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A Newsletter from ***Stewart Acoustical Consultants***

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*Celebrating 30 Years of Service*

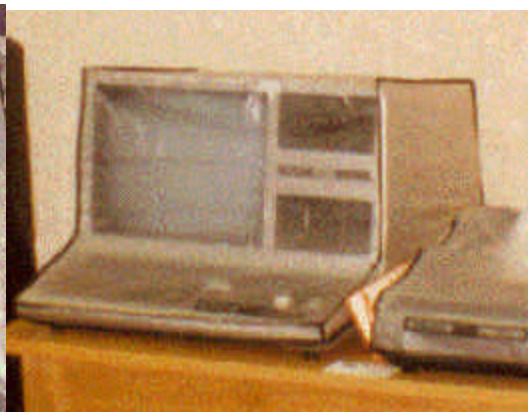
# *Happy Holidays*

We wish everyone a happy holiday season and a prosperous new year.

# *Thirty Years!*

December 27, 1978 was the fiftieth anniversary of the founding meeting of the Acoustical Society of America. By coincidence on that day, the corporation that is now Stewart Acoustical Consultants was formed, 30 years ago. On January 2, 1979 we opened our door for business in a small office at 975 Walnut Street in Cary. We shared a conference room, receptionist, answering service, and typist with other small businesses. The Dow Jones Industrial Average that day was at 811, down from highs over 1000 earlier in the decade. The prime interest rate was 11.75% and headed up, peaking at 21.5% two years later. As today, not exactly the best time to be starting a business.

It was truly a different era, the era before computers and the internet. Measurements were made with instruments with needles, and written down by hand. Reports had to be typed on a typewriter and retyped as edited. Calculations had to be done by hand. Within a few years we did enter the computer age with our TRS 80 with two floppy disks, one carrying the operating system. There was no such thing as a hard drive. We also got our first instrument that could be controlled by a small computer. We somehow made it through the first 15 years without email. Needless to say much has changed with the development of computers and the internet. We never envisioned in those early years that we might actually be able to listen to the way a new room would sound before it was even built.



In these thirty years we have served hundreds of clients with hundreds of projects. In 2007 alone we worked on 124 different projects. We know that we have truly had an influence in making our part of the world sound a little better over the past 30 years and with a new generation look forward to a long future.

## LEED for Schools Changes for 2009

The LEED for Schools Acoustics requirements for 2009 have changed making it much easier to qualify and reducing the available extra points for acoustics. The only acoustical prerequisites now are related to the room acoustics and HVAC noise of core learning spaces. For rooms less than 20,000 cubic feet the requirement is to either use NRC 70 or better acoustical ceiling, or demonstrate that the reverberation time requirements are met. A new requirement is imposed on core learning spaces greater than 20,000 cubic feet that their reverberation time be less than 1.5 seconds. The HVAC noise must calculate to 45 dBA or less by ASHRAE methods. Only one extra point is available explicitly for acoustics. To obtain it the STC requirements of the ANSI standard must be met except for windows that can be STC 35, and the HVAC noise must calculate to 40 dBA or less by ASHRAE methods.

## Top 10 ways to foul up a resilient channel installation

In the spirit of David Letterman's top 10 lists, the 10 most common mistakes in the use of resilient channel that reduce acoustical performance.

10. Overlap ends of channel several inches, resulting in squeaks.
9. Use double leg channel that is not really resilient
8. Use 20 gauge channel that is not really resilient
7. Install resilient channel in line under trusses instead of perpendicular
6. Install resilient channel upside down
5. Install resilient channel with solid part of web at joists or studs
4. Put resilient channel between two layers of gypsum
3. Use hat channel instead of resilient channel
2. Use long screws from gypsum into wood above
1. Use poor quality resilient channel just because it is labeled RC-1

## Ceilings in Residential Buildings with Concrete Floors

We find a trend to avoid ceilings in residential structures with concrete floors, or to just put ceilings in limited areas like kitchens or bathrooms. This is a dangerous practice that increases risk of unsatisfactory isolation not only vertically but also horizontally. Not only are there risks of leaks at the interface of walls with the underside of the slab, but there is flanking through the concrete. Greater effort is required above to isolate impact sounds. A problem is created when a hard surface floor with minimal treatment is installed above a ceiling, but adjacent to areas without a ceiling. The ceiling may prevent an impact noise problem directly below, but not to the adjacent areas that do not have a ceiling.

## Tapping Machine Purchased

For the past couple of years we have rented a tapping machine from another consultant when needed for floor impact tests. We have now purchased that machine. This means some reduced cost for impact tests.

## Tectum Finale with C40 spacing and polyester

We have widely used Tectum with 1.6 inch or 40 mm furring and fiberglass batts behind it, what is called a C40 mounting. Several years ago, Tectum introduced a product called Finale with built-in 1 inch furring and fiberglass. Now, they are offering the Finale product with the 40 mm furring. They are also offering the option of a polyester backing rather than fiberglass.

## Sliding Doors for Offices

We are seeing increased use of sliding doors for offices and conference rooms without consideration of the privacy issues involved. These doors are usually installed barn style, that it sliding over the wall outside the office, leaving a gap between the door and wall when closed. In some cases these gaps are small and in some they are very large. Often there are no seals of any type. Large unsealed gaps are essentially like having the door open. Sealing systems for such doors are not as readily available as for hinged doors, and the available options will typically not work as well as with a hinged door.

