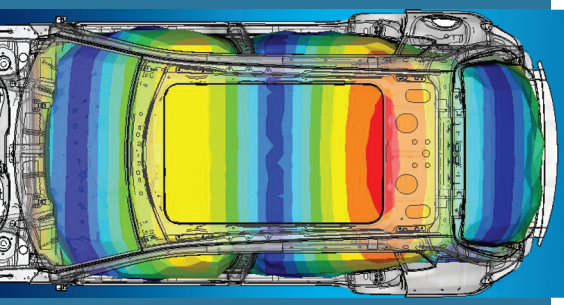
ROUSH®



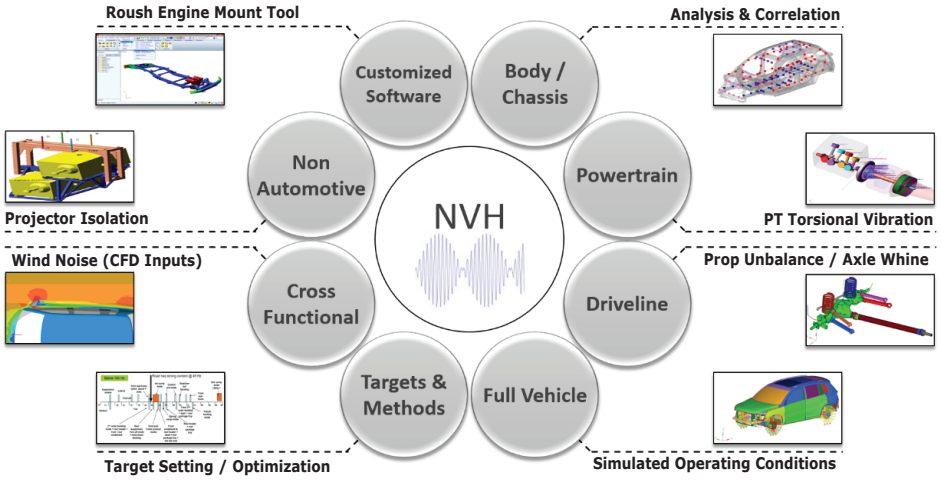
CAE

Noise and Vibration Engineering

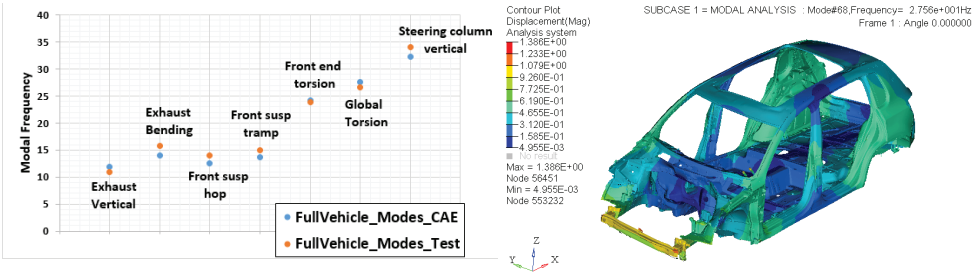
We have one goal — improving the noise and vibration quality of our customers' products. Roush delivers innovative, effective noise and vibration control solutions. By combining advanced analysis capabilities, comprehensive engineering services, and state-of-the-art facilities, Roush has become a proven 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.

The Roush Noise and Vibration CAE group has vast experience in solving multiple customer problems using state of the art software tools and in-house development codes.



In the automotive industry, subsystems with accurate representation of geometry, mass, stiffness and connection are assembled to create complex **full vehicle models**. Further analysis is performed to evaluate the NVH characteristics of the entire system.



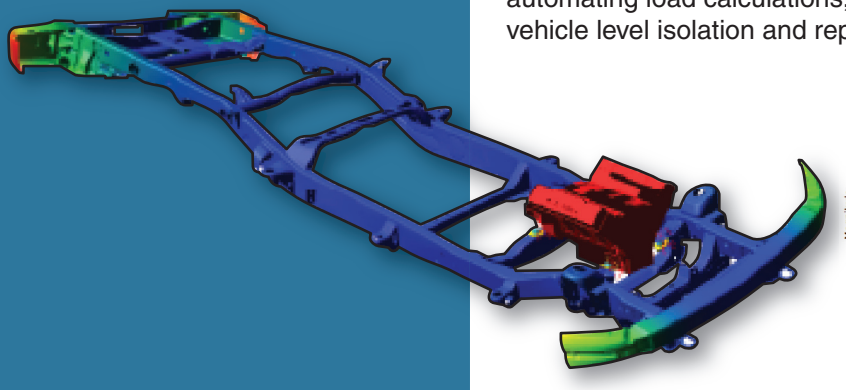
Simulations we perform to enhance the NVH behavior include:

