

A Newsletter from **Stewart Acoustical Consultants**

***Our 27<sup>th</sup> Year***

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## Welcome!

We are trying to make our newsletter a little more frequent and regular with a goal of quarterly publication. If you do not wish to receive these newsletters, please let us know.

## Joe Bridger – Individual Member of NCAC



Joe Bridger has been elected an Individual Member of the National Council of Acoustical Consultants. NCAC is an international trade organization of acoustical consulting firms. The principals of those firms must meet certain qualifications for the firm to become a member. Those principals and other senior staff who meet the same qualifications are eligible to become Individual Members of NCAC. The Individual Members are fully eligible to participate in NCAC and to represent their firm to the organization or hold office. Joe joins Dr. Stewart, a Past President of NCAC making Stewart Acoustical Consultants the only firm in our primary service area with two Individual Members of NCAC.

## Revision of ASTM E336 Approved – Testing for NIC, ASTC, Minimum FSTC

The effort to revise the ASTM standard for measuring sound isolation between rooms has climaxed with the approval of ASTM E336-2005. Dr. Stewart has been the task group chair leading this effort for several years. Obtaining consensus agreement for some major changes in this standard was a major accomplishment. One major change is the defining of new terms and measures called Apparent Transmission Loss and Apparent Sound Transmission Class, ASTC. This is the apparent STC of the partition as tested including all flanking transmission. In the past, this result was often erroneously reported as the Field Sound Transmission Class, FSTC. However, FSTC by definition does not include any flanking. Actually measuring FSTC in the field is almost impossible and most results reported in the past should have been labeled “Minimum FSTC.” The revision makes this requirement clearer for cases where efforts are made to minimize flanking. The other major change involves the measurement of Noise Reduction and Noise Isolation Class, NIC, between large rooms. By the new standard, whenever either of the rooms has a volume of 150 cubic meters or more, all measurements are to be made 1 to 2 meters from the partition between the rooms rather than averaged over the room. This will result in typically lower levels of NIC than previously reported. However, this will more accurately reflect actual perceptions especially close to the partition. This will be significant in the testing of operable partitions.

## Hair Cell Regeneration to Restore Hearing

It was discovered several years ago that birds have the ability to regenerate hair cells in the inner ear after they are damaged by loud noise. This has led to further research altering the DNA of guinea pigs which has allowed them to regenerate hair cells. This research provides strong hope that a potential method could be developed to allow humans with noise-induced hearing loss to regenerate hair cells and recover their hearing.

**Flanking in Wood Frame Structures – Canadian Research**

Our friends at the Institute for Research in Construction at the National Research Council of Canada have completed and published a major study on flanking effects in wood frame structures. A copy can be obtained at this site.

<http://irc.nrc-cnrc.gc.ca/fulltext/rr193/rr193.pdf>

As discussed in the guide, the dominant transmission between two adjacent rooms is often through the floor rather than through the wall between the rooms. A direct path from the floor to a wall below also can limit sound transmission vertically. Details must be considered carefully to avoid these problems. Simply picking a good wall or floor-ceiling design does not assure good isolation.

**People who work with us, Mathew George and Kevin Bengel**

In addition to our staff of Noral Stewart, Joe Bridger, and Aaron Farbo, we occasionally have assistance on projects from others to handle special situations. This month, we highlight two of these people, Mathew George and Kevin Bengel, PE. Mathew at right was a former employee who was trained in our methods of analyzing room acoustics and HVAC noise. Mathew now operates MMG Acoustical Consultants in Bangalore, India. Through the internet, he is able to continue working with us doing the same analyses he did in our office. We use Mathew primarily when our workload requires it in order to meet client schedule needs. Kevin Bengel, PE is the former chief acoustical engineer of the Newport News Shipbuilding and Dry Dock Company. He now operates a general mechanical, electrical, and plumbing engineering practice in Graham, NC as Alamance Consulting Engineers. Kevin assists us primarily in cases where a North Carolina registered engineer knowledgeable in acoustics is required.

**Problems in the HUD Noise Model over Soft Ground**

For several years we have observed that the HUD noise model required for calculating highway noise in HUD funded projects would indicate higher noise levels than we observed or than were calculated by DOT studies. A recent investigation for a client has verified this and determined the reason. When the model was developed around 1970, the effect of soft ground on sound propagation was not well understood. Measurements used to develop the model showed variation, but an average result was used. Separate models for hard and soft ground were not recognized as necessary. Further experience indicates a strong difference between soft and hard ground for about 1000 feet beside a road. The recent DOT models recognize this with separate models for hard and soft ground. Levels calculated with the HUD model can be several decibels higher than the actual sound levels when a project is several hundred feet from a highway. This can make the difference between a project qualifying or not qualifying for HUD financing, or can cause a major increase in construction cost. This could keep an individual from obtaining an FHA mortgage. Unfortunately, there is no relief until and unless Congress can approve a funding to revise the model and change the regulation. HUD has a firm position that it must enforce the regulation with the model as it stands even if it is wrong.

