Corman-Imbach Marine Inc. rebuilds the Annapolis City Dock

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Efficient Concrete Pile Design in D.C.

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PILEDRIVER

The Official Publication of The Pile Driving Contractors Association | Q2 2008 Vol. 5, No. 2

Project of the Year Award

Project Value Greater than $1 Million

Weeks Marine wins award for Virginia Wharf Project

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On the Cover:
Weeks Marine, Inc.

Driving Together

PDCA Members Unite to Support the Industry

By Van Hogan, PDCA President

As I begin my term as president of the PDCA my thoughts drift back to the time when I first became involved in this organization. In spring 2001, the PDCA had just completed its first strategic planning session. Charlie Ellis, our chairman at the time, issued a call for volunteers to begin implementing that plan. By that time, I had attended several Annual Meetings, then called Winter Roundtables, and had been very impressed with the quality of our educational presentations and the level of participation at our conferences. I was particularly impressed with the people I met in the organization. All were quality individuals with a can-do spirit, problem solvers who were interested in contributing to their industry. In short, the kind of people that you enjoy being associated with.

I answered Charlie's request and was appointed chairman of the Communications Committee. Our first organizational meeting was in June 2001 in Denver, Colo. Our committees were organized at this meeting, and I was joined by committee members Doug Scaggs and Garland Likins and later by Steve Whitty, three individuals for whom I have a tremendous amount of respect. We established our committee's objectives and began work. I have to admit that I knew nothing about magazines and Web sites when I joined this committee but I learned. My work on this committee has put me in contact with people around the world. Everyone that I have come in contact with has helped me to learn even more about our industry. I was no longer limited to my own local experience but could now draw on their broad range of experience as well. With every conference, every article, and every conversation the world became a bit bigger.

As I continued to work within the PDCA I became involved in limited roles with other committees due to the requirements of my position with the Communications Committee. Each of these committees is involved with important work regarding the primary objective of our organization: the promotion of driven pile solutions in all cases where they are effective.

The Education Committee works to recruit speakers and develop presentations to help us all do our jobs better. They continue to show us different approaches to our work, new design techniques and the various ways that driven piles have been used to benefit various projects around the world.

The Technical Committee develops industry specifications and currently represents us before AASHTO's T-15 Committee. When it comes to governmental and quasi-governmental code committees, individual companies do not get a seat at the table. However representative trade organizations such as the PDCA do. You better believe that our competition has a seat at the table, so we need to be there as well. If you are not at the table, you are on the menu.

The Market Development Committee seeks new ways in which we can promote driven piles. They also work hard to make our events as enjoyable as they are informative.

Our Environmental Committee works to define and understand the environmental challenges our industry faces. They also continue to promote the benefits to the environment derived through the innovative use of driven piles and installation techniques.

The Communications Committee keeps you informed of PDCA and industry events, member news, innovative uses of driven piles and advances in technical design and material science.

Our Membership Committee continues to spread the word within our industry about the benefits of PDCA membership, which keeps our organization growing.

Now we have a new Safety Committee that will be meeting with agencies that develop safety codes to ensure that they understand our work as those codes are developed. We want regulations that are not burdensome but beneficial, and we also want regulations that help us all achieve the common objective of working safely.

Currently, the PDCA is undertaking the development of a new strategic plan. We not only need your input to develop this plan; we need your time and abilities to implement it. Please consider joining a committee. You won't be disappointed. You will work with some of the finest people in our industry, you will have a chance to contribute, and you will undoubtedly learn. You might not think that you have enough free time to do much, but don't let that stop you from joining. The time commitment varies by committee and current objectives. Being an international organization we realize that it is difficult to meet often in person so we utilize telephone and Web conferences to keep in contact and on track. Our committees touch just about everyone's area of interest, so everyone has something they can contribute and it's a given that you will take away more from your involvement than you would ever expect. Contact the PDCA office to discuss opportunities and find a committee that appeals to your interests.

There was once a battle in which a member of the losing side related to one of the victors, "You attacked us with a 10,000-man army. We fought back with 10,000 one-man armies." It is not difficult to see why the poorly organized group lost the battle. We are in a much better position to achieve our common objectives together than as individuals. Work with the PDCA to multiply your efforts and build our industry.

In closing, the PDCA has come a long way since its inception. It is my privilege to serve as president this year. We need to remember that whatever we accomplish in the coming year will not stand alone. We stand on the shoulders of those that have come before us. We owe them our gratitude for their dedication and hard work that brought us to this point. We also have an obligation to continue their good work to the best of our abilities. We have a tremendous Board of Directors, an equally strong group of committee chairs and members, and a talented executive director. We look forward to making great strides this year. I especially want to thank my good friend, Mark Weisz, for his leadership as president this past year. He did a tremendous job. We just completed one of our best — if not the best — Annual Meetings in our history. We now look forward to our first joint conference at the International Foundation Congress and Equipment Expo in Orlando, Fla., next year. In the mean time, we have work to do so "Please keep driving!" ▼

Meeting Success

12th Annual Conference is a hit, and PDCA helps present IFCEE '09

By Stevan A. Hall, PDCA Executive Director

The PDCA held its 12th Annual International Conference and Exposition at the Arizona Grand Resort in Phoenix, Ariz., this past February. The PDCA executive was very pleased with the turnout, as it hosted more attendees than any prior conference and was supported by over 40 contracting companies. Reports from the exhibitors indicate the contractor showing made a real difference in the conference this year.

For the first time, all PDCA committee meetings were integrated into the conference's daily agenda, allowing attendees to participate in the meetings, gain a better understanding of the committee activities and responsibilities, and provide greater awareness of the important role that committees play in their association.

PDCA presented relevant and topical lectures throughout the three-day conference on several case studies of driven pile projects including a fast-track project rebuilding a railroad trestle near Sacramento, Calif., by Foundation Constructors; Driving Pile in the San Francisco area by Abe Engineering; Traffic Bridge Transformation – An ODOT project over the Meander Reservoir by Great Lakes Construction; Advanced Skills in Driving Sheet Pile in Extremely Difficult Soil Conditions presented by John White with American Piledriving Equipment; Sunfish Pond Design-Build Solutions by Bermingham Foundation Solutions; the Carousel Mall Expansion Project in Syracuse, N.Y., by Cianbro Corp.; and Challenges Facing the Pile Driving Contractor by George Goble, which was followed by a panel discussion on the same topic.

There was plenty of time to socialize and network during the PDCA second annual golf tournament at the Phantom Horse Golf Club on South Mountain. The event attracted over 60 players in the Captain's Choice formatted tournament. PDCA held all its breakfasts, mid and afternoon breaks, as well as all receptions in Exhibitor Hall to increase traffic to the exhibitors and provide a common meeting space for additional socializing and networking. The conference concluded with a Harley-Davidson Theme Night Annual Dinner with appropriate dress and was accompanied with a casino night for fun and prizes and some dancing to the sounds of Canyon Walls, a local country band.

The PDCA is well on its way to promoting it 13th annual conference, however in 2009 the format will be different than anything you have ever seen. The Pile Driving Contractors Association (PDCA), the Geo-Institute of ASCE, and ADSC The International Association of Foundation Drilling have joined together as partners to present the largest Geotechnical Engineering and Geo-Construction Congress ever held: The International Foundation Congress and Equipment Expo '09 (IFCEE '09).

This Congress will focus on foundations and will include related geo-engineering and geo-construction technologies including foundation engineering, ground modification, and earth retention. The IFCEE '09 provides a premier setting as well as providing a vital element in helping you meet your marketing goals!

The IFCEE '09 will be held in Orlando, Fla., at the Lake Buena Vista Palace Resort from March 15 to 19, 2009. This conference will attract over 2,500 people in the geotechnical engineering and geo-construction-related fields. The conference will include a mega-indoor and outdoor exhibit area as well as lectures on the top issues in geotechnical engineering and geo-construction.

The PDCA has submitted and received approval for the following sessions:

- Driven Pile Case Histories Emphasizing Economics
- Activities of Industry Organizations and Industry Developments
- New Technology in Driven Piles
- Use of Driven Pile in Major Infrastructure Projects
- Sheet Piles - Design, Installation and Performance

The PDCA will also have some of its traditional events and awards, such as the President's Award for Distinguished Service, Project of the Year Awards, and Committee Chair of the Year. PDCA members will also be able to participate in either the PDCA third annual golf tournament or a combined tournament with players from all organizations. Save this date on your calendar and plan on attending this event.

You will read more about the Project of the Year Awards and Committee Chair of the Year, however I want to personally congratulate all of the companies who entered the Project of the Year Awards program. The competition was very strong in 2008 and all projects submitted are worthy of Project of the Year. Congratulations to Weeks Marine, Inc. and Blakeslee Arpaia Chapman, Inc. for winning the Project of the Year awards (Greater than $1 Million and Less than $1 Million, respectively).

I also want to congratulate and thank John King with Pile Drivers, Inc., which is based in Hollywood, S.C., for being selected as the Committee Chair of the Year by 2007 PDCA President Mark Weisz. King is the Chair of the PDCA Membership Development and Member Retention Committee. In 2007, King did an excellent job of not only meeting the early annual goal set by Weisz of 125 contractor members by the end of 2007, but he and his committee exceeded that goal by ending the year with 135 contractor members. King's leadership also resulted in a 95 percent overall retention rate for all membership categories in 2007 and an associate member increase of 30 percent. ▼

PDCA
PILE DRIVING CONTRACTORS ASSOCIATION


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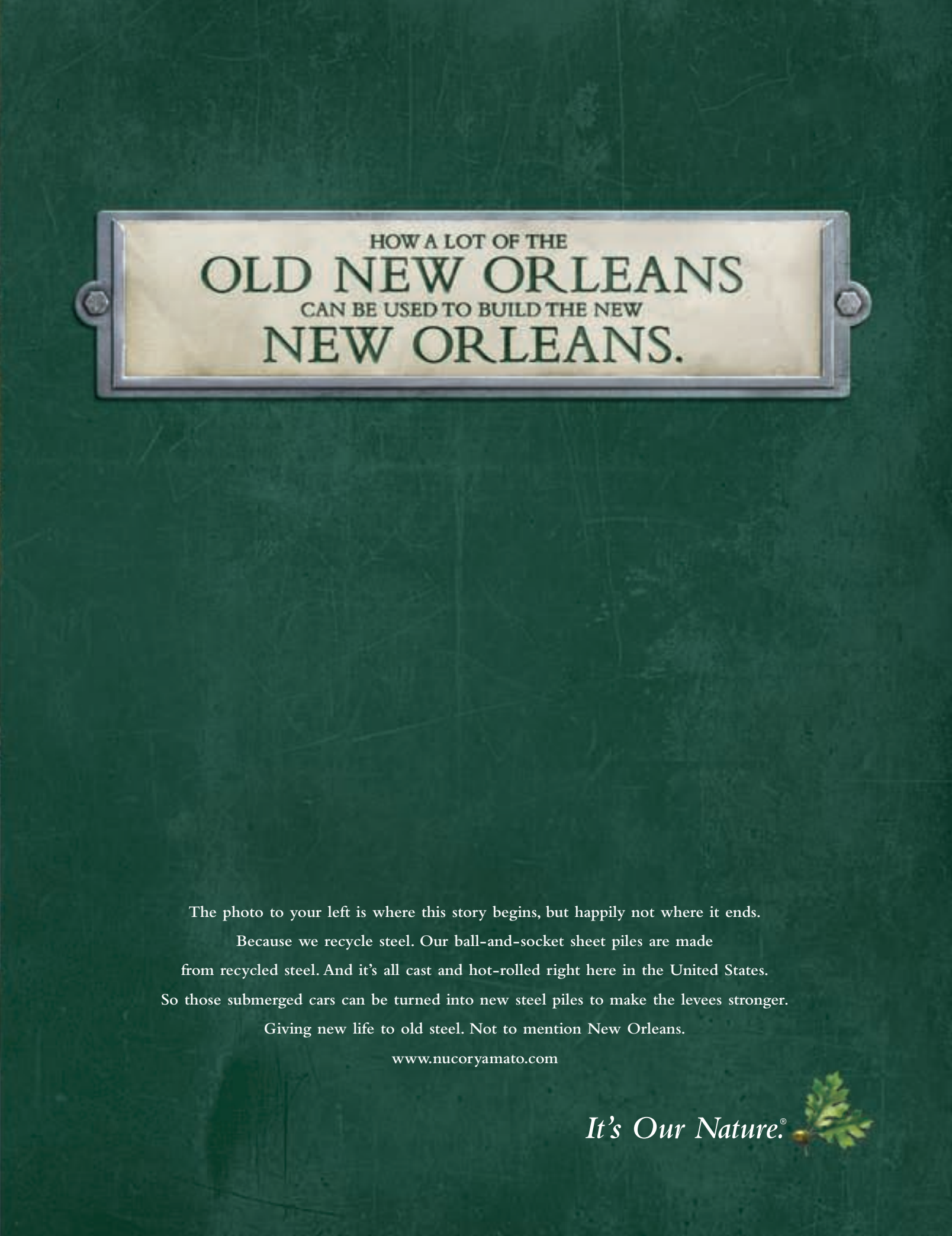
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PDCA elects a New Board of Directors

Members of the Pile Driving Contractors Association have cast their ballots and elected the new 2008 PDCA Officers and Board of Directors. The following individuals have been named to the 2008 Board.

The Officers are President - Van Hogan (Ed Waters and Sons Contracting Co., Inc.); Vice President - John King (Pile Drivers, Inc.); Secretary - Don Dolly (Foundation Constructors, Inc.); Treasurer - John Linscott (H.B. Fleming, Inc.); and Immediate Past President - Mark Weisz (C.S. Marine Constructors).

The Directors are Rusty Signor (Signor Enterprises); Irv Ragsdale (Clark Foundations); Mike Elliott (Pile Equipment); Richard Gilbert (Skyline Steel); Pat Hannigan (GRL); Buck Darling (Herbert F. Darling); John Parker (Parker Marine); Dave Chapman (Blakeslee Arpaia Chapman); and Mike Justason (Bermingham Foundation Solutions).

PDCA Chapter Representatives to the Board of Directors are Michael Jahnigen (Sun Piledriving Equipment) for the Mid-Atlantic Chapter; Sonny DuPre (Cape Romain Contractors) for the South Carolina Chapter; Michael Kelly (Gulf South Piling & Construction) for the Gulf Coast Chapter; and Charlie Gibson (Manson Construction) for the California Chapter. ▼

From L to R: Pat Hannigan, Rusty Signor, Mike Justason, John Linscott, Past President Woody Ford, John Parker, and John King

Standing first row from L to R: Mike Elliott, Michael Kelly, Technical Committee Chair Dale Biggers, Van Hogan, Past President Harry Robbins, Past Treasurer Trey Ford.

