PILEDRIVERS.ORG

The Official Publication Of The Pile Driving Contractors Association - Summer 2002 - Volume 3, Number 3

H.B. Fleming Carves A Niche In Northern New England Market

Page 14

Conference Will Address Advances In Pile Driving

Page 9

PDCA Member Helps Get Rid Of That Sinking Feeling

Page 17

Education Is The Key To Our Future

As a pile driving professional, I joined the PDCA to help ensure the vitality of driven piles for future generations. My first move as a new member was to join the Education Committee, because I felt this is where I and our organization can make the biggest impact on the deep foundation industry. Now as president of the PDCA, I feel just as strongly that education is the key to the future of pile driving.

This July marked a milestone in education for the PDCA. Our organization sponsored 25 professors who spent five days in Logan, Utah, learning the intricacies of pile driving, at the 2002 College Professors' Driven Pile Institute.

From The President
By Jim Frazier

This intensive, one-week seminar was designed and led by engineers, business people and professors who are well known in the deep foundation industry. The goal of the institute is for attendees to take their newly acquired knowledge of driven piles back to their faculty members and make it part of the curriculum for engineering students.

The driven pile institute is a three-year program that will educate a total of 75 college professors. That is a lot of people learning and then teaching the benefits of driven piles. This is a giant step in the right direction for our organization and our industry. It is also a monumental task, and one which requires many resources.

In garnering funds for this event, the organization has three options: (1) request contributions from the members; (2) raise dues; or (3) increase membership to add money to our budget. For this year, we have decided to pursue contributions from the membership to pay for the education of the professors chosen to attend the Institute.

By the time this newsletter is printed, the Professors' Institute will be completed, but we still need your contributions. Even if no professors from your region attended the Institute, a small donation to this event is still a donation to the education of the industry as a whole.

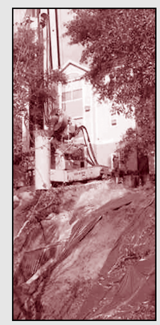
This event is a critical move in our strategic plan to fight for recognition in the deep foundation marketplace. Our competition has successfully been using these types of tactics for some time, and we all know the impact it has had on our businesses. So please take a minute to consider the vast and long-lasting effects of an education program such as this one and think about a donation to the Institute.

For those who have contributed to the Institute, I would like to thank you.Your donations are truly making a difference and solidifying the future of our industry.

Table Of Contents

Page 9

Page 14



Page 17

Departments

Please call (970) 945-1231 to order reprints of articles or to obtain a copy of *PileDrivers.Org's* editorial index. Visit the Pile Driving Contractors Association on the Worldwide Web at www.piledrivers.org. For further information on Pile Driving Contractors Association topics, please contact us at (970) 945-1231.

PileDrivers.Org is published quarterly. Please contact us by mail at P.O. Box 1429, Glenwood Springs, Colo. 81602; by fax at (970) 384-0512; by telephone at (970) 945-1231; or by e-mail at membership@piledrivers.org.

The subscription rate for members is $18, which is included in the Association's annual dues. The U.S. subscription rate for non-members is $36 for one year and $72 for two years. Canadian subscribers: add $5 per year; all other non-U.S. subscribers add $10 per year.

2002 PDCA Board of Directors

Jim Frazier • *President*
Lawrence Construction Company
Phone: (303) 791-5642
E-mail: jim@wedrivepile.com
Home page: www.wedrivepile.com

Randy Dietel • *Vice President*
Piling, Inc.
Phone: (409) 945-3459
E-mail: randy@pilinginc.com

Wayne Waters • *Treasurer*
Ed Waters & Sons
Phone: (904) 268-4419
E-mail: wew2150@aol.com

Charles Ellis • *Past President*
Phone: (402) 228-1624

Trey Ford • *Director*
Ford Pile Foundations, Inc.
Phone: (757) 497-3593
E-mail: piledriver@msn.com

Rory Kelly • *Director*
Skyline Steel
Phone: (703) 978-2500
E-mail: rkelly@skylinesteel.com

Reginald K.L. Lee • *Director*
Hawaiian Dredging Construction Co.
Phone: (808) 735-3211
E-mail: rlee@dillingham.com
Home page: www.hawaiiandredging.com

Garland E. Likins • *Director*
Pile Dynamics
Phone: (216) 831-6131
E-mail: garland@pile.com

Fred Stromness • *Director*
Build, Inc.
Phone: (801) 295-1300
E-mail: build@aros.net

Mark Weisz • *Director*
CS Marine Constructors
Phone: (707) 562-4100
E-mail: mark@csmarine.com

John L. White • *Director*
American Piledriving Equipment
Phone: (253) 872-0141
E-mail: john@apevibro.com
Home page: www.apevibro.com

Stephen K. Whitty Jr. • *Director*
Specialty Piling Systems, Inc.
Phone: (985) 643-0690
E-mail: stevewhitty-sps@att.net

Max J. Williams • *Director*
Gulf Coast Pre-Stress, Inc.
Phone: (228) 452-9486
E-mail: mwilliams@gcprestress.com
Home page: www.gcprestress.com

Stan Orr, CAE • *Executive Director*
PDCA
Phone: (970) 945-1231
E-mail: ceo@piledrivers.org
Home page: www.piledrivers.org

Piledrivers.org

Publisher - Stan Orr, CAE - Glenwood Springs, Colo.

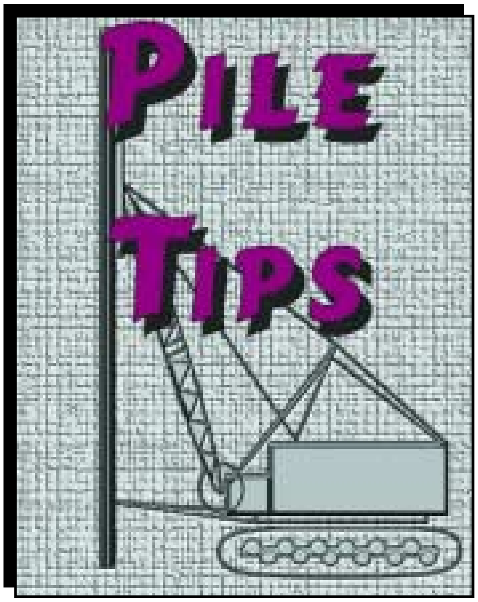
Editor - Jennifer Hart - Hanover, Pa.

Layout/Design/Production - Brian Sherman - Mt. Pleasant, S.C.

Cover photo: H.B. Fleming installs a cofferdam for an abutment for a small bridge in Lincolnville, Maine.

PDCA

ADVERTISERS.ORG



The Latest In Crawler Cranes

A range of new crawler cranes was introduced by several manufacturers recently.

One of the most innovative new products was unveiled by **Link-Belt** at CONEXPO in March. The manufacturer introduced its LS-308H II series at the Las Vegas event, a 110-ton lattice boom crawler crane that was designed to handle a variety of applications. The LS-308H II is equipped to perform lift applications, pile driving, clamshell, dragline, duty cycle and demolition job requirements.

The machine's 332-horsepower Mitsubishi engine produces good line speeds under any heavy load condition. The total horsepower control allows the machine's hydraulics to work at maximum speed and pressures during heavy load applications.

