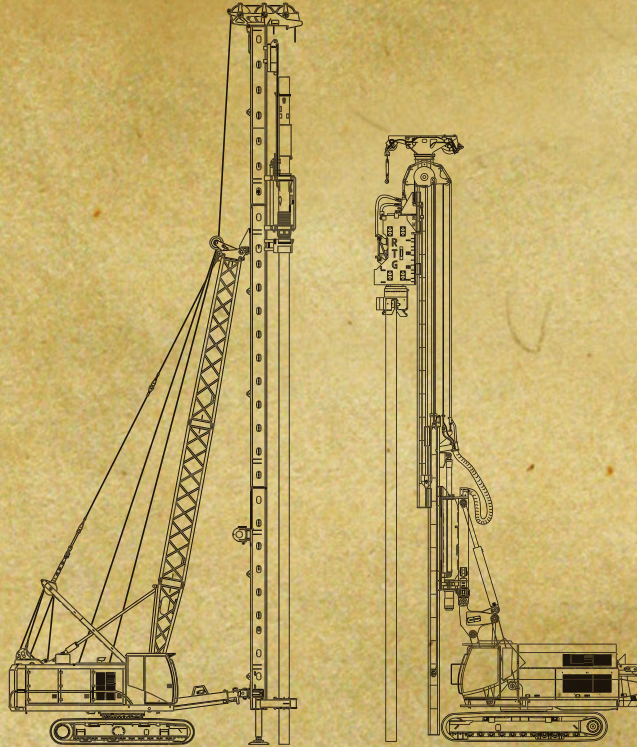
Effect of Soil Setup or Relaxation

Soil setup (increase of resistance over time) can have a major impact on driving criteria since the driving criteria are set for the conditions at the time of driving, not later after setup has occurred. The same issues hold true for relaxation (the loss of resistance over time) in those rare soil and rock formations where it occurs.

Use of Data Collected During the Testing Program

Data collected from test piles can be used in several ways to develop production pile criteria. Some of these uses include: verification of hammer performance and drivability; measurements to indicate axial resistance at specific blow counts; verification of axial resistance from static load tests; measurements to demonstrate setup; and, signal matching of HSDT results to provide refined soil resistance models for wave equation analysis for production piles.

Continued on page 89



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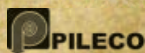


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Useful Practices: Pile Driving Criteria Developed Without Test Pile Data

While the focus of the report was the use of test pile data to develop driving criteria, it was important to include a discussion of criteria developed without the use of test piles due to the volume of agencies that do not use test pile data. The most common circumstances where this practice may be effective include small projects with relatively few piles, projects where piles are driven to bear on rock, and projects where local experience suggests that the costs and time involved in performing test pile measurements are not justified. In these situations, the driving criteria are established in advance using wave equation analysis or a pile driving formula. The piles are driven to meet the pre-established criteria, often verified with a driving formula.

Useful Practices: Pile Driving Criteria Developed With Test Pile Data

Through the written survey response and the interviews, several useful practices with regards to using test piles were identified. Most agencies integrate combinations of two or more practices to develop criteria, examples of which are included in the syn-

thesis report. Some of the more significant individual practices identified are summarized here.

Addressing Site Variability

To address site variability, and to address the challenges of extrapolating results from a static load test across a project site, HSDT is the predominant method used by most agencies to determine axial resistance of test piles on a routine basis. Several techniques of utilizing this method were noted in the surveys. One technique is to divide a site into control zones where a single test pile (static or dynamic) would be representative of the subsurface conditions within each control zone. Another approach is to utilize a preproduction HSDT test pile (usually in a production pile location) at each pier location.



Use of Pre-production versus Production Test Piles

Some agencies take advantage of using pre-production test piles to establish or finalize driving criteria; however, most agencies do not routinely utilize pre-production test piles. A typical practice is to utilize a production pile as a test pile, usually the first production pile at a given pier loca-

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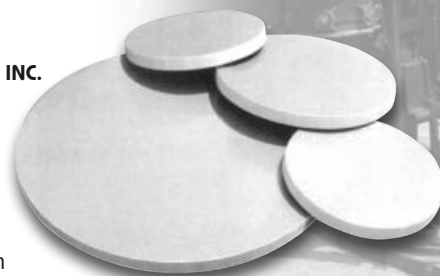
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tion, with a driving criteria established in advance of the installation of the test pile. The results of the production test pile either verify that the established criteria are suitable or are used to make modifications to the criteria.

