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Stresswave 2008: All you need to know about dynamic foundation testing

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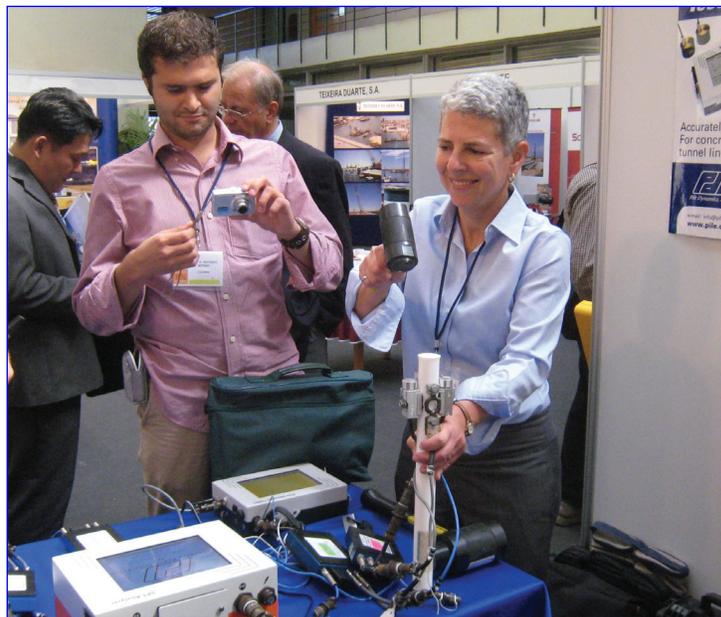
The Eighth International Conference on the Application of Stress Wave Theory to Piles ("Stresswave 2008") took place in Lisbon, Portugal in September 2008. Professor Jaime Santos of Instituto Superior Técnico chaired the highly successful event that attracted close to 200 attendees from all over the world.

Academics and practitioners presented approximately 100 papers; GRL and PDI engineers authored fourteen of them. The full text of the noteworthy PDI and GRL contributions summarized below may be downloaded from the PDI - GRL website.

Likins, Piscsalko, Roppel and Rausche review the evolution and current state-of-practice of High Strain Dynamic Testing in "**PDA Testing: 2008 State of the Art**". The authors assert that "while the basic methods have changed relatively little since 1980", the field has benefited from significant technological advances of the past 30 years, transforming itself from an academic exercise to routine practice now specified or recommended by multiple codes and standards and widely applied throughout the world. Papers summarized in this article corroborate this statement. Likins et al note that the primary technology developments of recent years have improved acceleration signals under extreme conditions, have introduced wireless data transmission from transducers to the Pile Driving Analyzer® and have permitted remote testing at reduced testing cost to provide expertly reviewed results more quickly.

A particularly interesting example of current testing capabilities as applied to high capacity drilled shaft foundations is presented in "**Large scale dynamic high-strain load testing of a bridge foundation**" (Hussein, Rausche, Bullock and McGillivray). Other recent developments related to high capacity tests include a dynamic PDA-based testing system that bridges the gap between dynamic and rapid load testing (Hybridnamic). This system is described in two papers: "**The effect of ram mass on pile stresses and pile penetration**" (Rausche, Likins, Miyasaka and Bullock), and "**Rapid load test on high capacity piles**" (Miyasaka, Kuwabara, Likins and Rausche). Additional practical applications of recent research in Dynamic Load Testing include "**Load rate effects on high strain tests in high plasticity soils**" in the city of Bogotá (Rodriguez, Alvarez and Velandia), "**Dynamic testing in sensitive and difficult soil conditions**" (Morgano, White and Allin), and "**A simplified method for predicting load-settlement curves**" (Beim and Hussein) which could be applied to Case Method results.

In the keynote lecture "**Mastering the Art of Pile Testing**", Frank Rausche and co-authors Nagy and Likins echo the theme of the significant evolution of High Strain Dynamic Testing, while presenting some of the challenges facing professionals of this field. The authors offer guidelines for optimal results. The theme of guidelines for proper testing and analysis is enhanced by Likins and Rausche in "**What Constitutes a Good PDA Test?**". Readers of these two papers are made aware of several potential pitfalls during data input, field data collection and during analysis: To overcome the variability of Smith soil model parameters (quakes and damping) testers are



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urged to always perform signal matching by CAPWAP® analysis and rely on refined wave equation analysis for parameter selection. The importance of choosing the appropriate test conditions such as hammer selection and the time of testing is highlighted. In order to avoid dynamic monitoring problems, readers are urged to be careful when instrumenting piles, inputting data and analyzing the data both during monitoring and in post-processing analysis.

Case studies include tests performed on a Wind Farm in New Jersey (Teferra, Saavadra and Echaniz) and offshore oil platforms (Webster, Givet and Griffith). These and multiple other papers presented at Stresswave 2008, bring to life the assertion that High Strain Dynamic Testing is now in common use throughout the world.

Codes and Standards pertaining to PDA testing are discussed by Beim and Likins in "**Worldwide Dynamic Foundation Testing Codes and Standards**". Documents pertaining not only to High Strain Dynamic Testing, but also to Low-Strain Testing (e.g. Pulse Echo), Cross-Hole Sonic Logging, and measurement of energy delivered by SPT systems are reviewed.

Traditionally, most papers presented at Stresswave conferences have focused on High Strain Dynamic Testing. The works "**Effect of Soil Resistance on the Low Strain Mobility Response of Piles Using Impulse Transient Response Method**" (Liang and Beim) and "**Comparing Cross-Hole Sonic Logging and Low-Strain Integrity Testing Results**" (White, Nagy and Allin) highlight the other major dynamic foundation testing methods.

The papers noted throughout this article may be downloaded from www.pile.com/references. The complete Proceedings of the "8th International Conference on the Application of Stress-Wave Theory to Piles", published in 2008 by IOS Press, may be ordered from iosbooks@iospress.com (USA and Canada), sales@gazellebooks.co.uk (UK and Ireland), or order@iospress.nl (rest of the world).