



Wave Equation and Dynamic Pile Testing

Three-Day Pile Testing Workshop



November 2018

Tuesday, November 6, 2018 - Wave Equation Analysis of Pile Driving

Wednesday, November 7, 2018 - Dynamic Pile Load Testing

Thursday, November 8, 2018 - Pile Integrity Testing

at

Radisson Blu Hotel Amsterdam Airport
Boeing Avenue 2 - 1119 PB Schiphol-Rijk, Netherlands
Tel +31 20 655 3131 - Fax +31 20 655 3100



Day One: Tuesday November 6th

Wave Equation Analysis of Pile Driving

08:00 Registration

08:30 One-Dimensional Wave Mechanics – Application of Stress Wave Theory to Piles

09:30 Introduction to the Simulation of Pile Driving by GRLWEAP
Soil Model including quakes and damping
Pile Model
Hammers and Driving Systems

10:15 Break

10:30 GRLWEAP Workshop: Hands-on Problem Solving Demonstrating
Bearing graphs and sensitivity studies
Calculation of Long Term Static Resistance (LTSR)
Calculation of Static Resistance to Driving (SRD) and driveability studies

Attendees may either observe the problem solving process or optionally follow the examples along on their laptops. This optional use of the attendee's computer requires having a license of the GRLWEAP 2010 software installed on that computer.

Upon request, the attendee will receive the GRLWEAP temporary license the week prior of the event. For successful operation of the program during the workshop it is crucial to have the program installed prior to commencement of the first lecture.

12:30 Lunch

13:30 Workshop continued
Offshore driveability analysis and pile material fatigue issues

15:00 Break

15:15 Workshop continued
Soil Set Up Effects and Friction Fatigue During Driving
Driveability Analysis of Vibratory Pile Driving

16:30 Refined Wave Equation Analysis, and EC7 and CEN/ISO 22477-4 annex B

17:00 Adjourn

GSP/PDI reserve the right of program changes



Day Two: Wednesday November 7th Dynamic Pile Load Testing

08:00 Registration

08:30 Wave Mechanics of High Strain Testing

10:30 Break

10:45 PDA Testing – Proper Practices – Driven Piles

12:30 Lunch

13:30 PDA Testing – Proper Practices – Drilled Shafts and CFA Piles

14:00 Signal Matching and CAPWAP® Background

15:15 Break

15:30 Data Interpretation Workshop: Case Method and CAPWAP

CAPWAP/PDA-S Workshop Materials: Attendees may either observe the problem solving process or optionally follow the examples along on their laptops. This optional use of the attendee's computer requires having a license of the CAPWAP/PDAS software installed on that computer.

Upon request the attendee will receive the CAPWAP/PDAS temporary licenses the week prior of training. Also upon request, the attendee will receive the PDA-recorded data that will be analyzed in the workshop. For successful operation of the programs during the workshop it is crucial to have the program installed prior to commencement of the first lecture.

16:45 Adjourn

17:00 PDCA Proficiency Tests

18:30 End of Proficiency Test

GSP/PDI reserve the right of program changes



Day Three: Thursday November 8th

Pile Integrity Testing

Deep Foundation Integrity and Quality Assurance

08:00 Registration

08:30 One-dimensional wave equation for low-strain (impact-echo) integrity testing

09:30 Low-Strain testing
Equipment and testing
Signal analysis, result interpretation and pile quality indicator

10:30 Break

10:45 Assessment of pile quality – the good – the bad – the ugly

12:00 High Strain Integrity Assessment as compared to Low Strain Tests

12:30 Lunch

13:30 Cross Hole Sonic logging
Equipment and testing
Signal analysis, result interpretation and pile quality indicator

14:30 Thermal integrity profiling
Equipment and testing
Signal analysis, result interpretation and pile quality indicator

15:15 Break

15:30 Consequences and remedial action for piles with anomalies

16:00 Bore hole monitoring
SHAPE – SHaft Area Profile Evaluator for wet bore holes
SQUID – Shaft QUantitative Inspection Device for bottom soil strength testing

17:00 Adjourn

GSP/PDI reserve the right of program changes

**Who should attend:**

Geotechnical, structural and construction engineers, owners, contractors and other professionals involved in the design, construction and specification of deep foundations.

- These workshops are suitable for those new to the field of High Strain Foundation Testing, Integrity Testing, Wave Equation or Signal Matching Analysis.
- The workshops are also suitable for those specifying quality assurance requirements for deep foundations and for those working with the testing results.
- The workshops provide updated information on proper testing procedures and benefits and limitations of pile testing methods. They are therefore valuable for the dynamic load testing and integrity testing professional who would like to sharpen their skills and learn about experiences gathered by others.
- The program also includes an examination for high strain analysts and testing engineers who would like to check their ability against an objective standard of proficiency or who want to demonstrate such experience and knowledge to the quality assurance specifiers (see also below).

