



**Pile Driving Contractors Association  
and  
Pile Dynamics, Inc.**

**Present**

**Seminar on Deep Foundation Integrity Testing and Wave Equation Analysis  
May 8, 2018**

**High Strain Dynamic Foundation Testing Workshop  
May 9 & 10, 2018**



**Four Points by Sheraton Calgary Airport  
2875 Sunridge Way NE  
Calgary, AB, T1Y7K7, Canada  
(403) 648-3180**

## Registration Starts at 8:00am

**Tuesday, May 8, 8:30am – 5:00pm**

### **Seminar on Deep Foundation Integrity Testing and Wave Equation Analysis**

#### **Who should attend:**

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

- This seminar is suitable for those new to the field of Foundation Testing and Analysis, and includes an overview of non-destructive testing methods (integrity and load testing) and their applications.
- It is suitable also for those specifying the testing to gain basic understanding for assessing the results presented in reports.
- This seminar is suitable for those needing an understanding of wave equation analysis methods.
- **Those attending the Workshop that follows this Seminar are strongly encouraged to attend this review of wave equation background materials.**

#### **Learning objectives:**

At the end of the seminar, attendees will be able to:

- Select an appropriate method of integrity assessment of deep foundations for a particular application.
- Review reports of integrity and dynamic load testing of deep foundations conducted by others.
- Run a basic wave equation analysis of pile driving.

#### **Program (subject to change):**

8:00 Registration and Breakfast  
8:30 Wave Mechanics – Basics  
9:30 Non-destructive testing – High and Low Strain  
10:15 Break  
10:30 Non-destructive testing – Crosshole Sonic Logging  
11:00 Thermal Integrity Profiling  
11:45 PDA Applications  
12:15 Lunch  
1:15 Wave Equation Background  
2:15 Wave Equation Workshop: Bearing Graph, Insp. Chart  
3:00 Break  
3:15 Wave Equation Workshop: Bearing Graph, Insp. Chart-cont'd  
3:45 Wave Equation Workshop: Driveability  
5:00 Adjourn

**Wednesday, May 9, 8:30am – 5:00pm**

## **High Strain Dynamic Foundation Testing Workshop Part 1**

### **Who should attend:**

- Users of the Pile Driving Analyzer® (PDA) system and CAPWAP® software interested in sharpening their skills.
- Engineers, foundation testing professionals, students and professors already familiar with the basic concepts of deep foundation dynamic testing and analysis.
- Professionals who desire to have a basic understanding of the dynamic test results being presented to them.
- Those interested in taking the **Dynamic Measurement and Analysis Proficiency Test\***

### **Learning objectives:**

At the end of this two-day workshop attendees will be able to:

- Operate the PDA in a manner conducive to acquiring good quality data
- Assess pile bearing capacity, pile driving stresses, hammer performance and pile integrity by various methods
- Avoid pitfalls when analyzing PDA data with the CAPWAP software
- Interpret PDA testing and CAPWAP software results
- Describe the soil-model used in CAPWAP
- Prepare the input for CAPWAP
- Review options for CAPWAP analysis and output
- Calculate bearing capacity and its distribution for driven piles from impact records

### **Program (subject to change):**

8:00 Registration and Breakfast  
8:30 Wave Mechanics for PDA testers (90 min)  
10:00 Break  
10:15 PDA Testing – Proper Practices  
12:30 Lunch  
1:15 Dynamic Testing of Drilled Shafts and Augered Piles  
1:30 Testing Economics  
3:15 Break  
3:30 Set-up  
4:15 PDA Workshop: Integrity, Stresses, Energy  
5:00 Adjourn

**Thursday, May 10, 8:30am – 5:00pm**

## **High Strain Dynamic Foundation Testing Workshop Part 2**

### **Program (subject to change):**

8:00 Registration and Breakfast  
8:30 PDA Workshop: Capacity Calculation  
9:15 CAPWAP Background  
10:45 Break  
11:00 CAPWAP Examples  
12:30 Lunch  
1:15 CAPWAP and Refined Wave Equation  
1:45 iCAP® – Instant Signal Matching  
2:15 PDA Data Quality – Examples  
3:15 Break  
3:30 Dynamic Measurement and Analysis Proficiency Test \*  
5:00 Adjourn

### **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, or print the training material and bring their own hard copy. **A colored, 3 slide per page printout may be requested from PDCA up to two weeks prior to the seminar (\$100 charge will apply).** Please contact PDCA at [debbie@piledrivers.org](mailto:debbie@piledrivers.org) if you want PDCA to provide the hard copy.

### **GRLWEAP Demo License:**

- Attendees are encouraged to use their own GRLWEAP USB key license. If you do not have a license or cannot bring the USB key license with you to follow along, a GRLWEAP 10 demo version will be offered and emailed the week before the Workshop.

A Certificate of Participation documenting the number of hours of instruction (PDH) will be provided. Check with your engineering board of registration for their continuing education requirements.

### **Dynamic Measurement and Analysis Proficiency Test:**

- At the end of the High Strain Dynamic Testing Workshop, participants may take a multiple choice Dynamic Measurement and Analysis Proficiency Test which will take less than 1-½ hours to complete. The test will cover the theory of Wave Mechanics, Case Method (PDA) equations, data quality assessment, data interpretation and basic CAPWAP analysis. The test is designed for those with experience in using the Pile Driving Analyzer<sup>®</sup> system and CAPWAP to perform High Strain Dynamic Foundation Tests. The best preparation for the test is work experience following an initial PDA training. The workshop will refresh the participant's theoretical background and be a reminder of some important points.
- Those taking the test are advised to study "Appendix A" and "Helpful Hints" of the PDA manual, review some of the EXAMPLE data provided with the PDA and read the CAPWAP background material. An email with the Study Material will be sent out in advance of the test date to help prepare. For more information about the Proficiency Test visit the website: [www.PDAProficiencyTest.com](http://www.PDAProficiencyTest.com)

A Certificate of Proficiency in High Strain Dynamic Pile Testing will be awarded to those who pass the test. The Level indicated on the Certificate is dependent on the score achieved on the test. Those who do not pass the test will receive full credit of test registration fee to be applied towards retaking the test at the next opportunity.

