



Information gathered by the engineers of
Goble Rausche Likins and Associates, Inc. and *Pile Dynamics, Inc.*

It is that time of the year again

We thank our clients and readers for another good year of working together and we hope that 2001 will bring you peace, health, success and delight.

NEWTON'S APPLE FALLS IN AMHERST

by Frank Rausche and Brent Robinson

GRL has designed and built a new dynamic loading system for drilled shaft capacity testing. The ram is modular and its weight can be varied between 5 and 20 tons. With these ram weights, and utilizing free release drop heights of up to 9 ft (2.7 m), we can generate ultimate test loads of up to 2000 tons.

The guide frame, designed and constructed in cooperation with Fritz Koltermann of the Foundation Equipment Corporation in Dover, Ohio, has a 1.8 x 1.8 m footprint and a height of 6 m. After the ram is lifted by the crane to its top position, a pin is



Bill Maxwell of Hub Foundation operates Newton's Apple

own Pile Driving Analyzer® to acquire test data. Jim Maxwell of Hub Foundation in Harvard, Massachusetts operated our dynamic loading apparatus.

GRL has called its loading system "Newton's Apple" because it is really smart; it is instrumented for a precise reading of pile top force. This reduces pile excavations for strain sensor attachment and also is more accurate than the calculation of force from strain when the concrete quality is questionable. Comparison measurements between measured ram force and the force computed from pile strain measurement yielded very close agreement.

GRL's Newton's Apple has also tested piles in Tennessee and currently is testing in Houston for Berkel & Co. Contractors, Inc. Their test pile sizes vary between 350 and 450 mm diameter and have lengths up to 25 m. Proof loads of up to 400 tons have been generated with the 7.5 ton ram.

SHAFT INTEGRITY TESTS IN AMHERST

For research purposes, the shafts at the Amherst site were prepared with a variety of defects. GRL used its new Cross-Hole Analyzer™ (CHA), manufactured by Pile Dynamics (see overleaf) to locate these artificial defects. Furthermore, we used the Pile Integrity Tester™ by Pile Dynamics to conduct tests according to the Pulse Echo Method, also called the Low Strain Method.



GRL's Brent Robinson conducts a CHA test in Amherst

inserted through the ram lifting bar into the guide frame to transfer the ram weight to the frame. Of course, the weight can also be dropped directly from the crane, if the crane boom can take the whip.

On September 6, 2000, GRL conducted a series of tests at the National Geotechnical Experimentation Site at the University of Massachusetts in Amherst with a 7.5 ton ram. A 25 ton hydraulic crane helped to assemble and move the loading system from shaft to shaft. We unloaded the system from the truck, tested 3 shafts of 900 mm diameter and 17 m length and reloaded the truck, all within 7 hours.

GRL performed this demonstration together with Carl Ealy from the Office of Research and Development of the Federal Highway Administration. Carl actively participated and used his

GRLWEAP NEWS

GRLWEAP 2001 is now in an extensive testing phase with emphasis on user friendliness. We are also doing a major update on our hammer data file and have submitted data request forms to hammer manufacturers and representatives. We hope to release this new software in the second quarter of 2001.

Please visit our improved web site at www.pile.com

CALENDAR OF EVENTS

2001

- Jan 17-20:** Hyatt Hill Country Resort, TX: ADSC Expo. Presented by The International Association of Foundation Drilling. For information call (214) 343-2091.
- Feb 1-2:** San Juan, PR: Course on Deep Foundations: Design, Construction and Quality Control. Presented by the American Society of Civil Engineers Continuing Education. For information call (800) 548-2723.
- Feb 22-23:** Technical University Braunschweig, Germany: German Pile Symposium. For information call 49-531-391-2730.
- Feb 22-24:** San Antonio, TX: Pile Driving Contractors Association's Winter Roundtable. For information call (970) 946-1231.
- Mar 6-7: Orlando, FL: GRLWEAP Seminar. Contact GRL-Pile Dynamics for information.**
- Mar 8-9: Orlando, FL: PDI Users Days. Contact GRL-Pile Dynamics for information.**
- Mar 9: Orlando, FL: Foundation QA Dynamic Pile Testing examination. Contact GRL-Pile Dynamics for information.**
- April 9-13:** Double Tree OceanFront Hotel, Cocoa Beach, FL: 25th Annual Short Course on Deep Foundations: Analysis, Design, Testing and Inspection. Presented by the University of Florida. For information please call (352) 392-1701 ext. 244.
- May 3-4:** Washington, DC: Course on Deep Foundations: Design, Construction and Quality Control. Presented by the American Society of Civil Engineers Continuing Education. For information call (800) 548-2723.
- June 11-12:** Gothenburg, Sweden: PDI Users Days. Presented by Pile Dynamics Europe. For information call 46-31-454307.

