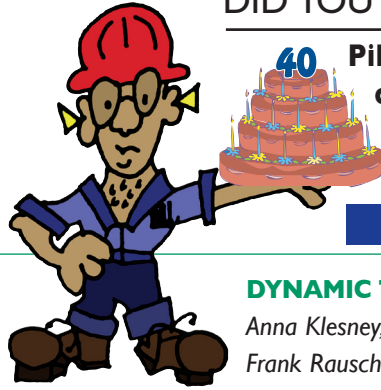


DID YOU KNOW?



40 Pile Dynamics celebrates its 40TH anniversary in 2012!



DYNAMIC TESTING OF HELICAL PILES

Anna Klesney, GRL Engineers
Frank Rausche, Pile Dynamics, Inc.

The American with Disabilities Act (ADA) is a US law that mandates that public buildings be accessible to individuals with impaired mobility, requiring, for example, the availability of ramps for wheelchairs. ADA improvements to the Amtrak Passenger Station of Alpine Texas required a new platform which was designed with more than 200 helical piles of 2-7/8 inch (73 mm) shaft diameter as a foundation system. The piles were to be advanced (helical piles are screwed into the ground by the application of torque) into the primarily granular soil profile to a minimum depth of 10 ft (3 m). Atwell, LLC from Southfield, MI, the construction manager for track owner Union Pacific Railroad and user Amtrak, retained GRL Engineers to perform dynamic load tests on 10 helical piles. Nine of the ten piles had not reached the desired depth and could not undergo static load tests because of their proximity to the tracks; the remaining test pile had been statically tested and was monitored under dynamic tests for comparison. Previously conducted dynamic tests in cohesive soils compared well with static tests for this type of pile.

Helical foundation systems offer a specialty solution for numerous applications including foundation underpinning, earth retention and residential and commercial foundations. Consisting of a central shaft with one or more helical-shaped bearing plates, extension shafts, and a bracket that allows for attachment to structures, the conventional helical foundation system is typically designed for maximum allowable design load of 60 kips (270 kN), with some systems designed for

up to 200 kips (890 kN). The most common means of estimating helical pile capacity is found in AC358, Acceptance Criteria for Helical Foundation Systems and Devices, by the International Code Council Evaluation Service, Inc. (ICC-ES). For capacity verification of helical foundation systems, the AC358 acceptance criterion considers system dimensions, load test results and torsion resistance. A successful verification of system installation and allowable capacity is established provided the maximum allowable torque is achieved during system installation and all full-scale axial load tests exceeded the allowable capacity by at least a factor of 2. For systems that fail this verification, the acceptance criteria specify additional testing.

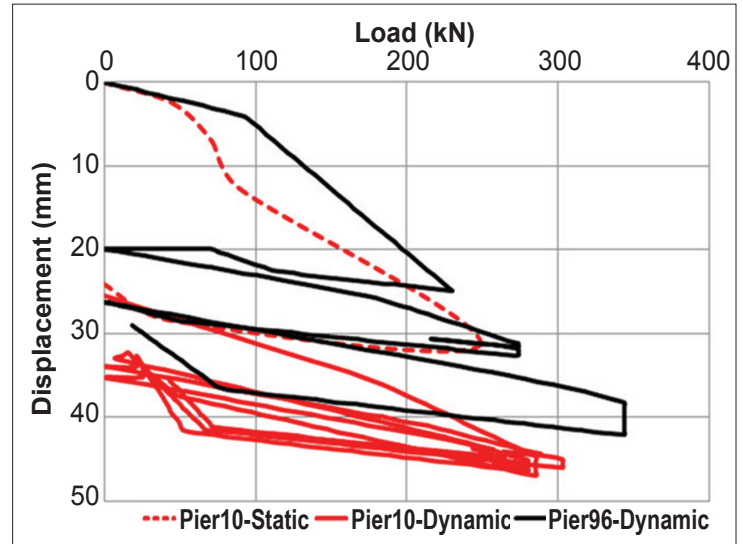


Figure 2 Typical Dynamic Testing Result and Static Load Test



Figure 1. Drop hammer with pile extension (photo courtesy Atwell, LLC)

