

A Newsletter from *Stewart Acoustical Consultants*

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Entering our 30th Year

Happy Holidays

All of us at Stewart Acoustical Consultants want to wish all of you a happy and joyous holiday season.

Welcome New Readers

Effective with this issue we have significantly expanded our distribution of this Newsletter. Those who have not seen previous issues can find them here. <http://www.sacnc.com/news.html>



Entering our 30th Year

Did you notice that banner above? Yes, on December 8, 1978 our Articles of Incorporation were filed with Secretary of State Thad Eure. We then coincidentally held our organizational meeting December 27, 1978, exactly 50 years to the day from the date of a similar organizational meeting of the Acoustical Society of America. We opened for business on January 2, 1979 at our original little office on Walnut Street in Cary. We bought some used furniture, some of which we still have. We had to pay someone to type our reports, and measurements were tedious, one frequency at a time. Computers have changed everything, the way we prepare reports, the way we measure sound, and the way we analyze rooms. However, the one thing that remains the same is our first priority in providing quality acoustical advice primarily to the people of North Carolina and adjacent states.

LEED for Healthcare open for Comment until December 15

The proposed LEED rating system for Healthcare facilities that includes credits for acoustics is open for comments until December 15. Information can be found here. <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1765>

New Products

Our newsletter usually has comments on new products available for the control of sound. We became aware of several just before the deadline at the annual meeting of the National Council of Acoustical Consultants and will provide discussions of these in our next issue. This shows the importance of membership and participation in such organizations as those who do not are often in the dark on such new products.

Bad Audio may not be Fatal, but Reactions to Noise can be.

Don and Carolyn Davis founders of the Syn-Aud-Con program of education in audio systems design have published a memoir titled "If Bad Sound were Fatal, Audio would be the Leading Cause of Death." The book is a collection of articles from their newsletter and other writings that chronicle their lives, the people they have known and worked with, and major and minor events they have been involved in. The title is simple a reference to the poor quality of many audio systems. However, some of organizations that track environmental noise as a concern have developed a collection of many confirmed news reports where people have killed others they considered noise makers, committed suicide over frustration with a noise problem, or killed someone complaining about their noise. We must all recognize that sensitivities and reactions to sound vary widely and that excessive noise can have serious consequences.

Raleigh Discovers Air Conditioning Condensers can be Noisy,



Apex changes Noise Ordinance

We reported in the summer 2005 issue of this newsletter that home air conditioning condensers are in violation of many city noise ordinances that impose low limits measured at a boundary when the condensers are allowed to be installed close to the boundary. Recently, it was reported in the North Raleigh News supplement to the Raleigh News and Observer that the City of Raleigh had become aware of this problem. In response to a complaint about relocated condensers, the city cited the homeowner, who then had the inspector measure and verify that even the complaining neighbor's condenser was over the limits. Where these sources do exceed ordinance limits, the high levels are usually confined to a small area near the boundary because the source is so close to the boundary. Raising the limit would allow higher levels over the whole property instead of just near

the boundary when sources are not so close to the boundary. The town of Apex had first responded to this situation by specifying that measurements be made 10 feet from boundary. This provides some margin for units close to the boundary, but is not a significant change for distant sources that affect the whole property. Even with this, the night-time limit of 45 dBA could be too low for existing sources. Thus, recently, Apex has increased their limits for residential properties from 55 day/45 night to 60 day/55 night. However, there is the other side of the coin that new condensers located close to a neighbor's bedroom window or outdoor relaxation area can be a problem. This needs to be handled with specific regulations for new construction and renovations that can be more restrictive than general ordinances that must recognize existing conditions.

Architectural Isolation Testing Standards

Two important revisions have been made in the 2007 edition of ASTM E336 for measuring airborne sound isolation in the field. For rooms greater than 150 cubic meters, the allowed room absorption to measure the Apparent STC has been increased from $V^{2/3}$ to $2(V^{2/3})$. It was found that the original requirement eliminated most rooms from measurement while the new requirement is in line with typical absorption found in smaller furnished spaces where measurements are allowed. Also, ASTC may now be measured in both directions through a partition if desired. If so, both results must be reported independently, though an averaged result may also be reported if desired. Further changes are in the works related to background sound and the handling of coupled spaces. Work has also begun on a major revision of E1007, the standard for measuring impact isolation. For the first time, an effort is being made to arrange a round-robin evaluation of these two standards where many different consultants will measure the same spaces independently with results compared to see the variations that result.

Noise of Plumbing Vacuum Breakers

The plumbing code now apparently requires the installation of devices typically called "vacuum breakers" on all exterior water faucets to prevent water in hoses from going back into the plumbing system. Some of these devices can create strong noise in the piping system that can be heard through much of the house when the water is running, at least if the piping is not isolated. Others are not noisy, and the cause of the difference is still unknown. Based on tests of locally available products, the ones sold by Home Depot are noisy and the ones sold by Lowes are quiet.