## Skylights and Rain Noise

Skylights are becoming more popular as a way to get natural daylight into residential, work, and educational spaces. These present the same acoustical challenges as windows if used in a noisy location, especially one with aircraft noise. However, they present an additional challenge in the form of rain noise. Even a well-designed skylight can produce more noise from rain impact than a common roof and ceiling combination. This noise can be minimized through design of the skylight to use two layers of translucent material with a significant air gap between them, use a material for the upper light that damps the sound produced by the rain, and use of an absorbing material between the two layers. This absorber should be a low density material that allows sound to pass through. Fiberglass is commonly used, but can produce an odor if there is a leak that causes it to get wet. Polyester can also work without the odor risk.

## Perimeter Effect on Sound Absorption

Most people are aware of the phenomenon of laboratory test results indicating sound absorption greater than 100%. Part of the reason for this is the simplification in the traditional Sabine formula used to compute the absorption from the reverberation time. However, it has also long been known that many small patches with large perimeter areas are more absorptive than the same total area of material in one large patch. Some manufacturers took advantage of this to test materials in small patches to achieve results much above 100% and claim superiority. On the other hand, building designers could take advantage of this effect to reduce the total material required by installing it in patches. The problem until now is that we have had no accepted proven method to account for this effect. Now a researcher believes he has the answer and presented his work to the recent NCAC meeting in Ft. Lauderdale. We await the opportunity to review this work in print before final judgment, but it looks very promising.

## New Products for Wall and Ceiling Isolation

Last spring we noted some new resilient isolation clip systems on the market. It seems a lot of people want to get onto this bandwagon and now more players are getting into the spring market. The two latest rubber based clip systems are from Mason Industries, an established major player in sound and vibration isolation and from Studco, an Australian supplier of steel framing. A sample of the Mason product was displayed at the NCAC exhibit in Ft. Lauderdale, and a flyer on the Studco product was received in the mail. Little additional information is available on these. The initial leader in coil springs for ceilings in residential markets was Kinetics Noise Control. Now, CDM and Pac International are introducing coil spring systems. We also hae learned of a new product under development that could be a significant advance for ceiling isolation. While literature and information are available on these products, we are finding in some cases products have not yet been fire tested. Thus, some caution and careful checking are advised before selecting these new products. Also, see the next story on appropriate installation.

## Proper Installation of Ceilings - Acoustical Performance and Fire Resistance

Discussions at the recent meeting of the Acoustical Society of America shed light on the fact that isolated ceilings using resilient channel or resilient clips are often not installed as required by fire ratings. This may even be the case for some acoustical test results with the differences enhancing the acoustical results but deteriorating the fire performance. Fire rating requirements need to be reviewed carefully for details of the installation. Often, the ratings achieved require the use of additional channels at joints in the gypsum board, so each piece of gypsum is screwed to a separate support channel. If there are multiple layers of gypsum with joints not aligned, this means even more extra channels for those joints. By the time all this extra channel is in place, the cost has increased significantly compared to a simple arrangement of channel 16 or 24 inches on center. Further there is reduced acoustical performance due to the greater number of contact points and to the reduced loading per clip or channel. Acoustical performance depends on loading the spring-like device for maximum deflection. If more spring devices or longer lengths of channel are added, the loading is reduced, resulting in a higher resonant frequency and reduced isolation. These differences can easily show up in the lower frequencies of the test ranges for IIC and STC, 100 and 125 Hz. Unfortunately, due to the cost involved, very little comparative test data is available, but the implications are clear in theory. Some manufacturers are looking at different elastomers to use depending on the number of clips and weight of gypsum. Some also have put emphasis on doing fire tests with minimal channel and clips with success. Thus, some products are available that allow the joints of the gypsum to be attached to the same channel, reducing costs and improving performance.

## Wall STC Variation

Over the past several years we have repeatedly discussed the variability of test results for structural sound blockage in the laboratory and in the field. There is an unfortunate assumption that the STC of a wall is a precise and 100% repeatable result. The truth is that in cases where many test results for the same construction are available, a wide range of results are seen. With enough data a median or average expected result can be established. However, with limited data, one cannot be certain whether the result seen is truly representative or high or low. With so many new products coming available, we have limited data that could be very misleading. Fortunately, for traditional constructions, and now for some of the newer constructions, an acoustical consultant who specializes in sound isolation and does a high volume of testing is compiling results to get statistical data on performance. For instance, consider wall that most typically performs around STC 51 or 52 in laboratory tests and is widely used in applications where a wall of greater than STC 50 is required with an expectation of greater than ASTC 45 in the field. His data on a very large number of these walls indicates that the wall will usually achieve greater than ASTC 45 in the field, but around 12% of the time it will not, even if nothing is done wrong in the construction. In our experience, we often find architects selecting walls that would typically achieve only around STC 48 in the laboratory for these applications, based on an unrepresentative test that indicates STC 50. Such walls have a very high risk of being less than ASTC 45 in the field.

## New ASTM E336 for Airborne Isolation

A new 2008 version of ASTM E336 has been issued making several small changes and clarifications. Further changes are in the works plus a major revision of ASTM E1007 for impact sound isolation. In accordance with ASTM policy, only the most recent issue of the standard is valid for use.