Standing second row from L to R: Safety Committee Chair Greg Lewis, Richard Gilbert, Mark Weisz, Don Dolly, Past President Randy Dietel, and Buck Darling.

The Pile Driving Contractors Association
"A Driven Pile is a Tested Pile"

MEMBERSHIP BENEFITS

General Membership Information

We are the premier association for pile-driving contractors

The PDCA was founded in 1996 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 100 contractor members, the PDCA offers many networking opportunities. Whether at our Winter Roundtable, our regional seminars or by just picking up the phone, you'll develop long-lasting professional relationships and friendships in the industry.

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 technical experts, suppliers to the piling industry and contractors. This conference focuses on the key issues faced by pile-driving contractors and features discussions and presentations as well as an extensive exhibit area.
- The Design and Installation of Cost-Efficient Driven Piles Conference (DICEP), held each September since 2000, is a nationally recognized two-day 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 has 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.

All PDCA members receive a complimentary copy of the PDCA's codebook, *Recommended Design Specifications for Driven Bearing Piles*, now in its third edition. This book covers all required guidelines for driven piles and includes a suggested bid and payment schedule.

PDCA also offers the *Installation Specifications for Driven Pile-PDCA Specification 102-07* 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.

"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.

Connect Worldwide at www.piledrivers.org

The PDCA's newly redesigned Web site 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. ▼

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PDCA

MEMBERSHIP APPLICATION

Step 1: Select Membership Type

I wish to apply for the following membership status (check one):

❑ **Contractor** ❑ **(Annual Gross Sales >$2 Mill./year: $850.00/year)**
❑ **(Annual Gross Sales <$2 Mill./year: $425.00/year)**

A Contractor Member is defined as a specialty subcontractor or general contractor who commonly installs driven piles for foundations and earth retention systems. Includes one primary membership. Secondary memberships are $75 each.

❑ **Associate** ❑ **(Annual Gross Sales >$2 Mill./year: $850.00/year)**
❑ **(Annual Gross Sales <$2 Mill./year: $425.00/year)**

Associate Members of the Association shall consist of firms or corporations engaged in the manufacture and/or supply of equipment, materials, testing or other services to the pile driving industry. Secondary memberships are $75 each.

❑ **Technical Affiliate ($100.00/year)**

Technical Affiliate Members of the Association shall consist of individuals who are involved with the design and installation of driven piles or in teaching the art and science of pile design and installation. They may be employed engineers, architects, government agencies, or universities. Employees of contractors are not eligible to become Technical Affiliate Members. Note: Technical Affiliate Membership category is for individuals only. For a company listing in the directory and on the Web site, you must join as an Associate Member.

❑ **Retired Industry Member ($50/year)**

A Retired Member shall be defined as any individual who has reached retirement age as defined by U.S. law, who has left active employment and who wishes to remain a member.

I am retiring as a ❑ Contractor ❑ Associate ❑ Technical Affiliate

Step 2: Demographic Information

Company Name _____ Phone _____

Your Name _____ Fax _____

Address _____ e-mail _____

City/State/Zip _____ home page _____

Step 3. Method of Payment

Attached is my payment of $_____ for annual dues.

❑ I understand that dues are due annually on December 31 and that if I joined PDCA after March 31, I may be entitled to a pro-rated dues amount for the subsequent year only.

I am making payment in full by

❑ Check # _____

❑ Credit Card: ❑ MasterCard ❑ Visa ❑ American Express

Card Number: _____ Expiration Date: _____

Name as it appears on card: _____ Signature: _____

Please send this completed application to PDCA | P.O. Box 66208, Orange Park, FL 32065
Phone: 888-311-PDCA (7322) | Fax: 904-264-9531 | www.piledrivers.org

Applications Systems

❑ Aluminum Sheet Piles
❑ Coatings & Chemicals
❑ Structural Steel
❑ Synthetic Material Piles
❑ Other_____
❑ Steel Pipe Piles
❑ Steel Sheet Piles
❑ Vinyl Sheet Piles
❑ Other Structural Materials
❑ Timber Piles/Treated Lumber & Timbers
❑ Concrete Piles
❑ Composite Piles
❑ H-Piles

Equipment

❑ Air Compressors
❑ Cranes
❑ Drill Equipment
❑ Drive Caps & Inserts
❑ Hammers
❑ Hydraulic Power Packs
❑ Leads & Spotters
❑ Pumps
❑ Specialized Rigs & Equipment
❑ Other

Services

❑ Consulting
❑ Design
❑ Freight Brokerage
❑ Geotechnical
❑ Marine Drayage
❑ Surveying
❑ Testing
❑ Trucking
❑ Vibration Monitoring_____
❑ Other _____

General

❑ Rental ❑ Sales ❑ Other _____ ❑ Other _____

C. Technical Affiliate Only (check all that apply)

❑ Analysis
❑ Geotechnical
❑ Surveying
❑ Civil & Design
❑ Materials Testing
❑ Vibration Monitoring
❑ Consulting
❑ Pile Driving Monitoring
❑ Other
❑ Educational/Association

Step 4. Geographic Areas Where Contracting, Products and Services Available

(All applicants check all that apply)

❑ All States	❑ CT	❑ ID	❑ MD	❑ NE	❑ NY	❑ SD	❑ WI
❑ AK	❑ DC	❑ IL	❑ ME	❑ NC	❑ OH	❑ TN	❑ WV
❑ AL	❑ DE	❑ IN	❑ MI	❑ ND	❑ OK	❑ TX	❑ WY
❑ AR	❑ FL	❑ KS	❑ MN	❑ NH	❑ OR	❑ UT	❑ Canada
❑ AZ	❑ GA	❑ KY	❑ MO	❑ NJ	❑ PA	❑ VA	❑ Mexico
❑ CA	❑ H	❑ LA	❑ MS	❑ NM	❑ RI	❑ VT	❑ Europe
❑ CO	❑ IA	❑ MA	❑ MT	❑ NV	❑ SC	❑ WA	❑ Global

Step 5. Sponsorship: Who told you about PDCA?

Member Name_____

PDCA
PILE DRIVING CONTRACTORS ASSOCIATION

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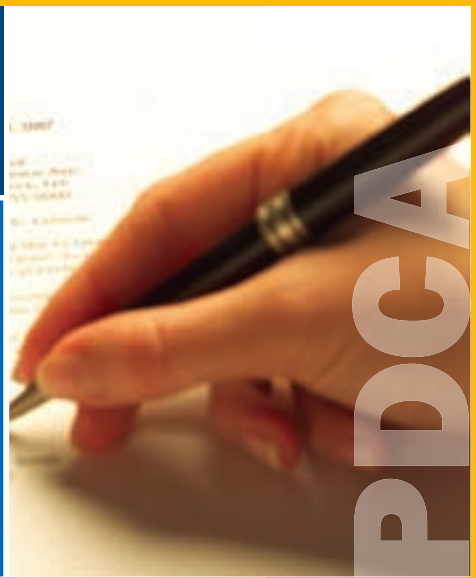
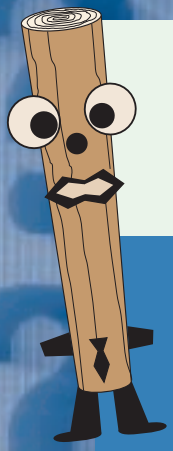




Did You Know?

In this department the PDCA asks "Did you know...?" and provides quick facts and tips of use to members.

Did you know that driven piles have been installed as deep as 6,366 feet below sea level?

36" x 1.5" well conductors driven off of the coast of Brazil using a Menck 225,000 ft.lb. MHU 270T hydraulic hammer.

PDCA Chapters Updates

PDCA Selects Committee Chair of the Year

Each year, the outgoing PDCA President is responsible for selecting the PDCA Committee Chair of the Year. Each PDCA Committee accomplished a great deal in 2007, so the selection by Weisz was not an easy one.

In 2007, the Membership Development and Member Retention Committee chaired by John King increased contractor membership by 29 percent. This growth in contractor members exceeded the 125 total contractor member goal set by Weisz early in 2007 and had the PDCA ending its 2007 year with 135 total contractor members. King was instrumental in accomplishing such a noteworthy task. He personally called on contractors, sent e-mails, letters, and membership applications, and then he followed up until the company joined. John's effort paid dividends on the Associate Member side as well, which saw a 31 percent increase. But membership development is not the only thing the committee is responsible for; they also address retention and King was relentless in getting renewals, ending up with approximately 95 percent of all companies renewing in 2007. For this reason, King with Pile Drivers, Inc. in Hollywood, S.C., was selected by President Weisz as the 2007 Committee Chair of the Year. Congratulations, John! Job well done!

President Mark Weisz presents John King with a plaque for 2007 Committee Chair of the Year.

Jerry DiMaggio, FHWA – PDCA Chapter Guest Speaker

The PDCA of the Mid-Atlantic Chapter held its quarterly dinner meeting on Thursday, April 24, 2008, at the Holiday Conference Center BWI, on Elkridge Landing, Linthicum, Md.

Jerry DiMaggio, Principal Bridge Engineer – Geotechnical, FHWA was the guest speaker for the evening's event.

During the meeting, the chapter also announced the new officers. Irv Ragsdale with Clark Foundations, LLC assumed the position of chapter president; Rob Braden with Skyline Steel remains as Secretary / Treasurer; and Michael Jahnigen with Sun Marine Maintenance is the past president.

PDCA of the Gulf Coast Chapter

The PDCA of the Gulf Coast Chapter held its second quarterly meeting at Messina's Restaurant in Kenner, La., on April 24, 2008. The next meeting is scheduled at Messina's on Thursday, August 21, 2008.

The PDCA of the Gulf Coast Chapter has also inducted new officers and committee chairs. Michael Kelly with Gulf South Piling and Construction is president; Robert Baker with Baker Pile Driving and Site Work, LLC is vice-president; and Paul Tassin with Foundation Materials is secretary / treasurer. Steve Whitty with Specialty Piling Systems is chair of the

Membership Committee and Henry Whitty with Professional Construction Services is chair of the Programs / Education Committee.

PDCA of the South Carolina Chapter

The PDCA of South Carolina will hold its next dinner meeting at the Town and Country Inn, Hwy 17, Charleston, S.C., on Tuesday, June 3, 2008. The speaker will be Dean Abbondanza with Skyline Steel, and he will make a presentation on Geo-structural supported excavation systems and the use of steel sheet pile as permanent foundations for structures.

PDCA of South Carolina Holds Engineering Seminar on Driven Pile

On March 27, PDCA of South Carolina hosted its third daylong technical seminar for engineers and engineering students on Driven Piles. As with the two previous, it was held at the venerable Citadel Military College in Charleston, S.C. The objective of the technical seminar was to continue the PDCA of South Carolinas efforts to providing ongoing education and information to the engineering community on Driven Piles.

The cost of the event was $75 per attendee, a bargain when considering engineers received six PDH's for attending the program. To keep the price down for the attendees the chapter offered Gold and Silver Sponsorships for $500 and $250, respectively. There were six Gold and seven Silver sponsors for the event. Gold sponsors got their business cards and company information in the program's binder, a table at the seminar to display their products or services and recognition on the event banner. Silver sponsors got to place their business cards and company information in the binders and were recognized on the event banner. The binders also included the business cards of the presenters and their power-point presentations.

The PDCA of South Carolina held a "thank you" dinner for all the presenters, Chapter Officers and special guests the evening before, allowing everyone to get acquainted. The seminar kicked off at 8:30 a.m. on March 27 with registration and breakfast. The seminar attracted 120 engineers, exceeding attendance of three previous years' attendance. The seminar was host to an impressive slate of speakers, which was organized by Billy Camp, P.E. with S&ME, based in Charleston, S.C., including Jerry DiMaggio, P.E., Principal Bridge Engineer – Geotechnical, FHWA, Washington, D.C. He has provided technical expert design and construction assistance on over 900 transportation projects in all 50 states, Central and South America, as well as the Middle East. DiMaggio has presented over 300 workshops and seminars for professionals on design and construction of bridges. DiMaggio made an excellent presentation on *Designing Driven Pile Foundation Under the AASHTO LRFD Platform*. Pat Hannigan, P.E., GRL Engineers, Inc., based in Chicago, Ill., followed DiMaggio. Hannigan has been involved in dynamic testing and analysis of deep foundations for the past 25 years and was the lead author for the 1996, 1998, and 2006 editions of the *FHWA Manual Design and Construction of Driven Pile Foundations*. Hannigan spoke on *Inspection and Monitoring of Driven Pile Foundations*, a topic that is very appropriate for our audience.

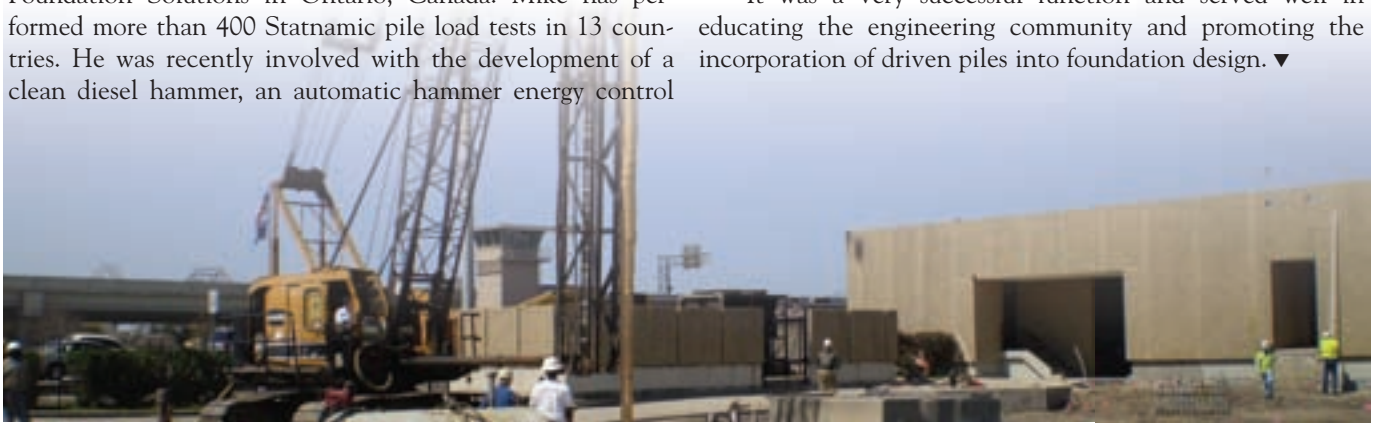
During the lunch break, PDCA Executive Director Stevan A. Hall held a drawing for several PDCA items, and DiMaggio, a relative of the Joe DiMaggio, drew for someone to win a baseball signed by "J. DiMaggio." It was a big hit and a lot of fun! Hall also introduced eight of the 18 National PDCA Board members in attendance, as well as National PDCA Past President Harry Robbins.

