



# GRL NEWSLETTER

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

NUMBER 2

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## PDA Users Day Is International Event

PDA users from eleven countries gathered in June for the annual PDA Users Day in Kungsbacka, Sweden. Flags of Australia, Canada, Denmark, Finland, Luxembourg, Norway, Sweden, the United Kingdom, the United States, West Germany, and Yugoslavia were proudly displayed in front of the headquarters of Goteborgs Betongpalar, the seminar host and GRL/PDI's European representative.

More than 30 participants were royally treated to a cocktail hour on June 11 and to a sumptuous seafood smorgasbord on June 12 aboard a sightseeing boat which explored Goteborgs' harbor.

Serious work was done too. After lectures about WEAP86 and CAPWAPC (June 86 version), the attendees were split into six groups. These small groups worked

alternately with three projects: PDA (Model GC), WEAP86 and CAPWAPC.

Although varying in degrees of experience, all six users groups closely predicted the static capacity of a load tested pile using CAPWAPC. (For the particular test case, Case Method and WEAP86 results, based on ordinary soil classification, were overpredicted by as much as 400%).

Further lectures introduced the PDA - Model GC features, the state of load factor design for piles in the United States, a case study of low strain integrity testing and a new graphics program, developed by GBP, which allows a contractor to quickly and accurately summarize length and bearing strata penetration of a pile installation.

## Monotube Pile Responds

In response to the April 15 GRL Newsletter, Ed Moss of the Monotube Pile Corporation has sent a package of driving and static load test records supporting his contention that Monotube piles often outperform other pile types because of their shape in sandy soils. Ed words his concern as follows.

"...(the enclosed data) represent successes for our product, but the disappointments stigmatize when neither a static analysis nor wave equation analyses would predict the results. Dynamic measurements probably would not either ... I can personally (predict the Monotube pile behavior), but the industry has become so sophisticated that an old grouch's estimate does not make a thick nor expensive enough report."

Actually, CUWEAP and WEAP86 have made some advances by explaining that conventional wave equations underpredict the performance of highly flexible friction piles because of residual stress effects. It is now necessary to determine the proper static and dynamic soil parameters for both fluted and tapered piles. To shed more light on the subject, we shall investigate whether residual stress effects may be considered in CAPWAPC.

We invite further reader response to this subject. Do you have correlations either successful or disappointing? We would welcome any input.

## GRL Seminars and Presentations -- A Worldwide Activity

GRL gives presentations and/or seminars on dynamic pile testing methods, an unknown art to many engineers. If you would like a presentation and can assemble at least 15 engineers, please contact us for scheduling. In the past three months the following speaking engagements were met:

Date	City	Sponsor	Type
4/15	Cincinnati, Ohio	ASCE	2 hour talk
4/17-18	Harrisburg, PA	ASCE	1 hour presentation
5/26-28	Paris, France	Laboratoire des Ponts et Chaussees	2 hour lecture
5/29	Paris, France	IPT	2 hour lecture
5/30	Munich, Germany	GBP	1 day seminar
6/2	Hamburg, Germany	GBP	1 day seminar
6/3	Malmo, Sweden	GBP	1 day seminar
6/5	Stockholm, Sweden	GBP	1 day seminar
6/9	Oslo, Norway	GBP	1 day seminar
6/17	Helsinki, Finland	GBP	1 day seminar
6/18	Washington, D.C.	FHWA	1 hour presentation

Topics included WEAP86, CAPWAPC, Load Factor Design, Hammer Performance and Instrumentation.

## Calendar of Events

PDI plans to exhibit its equipment at the:

- Deep Foundations Institute Annual Convention October 22-24, 1986 in Houston, Texas
- ASCE Annual Convention October 27-31, 1986 in Boston, Massachusetts.

We hope to see you there.

# Current GRL Projects Span the Country

## Maryland

Pile testing on 120 ft long 54x6 and 66x6 inch post tensioned cylinder piles has been completed at the Choptank River Bridge near Cambridge, Maryland in cooperation with McLean Contracting and Maryland DOT. Tests checked for bending and axial compression and tension stresses during driving and verified bearing capacity. Ultimate capacities often exceeded 800 tons (7 MN).

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Similar tests for Chemung Contracting were resumed at the Nanticoke River Bridge in Sharptown, Maryland. These tests again included strain measurements on three points to limit pile top damage from excessive bending stresses.