An important feature of the machine is its HYLAB (Hydraulic Lattice Boom) controls that offer pinpoint, reliable performance in duty cycle work. Link-Belt's state-of-the-art, pilot operated, variable displacement hydraulic power system delivers independent control of load hoist drums that are directly proportional to hoist lever movement.

Liebherr unveiled its new LR 1350/1 crawler crane and the HS 855 HD at CONEXPO. A 350-metric-ton crane, the LR 1350/1 is powered by a 367-horsepower consumption-optimized Liebherr turbocharged diesel engine with an electronic engine management system. Its state-of-the-art technical features include five hoisting winches and up to five slewing gear drives manufactured by Liebherr.

Terex has expanded its line of hydraulic lattice boom crawler cranes with the addition of two new models. At the top of the line is the HC 275, with a maximum lift capacity of 275 tons, a maximum main boom length of 300 feet and maximum lift crane boom and jib length of 390 feet.

The second new model to make its debut is the HC 150, with a 150-ton capacity, 250 feet of main boom length and maximum boom and jib length of 330 feet.

Excerpted from Lifting and Transportation International, *May/June 2002*

Reinventing The Wall

Whatever their purpose – be it to shelter, contain or support – walls are usually constructed with solid materials. Now a group of researchers is challenging this assumption as its members explore ways to create a chamber that would have walls made of liquid metal.

The project, the Advanced Power Extraction Study (APEX), is being undertaken by a group of 12 national laboratories and universities. The catalyst for the research is the anticipated development of fusion as an energy source. Because fusion would require plasma gases to be heated to a temperature of 100 million degrees centigrade – 10 times the temperature of the sun – containment chambers would have to be able to sustain such intense temperatures. A solid wall could easily be damaged by the extreme heat.

In contrast, a wall composed of liquid metal would be in constant motion, which would diffuse the heat. What is more, a wall of liquid metal could recover almost instantly from any damage it might sustain.

According to Mohamed Abdou, a professor of engineering at the University of California at Los Angelses and the project leader, APEX researchers are focusing on two approaches: one involving centrifugal force and the other involving electromagnetic force.

Excerpted from Civil Engineering, *June 2002*

Safety Survey

Most people who responded to a *Lift Equipment* survey this past April had positive comments about safety measures within their companies. For example, 56 percent highly rate the importance of a safety manager whose sole responsibility is to maintain safety, training and compliance. In addition, 41 percent indicated their safety program is better than most when compared with their competitors. This number correlates with a question regarding safety meetings: Forty percent of participants said they hold comprehensive safety meetings every week. Which safety challenges did respondents rate the most? Lack of follow-through by employees rated highest at 39 percent, while regulation compliance came in second at 29 percent.

Even though safety awareness seems to be high within companies, their budgets may reflect a complacent attitude. The March 2002 issue of the *Construction Industry Confidence Indicators*, published monthly by Mercor Media, Inc. of Chicago, reports that more than one-third of participating companies believe training expenditures have a direct impact on job-related accidents. In addition, 81 percent said they believe equipment operator training is very important. Nevertheless, 60 percent said they have not changed training budgets in the last 12 months, and 19 percent actually decreased funds. Only the remaining 21 percent increased their budgets.

Excerpted from Lift Equipment, *June/July 2002*

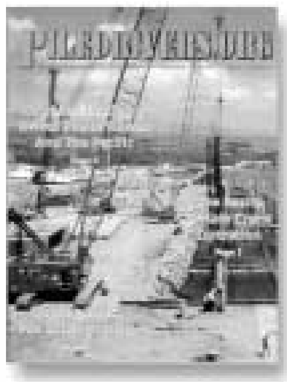
Safety Standard Revisions Start

A rulemaking committee to revise worker safety standards on cranes is under approval by the U.S. Department of Labor. For three years, an OSHA advisory group made up of 38 crane manufacturers, rental companies and union representatives has discussed revisions to the 1950s standard. OSHA officials said economic impacts will create obstacles while the group works on revisions.

Excerpted from Lift Equipment, *June/July 2002*

PDCA Resources

Publications



piledrivers.org

Author guidelines - Want to write an article for *PileDrivers.Org*? For a copy of our guidelines, call PDCA at (970) 945-1231 or contact PDCA online at editor@piledrivers.org.

Editorial Calendar

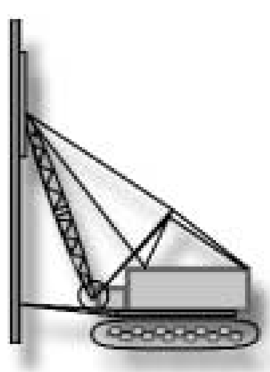
For a copy of the *PileDrivers.Org* editorial calendar, call PDCA at (970) 945-1231 or contact PDCA online at editor@piledrivers.org.

Media Kit

For a copy of the *PileDrivers.Org* media kit, call PDCA at (970) 945-1231 or contact PDCA online at editor@piledrivers.org.

Referrals

PDCA provides a direct link between contractors and end users and contractors and suppliers. For more information on this valuable service, contact PDCA at ceo@piledrivers.org.



Online

Home Page

Visit our Web site to find a contractor or supplier member. Register for the next PDCA meeting. See *PileDrivers.Org* online. This and more on your Association's home page.

Headquarters Contacts

General information: info@piledrivers.org
Executive director: ceo@piledrivers.org
Membership: membership@piledrivers.org
Meetings: meetings@piledrivers.org
Publications: editor@piledrivers.org

Manuals and Texts

Recommended Specifications For Driven Bearing Piles

PDCA's Code Book, now in its third edition, is a must-have guide. Available only through PDCA.

Design and Construction of Driven Foundations Manual

This two-volume set is produced by the FWHA and is available through PDCA. For more information, contact PDCA at (970) 945-1231 or online at ceo@piledrivers.org.

PDCA-Sponsored Conference Will Address Advances In Pile Driving

New Orleans is the location for "The Design and Installation of Cost-Efficient Driven Piles," a conference sponsored by the Pile Driving Contractors Association and scheduled for Sept. 19 and Sept. 20.

The pile driving industry is advancing. Pile materials and capacities are changing and pile behavior is constantly being analyzed and tested. This one-and-a-half day seminar is designed to highlight the dramatic developments in pile driving equipment and methods in recent years. The PDCA has assembled a stellar lineup of presenters to address and explain the most important advances in the industry.

This seminar is an educational opportunity for geotechnical engineers, design engineers, college professors and contractors who are interested in taking advantage of opportunities to reduce the cost of deep foundations using driven piles.

Following an introduction by PDCA President Jim Frazier, attendees will spend Thursday morning learning about code-required bridge strengths to resist vessel impact loads, foundation analysis (Continued On Page 11)

The Speakers: The Design And Installation Of Cost-Efficient Driven Piles

Patrick Bermingham has developed technology for the foundations construction industry for more than 18 years. As president and head of research of Bermingham Construction and Berminghammer Foundation Equipment, he has developed a wide variety of equipment and systems, including an underwater hammer for deep-water applications. He has collaborated with Sheffield University in the United Kingdom and other universities.

Henry T. Bollmann, PE, is a senior structures design engineer for the Florida Department of Transportation. He conceived of and helped develop 3D non-linear soil-structure interaction computer software – FLPIER.