Afternoon presentations began with Tommy Parker of Parker Marine Contracting Corporation in Charleston, S.C. Parker started in the pile driving industry in 1950 and is a recognized authority on local practice. He spoke on *A History of Piledriving in the Charleston area*. It included power point slides back to the early 1960s. Parker's presentation was informative and colorful, showing the audience how far the industry has evolved over the last 58 years.

The final speaker was Mike Justason with Bermingham Foundation Solutions in Ontario, Canada. Mike has performed more than 400 Statnamic pile load tests in 13 countries. He was recently involved with the development of a clean diesel hammer, an automatic hammer energy control system, and the use of pile foundations as a component of a building's heating and cooling system. Justason gave a fascinating presentation on *Recent Advance in the Pile Driving Industry*; covering energy piles, clean diesel hammers, ECS, and noise abatement.

The seminar concluded with a great panel discussion and audience participation, and it was moderated by DiMaggio. The discussion was titled *Current Practice and Future Trends for South Carolina Deep Foundations*. The panel consisted of Zane Abernathy, P.E., F&ME, a geotech from Columbia, S.C.; Donovan Ledford, P.E., WPC, a geotechnical firm of Charleston; John Moore, P.E., 4SE Structural Engineers of Charleston; and Tim Mays, Ph.D, a structural engineer and professor at The Citadel. The audience enthusiastically availed themselves of the moderator's and panelists' expertise. The program concluded at 3:00 p.m.

It was a very successful function and served well in educating the engineering community and promoting the incorporation of driven piles into foundation design. ▼



Conference Fun in Phoenix

The PDCA 12th Annual International Conference and Exposition: Feb. 20 to 23, 2008

By Stevan A. Hall, PDCA Executive Director

In 2008, the Pile Driving Contractors Association went to the Arizona Grand Resort, Phoenix, Ariz., for its 12th Annual International Conference and Exposition. The conference attracted more than 200 attendees, 41 contracting companies and 34 exhibitors. The PDCA also integrated all committee meetings into the conference's daily agenda, allowing all conference attendees to participate and get a feel for what the committees do and the important role they play in the PDCA.

PDCA presented relevant and topical lectures throughout the three-day conference and highlighted several case histories. These included a fast-track project rebuilding a railroad trestle near Sacramento, Calif., by Foundation Constructors; Driving Pile in the San Francisco Bay Area by Abe Engineering, Traffic Bridge Transformation – An ODOT project over the Meander Reservoir by Great Lakes Construction; Advanced Skills in Driving Sheet Pile in Extremely Difficult Soil Conditions presented by John White with American Piledriving Equipment; the Sunfish Pond Design-Build Solutions by Bermingham Foundation Solutions; the Carousel Mall Expansion Project in Syracuse, N.Y., by Cianbro Corp.; and Challenges Facing the Pile Driving Contractor by George Goble, followed by a panel discussion on the same topic.

The PDCA also held its second annual golf tournament,

attracting over 60 players to the Phantom Horse Golf Club on South Mountain, held a Harley-Davidson Annual Dinner with appropriate dress, a casino night and dance to the sounds of the Phoenix-based band Canyon Walls.

PDCA is especially grateful to the PDCA Education Committee, which is chaired by Mike Justason with Bermingham Foundation Solutions and for the tremendous support it received from the Market Development Committee that is chaired by Mike Elliott with Piling Equipment, Inc.

PDCA would like to acknowledge the corporate sponsors and exhibitors who helped make this conference such a success. ▼

The golf course at the Arizona Grand Resort.

The great outdoors of the Arizona Grand Resort.

The PDCA slogan A Driven Pile is a Tested Pile is proudly on display.

Exhibitor Hall is prepped for the busy annual conference.

Participants in the Companions' Program are all smiles.

Above: Mike Songer with IHC for North America and Bill Nicholson, the director of German Boring LLC in Exhibitor Hall.

Below: Phoenix-based band Canyon Walls entertains during the annual dinner.

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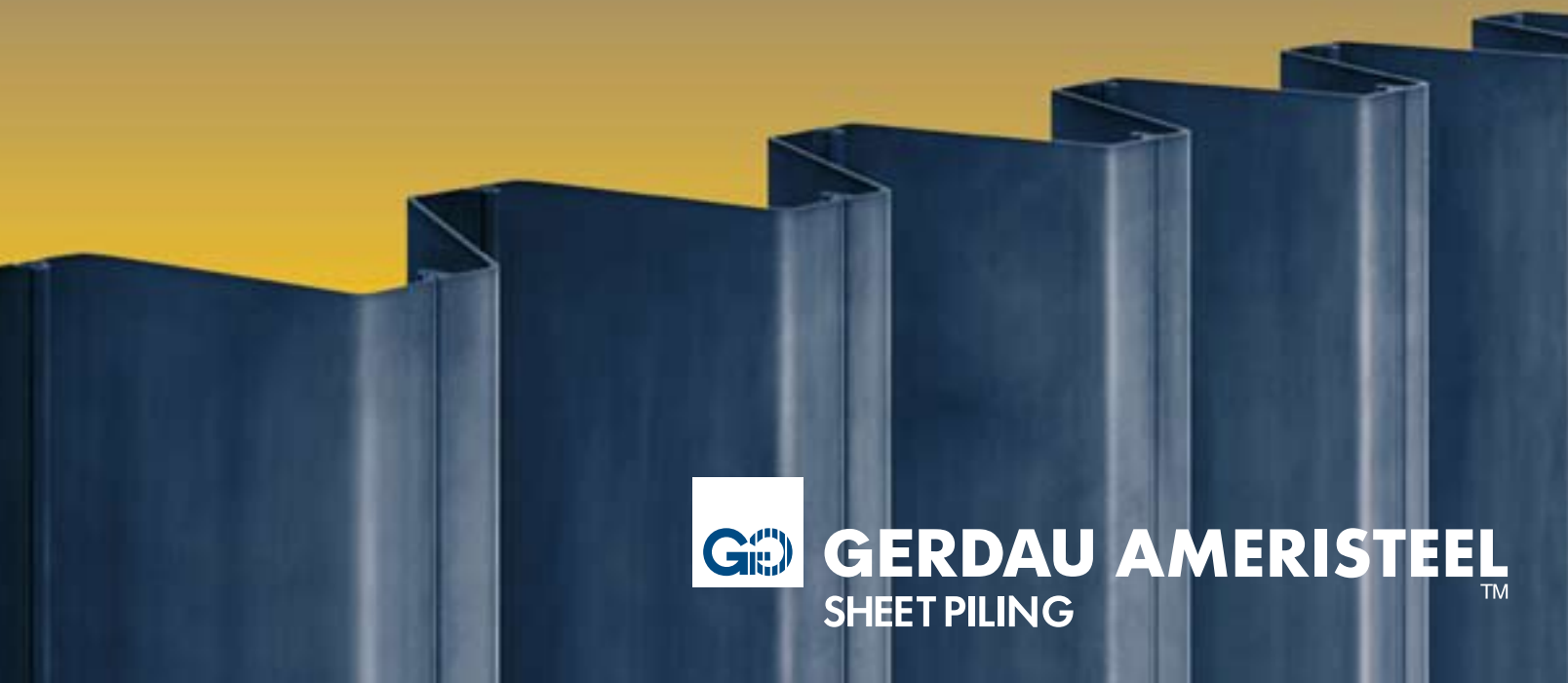

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Attendees take in a slide show.

Gene Merlino, President with MG Forge Construction, LLC, Golf Tournament Sponsor.

PDCA members get ready for a speaker.

Below: 2008 PDCA Director Richard Gilbert with Skyline Steel and PDCA Past President Harry Robbins with Palmetto Pile Driving.

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Thanks to All of the Conference Exhibitors

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Timber Piling Council

Attendees have their eyes on the prize.

And the Award goes to . . .

The PDCA is dedicated to acknowledging the hard work, ingenuity, and commitment that goes into each project where driven piles are used in a deep foundation or earth retention system. This esteemed tradition recognizes excellence in driven pile projects competed by PDCA members in good standing.

Through the Project of the Year Award, the PDCA has the distinguished opportunity to continue its long-standing and consistent commitment to recognize those PDCA members who demonstrate excellence in the process of providing solutions, services, and products to the needs of the deep foundation and earth retention environment.

Winning Entries

Project Value Less than $1 Million
Mystic Seaport Museum and Lift Dock Replacement – *Blakeslee Arpaia Chapman, Inc.*

Project Value Greater than $1 Million
APM Terminal Wharf Project – *Weeks Marine, Inc.*

Congratulations to the Winners of the 2008 PDCA Project of the Year Award:
Weeks Marine, Inc. and Blakeslee Arpaia Chapman, Inc.

Honorable Mention:
Gaylord National Harbor Hotel and Convention Center – Kiewit Constructors, Inc.
Bridge Over the Trout River I-95 – Hal Jones Contractor, Inc.

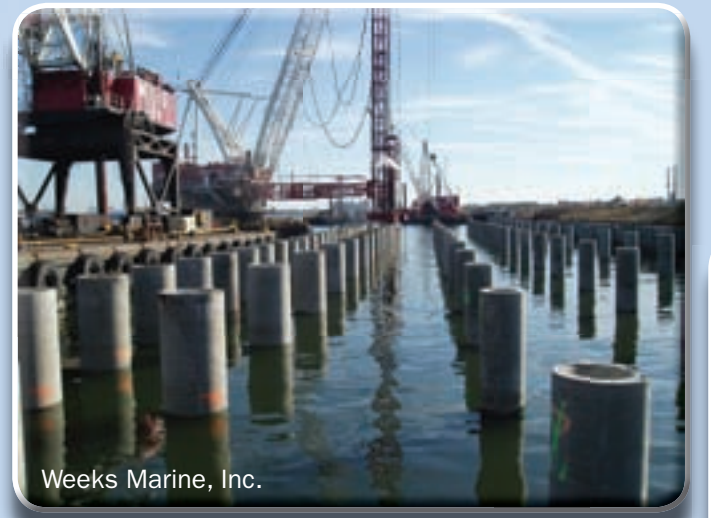
Congratulations also to Kiewit Constructors, Inc. and Hal Jones Contractor, Inc.

Entries:

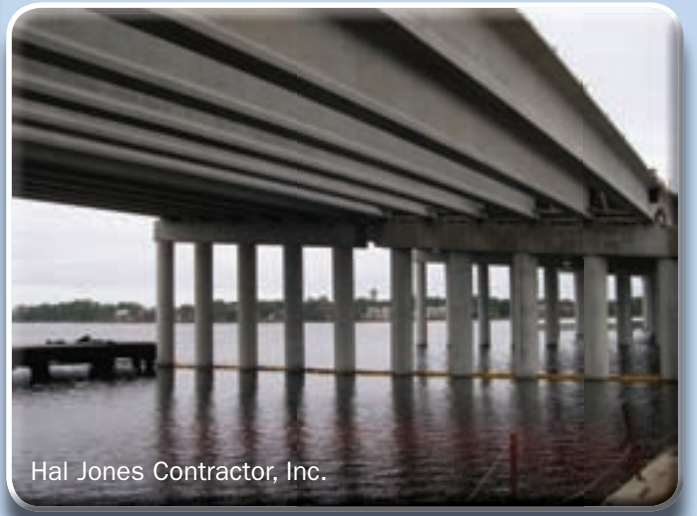
Project Value Less than $1 Million
Mystic Seaport Museum and Lift Dock Replacement – *Blakeslee Arpaia Chapman, Inc.*

Project Value Greater than $1 Million
APM Terminal Wharf Project – *Weeks Marine, Inc.*
Argosy Casino Expansion – *Richard Goettle, Inc.*
Bridge Over the Trout River I-95 – *Hal Jones Contractor, Inc.*
Brunner Island Power Plant – Pennsylvania Power and Light – *Brayman Construction Corporation*
Freeport Regional Intake Structure – *Balfour Beatty Infrastructure, Inc.*
Gaylord National Harbor Hotel and Convention Center – *Kiewit Constructors, Inc.*
Haliburton CFS Plant – *Cajun Deep Foundations, LLC*
Huntingdon Place – *Loftus Construction, Inc.*
Hurricane Katrina Repairs and Modifications, I.H.N.C. East Side, N. Claiborne to Florida Ave., New Orleans – *Cajun Deep Foundations, LLC*
National Harbor – *Cianbro Corporation*
SCDOT Project Charleston County, Bridges on US 17 Across Rantowles Creek and Wallace River – *Cape Romain Contractors, Inc.*

2008 Project of the Year Awards



Weeks Marine, Inc.



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Project of the Year

Project Value Greater than $1 Million

Weeks Marine wins award for Virginia Wharf Project

By Richard P. Palmer, Neal E. Williams, and Jeanne Fronda, Editor

Weeks Marine, Inc. was selected as the prime contractor for a greenfield wharf construction project in November 2004 and it began work immediately on this challenging project in Portsmouth, Va. Weeks completed its portion of the construction in December 2006, while overall construction was completed in three years and the facility opened in July 2007.

This project presented logistical, equipment and staffing challenges that were unprecedented in Weeks' history. At one moment in the project, five marine cranes were devoted to pile driving activities, while on land two other rigs kept pace. Material arrived on a coordinated fleet of 10 deck barges, with truck deliveries keeping the shore work moving. Working up to 14-hour days for much of the production pile installation kept two shifts of pile drivers hopping, with some all-nighters thrown in to tackle more difficult areas. Weeks Marine had up to 160 hourly employees during the course of this project.

Within an hour after receiving the official notice to proceed, Weeks issued the first purchase order for millions of dollars worth of HZ and AZ steel piling, with firm delivery dates less than 12 weeks out. A purchase order for the precast concrete cylinder piles followed soon behind.

Project Introduction

The wharf project presented a unique challenge on several fronts. The schedule was demanding; the pile driving was on the critical path from the start; the load capacities were very high for the driven cylinder piles and there were thousands of piles to drive. The project included the construction of a 3,750-foot-long HZ combi-wall bulkhead, four sheet pile retaining walls, a 3,100-foot-long concrete cylinder pile supported wharf and two mooring dolphins founded on 48" steel pipe piles. Weeks Marine fabricated custom templates and equipment (including a fixed lead driver for a 350-ton capacity marine crane); mobilized a large fleet of cranes and barges; and committed to an aggressive two-shift work plan through much of the pile driving to meet the logistical and schedule challenge.

