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THE OFFICIAL PUBLICATION OF THE PILE DRIVING CONTRACTORS ASSOCIATION | Q1 2010 VOL. 7, NO. 1

PDCA's 14th Annual Conference and Expo 2010

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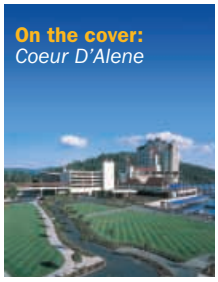
Contents



The article that ran in the Q4 2009 issue "Driven Treated Timber Piles Lead the Way to Revitalize Beach Tourism" (p.57) was mistakenly credited to Michael Carter when it should have been "Cox Industries".

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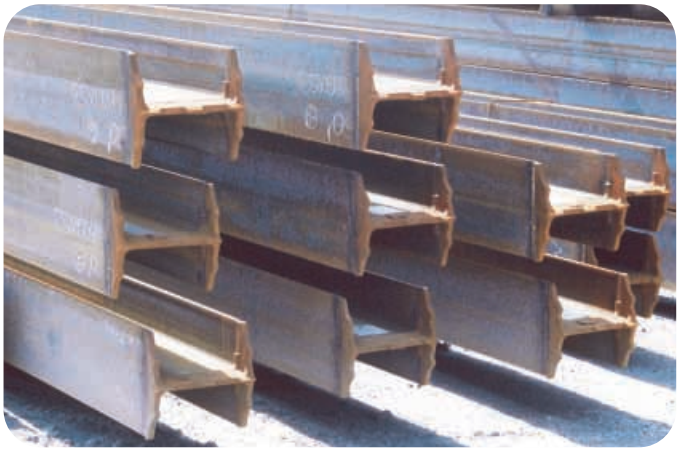

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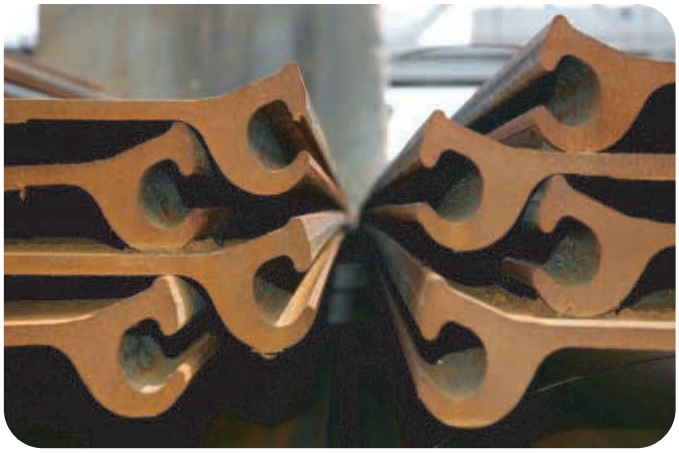

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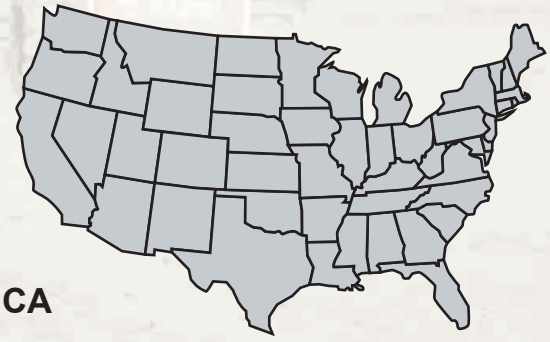

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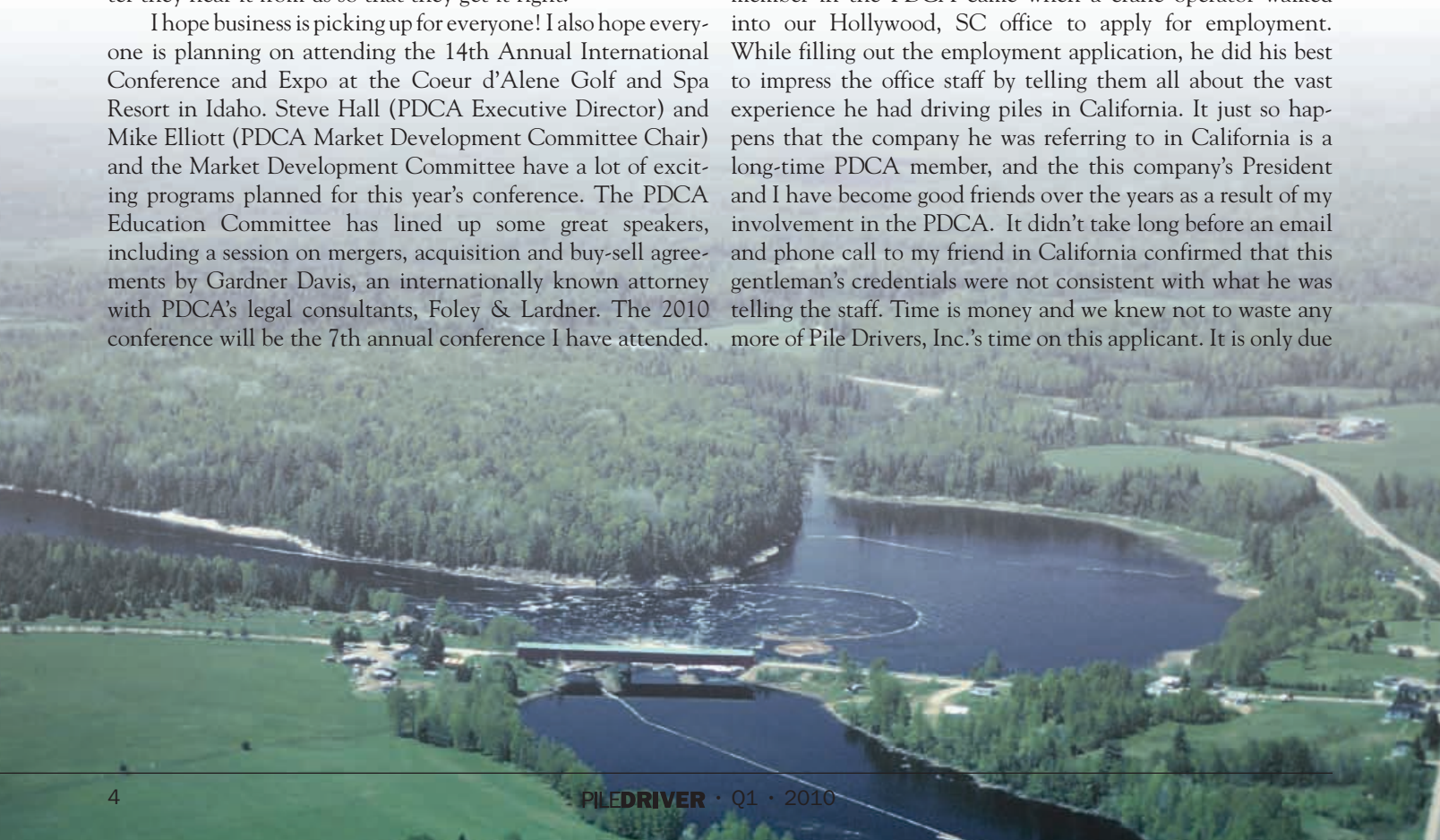
Keep Doing What You're Doing And Keep Getting What You're Getting

By John King

What I'm trying to say is you reap what you sow. Be honest, how many of you have called a professor and asked them what you could do to help educate our future engineers about pile driving? Let me refer back to what the leadership of the PDCA heard in 2007 at the Professors' Driven Pile Institute when a professor from Lawrence Technological University in Michigan said, "It was the first time anyone had ever told me about pile driving." Every pile driver knows what our competitors are telling professors, engineering students and engineers about what pile driving does. If we are going to promote the quality control, quality assurance, green aspects of piles and the benefits of a driven pile, it's better they hear it from us so that they get it right.

I hope business is picking up for everyone! I also hope everyone is planning on attending the 14th Annual International Conference and Expo at the Coeur d'Alene Golf and Spa Resort in Idaho. Steve Hall (PDCA Executive Director) and Mike Elliott (PDCA Market Development Committee Chair) and the Market Development Committee have a lot of exciting programs planned for this year's conference. The PDCA Education Committee has lined up some great speakers, including a session on mergers, acquisition and buy-sell agreements by Gardner Davis, an internationally known attorney with PDCA's legal consultants, Foley & Lardner. The 2010 conference will be the 7th annual conference I have attended. Among all of the benefits I get from these conferences, I truly enjoy seeing all of my friends, meeting new PDCA members and catching up on stuff beyond the e-mails. Please make every effort to join us in 2010 for this conference. As the PDCA continues to grow and our conference expands and provide more each year, I find that I get more out of the conference than I put in.

There are many reasons why companies and individuals are members of the PDCA. The benefits and services are broad, so you can take advantage of all or pick and chose what fits best for you and your company. A recent example of just one of the many benefits Pile Drivers, Inc. has received as a member in the PDCA came when a crane operator walked into our Hollywood, SC office to apply for employment. While filling out the employment application, he did his best to impress the office staff by telling them all about the vast experience he had driving piles in California. It just so happens that the company he was referring to in California is a long-time PDCA member, and the this company's President and I have become good friends over the years as a result of my involvement in the PDCA. It didn't take long before an email and phone call to my friend in California confirmed that this gentleman's credentials were not consistent with what he was telling the staff. Time is money and we knew not to waste any more of Pile Drivers, Inc.'s time on this applicant. It is only due



MANDAL PIPE

LONG ISLAND RAILROAD BRIDGE REPLACEMENT

The Long Island Rail Road or LIRR is a commuter rail system serving the length of Long Island, New York that has been classified as a Class II railroad by the Surface Transportation Board. It is the busiest commuter railroad in North America, servicing around 81 million passengers each year, and the oldest US railroad still operating under its original name and charter.

In order to upgrade its existing track and position itself for future expansion, upgrades to existing railroad bridges have been undertaken.

At Powell Creek and at Hog Island, Mandal Pipe Company has supplied the overlength piling for the bridge replacements. This piling is supplied weekly for the pile driving work which can only be done on the weekends during the periods of slack commuter traffic. At both sites, the piling is driven around and through the existing railroad bridges during the weekend outages. Once the 144 pieces of 70' long 20" diameter steel pipe piles are installed, they will be internally cleaned, rebar cages will be installed and then they will be filled with concrete.

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to Pile Drivers, Inc. involvement in the PDCA that this situation resulted in a good business decision on our part and the elimination of a future problem for our company.

PDCA of South Carolina just held its 4th annual Oyster Roast. A crowd of over 250 people attended. I received a note from a contractor member that sums up the PDCA and one of the many reasons why I'm proud to be a PDCA member. The note read: "Thanks for the great time and food. My wife and I attended and thoroughly enjoyed the oysters, which are my favorite food, as well as the barbecue. All the people we met were very gracious. These are truly great people to associate with." Julius Taylor, Jr. (Taylor Bros. Marine Construction).

Great people to associate with; I couldn't of said it any better. I wonder if Mr. Chuck Whitaker and those who joined him at O'Hare Airport in 1994 ever thought it would be this great. Chuck, we all owe you a big "Thanks!".

This being a new year, many of the chapters have new presidents. I hope they all know that Pollyanna Cunningham (PDCA Communications Committee Chair) has set up a password for each president so they can update their chapter page on the national website. If every member would send a picture or information to their chapter, it can be added to the chapter page. Let's see which chapter can put together the best page. Maybe in the near future we can have PDCA Chapter Page of the Year award.

Haiti, Texas and China

I'm sure we have all seen the condo building in China that fell over, as well as the condo in Texas that has to be torn down after it was determined that the auger cast piles were failing and all the devastation in Haiti with its poor building codes…….Just remember DRIVEN PILES ARE TESTED PILES. ▼

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Executive Director's Message

By Stevan A. Hall

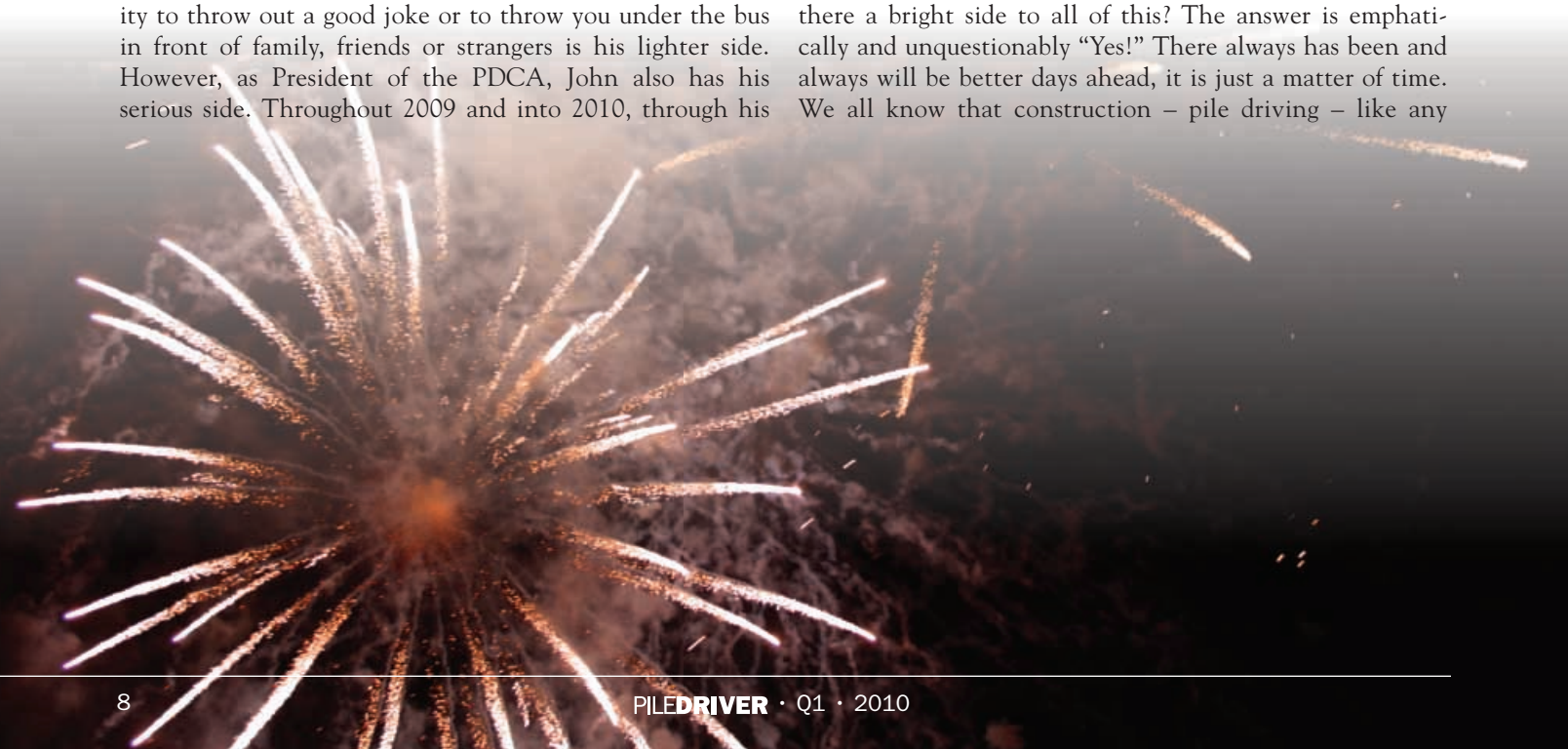
Let me begin the 2010 first-quarter edition of PileDriver magazine by saying, HAPPY NEW YEAR! All of us at the PDCA want to wish our members, guest subscribers, future 2010 PDCA members and all the rest of you out there in pile driving country a prosperous, successful, healthy and happy 2010.

We are very fortunate to have an extremely dedicated group of officers and directors at the helm of the PDCA. Throughout 2009, the Executive Committee and Board of Directors were very successful in providing the leadership and guidance required to keep the PDCA moving forward, providing continued success and a determined focus on the established goals and objectives of the Association's strategic plan.