Update on Book and Article by Marshall Long on Condominium Acoustics

In the Spring Issue of this Newsletter we commented on some statements by consultant Marshall Long regarding condominium isolation in a book and a journal article. We noted that he gave an impression that luxury condominium buyers have a reasonable expectation of levels of impact isolation that were not practical to achieve especially in wood frame construction, specifically IIC 75. He has responded in a letter. First it appears from his letter that when he speaks of a given IIC, he is really expecting the FIIC to be 5 points lower. It is also clear that when he speaks of “Luxury” condominiums he is really speaking of true luxury high end condominiums. In our area, almost all condos are routinely called “luxury” though most are what he refers to as a “medium” category. If we make the 5 dB adjustment for expected results, then his “medium” category recommendation matches our goal for typical condominiums with wood-frame construction, around FIIC 60. We are concerned that buyers in our area will not distinguish between his definition of “luxury” and that commonly used here, and will not recognize that the numbers he is talking about are 5 dB higher than he really expects in the field. We still have not seen Long’s goal of FIIC 70 for really high end “Luxury” condominiums achieved in a wood frame structure. He submitted a test report of the best result we have seen on a wood frame structure, FIIC 69. This used a full inch of Regupol on the floor, springs to support the ceiling and two layers of gypsum on the ceiling.

Beware of those offering test results not complying with standards

We were recently contacted regarding some STC testing of a door in the field. We first explained that any result measured in the field had to be labeled ASTC or FSTC and that only laboratory results could be labeled STC. Once the situation was further explained to us, we had to explain even the ASTC or FSTC could not be measured under the circumstances because the rooms were too small. The caller then said he knew of someone who could provide the result. Later, the chief test engineer of the door manufacturer saw us at an ASTM meeting and reported being given this strange test report that did not make any sense. He got it from the people who had called us. Unfortunately, there are people out there who will provide a report that indicates an STC result when the customer asks for it without paying any attention to standards. These people often make measurements in very strange ways that are not even close to standard methods. Those specifying field tests need to become familiar with the requirements for various ASTM tests, specify the appropriate test, and require test results in full compliance with the test standards. It is our policy not to report ASTC results as such unless appropriate conditions as required by the standard are met.

Tinnitus originates in Brain rather than Ear

It has long been thought that Tinnitus (a ringing sound appearing to originate in the ear) was a sound generated in the ear by some mechanism unknown. Researchers at the University of Buffalo have now shown that it actually results from an action of the brain in trying to pick up weak signals from the ear. When the ear is putting out a weak signal due to hearing loss, the brain tries to amplify the signal coming to it to make up for the weakness. In doing so, it begins to pick up the background sound in the body that was already there but unnoticed when the signal from the ear was strong enough. It is similar to the problem of a recording on tape that is too weak. When you turn up the volume to try to hear it, you hear the “hiss” on the tape.

Even the Expert sometimes cannot satisfy the Family

Recently, my wife pointed out that the shower rod in my son's tub was too low so the curtain hung on the bottom of the tub. In order to raise it I decided to provide one of the new curved rods to give him more room too. Once I got it finished I was met with this sullen disappointed look and the question of why we could not just get Grandma to hem the curtain. What was wrong? "That rod hurts my ears." Turns out the new rod is not well damped like the old rod, so the movement of the metallic hooks over it resulted in a metallic ringing sound. You see, my son is one of those people sensitive to higher-pitched sounds. A little tape on the rod temporarily resolved the problem until we got some plastic hooks that satisfied him.

Modular Classroom Acoustics

Modular classrooms differ from classrooms built in place in that they are not easily custom designed for a specific location and the environmental noise present at that location. Also, because they must be easily moved, the weight and thickness of walls and roof become a constraint on how well they can block exterior noise. A new standards committee with strong participation from the modular industry is working on a standard specifically for modular classrooms. The primary difference from the regular classroom acoustics standard will be a way to rate the ability of the classroom to block exterior noises, or to rate the environments it would be suitable for so that proper modular classrooms can be selected for noisy areas.

Check your Zoning and Noise Ordinances

When most people buy a home they presume the zoning of the property is residential. They also presume that if there is a local noise ordinance that it protects them as it would most residences. However, two factors can combine in many places to create a situation where a homeowner has essentially no noise protection. This is a combination of non-residential zoning and a noise ordinance that bases its limits on the zoning of the impacted property rather than its actual use. The problem is more widespread than many would believe. In Raleigh, vast new expensive neighborhoods have been built in areas zoned "Thoroughfare." The Raleigh noise ordinance considers "Thoroughfare" the same as "Industrial." The Raleigh noise ordinance makes no special provision for homes in this "Thoroughfare" district. Thus, if a new noise source moves in near these homes, they find that they have no protection from the ordinance. In other places, existing homes with people still living in them have been rezoned as Industrial property to encourage industrial expansion in an area where planners believe that is appropriate. However, this then takes noise protection from the property. While owners might see their property as more valuable for industrial use, they should be aware of the problem for anyone continuing to live there. On the other hand, in most places the noise ordinances base limits on the actual use of the property regardless of zoning. This creates situations where someone converting an industrial property to residential use can then actually impose new lower noise limits on existing sources that were previously in compliance with limits for a non-residential neighbor. Thus, changing land use is a problem that can cut both ways and create problems. Communities adopting noise ordinances need to consider these effects. Rules need to be clear and notices should be given to anyone purchasing or moving into a property that does not have normal residential property protection against noise. The best compromise on this issue is probably to base limits on actual use for zoning or development ordinances to protect existing residences, but to base the limits on zoning of impacted property for general ordinances so at least due process is required before requirements on a neighboring source are changed.