"The time obstacle was probably the biggest challenge," says Weeks Marine, Inc.'s Mid-Atlantic Area Manager Rick Palmer. "It was a very fast-track project."

A comprehensive test pile program for the cylinder piles was the first priority for the pile drivers once they mobilized to the site. The statnamic load testing called for by contract provided the information the engineers needed to economize their design for the project's benefit. There was no time to waste, as

the HZ/AZ combi-wall construction started while the test pile program was still in full swing. An AZ-18 sheet pile anchor wall was driven on land, chasing the main bulkhead wall down the site. A hardworking subcontractor, Marine Contracting Corporation, helped Weeks complete low-level retaining walls and two mooring dolphins while an intensive engineering and fabrication effort was underway to transform the Weeks W-526 Derrick Barge into a fixed lead pile driver capable of handling piles over 165 feet in length.

Pile Driving

The project required a wide variety of steel and concrete pile types. HZ and AZ steel piles were used to construct the main bulkhead, retaining walls and deadman anchor wall. Concrete cylinder piles, 36 inches and 54 inches in diameter, were used as the foundation for the cast-in-place concrete crane beams and wharf platform.

"The design required very high capacities for the wharf piles," says Palmer. "For the material that we were driving into, these were very high-capacity friction piles. I believe the foundation used here was the best choice and the engineers' design worked as expected."

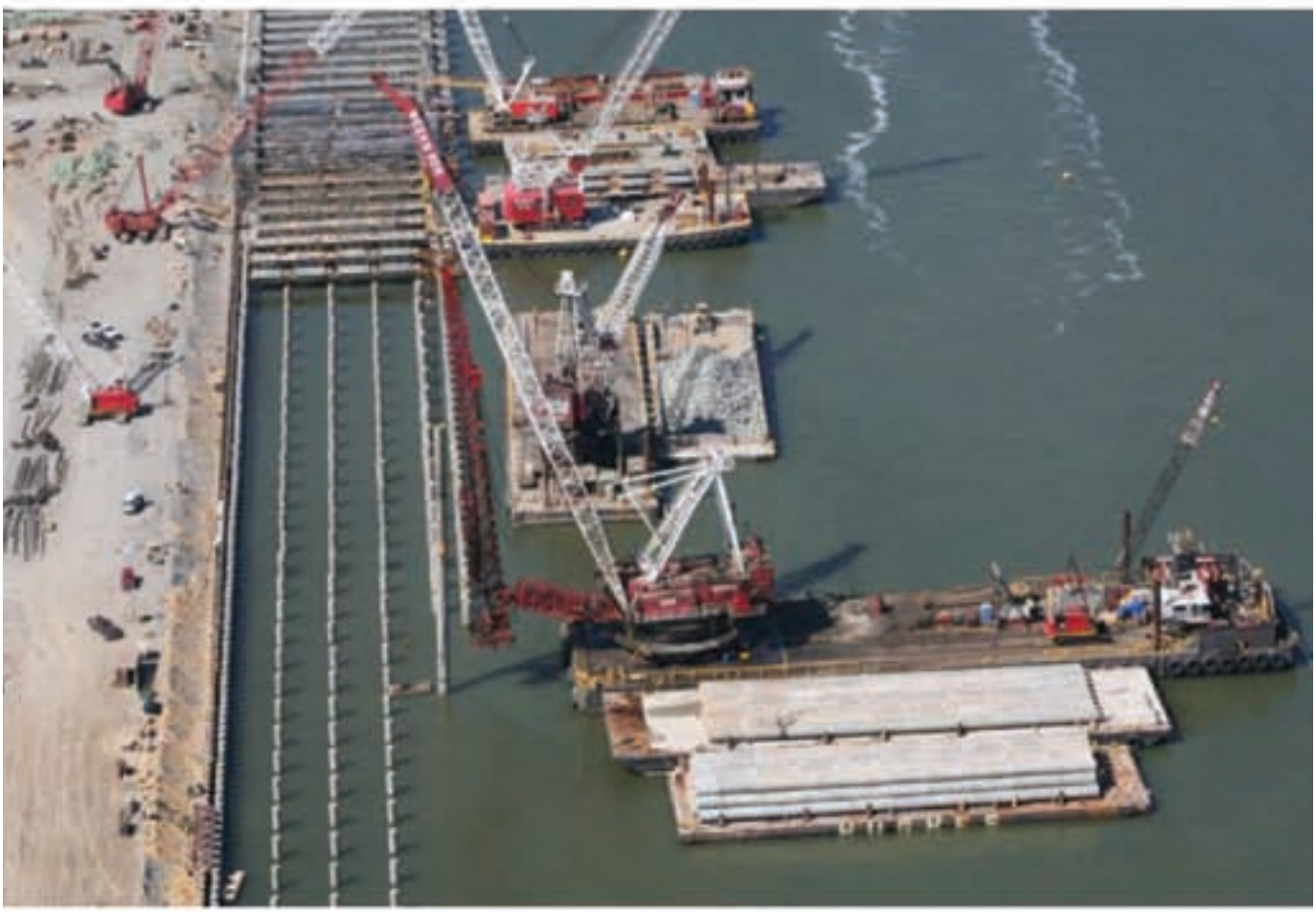
The main bulkhead was constructed as an HZ combi-wall with HZ king piles and AZ intermediate sheets installed. The king piles were tied back using steel tie-rods to an anchor wall built of AZ sheets. This retaining wall system segregated the water from the land with HZ and AZ piles.

Two low-level retaining walls extend from both ends of the HZ combi-wall bulkhead and initially continue along the same alignment as the bulkhead before angling back to meet the beach. These submerged walls cut off the 55-foot-deep wharf-side berthing basin from adjacent tidal wetland areas.

The cast-in-place concrete crane beams and wharf platform were supported by over twelve hundred 54" and 36" diameter pre-cast post tensioned concrete cylinder piles. All of the concrete cylinder piles were designed and driven plumb. Prior to the start of production driving, eight indicator test piles were driven, four 54" diameter by 164-foot-long piles and four 36" diameter by 152-foot piles, and an extensive test program utilizing both PDA and Statnamic testing was performed. A primary goal of the test program was to minimize the production pile lengths and the program was very successful. Final production pile length produced significant savings when compared to the original design lengths.

Fifty-four-inch diameter piles, were driven under the outboard crane rail beam and 36" diameter piles, supported the landside crane rail beam.

Two concrete mooring dolphins were constructed on the north end of the wharf with each dolphin supported by pipe piles 140 feet in length.



The Weeks 526 with its swinging fixed lead system hoists a 54" diameter pile and sets the pace for the wharf construction fleet.

Innovation in Construction Techniques or Materials

Although concrete cylinder piles have been used in the United States for over 50 years, the piles on this project were designed with very high ultimate capacity. Confirmation of this capacity installed and in place was a necessity to validate the design, and the statnamic tests were able to provide the answers needed.

The W-526 pile driver turned into the workhorse of the project. From the start of the project, the means and methods selected and developed for the pile driving controlled the pace and schedule of the job. For the HZ combi-wall, Weeks needed a durable and accurate template that would allow the precision placement of the king piles, but the schedule dictated that template (with nine new piles) be filled and driven out at least once per shift. Often the water depth along the bulkhead alignment can be used to the contractor's advantage, but here the water depth averaged less than five feet, meaning that every pile would have to be set and held with 80 percent of its length above the bottom template gates. Weeks developed a two-tier, pile supported template that held the piles in the correct alignment and could be moved ahead quickly. Durabond Steel Corporation fabricated the template for Weeks.

The HZ and AZ combi-wall completed with anchor wall and tie-rods installed.

The sheet lengths and favorable soil conditions for the bulkhead anchor wall allowed the Movax SP100 vibratory hammer (mounted on a CAT 345 excavator) to install over 100 wall feet per shift with a crew size of two men and a part-time forklift operator.

The tightly spaced landside crane rail beam piles just off the front of the HZ combi-wall face also presented a challenge. Originally, Weeks planned to utilize floating templates for all of the cylinder pile driving, but once the job was in hand, Weeks' engineers found that a cantilevered template that hung from the HZ piles could theoretically be faster and more accurate for the landside crane rail piles. However, devising a way to accommodate the variations in the driven HZ pile locations was key. A unique two-part template that pinned into the HZ piles and at the same time allowed for horizontal adjustments was the solution.

"The time obstacle was probably the biggest challenge. It was a very fast-track project."

Rick Palmer, Weeks Marine, Inc. Mid-Atlantic Area Manager

The most successful pile driving concept that was developed and utilized on the project was a hanging fixed lead system specifically designed and fabricated for the Weeks W-526 Derrick Barge, an 80 x 290 foot hull with a mounted 350-ton capacity, American R-40 whirly crane. Weeks looked to the West Coast where fixed lead drivers of this style have been utilized with much success by many marine contractors, then super-sized the design to take full advantage of the W-526's working capacity.

Weeks based the design on the need to upright and drive 54" diameter concrete piles exceeding 164 feet in length. A single pile of that size weighs over 80 tons, while the hammer to drive those piles, a Raymond 60X, weighs 43 tons by itself. The system also needed the reach and to find an adjustable way to drive 12 or more piles from a single location. In addition, pre-drilling each pile location in advance of the

The Weeks 526 and Raymond 60X steam hammer completes the driving of a 36" diameter concrete cylinder pile.

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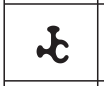
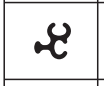
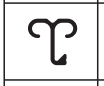
	**PZ Tee**	Tee Corner (~50° to ~130°)
	**Joker**	Tee Corner (~50° to ~130°)
	**Bullhead**	Tee Corner (~50° to ~130°)
	**CBF**	Tee Corner (~50° to ~130°)
	**Colt**	Corner (~25° to ~65°)
	**Cobra**	Corner (~115° to ~155°)
	**PBS-M** **PBS-F**	PZ / PZC + Peiner Beam
	**BBS-M** **BBS-F**	PZ / PZC + Domestic Beam
	**WOM** **WOF**	PZ / PZC + Pile Pipe Weld-on
	**LBM** **LBF**	Transition Profiles 
	**For all AZ** (U-Pile/Larssen) **Hoesch 1706, 1806, 1856, 1906, 2506, 2606, 2706**	
	**V 20**	Corner (~30° to ~150°)
	**VTS**	Tee Corner (~45° to ~135°) Circular driving
	**VT**	Tee Corner (~45° to ~135°) Omega corner
	**Omega 12**	Omega corner Jagged U-Walls
	**V 22**	Larssen Interlock + Pipe Pile Weld-on
	**PL**	U-Pile + Peiner Beam
	**PLZ I** **PLZ II**	Peiner Beam + Larssen-Z Piles
	**LBM** **LBF**	Transition Profiles 

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	**HZ**	Variable weld-on
	**PZL** **PZR**	Hoesch-Z + Peiner Beam
	**For Hoesch-Z** **with a width of 30.15 inches or 675 mm**	
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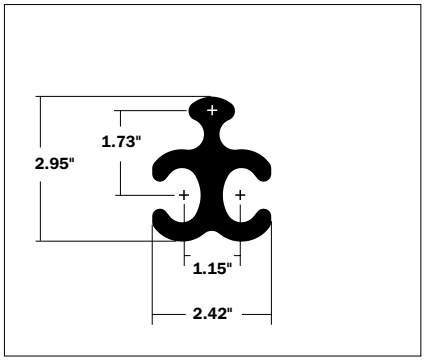
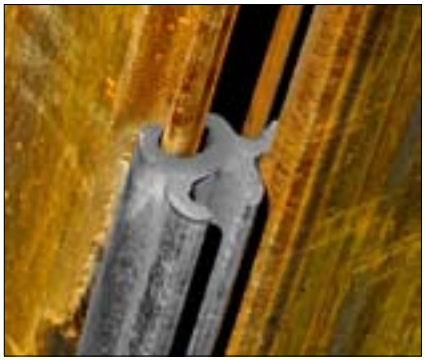
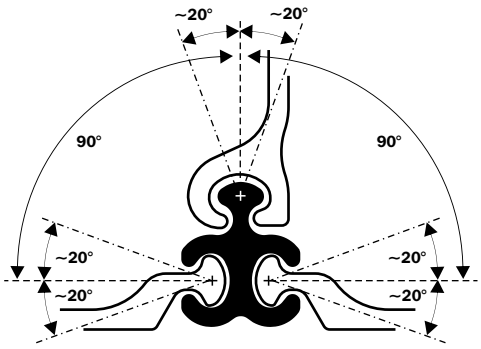


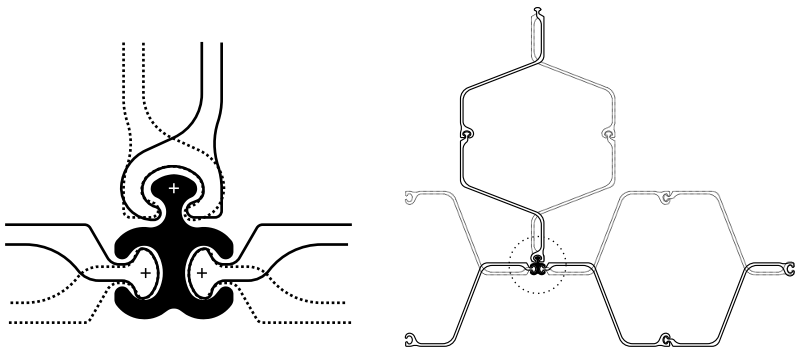




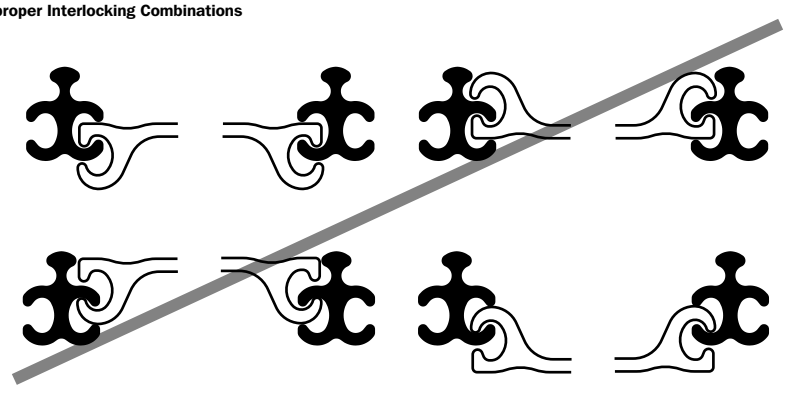
Installation Guidelines

1. General interlocking guidelines call for a ball-to-socket or a socket-to-ball connection. Please review the proper interlocking examples listed.
2. Thread the connector into the interlock while the sheet pile is out of the ground.
3. Adjust the connector to the appropriate position.
4. Tack or spot-weld the connector in place (typically a 10" weld attaching the connector to the sheet pile at the top is sufficient).
5. Drive/extract the sheet (with the connector attached) as you would normally.