## California

An extensive test series was conducted at the San Jose Convention Center in California in cooperation with Woodward-Clyde. Bert Miner of GRL Colorado conducted most of the work on these square concrete piles with Cleveland support from Michael Morgano.

## Florida

Michael also tested 180 foot long steel H piles in Ft. Pierce, Florida. Careful planning of the tests together with pretest wave equation analyses made it possible to shorten the piles by 30%.

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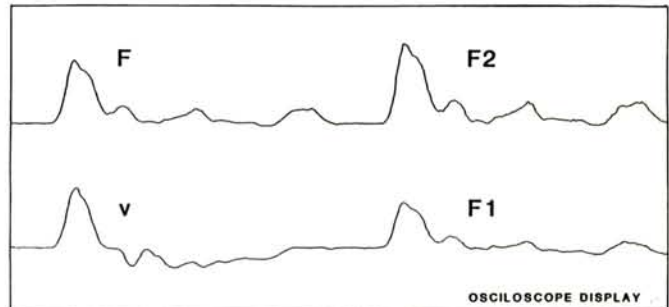
In Fort Lauderdale, low strain tests were performed on prestressed concrete piles using a PC based computer system. Cracked piles were identified. A few damaged piles were pulled and inspected. The validity of the method was confirmed.

## Minnesota

GRL in cooperation with GME Consultants of Minneapolis, is currently conducting dynamic pile tests at the site of a paper mill in Duluth, Minnesota. By using the PDA and Saximeter as an integral part of the site quality control, the blow count driving criteria has been reduced for the project.

## News From PDI

The Model GC program is in an extensive testing stage. This program allows for the simultaneous oscilloscope display (see simulated drawing below) of force, velocity and two additional quantities (like the two individual strain records for bendings checks). Other features include variable digitizing rates, new computational features, and revised plotter output. Release of this program is expected for September 1986.



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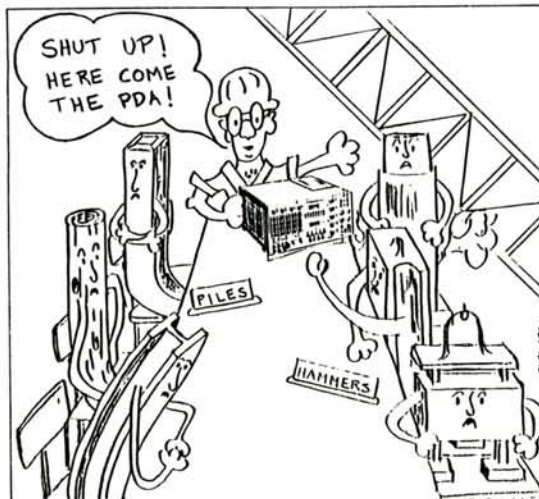
PDA's were delivered and training was administered to the Florida DOT and Indeco of Iowa. Florida will use the equipment first at the Appalachicola Bridge, Indeco is using the PDA for the Corps of Engineers at Lock 26 site near St. Louis.

## Paper Available

### ASTM Standard Proposed for Dynamic Pile Testing

In June, 1986 C.D. Thompson of Trow Ltd, Toronto, Ontario submitted a standard on dynamic pile testing to ASTM entitled "New Standard Method of High-Strain Dynamic Testing of Piles." It details testing equipment requirements and recommends certain testing and reporting procedures.

As dynamic pile testing becomes a widely used engineering tool, a standardized method becomes essential. We recommend our users and our clients to familiarize themselves with the proposed document and to adhere to it. Please contact either Chris Thompson's office (Trow Ltd., 1595 Clark Blvd., Brampton, Ontario L6T 4V1, Canada; phone: 416 793-9800) or us for a copy.



## WEAP86 Users Be Aware

It may happen that your residual stress analysis does not converge. All results following that message may be meaningless. Improved

performance may be achieved with gradually increasing Ru values, e.g. instead of Ru = 400, 600, 800, ... analyze Ru = 200, 400, 600, ... to avoid the big jump from 0 to 400.

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### Please Note:

- Our correct address!
- WEAP86 is now available in either English or SI units.
- Please let us know if your address was incorrect or if you know someone who should be included in the mailing (i.e., contractors, engineers, etc.)

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