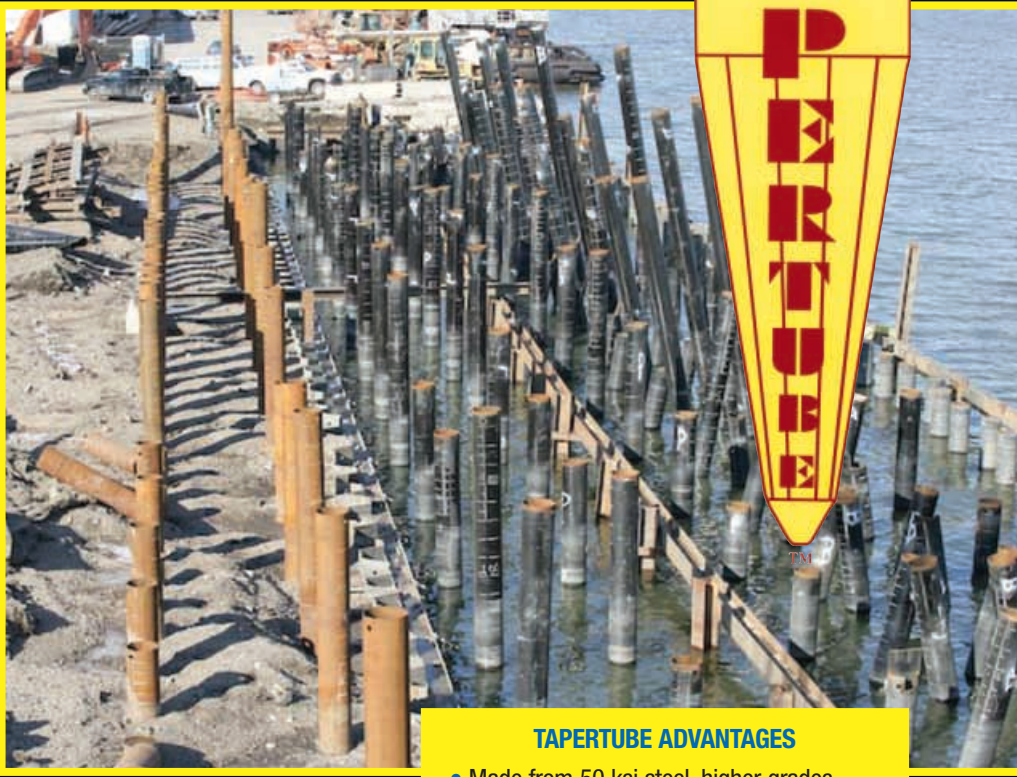
I want to take this time to personally thank Mr. John King (Pile Drivers, Inc.), President of the PDCA. John's unique style of leadership is something to behold. John's good-humored and fun-loving nature, his consistent ability to throw out a good joke or to throw you under the bus in front of family, friends or strangers is his lighter side. However, as President of the PDCA, John also has his serious side. Throughout 2009 and into 2010, through his actions and leadership, John has established himself as one of the hardest working, most dedicated and passionate individuals PDCA has had the pleasure of working with. On a daily basis John wears his love for the PDCA and the pile driving industry on his sleeve – like a badge of honor.

I am looking forward to having Don Dolly (Foundation Constructors), assume his role as President for 2010-2011 this May at the PDCA 14th Annual International Conference and Expo 2010, in Coeur d'Alene, Idaho. Don is an excellent leader with an unequaled passion for ensuring success at all levels of the PDCA. Don's intelligent, forward thinking and business-like attitude that has made Foundation Constructors successful will serve the PDCA well during this difficult economic period in our industry's history.

I want to speak to all of you about the economy. There is no question that we are all going through a tough economic downturn and have been for more than a year. Is there a bright side to all of this? The answer is emphatically and unquestionably "Yes!" There always has been and always will be better days ahead, it is just a matter of time. We all know that construction – pile driving – like any



THE SHAPE
OF THE FUTURE...



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"Make your association work for you"!

other industry ebbs and flows with the economy. When times are good, we are very prosperous and when times are bad, we cinch up our belts and forge ahead, determined and unwavering. We have had tough times in the past and we will have tough times in the future, but despite all of the challenges we have faced, we have persevered and we have come out of the darkness and into the light every time.

Where do we go from here? Publicly-funded construction increased in 2009. Stimulus spending helped increase highway and street construction by 3.7%, but education and private residential construction was down. McGraw-Hill reported "the bottom of construction starts was reached in February 2009, which was then followed by an up-and-down pattern, which suggests that the transition has been made from steady decline to low-level stability." The economist can go on and on about percentages here or percentages there, but the bottom line for success today, in my humble opinion, is creativity – make your market work for you and make your association work for you. Pile driving contractors need to be more aggressive today than ever before – and you need to be aggressive in ways you may never have thought about before. Some of our members are holding their own "benefits" of driven piles programs, inviting local structural, civil and geotechnical engineers to pile driving demonstrations, inviting speakers to talk to those same crowds, to students and professors. They are holding luncheons with audiences that specify deep foundation systems and methods. These entrepreneurs are bringing driven pile benefits to the decision-makers, and it is paying dividends.

I also said, "Make your association work for you"! PDCA is the only association dedicated 100% to the driven pile market and no one knows it better than we do. Now is the time you should be relying on your association membership to help you make a ROI. Call us, talk to us, and find out what the PDCA can do to help you.

I would be remiss if I did not tell you about the PDCA 14th Annual International Conference and Expo 2010, coming in May to The Coeur d'Alene Golf and Spa Resort in Coeur d'Alene, Idaho. There is a large editorial in this magazine dedicated to explaining most of the events and activities planned during this year's conference. I believe this conference will be one of the most enjoyable, as well as practical conferences the PDCA has ever assembled. One way you can invest in your company is by investing in your attendance at this year's conference. So many have come away from previous PDCA conferences expressing their total satisfaction with the program, but most importantly are the new relationships they discovered while being there. New relationships mean new business, which means more work, which means a better bottom line. Networking opportunities will be abundant at the conference, with every breakfast, break, and reception being held in the exhibit hall; as well as the hall being directly adjacent to the presentations, allowing for a constant flow of traffic back and forth between speaker presentations. Some say more business is conducted on a golf course than in an office – well, we have the perfect course for you to conduct a "little" business. The golf course at Coeur d'Alene is not only spectacular, making it a great place to play, but it is also a great networking opportunity. During our evening Lake Coeur d'Alene cruise, you will have a captive audience – unless they swim well in cold water. The cruise is just another great place to sit back and leisurely network with old friends, new friends, old clients and new. Don't miss this exceptional opportunity. Come join us from May 6-8, 2010 in Coeur d'Alene, Idaho for the PDCA 14th Annual International Conference and Expo 2010. ▼

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

We are dedicated to advancing the driven pile

As the only organization solely dedicated to pile-driving contractors, we know that you understand the superiority of the driven pile in most applications. We are the only association addressing the intrusion of non-driven solutions that take away business from the driven-pile contractor. The PDCA understands that to survive in today's competitive marketplace, a pile-driving contractor must strive to stay abreast of the latest trends and technologies in the industry. That is why we maintain close ties with the world's leading suppliers to the industry. It's why we provide a broad range of educational programs for university professors, practicing engineers and contractors. And, it's why more and more contractors, engineers and suppliers are realizing that the PDCA significantly increases their value in the marketplace.

We are a direct link to decision makers

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

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

We offer timely, valuable services

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

Job Referrals

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

Peer-to-Peer Opportunities

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

Annual Membership Directory

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

Educational Conferences and Meetings

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

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

Industry Development

The PDCA continually strives to expand market share for the driven pile. The PDCA sponsors the Professors' Driven Pile Institute, held at Utah State University in Logan, Utah. Up to 25 professors from major engineering schools are invited to participate in an intensive, weeklong program that presents them with the latest concepts in driven-pile design, installation and quality control. Some of the leading faculty in the deep foundation field 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.

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

"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.

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

Connect Worldwide at www.piledrivers.org

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

Leadership Opportunities

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

Membership is available to you

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

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

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

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PDCA

MEMBERSHIP APPLICATION

Step 1: Company Information

Company Name: _____

Contact Name: _____

Address: _____

Phone: _____ Fax: _____

City / State / Zip: _____

Company Home Page: _____ E-mail: _____

Step 2: Select Membership Type

Important! Read carefully! The PDCA Bylaws define member classifications and qualifications. Dues are established by the PDCA Board of Directors and shown in ( ) for each type.

- ○ **Contractor Member** – General or Specialty contractor who commonly installs driven piles for foundations and earth retention systems.
  - ○ *Contractor I Member Company* – Annual volume > $ 2 million **($850.00)**
  - ○ *Contractor II Member Company* – Annual volume < $ 2 million **($425.00)**
- ○ **Associate Member** – Firms engaged in the manufacture and/or supply of equipment, materials, or services to the pile driving industry.
  - ○ Associate I Member Company – Annual volume > $ 2 million **($850.00)**
  - ○ Associate II Member Company – Annual volume < $ 2 million **($425.00)**
  - ○ *Local Associate Member Company* **($100.00)**
    Small Associate Company desiring membership in a single local chapter, who only serves that local market, and whose interest is to support the local chapter. Membership must be approved by PDCA Executive Committee.
- ○ **Engineering Affiliate** – Any Engineering company, firm, corporation, or individual (Structural, Geotechnical, Civil, etc) involved in the design, consulting, testing or other engineering aspect associated with driven piles, deep foundations or earth retention systems.
  - ○ *Engineering Affiliate – 1-5 offices* **($100 per office)**
    Listing up to 5 Individuals per office at no additional charge
  - ○ *Engineering Affiliate – 6-11 offices* **($90.00 per office)**
    Listing up to 5 Individuals per office at no additional charge
  - ○ *Engineering Affiliate – 12+ offices* **(80.00 per office)**
    Listing up to 5 Individuals per office at no additional charge
- ○ **Individual Member** – **($50.00)**
  An individual employed full-time by a university or college and teaching Undergraduate or Graduate courses in engineering; or an individual employed full-time by the government.
- ○ **Retired Industry Member** – **($100.00)**
  Individual who has reached retirement age, left active employment, and wishes to remain a member.
- ○ **Student Member** – **($20.00)**
  Full time students studying towards a bachelor, master or doctorate degree in a regular university program.
- ○ **Affiliate Labor Organization Member** – **($100.00)**
  Concerned with pile driving for the purpose of gathering and sharing information.
- ○ **Organization Member** – Non-voting membership category. Must be approved by the PDCA Executive Committee.

Step 3: Member Information

(complete only the category for which you are applying)

A. Contractor Members – check all services that your company provides:

❒ Bridge Buildings
❒ Bulkheads
❒ Deep Dynamic Compaction
❒ Deep Excavation
❒ Docks and Wharves
❒ Earth Retention
❒ General Contracting
❒ Highway and Heavy Civil
❒ Marine
❒ Pile Driving
❒ Other

B. Associate and Engineering Affiliates Members – check all products and/or services that your company provides:

Accessories

❒ Cutter Heads and Drill Bits
❒ Dock and Marine Supplies
❒ Hammer Cushions
❒ Other
❒ Hoses and Fittings
❒ Lubricants and Grease
❒ Pile Cushions
❒ Pile Points and Splicers
❒ Rigging Supplies
❒ Safety Equipment

Materials

❒ Aluminum Sheet Piles
❒ Coatings and Chemicals
❒ Concrete Piles
❒ Timber Piles/Treated Lumber
❒ Composite Piles
❒ H-Piles
❒ Steel Pipe Piles
❒ Other
❒ Steel Sheet Piles
❒ Structural Steel
❒ Synthetic Material Piles

Equipment

❒ Air Compressors and Pumps
❒ Cranes
❒ Drill Equipment
❒ Drive Caps and Inserts
❒ Hammers
❒ Hydraulic Power Packs
❒ Leads and Spotters
❒ Marine Equipment
❒ Specialized Rigs and Equipment

Services

❒ Consulting
❒ Design
❒ Freight Brokerage
❒ Analysis
❒ Pile Driving Monitoring
❒ Geotechnical
❒ Marine Drayage
❒ Surveying
❒ Civil and Design
❒ Other
❒ Testing
❒ Trucking
❒ Vibration Monitoring
❒ Materials Testing

General

❒ Rental
❒ Sales

Step 4: Geographic Areas Where Services and Products Are Available

(All applicants check all that apply)

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

Step 5: Method of Payment

I am providing payment in the amount of: _____

I am making payment in full by: ❒ Check ❒ Visa ❒ MasterCard ❒ American Express ❒ Discover

Card Number: _____ Expiration Date: _____

Name on Card: _____ CVV Code: _____

Statement Billing Address: _____

_____

Signature: _____

Please complete this application and mail to:
PDCA – 1857 Wells Road - Suite 214 Orange Park, Florida 32073 or Fax to: 904-215-2977

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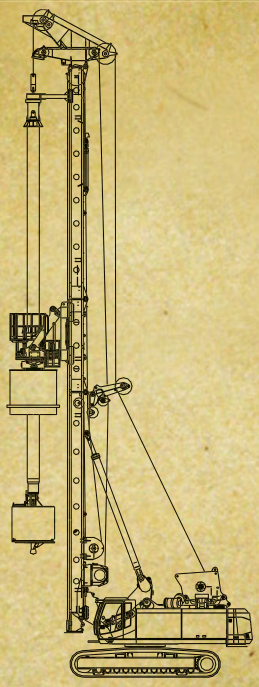

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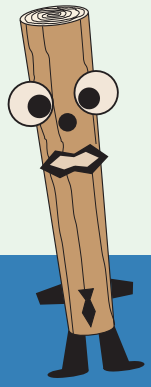


Did You Know?

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 5TH EDITION

The PDCA Technical Committee's and AASHTO T-15's (Subcommittee – Substructures and Retaining Walls) hard work on revisions to the LRFD Bridge Design Specifications: Section 10, Article 10.5 and Article 10.7 should serve the pile driving industry well. The new 5th edition of the AASHTO LRFD Bridge Design Specifications is being printed and will be available in March 2010. To pre-order, go to https://bookstore.transportation.org/item_details.aspx?ID=1560.

The PDCA Technical Committee received support and approval from T-15 on almost 100% of our recommended revisions, including significant changes to the Resistant Factors.

