

A Newsletter from **Stewart Acoustical Consultants**

7330 Chapel Hill Road, Suite 101 Raleigh, NC 27607

Ph. 919-858-0899 sac@sacnc.com

Making our World Sound Better Since 1979

Audio, Video, & Technical Systems Design/Evaluation Services now in our office!



Fred Schafer of F.C Schafer Consulting has relocated into our office in Raleigh.

Through our professional partnership with Fred Schafer and his firm, our firm provides Sound and Media Presentation Systems Design and Evaluation. We also have Dr. Richard Honeycutt, who will be providing additional support in audio systems design and evaluation. We look forward to expanding this team as this segment grows.

A long history of great collaboration (perspective provided by Noral Stewart) - *In the beginning in 1979, our firm had included "Sound Systems" in our business plans but we quickly recognized that our strengths were in "Architectural Acoustics, Environmental Noise, and Workplace Noise". We chose to partner with independent sound system designers when that expertise was required. We have worked closely with Fred Schafer on projects involving sound systems for over 25 years. In fact, Fred has also assisted with the room acoustics on several projects including the Squires Recital Hall at Virginia Tech. In the past 7 years we have had the desire to have AV design services being provided "in house" by one who has the depth of knowledge and expertise our clients have come to expect. Having Fred physically located with us allows us to achieve this vision, work together more efficiently and signals an even closer working relationship between our firms.*

A natural fit - Fred shared these thoughts about the move: *"Over the years, working with Stewart Acoustical Consultants has always been a rewarding experience. Our projects have been interesting and often unique and the professional, innovative problem solving rewarding. So, when the opportunity presented itself that Stewart Acoustical Consulting and F.C. Schafer Consulting could share the same offices in order to deepen and enhance each other's services, it was a **natural fit**. The decision to relocate our consulting practice from Concord, NC to share offices with Stewart Acoustical Consultants in the Triangle area would not have been possible without the **level of trust** in Stewart Acoustical Consultants developed over numerous projects and years."*

The right move, the right person, the right time – Joe Bridger had this to say about Fred coming to Raleigh – *"I have enjoyed working closely with Fred on many projects. We chose to work almost exclusively with Fred when independent audio design/evaluation was required as the years passed because of our great working relationship, our shared passion for great results, and his hard work ethic. I began to see the need to add AV design as a fully integrated part of what we provide in 2004, when projects we were involved in were getting larger, we were growing and clients were seeking more and more a single source for AV and acoustics. Fred has always been the person I trusted to help us grow these services and I was incredibly excited when all the pieces finally came into place. We have had nothing but very positive feedback from our clients and his about this move. Together, our firms offer a full spectrum of services and experience unmatched in our area."*

This is part of our continual evolution into a "one stop shop" with a great SAC team. Please go to page 4 and 5 to learn more.

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International Green Construction Code – On May 20 the International Codes Council hearing committee meeting in Dallas accepted the major rewrite of the acoustics section of the proposed International Green Construction Code as submitted by Noral Stewart on behalf of the Acoustical Society of America, the National Council of Acoustical Consultants, the ASTM task group on building codes, the Institute of Noise Control Engineering and ASHRAE TC 2.6 on Noise and Vibration. David Marsh of the Kinsella-Marsh Group represented the acoustical community at the meeting. Unfortunately, the committee also accepted a couple of other proposed changes submitted by others that introduce problems. The ICC appears committed to including acoustics in this code. The work of the acoustical community is to assure that the requirements written are technically correct and reasonably appropriate. Work will continue through hearings in Phoenix in November.

