

A Newsletter from *Stewart Acoustical Consultants*

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Stewart Named Fellow of Acoustical Society of America Receives ASTM Award of Merit, Named Fellow of ASTM

Noral Stewart has received two major honors from the Acoustical Society of America and ASTM International.

Stewart is now a Fellow of ASA, the highest level of membership in ASA. This recognition is awarded after review of a portfolio of information submitted by other members of the Society for significant contributions to acoustics. Stewart was recognized for Contributions to Building Acoustics and Noise Control. The Acoustical Society of America is an international technical society covering all facets of acoustics with about 7000 members overall. Of approximately 1500 members of ASA who designate either Architectural Acoustics or Noise as their primary interest, only about 113 are Fellows. The election occurred at the April meeting in Baltimore and the certificate will be presented at the November meeting in Cancun.

Dr. Stewart was also honored by ASTM International with its highest honor, the Award of Merit, which carries with it the title of Fellow of ASTM. This award recognizes major contributions to the development of standards in acoustics. ASTM International is a standards writing organization developing standards in a wide variety of industries. Stewart has been active in Committee E33 on Building and Environmental Acoustics since 1985. This is a distinct honor as Stewart is only the 9th member of Committee E33 to be designated a Fellow since the first in 1974. He is the only Fellow of ASTM currently conducting measurements in accordance with the E33 standards.



Opportunity in SC for Architects to Receive Learning Units (LU's) – Stewart Acoustical Consultants will be providing three opportunities for architects and engineers to receive a learning unit in acoustics in South Carolina this month. We will be presenting the Architectural Acoustics class developed by the Acoustical Society of America and registered with AIA. This is a health, safety and welfare credit. The class will be presented as part of a “CEUpalooza” organized by Carolina Architectural Lighting. Classes will be in the late afternoon in **Greenville** (22nd), **Columbia** (23rd) and **Charleston** (24th). Information can be found [here](#). The class will be presented by either Joe Bridger or Noral Stewart. Richard Honeycutt of EDC Sound Services whom we work with on several projects will also be there. If you would like us to briefly visit your office during this trip, or want to learn more, contact our office.

Classroom Acoustics Standard Revised - ANSI S12.60-2010, a major revision of the Classroom acoustics standard has been approved and can now be obtained without charge from the standards secretariat of the Acoustical Society of America at this [link](#). One of the major changes was improvement of the requirements for exterior walls and roofs in noisy areas to match the sound isolation to the noise present. Consideration is given to situations where walkways or other people activities outdoors are close to classrooms. A significant effort was made to clarify what is a core learning space. Sound systems used in classrooms must provide even coverage and be adjustable so as not to disturb adjacent classes. Sound in hallways is now limited to 45 dBA. Noral Stewart and Joe Bridger both made significant contributions to the improvement of this standard. A proposal to include this in the new revision of the International Building Code has been rejected by the ICC.

ANSI/ASHRAE/USGBC/IES Standard 189.1-2009 Standard for the Design of High-Performance Green Buildings except Low-Rise Residential Buildings -

This standard approved in December 2009 contains some of the same problems as proposed in the Green building code with regard to design of the building envelope to resist sound. It is written better and the portion on sound isolation between spaces in buildings is generally appropriate. The following are the requirements between interior spaces:

- A. Wall and floor/ceiling assemblies separating adjacent dwelling units, dwelling units and public spaces, adjacent to tenant spaces, tenant spaces and public spaces, and adjacent classrooms shall have a composite STC rating of 50 or greater. (no reference to impact sound.)
- B. Wall and floor/ceiling assemblies separating hotel rooms, motel rooms, and patient rooms in nursing homes and hospitals shall have a composite STC rating of 45 or greater.
- C. Wall and floor/ceiling assemblies separating classrooms from rest rooms and showers shall have a composite STC rating of 53 or greater. (no exception for rest room used exclusively by classroom and with a door to the classroom.)
- D. Wall and floor/ceiling assemblies separating classrooms from music rooms, mechanical rooms, cafeteria, gymnasiums, and indoor swimming pools shall have a composite STC rating of 60 or greater.

The following requirements are imposed on exterior walls and roof:

Wall and roof-ceiling assemblies that are part of the building envelope shall have a composite OITC rating of 40 or greater **or** a composite STC rating of 50 or greater, and fenestration that is part of the building envelope shall have an OITC **or** STC rating of 30 or greater, for any of the following conditions: (note composite includes windows and doors)

- A. Buildings within 1000ft (300m) of an expressway
- B. Buildings within 5 mi (8 km) of airports serving more than 10,000 jet aircraft
- C. Where the **yearly** average day-night average sound levels at the property line exceeds 65 decibels.