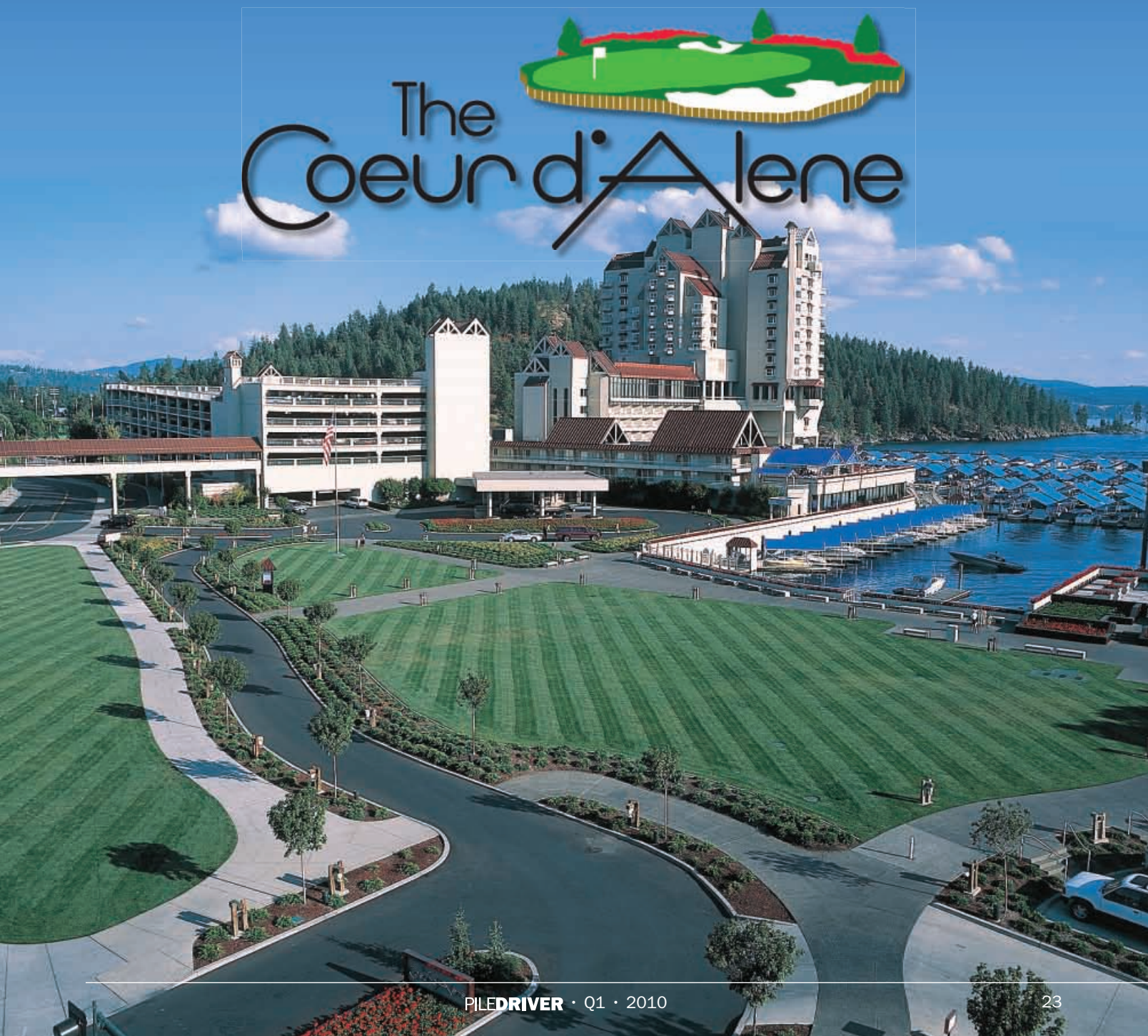
The Ad Hoc Task Force that included members of the Pile Driving Contractors Association's Technical Committee and all T-15 members was created in 2007 to review the LRFD pile design specifications with regard to consistency with current national design practice and to address concerns raised by AASHTO Bridge Subcommittee members as they attempted to apply the new design specifications in their respective states.

The provisions of these specifications are intended for the design, evaluation and rehabilitation of both fixed and movable highway bridges. The design provisions of these specifications employ the Load and Resistance Factor Design (LRFD) methodology.

The PDCA will devote considerable editorial to the PDCA's efforts and the subsequent revisions to 10.5 and 10.7 in the next edition of PileDriver magazine.

Pile Driving Contractors Association

14th Annual International Conference and Expo 2010



Annual Conference

The PDCA's 14th Annual International Conference and Expo 2010 will be held at the Coeur d'Alene Golf and Spa Resort, Coeur d'Alene, Idaho from Thursday, May 6 through Saturday, May 8, 2010. Coeur d'Alene personifies "The Great Outdoors". A consistent recipient of the AAA Four Diamond Award and Mobil Four-Star Award, the Coeur d'Alene Golf and Spa Resort is a place of world-class luxury, serenity, exceptional entertainment, a World-Class spa and golf course all in a comfortable and leisurely setting on Lake Coeur d'Alene. Coeur d'Alene, Idaho lies approximately 40 miles east of Spokane, WA, and provides shuttle service to and from the resort to the airport.

Educational Programs

The PDCA will incorporate business programs with project case histories in a unique format during the conference presentation series. The programs will include a case history of the Flatiron Washington Bypass Bridge, N.C., which used the pile driving launching gantry method that reduces environmental impact on bridge construction – an international award winning project; Minefields in Mergers, Acquisitions and Buy-Sell Agreements by Gardner Davis, Attorney for the international law firm, Foley & Lardner; Template for a World-Class Safety Program by John Lanigan, Corman Marine, PDCA Safety Committee Chair; a panel discussion on "Challenges Facing the Pile Driving Industry in Difficult Economic Times", and more.

Exhibitor Hall

The PDCA will provide opportunities for 50 exhibitors to display information about their companies, products, services and materials at the conference. With almost 10,000 square feet of space, the exhibit hall will allow for 8'x10' booths with full floor displays, tables, chairs and electric. Along with the exhibits, the exhibit hall will be the site for the Opening Reception, Continental Breakfasts, and AM and PM Breaks. The Exhibit Hall location will also provide for a constant flow of traffic in between speaker presentations.

Committee Meetings

All PDCA Committees will meet during the annual conference. Committee meetings will be scheduled in the mornings, prior to the conference presentations. Everyone registered for the conference is welcomed to attend the Committee meetings. The PDCA Executive Committee and the PDCA Board of Directors will also meet during the conference.

PDCA Committees include: Education, Technical, Market Development, Membership Development and Member Retention, Communications, Environmental and Safety.

Social Events

The conference has a fantastic schedule of social and networking events planned for everyone. The conference begins with an Opening Reception on Thursday evening, May 6 in the exhibit hall. The Opening Reception will feature an open bar, heavy hors d'oeuvres, and local favorites to welcome you to "Big Sky Country". Friday, May 7 will be the PDCA 3rd Annual Golf Tournament on a course you won't want to miss – floating green and spectacular vistas, this course is ranked among the best resort courses in the world. That evening, board the Mish-an-Nock and Spirit (moored together as one big boat) for an evening cruise, complete with open bar, dinner menu and buffet. Saturday, May 8 will include the PDCA Awards and

Business Luncheon, where the "Project of the Year Award" winners will be announced, along with the new Board and Committee Awards. The annual dinner will be that night on the shores of Lake Coeur d'Alene. With a dress theme of "Early Frontier", awards will be given for the most authentic – or most fun. The dinner will feature a reception with open bar and bonfires on the beach, Wild-Wild West All American BBQ including Certified Angus Beef Prime Tenderloin Cowboy Steaks, whole Dungeness crab and Alaskan king crab legs, beer can chicken and more. The evening will conclude with a band and dancing. PDCA will schedule a private "Kids Pizza Party" in the Presidential Suite – complete with qualified supervision and fun activities for the younger ones.

Companion's Program

A special tradition of the PDCA Annual Conference is the Companion's Program, where all the spouses and guests meet once again to renew old friendships and make new friends. This year, the Companion's program will feature a morning gathering in Beverly's Restaurant for breakfast, followed by a short walk to the town of Coeur d'Alene where you will visit all the unique shops and take in the beauty and history of Coeur d'Alene. The PDCA has scheduled a private luncheon off-site for that afternoon. On Saturday, after breakfast, you will join world renowned Chefs at Beverly's, a 5-star resort restaurant, to participate in the "Culinary Cooking with the Chefs" program – an opportunity to prepare, cook and eat an exceptional meal under the tutelage of some of the finest chefs around. That afternoon, you will be pampered in the 15,000 square foot Coeur d'Alene Spa with free manicures and pedicures – just in time for the evening's annual dinner. The Companion Program participants are always welcomed at all conference social events, including the Opening Reception, luncheons, cruise, and annual dinner and dance.

Don't miss the opportunity to come to Coeur d'Alene to learn, socialize and network with old friends, colleagues, clients, and potential clients at this year's annual conference.

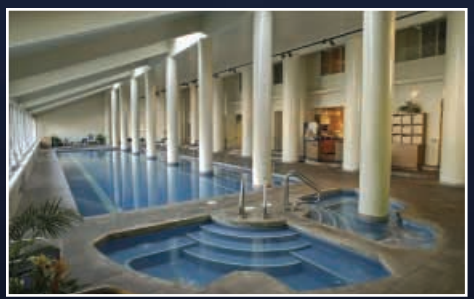
Accommodations

As mentioned previously, the Coeur d'Alene Golf and Spa Resort consistently receives high ranks for its world-class luxury, serenity, exceptional entertainment, a world-class spa and golf course, all in a comfortable and leisurely setting on Lake Coeur d'Alene. The Resort itself has rankings that include Travel and Leisure Magazine Top 500 World's Best Hotels, Zagat's One of the Top 10 Ski Resorts (not necessarily relevant – we hope!), AAA Four Diamond Award, Lifestyles of the Rich and Famous One of America's Top 10 Resorts and Conde Nast Traveler ranks it America's Top Mainland Resort and the World's Top Travel Product.

The golf course is a Golf Magazine Gold Medal Winner 2008, Golf Digest Five Star and America's Most Beautiful Resort Golf Course, and Conde Nast Traveler Top 100 Golf Courses 2007.

Dining is no different with DiRoNa Fine Dining Award, AAA Four Diamond Award, Wine Spectator Grand Award and Hagadone Hospitality IFMA Foodservice Operator of the Year – Silver Plate Award.

There are other numerous awards, too many to mention; but one thing you can be assured of – if you come to the PDCA 14th International Conference and Expo 2010, you won't be disappointed! ▼



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2010 New PDCA Members

The following is a list of all members who have joined the PDCA in 2009. The association would like to welcome everyone on the list!

Associate Member

GeoEngineers, Inc.
David P. Sauls, P.E.
Tel: 225-293-2460
Fax: 225-293-2463
11955 Lakeland Park Blvd., Suite 100
Baton Rouge, LA 70809
USA
www.geoengineers.com
dsauls@geoengineers.com

Contractor Members

F. Miller Construction, LLC
Mark Korkowski
Tel: 337-721-7517
Fax: 337-433-2678
825 Ryan Street
Lake Charles, LA 70616
USA
www.fmillerconstruction.com
mkorkowski@fmillerconstruction.com

Macro Enterprises, LTD.
Scott Morris
Tel: 516-799-3434
Fax: 516-799-3845
25 East Chestnut Street
P.O. Box 398
Massapequa, NY 11758
USA
www.macroenterprisesltd.com
smorris@optonline.net

RHTC, Inc.
Jeff Hairston
Tel: 318-330-9000
Fax: 318-330-9014
309 Smith Street
West Monroe, LA 71292
USA
www.rhtcinc.com
jeffh@rhtcinc.com

Superior Construction Company
Maggie Laneri
Tel: 904-292-4240
Fax: 904-292-2682
7072 Business Park Blvd.
Jacksonville, FL 32256
USA
www.superiorfla.com
estimating@superiorfla.com

Walter Toebe Construction Company
Jeff Stover
Tel: 248-349-7500
Fax: 248-349-4870
29001 Wall Street
P.O. Box 930129
Wixom, MI 48393
USA
www.toebe-construction.com
jstover@toebe-construction.com

Engineering Affiliate Members

Aquaterra Engineering
Tom Vrenick
Tel: 225-344-6052
Fax: 225-344-6346
2822 O'Neal Lane
Baton Rouge, LA 70816
USA
www.aquaterraeng.com
tvrenick@aquaterraeng.com

Badeaux Engineers, Incorporated
Michael Badeaux
Tel: 985-447-2317
Fax: 985-447-2319
115 E. 6th Street
Thibodaux, LA 70301
USA
michael@badeauxengineers.com

JL Arnold Engineering
Jeff Arnold
Tel: 727-823-4200
Fax: 727-823-4224
PO Box 179
St. Petersburg, FL 33731-0179
USA
jeff.arnold@jlarnoldengr.com

Lloyd Acoustics, LTD.
Nigel Dillon
Tel: +44 (0) 28-9261-0525
Fax: +44 (0) 28-9261-0524
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Moira, County Armagh, BT67 OPL
Northern Ireland
www.lloydacoustics.com
nigel.dillon@lloydacoustics.co.uk

Sany America, Inc.
Larry Washington
Tel: 678-251-2824
Fax: 770-631-7731
100 World Drive, Suite 218
Peachtree City, GA 30269
USA
www.sanyamerica.com
lwashington@sanyamerica.com

Universal Engineering Sciences
Joshua Adams
Tel: 904-296-0757
Fax: 904-296-0748
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Jacksonville, FL 32257
USA
www.universalengineering.com
jcadams@universalengineering.com

Individual Member

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Fred Johnson
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Fax: 909-606-7165
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- stronger sections increase strength per pound
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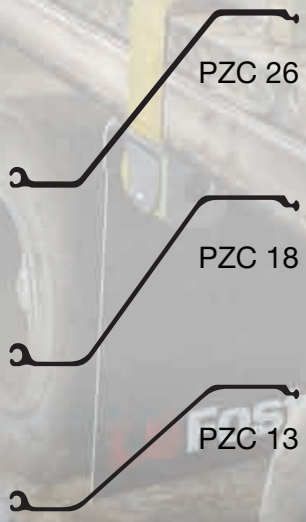

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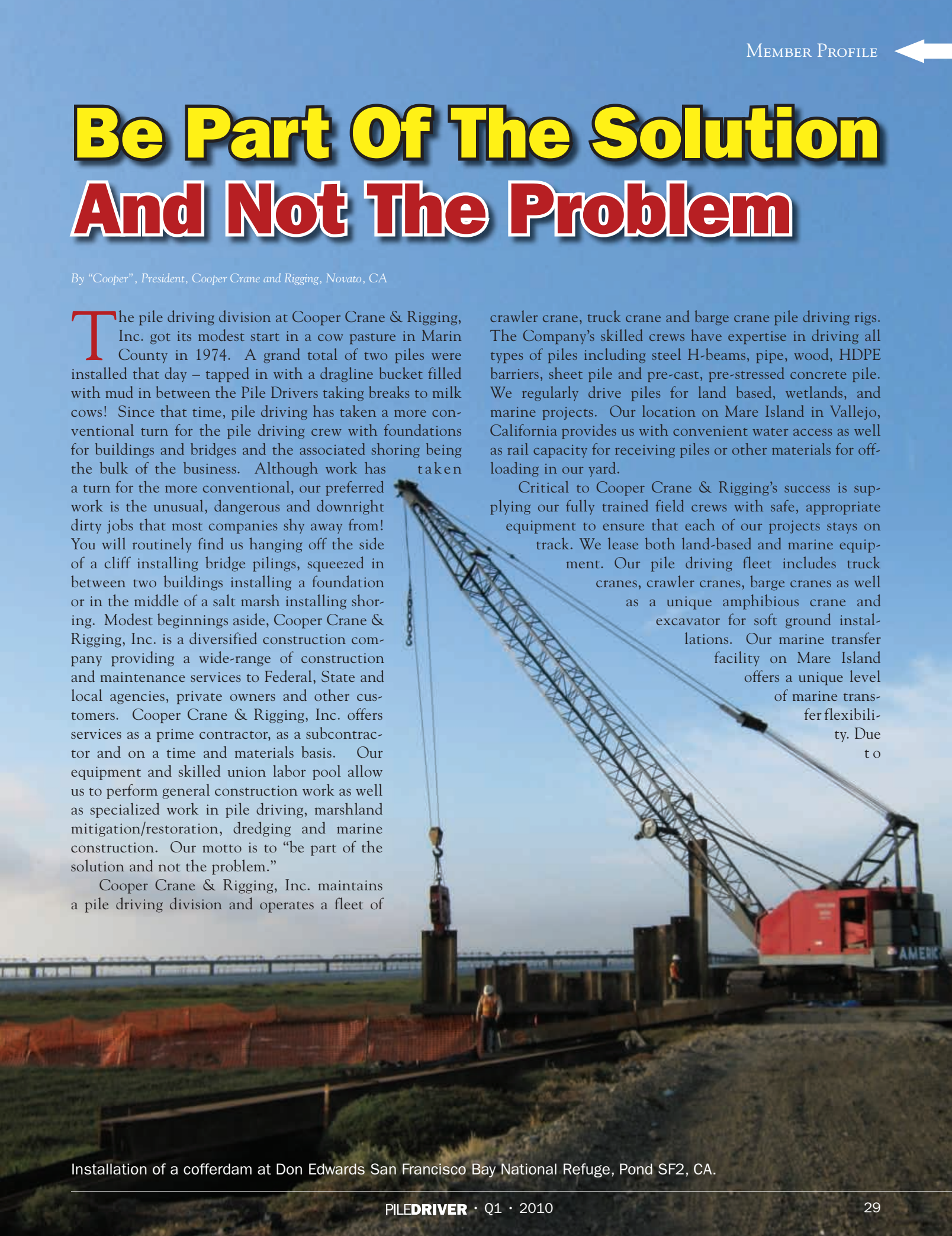
Be Part Of The Solution And Not The Problem

