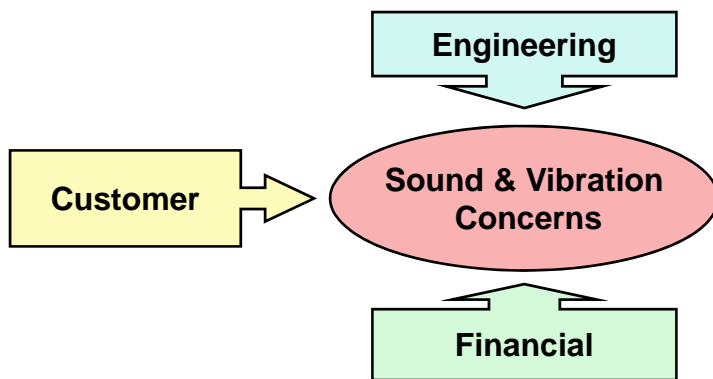


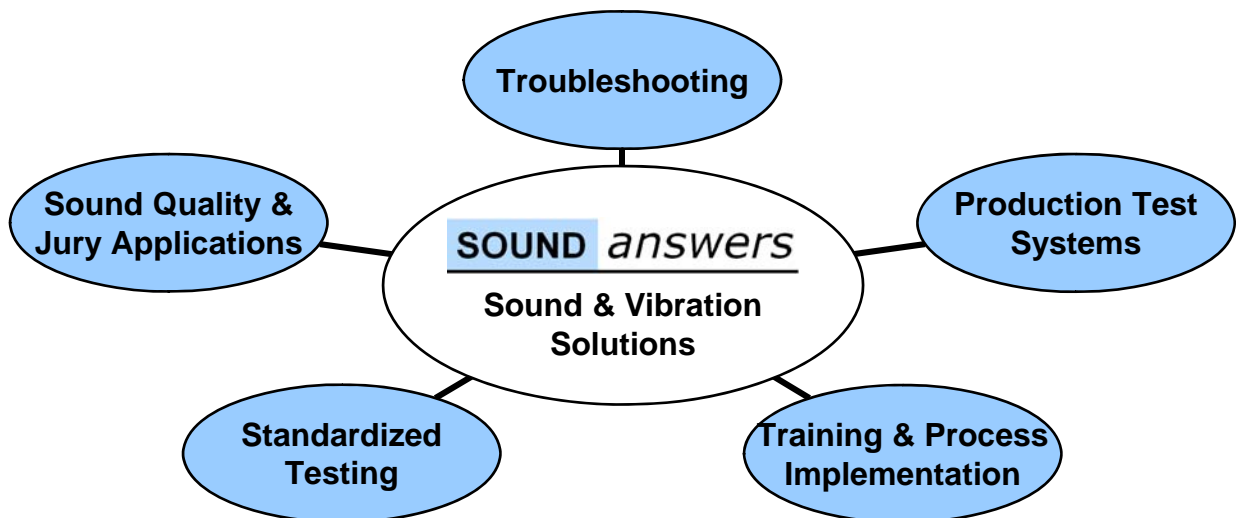
SOUND *answers*

A Sound & Vibration Consulting Firm

Sound Answers Inc. is an independent Sound and Vibration (S&V) consulting firm focused on providing complete S&V design, development and implementation solutions by linking our S&V expertise with the technology of our strategic partners.



Sound and vibration performance requirements continue to increase in all industries from a variety of sources. Sound Answers works with Customers at every level, from those who must react to a new S&V issue to someone who would like to incorporate design solutions with S&V performance in mind.



Sound Answers is prepared to be the NVH resource for your company by supplying the expertise required to resolve your sound and vibration concerns. Our broad application experience covering the **automotive**, **consumer product**, **off-highway** and **manufacturing** markets allows us to work with Customers at any stage in the product cycle.

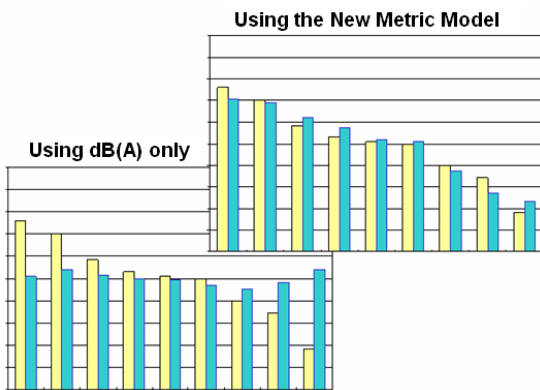
Working with Sound Answers enables Customers to build their S&V skills, gain greater understanding of their product and successfully implement S&V into their engineering process.