Specification of Partitions and Floor-Ceilings in Drawings – We have observed a disturbing trend in drawings for multi-family residential structures. Some architects are not clearly detailing the design of partitions and floor-ceilings separating individual residences. The drawings instead show the complete details of all the options in a selected UL design listing. These listings typically provide many options which meet a specific fire-rating. However, all the various options provide a wide range of acoustical performance, some of which often do not even meet the minimum building code requirements. Without the specification of the particular options to be used, the building contractor or someone else is left to choose which details to use. The UL listing information can assure the fire requirements are met, but it does not assure appropriate acoustical performance. Often there are problems and it is unclear who decided to do what. Needless to say, problems often result, and then it is left to the courts to sort out who was responsible. It is our belief that the drawings for a project should clearly define exactly how partitions and floor-ceiling structures are to be built.

Column Loudspeaker Arrays – Not your Grandfather’s Column Speaker – There is a number of new, what could be termed, “Third Generation” column loudspeaker arrays currently available. While these column array loudspeakers may look a bit like the old column speaker of the 1950s and 1960s, do not be fooled, they are not your grandfather’s column loudspeaker. These new “Third Generation” loudspeakers range from the simple to the complex in their ability to control their sound pattern in the vertical plane. The more complex units utilize amplification and digital signal processing on each element to control the vertical coverage pattern as well as direct, or “Beam Steer”, their pattern toward the listener.

What has been called the “Updated Classic Column Loudspeaker Array Design” uses no internal amplification or signal processing. All amplification and signal processing is external. Vertical beam-width is determined by driver size and type, driver spacing, column length and column shape (curved or straight).

The next level of complexity in the new column array world utilizes the aforementioned basics while adding their own enhancements such as internal amplification without beam steering; units that are factory set for one vertical beam coverage angle that may, with the flick of a switch, be changed to a narrower vertical beam coverage angle while others are able to change vertical beam angle as well as “voicing” for a choice between speech or music.

The top of the line column loudspeaker arrays offer beam steering that was impossible prior to miniature amplifiers and affordable sophisticated signal processing. To accomplish this “beam-steering” each driver (loudspeaker element) is powered by its own amplifier and signal processing channel. This means that every driver in the column loudspeaker array may be manipulated to achieve the desired vertical beam angle as well as the angle (up or down) that the vertical beam pattern exits the speaker.

There are a few points to remember when considering using column loudspeaker arrays. First, the intended use of these speakers is to have a narrow vertical coverage angle (typically between 10 and 30 degrees) and a wide horizontal coverage angle (typically 120 degrees). Second, the size of the driver defines the upper frequency limit. Third, the total length of the column defines the low-frequency limit of pattern control. With proper powering and signal processing a column of around 24, 2” or 3” drivers will provide a full frequency response (including frequencies below 300Hz) and vertical coverage control (assuming a column length of at least 8 feet). It is worthwhile to note that about 24, 2” or 3” drivers have the same cone area as a single 15” woofer. This means that this new generation of speakers can move a significant amount of air in comparison to their ancestors.

This new generation of column array loudspeaker designs adds another useful tool in the never ending challenge to correctly interface the acoustics of the room with the acoustical performance of the sound system.

2010 Standards for Accessible Design: Titles II and III DOJ September 15, 2010 – Communication systems that are currently being installed in classrooms are considered integral to the use of the classroom and are subject to ADA 219.2 which requires a hearing assistance system to be included as part of the system. Additionally, since the majority of these rooms are designed to seat 50 or fewer students the requirement is that there be two (2) receivers available in each room and that each one of these receivers be hearing-aid compatible.

Therefore, the cost per room for these sound reinforcement systems will increase depending on the hearing assistance system used and the number of receivers that need to be available. Additionally, these systems incur a perpetual cost as well as the expected life-span replacement cost.

As far as normal classrooms are concerned adherence to ANSI 12.60 Acoustics for Classrooms will result in appropriate speech intelligibility and a quality listening environment to support educational programming.

This having been said, there is evidence to support the use of classroom amplification systems, albeit with an associated hearing assistance system, for special education classrooms for those affected by ADHD, ADD, Hearing Loss and other learning disorders. Additionally, there is research that supports the use of amplified sound for the teaching of language to students.

