



The Rising Cost of Steel

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COVER:
PDCA Project of the Year:
Metro Wastewater Treatment Plant, St. Paul, MN.
Photo courtesy of AET.



Pile Setup – A Competitive Edge

By Wayne E Waters, PDCA President

Those of you who missed this year's Winter Roundtable missed the best one yet. It was attended by a record number of contractors and, for the first time, commenced with two very popular short courses. You should make it a point to try to participate next year.

One of the programs, that I presented, involved the use of pile set to achieve ultimate bearing capacity. This case study involved a project recently completed at the Orlando International Airport utilizing 18-inch diameter pipe piles.

For some of you, depending on geographical area, the use of pile set to achieve bearing is an accepted common practice. For others, it is a very

new concept to engineers that you may be dealing with, one which can be very valuable in terms of time and dollar savings.

At the Orlando International Airport, the end of driving blow counts and PDA results indicated achievement of capacities on the order of 40 to 60 percent of the required ultimate (400 to 500 kips) at a depth of approximately 50 feet above the elevation, where refusal would be expected. However, three days later, due to pile set, capacities on 20 PDA tested piles were all well above capacities required.

After two static load tests verified PDA results, over 300 production piles were installed with an APE 30-

32-pile hammer with a blow count that never exceeded 20 blows per foot! This resulted in a savings of over 15,000 feet of piling.

Keep this principal in mind when bidding jobs where soil conditions are proper for consideration of set, PDCA can be helpful to you by providing case study and other resources that may help make you more competitive. In many cases, hammer blow count at the end of driving does not indicate what the capacity of the pile really is. If you are willing to test, and soil conditions are conducive to pile set, you, along with a willing owner and engineer, can save a considerable amount of time and money. ▼

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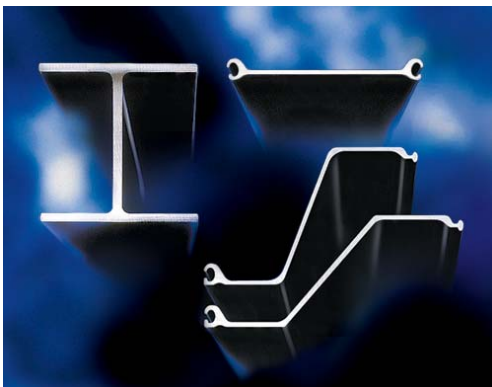
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	in ²	cm ²	in	mm	in	mm	lb/ft	kg/m ²	lb/ft ²	kg/m ²	in ⁴	cm ⁴	in ³	cm ³	in ³ /ft	cm ³ /m	ft ² /ft	m ² /m	ft ² /h	m ² /m
P222	11.9	76.6	22.0	559	9.0	228.6	40.3	60.1	22.0	107	151	6301	32.5	532	17.7	952	4.92	1.50	4.48	1.37
P227	12.1	78.2	18.0	457	12.0	304.8	40.5	61.3	27.5	134	282	11734	45.3	742	30.2	1622	4.93	1.50	4.48	1.37
PS27.5	13.4	86.6	19.7	500	—	—	45.1	67.9	27.8	136	5.02	209	3.19	52.2	1.94	104	4.58	1.40	3.88	1.18
PS31	15.2	98.2	19.7	500	—	—	50.9	77.0	31.5	154	5.51	229	3.35	55.0	2.04	110	4.58	1.40	3.87	1.18

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PDCA Off to a Strong Start in 2004

By Tanya Goble, PDCA Executive Director

2004 WINTER ROUNDTABLE RE-CAP

The PDCA had one of its most successful Winter Roundtable Conferences ever. Held in February, at the Wyndham Orlando Resort, the conference had more than 175 attendees and the highest number of contractor companies to date. There were many excellent presentations including:

- Bob Bittner, of Ben C. Gerwick, who spoke about the development of the float-in cofferdam, used in conjunction with larger piles for in-water bridge foundations.
- Robert Abbot, of Strategic Environmental Consulting, who discussed the impact of marine pile driving on fish and methods and costs of mitigation.
- Bill Crittenden, of Granite Construction, who described the fabrication and installation of 60-inch diameter cylinder piles for a Florida bridge replacement project.
- Amy Scales and Jeremy Wilcott,

of the Florida DOT, who spoke on the I-4 St. John's River Bridge project, including the test pile program and design-build process.

- Chris Dumas, of the FHWA, who discussed how contactors can expand their market share by implementing more sophisticated designs and quality control methods.
- Brian Cooper, of Arthur J. Gallagher, who reviewed the current state of the construction insurance market.
- Craig Christenbury, of Chris-Hill Construction, who discussed his experiences with the remote pile-driving analyzer.
- Wayne Waters, of Ed Waters & Sons, who presented a case study on how the use of pile set saved time and money for a new transit system at the Orlando airport.
- Scott Hanson, of Kiewit /FCI/ Manson JV, who presented an overview of the Oakland-San Francisco Bay Bridge project.



Left to right: Mr. Mohamed Hussein and Dr. George Goble.

- Rick Kumrow and Ryan Gorman, of Corman Construction, who spoke about the pile-driving operations on a section of the Woodrow Wilson bridge project.

If you were unable to attend the Winter Roundtable, you can view some of these presentations on the PDCA Web site at www.piledrivers.org. The PDCA wishes to thank all exhibitors, conference sponsors, and speakers for their participation.

PDCA SHORT COURSES A BIG HIT!

Two PDCA short courses made their debut at the Winter Roundtable. Both courses were very popular and received high marks from attendees. Dr. George Goble's course, "Pile Design for Non-Engineers," taught the basic methodologies of pile design without all the math! Mohammed Hussein of GRL Engineers presented an overview course on "Wave Equations and Dynamic Pile Testing." (see photo).

The PDCA sends a big thank you to

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A special thanks goes to our Winter Roundtable Corporate Sponsors. The 8th Annual Winter Roundtable would not have been possible without the generous support of our corporate sponsors. Their contributions made is possible for our attendees to enjoy most of the special events of the Roundtable — from coffee breaks to receptions.

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Mr. Hussein and Dr. Goble for their time and efforts in delivering these courses.

PDCA COMMITTEES UPDATE

Meetings of all of the PDCA committees were held at the Winter Roundtable. Here is a brief summary of each:

COMMUNICATIONS COMMITTEE

The Communications Committee recently completed work on a new pile-driving promotional CD. More details on this exciting new program are provided below. The Committee is working on new articles for the magazine and features for the PDCA Web site, www.piledrivers.org. The 2004 membership directory will be published in July and distributed to the mailing list. To improve communications with our membership, this committee is also working on improving PDCA's e-mail lists and broadcast e-mail capability.

EDUCATION COMMITTEE

The Education Committee is working hard on developing the program for the 5th Annual Cost-Efficient Driven Piles Conference, to be held September 16-17, in Los Angeles, and also for the 2005 Winter Roundtable, in February, in Charleston, South Carolina. The PDCA frequently receives requests from university faculty for contractors to present an overview of pile driving to students. In response, the Committee is developing a presentation to more easily accommodate these requests. In addition, to supplement our new CD, the committee is developing a set of video clips, which will also be supplied to university faculty. If you have good video clips that show pile-driving hammers, different pile types or interesting pile-driving applications, please contact PDCA headquarters.

ENVIRONMENTAL COMMITTEE

This year, PDCA has established a new committee that will focus on environmental issues related to piledriving, such as noise, vibrations, air pollution, and biodegradable fuels. PDCA Board Member John Linscott, of HB Fleming, is the new chairman of the committee and is in the process of identifying committee members and developing plans for the next few years.

MARKET DEVELOPMENT COMMITTEE

This year, the PDCA will begin exhibiting at more industry events in order to raise the visibility of the Association, recruit new members and promote the driven pile. The Market Development Committee is developing a set of new tradeshow displays and promotional items and identifying the events where PDCA will participate. The Market Development Committee will also be working on increasing the resources available to PDCA to better respond to inquiries related to the pile driving industry.

TECHNICAL COMMITTEE

The Technical Committee will be updating the current PDCA publication, *Recommended Design Specifications for Driven Bearing Piles*. The new specifications will include a single set of LRFD factors and be released in this fall. The committee has also begun work on a set of installation specifications for private sector work. PDCA members are invited to send examples that they may have from previous jobs to headquarters. These will be used to help guide the committee in defining the new specs.

The committee is also working with a university professor to coordinate data on testing and driving of piles.

NEW FEATURES ON THE WEB SITE

The PDCA Web site, www.piledrivers.org, has received a new look, designed to better match our logo. A new section has been added that will be used to distribute presentations and papers from PDCA events, such as the annual Winter Roundtable and Cost-Effective Piling Conferences. A number of presentations from this year's Winter Roundtable are now available on the site. Click on "presentations" on the PDCA homepage to access them.

DRIVEN PILE CD NOW AVAILABLE FROM PDCA

The PDCA has developed a new educational CD, *Driven Piles are Tested Piles*. The CD provides an overview of the driven pile, including the history of driven piles, types and uses of driven piles, types of installation equipment and quality control methods. Many thanks go to Steve Whitty, of Specialty Piling Systems, for the tremendous effort he put into the development of the CD!

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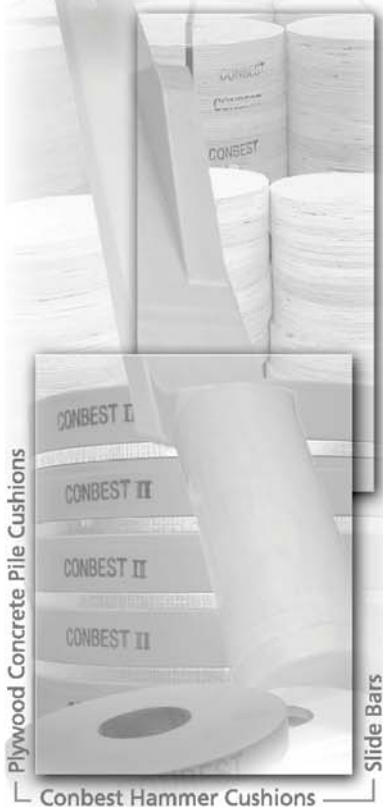
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The CD will be distributed, free of charge, to university faculty and PDCA members in April, and be used to help promote the benefits of driven piles at upcoming conferences and tradeshow.