Atwell proposed high-strain dynamic testing of the non-conforming piles. A joint effort with GRL led to the development and construction of a simple, 1,500 lb (680 kg) drop hammer with a reusable, portable pile extension fitted for transducer attachment and drop hammer impact (Figure 1). GRL tested ten helical piles: one on which a static load test was conducted, for comparison, and nine production piles for additional verification. Three or four impacts with fall heights of up to 3 ft (0.9 m) were applied; the ensuing forces and velocities of the helical piles were measured by a Pile Driving Analyzer® Model PAX and analyzed by CAPWAP®. The simulated load set curves of the impact loadings, calculated by CAPWAP, were then plotted together considering the displacement history of previous loadings. A typical result is shown in Figure 2, showing similar results for static and dynamic tests.

The ten dynamic tests conducted on the helical piles provided an efficient and economical alternative to static load testing.

2012 Calendar of Events

for a complete listing visit www.pile.com/events

May 15, 16, 22 and 23 at 9 am Eastern Time: CAPWAP® users are encouraged to refresh their skills at PDI's CAPWAP Webinar, presented by Brent Robinson in four 2 hour long sessions via Internet and Phone Connection. Info: www.pile.com/events/pdievents

May 16-17, Portland, OR: **Visit PDI at exhibit booth 31** at the Deep Foundations Institute's SuperPile Event. Info: www.dfi.org/conferences.asp

May 24, Cleveland, OH: **PDI and GRL are proud sponsors** of the 17th Annual Great Lakes Geotechnical/Geoenvironmental Conference (GLGGC), at Case Western Reserve University. **GRL will exhibit. Dr. Gray Mullins**, instrumental in the development of the **Thermal Integrity Profiler**, will present a keynote address. Info: <http://filer.case.edu/xy21/2012GLGGC/Home.htm>

June 6 at 1 pm Eastern Time: **Michael Morgano** presents the Live Audio Conference "**Quality Control of Deep Foundations**", through Lorman Education Services. Info and registration: www.lorman.com/ID389824, discount code F2716129, priority code 15999.

June 7-8, Denver, CO and August 16-17, New York, NY: **Mohamad Hussein** presents at the ASCE seminar "Deep Foundations: Design, Construction and Quality Control". Register through <http://secure.asce.org/ASCEWebSite/Webinar/ListSeminar.aspx?CatCode=CED-GEOT#54>

June 13, Brussels, Belgium: GSP and PDI present a Seminar on Deep Foundation Dynamic Testing and Wave Equation Analysis. Frank Rausche and Oswald Klingmüller will present. The Low Strain Testing Proficiency Test will be offered. Info: www.pile.com/events/pdievents

June 14, Brussels, Belgium: GSP and PDI present a High Strain Dynamic Foundation Testing Workshop and Examination. Frank Rausche and Oswald Klingmüller will present. The PDI/PDCA Dynamic Measurement and Analysis Proficiency Test will be offered. Info: www.pile.com/events/pdievents

June 17-20, São Paulo, Brazil: **Visit the booth of PDI representative Carmix do Brasil** at SEFE7, the 7th Seminar on Special Foundations Engineering and Geotechnics and 1st Foundation and Geotechnics Industry Show. Info: www.sefe7.com.br/en/index.php

June 21, São Paulo, Brazil (tentative): PDCA and PDI offer a PDA and CAPWAP Workshop and Proficiency Test. Details forthcoming.