By "Cooper", President, Cooper Crane and Rigging, Novato, CA

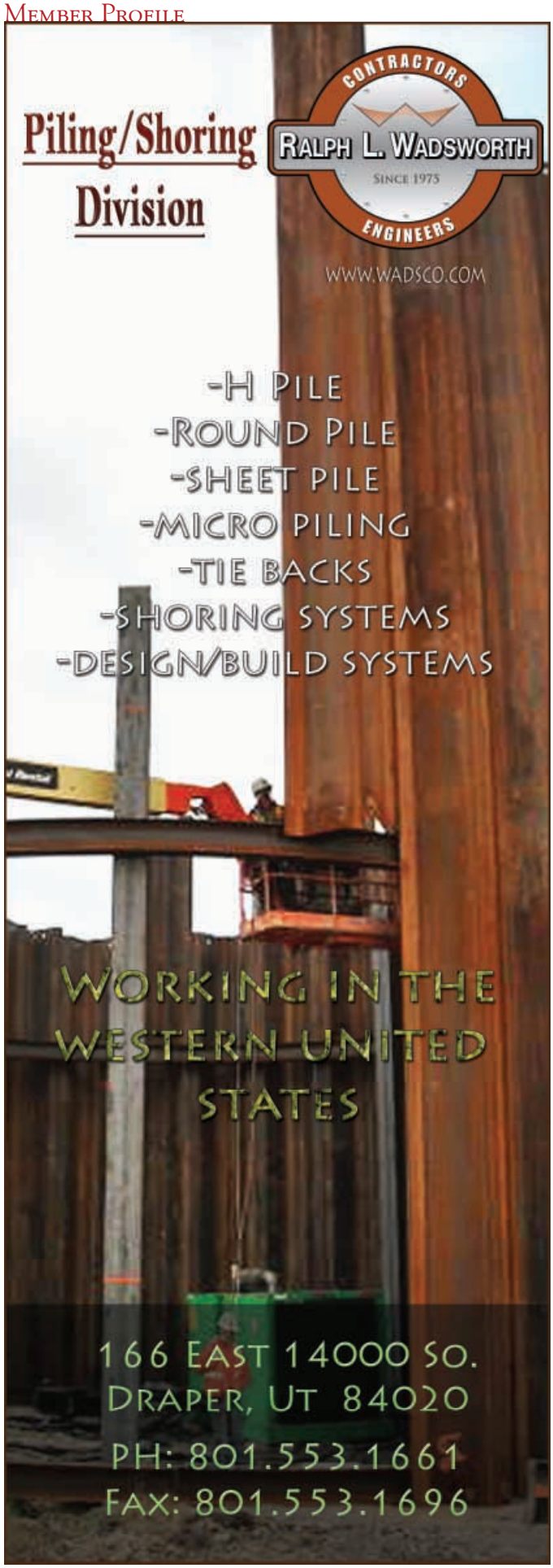
The pile driving division at Cooper Crane & Rigging, Inc. got its modest start in a cow pasture in Marin County in 1974. A grand total of two piles were installed that day – tapped in with a dragline bucket filled with mud in between the Pile Drivers taking breaks to milk cows! Since that time, pile driving has taken a more conventional turn for the pile driving crew with foundations for buildings and bridges and the associated shoring being the bulk of the business. Although work has taken a turn for the more conventional, our preferred work is the unusual, dangerous and downright dirty jobs that most companies shy away from! You will routinely find us hanging off the side of a cliff installing bridge pilings, squeezed in between two buildings installing a foundation or in the middle of a salt marsh installing shoring. Modest beginnings aside, Cooper Crane & Rigging, Inc. is a diversified construction company providing a wide-range of construction and maintenance services to Federal, State and local agencies, private owners and other customers. Cooper Crane & Rigging, Inc. offers services as a prime contractor, as a subcontractor and on a time and materials basis. Our equipment and skilled union labor pool allow us to perform general construction work as well as specialized work in pile driving, marshland mitigation/restoration, dredging and marine construction. Our motto is to "be part of the solution and not the problem."

Cooper Crane & Rigging, Inc. maintains a pile driving division and operates a fleet of crawler crane, truck crane and barge crane pile driving rigs. The Company's skilled crews have expertise in driving all types of piles including steel H-beams, pipe, wood, HDPE barriers, sheet pile and pre-cast, pre-stressed concrete pile. We regularly drive piles for land based, wetlands, and marine projects. Our location on Mare Island in Vallejo, California provides us with convenient water access as well as rail capacity for receiving piles or other materials for off-loading in our yard.

Critical to Cooper Crane & Rigging's success is supplying our fully trained field crews with safe, appropriate equipment to ensure that each of our projects stays on track. We lease both land-based and marine equipment. Our pile driving fleet includes truck cranes, crawler cranes, barge cranes as well as a unique amphibious crane and excavator for soft ground installations. Our marine transfer facility on Mare Island offers a unique level of marine transfer flexibility. Due to



Installation of a cofferdam at Don Edwards San Francisco Bay National Refuge, Pond SF2, CA.



its convenient location on Mare Island, CCR boasts prime yard space and a whirly crane which enables our clients to easily lift or splash equipment into San Francisco Bay.

Due to the nature of our work and the unique environments we work in, we have an opportunity to interact with many of the regulatory agencies in the San Francisco Bay Area on a regular basis. Some of the agencies we routinely work with include the San Francisco Bay Regional Water Quality Control Board (RWQCB), U.S. Army Corps of Engineers (ACOE), California Department of Fish & Game (DFG), U.S. Fish and Wildlife Service (FWS), National Marine Fisheries Service (NMFS), San Francisco Bay Conservation and Development Commission (BCDC), and many local agencies. Familiarity with the agencies' staff members, regulations, general policies/practices and applications/permit processing has been an advantage to many of our clients as we are able to advise our clients in their initial design/construction staging and in many cases help them avoid potential time-consuming delays both at the permit level and at the project end of the process.

Three recent projects demonstrate our flexibility in work environments. We are perfectly capable on land (Timber Bridges), in Bay mud (SF2) and in the water (Vallejo Yacht Club Seawall)!

North Coast Railroad Authority – Timber Bridges

The North Coast Railroad Authority Timber Bridges was a repair of 42 timber railroad bridges in Marin and Sonoma Counties. Bridges ranged from simple timber pile replacements to the more complex turnstile Haystack and Blackpoint Bridges whose replacements necessitated being within fractions of an inch within tolerance in order to continue operation.

Salt Pond Restoration Sf2, Don Edwards San Francisco Bay National Refuge (Ongoing)

The project consists of restoring and enhancing wetlands in San Francisco Bay Area by reconfiguring Salt Pond-Levee SF2 resulting in a managed pond for migratory water bird forging and nesting. The work also includes earthwork to construct large mounds of on-site soil/bay mud for nesting islands, the construction of berms of onsite soil/bay mud, excavating water channels/ditches, raising the perimeter levee using imported fill material and constructing water control structures (culverts, precast concrete box weirs, slide gates, etc.). Our pile driving crew tackled the complex water control structures, an inlet and outlet control structure with a total of 11 tidal gates resting on Bay mud!

Vallejo Yacht Club Seawall

This project was in our "backyard" and consisted of the removal of the existing 894-foot long degraded timber breakwater and installation of a new 1,355 foot long breakwater in order to create a larger harbor. The steel sheet pile breakwater expanded the footprint of the existing marina approximately 80 LF beyond the existing breakwater and added approximately 190,000 SF of new area to the harbor.

Cooper Crane believes in giving back to the community. In addition to participating in activities and projects for the

community of Vallejo, we also have crew members involved with local, state and national search and rescue operations such as FEMA, California Task Order 3 and Marin Search and Rescue. Our Founder, Cooper, assisted with heavy rigging rescue operations in New York after 9-11 and in New Orleans after Hurricane Katrina and participates regularly in local search and rescue calls in the Bay Area.

Cooper has recently been selected as the President for the Pacific Coast Pile Drivers Association. He is very appreciative of the position and looks forward to assisting local members through these difficult economic times as well as providing guidance on the ever changing regulatory world that pile driving is a part of.

When you have a project that is out of the ordinary and you need some real experience – give us a call. Chances are we have probably done it at least once before, and if not, can probably figure out how to make it happen! For inquires, please contact "Cooper" at:

Cooper Crane & Rigging, Inc.
P.O. Box 2540
Novato, CA 94948
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E-Mail: cooper@coopercrane.com

Aerial photos of nesting islands at Don Edwards San Francisco Bay National Refuge, Pond SF2, CA

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"DEDICATED TO SERVICE"

ICE® of the Foundation Industry® begins...

By Pollyanna Cunningham, Marketing Director, ICE- International Construction Equipment, Matthews, NC

Over three decades ago, Dick Morris, Tom Cunningham and Bob Vincent pooled their experience in the foundation construction industry to form International Construction Equipment, Inc., ICE®. The goal was to manufacture and market advanced pile driving and drilling equipment for the deep foundation industry.

The initial focus of their collaboration was to design and build vibratory pile drivers/extractors. Their approach was simple, but significant – using available horsepower, turn as much eccentric moment as possible at 1,600 vibrations per minute. This approach, critical to maintaining full speed during hard driving, resulted in the greatest production day after day. This, plus other advances in vibratory technology developed by International Construction Equipment, Inc., quickly made the bright green and yellow "ICE" logo a common symbol on job sites among the likes of CAT, Manitowoc and Linkbelt.

With a philosophy dedicated to serving their foundation construction clients through the development of new products, expansion into the impact hammer market was the natural progression for International Construction Equipment, Inc. After initially starting as distributors for BSP, Menck and Mitsubishi, an opportunity to acquire a well-established product line presented itself in 1979. After only five years in business, International Construction Equipment, Inc. purchased the Link-Belt diesel hammer line from FMC Corporation and added impact hammers to their line of manufactured equipment.

This acquisition set the stage for development of a line of single-acting diesels that would establish a new standard for diesel pile hammers. International Construction Equipment, Inc. engineers combined the clean, efficient operation of high-pressure fuel injection, with structural and systemic improvements over existing single-acting hammers.

The result was a line of low-weight, high-efficiency diesel hammers with energy ratings of up to 210,000 ft-lbs. In early 2000, International Construction Equipment, Inc. added cost-effective Chinese-made diesel hammers to their product line.

In 2008, International Construction Equipment, Inc. contracted with Comacchio, the Italian manufacturer, for exclusive distribution in the USA of the Comacchio line of drilling and geothermal rigs. The Comacchio line includes multiuse hydraulic drill rigs suitable for ground consolidation, anchor drilling, geotechnical works, water well drilling and geothermal energy.

COMACCHIO
DRILLING AND FOUNDATION EQUIPMENT SPECIALIST

DRIVE-CON, INC.
THE DRIVING FORCE IN PILE DRIVING EQUIPMENT

Expanding geographically from the original Matthews, North Carolina location, International Construction Equipment, Inc. opened branch locations and distributors across the US and Canada.

In January 2010, ICE® bought Drive-Con, Inc, one of the driving forces in rental equipment in the greater DC area. It is now known as the ICE® Capital Branch, servicing the Baltimore, DC and greater Virginia area.

International expansion began in 1982 with Far East Pte, Ltd. was formed in Singapore to serve the foundation industry of the Far East. ICE Far East owns ICE Far East Sdn. Bhn. in Malaysia. In 2003, International Construction Equipment, Inc. established ICE APAC in China.

Today, International Construction Equipment, Inc. has established not only a strong group of dealers to handle all relationships and service to the international markets but announced in early February 2010, its newest family company called iCON® Foundation Equipment, BV in Europe.

With an eye to environmental considerations, International Construction Equipment, Inc. power units are in full compliance with all current US EPA and European pollution–control requirements. Further development enabled the use of non-toxic, biodegradable fuel and lubricants, replacing petroleum products on environmentally-sensitive jobs.

At Bauma 2010, ICE® will introduce to the world a revolutionary new line of Resonance Free (RF) vibratory hammers. This patented addition to the ICE® family of products is designed to meet tough new job specifications from California to the European Union.

iCON
THE iCON OF THE FOUNDATION INDUSTRY SINCE 1974

Combining internal product development with carefully selected external manufacturers, International Construction Equipment, Inc. has expanded its product range to include vibratory driver/extractors, diesel impact hammers, hydraulic impact hammers, leads & spotters, leads & excavator mounted rotary heads, and hydraulic drilling rigs to provide a "one-stop foundation shop" for contractors worldwide. ▼

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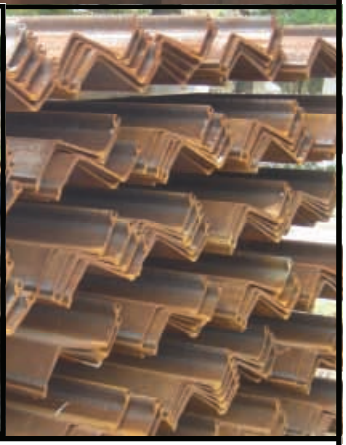

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Precast / Prestressed Concrete Piles to Provide the Foundation for a Nuclear Component Manufacturing Facility

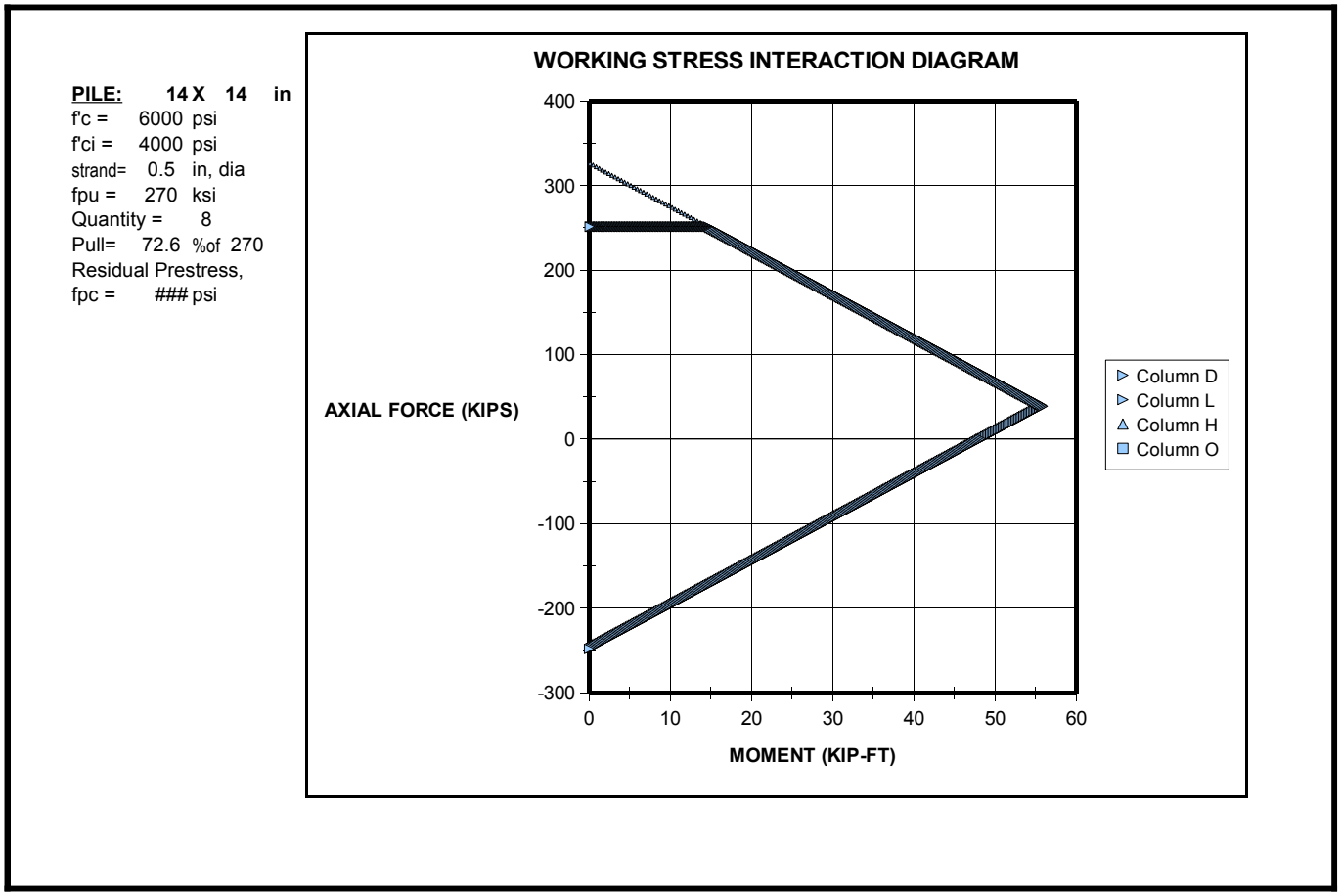
By Patricia Barnes, Bayshore Concrete Products

The manufacture of critical nuclear components requires a precisely built manufacturing facility. AREVA and Northrop Grumman Shipbuilding are partnering on a $363.4 million dollar venture to fabricate equipment and pressure vessels for the nuclear industry and to provide nuclear engineering services. The start of this joint venture begins with the construction of a 333,000 square foot building in Newport News, VA.

