MEASURING MECHANICAL & PYROSHOCK

A Training Course for Successful Shock Measurement

May 19-21, 2026 | Buffalo, NY | Presented by: Dr. Ted Diehl

Including **ENDEVCO** sensors, electronics, and cables

PCB PIEZOTRONICS
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BODIE TECHNOLOGY, INC.
The Noisy Data Experts™

MEASURING MECHANICAL & PYROSHOCK

Lecture Topics

1. Introduction to the Measurement of Shock

Brief introduction into the topic

2. A Brief Overview of Key DSP Fundamentals - Data Sampling, Avoiding Aliasing, FFT, Filtering ...

Clearly explain issues with collecting analog signals digitally, avoiding aliasing, and common DSP tools

3. Accelerometer Types Used for Shock

Key technology choices including sensing type (PR & ICP®), mechanical isolation, and onboard analog filtering

4. System Requirements for Shock Measurements

Typical components in a measurement system and guidance in setting up a valid measurement

5. Accelerometer Mounting & Cable Routing

How cables can add unwanted noise and lowpass filtering effects, and how to avoid this

6. Accelerometer Related Data Errors

Typical approaches for PR and ICP® accelerometers
Advantages of adjustable constant current controls in PCB ICP® signal conditioners for driving long cables

7. Brief Overview of Shock Response Analysis (SRS)

Explanation of Absolute Acceleration SRS and PVSS (Pseudo Velocity Shock Spectrum), what are they and how to use them
Advantages of making 4CP (four coordinate paper) plots for PVSS

8. Post Processing of a Typical Shock Measurement

Demonstrate typical calculations done on measured acceleration data
Includes Importance of using DSP properly in data processing of shock

9. Comparing Different Accelerometer's Performance During Severe Impact

Assess both PR and ICP® accelerometer performance
Discuss error sources to be aware of when recording mechanical shock

10. Comparing Physical Measurements with Numerical Simulations

Outline the key differences between tests and simulations that cause apparent discrepancies
Describe proper workflows and calculations to have the best chance of correlation in both the time domain and frequency domain

11. From Planning to Measurement Validation: A Severe Shock Case Study

A guided class activity to explore planning, performing, analyzing, and validating a severe shock test

12. Pushing Accelerometers Beyond Their Design Limits: The Out-of-Band Energy Problem

Explore how unmeasured out-of-band energy in both amplitude and frequency creates a gray zone that can distort severe shock measurements.

Learn how advanced post-processing techniques can help reveal and mitigate these effects.

13. Live Demonstrations of Severe Shock Measurements

Observe live metal-on-metal impact tests using multiple accelerometer technologies.

Evaluate data plausibility, identify sensor and system limitations, and apply methods to improve severe shock measurements.

14. Summary of Best Practices for Transient Accelerometer Measurements of Mechanical Shock

Summary of the key course take-aways

At This Training, Participants Will Learn:

Recommended approaches and challenges for making transient acceleration measurements of severe mechanical shock and pyroshock

Key technology choices related to piezoresistive and ICP® transducers

The importance of proper cabling and signal conditioning, especially for tests requiring long cables

Various causes that distort measurements with high frequency noise, zero shifts, and/or other problems

The importance of proper DAQ selection, sampling rates, and filtering (both analog and digital)

The dangers of aliasing and how to avoid it

Suggested workflows to process measured accelerometer data including calculations to help assess measurement plausibility, methods to check for signal distortions, and approaches to minimize them

What Shock Response Spectra is, how to calculate it, and why PVSS analysis is such a powerful way to assess accelerometer data

Instructor Bio

Ted Diehl, PhD

President and CEO, Bodie Technology, Inc.

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Ted is responsible for strategy and technology development for Bodie Tech and is the developer of the Kornucopia® ML™ software tool suite. He is also a Corporate Fellow at Magic Leap, Inc.

Ted has been an active participant in FEA and Physical Testing community for over 30 years, representing companies in several industries. His primary focus is developing methods to solve industrial problems through a creative, yet pragmatic, mix of experimental, computational, and theoretical approaches. Dr. Diehl pioneered many FEA-oriented digital signal processing algorithms, initially for use in cell-phone impact mechanics, and then expanded to a host of noisy data problems for both physical testing and transient FEA simulations. Dr. Diehl received his PhD in Mechanical Engineering from the University of Rochester.

This training is designed for 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 accelerometers for the measurement of severe mechanical shock and pyroshock.

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