Use of High Strain Dynamic Testing (HSDT)

Most agencies have determined HSDT to be a useful practice on at least some, if not most, driven pile projects. A common practice is to utilize HSDT on at least one pile per substructure to develop and/or verify driving criteria, often using signal matching analysis to estimate static resistance. Another practice is using restrrike measurements for evaluation of setup or for verification of pile resistance/integrity. In certain circumstances, most notably with large pile sizes, agencies include one or more conventional SLT to provide a site-specific calibration of the HSDT correlations to static resistance.

Use of Static Load Tests (SLT) or Rapid Load Tests (RLT)

Although most agencies employ SLT infrequently, SLT are recognized to be a useful technology by providing the most direct measure of the pile's static resistance versus the driving data. SLT is most often employed only on large projects where the costs of the test(s) can be recouped by the savings from more efficient foundation designs. A few agencies recognize RLT as a useful and sometimes cost-effective alternate to SLT for large capacity piles.

Conclusion

This article has provided a very brief summary of the synthesis report NCHRP Synthesis 418 Developing Production Pile Driving Criteria from Test Pile Data. Detailed discussions of the issues presented here and others, as well as the data and results from both phases of the survey, are included in the report, which can be obtained through the TRB at <http://www.trb.org/Publications/Blurbs/165831.aspx>. Although the data collected indicates that the approach to developing driving criteria is highly variable, several common useful practices were identified and presented, along with examples of the practical approaches several agencies use to integrate a range of technologies to develop pile driving criteria under typical conditions. The limitations and impediments to implementation of each practice are discussed as well.

Acknowledgements


The authors would like to thank all of the agencies that participated in the survey, particularly those that participated in the Phase II interviews. The time and attention provided by all of the participants is greatly appreciated. The authors would also like to thank the technical review panel for their time and efforts: Mr. Tony Allen, P.E. (WSDOT), Mr. Stephen Borg, P.E. (NYDOT), Mr. Larry Jones, P.E. (FDOT), Mr. Brian Liebich (Caltrans), Dr. Michael McVay (University of Florida), and Dr. Naser Abu-Hejleh, P.E. (FHWA). The work of Mr. Jon Williams of TRB is gratefully appreciated for his management of the project on behalf of TRB. ▼




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In 2012, the Pile Driving Contractors placed an emphasis on providing greater educational opportunities for PDCA members and those associated with the pile driving industry. In an effort to make sure all PDCA members have access to quality programs and continuing educational opportunities, the PDCA's Education Committee developed and scheduled more than eight seminars, workshops, or conferences in 2012. An additional component of the PDCA strategic plan is to create liaisons with organizations that support mutual goals as that of the PDCA. On March 16, 2012, the Pile Driving Contractors met with Brian Sien, Administrator for the Academy of Geo-Professionals (AGP), and agreed to support the AGP with the PDCA acting as a Cooperating Organization.

The Academy of Geo-Professionals (AGP) was founded in October 2008 by practicing geo-professionals who were members of the American Society of Civil Engineers' Geo-Institute. The Academy was created primarily to offer a voluntary, post-license credential that provides professional engineers an opportunity to gain further recognition in the broad field of geotechnical engineering.

AGP's goal is dedicated to improving the practice, elevating the standards, and advancing the profession of geo-professional engineering. The Academy will meet these goals and objectives with the oversight of our Diplomate, Geotechnical Engineer (D.GE) specialty certification program for geo-technical professional engineers.

The objectives and missions of the Academy of Geo-Professionals are to:

1. Identifying and certifying individuals with specialized knowledge in the Geotechnical engineering for the benefit of the public.
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4. Supporting and promoting positions on Geotechnical engineering issues important to the public health, safety, and welfare.

5. Encouraging life-long learning and continued professional development.

The objectives and mission of the Academy of Geo-Professionals are consistent with the PDCA's Mission Statement that states (in part), "PDCA's mission is to promote driven pile and provide exceptional support and service to our members." To do this, "We will provide educational opportunities and technical support to our members; Represent the pile driving industry before various organizations and government agencies; and Build relationships and disseminate information through networking opportunities."

To read the PDCA's entire Mission and Vision Statement go to www.piledrivers.org and click on the "Vision & Mission Statements" link at the top of the home page.