Dan Brown, PhD, is Gottlieb Professor of Civil Engineering at Auburn University. The author of numerous papers on deep foundations, he is a past recipient of the ASCE Huber Prize for his research on pile foundations. A past chairman of the ASCE Deep Foundations Committee, he served as chair of the ASCE International Deep Foundations Congress, held in Orlando, Fla., in February.

Rick Elman is senior associate at Mueser Rutledge Consulting Engineers. He has specialized in the design of marine structures and shallow and deep foundations and has extensive experience in the design of foundations for transportation structures, slurry walls, underpinning, earth and rock tiebacks, sheeting and bracing, as well as grouting and epoxy sealing for retaining structures.

Jim Frazier is manager of the pile driving division of Lawrence Construction in Littleton, Colo. He has more than 20 years of experience in pile driving and bridge construction, including bidding and estimating. He currently serves as president of PDCA.

Van Komurka is a geotechnical engineer in Milwaukee. In 1994, he co-founded Wagner Komurka Geotechnical Group, a firm specializing in geotechnical engineering, with particular expertise in the testing and design of cost-effective deep foundations.

Garland Likins, PE, has been involved with deep foundations since 1971, starting with his graduate studies in civil engineering, which centered on piling research at Case Western Reserve University, under the direction of Dr. George Goble. (Continued On Page 11)

Conference

(Continued From Page 9)

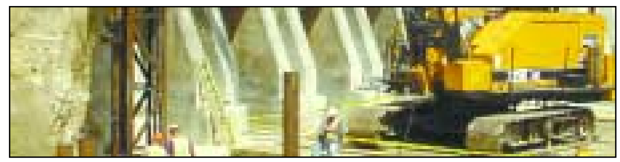
and design using FBPIER and the differences in static capacity between drilled and driven piles. The afternoon session will address Milwaukee's Sixth Street Viaduct project, which will illustrate the effects of setup on the choice of pile hammer, pile capacity and the overall pile installation, as well as the implications of load testing; and the I.H.N.C. Lock Replacement project, a good example of the installation of large diameter, high capacity steel piles.

Friday's half-day session will begin with an overview of the replacement of the Woodrow Wilson Bridge and how the Pile Demonstration Program provided a basis for eliminating static load tests during construction. Safety factors of driven piles, driveability factors as they relate to impact force, and a discussion of the Orlando pile driving demonstration will complete the conference agenda.

Presenters for the conference are a select group of professional engineers, business owners and professors who have extensive involvement in and knowledge of the pile driving industry. Their insight and experience with pile driving equipment, analysis and deep foundation projects are an invaluable continuing education source for attendees. During the seminar, participants will be able to meet with presenters and other attendees to ask questions and share information.

For more information, contact the PDCA at **(970) 945-1231, meetings@piledrivers.org** or visit the PDCA Web site at **www.piledrivers.org.**

See Conference schedule on page 12



Registration fees are $265 if payment is received by Sept. 1, 2002, and $295 after that date. The fee includes: the official Book of Proceedings; session handouts; a copy of the PDCA Code Book, "Recommended Design Specifications for Driven Bearing Piles," 3rd edition; breakfast, two breaks, lunch and a reception on Thursday; and breakfast and a break on Friday.

The seminar will be held at the historic Whitney Hotel, located at 610 Poydras St. in New Orleans. Reservations can be made by calling (504) 581-4222. The room rate is $109 for a single and $129 for a double per night, guaranteed until Aug. 18. After that date, the room rate will be offered on a space-availability basis only. Room taxes are 12 percent. There is hotel shuttle service to and from the airport.

The Speakers

(Continued From Page 9)

He is a registered professional engineer, a principal of GRL Engineers and president of Pile Dynamics. He has authored numerous publications and is a frequent lecturer.

James Long is professor of geotechnical engineering at the University of Illinois in Urbana. He has been active in research on the rational determination of resistance factors and factors of safety for driven pile design. He is a member of the PDCA Code Committee.

Julie Oliphant has been a geotechnical engineer with the U.S. Army Corps of Engineers in New Orleans since January 1999.

Richard B. Pinner is a senior geotechnical engineer in the Structure Foundation Branch of the Corps of Engineers, New Orleans District. He has 20 years of experience in planning and directing geotechnical studies and designs for major structures in the New Orleans District.

Hugh Ronald, PE, is senior bridge engineer for the Sverdrup in Jacksonville. He has extensive experience in bridge design, project management, value engineering and design-build. He has done extensive design work on water and wastewater treatment plants, marine structures, stadiums and buildings throughout the United States and overseas. He is a member of ASBI, IASBE and PCI.

Robert F. Stevens, PhD, joined the Special Projects Group of what is now Fugro-McClelland Marine Geosciences in March 1978. He has more than 30 years' experience monitoring pile installations and is a fellow of the American Society of Civil Engineers and a member of the ASCE Codes and Standards Activities Committee.

The Conference Schedule

Thursday, Sept. 19, 2002

8 - 8:30 a.m. • Welcome and introduction to the Seminar - *Frazier*

8:30 - 9:45 a.m. • ★ ***Keynote Lecture*** ★ "Determining AASHTO Bridge Strength Requirements to Resist Vessel Impact Loading" - *Bollmann*

Often the most important bridge design considerations, such as span lengths, span layout, foundation types and construction costs, are controlled by the requirement to satisfy vessel collision loading. This timely talk will focus on how to determine the code-required bridge strengths to resist vessel impact loads and how bridge designers can arrive at a safe and economical solution.

9:45 - 10:45 a.m. • "Foundation Analysis and Design Using FBPIER" - *Ronald*

Procedures developed for the cost-effective design of deep foundations will be presented using FBPIER as the primary tool for substructure analysis. Use of linear and non-linear analysis in the design process will be discussed. Procedures for ship impact analysis, strength limit state design and establishment of minimum pile tip elevations will be reviewed. The design of the St. George Island Bridge foundations and substructure will be used as an example.

Time permitting, a demonstration of FBPIER will be conducted. A simple foundation will be modeled, soil profile input and loads generated. The subsequent analysis and review of the results will demonstrate the potential of the program as a design tool.

11:15 a.m. - 12:15 p.m. • "Comparing Static Axial Capacity Between Drilled and Driven Piles" - *Brown*

This presentation will provide an overview of the differences in static capacity between drilled and driven piles. The effects of installation, time dependency, displacements required to mobilize capacity and field verification of capacity during construction will be discussed. Select case histories will be examined, and soil conditions in which each foundation type may be used will be identified.

1:15 - 2:30 p.m. • "Milwaukee's Sixth Street Viaduct Project" - *Komurka*

Accounting for setup in pile design can result in the use of smaller hammers, smaller pile sections, shorter piles, higher capacities and, therefore, more-economical installations. A methodology and case history will be presented that utilize dynamic monitoring during initial driving and restrike testing to characterize unit setup distribution as a function of depth, allowing for development of depth-variable penetration resistance criteria.

3 - 4 p.m. • "The I.H.N.C. Lock Replacement Project - Load Test and Installation Studies for Large Diameter, High Capacity Steel Piles" - *Pinner, Oliphant*

An overview of a proposed (float-in) lock replacement project and the completed pile load tests will be covered. The pile load test contract consisted of installing 48-inch diameter steel pipe piles utilizing vibratory and impact hammers; static compression load tests; dynamic pile tests; and noise and vibration monitoring.

