DID YOU **KNOW?**

THE TALLEST BUILDING IN THE WORLD IS BEING BUILT IN DUBAI, UAE, AND ITS FOUNDATIONS HAVE BEEN TESTED WITH THE PILE DRIVING ANALYZER®.

Pile Dynamics, Inc.

GRL engineers, inc. Dynamic Measurements and Analyses

7TH STRESSWAVE CONFERENCE ROUNDUP

The 7th International Conference on the Application of Stress Wave Theory to Piles was held in August in Kuala Lumpur, Malaysia, marking its first time in Asia. This conference has been occurring every 4 years since 1980 with previous locations in Europe, North America and South America.

Dr. George Goble, George G. Goble Consulting Engineer LLC, gave the keynote address "Pile Dynamics Stress Wave Measurement and Evaluation: Past, Present and Future". Dr. Goble reviewed development of electronics and sensor technology, and of analysis methods and software. He summarized current practice, including use of the Pile Driving Analyzer® (PDA) model PAL-R with remote transmission capabilities, and envisioned a future when setup would be used to more advantage to lower pile foundation costs and the Load and Resistance Factor Design codes would be implemented.

GRL's Dr. Frank Rausche and PDI's Garland Likins delivered special invited lectures. Garland Likins presented "Correlation of CAPWAP® with Static Load Tests", co-authored with Frank Rausche. This paper summarizes the CAPWAP correlations presented at the previous 6 Stresswave Conferences dating back to 1980. Data furnished by various PDA users was combined with the original 1975 study by Goble and with the database compiled by GRL for the United States Federal Highway Administration in 1996. Static test results and restrike dynamic test results were available for 303 piles. The statistical analysis yielded an average CAPWAP prediction to Static Test result ratio of 0.98 and an excellent coefficient of variation of 0.17, confirming the reliability of CAPWAP.

Frank Rausche presented the special lecture "Application and Correlation of the Wave Equation Program GRLWEAP™", co-authored with Dr. Liqun Liang, Dave Rancman and Ryan Allin. This paper shows that the residual stress option in GRLWEAP makes a relatively large difference in predictions for flexible piles and strongly recommends its use. It also compares predictions with measurements for numerous test cases for both steel and concrete piles, demonstrating the accuracy of GRLWEAP.

"Identifying Soil Relaxation from Dynamic Testing", by Michael Morgano and Ben White, discusses the applicable soil conditions for relaxation and acknowledges the challenge of considering and dealing with a reduction in capacity after installation. The paper presents a case of dramatically smaller restrike blow counts at 3/4 of the end-of-drive transferred energy, and a capacity of 2/3 of that at end of drive. This soil (shale in this case) behavior requires caution by the designing geotechnical engineer.

"Evaluation of Defects and Tomography for CSL", by Garland Likins, Scott Webster and Mario Saavedra, discusses the relative merits of

Kuala Lumpur, Malaysia

PVC and steel access tubes for cross hole sonic logging (CSL). It presents the case for the importance of CSL testing for all drilled shafts, which by nature have reduced redundancy and therefore increased risk. It also discusses automated detection of defects in records, and appropriateness of analyses such as 3D tomography.

"Inspection and Quality Control of Augercast Piles", by George Piscsalko and Ben White, compares and correlates the installation of augercast piles (CFA) with automated monitoring equipment such as the Pile Installation Recorder™ (PIR-A), with inspections using low strain integrity testing methods using the Pile Integrity Tester™ (PIT).

"Dynamic and Static Load Testing of an Augercast Pile", by Bill Chambers and Michael Morgano, presents a typical case history of a dynamic test where GRL used a drop weight of 3.0 tons on 457mm (18 inch) augercast piles in silty sands. The paper discusses required ram weight and pile top cushions for dynamic tests on cast-in-place piles, and presents a correlation with a static load test.

