VIBRATION RESEARCH

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SOUND & VIBRATION TECHNOLOGY

WELCOME

VIBRATION RESEARCH

CREATE A SHOCK (SRS/UDT) TEST USING FIELD DATA

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CORE VALUES

COLLABORATION

CAPABLE & COMPETENT

ACCOUNTABLE & RESPONSIBLE

STRONG & DRIVEN WORK ETHIC

DO THE RIGHT THING

INNOVATION

INTRODUCTION

TEST MODES USED FOR GENERATING A TEST BASED ON REAL-WORLD DATA

- Field Data Replication
- Random Import
- Fatigue Damage Spectrum
- UDT/SRS
- Sine Tracking, Acceleration & Generation (STAG)

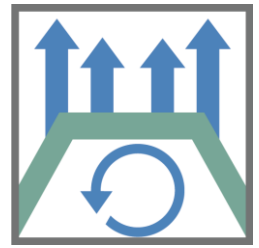
Field Data Replication

Random Import

Fatigue Damage Spectrum

Shock Response Spectra

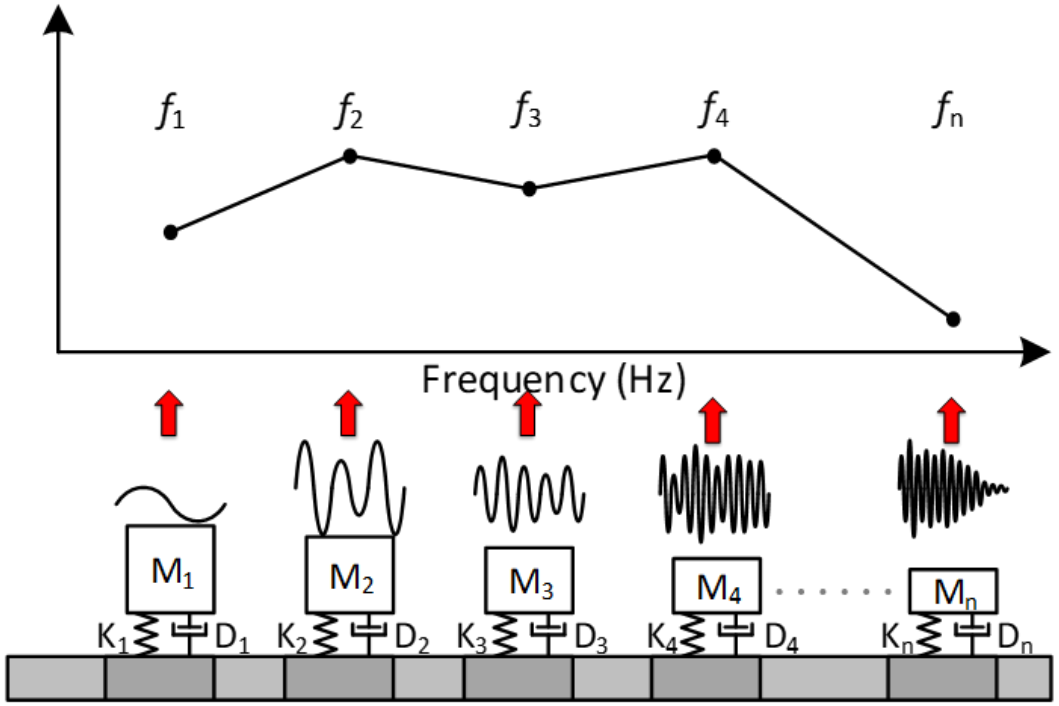
User Defined Transient



Sine Tracking, Analysis & Generation

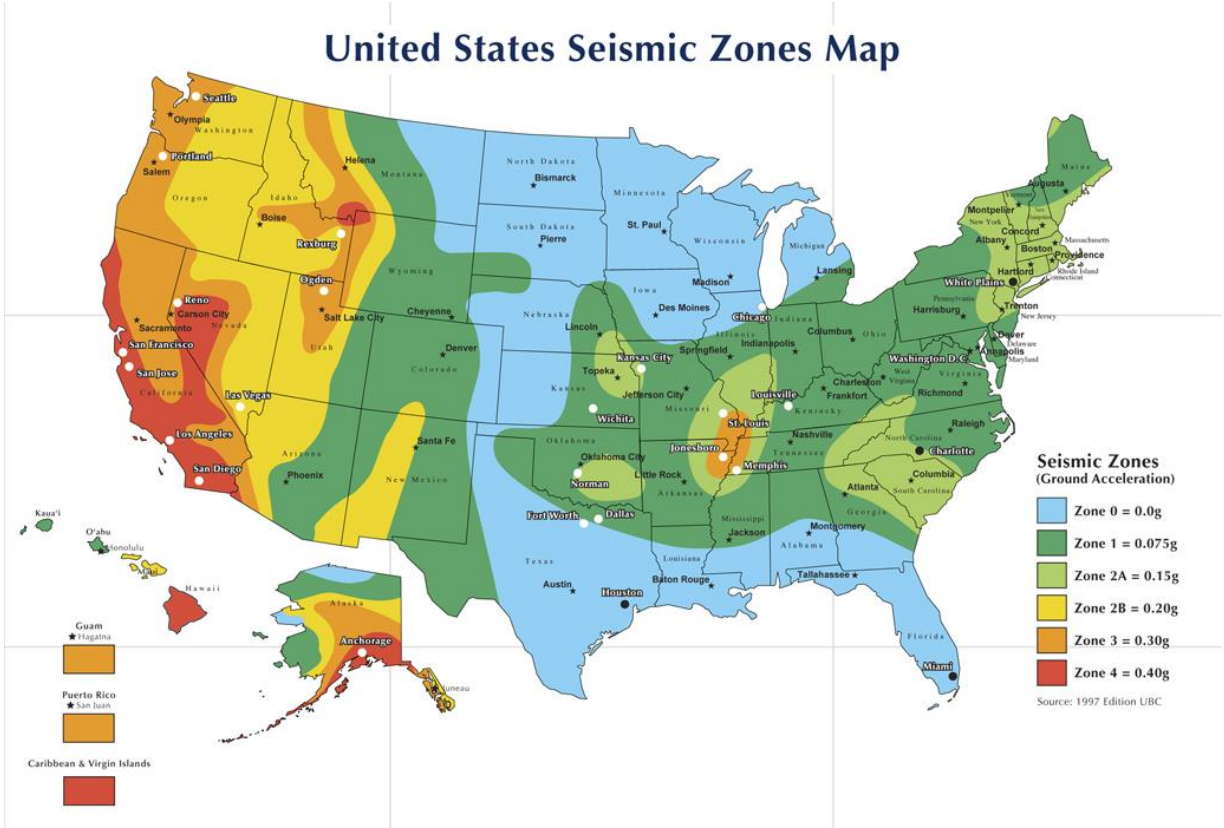
INTRO TO SHOCK RESPONSE SPECTRA (SRS)

- An FFT is not useful for analyzing a shock pulse
  - Engineers need the max acceleration for each frequency bin
- SRS uses a theoretical set of SDOF oscillators
  - Gives a computed max at each frequency, the ‘maximax’



INTRO TO SRS

SRS WAS FIRST PRESENTED AS A TOOL FOR EVALUATING A STRUCTURAL RESPONSE TO AN EARTHQUAKE BY DR. MARCUS BIOT IN 1933



SRS APPLICATIONS

SRS IS NOW A COMMON TOOL FOR EVALUATING COMPLEX SHOCKS IN MANY INDUSTRIES

- Seismic/Earthquake/IEEE344
- Naval & Shipboard Shock
- Space Flight and Vehicles
