



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®.



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.