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Dealing with **Piling Corrosion**

Introduction

Piling has been used to support man-made structures since the Middle Ages. The Romans used wooden piles to build homes, bridges, roads and viaducts all over Europe. When the first steel piles became available around the turn of the 20th Century, piles became capable of being driven down into adverse soil conditions more than ever before. H-piles, pipe piles, and sheet piles are specified today for demanding marine and deep foundation applications in all types of soil conditions. Despite the historical success of driven steel piles, corrosion still remains an Achilles heel that should be accounted for when engineering the piling for any construction project. A cost effective approach to combating the effects of corrosion over the expected service life of the piles can significantly reduce overall project costs.

Corrosion of Iron and Steel

Corrosion of iron and steel in soil, water or moist outdoor environments is caused by electro-chemical reactions. It is a natural process where the binding energy within the steel atoms is weakened to the point that one or more electrons leave the atomic structure of the metal. Electric current is carried through water by the transport of metal ions. It requires the presence of oxygen, an electrolyte, and conditions that produce anodic and cathodic surface areas on the metal. The anodic reaction (oxidation) represents the acquisition of charges by the corroding metal, while the cathodic reaction (reduction) represents the loss of charges by the hydrogen ions that are discharged. The corrosive metal loss occurs at the anodic regions on the surface of the metal where the passage of current out of the metal is accompanied by the dissociation of ferrous ions.

Corrosion of Steel Piling in Soil

The corrosion of steel piles requires the diffusion of oxygen from the soil to the steel surface in the presence of a conductive liquid or soil (electrolyte). Corrosion usually requires the soil to be pervious to air. Variations in soil conditions create a differential aeration on the surface of the pile that serves to create the cathodic and anodic areas on the piling surface.

In general, the corrosion behavior of structural steel in soil can be divided into two categories: corrosion in disturbed soil and in undisturbed soil. Disturbed soil is soil in which digging, backfilling, or other soil upheaval has taken place. Oxygen is introduced into the soil as a natural consequence of soil disturbance in the presence of air. The corrosion rate of steel in disturbed soil is influenced by a number of corrosion-related parameters.

These include soil resistivity, pH, soil moisture, and oxygen content within the soil. For piling driven into recent fill soils and particularly industrial fill soils, some protection may be necessary due to elevated levels of corrosive chemicals or low pH. The potential for corrosion in disturbed soils varies widely, and is most consistently associated with conductivity (lowered resistance to electric current) in the soil. Where protection is required, a durable protective corrosion layer should be applied to the piles.

Generally, undisturbed soils are so deficient in oxygen at levels a few feet below the ground line or below the water table zone; steel pilings are not appreciably affected by corrosion. Since the groundwater surface acts as a diffusion barrier, corrosion is most significant in the unsaturated zone between the ground surface and a level just below the groundwater level. Corrosion decreases with depth on piles or sheet piles in stationary, fresh water or salt water, due to the reduced oxygen content. Steel piles driven into undisturbed ground usually require no protection irrespective of the soil types encountered.

In flowing ground water however, corrosion can be significant also at greater depth.

Corrosion of Piling in Marine Environments

The life of unprotected steel piling in marine installations varies with the conditions of exposure. Wharf or pier construction in protected harbors can be expected to have a considerably longer life than shore structures that are subject to salt spray, wave action, and sand abrasion. Seawater causes more corrosion due to the high salt content than fresh water. Salt water can be mixed with fresh water, especially in harbors and river deltas.

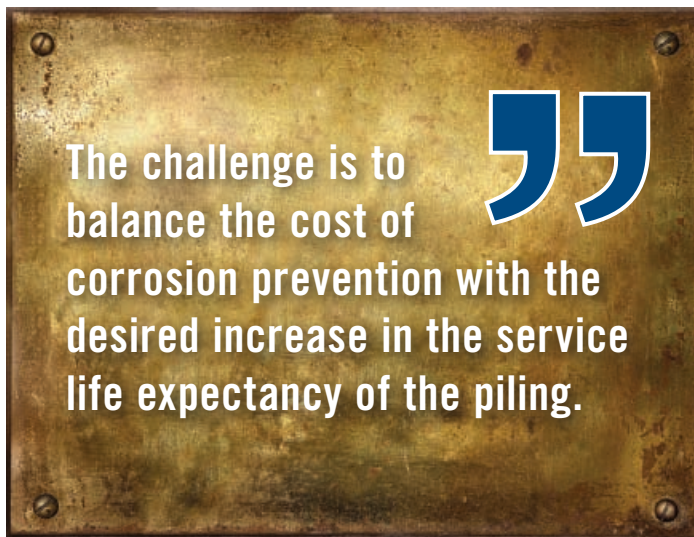
Vegetation on steel can influence the rate of corrosion. The most important factor in corrosion is the duration of exposure of the steel surface to water and the presence of corrosion-stimulating agents in the moist zone. The risk of corrosion is more serious for piles in direct contact with polluted and/or seawater. In marine splash zones, protections can be employed in the form of coatings or concrete encasement.