The contents of the CD can be also downloaded from the PDCA Web site in the "presentations" area described on the previous page.

**The Pile Driving Contractors
Association presents:
5th Annual Cost-Efficient Driven
Piles Conference
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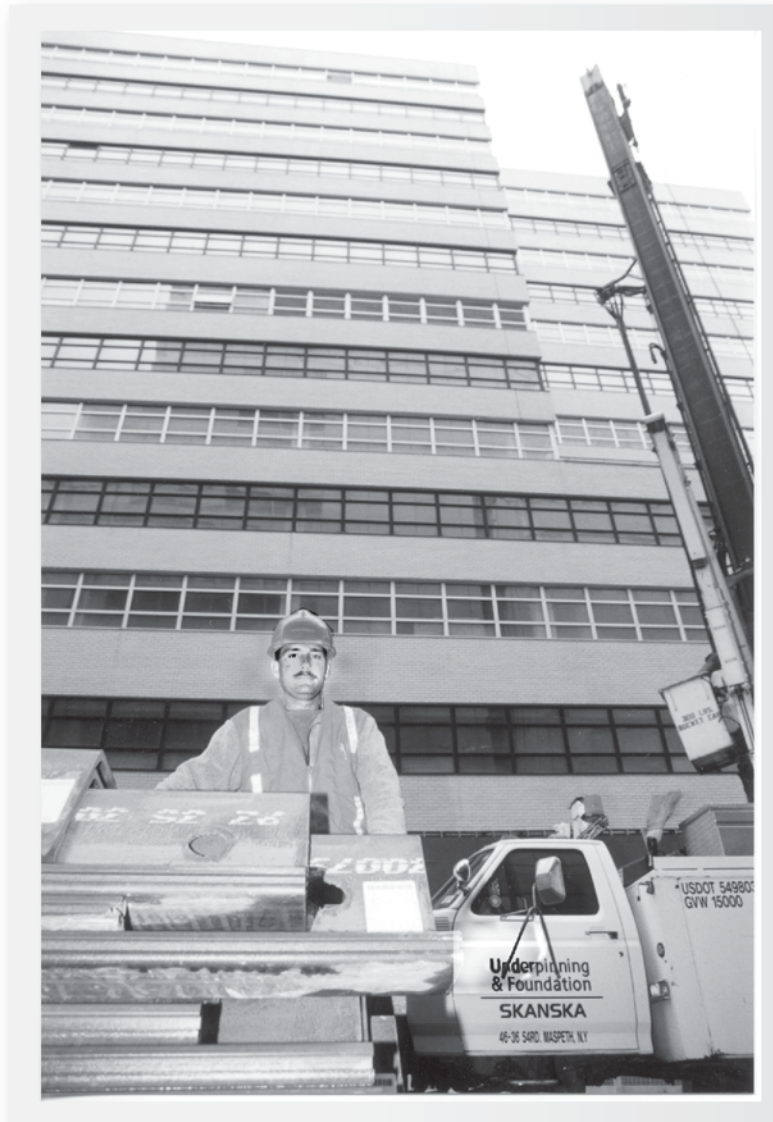
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The conference will be held at the Sheraton Gateway Los Angeles, 6101 W. Century Boulevard. Reservations can be made by calling (310) 642-1111. A special conference room rate of \$109-\$119/night (plus room tax of 14 percent) is available. The deadline for the guaranteed conference room rate is August 15. After that date, the room rate is available on a space-available basis only.

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Pile were delivered from the mill by rail in lengths that had been determined by the pre-production pile-testing program.

PDCA Members AET and L.H. Bolduc Help Save Owner \$1 Million in Wastewater Treatment Project

By Lisa Kopochinski, Piledriver Editor

Although construction started three months behind schedule, the foundation team made up much of this time by installing several test piles prior to other site activities, by verifying the design-pile capacity could be achieved at shorter driven lengths, and by eliminating the static load tests.

An ounce of prevention can be worth a pound (or even \$1 million) worth of cure.

This old adage applies to the site preparation and foundation phase of the Metro Wastewater Treatment Plant (MWWTP) new solids processing facility in St. Paul, MN.

The 65-year-old MWWTP, one of the largest wastewater treatment facilities in the U.S., is being upgraded with a new solids processing plant. Scheduled to go on-line in 2005, it is a much-needed upgrade. The new \$80 million solids processing plant will replace the existing incinerators, thus increasing processing capacity, while reducing air pollution emissions and energy usage. It will be able to handle 400 dry tons of waste daily.

The MWWTP, often referred to as Pigs Eye, is located southeast of downtown St. Paul, just northwest of Pigs Eye Lake (hence the nickname).

The facility is located within a relatively flat area along the eastern banks of the Mississippi River.

The site preparation and foundation phase of the project included installing a sheet-pile wall and excavation support system; dewatering to lower the groundwater table; excavating to a depth of up to 24 feet below site grade; installing a driven pipe pile foundation system at the base of the excavation; and constructing the base slab for the facility. The driven pile foundation system consisted of over 1,955 steel pipe piles with an outside diameter of 12 3/4 inches and a wall thickness of 3/8 inch. Design loads of 75 tons in compression and 30 tons in uplift were achieved at driven lengths of 50 feet to 60 feet.

PDCA member and geotechnical engineering firm American Engineering Testing, Inc. (AET) of St. Paul, MN was retained for the project by the general contractor Madsen-Johnson



Before the site was excavated, test pile were driven to permit more time for soil set up below the excavation bottom.

Corporation, to provide dynamic pile-testing services and observe the originally planned static load testing.

Dynamic pile testing was utilized during the foundation phase of the project to aid in evaluating pile capacities and establish driving criteria. The scope of dynamic pile testing was increased in order to evaluate the potential to achieve the design-pile capacity at reduced driven lengths. The final pile-testing program included dynamic testing of 39 of the more than 1,955 total piles driven for the project. Some of these piles were dynamically monitored during restrrike as long as 60 days after initial drive. The results of the dynamic pile-testing program are as follows:

- better coverage for evaluation of subsurface variability
- the elimination of static pile-load testing for the project
- a reduction in time on the project schedule

- the conservation of many tons of foundation materials
- a savings in excess of \$1 million in foundation costs

“AET installed a number of piezometers to aid in evaluating ground-water level fluctuations during construction, as well as a number of inclinometers to assist in evaluating sheet-pile wall movements during construction,” explains Bill Cody, AET’s principal engineer. “We also provided engineering consultation during the construction, and precondition survey and vibration monitoring services.”

AET conducted dynamic pile tests on six initial test piles beginning in December 2001, approximately two months before construction began. This was done before the excavation was even made, allowing AET to evaluate the proposed design before beginning production.

“The purpose of the early start was

to install some pile and allow time for set-up to occur in order to evaluate potential increases in pile capacity with time. Our work on the piling portion of the project ended in March, 2002,” says Cody.

PDCA member L.H. Bolduc of Anoka, MN, the foundation pile-driving contractor on the project, was responsible for driving all test pile and production pile. The company began the project in December 2001 with test piles and completed their work on the project by June 2002. Throughout the project, the company’s involvement was aggressive in finding ways to be efficient and cut costs.

The most significant obstacle AET and Bolduc encountered was convincing designers that a modification in the project’s specified pile-testing program could have significant benefits to the overall project in terms of cost and time savings. “We overcame this obstacle,”

PDCA 2003 Project of the Year



Photos: AET

Production pile driving went smoothly because the PDA was utilized to quickly check pile capacities and provide a basis for modifications in driving criteria.

elaborates Cody, by effectively presenting the results of the initial tests and extrapolating those results to the overall foundation system; as they affected actual driven pile lengths and associated costs. Obviously, the owner, Metropolitan Council Environmental Services (MCES), was very interested in saving money on the project and, through effective communication with them, we won their trust as a competent engineering firm and pile-driving contractor. MCES was proactive in giving us the support and latitude to conduct additional dynamic pile tests so that we could support our initial findings. We were successful in combining Bolduc's project-specific experience and our pile-testing capabilities to make a strong case that the variable site conditions warranted a different approach than the original specifications envisioned."

Robert Werness, president of L.H. Bolduc, said he found the pipe to pose another challenge. "Since pipe was a mill item, lengths to avoid splicing were a major concern. With an early test pile program using PDA, [to provide answers for capacity across the site], we were able to order the correct lengths," he says.

Design consideration for use of driven piles

"I think on this particular project, the contractor, L.H. Bolduc deserves most of the credit for having the insight to develop a test pile-driving scheme that would optimize the potential capacity of the pile," says Cody. "It's common knowledge that the longer a pile is in the ground, the more capacity it gains from

soil set up. On most projects, time just isn't available to allow the set up to fully mobilize and pile-capacity predictions are often conservative. The Pile-Driving Analyzer was also a useful tool because of its mobility and efficiency in predicting pile capacities. It was used to confirm capacities of a number of production pile driven during the course of construction that would have otherwise gone untested had the original specifications been enforced. The PDA was an extremely valuable tool in allowing us to "dial in" the required pile penetrations needed to develop the design capacities with a reasonable safety factor."



Recipients of the PDCA 2003 Project of the Year Award (left to right): William Cody, PE, American Engineering Testing; Megan Lee, American Engineering Testing; Robert Werness, L.H. Bolduc Company.