AREVA, Newport News LLC is the official name of this new company. Construction of the building is already underway at the Newport News shipyard in Virginia. "We are establishing a world-class entity that fully supports the deployment of a fleet of U.S. Evolutionary Power Reactors made in American by Americans and for Americans" (quoted by AREVA CEO Tom Christopher as reported in Trade & Industry Development, www.tradeandindustrydev.com)

The first step was choosing CH2M HILL as the design firm. As a global, full-service design and construction firm, CH2M HILL brings to AREVA the cradle-to-grave capabilities required to meet the challenges of an EPCM project delivery such as that of the AREVA Newport News Facility. CH2M HILL has a 30-year history of providing consistent engineering design services on large-scale industrial projects for AREVA's partner, Northrop Grumman Shipbuilding. This is the strongest testament to the technical and project delivery talents that made CH2M HILL an attractive choice for AREVA.

After careful consideration, precast concrete piles were chosen for the foundation of the manufacturing facility. The main advantage of the precast concrete piles, in lieu of a slab-on-grade, is the avoidance of significant settlement that would otherwise be expected in the highly-compressible soils on the site. CH2M HILL's geotechnical engineer selected 14" square piles based on the best combination of capacity and physical size, in order to meet the design constraints. The pile spacing varies for the different zones of the facility, but is generally in the range of 3 to 5 m on center. The soil/ rock surveys revealed the existence of the 'Yorktown' formation that is characterized by its high friction coefficient, providing stability by 'grabbing' the piles once they are driven to design elevation. (The Yorktown formation is fossiliferous clay with varying amounts of fine-grained sand, bluish gray, shell material commonly concentrated in lenses.)



Moment and Axial Load Interaction Diagram

Bayshore Concrete Products (BCP), a leader in the production of precast, prestressed concrete, is supplying precast concrete square piles for the foundation of the137.5 foot tall, 700 foot long building. Precast prestressed concrete piles are an economical, sustainable, high strength solution for building deep pile foundations. Where possible, BCP manufactures piles using recycled materials such as reinforcing steel and concrete pozzolans. Inherent in concrete construction are fire resistance, immunity to corrosion, resistance to organic attack and weathering resistance; which in turn can lower maintenance and operational costs and increase the life span of a structure.

BCP is producing over 439,000 linear feet of 14" square piles with half inch diameter high strength prestress strands allowing for a design bearing capacity of 172 tons.

The 5,700 plus piles range from 59' to 100' in length and are cast with an ultimate compressive strength of 6,000 psi in 28 days and 4,000 psi compressive strength at time of driving the piles. Quality Control for this project is done in accordance with PCI MNL-116. Bayshore Concrete is ISO 14001 environmentally certified and has an industry leading safety record. BCP plants are certified by the Precast/Prestressed Concrete Institute (PCI).

Production is on the fast track - BCP is currently producing approximately 65 piles per day (5,020 linear feet per day) at its Chesapeake, VA plant. The piles are cast using 3 beds 400' to 440' in length. Accelerated curing with steam is used to be ready for the next pour within 24 hours. The piles are being trucked to the site at a rate of 40-50 per day.

Bayshore Concrete is ISO 14001 environmentally certified and has an industry leading safety record.

AREVA and Northrop Grumman Shipbuilding: the start of this joint venture begins with the construction of a 333,000 square foot building in Newport News, VA.

BCP has produced over 1/2 million square piles in lengths ranging from 25 feet to 171' long (over 35 million linear feet). Standard square pile sizes range from 10" to 30" square. Bayshore has 12 beds for the production of square piles which allows it to meet the needs of multiple customers and projects at the same time. Bayshore's batch plant potential output of well over 200 cubic yards per hour provides a reserve capacity for unusually large-volume continuous pours. BCP also has the capability to epoxy coat piles in the splash zone for use in marine projects.

Waterfront Marine Construction, Inc started driving the piles in October of 2009 at a rate of 30 to 40 piles per day. The aggressive schedule requires 3 pile rigs, each consisting of a Terex American HC-100 Hydraulic Crawler Crane, an APE model D30-42 Diesel Pile Hammer, and an APE D20 Auger. After pre-drilling (pre-augering) to depths of 30 linear feet each pile then requires 550 to 750 blows depending on the length of the pile, soil conditions and any obstructions encountered. The piles are driven 74 to 84 ft deep to a tolerance of +/-3" precise placement and depth. The challenge in driving the piles has been encountering obstructions of concrete, wood, metal and cable which then requires Waterfront to preauger and/ or spud through or dig out these obstructions. Waterfront Marine in well equipped to handle these issues.

The pile driving process is expected to be completed

This 25 acre site is situated on the Elizabeth River and mainly produces square piles and double tees.

in the summer of this year (2010). The construction of the building will continue through 2011 with AREVA starting to produce components in 2012.

AREVA is the world leader in nuclear energy and have had a presence in Virginia since 1957 - its operations in Lynchburg, VA is the headquarters of AREVA NP, Inc. They have been dedicated to the design and construction of nuclear power plants, plant maintenance and repair, and the manufacture and supply of nuclear fuel.

Waterfront Marine has been in business since 1982 and operates in Virginia, Maryland and North Carolina. Foundation pile driving comprises about 40% of their business. Waterfront Marine is also involved with projects that include marine construction, bridge construction, MSE walls, and sound walls.

Bayshore concrete was established in 1961 to produce the precast concrete components for the 17 mile Chesapeake Bay Bridge Tunnel. Bayshore Concrete is located on 90 acres on the Chesapeake Bay in Cape Charles, VA. Over the years Bayshore Concrete has expanded its product line to include precast and prestressed concrete for marine facilities, mass transportation, parking structures, offshore structures, piers, and heavy construction in addition to the manufacturing girders, segments and piles for bridges. The piles for this Areva project are produced at Bayshore's plant in Chesapeake, VA. This 25 acre site is situated on the Elizabeth River and mainly produces square piles and double tees. Bayshore Concrete is committed to providing sustainable components and protecting the environment for future generations. All Bayshore products are made with materials purchased within the United States utilizing recycled materials whenever feasible. ▼

Arvea pictures courtesy of CH2M Hill

Timber Pilings Used for "Limited Access" Jobs

By Dmitri Drezins, President, Dmitri Pile Driving, Chalmette, LA

It is a well known fact that New Orleans, LA is built on very poor soil conditions made up of soft soil, silt, and clays. This, along with an extremely high water table, triggers just about every structure to be placed on pilings including residential homes, street lights, driveways, pools, and even air conditioning pads. The pile driving contractor can take advantage of the soft ground when it comes to limited access pile driving as smaller equipment needs to be capable of installing the necessary timber piling lengths.

Dmitri Pile Driving, Inc. ("Dmitri") was established in 1997 to provide commercial and residential pile driving services throughout New Orleans and the surrounding parishes. Over the years, Dmitri has taken on a number of limited-access jobs to meet the market demand.

Equipment Used for Limited Access Types

Limited access can be subdivided into three areas:

- **Overhead Restriction** (e.g. driving under a canopy or trees)
- **Width Restriction** (e.g. having only 7' access or less to bring in equipment)
- **BOTH Overhead and Width Restrictions**

As every pile driving contractor knows, each jobsite brings along its own set of challenges and obstacles. Therefore, equipment selection will be based on the characteristics of each job. Some samples of limited access equipment used by Dmitri include the following:

Overhead Restriction Equipment:

Dmitri often drives residential pilings with a C-350 Bantam with a 50' set of leads that is capable of driving a one-piece 40' piling after allowing room for the hammer and piling hood. This crane is 8' 6" wide and utilizes a 3,000 pound drop hammer which, at a 5' drop, will produce energy of 15,000 foot pounds. This rig can be unloaded and driving pilings in fewer than 5 minutes!

Dmitri has fabricated many different lengths of fixed leads for limed limited access jobs, some as short as 10' that were used to drive 10-3/4" 50' pipe piles with a ceiling restriction of 11'. These pilings were driven in 5' sections.

Width Restriction Equipment:

When width becomes an issue, Dmitri uses a T300 bobcat with proprietary attachments to use on such jobs. There

Dmitri often drives residential pilings with a C-350 Bantam.

is a 3-step process to driving pilings with a bobcat. First, an 8' to 12' hole is drilled with a standard bobcat full flight bit. Second, a grapple attachment is used to pick up the timber pile and place it in the pre-augured hole. The grapple then grips the piling approximately 8' above grade and then pulls the piling down with the weight of the bobcat. This process occurs over and over again until the piling cannot be pulled down. Lastly, a hammer attachment is used with a maximum energy of 7,200 foot pounds to drive the remaining piling down. Dmitri Drezins, the owner of Dmitri Pile Driving, Inc. drives all of the bobcat jobs himself to ensure the quality and safety of such jobs. Both the hammer and grapple attachments were built by Dmitri Pile Driving, Inc.

Limited Access Jobs

Commercial Building Foundation Stabilization – Chalmette, LA

Dmitri was contracted to provide 78 Class 5 40' pilings for a foundation stabilization project. The entire job was to be driven under a canopy which measured 20'. Dmitri used the Bantam crane for this project and drove the timber pilings in sections (2 – 15' sections and 1 – 10' section). The pilings were connected together using a parish- approved piling connector. Dmitri did encounter numerous underground obstructions (pockets of concrete) which had to be punched through and extended the production timeline. The total time to complete this job was 3 ½ days.

Residential Bulkhead Project – Slidell, LA

Dmitri took on a 100' residential bulkhead project for a residence that backed up to a small lake that was not accessible by barge. The contract called for the face pilings and tie-backs to be installed as the homeowner was to install the vinyl sheet piling. There were to be 21 face pilings measuring 25' in length and 21 tie-backs measuring 15'. All pilings were to be driven 5' on center. This was a challenging project as the only access to the backyard was through the homeowner's garage. Dmitri used the bobcat pile driver to complete this job. All timber pilings were installed in one-piece. The total time to complete this job was 2 days.

Residential Pool Project – New Orleans, LA

As stated above, even pools require pilings in some areas

of New Orleans. Dmitri was contracted to install 36 Class 5 40' timber pilings for an underground swimming pool. Access to the backyard was limited to 7'. Therefore, Dmitri used the bobcat to drive these pilings. All pilings were punched to the proper elevation according to the plans. There were 7 different elevations in all ranging from 1' below grade (for deck pilings) to 7' (for the deepest portion of the pool). This project took a total of 1 ½ days to complete.

Commercial Shopping Mall Entrance – Metairie, LA

Dmitri was awarded a commercial contract to install 54 (8-3-6) 30' pilings for a shopping mall entrance. The entrance was wedged between (2) 50' tall buildings and the clearance from wall to wall measured only 7'. In addition to the building clearance, Dmitri also had to contend with underground utilities that were marked prior to driving. Needless to say, there was very little room for error and great precaution had to be taken in order to not damage the existing buildings and not disturb

When width becomes an issue, Dmitri uses a T300 bobcat with proprietary attachments.

There was very little room for error and great precaution had to be taken not to damage the existing buildings.

the underground utilities. Dmitri carefully used the bobcat pile driver to install the pilings. The project was completed in 4 days as this was a precision project.

Residential Addition – New Orleans, LA

Dmitri took on a seemingly easy backyard addition (20 Class 5 35' pilings) with plenty of room for equipment access. However, low hanging HISTORICAL oak tree limbs brought about quite a challenge. Dmitri utilized the bobcat rig to thread the piling through the limbs so the pilings could be driven. The leads of any other machine would not have been able to get under such limbs. This project was completed in 2 days.

Dmitri's willingness to take on limited access jobs has opened up a new market for the company. These jobs now account for 8% of Dmitri's workload. ▼

Dmitri Drezins, the owner of Dmitri Pile Driving, Inc. drives all of the bobcat jobs himself to ensure the quality and safety of such jobs.

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PILE CHECK

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Pile Driving Demonstrations – Then & Now

By Frank Rausche and Pat Hannigan, GRL Engineers, Inc.
Clayton Signor, Signor Enterprises and Joe Caliendo, Utah State University

It was a sticky, hot June day in 1972, when approximately one hundred geotech experts, participants in an ASCE Specialty Conference, were filling the bleachers at a grassy site on the Purdue University Campus in Lafayette, IN. While the sky turned black, the Foundation Equipment Corporation drove an H-pile with a DELMAG D- 12 to a depth of about 35 ft. Prior to the pile driving demonstration, days had been spent preparing the test equipment and moving it into a van to the site and organizing the test pile with strain gages. Purdue Professor Gerry Leonards asked Case Institute of Technology Professor George Goble to attempt measuring the residual stresses in the pile (not an easy task under any circumstances and particularly not when the main emphasis was a demonstration).

In addition to strain gages along the pile length, George Goble, Frank Rausche and Garland Likins (the GRL team) also used a top transducer and accelerometers and connected them to the first routinely working Pile Driving Analyzers (PDA). But before that could happen, the sky unloaded huge buckets of water over the site and onlookers, making the readings jittery. However, the capacity of the pile was accurately read from the PDA's digital display and then confirmed by a static load test, performed immediately following the pile installation. Analyses of the results, later performed at Case Institute of Technology in Cleveland, OH, were presented in a Proceedings paper[1].

Several pile driving and testing demonstrations were attempted following the Purdue experience. Difficulties with driving equipment; soil resistance that was either too low or too high for a meaningful demonstration, uplifting test dead loads and other problems made the demonstrations difficult and caused the GRL team only hesitatingly to recommend additional demonstrations.

Pile Driving and testing demonstration at PDPI in Logan, UT

Forward 37 years to June 2009: During the 2009 Professors' Driven Pile Institute Proceedings, 26 university professors saw within a short morning period the driving and dynamic monitoring of a steel pipe and two concrete piles. A day earlier, after Utah State University's Prof. Joe Caliendo and his team had statically tested two piles under compressive and lateral loads, GRL Engineer's Pat Hannigan performed a restrike test on a load test pile and the energy calibration of an automatic and a cathead and rope safety hammer. Hannigan had brought along his PDA, Model PAX, and utilized wireless sensors to acquire the data. The results from PDA and the more rigorous CAPWAP analysis were shown a short time later to the participants in a class room of Utah State University2. The longest time was spent on the demonstration of static compressive and a lateral load tests.

As part of the SPT demonstration, the participants were invited to operate the cathead and rope machine and compare their result. PDA calculated transferred energies were displayed and stored by the PDA. These transferred energy values, divided by the SPT rated energy (140 lbs ram weight times 2.5 ft drop height = 350 ft-lbs potential energy) yield the transfer efficiency which has been plotted both for the automatic and the cathead and rope hammer in the figure below. Obviously, the professional

[1] Demonstration onlookers watch George Goble carry instrumentation to a sheltered place

Demonstration onlookers watch George Goble carry instrumentation to a sheltered place

PDPI instructor Pat Hannigan installs wireless gages

SPT operator did a much better job than the three professors while the automatic hammer provided consistently high energies.

SPT Transfer efficiencies for Automatic and Cathead and rope hammers

The demonstration of the static and dynamic load tests in Logan are always rather challenging. The demonstration site consists of a 7 ft crust and then very soft soils to a depth of roughly 45 ft where a bearing layer prevents the artesian water below from flooding the site. A steel pipe pile had been installed in previous years and it is used to demonstrate the static load test. The same pile is then tested by driving the pile for approximately 3 inches with a Kobelco 13 hammer. This year the PDA indicated capacity was 160 kips. The static load test failed at 170 kips. Unfortunately, the transferred energy was only 3,300 ft-lbs and for that reason, the equivalent blow count was 30 blows/ inch. Under those circumstances, it is understandable that the CAPWAP calculated load-set curve does not show a clear failure. A comparison of static and dynamic load-set curves is shown below.

