

A Newsletter from **Stewart Acoustical Consultants**

Our 29th Year

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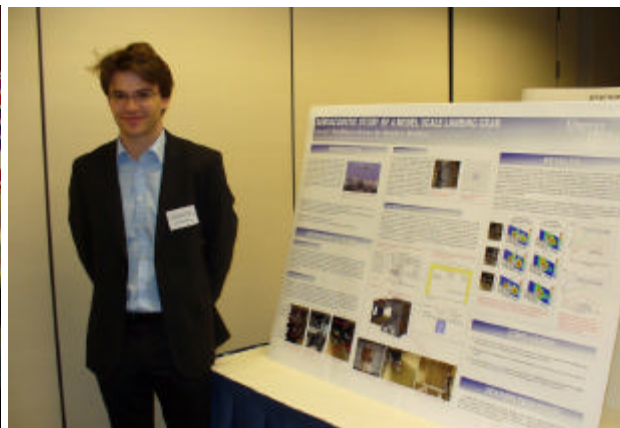
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Student Competition Held

The North Carolina Chapter of the Acoustical Society of America held its annual student competition including the Royster Award on March 30. Four graduate students from Virginia Tech and an undergraduate from Duke were entered in the Royster competition and three architectural students from Virginia Tech competed for chapter prizes. A \$2500 Royster Award was presented to Lisa Burton a graduating senior in mechanical engineering at Duke who will enter graduate school at MIT in the fall. Her poster involved a tuned silencing system using a carefully selected pattern of expansions with sound absorption in a duct. A \$1000 chapter prize was awarded to Marcel Remillieux of Virginia Tech for his work on noise source location and control on a scale model of an aircraft landing gear. A \$300 award was made to architectural student Tad Schifflett for his project involving acoustical treatment of an animal shelter.



Lisa Burton with Larry and Julia Royster



Marcel Remillieux with poster

On Allowing Suppliers to Write Specifications – Music Suites

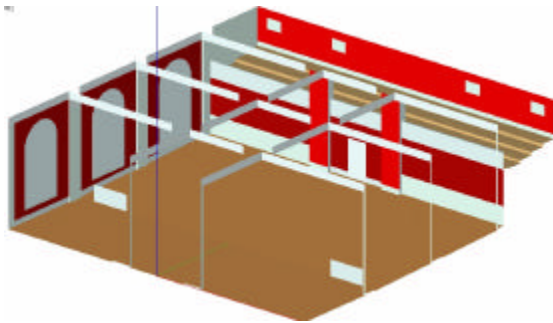
We have found that designers sometimes allow suppliers to write specifications for various parts of a building design. Caution must be used when doing this. A supplier will typically write a specification to favor his products or even to exclude competition. Sometimes it is possible to modify what they have done to allow competition. However, if you are not familiar with all the characteristics of the product or system, you may not recognize requirements that are unnecessary but restrict the specification to a particular product. In some cases it may be necessary to limit a specification to a particular unique product, but when that is not required, it is usually better to provide opportunity for competition among suppliers.

A special case is that of music practice spaces for schools or churches. One particular company is a specialist in this area and can provide complete systems including the design if desired. However, all the components required can be obtained from other suppliers. The difference is that these other suppliers are not set up to do the full room design. They expect the building designer to tell them what they are to provide. Now, the company that can do the complete design usually does a very good job and is an option. However, just realize that if you allow them to write the specification, they are going to write it in such a way that no one else can meet it. Trying to save money by letting a supplier write a specification does not always pay off.

Violin Acoustics at East Carolina University

The Raleigh News and Observer recently featured a major article on the research on violin acoustics being conducted by Dr. George Bissinger at East Carolina University. Dr. Bissinger has been conducting this research for many years, but recently he was able to for a few days get together some of the greatest known violins, some of the best living violin makers, and advanced equipment to gather a large amount of data. The story can be found here along with an audio and slide show. <http://www.newsobserver.com/689/v-print/story/490355.html>

Courtroom Acoustics – History and Technology



Our state has many older courthouses. Over the years many courtrooms have been modernized, but in recent years interest has developed in restoring some courtrooms to their original architecture. A side effect is that the original acoustics of these courtrooms have also been restored including excessive reverberation, but now combined sometimes also with excessive ventilation noise.

