



# GRL NEWSLETTER

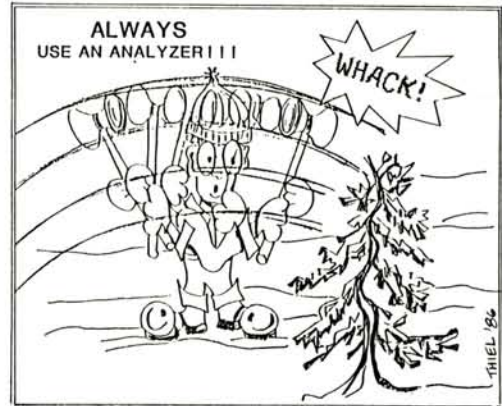
INFORMATION GATHERED BY  
THE ENGINEERS OF  
GOBLE RAUSCHE LIKINS  
AND ASSOCIATES, INC.

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## ★ ★ ★ SEASON'S GREETINGS ★ ★ ★

It is the time of the year to wish our readers a peaceful holiday season and a prosperous 1987. GRL also would like to thank its clients and friends for their support in the past year. Many ideas have been formulated as a result of our joint cooperation. A few calm days during the holidays hopefully will allow us to put some of the new thoughts into reality.



### DFI Engineers Gather in Houston

Engineers gathered in Stouffer's Hotel in Houston October 22-24 for the annual Deep Foundations meeting. Lectures covered various aspects of pile analysis, installation and research. Committee members reported on progress in their problem area (see box). PDI had an exhibit at the successful conference.

Please Take Note of Future DFI Meetings:

- May 1987, Luxembourg
- October 10-14 1987, Hamilton, Ontario

### Seminar Presentations

George Goble spent the month of August in Rio de Janeiro working on the development of a cooperative research program with Catholic University of Rio. While there, he presented a one week course on wave equation analysis, dynamic monitoring, analysis of measurements and hammer performance. Thirty-five practicing engineers attended. Dr. Goble also presented seminars at the University of Brazil and to practicing engineers in Sao Paulo.

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A research project at the University of Colorado to develop a Load and Resistance Factor Design system for the Pennsylvania Department of Transportation is now nearing completion. The procedure was presented to the department's engineers and consultants on October 22 by George Goble and Jim Langer of Gannett and Fleming Consultants. On October 29, a presentation was made on a similar topic during the Geotech program at the Boston ASCE Convention.

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### DFI Committees Report

#### Equipment Application Committee Drops Hammer Rating Plans

For years, efforts have been made to develop a uniform rating method for impact pile driving hammers. This need was felt necessary because of the possibility of "paper engineering" by manufacturers, i.e., rate the hammer with a geometrically possible stroke which cannot be achieved in reality.

George Goble had made a proposal which would "test" the hammers by comparative wave equation analyses. Preliminary results were received rather coolly by the industry and George therefore proposed to discontinue the project particularly since wave equation analyses are now performed on most jobs. The committee, under the chairmanship of Manni Fine of the Birmingham Construction Co., debated the proposal and then agreed to cancel the project with only two opposing votes.

#### Committee on Cushion Testing Standard Produces Document

Alan G. McKinnon, Foundation Equipment Corp., Dover, Ohio, presented the cushion testing standard to the attendees. This paper was essentially prepared by consulting engineer Dave Rempe and a few materials were already tested. Interestingly, some of the elastic moduli reported were significantly lower than reported earlier by the industry, and therefore came closer to the values recommended in WEAP86. Alan, assisted by GRL, also prepared wave equation example runs: old vs new.

#### DFI Construction Industry Roundtable

Efforts have been made by the DFI to produce a set of guidelines which would assist the participants in cases of disputes. The goal of the DFI is to settle any potential arguments as quickly as possible with the least amount of unnecessary cost.

For more information or copies of DFI documents, please contact the DEEP FOUNDATIONS INSTITUTE, 66 Morris Ave., P.O. Box 359, Springfield, N.J. 07081; (201)379-1100.

# Alaska's Cook Inlet Proves to be Testing Challenge

In a joint effort with Tera, Inc. of Houston, GRL's Frank Rausche and John Polder performed dynamic testing and analysis during the installation of 48 piles for an oil platform in Cook Inlet, Alaska.