Photos: AET

Proactive approach part of project's uniqueness

At a site where driven-pile foundation support is the norm, the unique part of this project involved the proactive approach of the pile-driving contractor. Bolduc elected to drive several test piles prior to the start of other site work activities to determine pile capacities at various pile toe elevations and to evaluate the potential for long-term pile set-up. This allowed them to order the optimum pile lengths, thus reducing time and costs involved for materials, for diving, and for splicing. Innovation also included an expanded dynamic testing program (resulting in better coverage for the evaluation of subsurface variability) and the elimination of the specified static load tests (resulting in the savings of time, materials, and money associated with these tests).

"[Along with us], MCES, AET, and Madsen-Johnson were involved in the early testing program, while the excavation sheeting and dewatering of the football field-size area by a depth of 24 feet was prepared," explains Werness.

Adds Cody. "I think it was unique and helpful that MCES entrusted the pile-driving contractor and pile-driving consultant to call many of the shots as the project progressed. I think they thought we were most qualified to make some of the decisions, given our level of expertise and previous history of successful projects."

Significant savings

Cody feels he found the project rewarding because of the significant savings in foundation costs and time to install the foundations.

In the pursuit of a value-engineering opportunity, the dynamic pile-testing program for this project was expanded. The results of the program, coupled with the efforts and cooperation of the foundation team, resulted in saving more than seven miles of steel pipe pile, as well as tons of concrete in-fill.

“With 2,000+/- piles required, we saved 30 percent in footage, which translated into a \$1 million savings to the owner and eight weeks in schedule time,” says Werness.

Once it was determined that there may be significant savings in foundation costs and time to install the foundations, it seemed as though the designers, owner, contractor, and consultants worked as a team to achieve the best end result,” Werness continues. “We had a high level of communication with all parties involved during the project and, at no time, did any one of the project team members assume an adversarial role. Unlike many government projects, a high level of common sense ruled the decision-making that occurred on this project. Probably the most rewarding was the owner’s gratitude after everything was said and done. They had a good foundation that saved approximately \$1 million and, because approximately two months had been shaved off the production pile-driving schedule, the overall project schedule got back on track.”

Adds Harold Voth, manager of plant engineering for MCES: “In a case where we had a tough site, with regard to variable subsurface conditions, we invested more than usual in the initial pile testing, and it paid off many times over. We are very satisfied with the teamwork exhibited by all parties involved.” ▼

PROJECT PLAYERS

Owner: Metropolitan Council
Environmental Services (MCES),
St. Paul, MN.

Geotechnical engineer: American
Engineering Testing, Inc. (AET),
St. Paul, MN.

Pile driving contractor: L.H. Bolduc
Co. Inc., Anoka, MN

General contractor: Madsen
Johnson Corp., Hudson, WI.

Structural engineer: CH2M Hill,
Eagan, MN



L.H. Bolduc Co. mobilized multiple rigs to increase production.



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PDCA Chooses Wastewater Treatment Plant as 2003 Project of the Year

The Metro Wastewater Treatment Plant, Solids Processing Improvements, Site Preparation and Foundation Phase project in St. Paul, Minnesota earned the PDCA 2003 Project of the Year Award for several reasons.

It utilized driven piles in an innovative manner. The design build team demonstrated that dynamic testing could prove a more economic foundation design to provide value for the owner. Through a combination of experience, initiative, and cooperation, the contractor and design team were able to meet the project's foundation requirements, while eliminating more than seven miles of steel pipe and over 1,000 cubic yards of related concrete fill. By dynamically testing less than two percent of the overall number of

piles, the contractor was able to prove that piles were capable of providing the required pile capacity at shallower tip elevations than those originally specified. The resulting shorter pile lengths also allowed the contractor to order material in optimum lengths, thus eliminating a large number of splices. The reduced quantities allowed the contractor to make up substantial time in the project schedule. The resulting savings in cost, time, and materials, through the use of driven piles, made this project a winner. It proves once again that a driven pile is a tested pile.

In addition, through the proactive use of the pile contractor, the cooperation of the foundation team, and the extensive use of dynamic pile testing, driving



Photos: AET

Delmag D19-32 hammers were used from start to finish.

pile lengths at the site were reduced and the need for static load tests were eliminated. The owner (MCES) realized a savings in excess of \$1 million in foundation costs. Of equal importance, significant time was shaved from the construction schedule and many tons of foundation materials were eliminated.

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10 3/4	.279	31.20	#1 Used	37,000	1,154,400
10 3/4	.281	31.41	New	694	21,767
10 3/4	.365	40.52	New	400	16,019
10 3/4	.500	54.79	New	3,549	194,255
11 3/4	.534	64.03	New	35,000	2,240,000
12 3/4	.281	37.42	#1 Used	40,000	1,496,800
12 3/4	.375	49.56	New	2,500	123,900
12 3/4	.500	41.45	New	1,800	74,610
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The Rising Cost Of Steel

By Bill Buckland

By now, most of you have experienced the meteoric rise in the price of steel products. This increased cost will permeate the construction and manufacturing sectors of our economy and awaken the long, dormant inflationary pricing pressures. How did we get here, where are we going, and what can we do about it?

The Problem

1. Scrap

We have been told that part of the problem stems from the sudden and dramatic increase of scrap prices. Scrap is one of the main ingredients used in the manufacture of all steel products and is sold to the steel producers by processors. These processors collect scrap locally, sort, crush, condense, and segregate according to size and content and then sell to the highest bidder either, on the spot market or through long-term contracts.

In the past, mills kept approximately a three-month supply of material in order to maintain production stability. But, after a disastrous year in

2001, some mills elected to reduce scrap inventory investment and move to a “just in time” strategy. However, in 2003, China, with a population of more than 1.3 billion, and with very aggressive construction plans, began to exert the global muscle we all knew existed. The demand for steel products in the Chinese economy transformed it from a net exporter of steel and raw materials to a net importer. The price of scrap suddenly became meteoric as processors gravitated to the lure of higher returns for their product. As the price rose, the domestic mills awakened to the prospect of lower supply at higher prices; all coming on the back of severely reduced inventory levels. In order to isolate this increase (and hopefully insulate the producers from angry customers) a “SCRAP SURCHARGE” was introduced in December of 2003 to be added to the base price of all steel products. This surcharge is tied to the published Chicago scrap price index and will float monthly.

2. Coke

Late in the fourth quarter of 2003, a fire interrupted the operations of the major producer of coke products

in the U.S., which was controlled by U.S. Steel. The corporation was forced to exercise the “Force Majeure” clause of its contracts with customers. This clause allowed U.S. Steel to interrupt shipment due to a natural disaster. The interruption of shipment of this most vital ingredient to steel making caused a reduction in production, as the manufacturers made plans to deal with fewer raw materials. Now, with more demand than supply, the producers were able to raise their base prices.

3. The Imports

In the first year of the Bush administration, the major steel producers petitioned for and received protection from imports of steel products under Section 201 of the trade laws. This protection was responsible for the reduction of steel products being sold in the U.S. The restrictions were lifted in November 2003. The import levels of steel have, however, remained at or below those of the previous year.

4. The Exchange Rates

When the European community voted to combine their currencies into the EURO, the exchange rate



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was 75 cents to the dollar. Today it is \$1.25 to the dollar. In short, the unfavorable exchange rate creates little desire to export steel to the U.S. at this time.

5. *The Freight Situation*

The cost of freight on the open seas has risen dramatically because of the demand for raw materials to China. Ships have been diverted to carry the ore, scrap, and oil products to this burgeoning region. The result is a near doubling of ocean freight costs, further escalating the cost of all products. On the domestic front, the trucking industry is bracing for the first comprehensive change to the rules governing interstate transportation in over 75 years. The U.S. government has drastically tightened the restrictions on the issuance of licenses, hours of operation, and the rules regarding rest procedures for all truck freight providers. These rules will effectively extend the lead-time for long hauls and increase the cost. Additionally, some provisions of the PATRIOT ACT will require the fingerprinting of all drivers so as to ensure the absence of their names from any federal terrorist list. It is thought, however, that further screening for felons, drug users, tax cheats, or AWOL child support payers will also take place. Upon discovery, no provision exists to notify the employer. This oversight will open another front in the legal war if this trucker is involved in a wreck while delivering freight to you.

These five major developments have combined to cause “the Perfect Storm” in the steel business. Prices have almost doubled for steel pipe since January of this year. Further, driven by panic buying, the lead times

for material have extended from four to six weeks to 20 to 25 weeks for large diameter straight seam pipe used for gas transmission, caissons and cast-in-steel shell (CISS) piles, road casing, billboards, and water towers. Major shortages are predicted by late spring and early summer as the pipe industry copes with less raw material and higher prices from their suppliers. It is expected that seamless steel pipe will be on allocation soon. Some pipe producers have idled parallel production lines and reduced staff in anticipation of material shortages.

The Solution

What can you do to prepare your company to cope with this extreme situation? When will a break in price occur and when will lead times shorten? The answer to these questions would make you a hot item on Wall Street. Quite frankly, no one knows. We are operating in uncharted waters. The major steel producers believe that demand will exceed supply for the next two to three years at a minimum. We are told that scrap prices will begin to decline in late spring, but will settle on plane at a higher price than before the price spike. The EPA is currently inspecting the site of the fire in the mine owned by U.S. Steel and this problem will eventually right itself. It will take years to solve the ocean freight problem because capacity needs to be increased. The exchange rates are mostly beyond our control as they float against the dollar. These rates drastically affect the importation of steel products into the U.S. Increased activity in the world demand for steel products will reduce the supply of foreign steel in the near future. The delivery of the steel we need will take longer and cost more as the new transportation regulations take effect.

