

A Newsletter from *Stewart Acoustical Consultants*

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In our 30th Year

Introducing Chris Barnobi

We are pleased to introduce another addition to our staff. Chris Barnobi is a senior in mechanical engineering at N. C. State from Charlotte with a desire to become an acoustical consultant. Though the faculty has told us that seniors these days typically will not take graduate level classes or classes beyond what is needed for graduation, Chris is doing both. He is now taking the second graduate level theoretical acoustics class. He will be assisting us in some project work developing EASE models for room acoustics.



Daylight Savings Time – Hearing Sounds Later in the Morning

Well the sun is coming up later according to the clock and do you notice anything else? Do you notice the sounds from distant sources you hear early in the morning, and now notice them later according to the clock? Temperature inversions are common overnight and peak in the early morning around sunrise until an hour or so after sunrise. This curves those distant sounds back to earth until the inversion burns off. Similar effects occur in reverse in the evening but now will start later according to the clock.

Resilient Channel Manufacturer gets its Pictures Right

The best known resilient channel for use in walls and ceilings is the Dietrich RCSD, a 25 gauge channel based on the original USG RC-1 design. We strongly recommend it, but unfortunately for the past few years we have had to warn people that the [Dietrich literature](#) showed the channel installed improperly and in fact did not even accurately represent how the channel was made. This has been corrected and the Dietrich literature now does show the proper details and installation. Also, beware of channel that calls itself RC-1. Since the trademark rights to the name have expired, manufacturers of various different channel designs have started using the RC-1 nomenclature which can be very confusing.

Loft Designs – No Ceiling = Poor Isolation

Loft style apartments and condominiums are becoming popular, but these bring with them reduced levels of sound isolation that are often disappointing to residents. The major factor is the lack of a separate ceiling below the floor slab or roof. This creates a problem first in getting good vertical isolation. However, it surprises many that the lack of a ceiling also is a major contributor to poor isolation side to side. Why? First the roof or floor surface above is usually continuous over the top of the wall meaning it can carry flanking sound through it. This is less of a problem for thick solid concrete, but more of a problem for steel or wood roof decks or thin or hollow concrete systems. A further problem is getting a good seal. Such a seal is obviously needed between the top of the wall and horizontal surface. This can be difficult if the surface is not flat. However, the overlooked problem is joints and cracks between sections of the floor or roof such as joints in concrete planks or between wooden boards. Sound can travel over the top of the wall through the cracks and they can be very hard to seal. One technique that works well is a soffit for a few feet each side of the wall, but this is not as good as a full ceiling.

Resilient Channel Installation Problems

We continue to find cases of improper installation of resilient channel. The most common problem is the use of long screws to attach gypsum with the screws going into trusses, joists, or studs. The screws should be only 3/8 inch longer than the layers of gypsum they are going through to assure they do not go into the wood or metal studs. Longer screws invariably find the joists or studs where the channels cross. Even worse, we have found a case where the channel was installed in line with the trusses instead of perpendicular, so every screw was into wood. Builders need proper training and supervision.

Aircraft Noise Developments and Research

The Department of Defense is taking the lead in developing guidelines to supplement Day-Night Level (DNL) with additional noise metrics in aircraft noise studies. The need to do this was recognized by the acoustical community shortly after the DNL was mandated by Congress as the primary measure for most Federal programs. It is hoped that the FAA will follow suit.

One of the complaints around airports has been the low-frequency noise that propagates near the ground from planes on take-off roll, thrust-reversal on landing, and sometimes just idling awaiting take-off. The sound is loudest during temperature inversion conditions that often occur in early morning and evening. Such sound does not produce high A-weighted levels and has long been ignored by Federal agencies. New research has been funded by the Federal government resulting in this [report](#) that shows the noise can be a problem and provides methods for evaluation. Another interesting conclusion from the work that we have known for years was that commonly used STC ratings for windows are useless in selecting appropriate windows in low-frequency environments. The superiority of the OITC method was recognized.

Research by Wyle Labs and Pratt & Whitney is aimed at showing that an incentive for adoption of quieter new aircraft can be provided by giving those aircraft preferential more-direct flight paths while keeping older noisier aircraft on routes that might be less efficient but reduce the noise impact on communities. This would not only reduce noise and costs, but reduce emissions.

[Research](#) by several European universities lead by Imperial College of London has demonstrated that increased noise levels raise blood pressure of people while sleeping. The blood pressures of sleeping subjects in their homes were correlated with simultaneously measured sound levels.

Round Robin Evaluation of ASTM Field Testing Methods

Questions have always arisen concerning the repeatability of the ASTM test methods for measuring airborne and impact sound isolation in the field. What would the variation in results be if several different people using different equipment were to independently measure the same pairs of rooms? For laboratories this is answered by shipping the same samples to various laboratories and having the laboratories test the samples. Field samples cannot be shipped. The people must go to the samples. Arranging this has been difficult but it is being tried this spring. Those attending the ASTM committee meetings in Anaheim, CA in April are being asked to stay another day and ship their equipment to the meeting so they can do tests. A local consulting firm Veneklasen Associates that does many of these tests is arranging a location where everyone can do tests in the same pairs of rooms. Stay tuned for results. Note that this is part of the issue of variation. Another question is what the variation would be if the same person was to test several samples of what is supposed to be the same construction.

New Products

This and most of our newsletters will contain some discussion of new products with acoustical applications. This is not intended to be an endorsement of these products but a way of making you aware of them for consideration.