Learning objectives: At the end of the workshops, attendees will be able to:

- Run a basic wave equation analysis of pile driving and understand the capability of wave equation analysis for assisting pile driving preparation and equipment selecting
- Understand the theoretical background of the various quality assurance methods for deep foundations
- Perform high strain and/or low strain testing with the necessary skill and diligence
- Understand the signal matching process of high strain dynamic data
- Review and understand reports of dynamic load testing of deep foundations conducted by others
- Review and understand reports of integrity testing of deep foundations conducted by others
- Select an appropriate method of integrity assessment of deep foundations for a particular application

Digital/ Hard copy of the Presentation:

- **All training material will be available digitally for download prior to the event.**

It is suggested that attendees download this material to their laptop and bring their laptop to the workshop, or print the training material and bring their own hard copy.

- **A colored, three-slide per page printout may be requested from GSP up to two weeks prior to the workshops (€ 50 charge will apply).**

Please contact GSP at af@gsp-mannheim.de if you want to receive the hard copy.

Lecturers

Dr.-Ing. Oswald Klingmueller is Managing Director of GSP mbH, Mannheim Germany; he has 30 years of experience in Dynamic Pile Testing and is Chairman of the German Committee for Dynamic Pile testing. In this capacity he is involved in formulating German codes of practice and issuing recommendations for dynamic pile testing. Dr. Klingmueller has recently been very active in managing dynamic pile testing works for wind turbines associated structures in the North Sea and the Baltic Sea.

Frank Rausche, Ph.D., P.E., D.GE, is a senior consultant of Pile Dynamics, Inc. (PDI) and former president of GRL Engineers, Inc. He has been involved in the research and development of dynamic testing and analysis methods since his mid-1960s work at Case Western Reserve University, where he derived the Case Method equations for dynamic pile testing and developed the CAPWAP and GRLWEAP software. Dr. Rausche has been a consultant throughout his career applying the dynamic and testing methods to solve practical problems on construction sites. He has published numerous papers and lectures frequently both in the USA and internationally.

Dr.-Ing. Matthias Schallert is Managing Director of GSP mbH, Mannheim Germany; he has 20 years of experience in Dynamic Pile Testing and is member of the German Committee for Dynamic Pile testing. Dr. Schallert has recently been very active in piling works for wind turbines in the North and Baltic Sea. He has formulated method statements, procedures for sensor attachment and handling of instrumented piles, risk assessment, quotations and has executed the tests in various offshore operation on board of jack-up rigs and driving vessels. He has wide experience in the evaluation of measurements, geotechnical assessment and reporting for submittal to public administrative boards.



Venue and Hotel Reservations

The Radisson Blu is located within a short distance from Amsterdam Schiphol airport. A shuttle departs from Schiphol Airport every half hour.

Attendees should make their own hotel reservations.

20 rooms have been reserved in classic category single at 159,00 €/night until 10th September 2018.

For reservations go to: www.radissonblu.com/hotel-amsterdamairport

or send an e-mail to: emma.oosterling@radissonblu.com

with use of the **code 181106GSPM** and the group name **GSP mbH**

Please note that the number of participants for each day of the workshop is limited to 35. Early registration is highly recommended.



Registration Information

Please fax, mail or e-mail this completed registration form to:
GSP Gesellschaft für Schwingungsuntersuchungen und dynamische Prüfmethode mbH
Steubenstraße 46 - 68163 Mannheim, Germany

Tel: +49 621 331 361

Fax: +49 621 343 58

info@gsp-mannheim.de

Name(s): _____

Organization: _____

Address: _____

City: _____ State, Province, County or Canton: _____

Postal Code: _____ Country: _____

Phone: _____ Fax: _____ Email: _____

Fees:	Workshop 1 day	€ 480,-
	Workshop 2 days	€ 935,-
	Total fee for 3 day Workshop	€ 1.350,-

Discounts:

A € 50 discount per day will be granted if registration is received prior to October 12th, 2018.
A € 25 discount per day will also be granted for second or additional participants from the same entity.
A € 100 per day discount will be extended to students providing current student ID (no other discounts).

21 % Dutch VAT to be added

Please enter No. of participants Workshop 1 day Workshop 2 days Workshop 3 days

Total fee	€ _____
Discount(s) (if applicable) subtract	€ - _____
PDCA proficiency examination € _____ x No. of registrants; enter total here:	€ _____
Subtotal	€ _____
Dutch VAT 21%	€ _____
Total payment	€ _____

Payment (Euros) by bank transfer against invoice to GSP Mannheim or by credit card

Please select: VISA MasterCard American Express

Name (as on credit card): _____

Account No.: _____ Expiration date: ___/___ Verification code: _____

Statement Billing Address: _____

City _____ State, Province, County, or Canton _____

Postal Code _____ Country _____

Signature: _____

The **GRLWEAP 2010** standard software (first or update license) will be offered at a 10 % discount to participants of seminar or workshop at either the time of registration or within one month following the workshop.