Warren Blazier – In the world of HVAC noise and vibration control, Warren Blazier was a consultant's consultant. He was the person many of us turned to when faced with difficult or unusual problems. He had a major influence on the ASHRAE noise and vibration committee and was author with Chuck Ebbing of the ASHRAE book "Application of Manufacturer's Sound Data." He was the father of the RC method or rating sound in rooms. When the state of California faced a crisis with almost every condominium project in the state being sued over low-frequency footstep sound in wood-frame structures, Blazier was called upon to do a major research project on the subject. Warren was born in Kansas, served in WWII, and studied music at Julliard before turning to engineering earning a masters with specialization in acoustics from the University of Wichita. He died at the VA Hospital San Francisco February 20.

Local Noise Ordinances – We recently noticed that Charlotte has revised its noise ordinance to now allow steady sound levels approaching 70 dBA continuously day and night in any residential area. If anyone was subjected to this they would understand how ridiculous it is. It would make any property exposed totally unacceptable for HUD financing for instance. This may have been brought on by concerns that the prior limits were too low for brief intermittent sounds. Ordinances need to recognize the difference between long-term continuous sounds and brief intermittent sounds and have limits and measurement methods appropriate for each. More next time on noise ordinances.

Comedy Zone Success – We recently faced a strong challenge to isolate the new Comedy Zone club in Charlotte from the high energy music club above it in an old mill building. The existing floor literally had holes in it and we could not add to the floor surface above. We had limited head room to work with and the necessity of integrating ducts into the ceiling. The club is now open and word is that you do not hear the music above. Check it out when you have a chance.

New Ways to Work on Projects – We continue to expand ways to provide service.

Design Build Team Member – Many projects are now found to be much more cost effective and faster to build in a design build model than the design-bid-build model. The design build world understands the need for all players at the table from the beginning. This new model means more often there is a need to work or partner directly with building contractors as one of their team members. It is a great way to provide added value to the owner for projects with acoustical concerns. We look forward to expanding these opportunities so general contractors can provide greater value to their clients.

A/V Integrator – Acoustics and A/V partner - We have found it is helpful to work for the A/V integrator when they have built a relationship with the owner and the owner is looking for them to provide a complete solution. We provide the acoustical advice and sometimes loudspeaker design assistance to ensure the owner gets the desired end result of clear audio and great acoustics. This 'one stop' approach has been well received and has led to great results for the contractor and owner. For years, AVCON has been one such partner and we have had many successful projects with them. We look forward to partnering on a regular basis with more A/V integrators in this way.

New Acoustical Products

Baswaphon improvements – Changes in the manufacturing process for the porous board over the fibrous substrate have provided an improvement in the sound absorption of the [Baswaphon](#) system of acoustical plaster over a fibrous base. Additional options for finishing are also now available with some at reduced cost.

Sound absorbing translucent curtains – A European textile designer [Annette Douglas](#) working with a Swiss research institute and a textile manufacturer has developed a thin translucent curtain material that can be used on windows where light is desired while providing significant sound absorption. This works similarly to microperforated film systems that could be stretched over windows, but provides a more conventional appearance and adjustability. There is no information when these may be commercially available.

Variable Acoustics Banners – [Acoustacorp](#) offers a system of retractable banners for variable acoustics made of wool or heavy velour hung as two flat panels with a few inches of airspace between them. This is similar to using heavy curtains but with a flat appearance and better absorptive properties.



The One Stop Shop - In the architectural design world today we hear new buzzwords, **BIM**, **integrated design**, **sustainability**, and **high performance buildings**. They all speak to expecting better results and a more thorough design. Our pace of life and the pace of the design world has increased thanks to modern tools. For example, consumers expect their cell phone to have the feature set of multiple devices like their camera, watch, planner, contact list, email, GPS navigation, internet, etc. **and** be faster and better. Likewise, designers of modern buildings are expecting to **get more services from one place**. This is especially so when those services are interrelated such as the acoustics, noise control, audio-video, and performance technology needs of a building. One consulting firm that can successfully provide **one stop shopping** for these needs will benefit everyone. We believe we have the right combination of people and assets to provide a **single point of contact** for these needs as described in the picture below.