## Update your Records Please - Phones – Address

We continue to get some mail at our Post Office Box, and we expect some of you are still calling our old phone number that has been forwarded. We will soon be discontinuing the phone forwarding and post office box. Please update all your records to our new address and phone numbers:

Address: 7406 L Chapel Hill Road, Raleigh, NC 27607

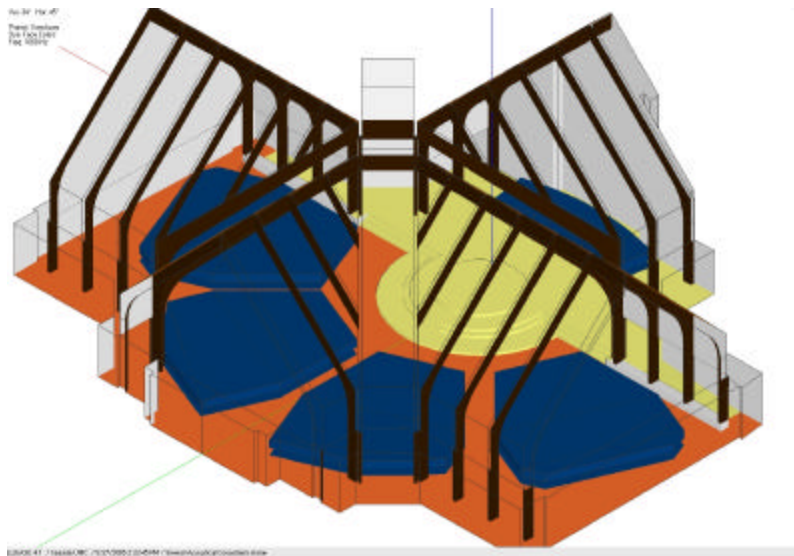
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## Experiences with EASE

We continue to learn with more use of the EASE AURA module. Recently we have been using this system to model some simple rooms and have learned that even distribution of sound absorption around the room may be a little more important than we have previously assumed for reverberation control. The AURA module is a strong but expensive tool that requires long computer runs tying up a computer. As a result, we will be making a specific charge for use of this powerful tool on future projects.



## North Carolina Chapter ASA approaches 40 years, will offer Student Award

The North Carolina Chapter of the Acoustical Society of America will hold the third annual Royster Award competition this fall. This poster competition open to all students interested in acoustics provides either two \$2500 awards or one \$5000 award. The chapter has decided not to offer other awards at the fall meeting, but is soliciting contributions to provide other awards in a competition in the spring of 2006. The chapter will also be celebrating its 40<sup>th</sup> Anniversary in the fall of 2005 and spring of 2006.

## Careful in checking Local Ordinances for Noise Requirements

We commonly assist clients with meeting the requirements of local noise ordinances. We have a collection of many of these and can often locate others quickly. However, we are finding that many localities will put requirements related to noise in parts of their ordinance code other than the primary noise ordinance. For instance, if you have a specific kind of business, it may be necessary to check parts of the local code applicable to that particular kind of business for noise requirements unique to that business. Those requirements could be more stringent than the general requirements in the local noise ordinance. Realize further that residential noise limits usually apply to sound going onto any neighboring property where anyone lives even if the property is zoned commercial. Also, watch for proposed changes in zoning or property use that could impose more stringent noise requirements on neighboring properties.

**Estimate the Reverberation Time of a Room with Hard Surfaces**

One of the most common problems we have to solve is that of the large room with all or almost all hard surfaces that has already been built. These may be gyms, fellowship halls, or hotel ballrooms. This can be good if you are trying to build a room for listening to classical music and the room will be filled with people. If the room is not too big, it may be acceptable as long as it is filled with people sitting quietly, or if you want it to be loud when all those people sing as in a church. However, when a room is large for the number of people and all the surfaces are hard, it can be very reverberant. It is easy to estimate the reverberation time of a room when all the surfaces are essentially hard. The reverberation time RT is approximately  $0.05 V / Sa$  where V is the room volume in cubic feet, S is the total surface area in square feet, and a is the average absorption coefficient of the surfaces. For many hard surfaces, "a" is approximately 0.05. Thus, in a room with hard surfaces, the RT is approximately  $V / S$ . By calculating this ratio for rooms of increasing size, the increase in reverberation can be seen unless the average absorption is increased.

**New Invoicing Program**

We will begin using new software in June to track our consulting time and to produce invoices. Thus, invoices will have a new look. We also plan to start emailing invoices as well as sending them by mail. We hope this double delivery will eliminate some problems of invoices lost in the mail. Several clients have sent requests for custom invoices. We serve typically over 100 clients per year. Custom invoices for each client have not been feasible. We hope the new system will give us more flexibility. We are also listening to requests for features and looking at providing such features in all invoices.

**Scheduling – It's Busy so Get on the Calendar**

The first five months of this year are on a record pace that would not have been possible without the addition of Aaron Farbo to our staff. We usually are looking for a little summer slow down this time of year. However, it does not appear to be happening as we already have June essentially filled and are scheduling July and August. If this continues, we will face serious trouble meeting the needs of all clients in the fall when demand normally peaks. If you do have work you need done in the fall, please make arrangements early.

**School and Classroom Acoustics Mini-Workshops at Virginia School Board Association Meeting – July 19 in Richmond**

Noral Stewart and Ben Motley of Rodriguez Ripley Maddux Motley will be presenting mini-workshops on school and classroom acoustics with emphasis on design of classrooms for good hearing by young students, those with hearing difficulties, and those listening to a second language.

**Calendar**

July 19 – Virginia School Board Association, Richmond, VA

October 3-4 – ASTM International, West Conshohocken, PA

October 17-24 – Acoustical Society of America and NOISECON 05, Minneapolis, MN

November 11 – North Carolina Chapter Acoustical Society of America, Hampton Roads, VA