"Large Drop Hammer Testing on Driven Piles in Delaware", by Wondem Teferra, Jeff Basford, and Frank Rausche, describes a case history where restriking concrete piles driven with significant subsequent setup gains failed to dynamically activate the required ultimate capacity with the installation diesel hammer. The 20 ton GRL APPLE drop weight was then used to successfully activate the required ultimate capacity.

"Dynamic Pile Test Records with Unusual Characteristics", by Mohamad Hussein, Marty Bixler and Brian Mondello, presents measurement cases with unexpected features, and then discusses implications of these features, as well as solutions and suggestions on how to deal with similar data.

Several other experienced users of PDI equipment contributed papers on high strain PDA testing, low strain PIT tests, and CSL. Complete conference proceedings may be obtained from Stresswave organizing committee member Richard Yu (richard@pac-ap.com) for US $40 per copy, plus shipping. Selected papers are available at www.pile.com.

Calendar of **Events**

October 7, 2004, ONLINE: Foundation Courses, Inc. presents Construction of Deep Foundations Teleweb Seminar Series: "Deep Foundation Design and Construction Process" by Dr. George Goble. For more information, contact Dr. Goble at 303-494-0702 or goble@bridgetest.com.

October 18, 2004, Atlanta, GA: PCI National Bridge Conference. Mohamad Hussein and Brian Mondello present "Driving and Dynamic Testing Methods of Prestressed Concrete Piles". For information, visit www.pci.org.

October 28-29, 2004, Philadelphia, PA: American Society of Civil Engineers (ASCE) presents "Deep Foundations: Design, Construction & Quality Control," with Mohamad Hussein, Joe Caliendo, Jerry DiMaggio and James Long. Information at www.asce.org/conted or 1-800-548-2723.

November 4, 2004, ONLINE: Foundation Courses, Inc. presents Construction of Deep Foundations Teleweb Seminar Series: "Drilled Pile Types" by Jerry DiMaggio. For more information, contact or Dr. Goble at 303-494-0702 or goble@bridgetest.com.

November 15, 2004, Fulford, York, England: Pile Dynamics presents a general seminar on the use and benefits of dynamic pile testing and integrity testing with PIT/CSL. For information visit www.pile.com/events/pdievents or contact us at info@pile.com.

November 16-17, 2004, Fulford, York, England: Pile Dynamics presents PDA, CAPWAP, and GRLWEAP workshop. The Foundation QA certification exam for PDA testers will be offered with this event. For information visit www.pile.com/events/pdievents or contact us at info@pile.com.

January 24-26, 2005, Austin, Texas: ASCE and Geo-Institute "GeoFrontiers 2005" Conference. Information at www.asce.org/conferences/geofrontiers05/.

March 17-18, 2005, Boston, MA: ASCE presents "Deep Foundations: Design, Construction & Quality Control," with Mohamad Hussein, Joe Caliendo, Jerry DiMaggio and James Long. Information at www.asce.org/conted or 1-800-548-2723.

June 19-24, 2005, Logan, UT: The PDCA Professors' Institute. Professors interested in attending should contact PDCA at 303-517-0421 or info@piledrivers.org.

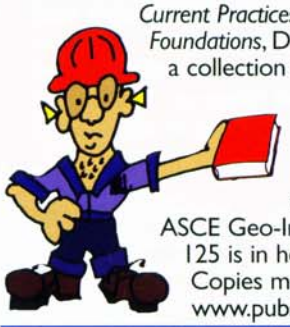
New Hire, New Ventures

Anna Klesney received a Civil Engineering Masters Degree from the University of Michigan in May and joins the GRL Main Office in Cleveland.

Ryan Allin completed his Civil Engineering degree at Cleveland State University in May and transfers to the GRL Ohio office.

Brent Robinson is on leave from GRL Main Office to pursue graduate work at North Carolina State University.