Sheet piling when utilized for marine applications provide the maximum strength and durability at the

lowest weight which good design can achieve. The effective life of unprotected piling, either mild steel or high yield steel, depends upon the stresses imposed on it in service along with the reduction of its cross section due to corrosion. Protective systems for sheet piling require knowledge of the stress levels and ranges in the product and the conditions of the soil/water in which it is to be driven. Whenever possible it is best to design the piling so that high bending moments or tensile stresses occur in areas away from concentrated corrosion. When necessary, cathodic protection may be appropriate in order to significantly reduce the corrosion rate of the piles.

In waterfront structures actually standing in seawater, the area immediately above water level—the so-called splash zone—is wet with a thin film of water that is saturated with oxygen.

Continued on page 98





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The area below water level is, by comparison, oxygen-starved, and is anodic to the splash zone. The most severe corrosion usually occurs within a zone about four feet high, extending from two feet below to two feet above low-water level.

In some cases there is an increase in corrosion at the mud line, not usually serious. Although oxygen cannot penetrate the soil, corrosion can occur by sulphate-reducing bacteria present in the soil. Sulphate reducing bacteria, which can exist in water and soil, colonize on steel pile faces and form a corrosion cell in which the steel becomes the anode. Accelerated Low Water Corrosion (ALWC) is defined as the localized and aggressive corrosion phenomenon that typically occurs at or below low-water level and is associated with microbial induced corrosion.

Atmospheric Corrosion

Mild carbon steels will rust in moist atmospheres, a relative humidity of over 50 percent provides the necessary amount of water, and at 80 percent or above, corrosion of bare steel is worse. The critical factors determining the atmospheric exposure rate of steel are moisture (humidity or precipitation) especially in marine salt-water environments. Piles exposed to the atmosphere are generally subject to low corrosion. However, conditions do exist in foundation structures that are conducive to severe corrosion where moisture, chlorides, and oxygen are abundant such as road runoff on a bridge deck or roadway.

Dealing with Piling Corrosion

Steel piles and sheet piles in soil and water must remain in place for a long time without corrosion affecting their load bearing capacity. Engineers usually rely upon a theoretical approach when dealing with corrosion when difficult corrosive conditions are anticipated. Ideally their designs must not result in steel piles that prove more costly for the client than the actual service conditions ultimately warranted. The challenge is to balance the cost of corrosion prevention with the desired increase in the service life expectancy of the piling. In situations where elevated rates of corrosion are likely, presented below are methods commonly utilized to protect the piles or to counter the anticipated effects of corrosion over their designed service life.

Over Dimensioning

The easiest method to provide for any corrosion damage is to over dimension the cross-sectional area of the steel piles. Increasing the wall thickness of the piling provides a corrosion allowance to insure adequate load bearing over the planned service life of the foundation structure. If a site is characterized as noncorrosive, then no corrosion allowance (sacrificial metal loss) is necessary. A common practice is to include an additional 3.2 mm (1/8 in.) to piling thickness as a contingency measure to counter higher than anticipated corrosion rates.

The amount of sacrificial metal will also depend on the amount of piling surface area exposed to the soil or water. Sheet piles and H-piles can experience corrosion over their entire surface area. Whereas for close-ended steel pipes, significant corrosion occurs normally only to the external surface of the pile; open-ended steel pipe piles may also be susceptible to internal corrosion. If the point of the open-ended pile is permanently below the ground water level and the upper head of the pile is hermetically sealed, the pile forms a closed, air-tight casing and corrosion of the internal surface of the pile becomes negligible.

High Yield Steels

Specifying higher yield strength steel in lieu of a mild steel piling grade is another method to counter potential corrosion losses over the life of the project. Increasing the minimum yield strength of the piling provides an extra measure to enable it to maintain its load bearing capability if and when any corrosion is experienced.