- Electronics
- Medical Devices
- Airplanes & Helicopters
- Automotive
- Consumer Goods
- And more...

SRS TESTING

THERE ARE MANY OPTIONS FOR SYNTHETIC PULSES MEANT TO BE, IN SOME WAY, REPRESENTATIVE OF THE REAL WORLD

- Linear Chirp
- Exponential Chirp
- WavSyn
  - Centered
  - Aligned Left
  - Alternating
  - Sequential
- Burst Random
- Enveloped Burst Random
- Damped Sine Waves

Synthetic Pulses may not have an appropriate frequency response for a desired environment.

Each pulse is unique, meant for different purposes.

It is important to select a pulse that is meant to generate the desired pulse duration, amplitude, and frequency response

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USING FIELD-RECORDED DATA

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RECORD THE DATA

- Record the Field Time History Data
  - Use the appropriate accelerometer
  - Mount the accelerometer
  - Set the sample rate (recommend 10x highest desired frequency)
- Recording Methods
  - ObserVR1000 – Autonomous Triggering (BETA, available soon!)
  - ObserVR1000 or VR9500 – Transient Capture
  - Other Data Acquisition System (Export to CSV, WAV, TXT, RPC, etc)

EDIT & ANALYZE THE DATA

- ObserVIEW
  - Cut/Crop Raw Waveform
  - FFT, PSD, Time Spectrogram
- VibrationVIEW
  - Transient Capture Analysis
    - A-V-D vs. Time
    - SRS Acceleration
    - SRS Pseudo Velocity
    - Energy Spectral Density