4 - 5 p.m. • "Large Diameter Piles and Soil Setup" - *Stevens*

During continuous driving, the clay surrounding a pile is remolded, and large excess pore water pressures are generated. Because the excess pressures decrease rapidly with radial distance from the pile, water will begin to flow laterally out of the disturbed zone and the clay will consolidate. As pore pressures dissipate, pile capacity increases. Field measurements have shown that the time required for driven piles to regain full capacity can be relatively long. The rate of consolidation is a function of the coefficient of radial (horizontal) consolidation, pile radius and pile type. Several methods to evaluate setup will be discussed. Case histories will be presented for small and large diameter open-ended pipe piles, concrete piles and timber piles. The use of combined CAPWAP analyses to interpret the results of redrive tests will be discussed.

Friday, Sept. 20, 2002

8 - 9 a.m. • "Pile Demonstration Program for Replacement of the Woodrow Wilson Bridge" - *Elman*

This case study presents the results from the Pile Demonstration Program conducted as part of the Replacement of the Woodrow Wilson Bridge project. The PDP was conducted to evaluate pile driveability and associated parameters necessary for dynamic analysis and to determine ultimate skin friction and end bearing values and their distribution for design. The PDP included dynamic monitoring, static load tests and Statnamic load tests at three locations, and the results enabled significant optimization of the foundation design and cost savings, as well as evaluating potential settlement of the existing Woodrow Wilson Bridge. The PDP provided a basis for eliminating static load tests during construction.

9 - 10 a.m. • "Factors of Safety for Driven Piles" - *Long*

Several methods can predict the axial capacity of piles, and the effort, expense and sophistication required to obtain predictions vary widely. Several load tests will illustrate the accuracy of specific methods.

10:30 - 11:30 a.m. • "Impact Forces Drive Piles, Not Hammers!" - *Bermingham*

At the moment of impact, the toe of the pile does not know its head has been hit, and the pile head does not know by which type of hammer it has been hit. Words like "single acting," "double acting," "diesel," "hydraulic" and "cushions" are unknown to the pile head. The head only feels a certain force that is maintained for a certain period. The pile shaft and toe only "feel" penetration resistance consisting of static and dynamic components. Driveability factors – the combination of the impact force, duration, pile dimensions and material – and soil resistance will be discussed.

11:30 a.m. - Noon • "Orlando Pile Demonstration" - *Likins*

The outcomes of the driveability and load capacity predictions from the live pile demonstration during the 2002 Geoinstitute in Orlando, Fla., will be discussed.

Noon - 12:15 p.m. • Close - *Frazier*


LBT Enterprises Ltd.
245 Melnick Rd. Winnipeg, Manitoba, Canada R3X 1V5
Home of the Prime® Concrete Pile Cutter
- Shears precast, pre-stressed concrete piles in seconds!
- Exposes steel strands cleanly in seconds!
- Attaches to construction equipment easily!
- No jackhammering or diamond sawcutting!
-Operates on land, underwater and below mudline!
visit our website at...www.pilecutter.com
or email us at prime@pilecutter.com
16" PCPC & 2-Part Cradle removing a pile cutoff
An operator with remote exposing steel strands
The 36" PCPC cutting a 43" caisson below 15' of water at mudline. The caisson had a 1/2" steel wall & 13 - 1 1/2" rebars.
Exposing steel strands is a snap with the Prime® Concrete Pile Cutter
A 34" pilecap with 14" steel H beams cut with a 30" PCPC.
Remote Pin & Gate Control System makes cutting off pilecaps and cutting underwater a breeze!
Phone: (204) 254-6424 Fax: (204) 254-2980 Toll Free in US & Canada: 1-800-665-7396
- Canada Patent - US Patents - International Patents -

H.B. Fleming Carves A Niche In

By Jennifer Hart, Editor

For almost a half century, H. B. Fleming has been a small but formidable specialty contractor based in South Portland, Maine. Started in 1955 by Howard Fleming and Ray Erickson, the ownership of H. B. Fleming has changed hands twice, and the company has been in a five-year boom under current owners John Linscott, PE, and Dean Sciaraffa, PE.

Linscott and Sciaraffa share more than just ownership of H. B. Fleming. Graduates of the University of Maine with bachelor's of science degrees in Civil Engineering, both are professional engineers who worked for Cianbro before purchasing H. B. Fleming. Linscott and Sciaraffa decided to become entrepreneurs after being relocated several times with Cianbro.

"We were looking to make a career change and wanted to stay in Maine," said Linscott. "We talked extensively about starting our own business, and then an opportunity arose to purchase H. B. Fleming."

Linscott and Sciaraffa knew H.B. Fleming was a well-respected company, and they liked the fact that it could mobilize its resources quickly for small, specialized projects. They bought the company in 1993.

H. B. Fleming focuses on pile driving and the construction of excavation support, cofferdams, pipelines, bridges and retaining walls. Its 25 employees are based in South Portland, Maine, and the bulk of H. B. Fleming's work is in New Hampshire, Maine, Massachusetts and Vermont. The company posts revenues of $5 million to $6 million a year, and its work is split evenly between the public and private sectors.

H. B. Fleming's employees are among its most important assets, and the company takes unique measures to retain them. For example, Linscott reports that health insurance costs in Maine are skyrocketing. In addition to the employees' coverage, the company has been paying for a large portion of family coverage as a benefit for workers. H. B. Fleming offers above average wages and an employee bonus program that help reduce turnover.

Keeping its employees busy is another priority for H. B. Fleming. Linscott and Sciaraffa are careful to balance the company's workload so employees stay busy year-round. This means focusing on about 50 to 60 projects a year and staying within the company's field of expertise.

"We have tried to branch out into other forms of contract work in the past," Linscott commented. "But this diverts our attention from what we do best. Dean and I have found it much more rewarding to put our energies into the company's strengths, rather than trying to expand our business offerings."

Linscott and Sciaraffa are working members of the H. B. Fleming team. They are responsible for estimating, equipment management, purchasing and client relations. And they are no strangers to the project.

"On occasion where a crew is short-handed, Dean or I will pitch in to get the job done," Linscott said. "Dean is a self-taught crane operator and tries to get behind the controls every few weeks. It helps us to remain connected to our work, our clients and our employees when we can join them on a job site."

Like most companies in the pile driving industry, H.B. Fleming faces the challenge of finding and retaining qualified workers. H.B. Fleming has arrangements with local technical schools and colleges to teach students about the business, and, when

they hire a new employee, Linscott and Sciaraffa try to create opportunities for advancement with the company.

In addition to attractive bonus, pay and benefit programs, maintaining a safe work environment is paramount to employee motivation and retention. Linscott reports that safety is built into every project from the time of the estimate.

"Specifying the right equipment up front heads off many safety issues before they can occur," Linscott explained. "The

> "On occasion where a crew is short-handed, Dean or I will pitch in to get the job done. ... It helps us to remain connected to our work, our clients and our employees when we can join them on a job site."
>
> **— John Linscott, PE**

Northern New England Market

right size crane, the correct hammer and the proper lead make a difference in how safely our crew can complete a job."

H.B. Fleming installs #8 sheet pile with Helical Anchor tiebacks for the Maine Medical Center in Portland, Maine.

Linscott finds that access to the job site is another hot safety issue. He and Sciaraffa demand that contractors provide safe and adequate access to job sites. Hard, firm areas are a necessity for the equipment required to perform H.B. Fleming's work. Often, they will visit the construction site before a crane is moved in. The company prefers to keep other contractors off-site while its crew is working.