Not quite as ambitious, yet equally impressive as far as smoothness of operation, speed of data acquisition and data processing was a July 2, 2009 demonstration organized by Rusty and

PDPI participant tries for high SPT energy

Pile Driving and testing demonstration in Austin, TX

Clayton Signor. More than 30 geotechnical engineers attended the demonstration in Manor near Austin, TX. Signor Enterprises demonstrated driving and restrike testing of two 6-5/8 inch diameter pipe piles (one had been installed 6 days prior to the demonstration) and one HP 10x42. John McIntyre, P.E., consultant to Signor, operated sensors and PAX in a remote mode, i.e., Garland Likins of GRL Engineers, Inc. from Cleveland, OH, monitored the data through the internet in real time as the piles were driven. He checked, and then relayed the results to the audience as the testing proceeded. Signor used a Pile Master 36-3000 air hammer (ram weight 3,000 lbs; rated energy 9,000 ft-lbs) to drive the piles into the Taylor Formation, a problematic expansive clay soil found in Texas. End-of-Drive (EOD) blow counts of the 25 ft long pipe were less than 2 blows/ inch while the beginning of restrike (BOR) required 10 blows/ inch. Energy calculated by the PAX suggested a nearly 100% efficiency of the uncushioned hammer. Load-set curves calculated by CAPWAP show roughly a 2-fold gain of capacity. The relatively small pipe pile had an ultimate capacity of nearly 230 kips and could safely support a load of more than 55 tons. The H-pile, driven after the restrike pipe test to 10 blows/ inch, reached an EOD capacity slightly higher than the restrike tested pipe. It can be safely anticipated that the H-pile will eventually be able to safely support 100 tons. However, verifying that capacity would require a hammer with a higher energy.

CAPWAP calculated load-set curves for pipe piles during installation and restrike

One interesting aspect developed during testing when the

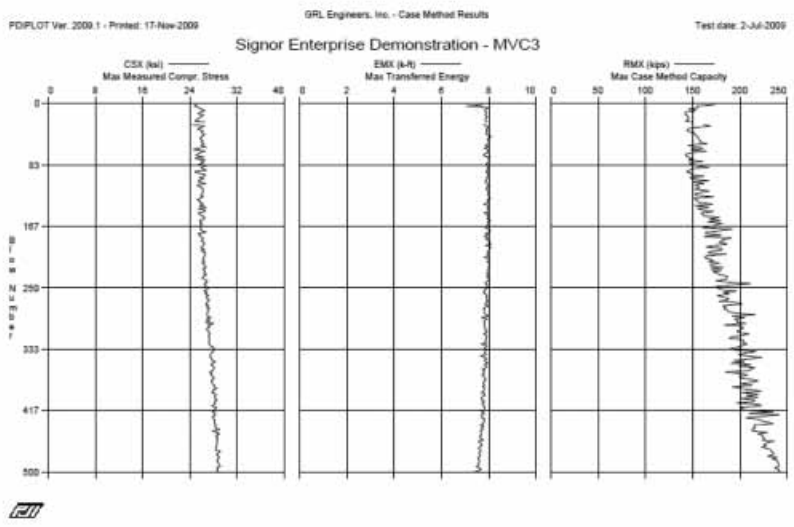
The Pile Master 36-3000 driving a 6-5/8 inch, 25 ft long pipe pile in Manor, TX

energy measured in the pile by the PDA turned out to be 30 to 60% higher than anticipated. The crew had thought to run the hammer at a stroke of 1.5 ft corresponding to a potential energy of 4,500 ft-lbs. However the measurements indicated 6,000 ft-lbs and greater values in the pile. Careful inspection revealed that the hammer was significantly over stroking and that during hard driving the energy in the pile was not much different from the potential energy of the hammer. These findings point out that the wave equation model of this hammer has to use a much higher efficiency than the 0.67 value that is generally used for traditional air hammers.

For each hammer blow, the plot below shows the maximum compressive stresses, transferred energy and capacity at the time of testing. Obvious trends as the blow number increases and thus the depth of installation are an increasing stress, slightly reducing transferred energy and a clear gain of bearing capacity.

Noise levels during driving, monitored by Rusty Signor, were in the mid 80 db range at a distance of about 50 ft from the pile driver. Ground vibrations were barely noticeable. It was concluded that these relatively small piles can be reliable and quickly installed, reaching high capacities with minimal environmental impacts.

While it is always a challenge for those organizing a demonstration, today's equipment both for pile installation and load testing has come a long way and makes for an interesting, dynamic and instructive event – barring any down pours. ▼



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PDCA OF SOUTH CAROLINA CHAPTER PRESENTS ANNUAL "MAC" NIGELS SCHOLARSHIP FUND AWARD

The PDCA chapter of South Carolina presented the "Mac" Nigels Scholarship Award to Cadet Mark Gordon Shaw, The Citadel, on December 1, 2009 at the Town and Country Inn, Charleston, SC, during their quarterly dinner meeting.

Cadet Shaw is the third cadet from The Citadel to receive the $1,000.00 scholarship award from the PDCA of the South Carolina Chapter. Previous recipients of the award include Cadet Steven Perry Scoggins (2008) and Cadet Caleb Paul Rodgers (2007).

Recipients of the scholarship are chosen each year by the engineering professors at The Citadel. Qualifications for receiving the "Mac" Nigels Scholarship Award are, in its purest form, "Who would Mac choose?" Other qualification considerations include being enrolled in The Citadel, College of Civil and Environmental Engineering, displaying a high level of moral and ethical character and upholding the CEE Department's motto, "Kaizen", which translated from Japanese to English means "the willingness to constantly pursue improvement a small step at a time."

The "Mac" Nigels Scholarship Fund was created in honor of McLeod "Mac" Creighton Nigels, who was a 1955 graduate of The Citadel. Over the next 51 years, Nigels became one of the best and most respected engineers in the United States. He was always a champion of the pile driving industry, first through his involvement in the prestressed concrete piling industry and later as a structural engineer.

Throughout his life, Nigels demonstrated a passion for his work and remained a student of his chosen profession. He was a fair man of absolute integrity, honesty and character; always seeking to become more proficient and always accepting full responsibility for his designs.

Cadet Shaw was selected as the 2009 recipient of the "Mac" Nigels Scholarship award as a testament that he too possesses these same qualities. A letter accompanying the scholarship award to Cadet Shaw ended with the following, "Therefore, you are challenged to continue to be a student of your chosen profession. Be honest and decisive. Be thorough, prayerfully considering all that you design. Take each project seriously. Study to show thyself approved."

Below are two pictures of Cadet Shaw being presented with the Mac Nigels Scholarship Award. ▼

On the left are Cadet Shaw and Scott Nigels (Mac's Son); on the right are Harry Robbins, Cadet Shaw, Scott Nigels and John Parker (President, PDCA of SC Chapter).

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ARGOSY CASINO EXPANSION
Open Cell Sheet Pile® Harbor Project

Article Contributors:

Michael Lane, Richard Goettle, Inc., Cincinnati, Ohio;
Todd Nottingham, PND Engineers, Inc., Seattle, Washington;
Richard Fifield, L.B. Foster Company, Lexington, Kentucky

Introduction

With the success of their existing riverboat casino operation on the Ohio River in Lawrenceburg, Indiana, the Argosy Casino planned a major expansion of their facilities. This expansion included a second 1,400 car parking garage, elevated walkways, and a new floating casino that doubled their original square footage and consolidated all of the gaming activity to one floor.

The design for the new expansion began in the fall of 2004. The original design of the new slip, 500-ft by 250-ft, consisted of a combination of tie-back Z-pile walls and combi-walls. The construction of this design was very susceptible to fluctuations of the river and would have required an extensive dewatering system to allow the installations of the tiebacks below water level. This design was solicited for bids but a contract was withheld due to permit delays. During this delay the owner's engineers sought alternate designs that could allow completion of the project within the original timeframe.

The alternate design that was finally selected was an OPEN CELL SHEET PILE® bulkhead system designed by PND, Engineers, Inc. The OPEN CELL® design eliminated the tiebacks and allowed the work to be performed in the dry without any dewatering. It was also not as susceptible to high water as the original design.

Site Conditions

Lawrenceburg, Indiana is located on the Ohio River about 25 miles southwest of Cincinnati, Ohio. The general area of the existing Argosy Casino is located within the south-central portion of a broad flood plain approximately one mile downstream of the confluence of the Great Miami River and the Ohio River. Normal pool for the Ohio River is elevation 455, while the 100-year flood level is 45 feet higher.

The subsurface profile exhibited by the borings indicated that the site is overlain by deposits of moderately to highly compressible random fill and recent river alluvium. An alluvium thickness as great as 40 feet was encountered in some test borings within the new slip construction. Due to the magnitude of the anticipated settlement within the OPEN CELL SHEET PILE® structures, an extensive remote monitoring instrumentation program was implemented by the geotechnical consultant, H.C. Nutting Co. of Cincinnati (a Terracon Co.)

Design

The OPEN CELL SHEET PILE® system is a patented retaining wall system that utilizes flat sheets to reinforce and retain soil to achieve a stable structure. The system consists of face sheets arranged in an arc that are anchored by tailwall sheets at regular intervals. The face sheets retain the soils while the tailwalls reinforce the soils. The system functions as a horizontally-tied membrane that does not require significant toe embedment for stability. *(Figure 1. and 2.)*

Design Challenges

The bulkhead system used for the Argosy project overcame several distinct design challenges from variable soil conditions, geometric requirements, heavy loading, as well as construction sequencing requirements.

All face sheets were driven into the glacial outwash, a layer of sand and gravel whose depth varies across the site. Thicknesses and structural properties of the overlying sediments ranged from the soft cohesive alluvium soil, to the lime-treated

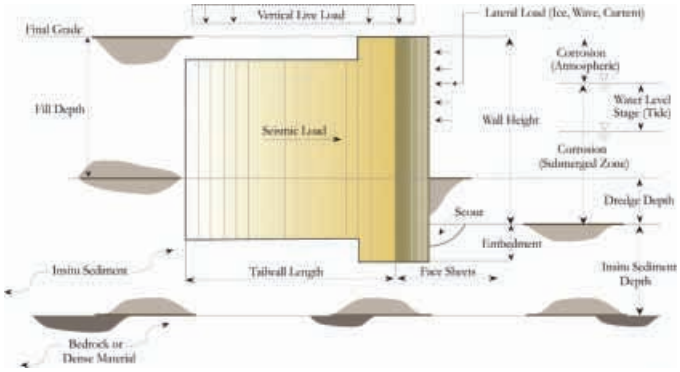

Figure 1. Isometric schematic view of an OPEN CELL® bulkhead

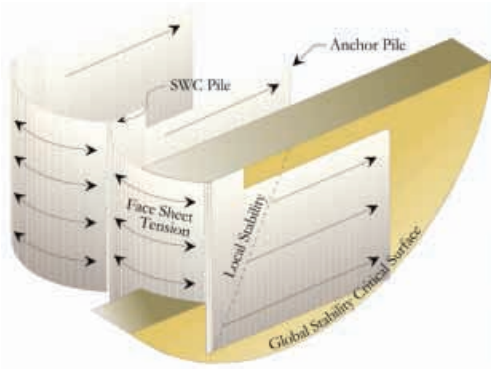

Figure 2. Cross-section with soils and soil loads.

dike material, to the new engineered fill of either clay or sand.

Variable wall configurations and transitions provided challenges for both design and construction. Initial construction required encapsulation of an existing bulkhead along the toe of the levee with an additional requirement of no more than three feet of levee excavation to maintain stability of that structure.

A back-to-back wall 30-ft wide and 400-ft long, separated the existing slip from the new slip. The tailwalls of each cell are lapped beside the tailwalls of the opposing cell separated by compacted granular fill.

The bulkhead is not only used as a retaining wall, but also as a means of holding down the floating vessel during high water events. The capacity was confirmed with an 800-kip pile load test. Tensile forces originate at the wye pile and are transferred to the surrounding soil through the adjoining sheets.

The design accounted for construction sequencing which required 100-ton cranes adjacent to the bulkhead face. In addition, during excavation the back-to-back wall retained up to 20-feet of water to allow the slip excavation to continue in the dry.

Construction

Excavation began with the construction of a new ramp needed to allow the delivery of equipment and material to the site in February 2007. Once the ramp was completed, two setting and driving crews and one service crew unloaded the daily delivery of sheet pile and kept the two driving crews supplied with the sheets as needed. (Figure 3)

The first wall was L-shaped and separated the existing slip from the new slip construction. It had to be built in front of and

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Figure 3. Construction Sequencing

beside the existing Argosy riverboat. This new wall enclosed an existing Z-pile tie-back wall, in which sections of the existing wall had to be removed to allow the installation of the tailwalls while keeping the integrity of the tie-back wall intact. The sheet piles for Wall 1 were installed within six feet of the old casino without affecting their daily operations.

After the completion of Wall 1, the second wall, which housed the new vessel, was started. Wall 2 creates a back-to-back wall with Wall 1.

Once all 2,000 linear feet of sheets were installed, the three-acre slip was excavated in the dry, and the only dredging required was in the river outside the limits of the new walls.

Notable Points

This project has several noteworthy aspects.

- This project was unique in that the slip was constructed with sheet pile, then excavated, and then flooded.
- Different soil types were present on this project, from very hard lime-treated soil in the existing jetty to very low blow count soil in the wetland area on the east side of the jobsite.
- The wye connections adjacent to the new casino were used as 200-ton hold-down anchors and had to be installed within two inches of plan location.
- There was limited storage space on site which necessitated the sheet pile being delivered by rail due to limited on site storage, it was necessary for the sheet pile to be delivered by rail to a storage facility approximately 25 miles away, near Cincinnati, Ohio, and trucked to the jobsite as needed.
- An instrumentation system was installed that remotely monitors the behavior of the walls and soils after construction. This system includes settlement gauges, inclinometers, piezometers and strain gauges.
- With a great deal of careful coordination and planning, along with use of the OPEN CELL® system, the casino slip was completed in time for delivery of the hulls of the new riverboat casino boat by the originally intended date in November 2007 allowing for full casino operations to occur in 2009.

Conclusion

The adaptability and economy of the chosen bulkhead system provided the Argosy project with a simple, constructible, and cost saving product that expedited the completion of the new facility. ▼

Project Participants

- **Owner:** Argosy Casino (a Penn National company)
- **Construction Management:** Messer Harmon.
- **Civil Engineer:** Core Fundamentals, Inc.
- **Pile Driving Contractor:** Richard Goettle, Inc.
- **Geotechnical Engineer:** H.C. Nutting (a Terracon Company).
- **Sheet Pile Supplier:** L.B. Foster Company
- **Structural Engineer:** PND Engineers, Inc.