This makes it more difficult for people to understand what is said in the courtroom. At the same time the technology of court reporting has progressed to where now court reporters often make audio recordings of what is said. They find that in listening to these recordings it is even more difficult to understand what is said than it is when listening live in the courtroom. This is creating problems in generating accurate transcripts. A courtroom is a space where people must be able to hear and understand clearly and make clear recordings, often without benefit of a microphone close to the person speaking. Good acoustical design is essential with care in restorations to provide modern acoustics.

Unique Products in Government Projects

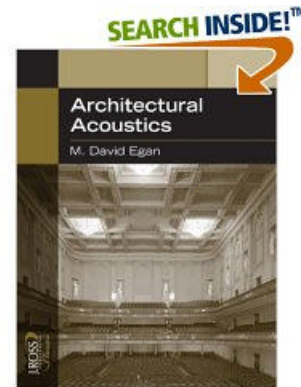
Government procurement procedures typically assume the products needed are commodities available from several sources. In the acoustics world in many cases even similar products available from multiple suppliers may not be exactly equivalent. Often they are and we can list several “equivalent” suppliers. However, in some cases we find that the best product for the application is available from only one supplier, either because they have a patent or just happen to be the only supplier. A very common example of this is the wood-fiber product Tectum. In other cases, clients want us to specify an NRC rating or STC rating with the presumption that any product that meets such a rating would be equivalent. That is not always true. Such single number ratings can be very misleading. Thus, actual materials and constructions must be specified to achieve desired results. Clients and government agencies must be prepared to work with us on these problems to assure the best results at least cost to taxpayers.

Classroom Ceiling Panels

In response to the need for good classroom acoustics at low cost, the three major ceiling manufacturers now offer inexpensive NRC 70 ceiling panels that are especially appropriate for use in classrooms. Using these panels at a height of 9 feet for at least 85% of the ceiling area will assure that the reverberation in the classroom meets the intent of the new classroom acoustics standards ANSI S12.60. These ceilings are the Armstrong School Zone Fine Fissured, the USG Radar Climaplus High CAC/High NRC, and the Celotex Fine Fissured High NRC. Specifying these ceilings with a 9-foot height is the easiest and least expensive route to reverberation control in classrooms.

Egan Book Available Again

Professor David Egan before his retirement taught architectural acoustics for many years at Clemson University and the University of North Carolina at Charlotte. His books on the subject developed for his classes have been highly valued by his students and other architects. The out of print books have been known to command premium prices. Now, his last book has been reprinted in paperback by J. Ross Publishing Classics and is available from the publisher and various sources. We have heard rumors that a new version of this classic book may be in the works.



New Wallboard Products, the light, the heavy and the damped

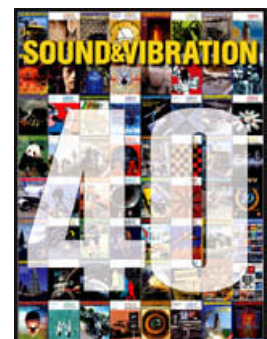
New wallboard products are being introduced for various reasons and these can have influence on acoustical performance. In past issues we have discussed the Quietrock products that involve thin gypsum panels laminated with other materials to provide damping and move the coincidence effect to a high frequency. National Gypsum has now worked with this company to introduce a similar line of products. The parent company of Quietrock, “Serious Materials” is now planning to offer a lightweight gypsum product on the theory that it takes less energy to transport. Potential users of this and similar product should recognize that reduced weight also means reduced acoustical performance. On the other end of the spectrum, USG has recently introduced their Fiberock line of wallboard. This product is mold resistant without a paper facing, but is heavier than regular gypsum and contains a high percentage of recycled content. In theory the extra weight should help improve sound blockage. However, USG has not thus far provided any test data to examine the benefit. There must be some concern until such data is available as the changes could influence the coincidence effect and affect the mid-frequency performance.