Notable Book



Current Practices and Future Trends in Deep Foundations, DiMaggio, J. and Hussein, M., eds., is a collection of papers on deep foundation design, construction, testing and inspection. Several papers authored by GRL and PDI are included in this volume and are available on our website. This ASCE Geo-Institute Special Publication No. 125 is in honor of George Goble, PhD, PE. Copies may be purchased at www.pubs.asce.org/HTML/gsp.html.

GRL tests drilled shafts at Stone Canyon

Kiewit Pacific retained GRL Engineers to test the drilled shaft foundations of the Stone Canyon Chlorination and Filtration Plants in Los Angeles, California. GRL undertook this work in conjunction with Dr. Daniel Pradel, P.E. of Praad Geotechnical Inc.

Camilo Alvarez (GRL California) instrumented 3 test piles for the Chlorination Plant. One pile was 24" (610 mm) diameter, and 2 piles were 36" (915 mm) diameter. Lengths varied from 28 to 75 feet (8.5 to 23 m). Required ultimate capacities were 100 tons for the 24" pile and 600 tons for the 36" piles. Camilo also tested 3 piles for the Filtration Plant with pile diameters of 30, 36 and 60" (760, 915 and 1525 mm). Pile lengths were all 45 feet (13.7 m). The Filtration Plant ultimate capacities were 400, 500 and 900 tons, respectively.

All piles at both sites were installed with rock sockets. A static test had originally been planned. However, the client elected to determine the portion of the capacity due to shaft resistance (skin friction) in the soil and the portion of the resistance in the rock socket by dynamic testing instead. The 15 ton GRL APPLE drop weight system tested the 3 piles in the Chlorination Plant in one day, and the 3 piles in the Filtration Plant in a second day. The successful APPLE/PDA testing and CAPWAP analysis showed that activated capacities exceeded the required ultimate loads for all piles, and that resistance in the rock socket was adequate.

The APPLE system saved US $126,000 in testing costs when compared with the planned static tests. Time savings were also significant.

Pile Dynamics website caters to international needs

Pile Dynamics products literature is available in multiple languages, and may be downloaded from www.pile.com/brochures. Hard copies may also be requested.

PDI Workshops

Following the Stresswave Conference, Pile Dynamics held workshops and seminars on dynamic pile testing and integrity testing in Kuala Lumpur, Beijing, Macau, Hong Kong, Ho Chi Minh City, and Manila. Strong attendance in all cities reflect the large interest in dynamic pile testing.

The next PDI seminar on dynamic pile testing will take place in York, England, in November. It gives an overview of high strain PDA testing and integrity testing with PIT and by Crosshole Sonic Logging (CSL). The following 2 day workshop covers wave equation analysis and high strain dynamic pile testing in more detail. The Foundation QA certification exam will be offered in conjunction with this event.

Readers Write

Shaun Walker from Jacques Whitford, Nova Scotia: "I had the opportunity to use the new PDA PAK in Sydney, Nova Scotia for Steel HP piles. The unit is just great!"

Prof. Emir Macari of the Department of Civil and Environmental Engineering at Louisiana State University invited Mohamad Hussein (GRL Florida) to lecture on "Deep Foundations Dynamic Testing and Analysis Methods". Prof. Macari wrote: "On behalf of everyone in attendance at your seminar, I want to thank you for a fine and informative presentation. These are the types of presentations that we would like to have from people who have daily access to the practice of geotechnical engineering."

Visit us at WWW.PILE.COM

GRL Dynamic Measurements and Analyses engineers, inc.

GRL Engineers, Inc.
Main Office: 4535 Renaissance Parkway
Cleveland, Ohio 44128 USA
E-mail: info@pile.com
Phone: +1-216-831-6131
Fax: +1-216-831-0916

California • Colorado • Florida • Illinois • North Carolina • Ohio • Pennsylvania

Pile Dynamics, Inc.

Pile Dynamics, Inc.
4535 Renaissance Parkway
Cleveland, Ohio 44128 USA
E-mail: info@pile.com
Phone: +1-216-831-6131
Fax: +1-216-831-0916