Coatings

Corrosion protective coatings are rarely used on piles in soil because of potential damage while the piles are driven. However when deemed necessary, organic resin coatings can be an economical choice. There are specialized paint and coating systems specifically designed for steel sheet and support piles in soil, fresh water and salt water marine applications. Concrete jacking and fiber wraps can also be very cost effective for marine applications.



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Cathodic Protection

Cathodic protection is a corrosion protection method where the corrosion current in the piling is compensated with a protective reverse current. The effect of the DC current is to force the metallic surface to become cathodic (i.e., collecting current). If the current is of sufficient magnitude, all metallic surfaces will become cathodic to the external anode. Using cathodic protection, the corrosion of steel piles can also be monitored with high reliability.

Summary

A review of the literature dealing with the various types of steel piling corrosion can yield a tremendous amount of data and helpful information. There are many case studies covering corrosion of driven steel piles in various marine and inland installations. The historical corrosion rates observed in these studies can provide the engineer with an informed insight as to how he may cost effectively adapt his piling design criteria to deal with corrosion over the service life of his project. ▼

Soil corrosion
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Seven Things Highly Productive People Do

By Ilya Pozin

You probably don't want to admit it but you love distractions. In fact, just like monkeys, you get a shot of dopamine every time something pulls you in another direction. Why do you think you check your email so much?

Want to be more productive and get your focus back? There are no secret tricks here... do one thing at a time. Stop multi-tasking—it's just another form of distraction.

Easier said than done, I know.



Here are ten tips for staying productive:

1. Work backwards from goals to milestones to tasks. Writing “launch company website” at the top of your to-do list is a sure way to make sure you never get it done. Break down the work into smaller and smaller chunks until you have specific tasks that can be accomplished in a few hours or less: Sketch a wireframe, outline an introduction for the homepage video, etc. That's how you set goals and actually succeed in crossing them off your list.

2. Stop multi-tasking. No, seriously—stop. Switching from task to task quickly does not work. In fact, changing tasks more than 10 times in a day makes you dumber than being stoned (http://articles.cnn.com/2005-04-22/world/text.iq_1_mails-iq-messages?_s=PM:WORLD). When you're stoned, your IQ drops by five points. When you multitask, it drops by an average of 10 points, 15 for men, five for women (yes, men are three times as bad at multitasking than women).

3. Be militant about eliminating distractions. Lock your door, put a sign up, turn off your phone, texts, email, and instant messaging. In fact, if you know you may sneak a peek at your email, set it to offline mode, or even turn off your Internet connection. Go to a quiet area and focus on completing one task.

4. Schedule your email. Pick two or three times during the day when you're

going to use your email. Checking your email constantly throughout the day creates a ton of noise and kills your productivity.

5. Use the phone. Email isn't meant for conversations. Don't reply more than twice to an email. Pick up the phone instead.

6. Work on your own agenda. Don't let something else set your day. Most people go right to their emails and start freaking out. You will end up at inbox-zero, but accomplish nothing. After you wake up, drink water so you rehydrate, eat a good breakfast to replenish your glucose, then set prioritized goals for the rest of your day.

7. Work in 60 to 90 minute intervals. Your brain uses up more glucose than any other bodily activity. Typically you will have spent most of it after 60-90 minutes. (That's why you feel so burned out after super long meetings.) So take a break: Get up, go for a walk, have a snack, do something completely different to recharge. And yes, that means you need an extra hour for breaks, not including lunch, so if you're required to get eight hours of work done each day, plan to be there for 9.5-10 hours.

Ilya Pozin founded his first company, Ciplex, at age 17. The digital marketing and creative agency caters to small businesses and start-ups. @ilyaNeverSleeps ▼

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The Big Picture on Bid Protests

By C. Ryan Maloney, cmaloney@foley.com – *Foley & Lardner LLP*

The Department of Transportation has just announced that the major multi-million dollar bridge project that your company spent weeks preparing your best and most competitive bid for has been awarded to another contractor. You know your company has the experience and qualifications to do the work, your bid was highly competitive, and this is the type of project that could have kept your company busy and profitable for years. You know you have the right to file a bid protest regarding the decision, but should you? What would be the grounds for the protest? What would be the chances of success? Is it worth the time, effort and expense?