Here are some suggestions for the responsible management of these problems:

1. **Communicate!** Call several of your favorite steel providers and stay abreast of the current prices and deliveries. You can no longer rely on the ability to purchase large quantities of steel, on the ground and at cheap prices. Since the steel distributors cannot receive firm pricing and delivery from the producing mills, you will be unable to quote projects with firm prices and deliveries. If you communicate regularly with your trusted suppliers, you will be better informed as to any break in price or shortening of lead times.
2. **Educate!** Read trade journals, major newspapers, the Wall Street Journal, Bloomberg, or other trusted news outlets. Subscribe to the American Metal Market publication or other trade journal.
3. **Investigate!** If you are quoting or buying a project with large quantities of steel, buy only from trusted sources. Make sure your supplier has the long-established mill contacts that will enable them to deliver your products as ordered. Each steel product will display a separate set of pricing and delivery problems. For instance, steel beams will have less of a lead-time and a lower overall price increase than steel pipe. Be aware that higher prices, longer lead times and spot shortages are upon us for the near term.
4. **Validate!** Follow all purchases with a written purchase order. Ask for and receive written quotations prior to issuing your purchase orders. Request mill test reports when necessary. Check your material prior to



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5. Operate! Many times we have postponed a purchase either to wait for a price reduction or simply because we are busy. After receipt of award, you should immediately secure your steel products and lock in your prices to mitigate any damaging effects on your project. Your supplier might also accept the order based on award of contract. The price level is up to stay and we need to deal with it and move on. Delaying a purchase may cost you either in a direct price increase or the prior sale of the only material you could find on the ground to do the job.

Over the years, most veterans in the steel business have combated various problems, such as excess steel imports, gluttony of domestic supply, “trigger pricing”, “voluntary restraint”, OPEC, and product allocation. The only constant is that the problems are eventually solved and give way to the newest threat. The prevailing wisdom of this latest “glitch” is that steel prices will settle into a new stratum, which will be greater than the level we have enjoyed for the last several years. The fear is that the rocketing prices will severely damage the main users of the product and delay or cancel some very nice and needed projects. But ultimately, we cannot change the direction of the steel prices. We can only cope with them. It is how we cope with them that will affect our future. ▼

Bill Buckland is president of Mandal Pipe Company, located in Atlanta, Georgia. He has been in the steel pipe business for more than three decades. He is a member of the U.S. Chamber of Commerce and the Pile Driving Contractors Association. He is currently on the board of directors and chairman of the Education Committee of the National Association of Steel Pipe Distributors. Direct your comments to billbuckland@mandalpipe.com.



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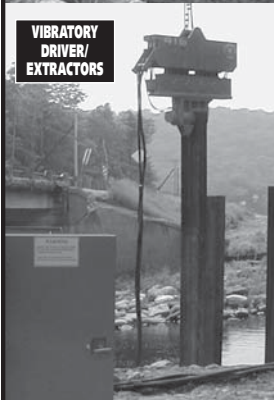
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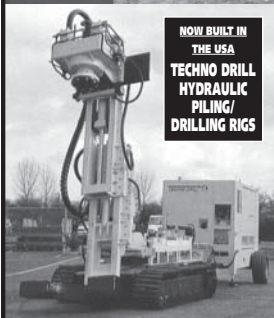
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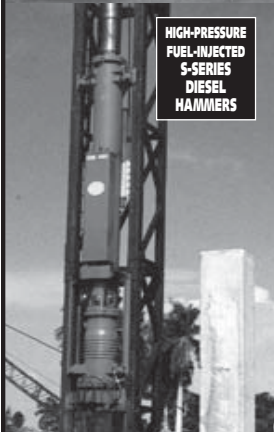
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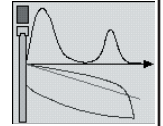
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SEISMIC RESPONSE OF DRIVEN BATTER PIPE PILE FOUNDATIONS

By Dennis Nottingham, P.E. and Kenton W. Braun, P.E., PND Incorporated, Anchorage, Alaska

Driven batter piles have been criticized in technical circles as forcing structure response into small periods thus causing increased seismic forces. In contrast, vertical piles and frames usually can mathematically be found to produce longer periods with corresponding smaller seismic forces.

An important feature of batter piles has been overlooked, particularly when steel spin fin pipe piles are involved.

This paper discusses structural period increase in batter pile groups and resulting force reduction without sacrificing strength of the system.

As opposed to concrete plastic hinging for a similar purpose, these steel structures do not rely on hinge material failure in achieving the end result. This is a significant advancement in theory for driven steel pipe batter piles.

Introduction

Recognition of the impact of seismic activity on large structures such as bridges, pipelines, docks, and other structures became important during start of design of the Alaskan Trans-Alaska Pipeline System (TAPS) in about 1971, when seismic design codes were almost non-existent. TAPS used the response spectra idea for structure design and divided Alaska into varying zones of seismic activity, addressing the highly active Prince William Sound region northward to the inactive North Slope region.

Currently, codes are attempting to extend this early practical work, but engineers are running into difficulty handling forces expected in zones of significant seismic activity. Presently, a typical simplified seismic response curve used in design plots a lateral force coefficient against structure period. The response curve takes a shape with declining lateral force coefficient versus increasing structure period. This has led toward some interesting attempts at increasing structure period without structure collapse.

Reinforced concrete "plastic hinges" are an example of this mathematical manipulation where concrete is assumed to break during a seismic event and may subsequently need repair or replacement as a price for period increase.

The 1971 designed TAPS Yukon River Bridge, with an orthotropic steel superstructure and steel framed piers, did not use this approach, but instead kept steel stresses below yield with no need for repairs even after the contingency seismic event.

Much discussion has been around the use of vertical versus batter piles for seismic or other lateral load resistance. Failure of concrete pile systems during past seismic events brought many to believe that batter piles were not a good choice. Also, other seismic failures related to welds and poor steel details cast a poor light on various steel structures.

During the period following the 1970s, many changes and ideas have been forwarded in an attempt to address structural handling of large cyclic lateral loads.

One idea for foundations with proven success has been the "spin fin" pipe pile (1984) with more than 3,000 installed to date. These piles have radiating slanted plates (fins) welded at the tip. Study of this development shows large predictable and reliable load capacity both cyclic and static and with the ability to handle large deformations without structural failure.

The following general discussion centers around the "spin fin" pile and an approach relating to seismic and other large lateral load design such as for marine dolphins, docks, and bridges.

Background

"Spin fin" piles were first conceived in 1984, following several years of straight fin use on marine structures. Straight fins were applied at the tip of pipe piles to increase frictional resistance, particularly for marine dolphins. In Alaska, straight

fins (plates) were first used in 1975 on a dolphin at Ketchikan, Alaska.

The need for greater reliable tension and compression load capacity prompted PND to test pipe piles of increasing diameter fitted with slanted plates at the tip. Results were so positive that a grant through the Federal Highway Administration (FHWA) was pursued for further testing. Results were published in a State of Alaska Research Report, February 1987 and the AASHTO Quarterly, July 1987. Subsequently, many full-scale load tests have been performed with the highest ultimate tension test reaching 1,300 kips for a bridge pile on the North Slope of Alaska.

An event recorded on video also displayed the unusual strength/deformation nature of "spin fin" piles. A tour ship was docking at Skagway, Alaska, when winds caused loss of control and faster-than-desired approach to the dock and dolphins.

The 35,100-ton displacement, 800-foot tour ship collided with and severely damaged one dolphin and totally destroyed another, both constructed with vertical steel piles, 12 and six in number, respectively, with heavy concrete caps. A third recently completed dolphin, utilizing three 30-inch-diameter spin fin piles (two battered), stopped the vessel prior to destroying the remainder of the dock.

A tourist video demonstrates that the ship contacted the new dolphin near amidships with a perpendicular approach velocity of approximately 0.6 feet per second. The contact energy was calculated to be over 400 foot-kips.

A light-duty fender was capable of absorbing approximately 100 foot-kips prior to complete collapse of the fender. The remainder of the energy was absorbed by movement of the dolphin. The dolphin's final location showed a final set of approximately eight inches horizontally. Using this information,



Figure 1 – “Spin fin” pile types: open tip (left) and conical (right).

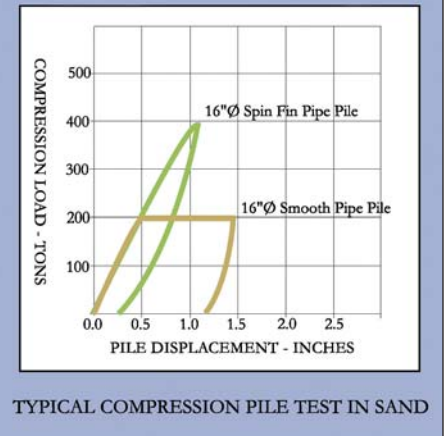


Figure 3 – Typical compression test

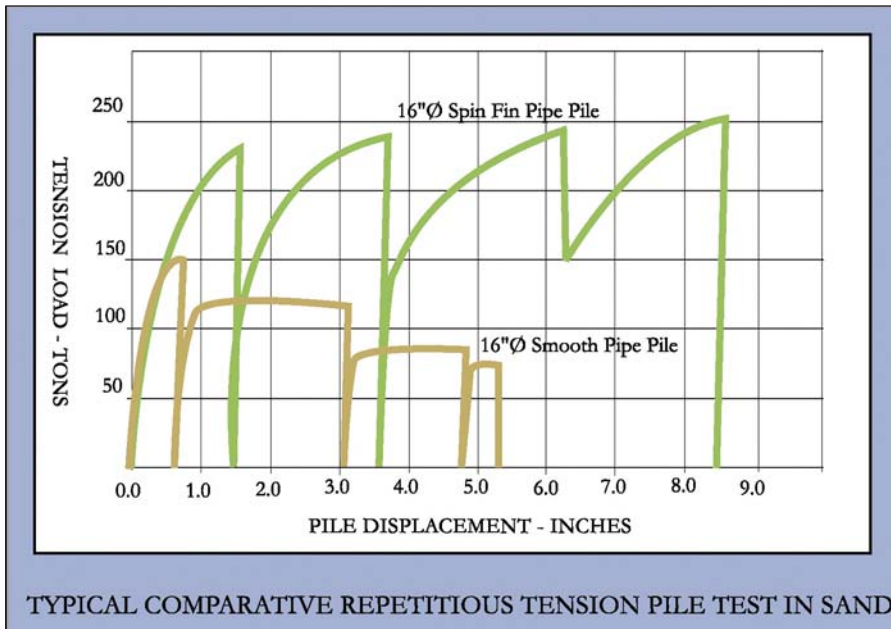


Figure 2 – Typical tension test with repeated loading

Seismic Analysis Approach

For purposes of discussion, a dock response to strong ground motion will serve to show the unusual strength of a batter “spin fin” pipe pile system.