H.B. Fleming usually prefers to act as a subcontractor. The company is a general contractor on only about five or six of its more than 60 projects a year. Linscott feels it is much easier to manage a job as a subcontractor because there is not as much paperwork or administrative follow-up. His staff is not equipped to be a full-time general contractor.

H.B. Fleming regularly participates in value engineering for its clients. Most commonly, the company is able to review a proposal and increase the capacity of the piles to reduce the number of piles used on the job. Some government bids that have come across Linscott's desk actually have value engineering in the contract with a clause to split the savings between the owner and the contractor. But Linscott finds that the private sector is actually more agreeable to the concept of value engineering. He uses all the resources at his disposal to make a bid as cost-effective as possible for the contractor or owner. He has utilized different design concepts on cofferdams, shoring systems and retaining walls to save money, and he often helps the geotechnical engineer write the job's specifications.

H.B. Fleming's work usually requires end bearing H piles, which are driven into marine clay and peat. The company owns eight Link-Belt cranes, ranging in weight from 35 tons to 80 tons, four MKT diesel hammers, four Vibro pile hammers and an assortment of hydraulic augers, leads and welding equipment. In the past several years, H.B. Fleming has created the designs and performed the pile driving for underpinning systems and shoring structures. The company's marine work is mostly pile driving projects such as bulkheads, piers and outfall pipes for wastewater treatment plants that do not require the use of a barge.

Currently, H. B. Fleming is constructing an outfall pipe for a wastewater plant in Exeter, N.H. The $400,000 job involves a 32-inch high-density polyethelene pipe, which is installed in a cofferdam and submerged in a river. Two 400-foot-long bulkhead projects were also recently completed in New Hampshire and Maine, where Linscott reports that business is booming.

One of the projects Linscott and Sciaraffa are most proud of is also the company's largest job. H.B. Fleming installed roughly 89,000 feet of H pile in just under eight weeks for a Home Depot in Portland, Maine. The 800 piles were spliced 100 feet in length, and Linscott recalls pushing three cranes to capacity to get the job done.

"The client was very pleased with our work on this project and with the incredible turnaround time. It is a good example of what we can really do when we direct and focus our efforts," said Linscott.

Linscott has found that driven piles are the least expensive deep foundation solution in his area. He said driven piles are almost always more cost-efficient than a drilled option. Even in the case of drilled mini piles – grout-type piles that are said to produce

(Continued On Page 16)

John Gay started working for H.B. Fleming in1965, operating various cranes until 1970, when he was assigned as operator on an LS-108B crawler crane that H.B. Fleming had just purchased. After 32 years, Gay is still the assigned operator on the 1966 machine. An expert at driving piles with fixed leads, he is now 64 years old and plans to keep driving pile for several more years.

Member Spotlight

(Continued From Page 15)

less noise and vibration than driven piles – H.B. Fleming's driven piles are the better value.

"In our experience, drilled mini piles do not necessarily lower noise and vibration," Linscott declared. "When we use impact hammers, noise and vibration are not a problem for our contractors or the general public. Pollution from lube oils is a bigger concern for environmentalists in our area than is noise pollution. We now use vegetable-based lubricants in all of our vibratory hammers."

Linscott continued, "The only time noise was a concern was during some pile driving work near the local hospital. We worked closely with the hospital staff to determine the best time to drive the piles. The hospital staff reported that patients enjoyed watching the pile driving activity."

H.B. Fleming joined the Pile Driving Contractors Association almost two years ago, and Linscott has made it a priority to become involved in the organization. He has already tapped into the PDCA's technical resources and finds it useful to hear how other contractors are doing business. The company is also an involved member of the Associated Constructors of Maine. Sciaraffa will be president of the organization next year, and Linscott currently serves on the Board of Directors.

Linscott and Sciaraffa have taken a company with a solid reputation and continued its tradition of providing quality work. They believe in hands-on, honest work, and clients reward that work ethic with repeat business.

In their free time, they can be found pursuing their interest in classic cars. Linscott may be seen driving his 1935 convertible Buick coupe with rumble seat or his Austin Healy 3000 sports car. Sciaraffa can probably be found polishing his 1966 Plymouth Satellite with 400 horsepower engine or driving his 1955 Thunderbird.

For more information about H.B. Fleming, visit its Web site at www.hbfleming.com.

A Sinking Feeling

Giken America Called In To Help After Giant Sinkhole Threatens Apartment Buildings

By Jennifer Hart, Editor

Central Florida is no stranger to sinkholes, but even long-time Floridians were amazed by the size and depth of one that formed in a West Orange County apartment complex in Orlando June 18. Measuring more than 160 feet in length and 65 feet deep, the giant sinkhole swallowed live oak trees within 10 feet of several three-story apartment buildings. Residents of the Woodhill apartments watched in horror as the massive hole lurked dangerously close to their homes. A second sinkhole measuring 15 feet across opened up approximately 150 feet from the first.

Orlando police and engineers were forced to evacuate several apartment buildings. Homeless residents were taken in by family, friends and the Red Cross, and some were relocated to other apartments in the complex. Residents were not allowed to return to their apartments until the sinkhole was stabilized. But stabilizing such a large sinkhole during a rainy summer in Orlando was a monumental task.

In Central Florida, sinkholes form when a fault in the lower limestone layer of the ground breaks through and loose sands on the top layers of ground sink in. Typically a sinkhole is backfilled with soil or concrete or made into a lake or pond. For the West Orange County sinkhole, these conventional methods would have created an even larger gorge.

Orlando-based geotechnical specialist GEC accessed the sinkhole and recommended a specialized retaining wall installed by PDCA-member Giken America Corporation of Orlando. Giken, a division of the Japanese-owned Giken Seisakusho Company, Ltd., was chosen for this project because of its unique pile driving equipment and methods.

Conventional, prefabricated piles are traditionally pounded or vibrated into the ground using percussive or vibratory energy. Because of the precarious position of the sinkhole, even slight vibrations on or near the site could have led to slope failure and additional loss of land and possibly even buildings. Yet to remedy the situation, the strength and durability of prefabricated materials was needed. Enter Giken America.

More than three decades ago, Giken's founder, Akio Kitmura, pioneered a new pile driving technique. The press-in method is a reaction-based system where a press-in pile driving machine uses previously installed piles to derive reaction force, which provides the power to hydraulically jack subsequent piles into the ground. Because piles are being "pressed" in, very little vibration or noise is generated.

At the beginning of a job, there are usually no piles in the ground from which to start. To combat this, the press-in piler is set up on a special stand and an appropriate amount of counterweight – determined by ground conditions and pile length – is added to the stand. The first pile is then pressed in using the reaction power from the combined weight. As each initial pile is driven, the press-in piler moves forward and grasps that pile, increasing the amount of available reaction force. Once all the initial piles have been pressed in, the piler can be moved off the reaction stand.

During normal operation, the press-in piler needs only one crane to pitch piles. Once a pressed-in pile is sufficiently stable, the piler releases its clamps from the reaction piles and uses this pile to raise itself up and propel forward. Grant Bearss, vice president of operations for Giken America, likens the movement of the press-in piler to a person climbing a tree.