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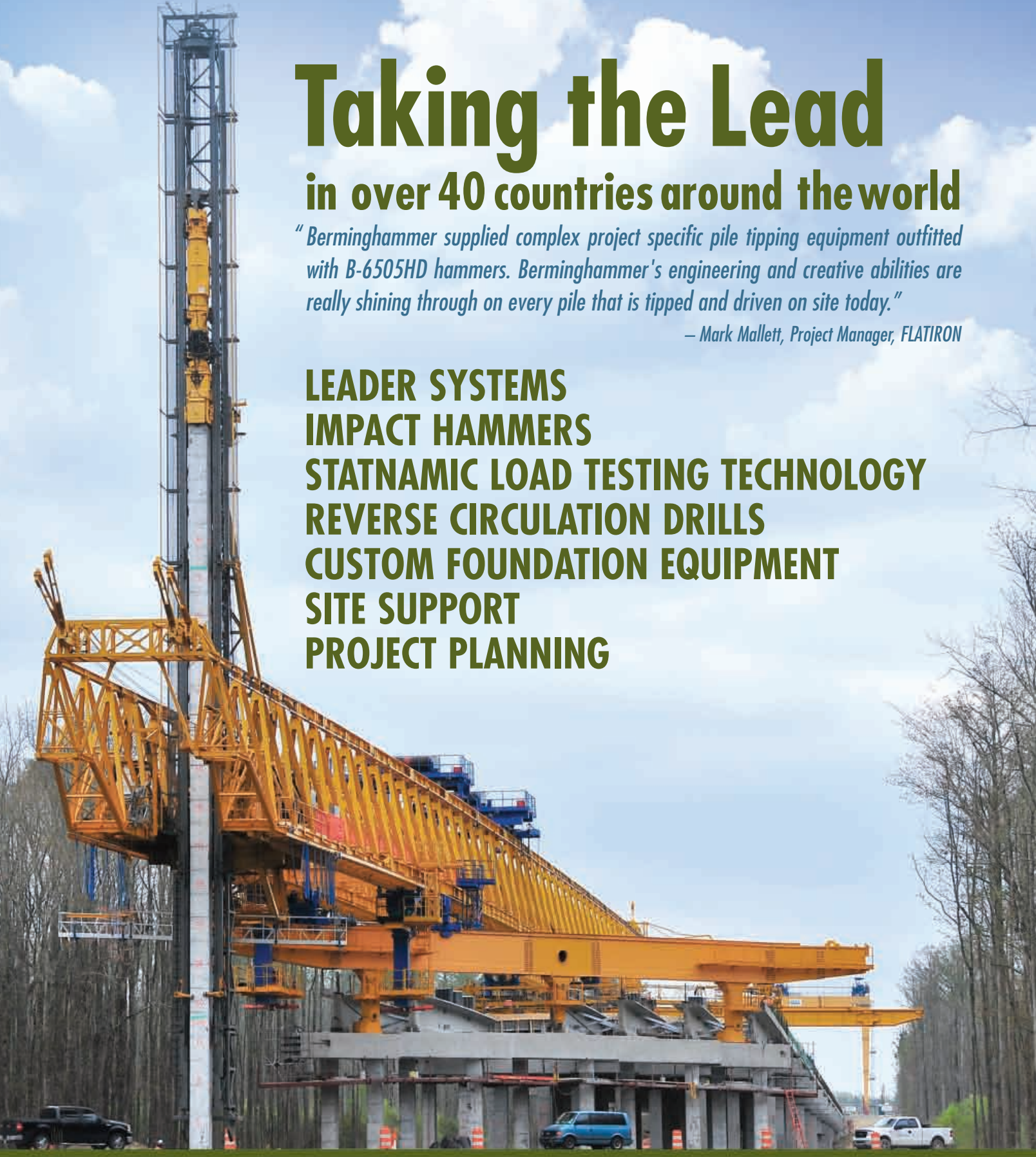

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Project Home Again is a nonprofit, housing development organization created by The Leonard and Louise Riggio Foundation shortly after Hurricane Katrina to build high-quality, energy-efficient homes for low and moderate-income, New Orleans homeowners who have been unable to rebuild and return to their communities.

Like thousands of people across the world, Leonard and Louise Riggio watched in horror and disgust as New Orleanians struggled for their lives in their deluged city for five long and sweltering days in August 2005. Struck by the myriad injustices the disaster revealed, the Riggios and their long-time friend, the former Deputy Mayor of New York City, Bill Lynch formed Project Home Again to restore community, hope and housing to hard-working families who had lost their homes as a result of Hurricane Katrina and the infamous levee failure that damaged or destroyed 80% of the housing stock in one of America's oldest and most unique cities.

The PHA homes are built primarily of pressure-treated Southern Pine wood products.

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Using primarily wood to build these homes allows the dealers to sell more of a sustainable product and empowers the builders to be more creative. Builders found using treated wood pilings in place of grade beams and concrete piers and saving time as well as money to be more efficient which also has a positive impact on the projects bottom line.

The home at 840 Pontalba Street in New Orleans defines the strength and beauty possible when building with timber piles.

The PHA homes are built primarily of pressure-treated Southern Pine wood products.

Cox Industries was proud to donate piling to the Southern Forest Product's HomeXE project in New Orleans. According to Don Surrency, VP of Cox, "this project provided an opportunity to showcase the use of piling in extreme environments".

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The Architecture of HomeXE emulates the classic French Creole-style revived by A. Hayes Town, a Louisiana native and graduate of the Tulane University School of Architecture. Foundation piles at front are neatly boxed and trimmed to blend into the traditional design. Built by IIone "Toni" Wendel of Olde World Builders and Remodelers the home at 840 Pontalba Street in New Orleans defines the strength and beauty possible when building with timber piles. ▼

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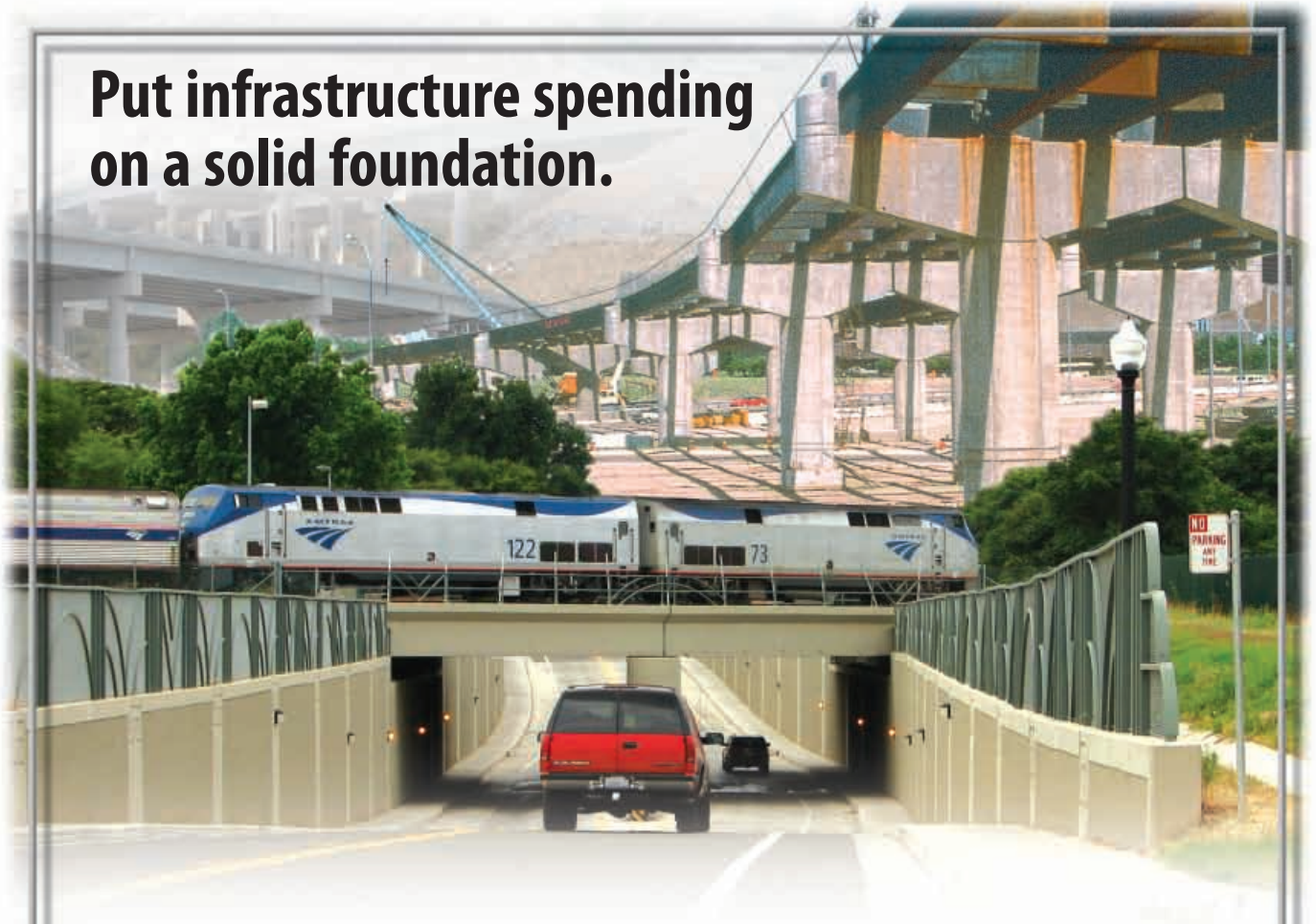

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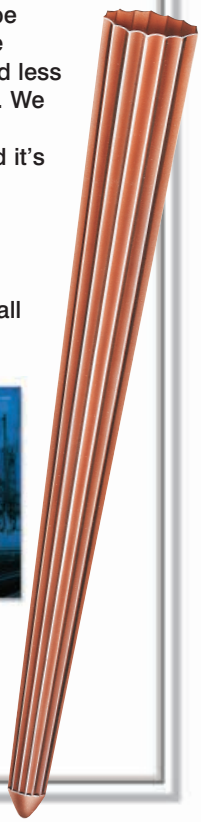

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GRL Engineers, Inc. tests piles on major bridge in Ecuador

Driven piles save $12 million on $32.5 million drilled shaft proposal

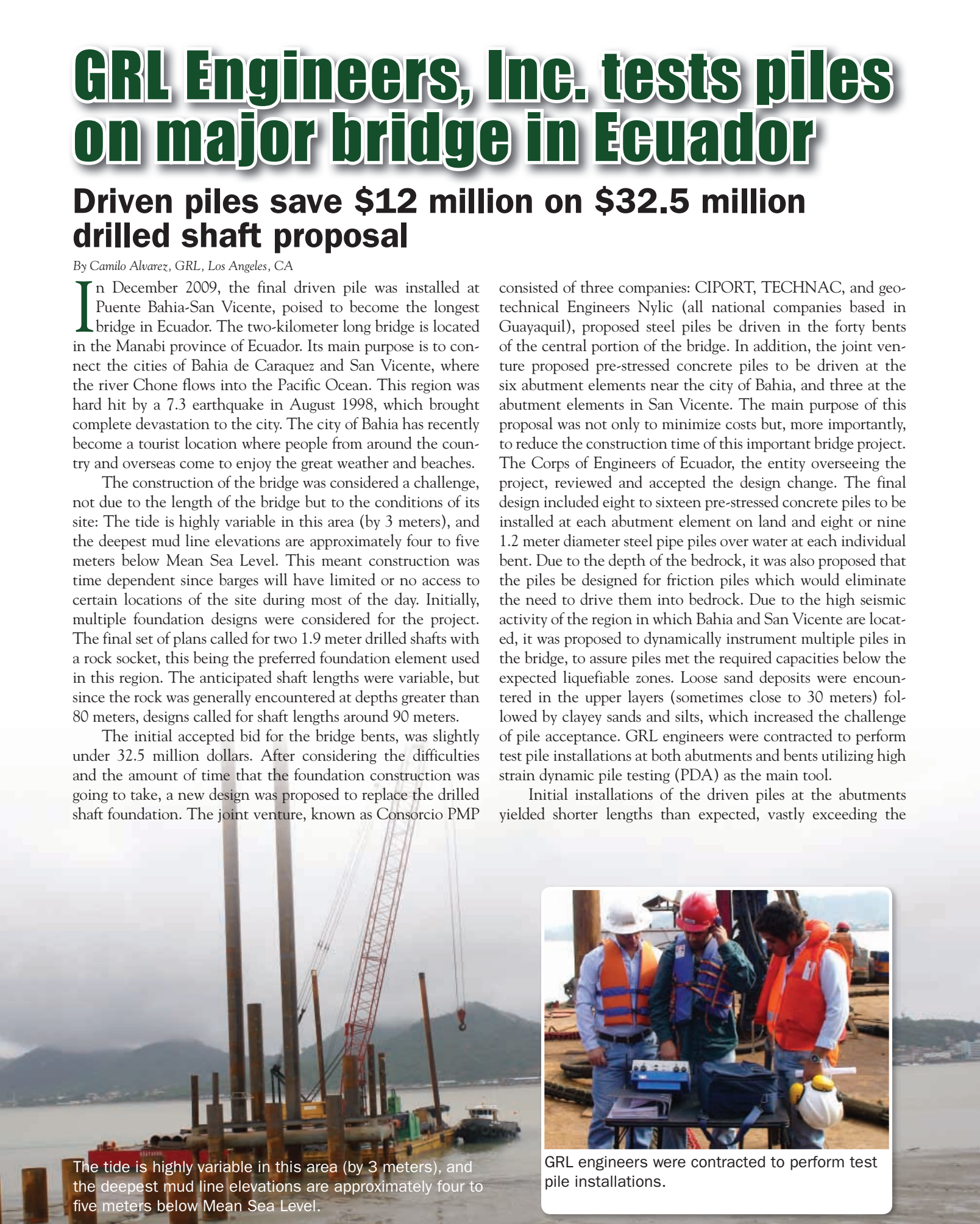
By Camilo Alvarez, GRL, Los Angeles, CA

In December 2009, the final driven pile was installed at Puente Bahia-San Vicente, poised to become the longest bridge in Ecuador. The two-kilometer long bridge is located in the Manabi province of Ecuador. Its main purpose is to connect the cities of Bahia de Caraquez and San Vicente, where the river Chone flows into the Pacific Ocean. This region was hard hit by a 7.3 earthquake in August 1998, which brought complete devastation to the city. The city of Bahia has recently become a tourist location where people from around the country and overseas come to enjoy the great weather and beaches.

The construction of the bridge was considered a challenge, not due to the length of the bridge but to the conditions of its site: The tide is highly variable in this area (by 3 meters), and the deepest mud line elevations are approximately four to five meters below Mean Sea Level. This meant construction was time dependent since barges will have limited or no access to certain locations of the site during most of the day. Initially, multiple foundation designs were considered for the project. The final set of plans called for two 1.9 meter drilled shafts with a rock socket, this being the preferred foundation element used in this region. The anticipated shaft lengths were variable, but since the rock was generally encountered at depths greater than 80 meters, designs called for shaft lengths around 90 meters.

The initial accepted bid for the bridge bents, was slightly under 32.5 million dollars. After considering the difficulties and the amount of time that the foundation construction was going to take, a new design was proposed to replace the drilled shaft foundation. The joint venture, known as Consorcio PMP consisted of three companies: CIPORT, TECHNAC, and geotechnical Engineers Nylic (all national companies based in Guayaquil), proposed steel piles be driven in the forty bents of the central portion of the bridge. In addition, the joint venture proposed pre-stressed concrete piles to be driven at the six abutment elements near the city of Bahia, and three at the abutment elements in San Vicente. The main purpose of this proposal was not only to minimize costs but, more importantly, to reduce the construction time of this important bridge project. The Corps of Engineers of Ecuador, the entity overseeing the project, reviewed and accepted the design change. The final design included eight to sixteen pre-stressed concrete piles to be installed at each abutment element on land and eight or nine 1.2 meter diameter steel pipe piles over water at each individual bent. Due to the depth of the bedrock, it was also proposed that the piles be designed for friction piles which would eliminate the need to drive them into bedrock. Due to the high seismic activity of the region in which Bahia and San Vicente are located, it was proposed to dynamically instrument multiple piles in the bridge, to assure piles met the required capacities below the expected liquefiable zones. Loose sand deposits were encountered in the upper layers (sometimes close to 30 meters) followed by clayey sands and silts, which increased the challenge of pile acceptance. GRL engineers were contracted to perform test pile installations at both abutments and bents utilizing high strain dynamic pile testing (PDA) as the main tool.

Initial installations of the driven piles at the abutments yielded shorter lengths than expected, vastly exceeding the



The tide is highly variable in this area (by 3 meters), and the deepest mud line elevations are approximately four to five meters below Mean Sea Level.

GRL engineers were contracted to perform test pile installations.

It took approximately nine months to install the bent piles over the water.

required loads in these locations. The estimated cost savings in both abutments was close to 3 million dollars with respect to the initial proposed estimate, in foundations alone. To start installing the steel piles in the central portion of the bridge, a test pile program was executed, which included initial drives and restrike testing of multiple piles. After completion of an initial test program, it was determined that high levels of soil setup developed after the initial pile installation. Driving criteria was developed for the piles, not for them to achieve the required ultimate capacities at the end of initial drive, but for them to gain the additional resistance from soil setup. Most of the piles were then driven to blow counts near 200 blows/meter with an ICE 205 hammer. This driving criterion helped avoid excessive blow counts, minimized driving times and time consuming and costly exchanges of hammer cushions.