To resist an expected peak ground acceleration of 0.45 g, the structural configuration shown on Figure 4 was developed.

Using conventional codes, the seismic response spectra is as shown on Figure 5.

Assuming the structure to be rigidly fixed near ground level, a period (T) of 0.57 seconds was calculated giving a value of “C” equal to 0.81g.

the ultimate tensile load to the vertical pile was calculated to be over 300 tons.

The incident illustrated the reliable strength and energy-absorbing capability of “spin fin” piles and led to the following concept discussion related to seismic performance.

Spin Fin Piles

Figure 1 shows the components of a typical “spin fin” pile tip including several slanted radial plates welded near the tip plus either open or conical pile tips. This arrangement allows the pile to effectively have an enlarged anchor at the tip.

Figure 2 shows a typical comparative load tension load test and Figure 3 shows a typical compression load test. Note the strength difference between a smooth pile and a “spin fin” pile. Typical smooth pipe piles will plunge both in tension and compression upon reaching

failure while “spin fin” piles continue to gradually gain strength. Repetitive load tension tests typically show progressive loss of strength for smooth piles. A commonly asked question about spin fin pile tips involves strength of the fins. To date, of the many piles extracted, no fin damage has been found.

The characteristics of “spin fin” piles make them ideal candidates for seismic load resistance where some pile deformation is acceptable.

Seismic Response

“Spin fin” pipe piles exhibit the capability of large load capacity in either tension or compression at relatively low steel stresses and with controlled deformation.

This fact allows analysis of batter pile systems resulting in longer structure period with resulting lower seismic lateral load coefficients.

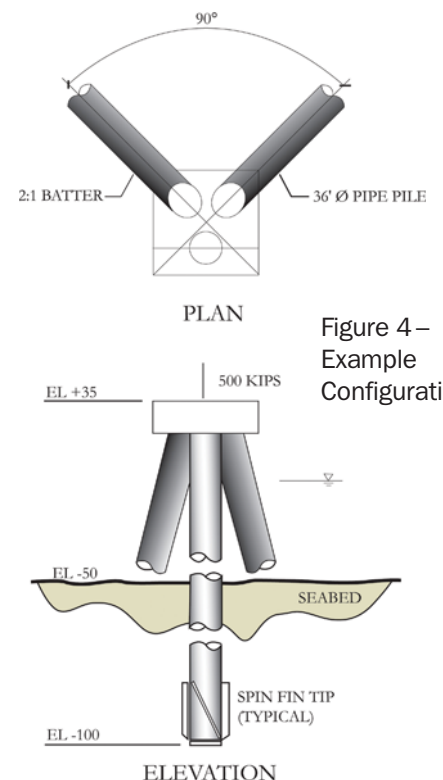


Figure 4 – Example Configuration

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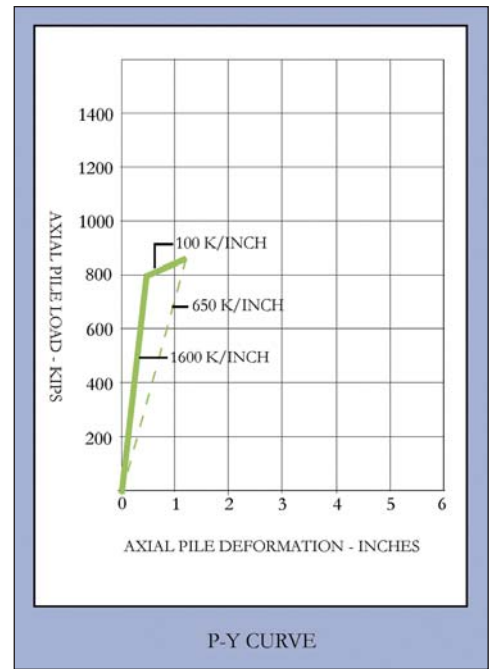
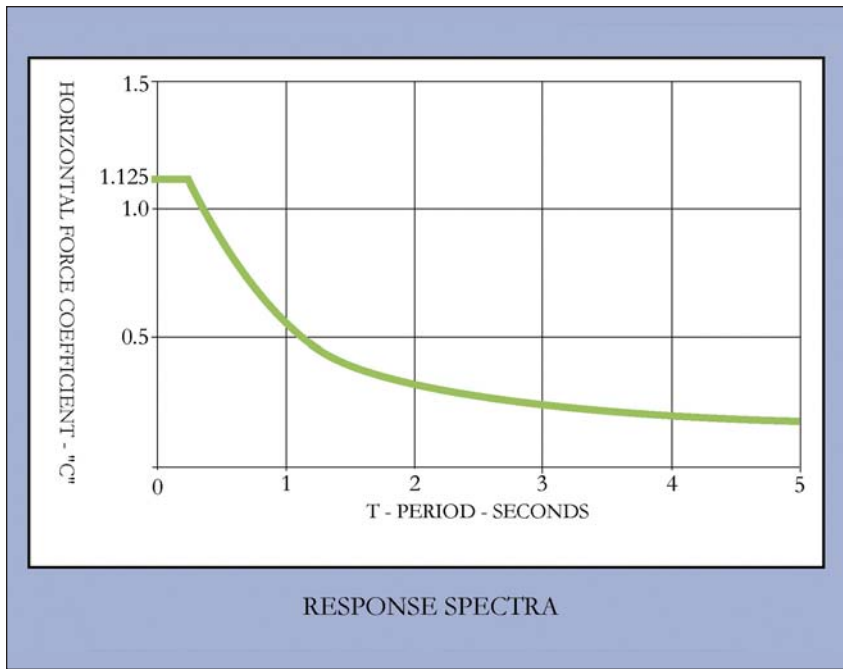
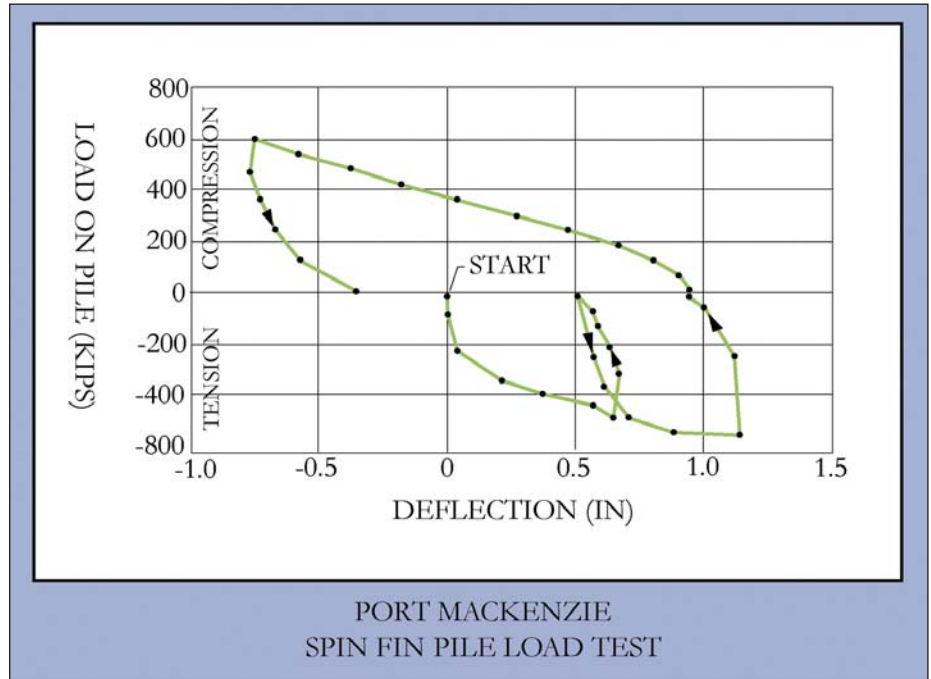


Figure 5 – Response Spectra

Figure 6 – P-Y Curve

Figure 7 – “Spin Fin” Pipe Pile Tension and Compression Tests.



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At this point, maximum pile stress was 13.6 ksi due to lateral seismic forces only.

By designing the “spin fin” for some pile axial deformation to occur, an effective axial spring constant can be assigned to each pile. (See Figure 6.)

For a $k = 650$ kips/inch, a new structure period (T) of 1.26 seconds was computed, giving a maximum pile stress of 7.8 ksi, which is significantly less than the rigid case.

This simple example helps to illustrate the interesting possibilities of the “spin fin” pile system and appropriate analysis.

Another 24-inch diameter “spin fin” pipe pile load test in both tension and compression also helps show spring characteristics of the system. (See Figure 7.)