These are all important considerations when deciding whether to pursue a

bid protest. Unfortunately, in most cases, there is not much time to sit back and mull things over, as almost all bid protests have to be lodged quickly, usually within a matter of days after the public entity announces the contract award. This article is intended to provide a “big picture” understanding of the basic framework for bid protests and of certain common types of issues that may be the basis for a successful protest. Of course, each situation is unique, and the varying governmental entities putting projects out for bid each have their own specific rules, procedures, deadlines and standards, which can sometimes be traps for the unwary. Therefore, it is important to consult legal counsel to advise and assist you with proceeding with a bid protest.

Act Fast

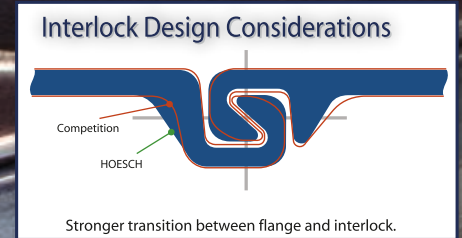
As noted above, bid protests almost always require fast action. The very first thing to do is review the applicable bid protest procedures of the public entity to determine the key deadlines and what needs to be done to file a protest. Failure to meet any of the deadlines generally



Continued on page 105

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acts as a complete waiver of the right to protest, so understanding what has to be done and when it has to be done by is critically important to a successful protest.

Second, it is important to be able to review documentation related to the bidding and evaluation process as soon as possible. Many of the key documents may be in your files, but some will have to be requested from the public entity via a public records request or other method. It is important to make such a request to the public entity as soon as possible after the award is announced, and even before the decision to protest is made, in order to try to allow time to review prior to the bid protest filing deadline. In particular, you should request and review the bid solicitation documents issued by the public entity, including all addenda or amendments, the bids submitted by you and the other relevant bidders, the bid tabulations by the public entity, minutes or transcripts of any meetings of bid evaluators, and any emails or other communications from the public entity related to the bid solicitation or award.

Common Grounds for Successful Bid Protests

Obviously, not every bid lost will provide the basis for a protest. As a practical matter, if your company's bid is not at least close to the lowest bid, there is likely to be little chance of a successful bid protest. This is because most successful bid protests turn on either the lowest bid having been erroneously rejected by the governmental entity, with the successful protest resulting in the award being granted to the lowest bid, or they turn on the governmental entity having failed erroneously to

