Sounds

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A Newsletter from ***Stewart Acoustical Consultants*** *Our 27th Year*

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School's Back, Summer Is Ending, Year End Will Be Here Soon!

Yes, it is approaching that time of year when the finish date for everyone's project seems to be the same. If you need work before year's end, please contact us soon to reserve your slot.

Classroom Acoustics Standard Now Available for FREE Download

With support from Armstrong, Trane, and Illbruck, the classroom acoustics standard ANSI S12.60 can now be downloaded as a PDF free of charge at http://asastore.aip.org.

Book on HVAC Noise Control Available from ASHRAE

A New Edition of "A Practical Guide to Noise and Vibration Control for HVAC Systems" by Mark Schaffer is now available from ASHRAE. This is an excellent non-mathematical guide to controlling noise and vibration. Schaffer is uniquely qualified not only being a highly competent acoustician, but also having grown up in a mechanical contracting family and operating the family business. It is available at this link for $57 for ASHRAE Members, $71 for others.
http://resourcecenter.ashrae.org/store/ashrae/newstore.cgi?itemid=25435&view=item&categoryid=174&categoryparent=174&page=1

New Equipment – Sound Source and Recorder

We have invested in some new equipment to better serve our clients. The first is a powerful amplified loudspeaker system that is more easily carried to the field for testing. The Samson Expedition system has the amplifier and some equalization control built into one of the speakers. A second speaker provides the ability to get a more even sound distribution and more reliable test results with a single test when testing isolation between spaces. To provide the noise signal for isolation tests, we have purchased two "Noise Plug" pink noise sources that are built into a small connector plugged into the powered speaker. We can now roll this one package to the test site rather than carrying in separate speakers, amplifier, equalizer, and tape player as sound source.

The other new item is a Marantz PMD 671 portable solid state digital recorder. This looks very much like a portable tape recorder, but records digitally directly onto a compact flash memory card similar to those used in digital cameras. It can provide very long recordings at a reduced quality, or the highest possible recording quality for shorter periods with battery power and no moving parts.

Product Updates – Resilient Channel, Isolation Clips, Special Wallboard

Mergers and reorganization among companies producing resilient channel for wall construction have resulted in easier availability of quality resilient channel in the southeast. Resilient channel was originally developed by US Gypsum as a way to provide some flexibility for a flat surface where studs were warped, and to improve sound isolation. Other companies then developed resilient channel designs and USG later sold their resilient channel business to another company. Almost all available test data are based on the original USG design. Concern has arisen that many of the available resilient channel designs may not provide the same performance. Some data tends to indicate this, but other data does not. For several years, the channel most widely used in the southeast was not like the USG design, though it was sold under the same name as channel meeting the USG design that was sold in other parts of the country. The original USG design is now available from Dietrich as RC Deluxe RCSD. The key features are a single leg design in 25 gauge steel, with web slots three inches long separated by one-inch solid sections. Resilient channel must be installed carefully and should never be installed between layers of gypsum.

At least two companies now provide systems of resilient mounts to support hat channel that can be used instead of resilient channel. These are Pac International and Kinetics Noise Control. These systems result in thicker walls or floor-ceilings than with resilient channel and generally provide better performance approaching that achievable with separate studs. This results from the combination of fewer attachment points with better isolation and in the case of walls especially from the greater air space created. One of the selling points is the history of problems resulting from improper installation of resilient channel.

Another supplier noting the problems in use of resilient channel in its marketing is Quiet Solution. They have introduced special wallboards made by laminating layers of gypsum with a flexible damping glue and sometimes layers of metal between them. This product has a clear advantage in cases wallboard must be mounted directly on each side of wood or heavy gauge metal studs. It can be particularly helpful in a retrofit situation where it is not desired to remove existing gypsum. The product especially improves blockage at higher frequencies where the sound transmits through studs and through the gypsum at the coincidence frequency where it is weak. The benefit of these panels is reduced when dual studs, resilient channel, or isolation clip systems are used to provide better isolation. In these cases, using layers of gypsum of different thicknesses or acoustical sealant between layers can do as well as the special board.

Antique Instruments

1930's General Radio Type 759

Dr. Stewart has taken possession of a collection of inoperable antique instruments assembled by Dr. Larry Royster. The intent is to preserve and possibly restore to operation some of those with more important historical significance. Among the most interesting are a General Radio Type 759 sound level meter from the 1930's, a Mine Safety Appliances Soundscope of the 1950's with the old octave bands, a Bruel & Kjaer 2203 sound level meter of the 1960's, and the original Dupont audio dosimeter of the 1970's that used a chemical cell to integrate noise dose.

Is Your Home Air Conditioner in Violation of Your Local Noise Ordinance?

Many local communities have adopted ordinances with night time sound level limits of 45 or 50 dBA, and Chapel Hill even has a daytime limit of 50 dBA for sound entering a residential area. Usually, people think of these limits as applying to commercial, institutional, or industrial facilities that might impact a residential property. However, they also apply to individual homes and the limits for sound coming from residential properties are sometimes lower than those from other properties.