AREAS OF EXPERTISE

Sound Quality & Jury Applications

Establish **objective sound quality targets** which correlate to end-user subjective preference.

Sound Answers helps Customers develop more representative pass/fail criteria, and incorporate these new targets in their manufacturing process. Utilizing the following techniques, Sound Answers takes the guess work out of sound quality projects.



- Target development
- Sound quality value engineering
- Jury evaluation
- Sound quality analysis and metrics development
- Buzz, squeak and rattle (BSR) evaluation
- Competitive product assessment



Standardized Test Customization

Optimize lab efficiency by deploying **standardized tests**.

Sound Answers realizes the need of the modern lab to complement commercial-off-the-shelf (COTS) software/hardware systems with custom S&V standardized test cells in order to meet increased efficiency requirements. In addition to providing customized sound and vibration training and services, Sound Answers provides relief to limited resources and efficiency concerns.



Custom GUI for Road Acquisition

- Performing standardized tests to specification
- Developing standardized test procedures
- Design and fabricate component test stands
- Building customized interfaces for commercial software
 - Pulse™ from Brüel & Kjær, to optimize the (COTS) S&V solution
 - LabVIEW™ from National Instruments, including tools and services, to help Customers define, design and deploy standardized tests
 - MATLab® from Mathworks, when enhanced capabilities for data analysis and reporting are required
 - I-deas Pro™, to streamline and/or automate the data acquisition and analysis process

Troubleshooting

Root cause S&V issues and develop design recommendations by applying the Source-Path-Receiver approach to S&V **troubleshooting**.

With access to state-of-the-art facilities and equipment, Sound Answers staff is poised to tackle any sound and vibration issue by leveraging the most innovative tools available.

Source – Path – Receiver Model



Troubleshooting services include:

- Noise contribution assessment
- Root cause analysis
- Countermeasure development
- Operating data acquisition
- Order tracking and spectral mapping
- Operating deflection shapes
- Modal analysis
- Advanced signal processing
- Noise-path analysis

Production Test Systems

Sound Answers works to control S&V quality in production by leveraging consulting expertise to provide a complete S&V offering to the manufacturing environment.

- Provide consulting expertise to define the necessary targets to move from Subjective Assessment to Objective Containment
- Implement a S&V Objective Containment system based on **Brüel & Kjær's PULSETM Production Test System (PPTS)**
- Identify how the Customer can best utilize the data from the PPTS for Process Control and/or Product Re-design.



Training & Process Implementation

“Give a man a fish, and you feed him for a day. Teach a man to fish and you feed him for a lifetime.” Sound Answers provides a variety of how-to and technical training. Our staff is focused on transferring technology and expertise to our Customers.

Sound Answers can assemble a custom training course to meet your needs, from fundamentals of acoustics and vibration to target development process, from typical troubleshooting techniques to development of custom test solutions.



Training Services Include:

- Targeted classroom training
- Customized on-site training and consulting
- Complete system integration for software, hardware and test systems
- Software customization and integration

KEY PARTNERSHIPS:

By complementing our S&V expertise with the technology of our partners, we can help Customers at any level of maturity from performing “NVH sensitive” design studies to specialized noise and vibration troubleshooting projects to development of standardized tests

Brüel & Kjær

www.bksv.com

Brüel & Kjær is a world-leader manufacturer of instrumentation and software for noise and vibration. By partnering with Sound Answers, Brüel & Kjær is able to provide its Customers access to S&V expertise for a variety of exploratory sound and vibration consulting. Sound Answers occupies office space at the new, state-of-the-art ARC facility with its world class laboratories. ARC Facilities include:

- 4WD NVH chassis dynamometer
- Sound Transmission Loss (STL) suite
- Sound quality and jury listening room
- Hemi-anechoic chamber with bedplate
- Brüel & Kjær equipped lab including transducers, 100s of channels of Pulse acquisition, microphone arrays, and a vehicle simulator lab



Application Research Center (ARC)

EST Testing Solutions

www.est-usa.com

EST offers testing services including vibration and shock, BSR, thermal, EMC, fluids and environmental durability. EST also offers a variety of refurbished test equipment and custom test fixtures. With A2LA accreditation for acoustics and structural testing, EST and Sound Answers provide standardized S&V testing capabilities.

Applied Technology Inc.

www.appliedinc.com

ATI offers CAD/CAE engineering services for product design and analysis. Sound Answers and ATI have identified an opportunity to provide integrated solutions for “NVH Sensitive Design” that can include:

- Root cause identification and design recommendation
- Detailed design and virtual validation
- Prototype and physical test confirmation

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