Proper Interlocking Examples

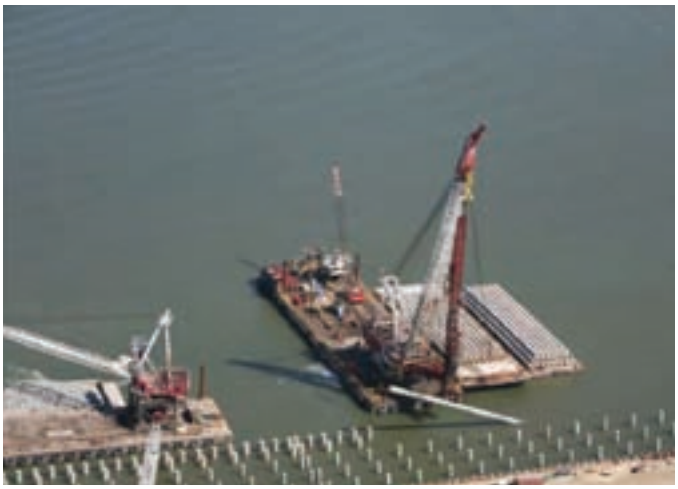


Improper Interlocking Combinations



Please note:

1. Swing or rotation stated are typical but can vary by 10° or more due to rolling tolerances found in sheet pile interlocks.
2. PilePro® connectors are protected by patents.



The Weeks 526 upending a 54" diameter cylinder pile.

"I believe the foundation used here was the best choice and the engineers' design worked as expected."

Rick Palmer, Weeks Marine, Inc. Mid-Atlantic Area Manager

pile setting had to be feasible and the operator needed a survey system that could direct him to the correct location, whether it was for pre-drilling or pile driving, with an accuracy of plus/minus 1 inch.

The equipment that was designed and built, along with a custom survey package (hardware and software) developed and installed by GPS Innovations, Inc. allowed the W-526 to meet or surpass all of the original design goals. Where it was hoped that the W-526 could work up to driving 5 piles a shift over the duration of the project, the crane and its crew drove five piles a shift the very first week it was in operation. The survey system combined the input from two robotic total stations and a lead mounted, dual axis inclinometer to provide graphical and numerical data in real-time to both the crane operator in the cab and the survey technician onshore. Variance displays allowed the operator to locate the drill or pile axis within a hundredth of a foot from the plan location.

One unexpected consequence of the high production rates was the premature failure of the micarta layers in the 60X hammer cushion block. The sustained driving rates, particularly on the 54-inch piles, kept the micarta at elevated temperatures and induced heat related failure in the phenolic resin surrounding the micarta's linen reinforcement. By switching to a different type of composite disk with a much higher working temperature range, the micarta disintegration problem was solved.

As an offshoot from the survey system purchased for the W-526 driver, Weeks was also able to minimize pile cut-offs. The total stations used to control the leads also had a reflectorless EDM (electronic distance measurement) capability, which enabled the onshore survey technician to accurately determine the elevation of the pile butt as it was being driven in its final blows. With the crane operator listening to the survey technician's radio call, the hammer could be stopped within seconds of the final yell. Of the 986 production piles driven with the W-526, over 900 were driven to grade and did not require any additional work prior to the concrete forming that followed.

Materials and Machinery Used

The wharf contract included the installation of a multitude of pile types, including concrete cylinder piles, steel pipe piles, HZ piles, AZ sheet piles and H-piles.

Applied Foundation Testing Inc. performed all of the PDA and Statnamic pile testing. Skyline Steel LLC provided the HZ and AZ steel piling to Weeks Marine, and Bayshore Concrete Products provided the precast concrete cylinder piles.

Weeks purchased a Movax SP100 excavator mounted vibratory hammer, which was manufactured by Hercules Machinery Corporation, for installing the sheet pile anchor walls. All concrete cylinder piles were driven with a Raymond 40X or Raymond 60X hammer. Pile Hammer Equipment Corporation provided their expertise at times to help Weeks keep the hammers running well.

Weeks drives concrete cylinder piles within tolerances of plus/minus 3" in location and plus/minus 1" in grade.

The low-level retaining walls and the mooring dolphins were installed by Marine Contracting Corporation of Virginia Beach, Va.

Other companies involved with the project included Durabond Steel Corp., Precon Marine, Inc., Geoquip Inc., International Construction Equipment Inc. and Conmaco.

Project Completion

Choosing and implementing the best solutions to conquer the project's pile driving challenges meant Weeks' project team and engineering staff had their hands full from start to finish. Template designs, equipment selection and the commitment to follow through with the engineering, fabrication and commissioning of one of the largest and unique marine pile driving systems in North America all combined to allow Weeks to provide a world-class solution for this world-class facility.

"Overall it was a great challenge," says Palmer. "We had the opportunity to work through a myriad of technical issues and come up with solutions. It was very interesting and rewarding to put together these very specialized pieces of equipment and get them working. It was a tremendous accomplishment, and we're incredibly gratified that it all worked out so well." ▼

Four 36" diameter cylinder piles wait to be driven by a Raymond 40X hammer hoisted by the Weeks 541 crane barge.

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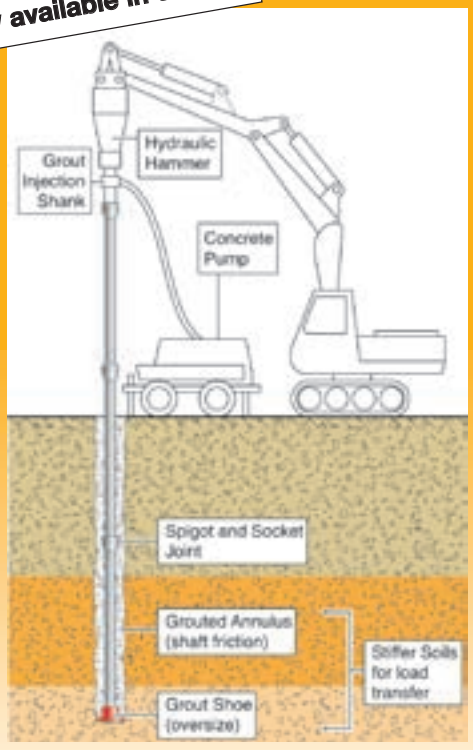

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Concrete Results

Gulf Coast Pre-Stress Inc. celebrates 40 years

By Jeanne Fronda, Editor

The state of Mississippi is known for its abundance of catfish, lush vegetation, and — of course — the second largest river in the U.S., the Mississippi River. Mostly composed of heavily forested coastal plains, the driven pile is an optimum foundation solution for this beautiful area.

Bordered on the south by the Gulf of Mexico, Mississippi is home to many companies that were devastated by Hurricane Katrina, and Gulf Coast Pre-stress Inc. (GCP) is one of them. Helping to rebuild the destroyed structures was added to the busy plate of the Pass Christian, Mississippi-based company.

The company has been very successful over the years. One week of the company's revenue in 2008 equals one year of the company's revenue in 1968, the year when Gulf Coast Pre-stress Inc. first opened.

GCP History

Situated on a 117-acre spot in the Harrison County Development Complex off Market Street at the Industrial Seaway Pass, GCP is a family-owned business that has 22 multi-project casting beds that are over 400 feet long each. L&A Contractors, a general contractor based in Hattiesburg, Miss., established the company, and it was later owned by Raymond International. On Feb. 22, 1990, GCP moved to its present ownership that consists of a partnership between the Spruill, Wareing, and Athan families.

GCP Celebrates 40 years

A private corporation, GCP is celebrating its 40th anniversary this year. Max Williams, vice president of sales with GCP, says plans are in the works for major announcements and celebrations for the company's anniversary.

"Considering that I've been here for almost all of the company's [40 years], I feel very fortunate," says Williams. "I've watched it expand from a very, very small business. I have a great deal of pride in how much the company has grown."

Products and Equipment

The company supplies precast prestressed concrete components for the bridge, marine, and structural industries. In addition, GCP provides concrete platforms for the petrochemical industry, large-diameter spun-cast cylinder piles for large foundation endeavors, and precast segmental sections for long-span bridges. The business also manufactures platforms and walkways, ditch liner sections, bridge girders, as well as triangular, square, cylinder piles and concrete sheet piles.

GCP operates a large concrete slab area for match-cast and miscellaneous precast items. GCP also houses a computer-controlled, twin turbine central mix batch plant that can produce up to 600 cubic yards of concrete per day. To permit rapid shipment and manufacture, items can be steam cured.

Possessing 2,000 feet of bulkheaded dock area border-

Image of work on I-10 near Lake Pontchartrain.

"I've watched it expand from a very, very small business. I have a great deal of pride in how much the company has grown."

Max Williams, Vice President of Sales with Gulf Coast Pre-stress, Inc.

ing on the Industrial Seaway, GCP has access to the Gulf Intracoastal Waterway. With two additional passage routes for products to be transported — a rail spur that is near the plant and Interstate 10 that is roughly 15 minutes away — GCP can ship its products using barge, train, and tractor trailer. Goods can be shipped to South and Central America and all U.S. states in the Gulf South.

"The bulkhead we have is just a bulkhead along a wall. The dock, when we complete it, [will enable us] to take our cranes and walk right out over the barges and load our products. We won't have to take the products sitting on the ground and then have a swinging boom crane pick it up and put it on the barge," says Williams.

With several departments — sales, production, quality control, engineering, and procurement — that are in house, GCP is fully certified by the Pre-Cast Pre-Stressed Concrete Institute. The business is also certified by the five state highway departments of Florida, Alabama, Mississippi, Louisiana, and Texas and by six federal government agencies including the Navy, Coast Guard, the Corps of Engineers, the Department of Agriculture, and the Department of Environment.

Company Success

Teamwork is key to GCP's success, and its staff strives to comply with the company motto: "Together we achieve the extraordinary."

With approximately 400 employees, most of the GCP team has been employed there for several years, and one of the owners, Q.D. Spruill, has been with the company since 1969. From the now-owner down to the leadman, 95 percent of its staff members have been with the company for an average of 28 years. Williams says another contributing factor to GCP's success is its managers.

"I've always contended that the key to our success is the management team at Gulf Coast Pre-Stress Inc.," he says. "By management team, I mean all the way from the president to the foreman to the leadman; it's a team that really works."

Williams says the second reason for the company's success is the company's products and location.

"We make products that are conducive to the area," he says. "Our products are what people want and what they need."

GCP has worked on many projects requiring structural pre-cast concrete. One of the company's first and largest projects involved installing the seat decks and pre-cast concrete for the Louisiana Superdome, a project demanding enough seat deck to stretch for 10 miles. Williams says one of the most memorable projects is the company's first cylinder pile job for the Alabama Power Company.

"There are certain ones that you tell stories about because they stick out in your mind," he says. "It started us a business

that we're really big on now, which is [manufacturing] spun-cast cylinder pile.

"[The Blakely Island Silver Hill transmission line] for the Alabama Power Department was the first significant job using cylinder piles. Jordan Piledriving drove the piles for that one."

The Pile-driving Industry and the PDCA

Williams says the PDCA has had a positive impact on the pile driving industry.

"Piling and being a pile-driving supplier in the industry as a whole has been very good," he says. "I think [the PDCA] has taken up the position that's been needed for many years. Unfortunately, we started it 15 years too late, because we should've had a pile driving contractors association way before everybody started crying uncle, me included. But we're not a dollar short; we're just a day late."

According to Williams, working with the PDCA is a great way to get involved in the industry.

"I think that the Pile Driving Contractors Association is going to do even more in the future. The PDCA is promoting expansion into regional PDCA membership," says Williams. "You can get more people to come to something that's 100 miles away than you can to go to a meeting in Chicago if you're from Florida, or to Florida if you're from Chicago. The regional chapters can narrow their vision to take care of problems or to help their industry based on what they need locally."

And Williams knows full well how a local event can cause abrupt changes. Hurricane Katrina caused severe devastation along the Gulf Coast. Although the natural disaster caused grave damage, in its wake was an opportunity for GCP staff to give back to the community while simultaneously helping the company.

"Katrina totally wiped our company out; that was the bad news," says Williams. "The good news is that it wiped out everything that our business had to do with, which are bridges and piers and docks and things like that. The good Lord gaveth and the good Lord tooketh away, and then he gaveth back in spades.

"All of our equipment, all of our forms and raw materials were lost. Then our buildings, most of them except for the two-storey buildings, were still standing. All interiors were lost. Whatever wasn't destroyed from the water up was destroyed from the rain down. They were all full of salt water."

Additions

GCP currently possesses two 150-ton straddle Mi-Jack cranes and a 300-ton Manitowoc, but one of the company's more recent additions is a large 350-ton boom crane that had to be brought to Mississippi by ship from Scotland.

Williams says GCP is building a new bed to help with the work and production that they are doing for the Interstate-10 twinspan across Lake Pontchartrain between Slidell and New Orleans. The expansion to build its new cylinder pile production plant cost several million dollars. ▼

Rebuilding an Historical City Landmark

Corman-Imbach Marine Inc. rebuilds the Annapolis City Dock

By Joshua Rice, Corman-Imbach Marine Inc.

The Annapolis City Dock, located in the heart of Annapolis, Md., has been a port of call for the watermen of the Chesapeake Bay since the early 1700s when it was a major international trade port. Today, nearly 300 years later, it is a focal point of Annapolis tourism and a key component to the local business economy, as it attracts visitors from around the world. Whether you enjoy watching the early morning sun rise across Spa Creek, strolling the boardwalk to admire the boats docked along Ego Alley or listening to the United States Naval Academy bands perform at the Susan Campbell Park, the City Dock offers entertainment for everyone.

However, like many cities across the United States, Annapolis faces an aging infrastructure. The existing timber bulkhead and boardwalk surrounding the City Dock had suffered significant deterioration during its 37 years of use since its last major overhaul in 1970 and was now in need of major repair.

"We're sinking and our pilings are coming apart," says Annapolis Mayor Ellen O. Moyer. "This is an essential, essential project."

Project Introduction

With the understanding that the boardwalk and dock needed to be renovated and updated, the City of Annapolis contracted with Kennedy Porter and Associates to design a new facility. The scope of the renovation contract included the installation of 960 lineal feet of new steel bulkhead; new finger piers along Ego Alley with new cable, telephone, Internet and upgraded electrical services to accommodate larger boats; the removal of the existing boardwalk; the construction of a new boardwalk; and the reconstruction of the Susan Campbell Park, including leveling and resurfacing with new-brick pavers.