Summary

To effectively establish realistic repetitive tension and compression “spin fin” pipe pile performance, more testing is required. However, positive implications of the use of the controlled features of “spin fin” piles offer a system with the potential to resist large and unusual repetitive loads. ▼

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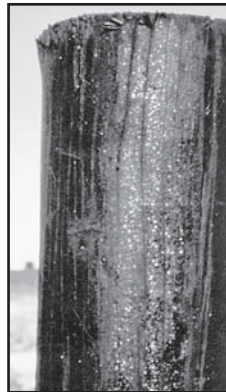
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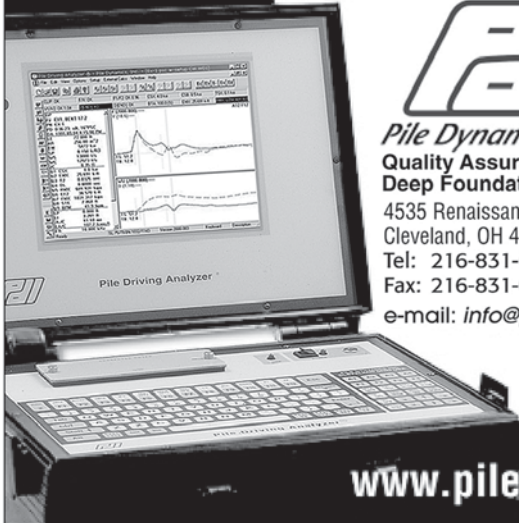
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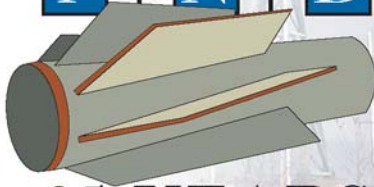
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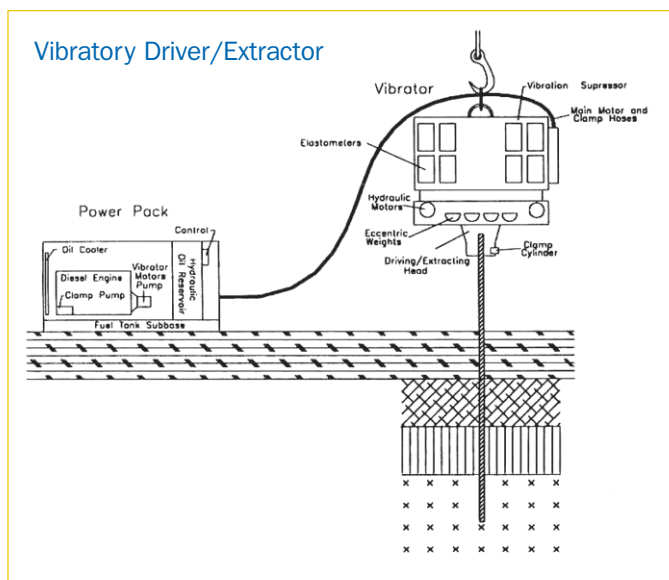
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Vibratory Driver/Extractor

The vibratory driver/extractor system is a unit that clamps to a pile and vibrates axially. The axial movement of pile and driver excites the soil dynamically, displacing it and allowing the pile and driver to sink under their own weight. Therefore, a “vibrator” works better in non-cohesive soils because granular soils displace more easily. Modern vibratory driver/extractors are usually powered hydraulically from a power pack that is located remotely. Electrically driven models are also available.

The exciter is that part of the vibratory driver/extractor that hangs from the crane line, clamps rigidly to a pile, and shakes axially. It consists of a suspension assembly, vibrating case, and clamp assembly. The suspension assembly minimizes the vibrations to the crane line and boom or other attachment. Older units had springs for this purpose, while rubber dampers or elastomers are now used. The vibrating case contains eccentrics, or off-center weights, held by bearings. Pairs of eccentrics are rotated in opposite directions by a hydraulic motor or motors such that all horizontal forces are canceled and only up and down forces and movements are generated. Some systems use gears, or sprockets and chains to synchronize the eccentrics.



The power pack of a vibrator system normally rests on the ground and powers the exciter. A power pack consists of a diesel engine, hydraulic pump or pumps, diesel fuel tank, hydraulic fluid tank, operating controls, switches, and valves all mounted on a steel frame. The engine drives the hydraulic pump and supplies power to the exciter through hoses that connect to fittings on the power pack. Each hydraulic motor has one hose to supply fluid to the exciter and one to return fluid to the tank. Since these motors are not 100 percent efficient, a drain line will return unused oil to the tank. This keeps the motor housing from filling up and damaging the motor. Some manufacturers provide safety relief valves on the drain line to protect the motor seal. Air or electric switches activate valves to control the flow of hydraulic fluid through the various hoses, thus controlling the operation of the exciter.

Clamp assemblies are used to attach the exciter rigidly to a pile. They are activated by hydraulic pressure. A sheet pile clamp may have only one cylinder that pushes a jaw against another fixed jaw while caisson clamps usually have two cylinders, each activating a movable jaw acting against a fixed jaw so that attachment is made to opposite sides of the caisson. Other clamp assemblies are arranged in various ways to attach to different type piles such as timber or pipe. Each clamp cylinder requires two hoses, one to supply the cylinder and one to return hydraulic fluid to the tank.

The vibratory driver/extractor incorporates a unique capability. It can instantly be converted from pile driver to pile extractor by pulling up on the vibratory crane hoist line.

Since vibratory drivers are often rated by driving force, which does not take into account pile weight, frictional area, or soil information, the horsepower to maintain frequency must be considered. Frequency is squared in equation 2, so if frequency drops, so does driving force. If one vibratory driver has greater eccentric moment or amplitude and another with equal horsepower has less eccentric moment, the higher amplitude machine will lose frequency more rapidly in difficult driving. In some hard soils, loss of frequency doesn't seem to affect performance, however. It is, therefore, important to consider all factors to determine the best vibrator for a given job.

Vibratory pile driver/extractors have not yet been generally accepted as bearing pile drivers. Where their use has been accepted in installing bearing piles:

- The vibrator has been permitted to drive a bearing pile within 10 ft. or so of expected normal penetration. An accepted impact hammer has then been placed on the pile to drive it to acceptable bearing and final penetration in the normal fashion, or;
- The bearing pile has been vibrated for end bearing on a firm stratum at some known consistent elevation. The vibrator has been permitted to drive all bearing piles as long as every pile stopped moving at the expected penetration, or;
- Test piles have been driven with a vibrator into a well-defined soil strata for a calculated penetration and bearing. During driving of the test piles, the rate of penetration under a specific vibratory driver has been carefully noted. The test piles have then been successfully test loaded. All production piles have, thereafter, been driven with the same vibrator to the same final rate of penetration.

Caution should be used when installing bearing piles with a vibratory pile driver. Because of possible changes to soil properties due to vibration (i.e. liquefaction, densification, etc.) these installations should be made with close coordination and guidance of the geotechnical engineer. ▼

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(see sidebar on page 29).

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RATING OF VIBRATORY DRIVER/EXTRACTORS

Vibratory drivers/extractors are not rated by energy delivered per cycle. The energy delivered per cycle is the total driving force times the amplitude of the vibrator. Since the displacement of the vibrator will depend on a variety of factors a rated energy cannot be calculated in this manner. A common agreement has not been reached by manufacturers for rating the effectiveness of vibrators. One reason is the variation in design based on each manufacturer's concept of what will work best in most applications.

The driving force of a vibratory driver/extractor is the product of the moment of the eccentrics in the machine and the square of the steady-state frequency at which the eccentrics can be rotated when loaded with an oscillating pile.

This can be expressed as:

$$\text{Driving Force} = \frac{\text{Frequency}^2 \times \text{Eccentric Moment}}{7.04 \times 10^7} \quad (2a)$$

where driving force is expressed in tons, frequency is in cycles per minute, and eccentric moment is in inch-pounds.

The above equation can be expressed in SI units as

$$\text{Driving Force} = \frac{\text{Frequency}^2 \times \text{Eccentric Moment}}{8.94 \times 10^5} \quad (2b)$$

where driving force is expressed in kilonewtons, frequency in cycles per minute and eccentric moment is in Newton-meters.

If the eccentric moment is in kilogram-meters then the equation becomes

$$\text{Driving Force} = \frac{\text{Frequency}^2 \times \text{Eccentric Moment}}{9.12 \times 10^4} \quad (2c)$$

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Rating of Vibratory Driver/Extractors

Amplitude is the amount of vertical movement of the pile produced by the vibratory unit. It is the direct result of the applied force generated by the rotating eccentric weights and its magnitude is dependent on a number of factors.

The total effectiveness of a vibrator is dependent on the inter-relationship of the mechanical characteristics of the vibratory unit. They include the amplitude, eccentric moment, frequency, dynamic force, vibrating weight and non-vibrating weight. The inter-relationship

of these factors may seem complicated, but it is quite similar to an impact type hammer where the ram weight, ram stroke, hammer speed, and pile weight all affect the driving results.

Vibrating weight is the weight put into motion, which includes the vibrating case, driving head, and the pile itself. Non-vibrating bias weight is helpful in moving a vibrating pile given enough available horsepower. Better results can also be expected by downcrowding or pulling down on a vibratory driver.

The force pulse rate (cycle rate) of any particular vibratory driver/extractor is equal to its attainable steady-state frequency. This value, 600 to 2,400 pulses per minute, is significantly higher than any impact pile hammer or extractor. With the vibrating mass of the machine and pile rigidly coupled together there is, of course, no transmission of force pulses through dormant interposed caps or cushion blocks. ▼

Hydraulic Vibratory Driver/Extractor Operational Conformance Checklist

1. Check that you have the manufacturer's current specifications for the type of Vibratory Driver/Extractor being used.
2. Check the alignment of the Vibratory Driver/Extractor and the pile.
3. Check that all hoses are tight and that no oil leaks are visible.
4. The Vibratory Driver/Extractor must be kept very clean. No dirt or water must be allowed to enter the hydraulic system.
5. Check that the hydraulic operating pressures and pre-charge pressures of the accumulators meet the manufacturers recommendations.
6. On initial start-up, allow the hydraulic oil to warm up before beginning operation.
7. After finishing driving, do not turn off the power pack immediately. Allow the unit to cool down first.
8. Check the condition of the hydraulic filter element. Most units have a warning or diagnostic system which warns of blocked elements.
9. Do not bend the hydraulic lines to a smaller radius than recommended by the hose manufacturers. This could affect the operation of the Vibratory Driver/Extractor and lead to hose failure. ▼



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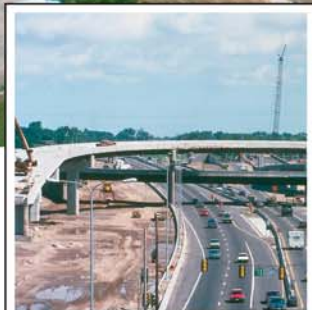
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**A driven pile is
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Benefits of Driven Piles

A driven pile is a relatively long, slender column, provided to offer support or to resist forces. It is made of pre-formed material and has a predetermined shape and size that can be physically inspected prior to and during installation, which is installed by impact hammering, vibrating, or pushing into the earth.