Exceptions : Buildings that may have to adhere to functional and operational requirements such as factories, stadiums, storage, enclosed parking structures and utility buildings

These exterior requirements could be difficult and expensive to meet and in many of the cases listed are unnecessary. There are many places within 1000 feet of expressways and within 5 miles of airports where such extra sound insulation is unnecessary. Even in areas where the day-night level is just above 65 dB, this level of sound insulation is unnecessary especially as a minimum requirement. Beware if you are involved in building that must meet this standard.

Green Building Code – We first told you about the green building code being developed by the International Codes Council in the last newsletter. Unfortunately, we and the rest of the acoustics world failed to realize the extent of what they were doing. No one in acoustics had been invited to work on development of the code. Very few people were aware that they planned such detailed requirements and no one had reviewed them carefully. In April, ASTM staff made Dr. Stewart aware of the details to assure that ASTM standards were properly referenced. This review revealed major problems in the proposal. Dr. Stewart and several other consultants have now urged the ICC to delay implementation of the section on acoustics until it can be carefully rewritten. If it is adopted as written there could be major cost impacts and problems with spaces even required to be noisier than is acceptable.

Predicting Performance of Armacel and other Alternative Duct Liners – Armacel provided us a tool (along with the technical background) to calculate duct liner acoustical performance from typical published octave band data. We are providing feedback to improve the tool. For our own purposes, Joe Bridger developed a way to calculate the estimated performance of various non-fiberglass duct liners and to efficiently solve for the length of liner required to achieve a specific result. This is more readily employed with our in house HVAC analysis software. This calculation is a little more complicated than with fiberglass and we are working to make the calculation as easy as with fiberglass. These tools allow us to model this and accept use of this liner where it will provide the performance needed.

It is important to note that fiberglass duct liner is much better at reducing the sound propagating down a duct than any of the Armacel products sold in the United States. However, if one is lining the entire duct for thermal insulation the performance of the Armacel products is often adequate. Thus far when using AP Coilflex vs. 1” fiberglass we have found the need to use at least 40% more, generally about 80%-120% more, and once as much as 400% more length of lining (fortunately it was 5 ft versus 20 feet).

Fee Schedule Extension – Credit Cards – Save with Payment in Advance– Normally each year on June 1 we start using new fee schedule for all new jobs, extending the old fee schedule for continuing projects through August. This year in recognition of the economy we are continuing to accept new jobs under the old fee schedule through July for work through August. We also have arranged to receive payment by credit card and through August, we will consider a discount for clients who can pay in advance for projects where we do not require such.

Reassignment of Responsibilities to serve you better – In recent years Joe Bridger has managed almost all our architectural projects with the exception of multifamily residential projects. With the growth of LEED for Schools and other Green Acoustics projects and federal/military work, and the reduction in multifamily projects, we need to rebalance the load. Noral Stewart will be heading up our traditional school projects and basic architectural acoustics spaces (gyms, social spaces, etc.). Joe will be focusing on large architectural spaces (churches, auditoria) requiring EASE modeling and substantial analysis, green building acoustics, complex HVAC noise control, and our federal/military project work.

In Memory of William A. Manson, Sr., PE – We have learned of the passing of Mr. William A. Manson Sr. of Richmond, VA. Bill graduated from Virginia Tech as an engineer and joined his father’s business Manson and Utley that had started installing tin ceilings in 1915. Bill recognized the importance of acoustics, participated in the first BBN-MIT summer class in acoustics with Leo Beranek, and joined the Acoustical Society of America, continuing as a member for well over 50 years. In addition to his work with Manson and Utley as an acoustical contractor and materials supplier, Bill developed a practice as an acoustical consultant.

In Memory of Manfred Schroeder - Manfred R. Schroeder passed away earlier this year. His work laid the foundation for significant advances in acoustics. He obtained his doctorate in Physics in 1954 from the University of Goettingen. His work laid the foundation of a statistical wave theory characterized by a critical frequency, now called the Schroeder-frequency. He joined Bell Laboratories, where his work included digital speech synthesis, monaural phase effects in hearing, and sound transmission in concert halls. He was Head of Acoustics Research, and then Director of the Acoustics, Speech and Mechanics Research Laboratory. In 1969, he was appointed Professor of Physics and Director of the Dritte Physikalisches Institut of the University of Goettingen, where he developed “quadratic-residue” diffusors (based on number theory) for optimally scattering radar and sound waves. In 1972, he received the Gold Medal of the Audio Engineering Society, and in 1987 he was awarded the Lord Rayleigh Medal by the British Institute of Acoustics. In 1991, he received the Gold Medal of the Acoustical Society of America “for theoretical and practical contributions to human communication through innovative application of mathematics, to speech, hearing and concert hall acoustics”.