Installation of Steel Sheeting A.

Construction Issues

The most challenging aspect of the $9-million dollar project was the compressed six-month construction schedule. Construction on the project could not begin until after the annual Annapolis Boat Show was complete in mid-October, and it would have to be completed by April 15, 2008 in time for the Maritime Heritage Festival that was scheduled for early May 2008. As a result, the dock, boardwalk and Ego Alley were completely closed to the public during construction, which sparked a tremendous public interest in the project.

Corman-Imbach Marine Inc. accepted the challenge and was the successful bidder on the high-profile project. Immediately after the contract was awarded by the City of Annapolis, the job team began to issue material purchase orders and select subcontractors. Additionally, public relations meetings were scheduled with local newspapers and television stations to alert the public of the upcoming construction project. To avoid heavy truck traffic in the downtown area, arrangements were made with major material suppliers to have the majority of the material delivered to Corman-Imbach's yard in Baltimore. The material was then loaded onto barges and towed to Annapolis.

Construction began on Oct. 18, 2007 following a brief groundbreaking ceremony hosted by the City. Among the first construction activities was the installation of a chain link fence around the perimeter of the dock. Once the fence and all erosion and sediment control devices were in place, work began on the removal of the parking lot and boardwalk to expose the existing bulkhead system.

Materials and Machinery Used

The new bulkhead design required the existing timber bulkhead to remain in place and called for new PZ 27, PZ 35 and PZ 40 steel sheeting to be driven approximately 3 feet in front of the existing bulkhead. Installation of steel sheeting began in early November 2007 and was completed by mid-January 2008. Overall, three crews working with 75-ton, 150-ton and 165-ton pedestal mounted barge cranes equipped with ICE vibratory hammers installed more than 800 tons or 960 LF of PZ steel sheeting, ranging in length from 40 to 80 feet.

To retain the new steel bulkhead, a 3' x 3' concrete dead man was constructed 25 feet away from the face of sheeting on a single row of 50-foot HP 14 x 89 piles spaced on 6- foot centers. Large diameter galvanized tie-rods were installed to connect the concrete dead man to the steel sheeting. Due to the limited amount of available work space on land, the 97 HP14 x 89 piles were installed by a subcontractor, Bryan's Quality Plus LLC, using a Junttan PM-20L rig with a HHK-5A impact hammer. Because of the close proximity of existing

View of Project from across Ego Alley.

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buildings, vibration sensors were installed to monitor seismic activity from the pile driving activities.

As a result of the compressed construction schedule, Corman-Imbach Marine Inc. subcontracted the installation of 15,000 LF of 12" diameter timber pile to Cyr's Marine Construction, which has been working on the water in the Annapolis area for more than 20 years. Owner Tim Cyr and his crew of three to four men began installing timber pile in January for the finger piers, which would create 20 new boat slips along Ego Alley. Cyr's work was completed by early March. The crew worked efficiently from the water using an ICE 216 vibratory pile hammer and a 40-ton Kobelco crane mounted to the deck of a 40' x 120' barge.

"Surprisingly, very few obstructions were encountered during any of the pile driving operations and we were able to easily work around those that were encountered," says Bob Burton, project superintendent with Corman-Imbach Marine Inc.

The amount of work to be completed on land was just as challenging as the water work. The contract called for the existing electrical room, called the "Bird House" to be torn down and rebuilt which included the installation of more than 13 miles of underground electrical conduit and wire. Corman-Imbach subcontracted this work to TECO Electric, a local electrical contractor that is very familiar with the area. Additionally, the more than 17,000SF of brick pavers in the Susan Campbell Park were removed and replaced along with existing park furniture, water fountains, bollards, flag pole and landscaping.

With the tight construction schedule, and little time to waste, a large factor to the success of this project was the positive relationship Corman-Imbach has with the City of Annapolis, and the timeliness of the City and Jeff Evans from Kennedy Porter and Associates in providing quick responses to any issues that arose on the project during construction. Working together, the City and the contractor kept the community informed on the construction progress and kept the overall impact of the project to the community to a minimum.

During the dead of winter in Annapolis, Corman-Imbach had up to 12 crews working two shifts, seven days a week to ensure that the project would be done in time for the City to host its Maritime Heritage Festival, as any down time would be very costly.

"It was sheer determination getting this done. We had to work with the tide, Mother Nature, compact space, and no time. This was done in the worst time of year, in the shortest time possible," says Harry Sandrouni, a civil engineer with the City of Annapolis.

"I have been on a lot of projects with tight schedules, but this schedule was one of the most demanding and strenuous," says Burton.

The great Henry Ford once said, "Coming together is a beginning; keeping together is progress; working together is success." Corman-Imbach would like to thank all foremen, crews and all of the subcontractors and suppliers who helped make this a successful project. Thanks to dedication and teamwork, an historical landmark was rebuilt for future generations to enjoy as we have for so many years. ▼

"Surprisingly, very few obstructions were encountered during any of the pile driving operations and we were able to easily work around those that were encountered."

— Bob Burton, project superintendent with Corman-Imbach Marine Inc.

Completed Sheeting and Timber Pile along Ego Alley.

Concrete Deadman H-Pile Installation by a Junttan Rig.

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Efficient Concrete Pile Design in D.C.

Changing the Face of Deep Foundations in our Nation's Capital

By Karl A. Higgins, III, P.E.

The Washington, D.C., metro area enjoys one of the healthiest building and infrastructure development markets in the United States, particularly in the early 21st century. The region is home to some of the nation's largest building developments. Notable recent projects include the National Harbor Development and the redevelopment of southeast D.C., spearheaded by the recent construction and opening of the new Washington National's baseball stadium.

Until recently, preferred deep foundation alternatives in the Washington, D.C., metro area often included drilled shafts (caissons) and augered, cast-in-place piles. Notable and recent Washington developments are supported on driven precast concrete piles, prompting some building industry leaders to ask, "Why the change?"

Introduction

Building in our nation's capital is expensive. Real estate, labor and materials are all major cost considerations. Having worked on hundreds of D.C. metro building and infrastructure projects, our collective experience indicates that owners want a reliable and less costly foundation, with emphasis on less costly. Let's face it - a building's foundation is "unseen" post-construction (typically). Many decision-makers would prefer to spend a building's cost budget on upgraded interior or exterior features versus a more costly foundation. As such, unless driven concrete piles are the least costly alternative, they are highly unlikely to be selected. So, why the recent trend toward the use of driven concrete piles in the Washington metro area? We believe the reason is price.

Efficient Designs

The Gaylord National Harbor Hotel and Convention Center project was the largest East Coast building project in 2006-2007 and the world's fourth largest building project during the same period. The project is situated on the bank of the Potomac River in Prince George's County, Md., just east of the newly constructed Woodrow Wilson Bridge connecting Maryland to Virginia. The project is a visible component of Washington, D.C.'s skyline and the hotel has views of our nation's capital. The hotel's grand opening was in April 2008.

The Gaylord National Hotel and Convention Center was the catalyst for the Washington Region's overall National Harbor project, the region's largest construction project, described by some media as a city in itself. The construction

Gaylord National appears in the right foreground while National Harbor appears to the left.

value of Gaylord's project is reported to be near $900 million, with the adjoining National Harbor Development, launched by D.C. metro developer The Peterson Companies, at nearly the same value. Gaylord Entertainment of Nashville, the project owner, required a tight construction schedule and a firm opening date in spring 2008. The first project task was installing the foundations for the new 18-storey hotel containing 2,000 guestrooms.

The preliminary geotechnical designs suggested that both auger cast-in-place piles and drilled shafts (caissons) be used. Driven precast concrete piles were considered an "alternative," but one that was believed to be more expensive than auger cast-in-place piles or caissons. Engineering Consulting Services, Ltd. (ECS), the Washington metro area's largest geotechnical consultant, believed that driven, precast concrete piles would be the least costly deep foundation alternative if the geotechnical design capacities could be increased from the preliminary assessments derived by others. ECS was hired by Gaylord Entertainment to demonstrate that driven precast concrete piles were more cost efficient and less risky than other deep foundations previously considered. Fourteen-inch square, prestressed, precast concrete piles with compression capacities of up to 150 tons each were ultimately chosen to support the hotel. Superior cost and schedule considerations, coupled with a high degree of design certainty — every driven pile is a tested pile — resulted in the choice of driven precast concrete piles for the hotel project.

Preliminary precast concrete pile capacities were determined to be on the order of 100 tons per pile. To make driven, precast piles more attractive from a cost perspective, the capacities needed to be increased toward the upper levels of allowable stress limits permitted by the International Building Code (IBC). For the same sized piles originally considered, 14-inch square precast concrete, the capacity estimates were increased to 150 tons per pile, a 50 percent increase from the original estimates. Even higher capacities were feasible, but pile driving times and lengths were limiting factors. Pile capacities in this range were previously thought to be too aggressive in the D.C. metro area considering the variability of the underlying soil deposits. However, a comprehensive test pile program confirmed that individual pile capacities in excess of 150 tons were possible with reasonable embedments into the bearing soils. Proving the higher range of capacities was key to the decision to utilize driven, precast concrete piles for this project.

Schedule was also an important consideration. Because higher capacity piles were considered, fewer were needed as compared to say auger, cast-in-place piles. Fewer piles resulted in smaller pile caps, which also improved the schedule. Overall, preconstruction assessments determined that driven, precast concrete piles would be faster to construct than other deep foundation types, including drilled shafts. The positive schedule impacts of driven piles were a definitive cost-savings measure.

Regional Influence

The positive impacts of efficiently designed, driven, precast concrete piles for Gaylord National spilled over onto the neighboring National Harbor Development, which began construction about one year after the start of Gaylord National, by regional developer The Peterson Companies. The entire National Harbor development cost is estimated at $2 billion. Several of the adjoining larger hotel or mixed-use structures (the Westin or Wyndham Resorts, for example), were also supported on driven, precast concrete piles, designed as efficiently as the project schedule would permit. Considering the construction dollars involved, all serious deep foundation alternatives were considered for the entire National Harbor development. Cost and predictability were key reasons precast concrete piles were chosen and why other deep foundation alternatives were not selected.

National Harbor Development shown on the left, and Gaylord National (not pictured) is to the right.

Undoubtedly, the regional successes of National Harbor have influenced the designers, contractors and owners of new projects planned in the Washington, D.C., metro area, particularly plans for redeveloping southwest and southeast D.C., where soil conditions are similar to National Harbor. The new Washington National's stadium is supported on driven precast concrete piles, and planned building developments in Washington's old "Navy Yard" will also be supported on driven precast concrete piles. Neighboring Arlington's "Potomac Yard" re-development, under construction since 2004, has several buildings supported by higher capacity, precast concrete piles.

ECS began a new building project in 2008, termed "Waterfront" located in southwest D.C. which is supported on 150-ton, relatively short (lengths on the order of 45 feet), 14-inch square precast concrete piles.

Vice-President and project representative, Herb Faling of Vornado said, "I have built buildings supported on drilled shafts (caissons), driven steel piles and auger cast-in-place piles, but never driven concrete piles."

In 10 more years, as the pile driving industry continues to flourish alongside Washington's building boom, we don't expect to hear these sentiments repeated.

Updating Pile Capacity Assumptions for the 21st century

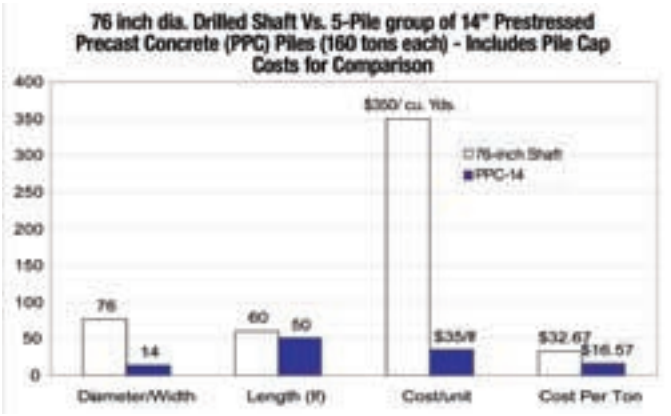
The success of National Harbor was born out of the idea of matching the structural pile capacity with the geotechnical capacity, for an efficient design. This approach has been repeated successfully since. Section 1809.2.3.3 of IBC 2003 states that the maximum allowable pile stress for prestressed piles is f'c = 0.33 f'c-0.27 fpc (f'c is the 28-day concrete compressive strength, fpc is effective prestress). For example, for a concrete compressive strength, f'c, of 5,000 psi and 6,000 psi, the maximum allowable piles stresses are 1,461 psi and 1,797 psi, respectively (assuming fpc is 700 psi). As such, allowable compression working loads for 14-inch precast concrete piles could range from 140 to 175 tons (approximately). The author recalls seeing many late 20th century geotechnical reports, industry training guides, or text book examples with suggested working loads for 14-inch piles in the 75- to 90-ton range.

Increasing the geotechnical design capacities, nearer to the code derived structural limits will produce a more efficient design. A more efficient design is likely to be more cost competitive with other deep foundation alternatives. This strategy is why the author believes precast concrete piles have seen a rise in popularity in Washington, D.C., over the past several years.

Improved Capacities' Impacts on Cost

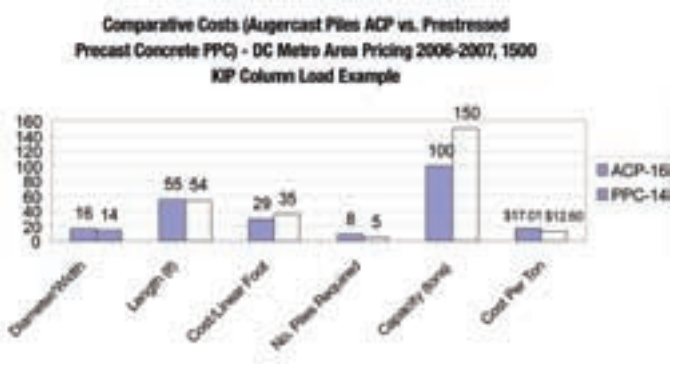
Utilizing higher capacity precast concrete piles makes them more attractive financially. Beginning about 2004, when higher capacity piles in the DC metro area were first considered, proving their cost effectiveness to owners and structural engineers was important. The Potomac Yard redevelopment project in Arlington presented a great opportunity to establish our anticipation of precast concrete piles' cost advantage.

Potomac Yard developers initially expected drilled shafts (caissons) to be the least costly foundation. Our initial assessment was similar; however, once higher capacity concrete piles were considered, their cost advantage became evident. Below



is an example cost evaluation that was prepared for Potomac Yard in 2004-5. Precast concrete piles only became the less expensive alternative (on a cost per ton basis) after their capacities were increased, and the pile group sizes diminished.