After the initial test pile program was completed, estimates of pile lengths were presented by both the Joint Venture and the Corps of Engineers. The proposed average pile length was close to 50 meters, although in more critical locations piles reached lengths close to 70 meters. Pile cutoffs were as well kept to a minimum, further decreasing the installations costs. As part of the quality assurance and pile acceptance, restrike testing was proposed of at least two piles in each eight or nine-pile group. This was also essential, because skin friction piles are generally not accepted in Ecuador. The idea was not only to prove that loads were above the required values, but also to allow for a low LRFD (Load Resistance Factor Design) resistance factor, for an optimal foundation solution.

It took approximately nine months to install the bent piles over the water and two months for the installation of the abutment piles. The total pile driving time was significantly shorter than expected, which meant that sometimes pile installation had to be stopped for lack of material. The cost of the central bent portion of the project was close to 20 million dollars. Thus, compared to the initial cost proposal of 32.5 Million dollars for the central portion of the pile work, the cost savings were above 12 million dollars. This does not include the abutments, where costs savings averaged 3 million dollars. Most critical, however, was the record time in which the piles were installed under very rough site conditions. In fact, the foundation was built in less than half the time anticipated by the initial proposal, even with budget and material supply problems slowing down the construction. Another advantage of the revised design is a greater redundancy; the original design called for two shafts per bent while the driven solution provides eight to nine piles per bent.

The bridge is expected to open for public use in the fall of 2010.

Acknowledgement

Special thanks to Rafael Miranda and Francisco Miranda and the Corp of Engineers of Ecuador who accepted our input in the project. Special thanks to Alex Velasquez who kindly shared the taken pictures of the bridge under construction. ▼

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Building on the 'Bottomless' Bog

By Nigel Dillion, President, Lloyd Accoustics, LTD, Northern Ireland

The N7 National Primary Route is the main link between Dublin and Limerick. Ireland's National Development Plan 2000-2006 identified that urgent improvements to this section of road's infrastructure were needed. Limerick County Council and North Tipperary County Council, in partnership with the National Roads Authority (NRA), planned to develop a new 38km 'high quality dual carriageway' between Nenagh and Limerick (Western Limerick). The 38km project consists of 28km motorway standard cross section, on a green field site; it will traverse two peat bogs (marshes) – at Annaholty and Drominboy – and connect to a 10km section of the existing Nenagh Bypass, which will be widened to dual carriageway standard.

In November 2006 Limerick County Council awarded the contract to design and build the N7 Nenagh to Limerick High Quality Dual Carriageway to Bothar Hibernian N7 JV. Bothar Hibernian is a consortium comprising contractors Mota-Engil (Portugal), Michael McNamara Company and Coffey Construction Ltd.

Mota-Engil Engenharia e Construcao S.A. is a Portuguese public quoted company with turnover in excess of €1.3 billion. They have 60 years of engineering and construction experience in 20 countries over 3 continents.

Michael McNamara and Company is a wholly Irish owned company with almost 60 years experience. It has a turnover in excess of € 500 million and employs over 500 people placing it in the top three building contractors in Ireland.

Coffey Construction Limited. Coffey Group is also Irish owned and with 33 years experience is one of the market leaders in the Building, Environmental and Civil Engineering Industry, with a turnover in excess €120 million.

Lloyd Acoustics Limited is an independent pile foundation testing company, providing re-assurance to piling and main contractors of their foundations using modern testing techniques.

In April 2008 Lloyd Acoustics (LA) signed a contract with Bothar Hibernia N7 JV to become the specialist independent pile testing company on the project. The agreement nominated LA to carry out dynamic pile testing, CAPWAP analysis and static load testing on the piles which form the foundation for the new road as it crosses the two peat bogs at Annaholty and Drominboy.

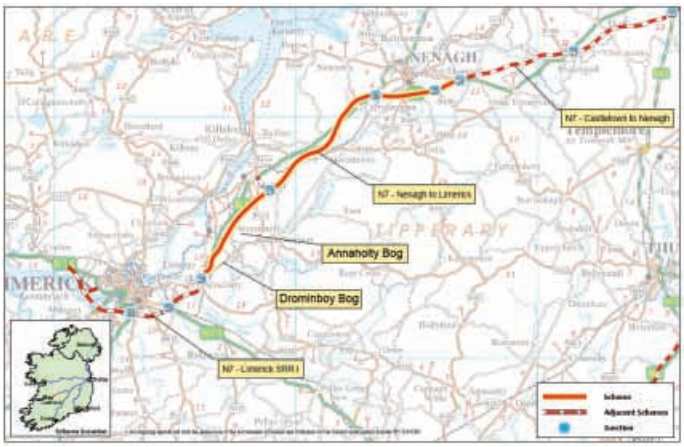
Bother Hibernian, along with their nominated engineers, Hyder Consulting considered various methods for the piling of the two bogs. The use of Continuous Flight Auger, bored cast in situ piles and AuGeo piles was discounted due to the extreamly weak soils. Therefore, driven piles were selected as the best option. Pre-cast concrete piles were considered the most appropriate solution. The mechanical method of jointing the piles was chosen due to tensile and lateral load capacity and cost.

The driving criteria for the hydraulic piling was also designed by the engineers Hyder Consulting, Junttan PM 20 piling rigs were chosen rather than crawler cranes because of their low centre of gravity and ability to pitch 13 and 14 single meter length piles and drive them with the correct, efficient, hydraulic impact hammer.

Hyder also had overall responsibility for the pile design, the design of the temporary piling platform, the spacing of the piles, the load application at each pile, the overall pile driving, review and 'set' at final driving. This was aimed at providing external foundation adjudication.

FK Lowry Piling was the nominated piling contractor. Lowry is an Irish based company with over 30 years experience in the industry and also own one of the largest pre-cast piling facilities in the country. FK Lowry encountered several obstacles during the contract, not the least of which was actually getting equipment and plant to the site.

It was decided, due to the size of the project and number of piles involved, that casting in yards in Northern Ireland and



The N7 National Primary Route is the main link between Dublin and Limerick.

The weight of these machines and the uneven surface of the temporary platform caused a significant amount of vibration accross the site.

transporting piles to the site was too expensive. Therefore, FK Lowry set up a casting facility to make piles close to the site. The casting facility allowed Lowry to only haul piles a few miles to the two bogs, which reduced transportation cost and provided a more convenient area to stockpile the 30,000 linear metres of 12m piles, which was needed at any one time and the total estimated contract for 200,000 linear metres.

Due to the weight of the Junttan piling rigs and weakness of the temporary platforms, it was necessary to have a distance of 60m between each piling rig. This meant the driving of the piles had to be done in a very organized manner and the program had to be scheduled accordingly. Due to vehicle tracking and lifting of the 30cm square x 12m concrete piles, maintaining verticality was a challenge and needed to be considered during driving.

When it came to driving the preliminary piles there were a few unexpected incidents. The bog was so weak that after the initial blows to punch the pile through the temporary stone platform, the pile fell 12m in 2.5 seconds, which was an alarming experience for the rig drivers. The piles were then jointed and although the estimated lengths were 18-21m, critical preliminary piles showed the drivability was much greater than had been predetermined in the engineers design. A commercial decision was made, that the test piles should be jointed again at 21m and driven until the 'set' criteria was reached. Incredibly the piles reached depths of 36m in some areas of the bogs. The piles were now much deeper than the pre-determined contract dictated and the design engineers were adamant that pile capacity must be achieved to avoid a re-design of the piling layout.

At this point Lloyd Acoustics began the testing program. LA performed re-strike dynamic testing of the preliminary piles, at a period of time after installation, to establish that the pile was still intact, had its integrity and that the joints were not damaged. This test also verified the capacity at the end of drive and that the pile was calibrated to the 'set' criteria. Capacities were then verified by CAPWAP testing, which yielded the distribution of the pile load was a 70/30% split, with a 70% bottom to a 30% shaft resistance on piles as deep as 36m!

Lloyds also carried out the static load testing. The original specification had called for Kentledge load testing, but it had become apparent that this method was not suitable.

LA was asked to come up with an alternative design to statically load the test piles in accordance with ICE procedures (the standard UK code of practice). LA recommended the use of sacrificial ground anchors. This proved difficult as in a self drilled bar application the anchors have several different wall thicknesses and therefore, to relate

In April 2008 Lloyd Accoustics signed a contract with Bothar Hibernia N7 JV to become the specialist independent pile testing company on the project.

this directly to capacity, you must have sufficient rock sockets.

At this stage the pre-cast piles had found rock at much deeper levels than expected, so this was deemed an excellent solution, because at each of the nominated static load test positions, the rock depth would be verified by the installation of the sacrificial anchors. This was accepted by Bothar as being an ideal opportunity to calibrate the piles and recalibrate the rock levels of the site, which originally had been shown at much less depth.

The installation of these anchors was then put out to tender with LA winning the contract. The works were carried out by a specialist drilling contractor, drilling on behalf of and supervised by LA. The selection of piles for the static load tests was done by Hyder. Over the extent of the two bogs, LA drilled over 7000 linear meters of two types of self drilled bars, with typical lengths ranging from 29m to 38m. The rock socket on each bar was between 5 and 6m and they were installed in a cement grout application.

To cope with the demand, LA had full time representation on site and a site office was set up, giving LA engineers a facility to analyse data and to monitor the static load tests; it also allowed LA to oversee the installation of ground anchors.

The static load tests were then carried out using specialized automated beam systems, designed specifically for the bog and able to operate with just two anchors. This, in combination with a high yield anchor bars, contributed to a significant cost saving, as it was originally assumed that four anchors would be used.

Using our automated, hydraulic load testing systems in tandem with our reaction beams was an efficient method of carrying out the static load tests required. Lloyd Acoustics automated load testing system allowed several tests to be monitored remotely by an engineer at the site office, which allowed the on-site technicians to continue with other testing or preparation for subsequent tests. At the peak of testing, LA had three load test systems running simultaneously, with

One of the main obstacles was the volume of site traffic passing in heavy earthmoving vehicles.

test information sent directly to our dedicated website for review. The automated systems apply incremental loading, via hydraulic jacks, directly to the pile head, without the need for manual application. This application is carried by data loggers controlling low to high pressure pumps.

One of the main obstacles we faced was the volume of site traffic passing in heavy earthmoving vehicles. The weight of these machines and the uneven surface of the temporary platform caused a significant amount of vibration across the site. During load tests, the vibration created by site traffic was disturbing the frame to which the gauges were attached, leading to poor data quality and false readings. A decision to perform the static load tests on weekends was made, which would allow data collection with no vehicular movement and therefore no vibration. LA achieved productivity of up to seven tests using three systems.

In addition to our remote monitoring, LA was able to display testing data live on our website. All parties involved in the piling welcomed this technological advantage, as it gave up to the minute data on how the piles were performing. Along with the current data, our website also provided access to an archive service, which allowed previous tests reports to be downloaded by our clients.

The static load testing began in May 2008 and continued until December, at which point testing was abandoned for the winter, due to poor weather and other commercial issues.

Testing recommenced in April 2009 and was fully completed by August 2009. Lloyd Acoustics successfully carried out 28 preliminary static load tests in Annaholty Bog and 28 in Drominboy. These piles were also subjected to 100% dynamic tests and CAPWAP analysis. Lloyds dynamically testing approximately 10% of the overall contract piles, of which approximately 8000 were installed. This equated to nearly 800 dynamic tests carried out by Lloyd Acoustics drop hammer, a specifically designed re-strike hammer mounted on a JCB handler for viability and handling. Contract testing also included approximately 185 static pile load tests across both bogs with sacrificial anchors installed at each test location to provide tension reaction.

The first 7km section of the Nenagh to Limerick N7, the area including the new Thurles link road, opened on December 17, 2009. The remaining sections are expected to carry traffic from April 2010. Pat Furlong, Bóthar Hibernian's project manager for the Nenagh-Limerick scheme, has expressed confidence that the new road will open by the revised deadline of April. He said 'The vast majority of outstanding works are now rapidly nearing completion and that the project is effectively at its "finishing off" stage.

Construction of the road through bog lands near Annaholty and Drominboy proved more difficult than anticipated and attributed to the delay but the problem has been successfully resolved through modern day engineering.' ▼

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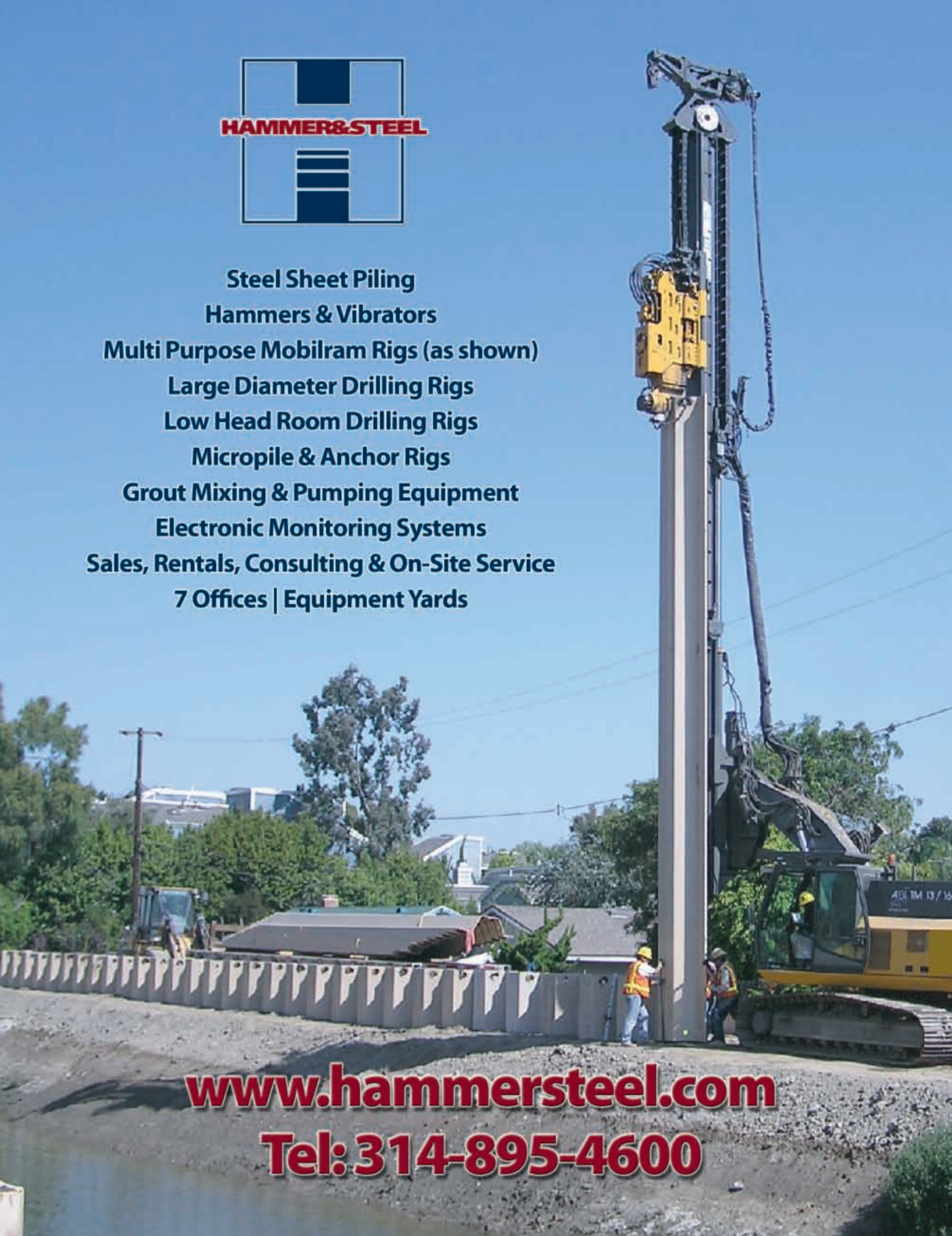
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