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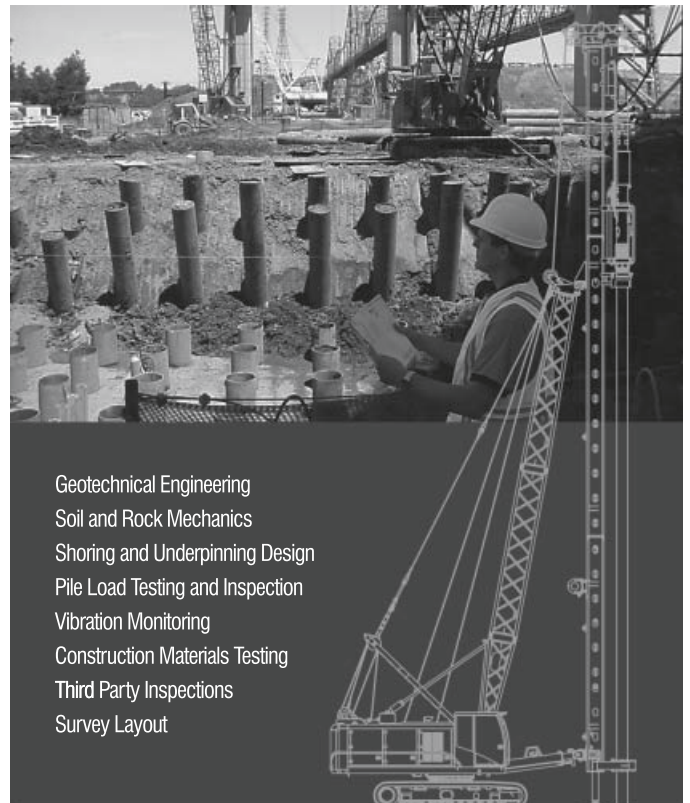
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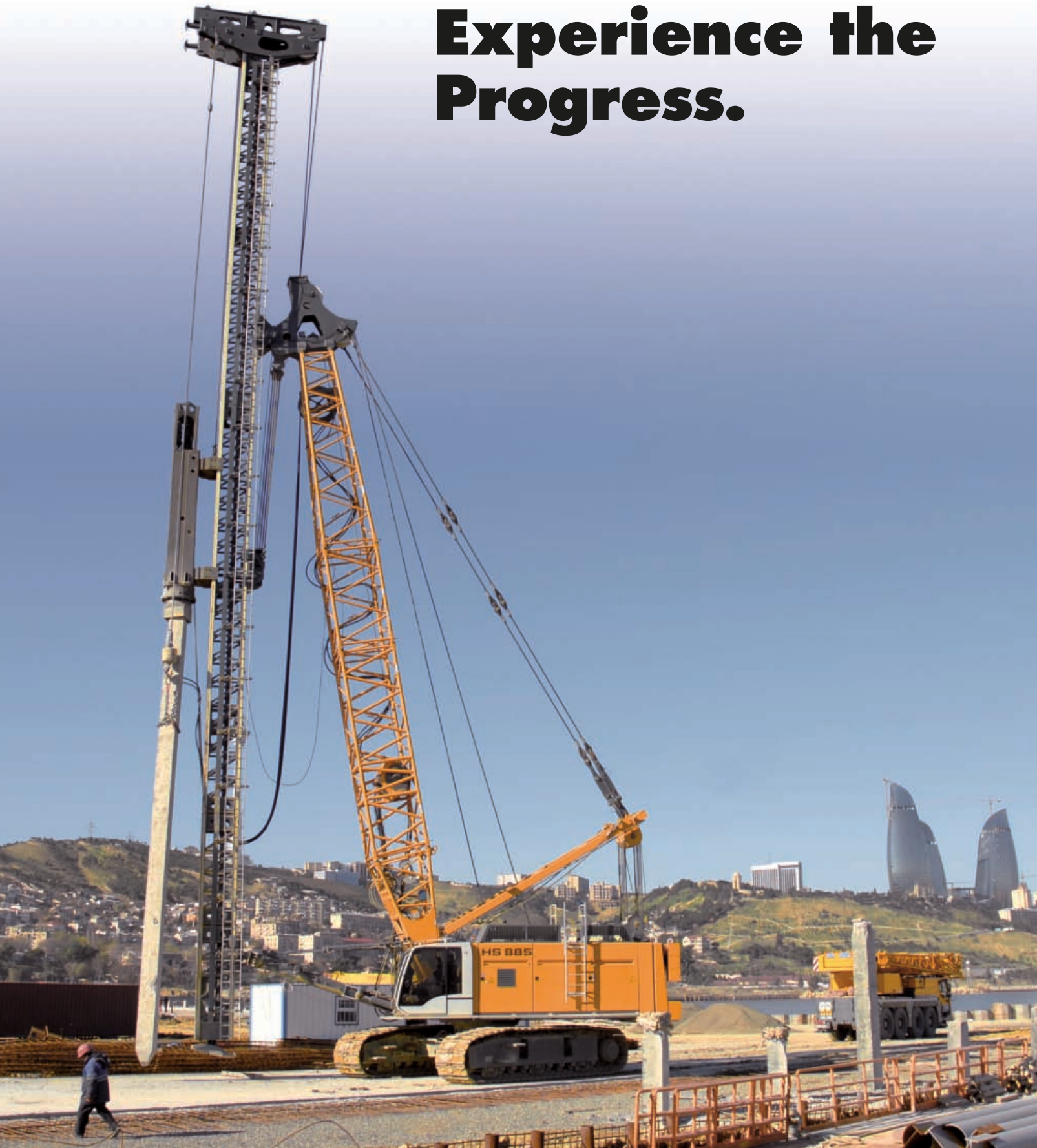


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reject the lowest bid for some reason, with the successful protest resulting in rejection of the lowest bid and award of the bid to the second lowest bidder. Although there are cases where a protest by a bidder other than the lowest or second lowest bidder is successful, such as when the top two lowest bids should have been rejected or when the entire bid process was so flawed as to require a re-bid, such situations are much less common.