**\*Please note it will take up to two weeks to receive your exam results\***

## **Workshop and Seminar Lecturers:**

**Patrick Hannigan, P.E.**, is the President of GRL Engineers, Inc. He has spent the vast majority of his 39-year engineering career focused on deep foundation design and testing. He received a Bachelor of Science degree in Civil Engineering from the University of Notre Dame, and a Master of Science degree in Civil Engineering from the University of Missouri-Rolla. He has published numerous technical papers and was the principal author for the 1996, 2006, and 2016 editions of the Federal Highway Administration manual "Design and Construction of Driven Pile Foundations". He is a licensed professional engineer in 22 states and is a member of the American Society of Civil Engineers, Deep Foundations Institute, Pile Driving Contractors Association, and the Association of Drilled Shaft Contractors.

**Brent Robinson, Ph.D., P.E.**, is a Vice President and partner in Pile Dynamics and GRL Engineers. He oversees civil engineering, research and development activities, and provides training to users of PDI equipment. He has lectured and performed measurement and analysis for foundation projects around the world. Brent has achieved Expert level on the PDCA/PDI Dynamic Measurement and Analysis Proficiency Test and on the Foundation QA High Strain Dynamic Testing Examination.

## **Hotel Reservations:**

**A special group rate and hotel room group block has been secured. Please ensure you book inside the group block to receive the special rate. Attendees are responsible for making their own hotel reservations.**

### **Four Points by Sheraton Calgary Airport**

Special group rate of CAD \$139 plus tax, for a single or double room. To make reservations please call the hotel at 403-648-3180 and identify yourself as part of the Pile Driving Contractors Group. **You must make your reservations by Monday, April 16** to receive the special group rate.

The hotel provides complimentary underground parking, guest room wireless internet access and complimentary use of fitness center. The hotel offers 24-hour shuttle service to and from Calgary International Airport (YYC). Please note that airport drop-offs are complimentary, and pick-ups are only \$5 (Airport Levy Tax).

- **Arrivals:** Please exit the airport at the main arrivals area. You will see numbered pillars across the street; pillar 16 or 17 is where our friendly guest services driver will meet you. Once you have found the pillars, call 403-648-3180 or utilize the courtesy phone with a direct line to our hotel. Please note that our shuttle may take 20 – 25 minutes to arrive based on traffic conditions.
- **Departures:** Schedule your shuttle ahead of time at the Front Desk. The shuttle runs regularly from 4 AM to 2 PM. Outside of these hours, the shuttle is available on demand.

## Registration

For **Online Registration** click [HERE](#), or Mail, Fax, or Email this completed registration form by **Tuesday, May 1, 2018** to:

**Pile Driving Contractors Association**  
33 Knight Boxx Road, Suite 1  
Orange Park, FL 32065  
Phone: 904-215-4771  
Fax: 904-215-2977  
[debbie@piledrivers.org](mailto:debbie@piledrivers.org)

**Early Bird Deadline – Tuesday, April 10, 2018**

**REFUND POLICY:** Cancellations prior to three weeks before the event will receive a 50% refund. Following this date, there will be no refunds, however name changes are permissible. There will be no transfer of funds to the next course permitted.

For more information contact Debbie Schmidt, Director of Events at PDCA: at 904-215-4771 or 888-311-7322 or by email at [debbie@piledrivers.org](mailto:debbie@piledrivers.org)

Name(s): \_\_\_\_\_

Organization: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State/Province: \_\_\_\_\_ Postal Code: \_\_\_\_\_ Country: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

**Registration Fees (includes: course notes, breakfast, AM/PM breaks and lunch):**

- |  |                 |
|--|-----------------|
| <input type="checkbox"/> Seminar on Deep Foundation Integrity Testing and Wave Equation Analysis   | <u>\$300.00</u> |
| <input type="checkbox"/> High Strain Dynamic Foundation Testing Workshop                           | <u>\$550.00</u> |
| <input type="checkbox"/> Dynamic Measurement and Analysis Proficiency Test ( <b>No Discounts</b> ) | <u>\$200.00</u> |

*\*If you do not pass the test you are allowed one (1) retake of the test at no additional charge at the next course*

- \$50 discount on **each** Seminar/Workshop for Early Bird registration prior to **April 10, 2018**
- Government Employees - \$50.00 discount on **each** Seminar/Workshop

Amount: Program total \$ \_\_\_\_\_

Discount (if applicable) subtract \$ \_\_\_\_\_

**Grand total** \$ \_\_\_\_\_

### CREDIT CARD INFORMATION

I am paying by:    \_\_\_ VISA    \_\_\_ MasterCard    \_\_\_ American Express

Name (as on credit card): \_\_\_\_\_

Account no.: \_\_\_\_\_ Expiration date: \_\_\_/\_\_\_ Verification code: \_\_\_\_\_

Statement Billing Address: \_\_\_\_\_

City \_\_\_\_\_ State / Province \_\_\_\_\_ Zip \_\_\_\_\_ Country \_\_\_\_\_

Signature \_\_\_\_\_