Quality

Driven piles are a total engineering solution. The design, installation, and quality assurance that are a part of each driven pile combine to eliminate guesswork and produce a known, reliable and cost effective product that can accommodate a wide variety of subsurface conditions.

Driven piles consist of natural materials or pre-manufactured structural shapes built to precise tolerances utilizing high strength materials and reliable quality control. All driven piles conform to ASTM standards. Their quality is

consistent from the first pile to the last and can be seen and verified prior to installation.

Driven piles maintain their shape during installation. They do not bulge in soft soil conditions and are much less susceptible to damage from the installation of subsequent piles. Many hollow-section piles can be inspected visually after installation to assure integrity. Most solid-section piles are uniform in section and can be dynamically inspected to verify integrity.

The pile-driving process can be easily modeled prior to installation to determine adequate and economic equipment selection. Static or Dynamic testing can confirm load carrying capacities of installed piles. Dynamic testing can easily confirm proper hammer performance and its effect on the pile. Many modern hammers have impact velocity measurement devices permanently installed providing a very high level of quality control.

The pile-driving process can be easily modeled prior to installation to determine adequate and economic equipment selection.

Adapts to Variable Conditions

Driven piles are usually installed to established criteria (e.g., minimum blow count per unit penetration or minimum penetration). Variable subsurface conditions can require piles of different lengths. Driven piles may either be cut off to shorten their length or spliced to extend their length. Splice designs usually meet or exceed the strength of the pile itself. One length does not have to accommodate all site conditions. This allows driven piles to easily adapt to variable site conditions to achieve uniform minimum capacity with high reliability, thus eliminating uncertainty due to site variability.

Driven piles are ideally suited for marine and other near-shore applications. There are no special casings required and there are no delays related to the curing of concrete. Piles driven through water can be used immediately allowing construction to proceed in a timely manner. To minimize disturbance in wetlands or allow work over water, driven piles can be used to construct temporary trestles. For bridges or piers, driven piles can be quickly incorporated into a bent structure allowing the bridge or pier itself to be used as the work platform for succeeding piles in top-down construction.


Driven piles can be selected to meet the specific needs of the structure, site conditions and budget. You can select from a variety of materials and shapes that best meet your needs.

Driven piles can be:

- Steel
- H-Pile
- Pipe (open-end or closed-end)
- Tapered
- Shell (mandrel driven)
- Sheet Pile
- Concrete
- Square
- Octagonal
- Cylinder
- Sheet Pile
- Timber

Other options include:


- Composite piles that combine pile types (e.g., a concrete pile with a steel tip extension) can be used to accommodate unusual site and driving conditions.
- New high-strength materials that allow for greater design loads per pile.
- Coatings and/or additives that can be used to mitigate the effects of corrosion thereby lengthening the service life of a structure.
- Coatings that can also be used to mitigate the effects of negative skin friction.




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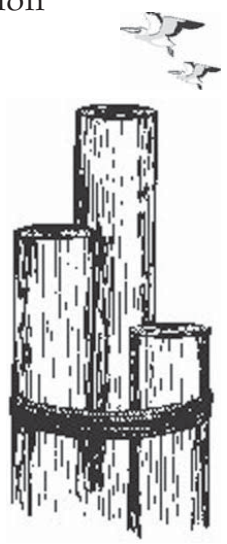
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- Pile shoes (or points) that can be added to assist penetration requirements and provide very reliable contact with rock.
- Splices to lengthen sections.
- Piles installed on a temporary basis to meet temporary needs.
- Piles installed to accommodate compression, tension or lateral loads.
- Hollow piles that can be filled with concrete or other material to improve their strength.
- Piles that can be driven as displacement or non-displacement types

Cost Effective

Driven piles are usually the most cost-effective deep-foundation solution. You pay only for what you need. There are no hidden extra costs or added expenses for site clean-up. The wide variety of materials and shapes available for driven piles can be easily fabricated or specified for high structural strength, allowing them to be driven by modern hammers to increased working loads thus requiring fewer piles per project, resulting in substantial savings in foundation costs.

Pile capacity is easily verified by either static or dynamic pile testing. Capacity per pile or pile length can be easily optimized to provide exactly the required capacity (including safety factors) to minimize foundation costs. Testing also eliminates the uncertainty of bearing capacity estimates based on static analysis. There is no need to be overly conservative and thus wasteful to protect against failure.

Driven piles require no set-up time. When installed to a specified bearing capacity they can be put into use immediately upon installation. Driven piles also leave no spoil behind. The site is left clean and ready for the next construction activity.

Reliable and Available

Pile-driving contractors can be found all over the country. The equipment and installation methods are time-tested and well proven. Advances in materials, equipment, methods, and testing continually combine to improve the efficiency of driven piles.

Recording the blow count versus depth during pile driving easily documents successful pile installation. You know what you have at the completion of driving. Because driven piles are usually driven to a blow count criterion,

they will have a measurable capacity providing assurance that they meet the project requirements. Piles can be easily driven through upper soft soil layers regardless of the soil type and groundwater conditions.

Driven piles have vastly superior structural strength. Driven piles almost never fail structurally during static testing or static loading. They have high lateral and bending resistance for their entire length making them ideal to resist wind, berthing, and seismic loading conditions. Driven piles can tolerate moderate eccentricity in the application of superstructure loads due to their full-length strength. Piles can be driven either vertically or at various angles of inclination to increase support for lateral loads. In special cases, piles can even be driven horizontally.

Driven piles are usually the most cost-effective deep-foundation solution.

Residual Benefits

Pile driving is relatively easy in many soils. Shaft soil strength usually increases with time after pile installation is complete to provide additional load capacity. Soil at the driven pile toe is in a compacted condition for displacement piles therefore end bearing can often carry a substantial load. There are no “soft bottom” soil conditions so large settlements for end bearing piles are eliminated. Driven piles displace and compact the soil. Other deep foundation options can require the removal of soil and considerable subsidence, which can undermine the support of adjacent structures and cause excessive deformations, both of which can result in structural problems. Drilling relieves soil pressures and reduces unit shaft resistances. In fact, while the removal of soil generally loosens and weakens the soil structure, reducing the capacity of previously installed piles, driven production piles densify the soil, improving the capacity of previously driven piles. Thus, driven piles generally have higher capacities than other pile types of the same diameter and length. Driven production piles usually have a higher capacity than the static test pile while drilled production piles often have a lower capacity than the test pile. Driven piles require no curing time and can be driven in natural sequence rather than skipping alternate piles, thus minimizing the moving of the equipment and speeding installation.

Environmentally Friendly

Driven piles are usually installed in a manner that produce no spoils for removal and therefore no exposure to or disposal problems with potentially hazardous or contaminated materials.

Alternate Uses

The most common use of the driven pile is in deep foundations. Driven piles can also be utilized in other applications such as pile-supported embankments, sound wall barriers, retaining walls, bulkheads, mooring structures, anchorage structures and cofferdams. ▼

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Ed Waters and Sons Hosts Civil Engineering Students

On January 31, 2004, PDCA Member Ed Waters and Sons Contracting Co., Inc. of Jacksonville, Florida hosted civil engineering students from the University of North Florida at one of its project sites. The students observed the installation of prestressed concrete piles with a single-acting diesel hammer. The students

were also able to observe the installation of steel sheet piles with a vibratory hammer at the nearby jobsite of new PDCA Member, Hal Jones Contractor. Many of the students had never been exposed to driven pile installation before. They were interested in the processes and asked a number of very good questions. ▼



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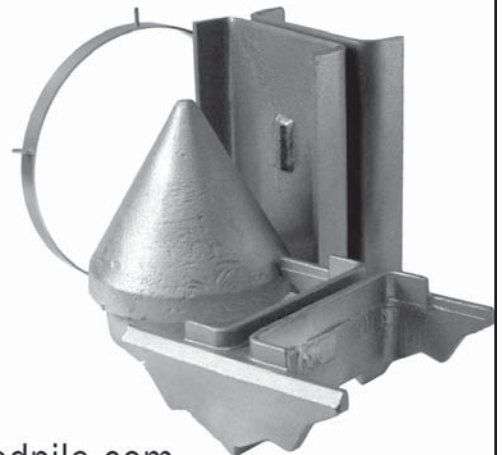
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CS Marine Constructors

Gives Insight on PDCA and the Industry

By Jennifer Bernal



Left to right: Jeff Thompson, Mark Weisz, Casey Stockon

CS Marine Constructors is a business that knows the value of being a PDCA Member.

The Vallejo, CA-based company was founded 25 years ago by Chuck Stockon and his son Casey. It specializes in pile driving, drilling, demolition, dredging, underwater salvage, pipeline and cable-laying projects. CS Marine Constructors is located on land and docks that used to be a part of the Mare Island Naval Base. All of its equipment, including their 16 barges, is located at the docks.

When starting the company, Stockon drew from his years of experience as vice president of Healy-Tibbetts. While there, he managed projects in Hawaii, California, the Caribbean, and Hong Kong.

Son Casey had recently completed his civil engineering degree from UC Berkeley and was managing work offshore of Santa Barbara, when he decided to help start CS Marine Constructors.

The company first joined PDCA in 2001. The first event they attended was the Winter Round-up in San Antonio where they enjoyed meeting other members and learning more about trends, new pile systems, and evolving technologies. "This is our life's work and we want to be part of our industry," Casey says simply.