Newsgroups – a Free Resource - Many people today are unaware of a branch of the internet called the USENET or Newsgroups. Back when we first became involved in the internet, this was as big a part as the browser web. Newsgroups actually originated right here in the Triangle when research labs at Duke and UNC created a system to post messages to communicate. Today there are many thousand newsgroups on all kinds of topics. These are most commonly accessed with software called “news reader.” Historically, the Outlook Express program (not Outlook) included with Internet Explorer included a news reader as well as email capability. Newsgroups can also be accessed by services such as “Google Groups.” In the mid-90’s, Angelo Campanella started the news group “alt.sci.physics.acoustics.” Such “alt” newsgroups are easily established. Recently, “sci.physics.acoustics” has been accepted into what is called the “Big 8” of newsgroups. Many consultants and others participate in these newsgroups and can answer simple questions. Check them out.

New Acoustical Products

Microsorber Solution for Radiant Ceilings - Radiant ceilings offer an energy efficient way to cool and heat a room uniformly, and are gaining acceptance and applications. However, from an acoustical perspective, untreated thermally active ceilings create an overly reverberant space. Since absorptive materials cannot be placed directly on the radiant surface, sometimes vertically hanging baffles are suspended from the ceiling. A [microperferated foil from RPG](#) offers the option of being installed parallel to and spaced below the surface in a single or double layer. The foil can be transparent or translucent, to allow lighting to be placed above it. The application allows for air movement and does not interfere with the thermal efficiency, while offering a comfortable environment.

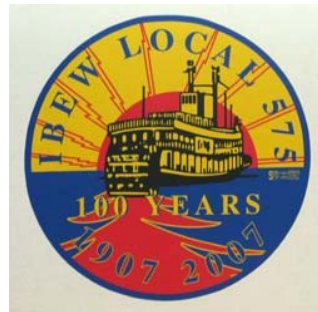
Dupont Audio Comfort Panels – It has been long known that Dupont Tyvek was an excellent material for covering acoustical panels. However, no effort had been made to develop a product that would look good enough for architectural applications. Researchers at Johns Hopkins came to Dupont with their need for a material that could be installed in hospital areas that were in operation. Together they developed the “[Audio Comfort](#)” product. This is basically a two-inch fiberglass panel sealed in Tyvek. It is recommended for locations high on walls or ceilings where it does not normally come in contact with people.

Improved Floor Isolation Mat – One of the materials available to isolate hard floor surfaces and reduce impact sound is an entangled mesh, typically available in three thicknesses of around ¼, 3/8, and ¾ inch. We have always recommended at least the 3/8 inch version for wood frame floor structures. Many clients want to use the thinner ¼ inch version. [Keene Building Products](#) has developed a modification of their ¼ inch version that is claimed to improve the performance to the range typically expected of the 3/8 inch version. This involves adding a soft compressible fibrous mat to the bottom of the mesh.

Treadmill Isolator – Treadmills and other gym equipment can pose very difficult vibration isolation problems. Pliteq has developed special [treadmill isolation pads](#) and is working on products for other gym equipment. Achieving proper isolation does require significant static deflection which means that a treadmill will move on the isolators when in use unless a heavy weight is used under the treadmill. However, the pads control the motion to an acceptable level for most users. A [movie](#) of the isolator in action is available on their website.

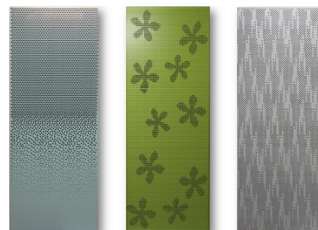
Printing Graphics on Panels

The *Mirage Illusions Series Acoustical Ceiling Panel* from [MBI Products](#) has a specialized Xaylon facing that can be custom-designed using any digital file. This makes it possible to replicate the look of real wood, tin ceiling tiles, natural surfaces such as marble or granite, or your own original graphic artwork. This solid custom facing allows a panel that provides essential acoustical properties with a high-end appearance. No perforations on the facing are necessary. A custom ceiling grid is also available for a seamless, consistent appearance.



[Kinetics Noise Control](#) also offers AcoustiGraphix panels faced with family portraits, art images, photos of favorite vacation destinations, movie posters, favorite college or pro sports teams and panoramic scenes. Simply provide a digital image of 100 DPI minimum and Kinetics will super impose the image on acoustically transparent fabric. The fabric is then stretched over the required acoustical core ranging from absorptive, diffusive or reflective surfaces. Any of the acoustical cores can be provided with cut outs to accommodate hidden speakers behind the photo image. Portraits, art images, school or team

digital photos and destination photo's can be provided pre framed, framed by customer or simply hung on the wall surface without framing.



Topakustik and RPG are introducing [Tofferfo](#) Graphic, standard and custom graphic designs on painted or veneered wood panels that are perforated to offer sound absorption. The image at left shows three standard options, but you can express yourself by providing a dxf file of your logo or custom graphic.