ASA, NCAC, and ANSI standards meetings in New Orleans

Noral Stewart in December attended meetings of the Acoustical Society of America, the National Council of Acoustical Consultants, and the ANSI standards committee on modular classroom acoustics. The ASA meeting provided several technical sessions of interest including sessions on issues related to isolation in multifamily structures. The NCAC meeting saw the awarding of the C. Paul Boner medal to Laymon Miller. Miller was a long time senior consultant with Bolt Beranek and Newman who developed and taught a short course in noise control for buildings and industrial plants. He continues to share his broad experience with the consulting community and is working on book of his experiences. The NCAC meeting also provided an opportunity to meet with representatives of many suppliers of acoustical materials and discuss new products with them. Many of these new products will be discussed in this newsletter.

Regupol QT becomes Ecore QT

The widely used Regupol QT line of recycled rubber floor underlayments will now be known as [Ecore QT](#) after termination of an agreement between Dodge Cork and the European company that owned the Regupol name. While other recycled rubber products are available, Ecore QT offer two distinct product lines for use either below a heavy layer of material or just below the floor surface. They also offer a wide variety of thicknesses and durometers of the rubber for tuning to various specific situations.

Inflatable Low-frequency Sound Absorber

[Flexcoustics](#) in Denmark has introduced an inflatable low-frequency sound absorber for large spaces that are boomy and reverberant at low frequencies. The product is especially useful in situations where variable acoustics are introduced, adding sound absorption for some uses but removing it for others such as when a more reverberant space is desired for classical music. Most materials that can be used in variable acoustics systems add primarily higher-frequency absorption. When this is done, the space can become unbalanced with the lower frequencies still being reverberant. This inflatable system can add the bass absorption for a more balanced room.

Door Seals

[Door and Hardware Systems, Inc.](#) has recognized a need for and developed door seals that may not provide the best possible isolation but which can match the performance of normal solid core or steel doors, work with warped doors or frames, not be difficult to install, and not require excessive force on the handle to open or close the door. They also have a product that provides a degree of sound blockage for the bottom of the door while allowing air passage, though this cannot work as well as a seal.

Acousticabinet for Music Rooms

Schools sometimes must store instruments in the band room. This takes up wall space that is really needed for absorption and diffusion, and can effectively reduce the volume of the room. [Wenger](#) has come up with an innovative solution. Their Acousticabinet has an open wire grille face exposing the inside of the cabinet to the room. Inside, the back surface facing the room is a sound absorptive panel that can vary in thickness. Combined with the shelves and grilles, the system also provides diffusion. While it is better to keep the storage out of the rehearsal room, this provides an option when that cannot be done.

Castershox

One of the noise sources in many industrial situations is the rolling of carts with hard wheels over floors that are not smooth. [Castershox](#) has introduced a vibration isolated caster with urethane tread that can help reduce the noise from this source.

Special Application Products from Pac-International

Pac-International continues to introduce special application versions of their resilient isolation clips. One is a [cabinet backer](#) system for supporting cabinets isolated from wall studs. This would be essential in single stud walls where the RSIC clips are used. They also are introducing a system for [mounting flat panel televisions](#) to walls which can be used even when the RSIC clips are not used. This can be useful when such tv's are to be mounted on double stud walls.

High Performance Smooth Acoustical Plaster Systems

By high performance we mean those that have the ability to achieve higher levels of absorption than typically achieved by acoustical plasters applied directly to a hard surface. These higher performance systems also have a smooth surface similar to regular plaster or gypsum, while those applied directly often require a rough texture for best performance. We have previously introduced [Baswaphon](#), a system of plaster applied over a fibrous substrate. Baswaphon now has some lower cost finish options. A similar product installed over a fibrous substrate is now available from Fellert. Finally, [Pyrok](#), as supplier of traditional gypsum and cement based plasters has introduced [Starsilent](#). This is a unique product requiring no substrate surface. It is a porous board made of recycled glass bottles that is installed as the base surface. An acoustical plaster is then applied over this to give a smooth finish. The absorption of the recycled glass board adds to that of the acoustical plaster, and if desired a large air space or fiberglass behind the glass board can further enhance absorption. A foil backing is available for the board in situations where airflow through the board would be a problem.

Elbow Silencers and Acoustical Return Air Grille

We are encountering more cases without room for regular silencers. An elbow silencer with a built-in 90 degree turn can be very effective at higher frequencies sometimes not introducing much more pressure drop than the turn itself and much less than a regular silencer too close to a turn. Such silencers are not standardized. Offerings from a few suppliers must be reviewed to find the best fit for a situation. [Dynasonics](#) has introduced some elbow silencers. They also have introduced a 4-inch-thick acoustical return air grille that has very good attenuation for such a thin product. This is somewhat similar to an acoustical louver but meant for indoor use. Applications include return grilles for residential air-handlers mounted in closets, and replacement grilles in situations where insufficient silencing has been provided in the return path for a major air handler.

Quiet Curtains

After getting a post card, we checked the website www.quietcurtains.com hoping that it was a commercial product based on research done at Georgia Tech that originally coined the name. That research showed that filler materials could be added to draperies to provide some significant sound blockage as well as absorption. Unfortunately, this product is disappointing. It provides significant absorption at higher frequencies at least, though some versions have almost no low-frequency absorption. Most disappointing is that they claim sound blocking benefit that essentially does not exist. They do provide a little benefit at high frequencies, but the need at windows is almost always for improved low-frequency blockage. They tested window and drapery combinations with no significant improvement in either STC or OITC with draperies.

Interior Storm Windows

We first mentioned [Soundproof Windows](#) in our summer 2006 issue. We normally do not fully trust offers of "soundproof" products on the internet, but this one looked good. Recently a homeowner near our office needed window improvements to reduce highway noise and inquired about these. We can now report they have been installed and they look and work very well.