Mark Weisz, a civil engineer, estimator, planner, and project manager for CS Marine Constructors, is on the PDCA board of directors, as well as the Education Committee.

A PDCA member since 1998, Weisz believes the best part of PDCA membership is getting to interact with other members. "The education committee educates other members and people outside the organization in order to draw new members in. It's been great to see the committee's efforts and achievements evolve and grow from year to year," Weisz explains.

He also believes that the company has greatly benefited from its PDCA membership.

"CS Marine Constructors is able to get continuing education and learn about industry trends and issues. The networking opportunities are invaluable. Overall, being a member of PDCA helps the company have better informed employees," Weisz says.

CS Marine Constructors appreciates its customers and always looks for ways to bring value to a job. "Owners often call us to discuss upcoming work. With our years of experience, we can provide valuable input during the design phase of a project," Weisz says.

Attributing its success to its employees and customer relations, Casey adds, "We put customer relations first. We have been in the business for more than 25 years and plan to be around for at least 25 more, so it's important to take care of our customers." ▼

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PDCA New Member List

We would like to welcome the following companies as new members. Please visit the PDCA Web site at www.piledrivers.org and click on Member Search for complete contact information on all PDCA members.

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All American Underpinning and Shoring

Roselle, Illinois
Contact: Michelle Lusader Services
Provided: Bridge Building, Bulkheads, Docks & Wharves, Earth Retention, Highway and Heavy Civil, Pile Driving.

East Bay Construction

Virginia Beach, Virginia
Contact: Joseph Burket
Services Provided: Bulkheads, Docks & Wharves, Marine, Pile Driving.

ETI

Lebanon, Maine
Contact: George Eliason Services
Provided: Bridge Building, Earth Retention, Highway and Heavy Civil, Pile Driving.

Hal Jones Contractor, Inc.

Jacksonville, Florida
Contact: Paul C. Kirkland Services
Provided: Bridge Building, Bulkheads, Docks & Wharves, Pile Driving, Marine.

Williams Brothers Construction Co.

Houston, Texas
Contact: James Pitcock Services
Provided: Bridge Building.

NEW ASSOCIATE MEMBERS

Geotechnics

East Pittsburg, Pennsylvania
Contact: Larry Wetzels Services
Provided: Deep Foundation Testing.

Hartman Engineering

Clarence, New York
Contact: Richard Hartman Services
Provided: Consulting, Cofferdam Design.

International Construction Services, Inc.

Pittsburg, Pennsylvania
Contact: Brian Land Services
Provided: Coatings & Chemicals, Steel Pipe Piles, Steel Sheet Piles, H-Piles.

Nationwide Utility Poles and Supply, Inc.

Brierfield, Alabama
Contact: Phil S. Myers Services
Provided: Timber Piling

T+R Pipeline Services

Houston, Texas
Contact: Warren Cross
Services Provided: Steel Pipe Piles, Steel Sheet Piles, Pipe.

NEW TECHNICAL MEMBERS

Chuck Blakeman

BECC Co., Inc.
Yarmouth, Maine
Services Provided: Construction Vibrations Specialist

Edward Hajduk

WPC
Charleston, South Carolina
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REQUEST FOR PHOTOS

Attention PDCA members. Piledriver magazine is on the lookout for any interesting photos you may have. We're looking for fairly generic pile-driving images that we can print in upcoming issues. If they are digital, they need to be saved in either a TIF, JPG or EPS format at 300 dpi and should be at least 4 x 5 inches in dimension. If they are actual hard copy photos, please mail them to:

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Lisa Kopochinski
3231 Strevell Way, Sacramento, CA 95825.
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We will be sure to return them to you.

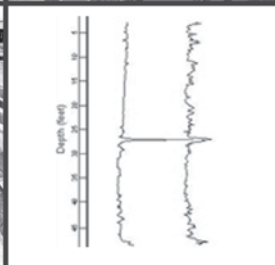
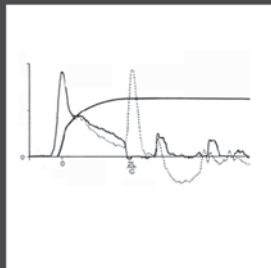


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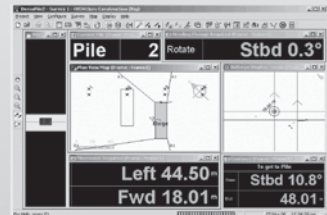


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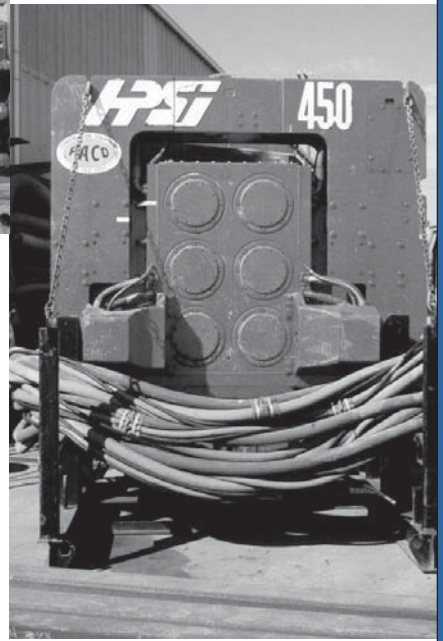
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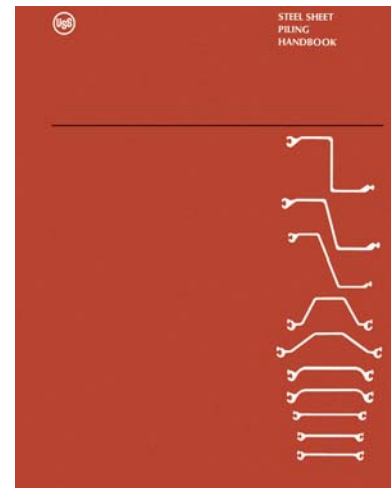
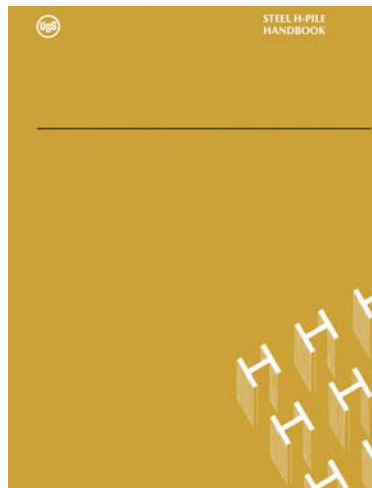
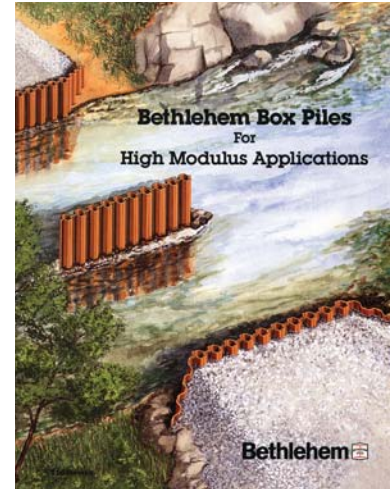
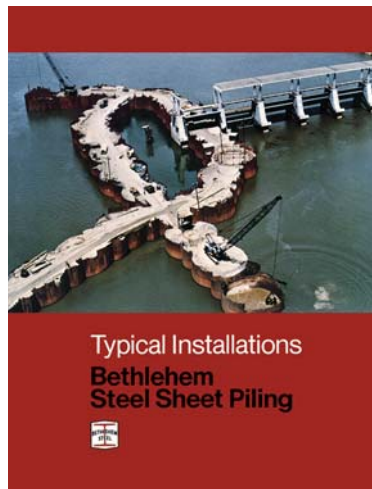
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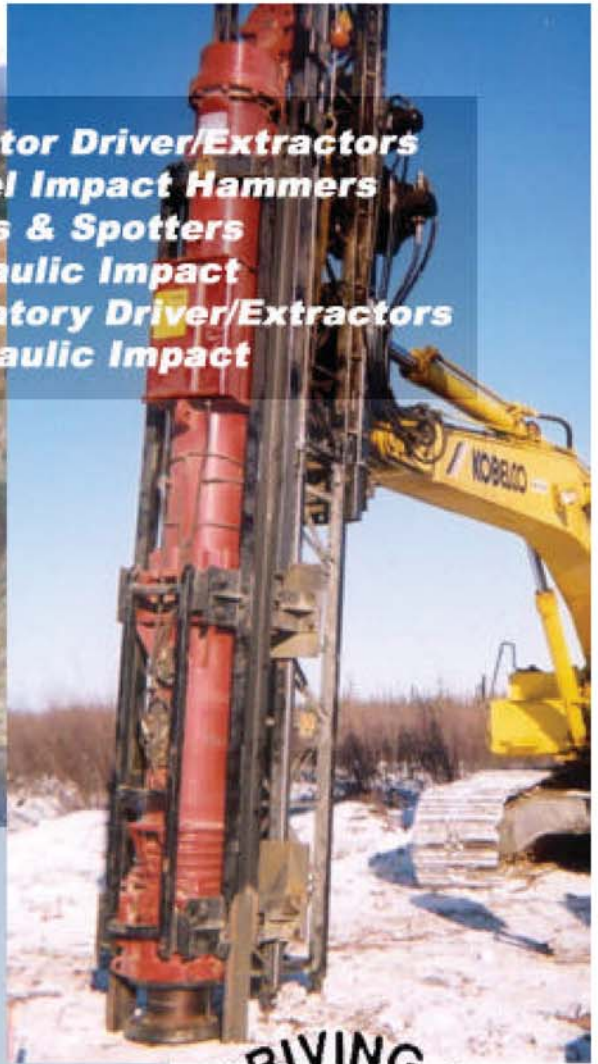
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