# *Sounds* Issue 21 Summer 2008

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



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*In our 30th Year*

**Audio and Audio-Visual Systems** – We have learned that we have lost some jobs because potential clients did not realize we had any way to provide audio or audio-visual services. Our business cards do read "Architectural Acoustics, Environmental Noise, and Workplace Noise." These are the strengths we concentrate on. In the beginning in 1979, those cards also listed "Sound Systems." However, we quickly recognized where our strengths were and the need to concentrate on those strengths. We also saw some problem sound systems designed by otherwise qualified acoustical consultants who were not specialists in sound system design. Successful sound system design depends not only on a solid understanding of theoretical considerations, but also a strong knowledge of the practical considerations and reliability of the equipment specified and ability to tune and adjust the system properly. We identified others strong in sound systems that could work with us when needed.

There are many people who design sound systems and also sell them. Some are quite good and in many cases the design-build approach can work well. We are pleased to work with these better contractors on many projects. In recent years, one contractor in particular, AVCON, has strongly encouraged their clients to involve us in their projects. In cases with difficult challenges we strongly advise clients to involve an independent acoustical consultant specialized in sound system design. The role of that consultant can be very broad or very limited. In some cases they may prepare a complete documented design for bid by several contractors. In others they may concentrate on just the design of a speaker cluster, leaving everything else to contractors.

Strange as it may seem, the number of independent consultants in sound system design (not selling products) is even fewer than consultants in architectural acoustics and noise. We are blessed to have two of the best in our part of the country in Jim Brawley and Fred Schafer. Both are not only highly experienced in audio systems, but also very knowledgeable in room acoustics. However, the demand for their sound system services is such that they typically turn over much of the other acoustical work on projects to others. This is a good fit that works for them and for us.

**Fred Schafer** has been involved in operating, designing, and installing sound systems since 1966. In 1973, he joined Ford Audio and Acoustics, Inc. of Oklahoma City as their first chief of systems design creating an in-house design department capable of all aspects of acoustical and electro-acoustical design. In 1980, he moved to Charlotte as Vice-President of an audio design and contracting firm, and then founded F. C. Schafer Consulting as an independent consulting practice in 1983. In the early 1990's, he spent a sabbatical exploring again his early interest in medical sciences, then again joined Ford Audio briefly to supervise installation of the initial sound system for the Charlotte NFL stadium. He then re-established F. C. Schafer Consulting. Fred continues to manage the operation of the sound system for Carolina Panthers games. His improvements to the system have led to work improving audio systems at other NFL stadiums.

**Jim Brawley** founded James S. Brawley & Associates, Inc. in 1981. Before that Jim worked as the Applications Engineer for JBL Professional. As part of his JBL experience he taught classes in sound system and room acoustic design to dealers of sound system equipment. Special design projects for JBL included a central loudspeaker cluster for the Hollywood Bowl, the development of an automatic mixing system, and creating a format for a new line of motion picture theater loudspeaker systems. His consulting practice continues to include product design as well as the design of systems for all types of venues- worship spaces, amphitheatres, courtrooms, auditoriums, motion picture theaters, home theater systems, arenas, stadiums, drama theaters, production studios, conference centers and educational facilities worldwide. Special projects have included large rock concert systems for artists such as Paul McCartney, Phil Collins, the Rolling Stones, Willie Nelson, Diana Ross, and Reba McIntyre. In 1987, he designed a sound system to cover 500,000 listeners for the Papal Mass in San Antonio, Texas.

**Stewart and Bridger to present papers at ASA meeting in Miami –** Both Noral Stewart and Joe Bridger will be presenting papers at the Acoustical Society of America meeting in November. Noral Stewart who has been working with the Modular Building Institute on sound isolation performance of modular classrooms will present current results in an invited paper for a special session on the acoustical issues related to modular classrooms. Joe Bridger will present three contributed papers. Two papers in a session on acoustics of green buildings will separately address ways to design room acoustics and mechanical systems for classrooms to be Green, affordable, and meet the LEED requirements. Another in a session honoring the late classroom acoustics leader Mike Nixon will compare different metrics, criteria, measurements, and calculation methods to address gymnasium room acoustics.

**LEED for Schools major growth area –** Three months ago we reported that 370 school designs were registered as seeking LEED for Schools certification. That number is now more than 1000 schools. This shows the dramatic growth in interest in this program that also carries with it acoustical requirements. We are seeing much of this interest and have several projects in progress. Anyone planning to pursue LEED for Schools certification should contact Joe Bridger as early as possible in the process.

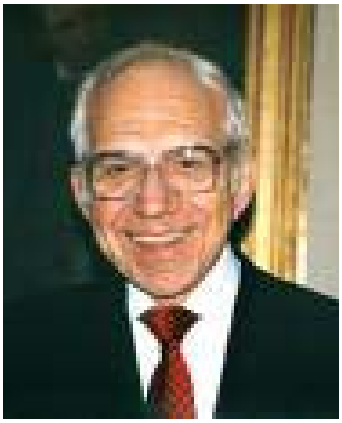
**Multifamily Housing –** With the growth of condominiums, townhouses, and apartments in our area, and especially with the building code requirements for acoustical isolation, we have seen major growth in our multifamily project work. This involves new design, testing, and unfortunately sometimes remedial work. We see many cases where acoustical performance does not meet even the code requirements much less the higher expectations of upper end buyers. Unfortunately there is much misleading information out there on acoustical isolation that can easily get one into trouble especially for impact sound on floors. Those who sell resilient materials for floors often do not understand the way their product must fit into a total system and that the rating they are giving you really was a result for that total system. Laboratory tests for systems that have well-isolated ceilings but poorly isolated floors can be very misleading with regard to real world performance. Wood frame construction can be especially difficult with potential construction defects even if design is good. Often in concrete construction people fail to recognize that impact sound can travel laterally as well as vertically. It is our belief that separate ceilings are essential for good isolation even in concrete structures. It is extremely difficult to fix these problems once created. Please seek guidance on your projects not only for isolation issues but all the many acoustical issues related to multi-family structures.