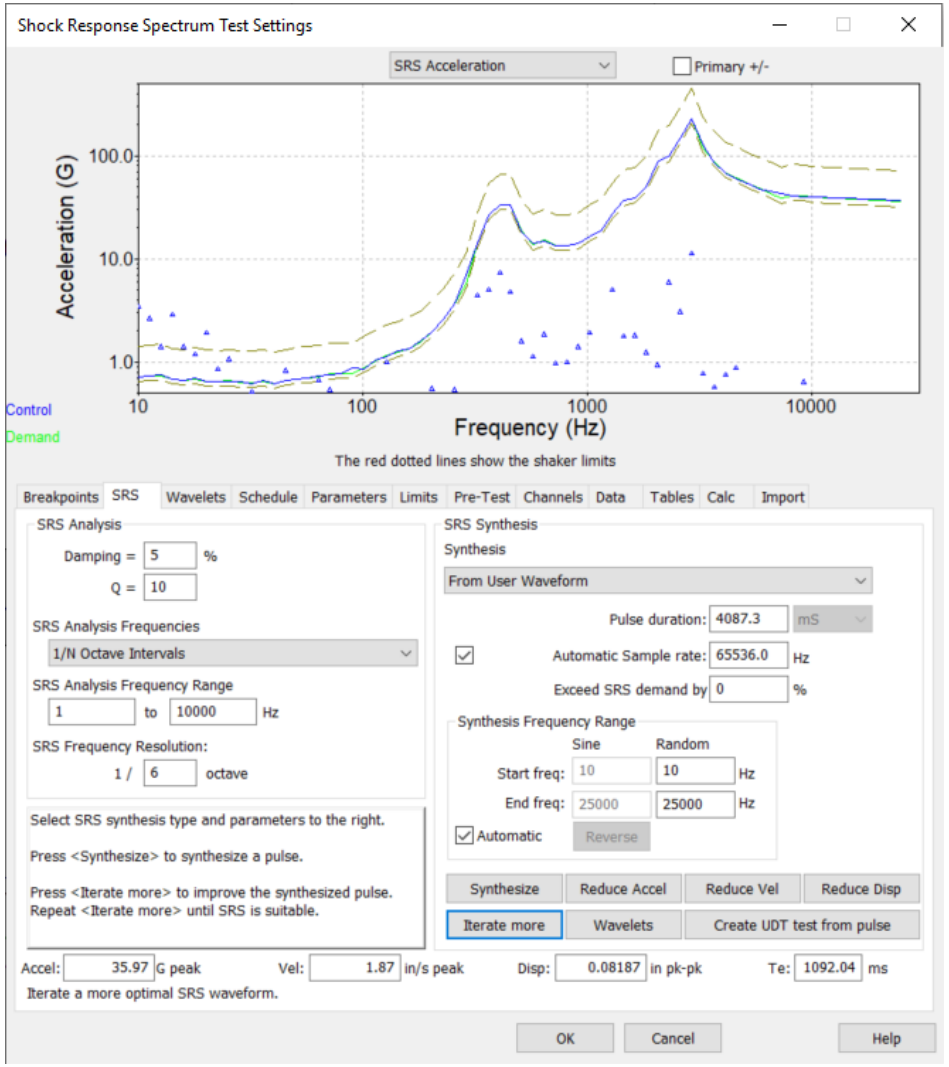
Shock Response Spectra

User Defined Transient

- Create and Save a Transient Capture Profile
- Create and Save a preferred Graph Layout
- Open the Waveform in VibrationVIEW (Convert to VFW if necessary)
- Apply the Test Profile and Graph Layout
- Copy and Paste SRS Acceleration Data to Excel to envelope multiple files

CREATE A NEW SRS TEST

- Copy & Paste Enveloped SRS Breakpoint Table
- Set SRS Analysis Parameters
- Synthesize and Iterate Waveform
  - Burst Random
  - WavSyn
  - Damped Sine Waves
  - **From User Waveform**
- Set Test Schedule
- Set Appropriate Test Parameters
  - Integration and Differentiation Filters
- Run the Test!
- Compare the Results!



CONCLUSIONS

- The user modified waveform, based on enveloped recordings
  - Maintains real-world characteristics
  - Creates an SRS waveform that accurately reflects recorded events

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LIVE DEMONSTRATION

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UPCOMING WEBINARS

Generate SoR Tests from Field Data
4/30/2020 at 11AM EST

ANY QUESTIONS?

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