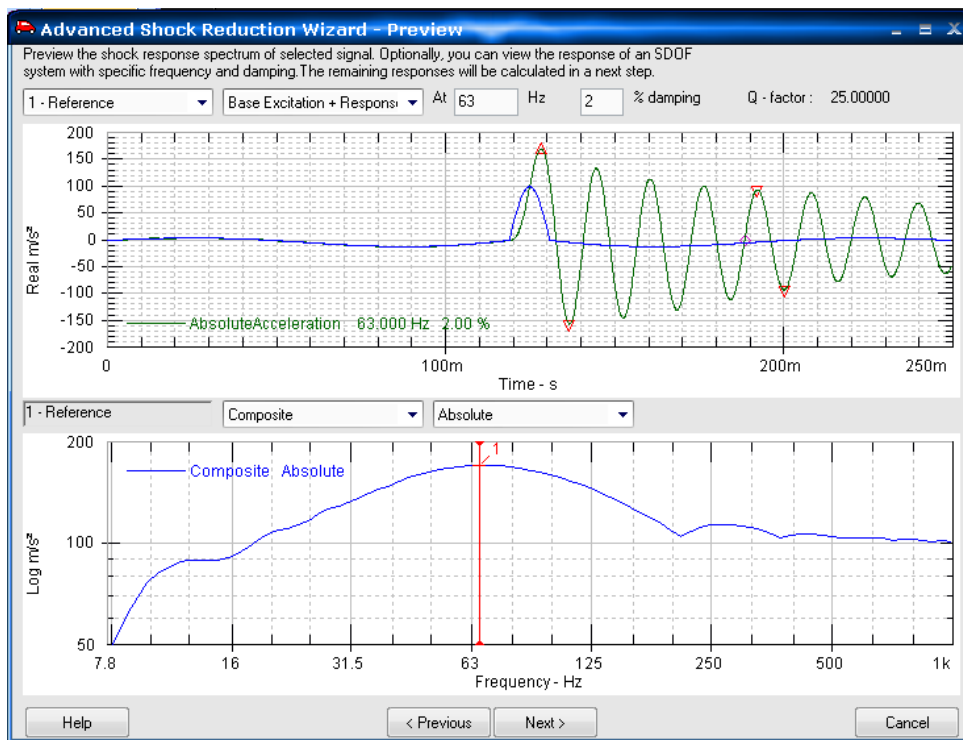# m+p Analyzer
Shock Response Analysis

The Shock Response Spectrum Post-Test module is part of the m+p Analyzer for noise and vibration measurement, analysis and reporting. The inputs to the Shock Response Spectrum Post-Test wizard are the shock measurements made on a structure, whether in standard block mode or continuous time domain throughput mode. The outputs are Shock Response Spectra (SRS). The analysis results can be used as inputs for m+p VibControl shaker control systems.

Advanced shock reduction

Key Features

- Composite, Primary, Residual SRS calculation
- Shock Response + SDOF Response preview
- Data reduction to one response spectrum per channel
- Intelligent wizards for easy and safe user guidance

Applications

- Examine the effects of short-duration peak stresses and accelerations on a structure
- Evaluate the damage of shock pulses on a structure and use the results to design shock isolators

Calculation and Analysis

Calculation Model

Available calculation models include the following:

- Absolute acceleration
  This model is useful for determining the stresses generated within the responding structure due to the combined effect of the elastic and damping reactions of the structure.
- Absolute velocity
  This model is used for determining the stresses generated within the responding structure due to viscous damping and the maximum energy dissipated by the responding structure.
- Relative displacement
  This indicates the displacement of the responding structure relative to its support, a quantity useful for evaluating the distortions and strains within the responding structure.

Time Interval

For every model, any combination of primary, residual or overall shock spectrum is selectable. The primary shock response spectrum describes the peak response during the time in which the measured shock is active. The residual shock response spectrum describes the peak response that occurs during the free vibration after the shock has terminated. The amplitude threshold to distinguish primary versus residual response is user-definable. The overall shock response spectrum is the combination of both.

Polarity

Any combination of positive, negative or absolute responses is available.

DC Offsets and Drifts

Measurement induced DC offsets and signal drifts can be removed from the input signals with a single push of a button prior to the SRS calculation. These operations can be applied on a user-selectable set of signals and the process can be monitored graphically. The presence of DC offsets and drifts in the input signals can lead to significant errors in the calculation of the shock response spectrum.

Frequency Band, Resolution and Damping

Calculations are performed in a user-defined frequency band and with a user-defined resolution. The shock response module suggests a frequency band where analysis can be performed without severe round-off errors. These limits are automatically calculated based on the sample rate and length of the input signals.

Preview

During analysis, a preview window displays any combination of time interval and polarity for any input signal. Displays also include the response of a structure for cursor selectable resonance frequencies and damping to any input signal. All these calculations are performed online.

Batch Calculation and Data Reduction

All combinations of primary/residual/composite response spectra and polarities for any input channel can be calculated in a single operation. Multiple measurements per input channel can be reduced to one shock response spectrum with peak hold averaging. The reduced response spectrum describes the damage potential of the combined shocks.

Feature Summary

- Data filter/selection based on header information
- Shock Response Model: absolute acceleration, relative displacement, absolute velocity
- Automatic DC offset and drift removal
- Computation parameters: min. and max. frequency, damping ratio, residual amplitude percentage, octave spacing (1, 1/3, 1/6, 1/12, 1/24 and 1/48)
- Shock Response Preview: display of shock response spectrum (channel selection; Composite, Primary, Residual, Primary + Residual; Absolute, Positive, Negative, Positive + Negative); display of base excitation together with SDOF response; the SDOF response is based on selected frequency (cursor in response spectrum or numerical entry) and on damping ratio (numerical entry)

- Response Calculation: entry of multiple damping factors; selection of Primary Positive, Primary Negative, Primary Absolute, Residual Positive, Residual Negative, Residual Absolute, Composite Positive, Composite Negative, Composite Absolute
- All necessary SRS calculation information is stored in the SRS data header for user review and documentation in test reports.

Operating System

- Microsoft Windows 10 Pro 64 bit

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