



GRL NEWSLETTER

INFORMATION GATHERED BY
THE ENGINEERS OF
GOBLE RAUSCHE LIKINS
AND ASSOCIATES, INC.

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PDA Users Make Waves News From the 1987 PDA Users Day

PDA users met on June 12 and 13, 1987 to learn from the experiences of their colleagues. They came from as far as Australia. Lectures were given the first day and hands-on workshops were conducted the second day at GRL-PDI's office in Cleveland, Ohio.

Talks and workshops centered around the following topics (see also below):

- CAPWAPCTM (Case Pile Wave Analysis Program), correlations, experiences, error potential, new program features.
- PDA (Pile Driving AnalyzerTM), Model GC capabilities, including hammer performance results and plotter capabilities.
- PIT (Pile Integrity Testing-by Low Strain) on either PDA or Compaq portable computers.
- Dynamic penetrometer testing using HPA (Hammer Performance AnalyzerTM based on radar) and PDA.
- WEAP86, experiences, corrections, enhancements.
- New products.

At the end of the two-day course in pile dynamic measurements and analyses, the attendants each received a certificate of participation.

Fast CAPWAPC Version Unveiled at Users Day

The new CAPWAPC, a graphics version, makes it possible for the user to work with a minimum of equipment and time. During the workshop six groups competed against each other with the graphics CAPWAPC to predict the bearing capacity of a load tested pile. Four groups had almost identical results (which matched the load test result). One group predicted a little low, another one too high. However, because of lack of experience and time constraints, this last group was not finished with its work.

Low Strain Integrity Systems Offered

Low strain integrity testing with small hand held hammers is applicable to both drilled shafts and impact driven piles. The attendants used both a PC-AT compatible, portable computer and the PDA.

Penetrometer Monitoring Becomes Routine

At the Piling Research Laboratory of the University of Colorado in Boulder, G. G. Goble has been developing the monitoring of SPT procedures. At the PDA Users Day, in cooperation with Technotest USA, the same capabilities were demonstrated on the lightweight DinaStar static-dynamic cone/penetrometer. Direct strain and acceleration measurements in the rods yielded energy and soil resistance data. HPA measurements may be used to rate SPT operator performance through comparisons of impact velocity values.

PDA-GC Capabilities Demonstrated

The PDA capability of directly computing the stiffness of a hammer cushion was demonstrated. PEBWAP (Pile End Bearing Wave Analysis Procedure) produced the pile bottom resistance vs pile bottom displacement curve for end bearing piles. Tension stress is now computed for both easy and very hard driving - usually tension is the only concern in easy driving. PDA plots now also include force, velocity, waves, resistance, energy and displacement as a function of time. The new four channel capability allows direct inspection of bending stresses for every blow during driving.

New Products from Pile Dynamics

Dean Cotton, PDI's chief electronic engineer, demonstrated new products including a batter indicator for efficient pile direction placement and a

mini SaximeterTM. The users enjoyed playing with these gadgets. More detailed information will be forthcoming in future issues.

PDA Deliveries, Training Keep PDI/GRL Engineers Busy

PDA's were recently delivered to Australia, Brazil, Canada, China, Sweden and Taiwan. GRL engineers were busy with training activities in Finland, Taiwan, and Shanghai with engineers starting dynamic pile testing. Additional instruction was given in Cleveland for engineers from Australia, Canada, Holland and Mexico.

Seminars

GRL held seminars with emphasis on WEAP86 applications in Florida, Louisiana, Oregon, New Jersey and California. On several occasions Charles O. Riggs also lectured about soil exploration methods.

PDI Exhibits at DFI Luxembourg Conference

The Deep Foundations Institute conducted an international conference during May in Luxembourg. The technical program included experiences gathered on construction sites both in the USA and Europe. PDA and CAPWAP users from both continents reported on their experiences.

Dynamic Developments Reported from Brazil

Sergio Belm, Manager of PD Engenharia, Brazil, reports a busy testing schedule. Dynamic tests on precast concrete piles have been performed both in the South and along the north coast of Brazil.

YOU ARE CORDIALLY INVITED . . .

to a second 1987 PDA Users Day in Kungsbacka, Sweden, to be held August 11 through 13, 1987.

Preliminary plans were made to conduct a PDA Users Day in November 1988 in Hong-Kong.

DON'T FORGET . . .

the Third Stress Wave Conference in Ottawa, Canada. Please contact:

*Prof. B. Fellenius
ANNA Geodynamics
4750 Donovan Court
Ottawa, Ontario
K1J 8W1 Canada*

for details about paper submittal dates and deadlines for the May 1988 conference.

GRL COLORADO HAS A NEW LOCATION:

*Goble Rausche Likins
Colorado, Inc.
5330 Sterling Dr. Ste. C
Boulder, CO 80301
(303) 444-3304*

Jay Berger Joins GRL Engineering Team

GRL welcomes Jay Berger as a new engineer. He is currently completing his M.S. program at the University of Colorado in Boulder. Studying under Professor Goble, Jay has researched the Load Factor Design Method for piling, a topic which he presented at the 1987 PDA Users Day. He has already started working in the new Colorado office.

New Offices for GRL

GRL proudly announces the opening of its Philadelphia and Orlando offices.

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PDA Training Given in Taiwan

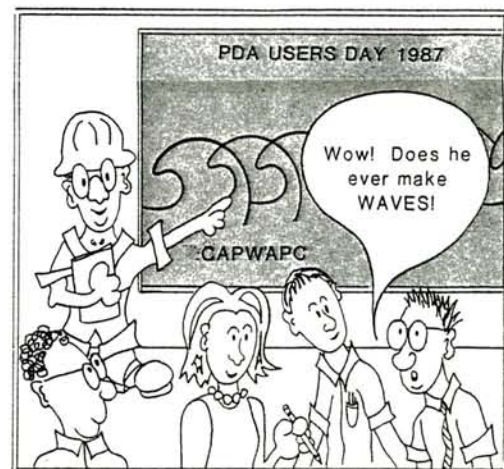
GRL engineers delivered PDA and CAPWAP systems to two major contractors in the Republic of China (Taiwan). In early April, Garland Likins trained BES engineering personnel in the systems' use. Systems were also delivered to RSEA whose engineers were instructed by Mohamad Hussein. The training included the testing of both steel and concrete piles in Taipei, Kaohsiung, and Taichung. While in Taiwan, Mohamad assisted UGI in testing a large diameter, bored pile (1.2 m dia. and 60 m length) using a specially designed 15T hammer. A two hour lecture, arranged by RSEA and attended by over 70 engineers, concluded the trip.

WEAP86 News

A new input program named Template has been prepared which includes the data contained in the tables in the Users Manual. It allows for simple data entry, a hammer file search, and contains a graphic representation of the driving system as a help.

The plotter output program was rewritten to incorporate screen graphics. The new version, W86GRF, supports several graphics drivers (EGA, CGA, Hercules, and Compaq) along with the HP plotters.

Math underflows were noted by some users for diesel hammers with more than three ram segments. Updates will be mailed to those organizations which received WEAP86 from GRL. The manual states incorrectly $E = 3.5$ ksi instead of 350 ksi for Bongossi wood.



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