Successful Measurement of Dynamic Force, Pressure & Acceleration

A Training course offered by PCB Piezotronics, Inc.

August 19-20, 2014 • El Segundo, CA

At this training, participants will learn to:

- Understand the physics and operating characteristics of dynamic force, pressure, and acceleration transducers and constraints associated with their use
- Interface transducers effectively with intended test environments
- Condition transducer signals to maintain their fidelity through selection of appropriate cabling, amplifiers, analog filters, sampling rates, DAQs, etc.
- Document extraneous measurands (e.g., strain, temperature, ionization products of a detonation, magnetic fields) that superpose as noise on the desired transducer response
- Apply corrective action for elimination of these noise levels
- Validate that final, recorded signals contain only the desired (force, pressure, or acceleration) data
- Perform "back of the envelope" checks to assure the bandwidth of the recording system did not impose constraints on recorded data
- Perform sensor and system calibration, data analysis, and data utilization

The training will also include in-house demonstrations by PCB® staff of sensor component manufacturing, as well as sensor assembly, testing, and calibration

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PCB Piezotronics Inc. ☎ Toll-Free in USA 800-828-8840 ☎ 716-684-0001 www.pcb.com

Who Should Attend:

Test personnel and their managers; design and analysis staff who use test measurements for model, component,and full-scale system verification; calibration laboratory staff; data reduction personnel; and more generally anyone whose work depends on the output from force, pressure, and acceleration measuring systems to support either test and analysis or control applications.

About the Event:

The training will begin Tuesday, August 19th at 9:00 a.m., and will conclude on Wednesday, August 20th at approximately 5:00 p.m. The cost is $800.00 USD per person, which includes lunch both days and a dinner reception on August 19th. Class size is limited to the first 50 paid registrants. To reserve your space, complete and submit the registration form or contact Alyson Grande at 866-816-8892 ext. 2628, or via E-mail at agrande@pcb.com.

About the Speaker:

Patrick L. Walter, Ph.D., Professor, Texas Christian University (TCU), will serve as training facilitator. Dr. Walter was employed for 30 years at Sandia National Laboratories, with the majority of his tenure spent managing flight, field, and laboratory test activities. The commonality of his work activities involved testing in hostile environments. In 1995, Dr. Walter joined the Engineering Department of TCU, where he teaches and has served as Chair.

Patrick L. Walter, Ph. D.

Dr. Walter also holds the position of Senior Measurement Specialist at PCB®, where he consults on dynamic force, pressure and acceleration measurement, primarily for aerospace and defense applications. Dr. Walter's technical articles and papers have appeared in numerous publications. He has served on and chaired various United States Department of Defense and Department of Energy committees, is active in many professional societies, and teaches Measurement System Engineering through TCU's Extended Education Department. He is a licensed professional engineer.

Program at a Glance:

Tuesday August 19, 2014

Lunch provided and dinner reception.

Start time 9:00 am

Lecture #1:
Program Introduction
- Measurements for test vs. controls
- Impedance considerations: electrical, acoustic, mechanical
- Differences between design/analysis and measurements problems

Lecture #2:
Introduction to Structural Dynamics
- Structural loads, response, and modeling

Lecture #3:
Measurement System Requirements: Linearity, Flat Amplitude Response, Linear Phase Response
- Basic guidelines for measurement system design
- Case studies

Lecture #4:
Dynamic Transducer Models
- Dynamic models for force, pressure and acceleration transducers

Lecture #5:
Signal Types and Acquisition
- System requirements for measuring deterministic vs. random data
- Data sampling and aliasing

Lecture #6:
Data Filtering
- Terminology
- Differentiators/integrators
- Detailed analog filter selection criteria

Wednesday, August 20, 2014

Lunch provided

BONUS SESSION

Start time 8:00 am

Demonstration: Accelerometer Calibration
by Eric Seller from The Modal Shop

Start time 9:15 am

Lecture #7:
Dynamic Force, Pressure, and Acceleration Measurements
- Transducer physics, cables, signal conditioning and calibration

Lecture #8:
Validating Time-varying Transducer Signals: Help for the Analyst
- Rules of thumb for assessing data
- Data validation
- Case studies

Lecture #9:
Analyzing and Using Shock and Vibration Data
- Examples of how acquired data impact design
- Measurement system requirements

Lecture #10:
Measurement System Design: Dynamic Force, Pressure and Acceleration
- Interfacing to the test environment
- Application examples

Lecture #11:
The Future: Smart Transducers, Wireless Transmission

Wrap-up, questions and answers

End of program

Please submit completed form via email to agrande@pcb.com
or fax to 716-684-0987 to the attention of Alyson Grande.
For further assistance, call 866-816-8892, ext. 2628 or e-mail: agrande@pcb.com

Training Registration Form

Training: "Successful Measurement of Dynamic Force, Pressure and Acceleration"
Presented by: Patrick L. Walter, Ph. D.
Dates: Tuesday, August 19th through Wednesday, August 20th, 2014
Location: El Segundo, California, USA
Venue: **Hilton Garden Inn**
Address: LAX / El Segundo
2100 East Mariposa Avenue
El Segundo, CA 90245
Phone: 310-726-0100

There will be a dinner social hosted by PCB on Tuesday, August 19th at 5:15 pm at Hilton Garden Inn.

Will you be joining us?
☐ **Yes** ☐ **No**

Attendee Registration Form

Name: _____ Title: _____

Company: _____ Primary Industry: _____

Address: _____

City, State, Zip: _____

Phone: _____ E-mail: _____

Payment Details

Cost: ***$800.00*** per person (includes lunch)

Select Payment Type: ❑ Company Check (Payable to PCB Piezotronics, Inc.)
❑ VISA ❑ MasterCard ❑ American Express

Credit Card Number: _____

Name on Card: _____

Exp. Date: _____

❑ Company PO PO # _____
(attach copy of company purchase order with billing instructions)

Mail payment or PO to: Alyson Grande, PCB Piezotronics, Inc. 3425 Walden Ave., Depew, New York 14043 US

_____

What is your main purpose in attending this seminar? _____

_____

Please list any topics of interest (test set-up, analysis, measurement, design) that you wish to be addressed:

_____