July 17-18, 9 am Eastern Time: Webinar (em português) Ensaio Não Destrutivo (PIT e outros ensaios) por Jorge Beim. 2 sessões de 1,5 a 2 horas cada. Info: www.pile.com/events/pdievents

September 4, 11:30 AM - 1:00 PM Eastern Time, via Internet and Phone Connection: **Garland Likins** presents the ASCE webinar "Integrity Assessment of Deep Foundations: Principles and Limitations". Register through: <https://secure.asce.org/ASCEWebsite/Webinar/ListWebinarDetail.aspx?ProdId=149344967>

September 3-5, Tallinn, Estonia: **Visit the booth of PDI representative Pile Dynamics Europe** at Baltic Piling Days, sponsored by Estonian, Latvian, Lithuanian and Finnish Geotechnical Societies. Info: www.balticpiling.com

September 18-20, Kanazawa, Japan: The 9th International Conference on Testing and Design Methods for Deep Foundations. Sponsored by The Organizing Committee of IS-Kanazawa. Info: <http://is-kanazawa2012.jp> (Successor to the International Conferences on the Application of Stresswave Theory to Piles)

October 3-6, Piacenza, Italy: **Visit the booth of PDI representative DRC** at Geofluid - Drilling and Foundations. Info: www.geofluid.it

October 16-19, Houston, TX: **Visit PDI at booth 703** of the DFI 37th Annual Conference on Deep Foundations. Info: www.dfi.org

October 24, Cleveland, OH: Seminar on Deep Foundations Testing and Wave Equation Analysis. Sponsored by PDCA and PDI. Info: www.pile.com/events/pdievents

October 25-26, Cleveland, OH: PDA and CAPWAP Workshop and Proficiency Test. Sponsored by PDCA and Pile Dynamics, Inc. Info: www.pile.com/events/pdievents

NEW ASTM STANDARDS FOR SPT

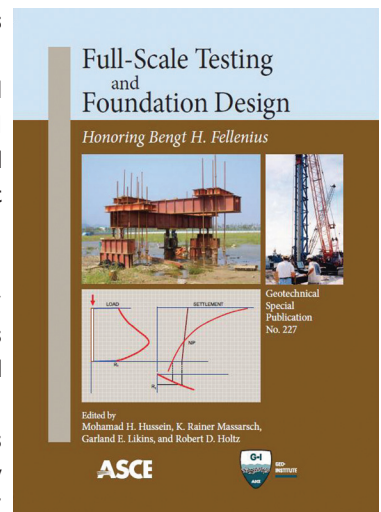
The American Society for Testing and Materials, ASTM, has recently revised standards related to the Standard Penetration Test. These documents are available from www.astm.org: D1586-11 - Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils; D4633-10 - Standard Test Method for Energy Measurement for Dynamic Penetrometers; D6066-11 - Standard Practice for Determining the Normalized Penetration Resistance of Sands for Evaluation of Liquefaction Potential. ASTM continues to recommend the calibration of SPT hammers by force and velocity measurements; such measurements may be obtained with the Pile Driving Analyzer® or with the SPT Analyzer.

GRL OFFICES NOW PROVIDING THERMAL INTEGRITY PROFILING

GRL Engineers is now equipped to provide services of Thermal Integrity Profiling across the country. This new method of assessing the quality of drilled shafts, which takes advantage of relationships between concrete temperature during curing and concrete integrity, is gaining increased acceptance across the United States. Advantages of Thermal Integrity Profiling include early testing (typically only one or two days after casting concrete, while three to ten days after testing are typical for crosshole sonic logging) and evaluation of the concrete outside the reinforcing cage. GRL has recently tested shafts in Nevada, Ohio and Washington State; Departments of Transportation of other States have expressed interest in learning about the promising new technology.

NOTABLE PUBLICATION

The American Society of Civil Engineers recently published Geotechnical Special Publication (GSP) 227: Full-Scale Testing and Foundation Design, edited by Mohamad Hussein, Rainer Massarsch, Garland Likins, and Robert Holtz. The book honors Dr. Bengt Fellenius and includes reprints of eighteen of his landmark papers. Thirty-three additional peer-reviewed papers written especially for this volume present test methods for various types of foundations and describe useful applications in a diversity of situations. These papers offer findings from interesting projects and document valuable lessons learned by some of the leading experts in the field of foundation engineering from around the world. The book may be purchased from www.asce.org/Product.aspx?id=2147486137&productid=149296508



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