While every potential bid protest situation is unique, there are certain common types of issues that are generally more likely to lead to a successful bid protest. First, a protest is more likely to be successful if it can be established that the public entity failed to follow its own rules or requirements, either in the bid solicitation documents or in the entity's governing statutes or regulations. For example, if the bid solicitation documents provided that the public entity will award the contract to the lowest bid from among the prequalified bidders, the public entity's award of the contract to the second lowest bidder on the basis that it was more qualified than the low bidder, when both bidders had been prequalified, may likely be the basis for a successful protest due to the public entity's failure to follow its own bid solicitation requirements. Another example might be if a public entity failed to follow or incorrectly applied the scoring or evaluation criteria described in the bid solicitation documents when evaluating or scoring the bids. If it can be established that the public entity's failure to follow the evaluation or scoring criteria changed the outcome, then that could likely serve as the basis for a successful bid protest.

A protest is more likely to be successful if it can be established that the low bid deviated from the bid solicitation requirements in a way that affects pricing or provides the low bidder with a competitive advantage over other bidders.

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Second, a protest is more likely to be successful if it can be established that the low bid deviated from the bid solicitation requirements in a way that affects pricing or provides the low bidder with a competitive advantage over other bidders. Deviations that affect price or competition are generally considered to be material deviations that cannot be waived by the public entity and that require rejection of the bid. For example, if the bid solicitation expressly required bidders to use certain specific types of materials in the work, an award of the bid to a bidder who proposed to use a different and less expensive type of material may likely give rise to a successful protest since the winning bidder would have obtained a pricing advantage over the other bidders by failing to comply with the bid requirement. Another example might be if the bid solicitation documents required the bidders to identify and list all of their subcontractors as part of their bids. If the winning bidder failed to do so, this may likely give rise to a successful protest since the winning vendor would have obtained a competitive advantage over other bidders by not being required to commit to specific subcontractors at the time of bid submittal and by potentially being able to accept lower subcontractor bids after opening of the bids.

In contrast, bid deviations that do not affect price or give a bidder a competitive advantage over other bidders are generally considered minor deviations that the public entity has the discretion to waive. Bid protests very often turn on whether a deviation in a bid was a minor deviation that could be waived or a material deviation that could not be waived and required rejection of the bid. The law generally gives public entities broad discretion in making such determinations, and an honest exercise of that discretion will generally not be overturned even if the decision may appear to be erroneous and reasonable people could disagree. However, the law also requires public entities to act rationally and in the best interest of the taxpayer, so clear cases of a significant effect on price or an unfair competitive advantage, particularly if the end result of the protest would save the public entity money, are generally strong grounds for a bid protest.





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Conclusion

Given the fierce competition for federal, state and local government work, contractors are likely to face the decision on whether to file a bid protest at some point. Contractors with a good "big picture" understanding of bid protests and of the need for fast action will be best positioned to timely protest in the right circumstances and more often obtain successful results from a bid protest, which can mean the difference between winning and losing a contract. ▼

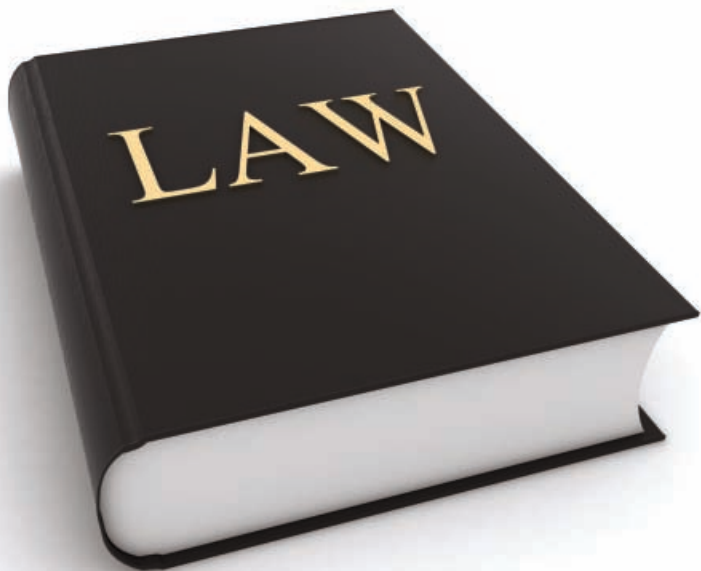


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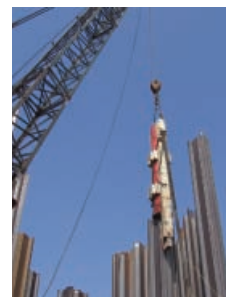
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