



## *A time for thanks*

This year the United States celebrates the Thanksgiving holiday on November 23. This traditional American holiday is the perfect occasion for Pile Dynamics and GRL Engineers to extend their special thanks to all readers of this newsletter.



## **Continuous Flight – a tour of job sites**

*Edited by G.Beim from contributions from PDI customers and staff.*

Auger Cast-In-Place (ACIP) piles are also known as Continuous Flight Auger Piles (CFA), describing the type of auger used in their installation. Indeed PDI technicians take frequent, if not continuous, flights around the world to install Pile Installation Recorders (PIR-A) on auger cast-in-place pile rigs. The PIR-A monitors the auger depth and torque during drilling as well as the pressure and incremental volume during grouting. Grout volumes are measured by a magnetic flow meter located in the grout line.

Many flights take PDI technicians to sites that are interesting from a technical point of view. Occasionally, they take them to sites that appeal to the general public as well. Please join us on a virtual tour of a selected few:



*Brian Lara Cricket Academy – dynamic load test on ACIP pile.*

Our first stop is the Brian Lara Cricket Academy in Trinidad. When completed in December 2006, it will be the practice grounds for the upcoming World Cricket Tournament in March 2007, and will be among the largest Cricket stadiums in the Caribbean. It will rest on 1200 ACIP piles with diameters 457 mm and 610 mm (18" and 24"), and depths up to 20 m (66 ft). Simone Jardine of foundation

contractor Gordon Winter Co Ltd. explained that ACIP piles were chosen due to the extremely hard consolidated clay on site. All piles were monitored with the PIR-A, that, according to Jardine, "proved to be an invaluable tool; particularly with respect to QC auditing and technical reviews, which by extension, saved QC personnel onsite. It was 100% reliable to the point where the torque per second was used as an indicative guide to clay hardness." At this site Geotech Associates Limited, under the direction of Ing. Andrew Budhram, performed 29 dynamic pile tests by dropping a 5.5 tonnes (12+ kips) ram up to 1.8 m (6 ft) onto the piles and measuring the response with a Pile Driving Analyzer®. CAPWAP® analyses, performed by GRL Engineers, yielded capacities of up to 3870 kN (870 kips) indicating that the piles had additional safety margins. Since correlation with 8 static load tests was excellent, the dynamic test results were used to optimize the foundation. Cricket fans can get ready to cheer next year in Trinidad.

From Trinidad, we move to the site of the expansion of the Los Angeles County Museum of Art in California, designed by renowned Italian architect Renzo Piano. Construction at this site continued without interruption despite the ongoing discovery of ancient fossils. The museum rests on the LeBrea deposit, composed of tar (or asphalt) so sticky that it has been entrapping thousands of animals and plants since the Ice Age. Fossils found during construction included saber tooth tigers, turtles and falcons, all dating to the last Ice Age. The foundation for the museum expansion consists of 125 ACIP piles with diameter 610 mm (24"), and lengths up to 18 m (60 ft). Shoring Engineers of Santa Fe Springs, CA, installed the piles with a Soilmec 412 rig. The PIR-A monitored all piles, as specified by the project structural and geotechnical engineers. According to Jason Weinstein P.E.,



*Los Angeles County Museum of Art*

Vice President of Shoring Engineers, the use of the PIR-A on this project saved both time and money. He feels that "the project could not have been done without the PIR-A. It took away the guess work as there was no way to go by feel" due to the challenging soil conditions, a unique mixture of clay and tar sands. The integrity of the piles was later verified with the Pile Integrity Tester (PIT). We are happy to report that no persons or equipment were entrapped in the asphalt during pile installation or testing.

The next stop on our ACIP tour is in Rockdale, Texas, the site of the future Sandow Unit 5 Power Plant. This new coal fired power plant being built by Bechtel for TXU Energy will replace an older plant, significantly reducing plant emissions and thus contributing to the quality of the environment.



*Sandow Unit 5 Power Plant*

Berkel & Company Contractors Inc. is installing 2000 ACIP piles up to 457 mm (18") diameter and up to 17 m (55 ft) long that will support all significant structures. Subsurface conditions consist of various layers of clay, sand and lignite. Tracy Brettman, Berkel's Texas Regional Manager, believes the PIR-A provided the highest level of quality control and quality assurance available (manual inspections are also being performed). The use of the PIR-A in all piles did not delay the construction schedule; the foundation work will be completed as planned in December 2006. The project has additional quality control specifications: 10 % of all piles will be subject to low strain integrity tests (PIT) and ten test piles were load tested for compression, tension and lateral capacity.

Our virtual job site tour highlighted future sites of relevant structures – be it for their significance to sports, the arts or the environment. From an engineering point of view, they all share the implementation of quality assurance and control procedures during the foundation installation phase, and for that their specifying engineers should be commended.

Disclaimer: PDI did not travel to the Texas site; Berkel & Company performed the installation themselves