"The piler grips the last installed pile, pushes itself up and moves forward. This system makes any supporting crane unnecessary," he explained.

Bearss has worked for Giken for six years, after a nine-year stint in Japan as a consultant for his own firm. He has a degree in Aerospace Engineering from RMC (Canada) and labels himself a "jack-of-all-trades" for Giken America. He often assumes the roles of field engineer, business operations manager and chief estimator for the company's American operations.

The Giken Wall

Giken America began working immediately to prepare for the installation of a tubular sheet pile wall that would encompass the sinkhole and protect the nearby apartment buildings. Large diameter pipe pile with fabricated interlocks was used to form a locked pipe pile wall that is both rigid and economical, considering its strength. The piles were installed by Giken America's press-in machine, the Silent Piler.

(Continued On Page 18)

Sinking

(Continued From Page 17)

In addition to the low noise and almost indistinct vibrations created by the press-in method, there was another major advantage to choosing Giken's pile driving system. Because the sinkhole was so close to the apartment buildings, there was only 10 feet of right-of-way from which to work. The Silent Piler requires only seven feet of right-of-way.

"Our crane and generator had to be placed some distance away from the site," commented Bearss. "The Silent Piler was the only piece of equipment that could get close to the sinkhole."

Corpac Steel Products of Miami was the source of the pipe pile and fabrication, and the materials arrived on site from St. Louis in less than one week. This incredible turnaround time had Corpac fabricators working around the clock. While Giken America awaited the arrival of the piles, its pile driving team was setting up at the sinkhole site.

> "We actually had to take the machine apart and lift it over the apartments in pieces to get it to the job site."
> **– Grant Bearss**
> **Vice President**
> **Giken America Corp.**

"Our piler had to be lifted over three-story apartment complexes," said Bearss. "We actually had to take the machine apart and lift it over the apartments in pieces to get it to the job site."

The project took nine working days to complete once materials arrived, and the Giken America team worked continuously through the daylight hours.

Bearss and his team faced several challenges unique to this project, some of which they had little control over.

"The rainy weather made work conditions uncomfortable and dangerous," he said. "Rain softens the already unstable ground and increases the risk of further sinkage. It was imperative we worked as quickly as possible to shore up this hole."

Bearss said it was also unusual to be working where the team could not see the crane and with the generator placed several feet away from the work site.

Press-In Piling Makes Inroads In U.S.

Giken opened its North American branch more than three years ago, and Giken America has acted both as general contractor and subcontractor (or rental agency) on several East Coast projects, most recently in Tampa and New York City.

Giken America created a temporary cofferdam for a pump station at the University of Tampa, Southern Florida. The fear of opening a sinkhole caused by vibrations that had previously accompanied the installation of sheet piles prompted the university to consider press-in pile driving.

In April 2002, Giken America completed the second phase of the Long Island Expressway/Cross Island Parkway project. The company rented its Silent Piler to Perini Corporation of New York City, which worked with the New York State Department of Transportation on the expressway project. According to Bearss, the economics of the materials, right-of-way restrictions and accuracy of installation were the reasons Perini chose Giken America. Perini used the Silent Piler to create a permanent retaining wall and area for temporary support of excavation. Bearss noted that this 35-foot cantilevered wall is the largest of its kind in North America.

As for residents of the Woodhill apartment complex, once the retaining wall was complete they were able to move back to their vacated apartments. In the future, a pond will remind these folks of the scary event that nearly swallowed up their homes.

Grant Bearss is vice president of operations for Giken America Corporation. He can be reached for comment or more information at gbearss@gikenamerica.com.

WANTED

Original Articles For PileDrivers.Org

PDCA is arming members with information relevant to the pile driving industry. Topics of interest include but are not limited to noise, vibration, safety, human resources and management skills.

Description

PDCA is seeking original articles that meet the following specifications:

Length:	Is 1,500 to 2,000 words and is a typed, clean copy.
Title:	Has a title with an active verb, followed by a one-sentence or one-paragraph lead that explains the purpose of the article.
Content:	Provides information that is important and relative to a majority of equipment managers and technicians.
Byline:	Includes a byline with a one-sentence description giving the author's full name, title, company or organization and contact number or e-mail address.
Artwork:	Includes supporting charts, tables, photos or artwork in TIFF or JPG file format that are of proper clarity and relate to the article.
Accuracy:	Is checked for accuracy.
Submission:	Is submitted as a Microsoft Word attachment in an e-mail to membership@piledrivers.org or on a computer disk in Microsoft Word format to: PDCA, P.O. Box 1429, Glenwood Springs, Colo. 81602.

Caution

PDCA has editorial guidelines available with information on style rules, evaluation and decision of acceptance, copyright transfer and the editing process. Please take a moment to review these guidelines at www.piledrivers.org or by calling (970) 945-1231.

Reward

Articles meeting the PDCA's editorial guidelines will be published in future issues of *PileDrivers.Org* and mailed to PDCA's membership. For a complete listing of the editorial guidelines, please visit www.piledrivers.org or call (970) 945-1231.

If you or someone in your office has an article or would like to write an article meeting the description above, please contact the PDCA at membership@piledrivers.org or (970) 945-1231.

PDCA's New Members

New Associate Members

Jeff Hroncich
Triad Metals International
3480 Grand Ave.
Pittsburgh, Pa. 15225
Phone: (412) 331-7772
Fax: (412) 771-9316

Jay Kessler
Brown-Strauss Steel
2495 Uravan St.
Aurora, Colo. 80011-3539
Phone: (800) 677-2778
Fax: (303) 375-8133
E-mail: jkessler@brown-strauss.com

Paul J. Kotsenas
Steel Dynamics
2601 County Road 700 East
Columbia City, Ind. 46725
Phone: (260) 625-8711
Fax: (260) 625-8950
E-mail: paul.kotsenas@stld-cci.com

New Contractor Members

David R. Chapman
Blakeslee, Arpaya, and Chapman
200 North Branford Rd.
Branford, Conn. 06405
Phone: (203) 488-2947
Fax: (203) 488-3997
E-mail: dchapman@bacinc.com

Ernest Grochalski
Stevens Painton Corporation
150 Technology Dr.
Canonsburg, Pa. 15317
Phone: (724) 873-0931
Fax: (724) 873-0937

John King
Pile Drivers, Inc.
4530 Hwy. 162
Charleston, S.C. 29449
Phone: (843) 763-7736
Fax: (843) 763-7974
E-mail: kingpiledriver@aol.com

Kaye Shealy
Pile Drivers, Inc.
4530 Hwy. 162
Charleston, S.C. 29449
Phone: (843) 766-5833
E-mail: piledriver@cchat.com

New Technical Members

Van E. Komurka
Wagner Komurka Geotechnical Group
W67 N222 Evergreen Blvd., #100
Cedarburg, Wis. 53012
Phone: (262) 376-2001
Fax: (202) 376-2002
E-mail: komurka@wkg2.com

PDCA

The Sounds Of Silence

Danish foundation contractor Per Aarsleff has developed a pile hammer silencer to comply with strict environmental noise restrictions being imposed on city center projects.

When sheet piling for a new art museum in Arhus, Denmark, was brought to a standstill soon after it began in November 2000, Danish foundation contractor Per Aarsleff had to find a new way of reducing the noise from its Junttan piling hammer to meet environmental restrictions.