**Are Red Cars Louder? –** We have all heard the theory that red cars are often perceived to be faster and more likely to attract a speeding ticket. Now, researchers in Germany have shown that red cars are perceived to be louder than blue or light green cars when the actual sound level is the same. Dark green cars were also perceived a little louder than the blue or light green, but not by as significant amount as the red cars.

**Horry County Noise Enforcement –** It has been reported in the news that Horry County, SC (Myrtle Beach area) has issued sound level meters to a number of deputies for enforcement of the county noise ordinance and also to gather data to evaluate the ordinance. A review of the ordinance indicates limits of 60 dBA daytime and 50 dBA night for sound reaching residential areas, but without any details on how this is to be measured. This daytime limit matches most ordinances and would be reasonable as an average level over a period of time but very restrictive if interpreted as an instantaneous level. The nighttime limit matches many but is lower than many others and could be too restrictive for home air conditioners near boundaries.

**Those old, old octave bands just will not go away –** What would you think if you encountered a current local law that said you had to drive a car built before 1960 and could not drive more than 30 mph on the interstate. A recent search for local noise ordinances revealed a very large number of localities around the country that are essentially doing this with regard to noise. Their local noise ordinances are copied from ordinances developed in the 1950's based on instruments that have not been made since 1960. Their limits are expressed in octave-bands with different frequency ranges than modern octaves. There is no way to measure as specified with modern instruments, and unfortunately the old instrument at right does not work any longer. Some of these ordinances also have extremely low and impractical limits in them. Unfortunately, local governments do not always get competent advice on drafting ordinances. Also, no one pays attention to the ordinance until problem comes up. Then they find the ordinance is difficult to enforce, or contains limits that can be shown to be unreasonable. Such ordinances can cause a lot of trouble for responsible businesses trying to do things right, or for a citizen impacted by a noise that then has trouble getting a resolution based on the ordinance.


**Efforts continue on updating standards for field measurement of sound isolation –** Many of our clients require tests of airborne or impact sound isolation between rooms. Dr. Stewart is chair of the ASTM task group that writes the standard E336 for airborne sound and active on the task group for the impact standard E1007. There is now a 2008 version of E336 with several minor but important changes. Work continues on some significant issues including treatment of coupled spaces. A major revision of E1007 is also in progress. This will introduce several new ways of measuring impact performance and probably rename the traditional FIIC as AIIC or Apparent IIC in parallel with the ASTC of E336.



**Leo Beranek autobiography published –** It could be argued that there would be very few if any acoustical consultants today if it were not for Leo Beranek. We also might not have the internet. This remarkable man now in his 90's has published his life story, Riding the Waves, a Life in Sound, Science, and Industry.

Growing up in 1920's Iowa, he became interested in radio and electronics and worked his way through college repairing and selling radios and drumming in a dance band. Wanting to go to graduate school but without money, he helped a stranger traveling through Iowa on the only paved road change a flat tire. Turned out the stranger was president of a radio company and former Harvard professor. Leo had just read one of his papers in the library that morning. This chance encounter led to a scholarship for his first year at Harvard where he impressed the faculty enough he was offered a research assistantship. While he had developed an interest in symphonic music, he had not thought about acoustics as a field, but his research project was the development of the first long-playing phonograph record. His continued graduate work made him a leading expert on the experimental study of sound absorptive materials. Turning down some other offers he stayed at Harvard upon completion of his PhD to assist in revising laboratory courses. With the coming of WWII, he soon found himself director of a major war effort to silence aircraft cockpits and other intriguing defense efforts making him well known at a young age.

After the war, the United Nations approached him and an MIT professor for help with the new UN headquarters. They formed the firm of Bolt Beranek and Newman (BBN) that became by far the largest acoustical consulting firm the world has known. In the 1950's New York City called Beranek to the rescue when it was found that new jet aircraft sounded a lot louder than propeller planes though the methods then used to measure the sound indicated them equal. The Port Authority was forbidding jets at the airports. A major rush project produced new measurement methods and convinced manufacturers and airlines of the need to further reduce jet noise which was accomplished in time for the first jet flights on schedule.

BBN became early pioneers in the use and networking of computers, developing the modem. It was one of their staff that suggested to the Army that a network for computers should be built. The Army also concluded BBN was better qualified to build the network than a number of major corporations. Many concepts of the internet including email and the @ in email addresses originated in the BBN offices. Today, a BBN network is the major backbone of the internet.

Leo never lost his interest in radio and then television. In the 1960's he led the longest running administrative law case in history (to the US Supreme Court four times) that resulted in taking away the license of an existing television station and establishing a new one on its channel. For several years he ran this new station building the reputation as the best commercial station in the country before selling it at a record price for a station.

Then in his 70's, he got back into acoustics concentrating on the design of concert halls, leading the design for several new halls in Japan before retiring at 87. At 88 he was still skiing the most challenging ski slopes of the Rockies. The book is available from the Acoustical Society of America and other sources.