

A Newsletter from **Stewart Acoustical Consultants**

Our 28th Year

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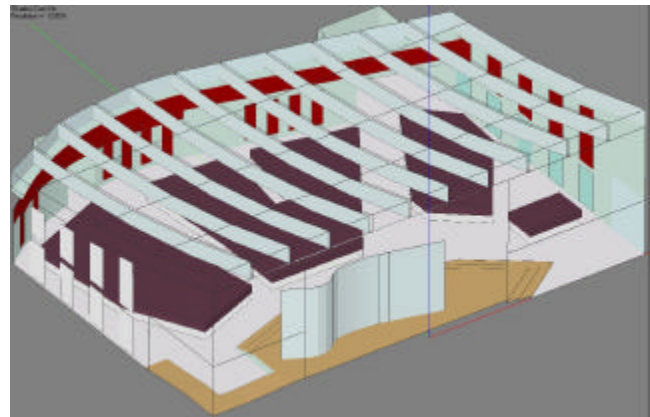
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Congratulations Canes – The Arena is Loud thanks to Fans not Acoustics

We want to join everyone in congratulating the Carolina Hurricanes on winning the Stanley Cup. The enthusiasm and loudness of the fans in the RBC Center has been observed by everyone watching the games, bringing several letters to the local newspaper from Canadians who are impressed. This led the Raleigh News and Observer to investigate whether the acoustics of the arena contributed to the loudness. As they found, compared to older arenas such as Reynolds Coliseum, it is more difficult for the crowds to become loud in the new larger arenas. The problem comes down to basic acoustics and the need for reverberation control that also reduces loudness. As the seating capacity of the new buildings has increased, the space volume (cubic feet not loudness) has increased more. Reverberation is basically proportional to the room volume divided by the amount of absorptive material in the space. In the old rooms, people provided most of the sound absorption that controlled reverberation. With the higher ceilings and greater volumes in the new spaces, the people alone are no longer enough to control the reverberation. Absorption must be added to the ceiling and other available surfaces. In the RBC center you can observe perforated metal acoustical deck over the ceiling center, and tensioned acoustical banners over the seating areas. The upper walls are also treated heavily with Tectum wood fiber material. This absorption in addition to controlling reverberation also reduces loudness. This balance between reverberation control and loudness is a key to successful design of spaces where both loud cheering of the crowd and clear speech are important.

Seminar on Acoustical Modeling

In September, the regional chapter of the Acoustical Society of America is hosting a special two day event on architectural acoustics modeling. The first day is a special full day seminar exploring the more advanced aspects of acoustical modeling with the EASE software we use. This course is being taught by Bob Coffeen, from the University of Kansas, who also teaches EASE around the country. The second day will be the fall meeting of the chapter and will be devoted to presentations on the utility of various



computer tools in architectural acoustics, including modeling software such as EASE. This was prompted by the growing prevalence of such tools and the continual need to increase our understanding of their capabilities and improve the effectiveness of their use. For more information about the meeting and to register for this event, please visit www.nc-asa.org

Another Use of High-Pitched Tones

A recent issue reported on the use of high-pitched tones as a deterrent to young people congregating at commercial establishments where the proprietors did not want them. The concept is that the young people hear these tones that older people do not hear. Now, the youngsters have tried to turn this effect to their advantage by adapting the tone for use as a cell phone ring tone that their teachers and others cannot hear. The news got out when a phone rang in a classroom taught by a younger teacher who heard it.

Garage Door Noise

Garage doors can be a noise problem when located under living space, and especially in condominiums when the owner of the space above does not control the garage. The manufacturers of doors and openers offer some options that can reduce the noise, and another option for isolation is available. Start with nylon rollers on the door. Next choose one of the quiet openers available, typically a belt drive model with a DC motor that can start and stop slowly, and sometimes with internal isolation. Finally, isolate the motor and door rails from the ceiling structure. This can be done using special clips available from Pac International. http://www.pac-intl.com/decoupled_gd.html. Note that costs can be reduced by buying individual parts for the isolation rather than the kit.

Spray-on Foam for Use inside Walls

We have found a spray-on foam product that can be used to provide sound absorption inside walls for increased sound blockage. The foam takes the place of fiberglass or mineral wool batts or cellulose. Thermal insulation foams often do not provide the needed sound absorption, but this one does. A major precaution must be taken however. The process involves spraying the foam into the cavity before the gypsum is applied to the second side. The foam expands and must be trimmed before the gypsum is installed. The special precaution is that the foam must be trimmed so it does not touch the gypsum on the second side. If resilient channel is to be installed, the foam can be trimmed even with the studs. Otherwise, the foam must be trimmed with a recess to prevent it from touching the gypsum. The foam is Sealection 500 from Demilec. <http://www.sealection500.com/dem/s500/index.php>

Cutting Travel Costs – GoToMeeting.com

Travel time can greatly increase the cost of a short meeting. We are always looking for ways to reduce costs for clients. We have subscribed to a new tool that we hope will do that through www.gotomeeting.com. This service allows us to have online collaboration meetings where we can share computer screens, mark up drawings, make presentations, and have a teleconference simultaneously. This is especially useful for collaboration with other design team members, and for owners who need the visual illustration and interaction in addition to a phone conversation. There is some limited webcam video sharing through the tool for some visual interaction (does not support video-streaming). We chose this tool for its ease of use for participants and great value. It is our hope that this tool will provide clients a way to reduce the time and cost spent traveling to meetings, improve visual communication, and encourage real time collaboration. For those wanting the visual face to face meeting, this tool is not a substitute for that. For those familiar with IM (Internet Messaging) tools, we can have video and audio interaction (webcam quality) separately or simultaneously with GoToMeeting through those tools (such as MSN messenger). We are also looking at other affordable videoconferencing tools that are easy for participants to use and can provide better quality video interaction for those needing that. For each client who wishes to use this service, we are making a flat fee charge of \$50 per project. This fee structure may change as we get more experience as we must pay a monthly subscription charge whether we use the system or not.