The firm had just started installing a sheet pile cofferdam around the perimeter of the 55m by 55m site, which sits amid a music hall, court buildings and residential flats. The local authorities had set a noise limit of 75dB at the nearest neighborhood building, 30m away.

Silencing was achieved by shrouding the impact zone between the hammer and pile top with a specially designed soundproof casing. The silencer comprises a hollow section steel frame filled with foam, surrounded by an aluminum casing which houses a 50mm thick rubber layer to absorb high frequency noise and a 6mm thick layer to dampen low frequency noise.

> "Men could stand by the rig and were able to talk without raising their voices."
> – Engineer Finn Rasmussen

The casing attaches to the mast of the piling rig and surrounds the whole hammer. Two hydraulically controlled gates close the casing at the bottom of the hammer so that it fits snugly across the top of the sheet pile without hampering the installation process, hence blocking noise.

"One of the problems developing the silencer was to make it handy and operational – the silencer has not slowed down piling too much," said Per Aarsleff Piling manager Lars Rande.

The sheet piles were installed through fill, boulder clay and into stiff fissured clay to form the basement excavation, up to 14m deep in places. Piles between 18m and 23m long were used for the three highest walls, with additional support by 280 anchors. The lower northern wall consists of 13m long piles.

Once excavation had reached just below the first anchoring layer, it progressed in 4m deep, 5m wide strips starting across the center of the hole. Each trench was excavated at 90 degrees to the previous one and a 700mm thick concrete blinding layer placed at the base. This provided constant support to the sheet piles throughout excavation and saved one layer of anchors in the sheet pile wall.

The sheet piles will provide permanent support to the basement, with museum walls built 500mm from the cofferdam, creating a service duct around the perimeter.

Noise levels were monitored throughout the installation and the 75dB limit was never exceeded. Container screens at strategic locations muffled noise further.

A similar silencing device has been used to install precast concrete piles on the project. A total of 620, 300mm square precast piles were driven for the museum, 570 of which were installed through the basement slab. Polystyrene blocks placed in the blinding layer at the pile positions allowed piles to be driven through the slab.

As 500kN to 1000kN of uplift was expected due to heave in the upper part of the clay, piles were designed for tension. To limit negative skin friction on the piles, the upper layer, above the water table, was predrilled to 8m with a 300mm auger.

The piles were driven to about 18m using a 6t Uddcomb hammer fitted with a silencer, which had to be modified to allow it to close around the square section of the pile below the hammer. Again, noise was cut by more than 10dB.

However, monitoring noise during this part of the work proved difficult because it was cut to below background levels.

> "One of the problems developing the silencer was to make it handy and operational – the silencer has not slowed down piling too much."
> – Per Aarsleff Piling Manager Lars Rande

"Men could stand by the rig and were able to talk without raising their voices," said Finn Rasmussen, the engineer who designed the silencer.

Work on the DKK230M (Ecu11.25M) contract was due to finish on schedule when this article went to press.

A similar silencer is being used to install concrete piles on another contract in the cosmopolitan Clementborg café district. Here, Per Aarsleff is using a Giken Silent Piler to install up to 13m long sheet piles to support a 3m deep excavation for a new shopping and entertainment center. The Giken can exert 150t of pressure and install 40m^2 of sheet piles a day without noise or vibration. Installation is helped by the use of water jetting.

Following the success of the prototypes, the silencer for precast concrete piling is close to its final version and Per Aarsleff will soon be able to offer most of its rigs with the silencer option.

Some 95 percent of piles in Denmark are driven, and the development of the silencer means Aarsleff can carry on driving piles under the increasingly severe noise restrictions being set by local authorities.

Aarsleff can continue to use sheet piles as a suitable solution where previously other methods, such as slurry walls, may have been chosen to meet environmental constraints.

This article originally appeared in European Foundations, *Summer 2001.*

Pile Driving And Vibration

Managing The Opposition

By Lisa Kopochinski for California Construction Link (3/28/02)

Pile driving and its effects on the community and industry was the topic of discussion at a recent seminar at the CON-EXPO-CON/AGG show in Las Vegas.

Pile driving is one of the loudest construction operations. Because it produces vibrations and noise thousands of feet from the driving activity, it has become a real problem for contractors. People are becoming increasingly intolerant to these effects and complaining greatly, even to the point of litigation, in some cases.

"Noise may be the most serious threat to the pile driving industry today," said W. Allen Marr, chief executive officer of Boxborough, Mass.-based GEOCOMP Corp. "It is causing damage because it creates a perceived problem to those impacted."

Marr said studies have shown that people can perceive vibrations at about 0.01 in./sec., or 100th the level at which structural damage might occur. As a result, people become anxious and may worry unnecessarily about the safety of their building.

The situation, Marr explained, is causing some project owners and government agencies to choose alternatives to pile driving – a detrimental move for the industry for several reasons. Alternatives may be more expensive or produce comparable levels of noise and vibration.

In an effort to address these concerns and offer a viable solution, GEOCOMP has developed iSite-VM, a Web-based system designed for the vibration monitoring of blasting, construction, demolition, earthquakes, traffic and trains.

"This is a real-time Web-based vibration monitoring system. We are collecting data today that was virtually impossible 10 years ago, at much less cost," said Marr.

The iSite model is based on seismographs located in areas accessible by telephone, he said. Clients interact with the system using pagers, e-mail and the Internet. All vibration data is downloaded to a centralized database, and clients are notified if alarm levels have been exceeded.

Marr, a geotechnical engineer who founded GEOCOMP 20 years ago, specializes in predicting and measuring the performance of large earthwork facilities and excavations. He is currently leading the team that makes all geotechnical measurements during the construction of Boston's $5 billion Central Artery/Tunnel project, dubbed the "Big Dig."

This massive project involves the construction of more than seven miles of underground highway through the center of the city. Numerous structures – from historic brick buildings to modern high-rises – exist within the potential impact zone of construction.

"A central part of the effort is an extensive instrumentation program to monitor the effects of construction work on adjacent buildings and changes in foundation conditions," he explained.

Marr added that contractors will benefit from the iSite system in numerous ways:

- Alarm notification allows for better control over construction vibrations.
- Data can be accessed from a Web browser.
- Data can be accessed by project, location and date, so file names are unnecessary.
- Automated reporting saves time and money.

He said contractors must develop approaches to manage vibration and noise levels produced by pile driving. These include:

- **Education:** People who may be impacted by pile driving need to be informed in advance of planned activities and what the impact may be. Informed people are less likely to suspect that vibrations and noise are causing physical harm to themselves or their property.
- **Abatement:** Take steps to reduce vibration and noise levels to the extent that this is economically possible. Limit the time of driving to daylight hours when people are less affected by these nuisances. Use noise shrouds or curtains to reduce levels by 15 to 30 dB.
- **Monitoring:** Measure the vibration and noise levels at key locations. Measurements can become invaluable if you face legal action over vibration or noise complaints. Should the measurements show unacceptable performance, adjust your work processes to correct the problem before a complaint occurs. Measurements should begin before pile driving starts to establish background levels of vibration and noise.
- **Involvement:** Keep the affected parties informed of the project's progress through the use of community representatives, meetings, newsletters or a project Web page.
- **Proactive:** Stay proactive to minimize misinformation. Often, vibration and noise can be more of a perceived problem, but you do have to work to manage the perception.

Show Your Pride In PDCA!