During the same 2005-06 time frame, ECS made several other similar cost evaluations for buildings supported on Auger Cast-in-Place (ACP) Piles. Like drilled shafts, ACP piles did possess price superiority, but only when late 20th century PPC pile capacities were applied. Once higher PPC pile capacities were applied, they became the less expensive alternative. Below is an example cost evaluation utilizing the higher range of PPC pile capacities.



Impacts to the Industry

Driving similarly sized piles to higher capacities does impact the pile contractors. Larger ram weights of 1.5 to 2 percent of the test load may be needed to establish minimum pile tip elevations, suitable terminating blowcount criteria, or "prove" the higher capacities during a dynamic testing program. For the 150-ton (300-kip) example mentioned several times above, the required ultimate test load would be about 600 kips (F.S.=2.0). The suggested ram weight may need to be in the 9.0- to 12.0-kip range and larger hammers require larger cranes. In some cases, deeper pile embedments require longer drive times and more total blows, which impact hammer and pile cushions. Hydraulic and air hammers are best suited due to larger ram weights and stroke height control. Large diesel hammers can be utilized if stroke height control can be ensured.

Superior cost and schedule considerations, coupled with a high degree of design certainty (every driven pile is a tested pile) resulted in the choice of driven precast concrete piles for the hotel project.

Closing

We believe that more efficiently designed piles will help the pile driving industry flourish; however, we designers also acknowledge the cost impacts to the contractors in achieving this goal. At least in the Washington, D.C. metro area, there is no one preferred or consistently less expensive deep foundation type. As such, most major building developments explore deep foundation alternatives and the least costly is often chosen.

If the pile driving industry wants to ensure its active participation in today's building market, cost needs to be a part of the equation and efficient pile designs help this endeavor. We encourage more dialogue on this topic within the industry to ensure broad support of driven piles between geotechnical designers and contractors.

Karl A. Higgins, III, P.E. is a managing principal with ECS Mid-Atlantic, LLC, the company's D.C. metro area headquarters. Higgins has over 18 years of experience in the building construction industry and has focused his practice on the geotechnical design aspects of urban construction. He is a recognized company expert on deep foundations and dynamic pile testing. Higgins manages a team of engineer's, geologists and technicians helping build some of Washington's most notable projects.

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In 2007, the Pile Driving Contractors Association began working with local PDCA chapters to jointly conduct the Design and Installation of Cost-Efficient Piles (DICEP) conference. In 2008, national PDCA and the Gulf Coast Chapter of the PDCA will host the 9th Annual Design and Installation of Cost-Efficient Piles conference on Wednesday, Sept. 24, 2008, in New Orleans, La.

DICEP is primarily designed for civil, geotechnical, and structural engineers, presenting the lectures from an engineering perspective. However, the conference is also intended to provide a positive learning experience for contractors and other firms or individuals who support, conduct business or are associated with the pile driving industry.

The 2008 DICEP conference will focus on design, installation, cost efficiency, varying material selection and advantages for using driven pile in deep foundation solutions through a series of lectures presented throughout the day.

The PDCA should finalize the conference logistics, including the site selection soon. Watch for more in formation on this important PDCA conference in future E-Letters, *Piledriver* magazine, and on the PDCA Web site, www.piledrivers.org. ▼

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Why not Timber Piles?

Design loads and timber piles

By Scott Webster, GRL Engineers, Inc.

Timber piles have been the most widely used driven pile foundations in history with known structures being supported by timber piles dating back thousands of years. However, with the development of steel and concrete pile sections, the use of timber piles has steadily declined as they are generally considered to be less versatile. In fact, over the past several decades engineering codes have been written to limit the use of timber piles to lightly loaded structures by limiting the design loads for timber piles. This has primarily been done due to the belief that timber piles are not as consistent in strength as the steel or concrete pile alternatives.

I was recently asked to give a presentation for the Charleston, S. C., chapter of PDCA on the use of timber piles, with specific emphasis on how the design loads for these piles could be increased to expand their use. This topic seemed rather intimidating at first glance and like most engineers I also felt that use of timber piles should be limited to the more lightly loaded foundations. However, upon researching the available data, it has become apparent that the engineering community may not be giving timber piles appropriate consideration.

Based upon the current codes, the allowable design loads for timber piles are based on an allowable design stress ranging from approximately 0.8 to 1.2 ksi (AASHTO 2002 Standard Specification). This allowable design stress is conservatively applied only across the pile toe area to calculate the allowable design load; therefore, for the typical southern pine timber pile with an allowable design stress of 1.2 ksi and a minimum eight-inch diameter tip, the allowable design load would be 60 kips (30 tons). This result agrees with the Timber Pile Design and Construction manual that allows a 60-kip design load for an eight-inch tip diameter southern pine timber pile. However, both of these specifications appear to conservatively apply a design stress over the pile toe area only, neglecting the large pile area above the toe. To accept this approach, one would need to assume that the majority of the pile capacity for the timber piles would be achieved at the pile toe. Considering that timber piles are tapered and that most piles derive their pile capacity from a combination of skin friction and end bearing, this seems quite unreasonable.

For an eight-inch tip diameter timber pile the minimum pile butt diameter ranges from 11 to 14 inches (ASTM D25). For a timber pile having a length of 35 feet the minimum pile butt diameter would be 12 inches. If we apply the allowable design stress of 1.2 ksi to the 12-inch butt diameter, the resulting allowable design load would be 136 kips (68 tons). Based upon my experience with timber piles, such a high design load

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with an adequate safety factor could be achieved, but only under ideal subsurface conditions. Therefore, it seems more logical to limit the design pile capacity based upon an average pile diameter rather than the pile diameter at either the pile tip or butt. Again, for eight-inch tip diameter piles with an average butt diameter of 12 inches, the average pile diameter would likely be very close to 10 inches. For a 10-inch average diameter timber pile the design pile load would then be 94 kips (47 tons). Depending upon the specific soil conditions, slightly higher or lower design loads may be more appropriate.

In order to justify the use of these increased design loads it is recommended that additional foundation testing at the start of the project be provided. Specifically, dynamic pile testing using the Pile Driving Analyzer (PDA) should be provided for a selected number of indicator piles across the project site. These PDA tests should be performed during both initial and restrike driving to fully evaluate ultimate pile capacities. Such testing is easily accomplished and will provide greater confidence in the installed foundations.

As an example, a recent project along the North Carolina seashore required timber piles to support a multistory condominium building. The eight-inch tip diameter piles were to be driven to a final penetration of approximately 25 feet below the existing grade for a design pile capacity of 50 kips (25 tons). Although the design loads were relatively low compared to the discussion above, dynamic pile testing was specified for the project in order to develop the driving criteria and to confirm that the design pile capacity with an appropriate safety factor would be achieved. As such, five indicator piles were planned to be driven and tested using the PDA during initial driving. Restrike testing if necessary, would be accomplished after waiting periods of only a few hours so that testing could be completed during a single day of testing. The general soil conditions at the time of testing consisted of between 1 to 12 feet of building pad fill, 13 to 24 feet of alluvial sands and silts underlain by clayey sand at a depth of 25 feet, which was the intended bearing layer.

PDA testing indicated that the ICE 32-S hammer being used transferred between 13 and 25 percent of the rated hammer energy. It should be noted that the hammer stroke was intentionally limited to about six feet to prevent pile damage. The pile top compression stress ranged from 1.4 to 1.6 ksi. The initial driving pile capacities ranged from 121 to 142 kips based upon the Case Method capacity estimates. A CAPWAP analysis of a selected test pile indicated an end of initial driving pile capacity of 132 kips, which would confirm the accuracy of the Case Method capacity estimates. Although sufficient pile capacity from the end of initial driving was confirmed for the 50-kip design load piles, restrike testing was performed to determine if additional pile capacity could be expected with time. Restrike testing performed after waiting between four to five hours indicated Case Method capacities ranging from 159 to 172 kips. A CAPWAP analysis performed for one of the test piles indicated a beginning of restrike pile capacity of 178 kips (see Figure 1). Based upon these results it was apparent that the piles would achieve safety factors well above two for the 50 kip design load. In fact, the average safety factor was approximately 3.3 based upon the restrike testing results. It should be noted that the restrike testing was performed after

minimal waiting time and that additional pile capacity could likely have been identified with a longer waiting period after initial driving.

Obviously, based upon the results obtained at this project, a higher design load could have been achieved resulting in significant cost savings for the project. PDA results indicate that a design load on the order of 80 kips (40 tons) could have been used which could have resulted in up to 40 percent fewer piles being required for the foundations. Such cost savings should be taken advantage of when possible for any foundation design.

As discussed, the potential for expanded use of timber piles based on increased allowable design loads can be accomplished. Current design specifications do not appear to take advantage of the potential for timber piles, and in fact appear to handicap such piles by limiting their design loads based upon the pile toe area only. Such specifications are unrealistic in all but the most unusual circumstances for timber piles (end bearing only soil resistance). Finally, significant cost savings can and should be achieved by using PDA testing to determine the ultimate pile capacity of timber piles. Such testing is commonplace for steel and concrete piles and this has in part allowed for higher design loads for these piles. PDA testing for timber piles is much less prevalent but can and should be used to increase design loads of these piles. The primary reason that PDA testing on timber piles is not common is that local and international building codes do not require load testing of piles with design loads of less than 40 tons. As such, timber piles are often designed with loads below this limit to avoid such testing. However, by allowing these design loads to increase, significant cost savings can be achieved by reducing the number of piles to be driven. The cost for dynamic testing on projects of this nature is quite small compared to the potential cost savings for the foundation piles.

Scott Webster earned a BSCE from the Military College of S.C. and a MSCE from the Michigan Technological University. He has worked extensively since 1986 with the dynamic pile testing and analysis techniques on a variety of projects. Working with both STS Consultants and GRL Engineers has allowed him to develop a strong background in this field as well as geotechnical engineering. This experience is critical when performing dynamic pile testing and analysis for a wide range of projects within the United States and abroad. ▼

