We have one goal — improving the noise and vibration quality of our customers’ products. Roush delivers innovative, effective noise and vibration control solutions. By combining advanced analysis capabilities, comprehensive engineering services, and state-of-the-art facilities, Roush has become a proven partner in identifying and resolving challenging noise and vibration issues. Backed by the diverse capabilities of the Roush family of companies, we are uniquely equipped to provide turnkey noise and vibration solutions.

Roush... your silent partner in developing smoother, quieter products.

**Damper and Vibration Absorber Engineering**

Roush has developed a proprietary tuned mass damper (TMD) and tuned vibration absorber (TVA) simulation package that utilizes a database of measured elastomeric material properties. This facilitates the designing of optimized damper systems for a wide variety of vehicle applications. Because Roush has access to a variety of elastomeric products, we are uniquely capable of fabricating damper systems and testing effectiveness using bench, shaker and vehicle methodologies.

The Roush simulation software takes into account temperature and frequency effects on elastomer properties while designing dampers. The Roush approach has proven to accurately predict performance in vehicles prior to fabrication.

**Roush Damper Tuning Process**

- Perform driving point measurements at proposed damper attachment locations
- Import FRF data into software
- Determine the optimal inertial mass, frequency, and damping
- Determine performance for various operating temperatures
- Determine how manufacturing tolerances will affect damping performance
- Determine trade-offs between cost, weight and performance
- Fabricate, bench tune and test the damper in a vehicle

![Matching Damping with SDOF Model](image1)

**Model Predicts Amplitudes and Phase Relationships of System and Damper**

![Original System Response vs. Response with Tuned Damper](image2)
Typical Damping Applications
- Steering wheel shake
- Exhaust systems
- Propshaft and half shaft bending
- Torsional vibration
- Powertrain bending
- Axle pinion pitch
- Subframe resonance
- Axle noise
- Transmission noise
- Body structure
- Aircraft
- Sports equipment
- Hand tools

Baseline With Damper

Impact test while mounted to bed plate

Performance verification in vehicle

Damper Application Example

Performance verification in vehicle

Baseline With Damper

dB(A)/SPL dB(A)/SPL

Shaker Test