Order Hard-Hat Stickers For All Your Workers!

Just 75 Cents Each
(Includes Postage And Handling)
Minimum Order Of 5 ($3.75) - All Orders Must Be Prepaid

For information, contact PDCA • P.O. Box 1429
Glenwood Springs, Colo. 81602 • (970) 945-1231
Fax: (970) 384-0512

The Book Of Proceedings

From the last two PDCA Winter Roundtables (2001 in San Antonio and 2002 in San Francisco) and the Design and Installation of Cost Efficient Driven Piles Conference (2001 in Atlanta) are now available

$25 Each

For information, contact
The Pile Driving Contractors Association
P.O. Box 1429 • Glenwood Springs, Colorado 81602
(970) 945-1231 • Fax: (970) 384-0512
E-mail: membership@piledrivers.org
Web site: www.piledrivers.org

2 Volumes - 1,162 Pages

Pile Drivers, Geotechs, Engineers, Professors, Students: Purchase your copy of the Federal Highway Administration's

Design and Construction of Driven Pile Foundations Workshop Manual

PDCA Members: . . . . $74.95 plus shipping & handling
Non-members: . . . . $84.95 plus shipping & handling
Orders of 10 or more: . . . . $59.95 plus shipping & handling

Shipping & handling: For UPS ground service in the United States, add $10 for first set, $5 for each additional set.

☐ Please send me _____ manuals ☐ Yes, I would like to become a member of PDCA

Name: ______________________ Company: ______________________

Street address: ______________________ City/state/zip: ______________________

Telephone: ______________ Fax: ______________ E-mail: ______________

Method of payment: ☐ Check enclosed ☐ Visa ☐ MasterCard ☐ American Express

Card # ______________________ Exp. date: ______________

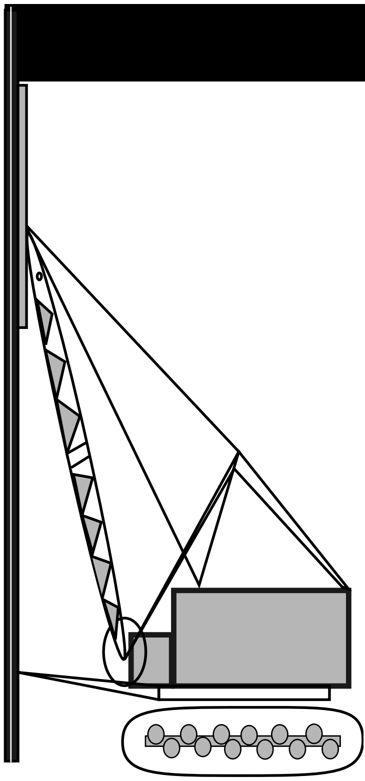
Signature: ____

Please make checks payable to PDCA. Fax or mail to:

PDCA, P.O. Box 1429
Glenwood Springs, Colorado 81602
(970) 945-1231 • Fax: (970) 384-0512
E-mail: membership@piledrivers.org
Home page: www.piledrivers.org

PDCA Membership Application

(Continued on back)



Primary or Official Representative

Company: ____________________

Name: ____________________

Title: ____________________

Phone: ____________________

Fax: ____________________

Address: ____________________

City/state/zip: ____________________

E-mail: ____________________

Home page: ____________________

Membership Type

(check one)

- ❑ Contractor
- ❑ Associate
- ❑ Technical Affiliate
- ❑ Student

Sponsored By: ____________________

Contractor Company Description

(check all that apply)

- ❑ Pile Driving
- ❑ Marine Contracting
- ❑ Earth Retention
- ❑ Bridge Building
- ❑ Deep Dynamic Compaction
- ❑ Bulkheads
- ❑ Other ____________

Associate Company

(check all that apply)

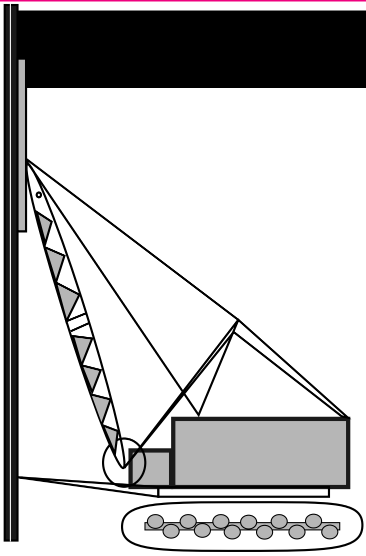
- ❑ Rental
- ❑ Sales
- ❑ Vibratory Drivers/Extractors
- ❑ Steel Beams
- ❑ Pipe Pile
- ❑ Timber Pile
- ❑ Concrete Pile
- ❑ Cranes
- ❑ Fixed/Swinging Leads
- ❑ Steel Sheet Piling
- ❑ H Bearing Piling
- ❑ Pile Point & Splicer
- ❑ Jet Pumps
- ❑ Plastic Pipe Piles
- ❑ Inserts
- ❑ Steel Fabrication
- ❑ Wick Installation Equipment
- ❑ Sheet Piles
- ❑ Drills
- ❑ De-Watering Pumps
- ❑ Composite Pile
- ❑ Cushion Materials
- ❑ Pile Driving Leads
- ❑ Wick Drain
- ❑ Cutter Head
- ❑ Drill Bits
- ❑ H-Beam
- ❑ Plastic Sheet Piles
- ❑ Drive Caps
- ❑ Dock Supplies
- ❑ Off Shore Leader System
- ❑ Wick Drain Supplies
- ❑ Drilling Supplies

Pile Hammers

- ❑ Vibratory
- ❑ Diesel
- ❑ Hydraulic
- ❑ Air/Steam

- ❑ Other ____________
- ❑ Other ____________
- ❑ Other ____________
- ❑ Other ____________

PDCA Membership Application



Technical Affiliate Company Description

(check all that apply)

- ❑ Analysis
- ❑ Consulting
- ❑ Design
- ❑ Geo Technical Engineers
- ❑ Testing
- ❑ Pile Monitoring
- ❑ Vibration Monitoring
- ❑ Civil Engineering
- ❑ Surveys:
- ❑ Other ______________________

Description __________________ ______________________

Areas of Contracting, Products and Services Available

(all applicants check all that apply)

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

Method of Payment

Attached is my payment of $_______ for annual dues.

- ❑ Contractor - $550 per company
- ❑ Associate - $550 per company
- ❑ Technical Affiliate - $75 per person
- ❑ Student - $25 per person

❑ Check Number _______________ ❑ Visa

❑ MasterCard ❑ American Express

Card Number: ______________________________ Name on Card: ______________________________________

Expiration Date:_________________ Signature: ____

Please make checks payable to PDCA. Copy this form and fax or mail it to:

PDCA, P.O. Box 1429, Glenwood Springs, Colorado 81602 • (970) 945-1231

Fax: (970) 384-0512 • E-mail: membership@piledrivers.org • Home page: www.piledrivers.org

Contributions or gifts to PDCA are not deductible as charitable contributions for federal income tax purposes. However, dues payments are deductible as a miscellaneous itemized deduction.

PILEDRIVERS.ORG
The Official Publication Of The Pile Driving Contractors Association - Summer 2002 - Volume 3, Number 3

The Pile Driving Contractors Association
P.O. Box 1429
Glenwood Springs, Colo. 81602