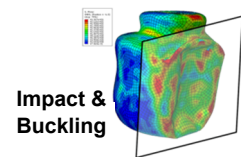
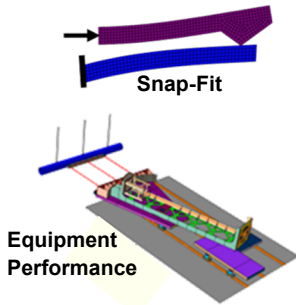


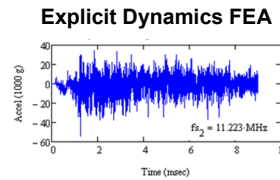
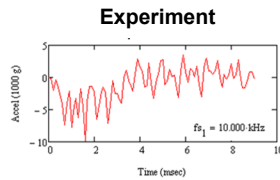
# Analyzing Noisy Data from FEA & Physical Tests via DSP – FFT, SRS, Filters & More



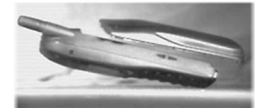
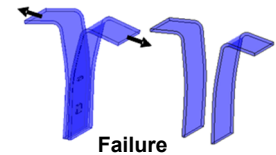
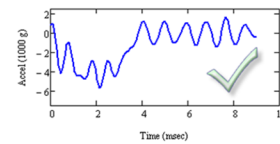
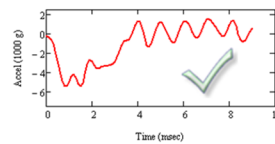
## Customizable Training Seminar Instructor: Ted Diehl, PhD



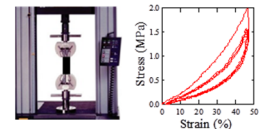
Learn



... into success!



Drop Testing



Advanced Material Testing

## Training specially designed for FEA Users & Test Engineers

### Course Description

Have you struggled with noisy data from either implicit or explicit FEA simulations and/or measurements?  
⇒ Not sure what filtering, FFT, PSD, SRS, PVSS, and other DSP tools are really doing to your data?

Training seminar teaches required concepts for working with noisy/transient data - from both measurements and simulations. This seminar is taught in the language of Mechanical Engineering and provides a fundamental understanding of DSP theory and its application to the field of nonlinear structural mechanics.

### Benefits of Training

- Learn how to collect digital data, avoiding **aliasing**. Applies to physical testing & simulation models.
- Perform spectrum analysis to interpret frequency content via DFS (so-called FFT) and PSD analysis.
- Filter data with confidence to remove high frequency noise or low frequency drifting.
- Apply SRS & PVSS shock spectrum methods to estimate impact severity, including estimating influence of a shock isolator and how to convert simple shock specs (1000·G, 0.5·msec) into SRS and PVSS spectra.
- Improve accuracy, efficiency, and usefulness of explicit dynamics simulations (Abaqus, LS-Dyna, Radioss...) including impact, shock, buckling, failure, penetration, sliding contact, and quasi-static analyses.
- Obtain better correlations between physical tests and FEA simulations. Learn:
  - ✓ Sources that cause distortions in physical tests and simulations and then how to potentially remove them.
  - ✓ How to make appropriate comparisons between simulations and physical tests.
  - ✓ How to get BOTH the measurement/test engineer and simulation user on the same page!

*"Your DSP course taught techniques that helped me create a standardized approach for processing noisy Explicit Dynamics simulations. This has improved my analysis and helped me deliver more useful FEA results on recent projects - your course is the best I have taken in a long time."*

**Michael J. Iacchei, Mechanical Engineer, U.S. Army, AMSAA**

# Analyzing Noisy Data from FEA & Physical Tests ...

Lectures	✓ - briefly covered , ✓✓ - covered in detail	1-Day Course	4-Day Course
1) Motivation for Using DSP with Simulations and Experiments		✓	✓✓
2) DSP Fundamentals		✓	✓✓
3) Shock Spectrum Analysis (Abs Accel SRS, PVSS, ...)		✓	✓✓
4) Using Energy to Enhance Analysis			✓✓
5) DSP Using Various Software (Kornucopia, MATLAB, Abaqus, & more)		✓	✓✓
6) Developing a DSP Strategy for a Given Problem		✓	✓✓
7) Working with Physical Measurements and Validating Simulations/ Experiments			✓✓
8) Working with Transient-Dynamic Models		✓	✓✓
9) Improving the Modeling of Failure		✓	✓✓
10) Working with Quasi-Static Models from Explicit FEA		✓	✓✓
11) Creating Viable FEA Material Data from Noisy and Messy Physical Data			✓✓
<b>Workshops</b>	Solutions provided in Kornucopia® ML (w/ MATLAB®) & Abaqus®		
<i>ASCII files and avi videos provided so attendees can use software of their choice.</i>			✓✓
1) Experiencing Common DSP-related Mistakes			✓✓
2) Learning DSP Using Simple Signals			✓✓
3) Transient Impact of a Container, Including SRS and PVSS Assessments			✓✓
4) Transient Penetration - Comparing Models and an Experiment			✓✓
5) Salvaging Shock Data that integrates to nonsense			✓✓
6) Quasi-Static Cam Mechanism			✓✓
7) Analyzing Failure and Crack Propagation			✓✓
8) Computing Derivatives and Integrals From Noisy Data			✓✓
9) Creating Elastic/Plastic Material Law From Slightly Noisy Experimental Data			✓✓
10) Analyzing a Stubby Block			✓✓

## Who Should Attend

Engineers, scientists, and technicians working with any of the following:

- Assessment of shock, impact, blast, failure, penetration, buckling, contact, or other noisy events.
- Simulations ranging from highly transient to vibratory to noisy quasi-static, especially those from explicit dynamics codes (Abaqus, LS-Dyna, Radioss, and others).
- Experimentally measured data of frequency rich, noisy events or messy/challenging data.

**Email course inquires to [info@BodieTech.com](mailto:info@BodieTech.com)**

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