PILE DYNAMICS INTRODUCES CROSS-HOLE ANALYZER

PDI has developed a Cross-Hole Analyzer (CHA) for determining the quality of concrete between pairs of tubes pre-installed in drilled shafts using the cross-hole sonic logging method (CSL). The CHA is built with a PAK-type enclosure that guarantees its ruggedness. It has a color screen, Windows based software and cutting edge electronics that assure its reliability. The system includes two sensors (a receiver and a transmitter), each with its own depth encoder. These sensors are lowered down the water-filled tubes and scan the shaft with a high frequency signal. The CHA is easy to use and the data interpretation is straightforward.

WINDOWS SOFTWARE

All Pile Dynamics software is now available for the Windows environment: GRLWEAP for Windows was released in 1999; PDA-W and CAPWAP-W have recently been released, and a Beta Version of the Pile Integrity Tester software PIT-W, which will replace PITSTOP, will be available in January, 2001. Please contact Pile Dynamics about upgrading your DOS software.

READERS AND CLIENTS WRITE

Bob Meyers, State Geotechnical Engineer of the New Mexico State Highway & Transportation Department, thanked GRL "for the excellent two day CAPWAP training class given on October 10 and 11, 2000. (...) We have estimated that the Department has benefited in over \$2.5 million reduced foundation costs to our projects over the ten year period we have been utilizing the technology, while insuring the long-term serviceability of our structure foundations. (...) We look forward to a continued professional and cordial relationship with GRL / Pile Dynamics."

Ravikiran Vaidya, a user of PDI equipment who moved from Singapore to start a practice in India, mentions "the tremendous support that I have received from your end (...). I now have at least 3 people trained to (...) collect PIT data. (...) I have almost been able to get the Western Region to adopt PDA tests and today I see great potential for this form of testing. I will definitely need more equipment in the near future. Overall, it has been tough but challenging since I left Singapore. (...) there is a lot of satisfaction of really creating a market for a fantastic product".

Jonathan D. Bray, Professor, U.C. Berkeley, comments on the use of the SPT Analyzer in the project "Documenting Incidents of Ground Failure Resulting from the August 17, 1999 Kocaeli, Turkey Earthquake". This project was a cooperation of research universities and government agencies in Turkey and the USA. "I would personally like to thank you once again for your support of this important project. Yes, indeed, Rodolfo (n.e.: Rodolfo Sancio) did an excellent job, but it was your equipment and training that made it possible. (...) The demonstrated usefulness of the equipment (...) for enabling reliable N60 numbers to be obtained cannot be ignored by the profession. Thanks again for your help."

Editor's note: for more information about this project please visit <http://www.ce.berkeley.edu/~sancio/turkey/adapazari/>.

DYNAMIC PILE TESTERS MEET IN SAO PAULO, BRAZIL

We would like to commend the organizers of the 6th Int. Stress Wave Conference, particularly Dr. Susumu Niyama, Conference Chairman, and Jorge Beim, Conference Secretary, for a well planned and organized event. Different from previous conferences was the format which featured fewer author presentations and more audience participation. The interactive "televoting" revealed the need for greater involvement of the testers "in the trenches" in future conferences. It also revealed that the audience felt very comfortable with the reliability of the dynamic pile testing methods.

Pile Dynamics sent four delegates to the conference. They had submitted 6 papers on high and low strain dynamic testing and wave equation analysis, and presented a key note lecture. If you would like to receive a copy of any of the papers please contact Pile Dynamics. In the exhibit, our PAL-R (the Pile Driving Analyzer with remote operation by telephone hookup) created great interest.

GRL

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