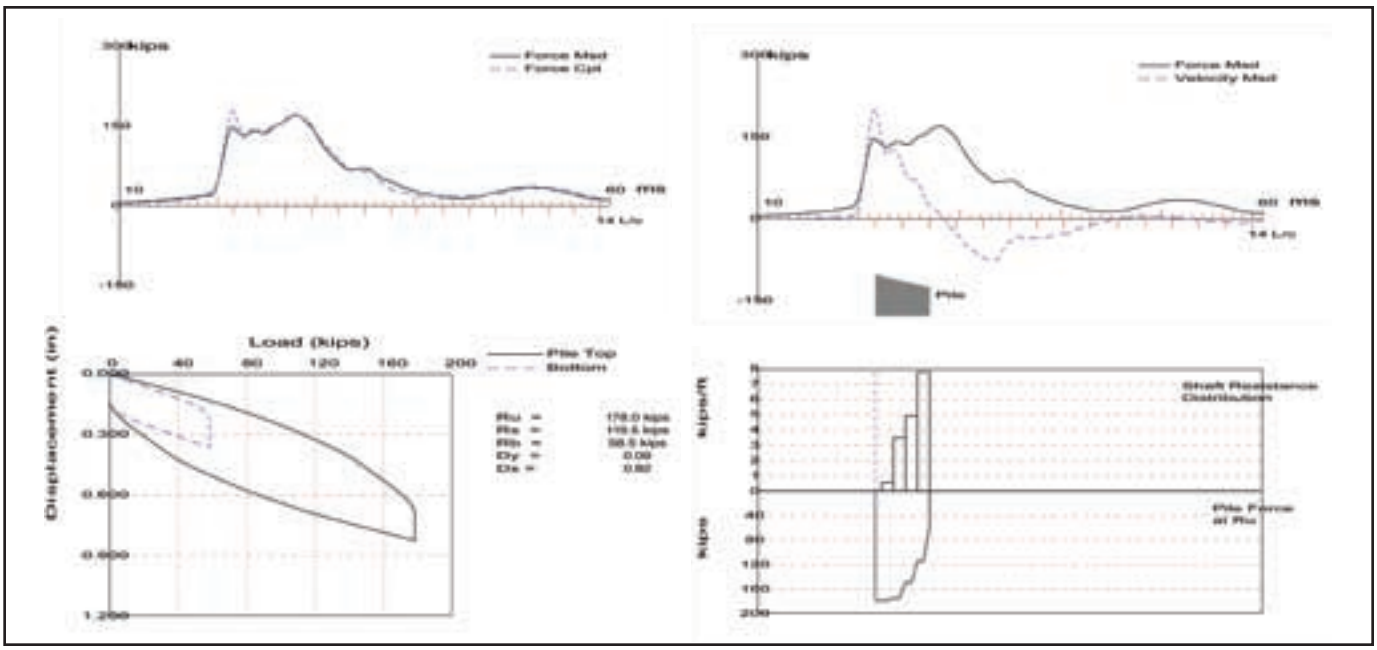

Figure 1 – CAPWAP results for restrike driving

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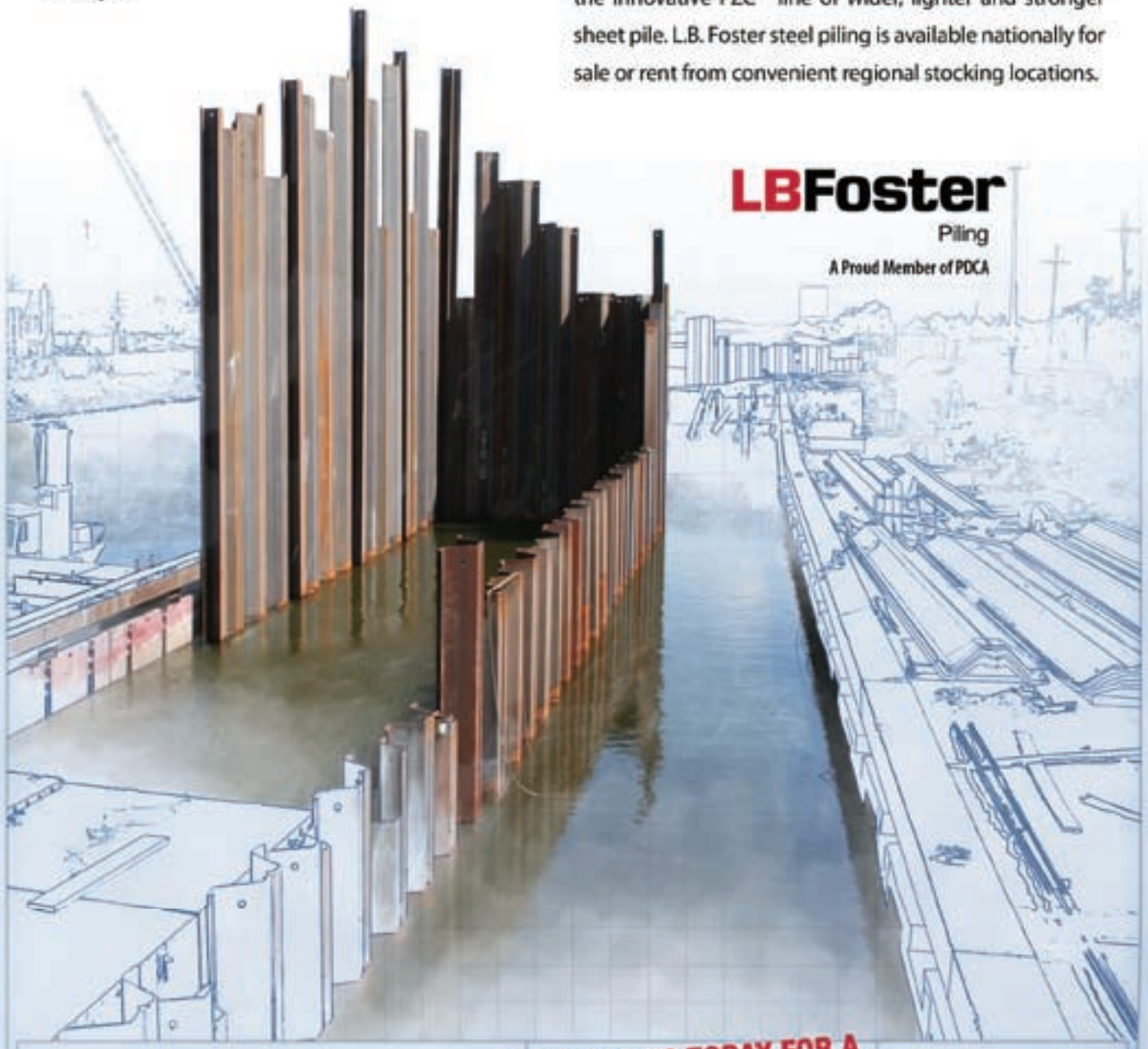

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Membership Definition

PDCA Associate and Technical Affiliate Memberships Defined

The PDCA has three major membership categories, which include Contractors, Associates, and Technical Affiliates. In the past, and to PDCA error, the Associate and Technical Affiliate memberships have not been listed correctly, or information has been provided that was not intended as part of that membership category. This section of PileDriver magazine is intended to clearly define the difference between the two memberships and to acknowledge our Associate Members.

Associate Members are "firms engaged in the manufacturing or supply of equipment, materials or services to the pile driving industry." Technical Affiliates are "individuals who are involved in the design or installation of driven piles or teaching the art and science of pile design and installation. May be employed engineers, architects, government or university employees."

Another difference is in the way the PDCA lists Associate Members and Technical Affiliates. Associate Members are listed in the database, Web site, and annual directory with the following information: firm name, company contact, company contact information to include address, phone, fax, Web site, e-mail address, type of work performed and state(s) / country in which work is performed. Technical Affiliate members are listed in the database, Web site and annual directory with the following information: individual's name, address and phone number.

Individuals who are currently Technical Affiliates, but are employed with companies who may want to change to an Associate membership may do so by contacting the PDCA office, thereby taking full advantage of an Associate membership and its benefits.

2008 PDCA Associate Members

(In alphabetical order and currently in good standing as of March 30, 2008.) ▼

American Piledriving Equipment
Applied Foundation Testing
Atlantic Wood Industries
Bay Machinery Corporation
Bayshore Concrete Products
Bermingham Foundation Solutions
Brittex International, Inc.
Cappco
Carpenter's Pole and Piling
CDS Manufacturing
Challenger Pipe and Steel, LLC
Chapparal Steel
CONMACO
Consolidated Pipe and Supply Co.
Corpac Steel Products
Cox Industrial Division
Crestwood Tubulars, Inc.
DFP Foundation Products, LLC
Dominion Pipe and Piling
Drive-Con, Inc.
DYWIDAG Systems International
Duffield Associates
Ellis & Associates
Equipment Corp. of America
Essev Tech, Inc.
Florida Pipe and Steel
Frank Black Pipe and Supply
Gate Concrete Products Co.
Geokon, Inc.
GeoQuip, Inc.
Glenn Lee Trucking
GRL Engineers, Inc.
Gulf Coast Pre-Stress, Inc.
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Liedtka Trucking, Inc.
Link-Belt Construction Equipment Co.
Lodge Lumber Company, Inc.
Mandal Pipe Co.
Martin Piling & Lumber Co.
McDonough Marine Services
McFarland Cascade
Menck GmbH – An Acteon Co.
MG&B
MidGulf Forest Products, Inc.
Mississippi River Equipment Co.
Mississippi Valley Equipment Co.
Monotube Pile Corp.
Municon Consultants
Naylor Pipe Co.
North American Steel Sheet Piling Association (NASSPA)
Northwest Pipe Company
Nucor-Yamato Steel Company
Pacific American Commercial Co.
Pearson Pilings, LLC
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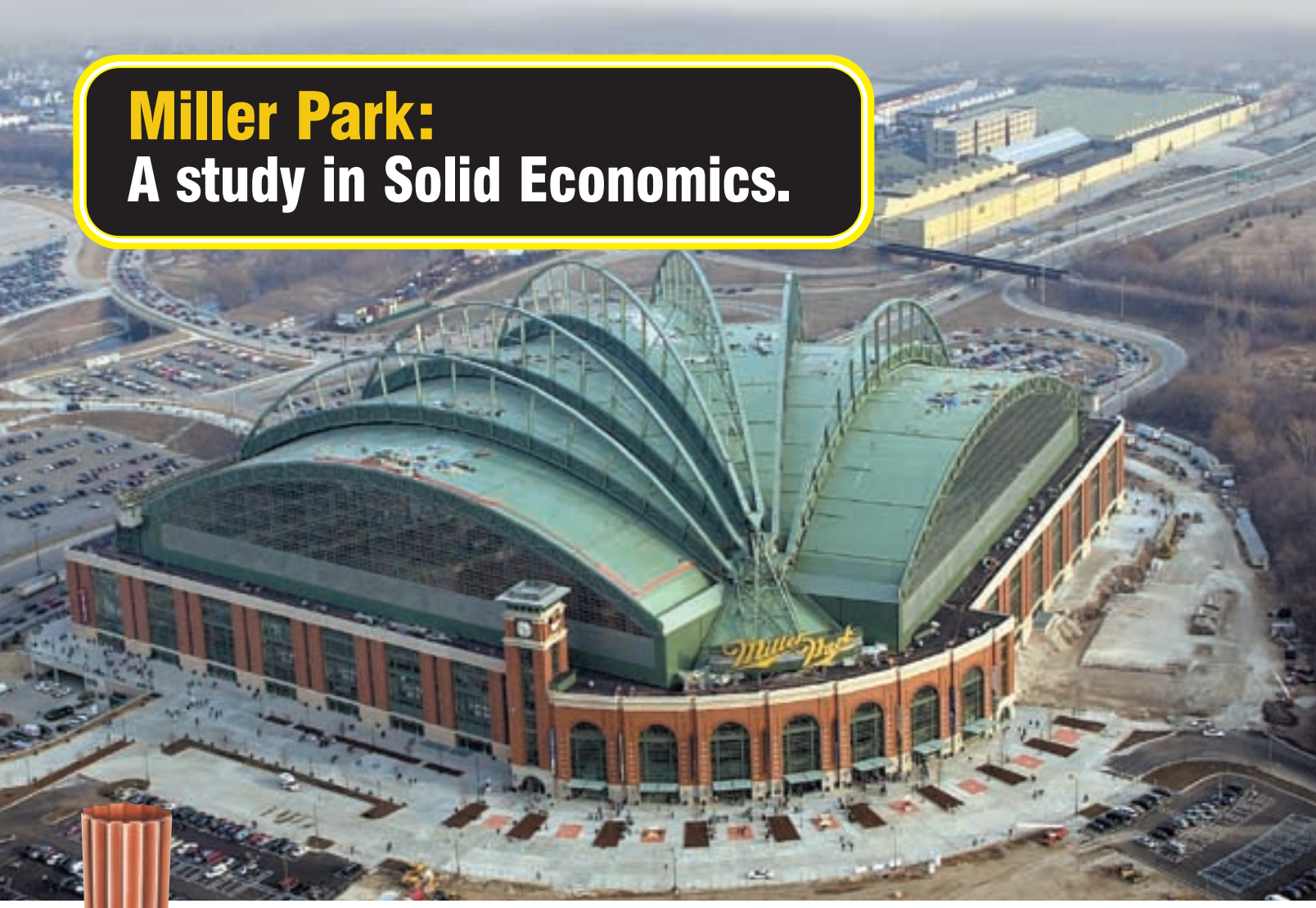

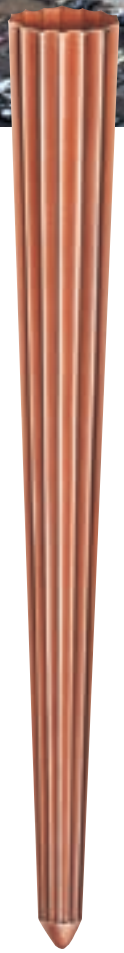

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Importantly, it was recognized that by investing a relatively small amount of money in a test pile program early on, millions could be saved in the deep foundation work designated for driven piling.

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Written by Kurt Seidel
Contributed by Julian Seidel

The pile creeps downward as the monkey dances,*
The pileframe trembles, shudders with each blow.
The helmet lists and twists and prances
But on and on the pile must go.

The pilehead takes a brutal beating,
The pile brakes rocks and floaters with the toe,
And slowly you can see the pile retreating
As it is hit and hit again, blow after blow.

With every blow you feel the aching
Of timber cushions pounded, wire ropes that strain
As everything is tested close to breaking
For just another quarter inch of gain.

And pile by pile is bashed and driven
Until exhausted it will pass the test,
And then at last is left alone and given
Its well deserved eternal rest.

Yet we who do the driving and the bashing
Cannot find rest, for even in our sleep
We hear the banging and the clashing
With which we drive the piles into the deep.

(1968)
** The monkey is an old slang term for the pile hammer.*

Kurt Seidel studied civil engineering at the University of Dresden, Germany, but was drafted into the Germany Army Railway Engineers in 1943. He served on the Russian Front, where his company's main mission was to destroy bridges behind the retreating German forces. He was captured by the American Forces and spent the last part of the war as a prisoner of war (POW) of the American Aviation Engineering Regiment in France and became their regimental surveyor, laying out airstrips. He was subsequently attached to the American Forces when they withdrew from France and discharged in Austria, a very generous favor on the part of the American Forces.

After his discharge he completed his studies at the University of Stuttgart. In 1950, his father (also a civil Engineer) and he were sent to Australia by a German company seeking construction opportunities in Australia. He decided to settle in Australia and started his own civil engineering construction company, specializing in construction of bridges throughout the State of Victoria. He mused that he was doing penance for all the bridges that he blew up on the Russian Front! He was an avid lover of everything that exercised the brain, including philosophy, classical music, and poetry. This is one of about 900 poems that he wrote during his 40s when he was most busy with his construction company.

He retired in 1980 and spent a long and happy retirement until his death in 2007. His son, Julian Seidel, also a civil engineer, first developed a fascination with pile driving as a young boy visiting Kurt's bridge sites. ▼

Remembering Alan B. Christopherson

Celebrating Alan's Life

Anchorage resident Alan B. Christopherson, 55, died on Feb. 1, 2008, at Providence Alaska Medical Center. A celebration of life was held on Friday, February 8, in the University of Alaska Anchorage Arts Building Auditorium.

Mr. Christopherson was an accomplished civil engineer in Alaska and took pride in a long design career that centered largely on North Slope oilfield development, but also reached into the Russian Far East. He contributed to many other prominent development projects in the state, among them the Alaska SeaLife Center, Kuparuk River submersible bridge, Whittier access tunnel, Alyeska Pipeline Service Co.'s spill response facility in Valdez, and essential dock projects in numerous remote areas. He was especially proud of the St. George harbor project and the lasting bond he formed with the people of that island.

Born in Seattle on May 5, 1952, Alan earned a bachelor's degree in civil engineering from the University of Washington and a master's degree in civil engineering from the University of Alaska Anchorage. He was a shareholder and officer of PND Engineers, Inc. At the time of his death, he was treasurer for the corporation.

Alan came to Alaska in 1975 to begin his engineering career at Alyeska Pipeline Service Co. He subsequently worked for R&M Consultants before joining PND in 1981. He excelled in the areas of planning, design, project management and construction of marine, port and land structures in arctic and sub-arctic regions. Alan held professional engineering licenses in Alaska, Alabama, New Jersey, New York, Oregon, Pennsylvania, Texas, Virginia, and Washington.

Mr. Christopherson earned many prestigious awards for his work, both locally and nationally. In 2003, he was recognized as Alaska's Engineer of the Year. In 2007, Alan was designated a Fellow by the American Society of Civil Engineers, one of the most esteemed honors that civil engineers can receive from their peers. He joined an elite group of just 19 other Alaskans who shared this distinction.

He considered his most notable achievement to be the development of specialized driven pile foundations for artic and sub-artic conditions. Alan strongly felt that engineering was a team event and acknowledged that many of the efforts he is credited with were supported by his staff and partners.

Throughout his career, Alan strived to improve the stature of engineers in the community. His contributions included active roles within several engineering societies, publication of numerous technical papers and articles, and presentations to both student and professional organizations. In 2002, he was one of the engineers interviewed for the "Bridging the Bering Strait" episode of the Discovery Channel's Extreme Engineering series.

Mr. Christopherson was an active contributor to arts and education organizations, including the 1 percent for Art committees for the Wendler Junior High School renovation and new Anchorage Fire Station #14. He also served as director of the Architects and Engineers Insurance Co., commissioner and deputy chairman for the Municipality of Anchorage Urban Design Committee, director of Gunderboom, Inc., and chairman of the Board of Directors for Chugach Electric Association.

Mr. Christopherson is survived by his wife, Mary; children, Andrew and Ashley; mother, Nadine Christopherson; and siblings, Art and Anne Christopherson. He was preceded in death by his father, Bert Christopherson.

Memorial contributions may be made to the Alan B. Christopherson Civil Engineering Scholarship fund. Address these to UAA, 3211 Providence Dr., Suite 236, Anchorage, AK, 99508. ▼

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