Cook Inlet, about 100 miles southwest of Anchorage, is rated as one of the most unforgiving environments in the world for deep foundations. Thirty-foot(+) tides, currents often as high as seven knots, huge ice floes, and earthquakes compound the problems presented by tough soils consisting of sand, gravel, cobbles, and overconsolidated silts and clays.

## Some Recent GRL Projects:

Bohemia River, Maryland --

Measurement assistance and CAPWAP analysis of test piles (54x6 inch prestressed concrete pipes) were performed for McLean Contracting Co. and the Maryland DOT.

Apalachicola Bay, Florida --

GRL engineers recently joined Schmettmann and Crapps to monitor pile driving during preconstruction tests for five different rigs at Apalachicola Bay, Florida. CAPWAP was performed concurrently using the Florida DOT system. Contractors are Misener Marine, L&A Construction, and G.H. Harders & Son.

Phoenix, Arizona--

Problems were encountered when driving H-piles for a group of bridge piers at the I-10/I-17 Interchange Project. Piles were advancing at low blow counts far beyond design penetration. As an alternative to splicing unavailable additional sections, piles were modified by welding L 8x8 sections between the flanges to achieve higher capacity at the design penetration. GRL confirmed that adequate capacity was then being developed (similar H-pile modifications are common practice in certain parts of Europe).

Two Analyzers and eight cable/gage sets were in operation from August to late October. CAPWAP analyses were performed both on-site and at the Cleveland office using modem and facsimile link-ups.

## News From PDI

Dave Peterman has joined PDI as a systems programmer and is involved in PDA programming. Dave has an engineering degree from the University of Akron.

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Among new products developed and tested at PDI are underwater gages. Both new designs and coatings are being tried; early tests have been very encouraging.

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J. A. Jones of Charlotte, NC has won a contract at the Kings Bay Naval Base in Georgia. The work requires dynamic pile testing; therefore the contractor purchased the PDA system. Training was held at the naval base.

## WEAP86 Developments

Noteworthy are the new DFI (see cushion standard) cushion testing results ( $E_s$ , secant modulus;  $e$ , coefficient of restitution). Previously published moduli (shown in parentheses) may have been tangent rather than secant values:

Conbest	$E_s = 120$ (560) ksi, $e = 0.94$ (0.80)
Hamortex	$E_s = 130$ (250) ksi, $e = 0.78$ (0.77)
Aluminum/Micarta	$E_s = 180$ (700) ksi, $e = 0.94$ (0.80)

GRL has prepared a brochure describing the features of WEAP86. A copy is enclosed. Please note that WEAP86 is not a trademark.

## International Notes

### Finland

Lohja Corporation engineers received PDA training during October from PDI's Garland Likins. Lohja is a manufacturer of precast concrete piling. They plan a CAPWAP training session in early '87.

### Ottawa, Canada

ANNA Geodynamics is a new testing company formed in Ottawa, Canada by Prof. Bengt Fellenius and Mr. Robert Edde. The company obtained both hardware and software from PDI and GRL. They received training in GRL's Cleveland office.

### Taiwan

San Lien Development Company, a distributor of specialized testing equipment, is the new PDI repre-

sentative in Taiwan. A PDA was recently delivered to the company.

### Australia

Former GRL engineer Julian Seidel reports that John Wagstaff Construction in Brisbane, Australia, has formed PileTest, an independent company for dynamic pile testing. The company offers PDA, CAPWAP and WEAP services.

### Egypt

The Hammer Performance Analyzer (HPA), PDI's radar device which tracks the ram speed, is being operated by McDermott Construction Company in Egypt's Gulf of Suez. GRL engineer Mohamad Hussein recently delivered the equipment to Egypt and instructed McDermott engineers in its use.

### Germany

A 24-page document in German for dynamic pile testing has been prepared by Prof. E. Franke, Darmstadt and J. Seitz, Bilfinger-Berger, Mannheim, Germany for the DGEG (German Society for Soils and Foundations). Several years hard work was needed to write this recommendation since the development of both integrity and capacity testing advanced at the same time. The document is a very clearly written summary of available methods and requirements for testing.

For information please contact Dipl.-Ing. J. Seitz, Carl-Reiss-Platz, Mannheim, West Germany.

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