Core Expertise – A firm must have a solid core of trustworthy advisors with **unmatched experience**. In business since 1979, our employees have over 90 years combined experience. We hold many leading roles in our professional organizations and in the development of standards and building codes. We also improve on the **state of the art acoustics** by sharing through technical papers, presentations, and teaching.

Talented Partners - We have built strong relationships with similar highly skilled professionals and developed a talented team of subconsultants. They add over 110 years of experience to the team, giving our SAC team an unprecedented 200 years combined experience.

Network of Specialists - Occasionally we need specialists with very specific skills for particular projects. These might be advanced vibration measurement and analysis, or modeling of aircraft or gunshot noise. We have people we can turn to when the special needs of a project call for it.

Scalable - With this network of experts, we can quickly scale our workforce as needed for any size task and quickly cater to expanding projects. We have been able to meet very demanding timelines for large projects. Successful scalability requires keeping a project moving and balancing the shifting needs of multiple projects and personnel.

Global Reach – With members of our team as far east as India and projects as far west as Hawaii, our firm has a diverse team and global reach.



SAC TEAM- The graphic and table below illustrate the wide ranging services we can provide through our firm and partners, and briefly introduce our primary team members. Tied together by our solid firm with the right relationships, skills, and assets, we can generally deliver whatever the client needs or put them in touch with someone who can, making us the ONE FIRM our clients need to call!



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| <p>Dr. Noral D. Stewart</p> | <p><i>Principal- Concentration in Multi-family/tenant spaces, Isolation/Privacy, Expert Witness, Occupational and Environmental noise. Started firm in 1979.</i></p> | <p>Fred C. Schafer</p> | <p>President of F.C. Schafer Consulting. - Audio/Video & Technical Systems Design/Evaluation. Room Acoustics. Collaborating since 1986. <i>"Innovative positive working relationships are based on people, their creative interaction, depth of knowledge, skill, experience and commitment to excellence. For our firms, the needs of the client are most important... In all the years we have worked with each other on projects, we have enjoyed projects with excellent results and client satisfaction."</i></p> |
| <p>Joseph F. Bridger</p> | <p><i>Associate Principal- Concentration in Architectural Acoustics-HVAC noise control, Isolation, Room Acoustics and Green Buildings. With firm since 1993.</i></p> | | <p>Principal Consultant of EDC Sound Services. - Primarily room acoustics and audio/video system design and evaluation. Known Noral since 1969 and Joe since 1993. Subconsulting since 2009. <i>"I enjoy working with this Acoustical Collaboration team because of their expertise, experience, and dedication to excellence, and crosschecking my conclusions with others whose experience, plus my own, totals over a century helps us all to do outstanding work for the client!"</i></p> |
| <p>Christopher L. Barnobi</p> | <p><i>Acoustical Analyst- Architectural acoustics and environmental noise. Known Noral and Joe since 2008. With firm since 2010.</i></p> | <p>Dr. Richard Honeycutt</p> | |
| <p>Mathew M. George</p> | <p><i>Principal of MMG Acoustical Consultants. Worked for firm from 2000-2003. - Room acoustics and HVAC noise control. Subconsultant since 2004. "My work relationship with SAC is not only an enjoyment, but a passion sustained by the fact I get to support and contribute to the efforts of one of the top acoustical consultancy firms around. The firm's support of my efforts has been very critical to my development as a professional consultant. Dr. Stewart and Joe in their own way will be my "father figures" in acoustics and because of their healthy mix of professionalism and feeling of "being a part of the family". With utmost respect and thankfulness, I acknowledge their contribution to my development as a person and trust them implicitly."</i></p> | | <p>Dr. John Gagliardi</p> |
| <p>Timothy Lavallee</p> | <p><i>President of LPES, Inc. - Environmental noise control. Known Joe and Noral since 2002. Subconsultant since 2007.</i></p> | | |