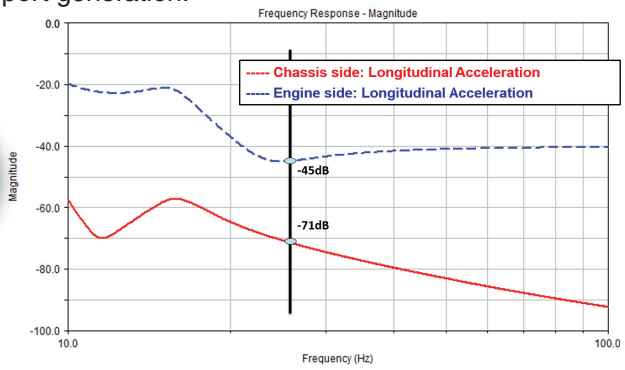
- Road Induced – Rough Road Shake, Impact Harshness, Road Noise
- Wheel/Tire sensitivity – Unbalance, Tire Force Variation
- Powertrain – Engine Idle, Part Open Throttle, Wide Open Throttle
- Driveline – Propeller Shaft Unbalance, Torsional Vibration, Whine
- Brake – Brake Shudder

*We're **focused, efficient** and we **deliver.***

The Roush CAE group has years of experience in solving powertrain and driveline related NVH problems. Roush CAE captured some of that knowledge when we developed the Roush Engine Mount Tool (EMT) software.

Roush EMT (Engine Mount Tool) is an in-house tool developed to design and optimize engine mount systems. The tool shortens the design time by automating load calculations, FD curve generation, modal decoupling, full vehicle level isolation and report generation.





Example of Isolation Achieved Between Engine and Chassis

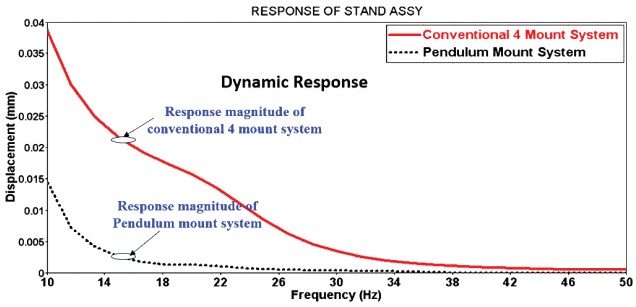
Power Train Modes AFTER Optimization – Uncoupled								
Mode	Frequency	Grid Point Kinetic Energy						Vehicle
#	Hz	X	Y	Z	Rx	Ry	Rz	CSYS
1	5.8	67						Fore Aft
2	6.1		99					Lateral
3	7.6					87		**Roll**
4	9.8			99				**Bounce**
5	16.4						89	Yaw
6	18.6				99			Pitch

Modal Decoupling of Engine Modes

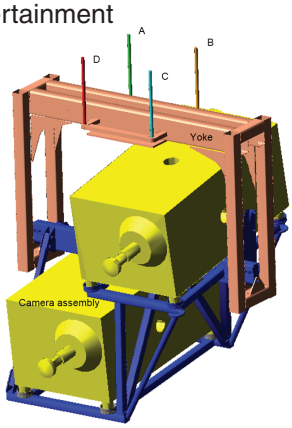
Roush has helped customers solve various NVH problems, including:

- Axle whine
- Suspension development
- Powertrain adaptation
- Driveline unbalance
- Steering wheel nibble, etc.

The Roush CAE group has applied NVH knowledge and expertise to solve problems in **non-automotive industries** like entertainment rides, medical devices and oil and gas exploration. Here are a few examples:



Medical Device Isolation



Camera Mounting Inside Entertainment Ride

Product Performance and Suitability:
All information regarding the use of Roush products identified in this datasheet is believed to be reliable by Roush, but are not product specifications and must only be used as a guide. Roush does not represent or warrant that its products are fit for a particular purpose or that they do not infringe any U.S. or foreign patents. Purchaser must independently determine the suitability of the Roush products for their particular application. Unless written otherwise in Roush's Terms and Conditions of Sale for the product, this datasheet or any verbal statements made by any other distributor, salesman or representative about the product will not be deemed to create an express warranty of any kind.

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Roush CAE
333 Republic Dr.
Allen Park, MI 48101
Main: 313-425-2600
Toll Free: 800-486-3637
Fax: 313-425-2970
CAE@roush.com

www.roush.com/NVH

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