Products Mentioned on our Website and in our Newsletter

You will notice that we have started mentioning some specific products in our Newsletter. These are not intended as general endorsements and are not paid advertisements. These are usually unique products available from only one supplier that meet special needs. Our intent is to make people who have such needs aware of these products that are usually new and that can sometimes be difficult to find. Suppliers with new or unique products should feel free to contact us.

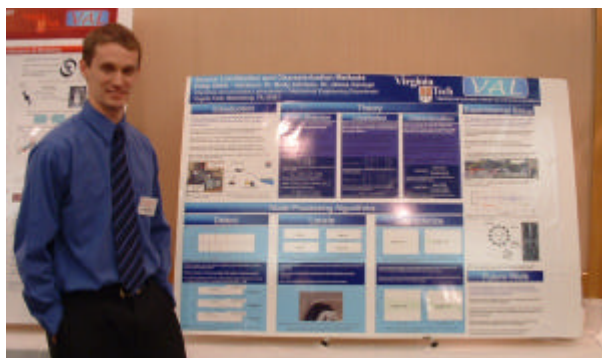
An Improved Party Wall for Townhouses

In the last issue we discussed the traditional “townhouse wall” that gives poor acoustical performance. We have noticed the growing use of a new wall system that gives good performance in townhouse applications. This wall has two sets of studs with batts in each stud space and a single layer of gypsum on each of the outer surfaces. However, in the middle, the studs are typically spaced about two to three inches apart and a single thick layer of gypsum is mounted between them. This central layer is supported between the studs rather than being attached to one set. It is attached to the studs at a few locations with special clips providing a flexible point contact. The combination of this minimal contact and large space filled with absorption on each side provides good low frequency blockage, and the three layers of gypsum separated combined with the different coincidence frequency of the thicker middle layer provides excellent blockage at higher frequencies. Dr. Stewart recently did an informal test of such a wall and found it to provide at least NIC 60 into an unfurnished room with all hard surfaces.

\$6850 awarded to Engineering and Architecture Students



Fourteen students competed on April 7 for the 2006 Royster Awards and additional scholarships funded by the North Carolina Chapter of ASA. Students presented posters on a wide variety of topics all in some way relating to noise control or hearing conservation. The primary award is from a fund contributed by Larry and Julia Royster. Additional awards came primarily from funds raised by the chapter. Some prizes were designated specifically for students in Architecture and Building Science, and one was designated specifically for an undergraduate or first year graduate student. The students were all from Engineering, Architecture, and Building Construction programs at Virginia Tech. The Royster Award of \$5000 was presented to Rahul Kadam (above with Larry and Julie Royster) a Mechanical Engineering student for his work on modeling of the noise and vibration of pneumatic power hammers. The top award for Architectural and Building Construction students went to David Clayton (left) for his work on speech intelligibility in a natatorium. Philip Gillett (lower photo) of Mechanical Engineering received the award for a first year student for his work on source localization. Posters were on a wide diversity of topics including outdoor learning spaces, controlling the sound exposure due to ipods, isolation between units of student housing, acoustical properties of walls, source localization and characterization, noise control of ducted propulsors, and virtual acoustic prototyping.



Transportation Noise Conference in July at Williamsburg

The committee on Transportation Noise and Vibration Control of the National Research Council holds two technical meetings per year, one in Washington, DC in January, and a summer meeting that is rotated around the country. This year's summer meeting will be in Williamsburg, VA July 10-12 and will feature tours Monday afternoon, and technical papers Monday and Wednesday morning and all day Tuesday. Topics include updates on activities of the FHWA and Federal Railway Agency, a demonstration of directive train horn performance, discussions of state noise policies, planning issues, and construction issues, several papers on the latest research on pavement related noise, and a session on the effects of noise on wildlife. Tours include the Monitor-Merrimac Bridge Tunnel and a precast barrier manufacturing plant. For more information see <http://www.adc40.org/>.

Posters on Worship Spaces Presented and to be Featured in new ASA Book

Our staff in cooperation with audio systems designers presented fourteen posters on worship spaces at the Spring Meeting of the Acoustical Society of America in Providence, Rhode Island. These posters will be featured in a book to be published by ASA covering worship space design achievements of the past 25 years. Cooperating with us in this effort are the audio systems designers for the various spaces: Fred Schafer of F. C. Schafer Consulting, LLC., Jim Brawley of James S. Brawley and Associates, Inc., Eb Strickland of Avcon, Inc., and Joe

Davidson of Davidson Audio Video. The spaces chosen illustrate a variety of worship styles and both new construction and resolution of existing problems.

Storm Windows, Interior or Exterior, for Improved Sound Isolation

As more residential projects are built in noisier areas the concern for improved windows becomes greater. Given the variation in tolerance of noise among occupants, builders may not want to upgrade all windows of a project when many occupants would find regular windows acceptable at least for some rooms. Careful design of initial windows to accept storm windows on the inside or outside provides residents an option to easily upgrade window performance, possibly only in selected rooms. For instance, road noise may be a problem only for bedrooms on one side of a home towards a major road. Many people are not aware of the possibility of using interior storm windows that can have a simple frame which becomes almost invisible if the window frame permits it. At least two websites are offering interior storm windows for improved sound isolation. www.stormwindows.com offers windows of regular glass, while www.soundproofwindows.com offers higher performance windows using laminated safety glass. With some new windows that have screens built in, it may be possible to replace the screen with a sheet of glass.