

Model 793.37 Resonance Search Process



Benefits

- Software helps determine the resonant frequency of your test specimen
- Reports test results in a variety of ways
- Multiple frequency sweeps in each test allow you to improve resolution of your results
- Patented phase and amplitude control algorithm adjusts test inputs to specimen response
- Includes iterative amplitude compensation algorithm
- Optional high speed data acquisition

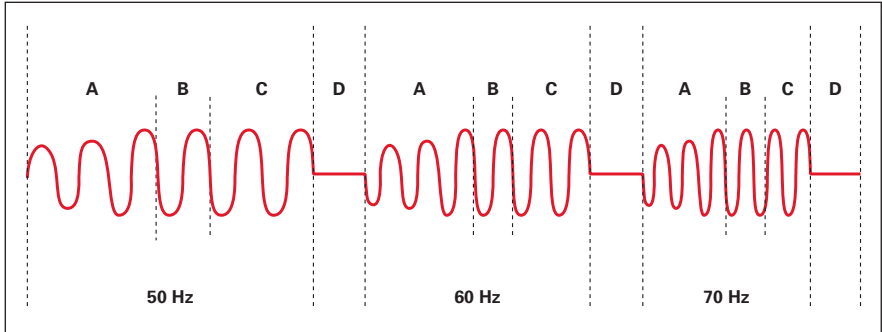
MTS Model 793.37 Resonance Search software allows you to conduct tests that search for a specimen's resonant frequency. Your system will excite the specimen with a constant amplitude sinusoidal input throughout a specified frequency sweep. Both phase angle and amplitude of the output and the input accelerations are measured and the amplification factor and damping at each condition are calculated.

Software data reports include the frequency where each measured parameter achieves its maximum and minimum values. The runtime portion of the software provides a wide variety of options for tabular and graphical presentation of the data. Data is stored in an ASCII file format for ease of access after the test is completed.

How it Works

The figure below shows a Resonance Search process sweep step having 50 Hz, 60 Hz, and 70 Hz test conditions. Each condition has an identical dwell period. Events A through D repeat for each test condition.

- A Achieve dynamic amplitude
- B Dwell at frequency
- C Acquire data
- D Process data



process2 - Resonant Search Parameters						
Control Search Analysis Destination Output Units Conditions General						
Sweep Step	Condition	Amplitude mm	Frequency Hz	Dwell Duration	Dwell Units	
1	1	10.000	1.0000	4.0000	cycles	
1	2	10.000	4.0000	4.0000	cycles	
1	3	10.000	7.0000	4.0000	cycles	
1	4	10.000	10.000	4.0000	cycles	
2	5	10.000	11.000	4.0000	cycles	
2	6	10.000	14.000	4.0000	cycles	
2	7	10.000	17.000	4.0000	cycles	
2	8	10.000	20.000	4.0000	cycles	
3	9	10.000	21.000	4.0000	cycles	
3	10	10.000	24.000	4.0000	cycles	

Shows all of the defined sweep-step conditions

process2 - Resonant Search Parameters								
Control Search Analysis Destination Output Units Conditions General								
Sweep Step	Sweep Type	Amplitude	Start Frequency	End Frequency	Frequency Steps	Dwell Duration	Dwell Units	
1	Linear	10.000	1.0000	10.000	3	4.0000	cycles	
2	Linear	10.000	11.000	20.000	3	4.0000	cycles	
3	Linear	10.000	21.000	30.000	3	4.0000	cycles	
4	Linear	10.000	31.000	40.000	3	4.0000	cycles	
5	Linear	15000	41.000	50.000	3	0.00000	cycles	

AddDelete

Sweep Type: Linear

Amplitude: 15000 (mm)

Start Frequency: 41.000 Hz

End Frequency: 50.000 Hz

Frequency Steps: 3 unitless

Dwell Type: CyclesTime

Dwell Duration: 0.00000 cycles

Defines the search sweep steps

Advantages of Model 793.37 Software

- ▶ **Allows You to Run More Types of Tests** – You can add the Model 793.37 Resonance Search software to an existing system to increase the types of tests that you can run. Typical systems will be able to run Resonance Search tests in addition to Dynamic Characterization, Static Deflection, Elastomer Tearing Energy, and Fatigue.
- ▶ **Customized Frequency Sweep** – Multiple frequency sweeps can be defined in one test. Each sweep is executed consecutively. This allows you to increase the resolution of the data close to the frequencies of interest, yet collect data over a wide range of conditions.
- ▶ **Automatic Correction** – If the feedback from the specimen does not agree with the desired waveform, Model 793.37 Resonance Search software will compensate for errors automatically with either its patented Phase and Amplitude (PAC) control algorithm or by using the iterative amplitude compensator. This feature also provides for faster, more efficient testing.
- ▶ **Faster Tests** – Because the Phase and Amplitude (PAC) control algorithm operates within the control loop on a point-by-point basis, the system adjusts for any errors every time the servocontroller updates the command to the servovalve (up to 6188 times per second). This feature drastically reduces the time for tests to be conducted from the traditional outer-loop amplitude control algorithm.
- ▶ **Familiarity** – Since MTS Model 793.37 Resonance Search software is an enhancement to other MTS elastomer software, you still have all of the testing flexibility and ease of use that you expect from MTS. The additional testing options are simply chosen from an extended list of processes.
- ▶ **Sequencing** – Sequencing between various steps of the test is integral to the design. This means that you can sequence automatically from a Fatigue step to a Resonant Search step and back to the Fatigue step to determine the level of accumulated fatigue damage.

Specimens

Resonant Search software accommodates material-type and component-type specimens used in axial or torsional loading environments. The types of specimens typically used in axial loading environments include muffler hangers, engine mounts, and similar devices with a substantial elastomer content.

Powertrain couplings and torsional bushings are examples of specimens typically used in torsional loading environments.

For More Information

Contact your local MTS field sales engineer for more information. Or, write, fax, or call MTS at the address below. Visit our web site at www.mts.com. Send e-mail inquiries to: info@mts.com

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