Furring System for Wall Panels

We have often used furring and fiberglass batts behind Tectum panels to obtain better low-frequency absorption, and ceilings with air spaces above provide extra bass absorption. Now, a supplier of absorptive wall panels is offering an optional four-inch wall furring system to enhance the bass absorption. See <http://www.thewaveproducts.com/specs/FRRails.pdf>. Unfortunately, no test data are yet available.

Sound & Vibration Magazine 40th Anniversary

Sound & Vibration magazine recently celebrated its 40th Anniversary with a very special issue containing articles by legends in sound and vibration. <http://www.sandv.com/home.htm>. Of special interest to us were two articles by Leo Beranek – “Who Really Invented the Internet” and “The Noisy Dawn of the Jet Age,” and an article by Laymon Miller – “The Squeaky Wheel ... and other Serious Things.” These articles and the whole issue are available on the website.



Bridger to Present Paper in Salt Lake City

Joe Bridger will in June present a paper at the meeting of the Acoustical Society of America in Salt Lake City about various lessons learned using the EASE and AURA computer modeling programs over the past few years. These programs have allowed us to more precisely determine locations for treatment of rooms to eliminate specific reflections and to optimize treatment to reduce reverberation with less material by putting it in the most effective places.

Acoustics at NC State in the 1960's and 70's

North Carolina State University was a leader in acoustics education and research in the late 1960's and 70's due primarily to the efforts of two young professors, Franklin D. Hart and Larry H. Royster. After both graduated in 1959, Frank had stayed to continue in graduate school while Larry initially went to work in industry where he became involved in a project on underwater transducers. Larry was able to bring his project with him back to the university as his dissertation subject. Frank spent a brief postdoctoral period with NASA before beginning as a professor. At NASA he became involved in acoustics and saw the possibility of a major acoustics research center at NC State. Back at State he started recruiting students and research grants and establishing courses as part of what was first the Vibration and Sound Laboratory, and then the Center for Acoustical Studies. Upon completion of his degree, Larry also joined the faculty and started a program with some degree of independence but cooperating with the Center. Larry and his wife Julia became international leaders in hearing conservation. Frank recruited Ron Bailey to go to England for a PhD and return to State as a professor, Bill Reiter to complete his degree at State and join the faculty, and Tom Hodgson as faculty member from England by way of Syracuse University. The major thrust of their research was the control of noise from industrial machinery with support from many industries and the federal government. One major program involved the textile industry in cooperation with Professor Paul Emerson of the Textile School. Frank Hart moved up the administrative ladder of the University, leaving as Vice Chancellor and Provost. All those professors are now retired except Ron Bailey a co-founder of our firm who is now Dean of Engineering at UT-Chattanooga. NC State today offers more limited opportunities in acoustics under the leadership of Professor Robert Nagel, but over the years has turned out dozens if not hundreds of students in acoustics.

Laboratory Test Reports Can Be Erroneous

We have previously discussed the fact that laboratory test results are not exactly repeatable and can be misleading. We recently reviewed a laboratory report on a type of glue that appeared to indicate miraculous performance in preventing impact sounds when used on a concrete slab with no ceiling below. After sending an email to the lab that did the test we got a quick return phone call after they had reviewed the situation. They had somehow accidentally failed to mention that a well isolated ceiling was installed under the slab during the test. The manufacturer of the glue product was honestly unaware of the very misleading claims made about his product as a result.

Condominium Acoustics – Recent Book and Article Misleading

A chapter in a recent book and now an article in the quarterly publication *Acoustics Today* by California consultant Marshall Long provide information on condominiums that we believe is misleading. A basic premise of the discussions that we agree with is that the building code requirements are insufficient to assure satisfaction of buyers of luxury condos. However, the author gives an impression that buyers of such condominiums have a reasonable expectation of such high levels of impact sound isolation that even he admits (in the book only) that they cannot be achieved on wood frame structures without the use of carpet. We also question some discussion of wood-frame thump and resilient channels. This work was not critically reviewed before publication, but since *Acoustics Today* is a publication of the Acoustical Society of America many people may give it more credence than it deserves.

Products Mentioned on our Website and in our Newsletter

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