The most prevalent sound source in residential areas is the air conditioning condenser system or heat pump. Justifications for sound limits in residential areas were developed before such systems became commonplace. These systems are often located within 20 feet of boundaries. Assuming they are mounted next to a house, most older systems will be in the range of 50 to 59 dBA at this distance. Only a few of the newest premium high-efficiency systems can be below 45 dBA at this distance.

Thus, it is highly likely that most homeowners are in violation of the local ordinances at the nearest boundary. Usually, this is not a major problem because most people expect the noise of these systems and because the exceedance is primarily due to the close proximity to the boundary rather than to the total sound produced. The level is decreasing rapidly with distance. Complaints regarding these systems usually occur when they are located in a sensitive location such a near a neighbor's deck or bedroom window, when the system has a particularly irritating sound, or when there are several systems near each other affecting a larger area.

Communities with noise ordinances need to consider changes to either raise the limits, or impose a minimum distance from the source for measurement, or both so as to not be unduly restrictive. Further information in this link

http://www.sacnc.com/ACNoiseOrd1.pdf

New Tools – Insul, Socrates, and TNM Lookup

For several years we have used a program we developed to estimate the transmission loss or sound blockage ability of multilayer walls. This program evolved from original theories developed by Ben Sharp of Wyle Laboratories and an initial program by George Hessler. Marshall Day Acoustics in New Zealand had also developed a similar program which has progress further than our efforts with more capabilities. They have made their program INSUL commercially available and we have purchased it. We are now working with them to tailor the material database to more closely match materials available in North America. This program gives us the ability to analyze complex walls that often have not been tested but might be found necessary especially in retrofit situations where we cannot build a wall in the preferred way. We also have a copy of the SOCRATES program developed by NRC Canada that estimates the sound blockage of walls based on their extensive test results. However, that program only allows you to evaluate well-designed walls and will not accept poor designs that people sometimes already have or want to use.

TNM Lookup is a simplified version of the TNM traffic noise model program for highway noise analysis used to calculate highway noise. In most cases this provides a very accurate assessment of expected highway noise when traffic information is available.

Insects – It's Not a Good Time of Year to be Measuring Outdoors

Anyone who has lived in North Carolina or the surrounding area has probably noticed the insects that we hear through much of the year, primarily crickets, katydids, and annual cicadas sometimes called locusts. Most people do not object to the insect sounds, and many even enjoy them. The sound is of such high pitch or frequency that it does not usually present a major interference with activities and is not usually heard loudly indoors. This also means that it does not mask lower pitch noises or sounds that might be disturbing to some.

The insects present problems in sound measurement. They can often control the overall A-weighted sound level. They can yield measured levels that exceed typical community noise ordinance limits. This makes outdoor measurements of sources that are not especially loud difficult in the period of June or July through October and possibly November. Ideally, outdoor measurements should be scheduled for December-May whenever possible. Some useful measurements are possible during insect season if the sound of concern is louder than the insects, or if it is concentrated below about 1400 Hz in frequency. Clients who need outdoor measurements need to consider insect interference in their plans and schedule measurements before or after the peak of the insect season when appropriate. Further information here http://www.sacnc.com/Insects.pdf

Workshop on Technology for a Quieter America

The National Academy of Engineering is initiating a project to collect and analyze data from government and private-sector sources on the impact of noise on the quality of life, on the current state of noise control technology, the role of noise control technology in international competitiveness, and the implications of all of the above on noise policy. The study, when undertaken, is expected to develop recommendations for public- and private-sector action to reduce the adverse effects of noise.

The development and execution of the NAE noise initiative will be undertaken in two distinct steps:

1. A project planning workshop will be convened following which a prospectus will be prepared for a consensus study, and
2. A consensus study will be conducted and will involve a variety of fact-finding activities such as additional workshops, background research, commissioned papers, and informal interviews leading to a consensus report with specific findings and recommendations for a follow-on implementation effort.

To help define the NAE study, a project planning workshop on *Technology for a Quieter America* will be held in Washington, DC on September 13-15, 2005. The workshop purposes are to identify and refine the issues and questions to be included in a consensus study, identify relevant expertise, conduct a preliminary assessment of the U.S. noise control technology base (the opportunities and barriers to its commercialization and application), understand federal and other government agency activities related to noise control and noise control technology, and assist the NAE in identifying technical and socio-technical issues that could lead to a quieter America. Subsequent to the workshop, a prospectus on the consensus study will be prepared.

Dr. Stewart has been invited to attend this workshop as the representative of the National Council of Acoustical Consultants.

Calendar

September 13-15 Workshop on Technology for a Quieter America, Washington DC
October 3-4 – ASTM International, West Conshohocken, PA
October 17-24 – Acoustical Society of America and NOISECON 05, Minneapolis, MN
November 4-5 – North Carolina and Washington, DC Chapters Acoustical Society of America, Joint Meeting and Student Competition, Hampton, VA (note corrected date)