Sounds

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A Newsletter from **Stewart Acoustical Consultants**
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Making our World Sound Better Since 1979

Medical Facility Acoustics – Interest in acoustics for medical facilities of all kinds is growing rapidly for several reasons. Hospitals are finding that their funding is being tied to patient survey results and that poor scores in such surveys regarding the noise in the hospital can reduce their funding. This provides a major financial incentive to reduce noise from alarms, mechanical systems, corridor activities, automatic doors, ice dispensers and various other sources that could disturb the rest of patients. HIPPA regulations present the potential of major fines if steps are not taken to avoid patient medical information from being overheard. This applies to all kinds of medical facilties including the family doctor's office and exam rooms. How, often have you sat waiting in an exam room and understood everything said in the adjacent room. Privacy requires the proper combination of sound blockage and background sound and is hard to achieve without control of both. Finally, the Facilities Guideline Institute has included acoustical requirements in its requirements that are applied to many new medical facilities. These are not applicable in all jurisdictions but do require careful design where applicable.

Revisions to FGI Guidelines for Medical Facilities effective in 2014 – The Facilities Guideline Institutes requirements and guidelines for medical facilities are on a 4 year revision cycle. The initial acoustical requirements were unveiled in the 2010 edition, and the 2014 edition will contain several revisions including some suggested by Dr. Stewart. Guidance for exterior facades will be based on OITC rather than STC, and lesser requirements will be imposed on less sensitive spaces such as corridors and stairways. Minimum sound absorption will be suggested though not required in operating rooms. The noise level limits for mechanical equipment were changed from a range with a minimum level to a maximum level only. The requirement for a composite STC 35 for corridor partitions including doors was relaxed to just an STC requirement for the partition itself, eliminating the need for seals on doors. This was based on complaints about sanitation of seals by hospitals. The Speech Transmission Index STI has been replaced by the Speech Privacy Class based on ASTM E 2638 as one of the options for evaluating speech privacy. Finally, the maximum limit for footfall vibration in patient areas was increased from 4000 µin/sec to 6000 µin/sec.

Excessive Alarms and Alarm Fatigue in Hospitals – The growing use of audible alarms in hospitals is creating a never ending din of noise making it very uncomfortable and hard for patients to rest and sleep and also making it very difficult for overworked nurses to keep up with them. A number of deaths have been associated with problems due to this sensory overload. Two years ago a "summit" meeting was held in Washington to address the problem. The Washington Post recently discussed the issue. http://www.washingtonpost.com/sf/feature/wp/2013/07/07/too-much-noise-from-hospital-alarms-poses-risk-for-patients/ Part of the problem is the way alarm systems are implemented and monitored in the US. Here alarms often sound in the patient rooms and nurses have to hear them even if they are not in the room. As a result patients are exposed to many monitor sounds not only associated with their care but also that of other patients. If a nurse is in another room or corridor bombarded by the sound of many alarms, they may not be able to distinguish one of particular importance. In some countries, alarms are monitored by a dedicated staff in a special room isolated from patients. That staff concentrates on separating real alarms from false ones and promptly alerting doctors and nurses.

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Virginia Building Code Requires Sound Insulation – The Virginia Uniform Statewide Building Code (USBC) has been modified to include requirements for isolation from outdoor sound in certain locations. Specifically this applies in areas greater than DNL 65 near Oceana Naval Air Station. The code provides two options. The first is that the walls, roof, and windows meet specified STC requirements that depend on the extrerior sound level in 5 dB ranges. One difficulty in this approach is that architects and builders typically depend on test data for the STC values, and test data are very limited for roof and exterior wall constructions. Fortunately the STC can be estimated and authorities accept such estimates. The other option provided is for a qualified person to analyze the construction plans and provide modifications as necessary to assure that the interior DNL due to exterior sound is reduced to 45. Basically, the outdoor to indoor noise reduction has to equal the difference between the stated DNL on contour maps and 45. This is not a simple matter of matching STC ratings. Proper analysis requires applying the transmission loss spectrum of the building components in third octaves to the A-weighted spectrum of the aircraft sound, considering the effects of the various wall window and roof areas and the sound absorption within the rooms, and subtracting 6 dB to account for going from a free-field outdoors to a diffuse field indoors. This is something that should only be done by an person very experienced in this kind of analysis. Unfortunately, rather than language to require the analysis be done by someone really qualified to do it, the code indicates that the "alternative design shall be certified by an RDP." RDP means "registered design professional" which means an architect or engineer registered in the state of Virginia, very few of whom are qualified to do the analysis. Thus, it is uncertain exactly what will be required to meet this alternative more accruate approach.

Calculating Sound Transmission of Partitions etc. – We often encounter the need to calculate the sound transmission properties of partitions, floor-ceilings, roofs, and other building elements for which test data are not available or for which data are so limited as to be questionable. In the 1970's, Ben Sharp of Wyle Laboratories pioneered methods of doing such calculations. Around 20 years ago we obtained a computer program put together by colleagues in the US to do some of these calculations and converted it to a spreadsheet. Then a consulting firm in New Zealand developed a more extensive program called INSUL. We obtained that program and have been using it extensively for the last 10 years. INSUL has been significantly improved in the last few years providing much more flexibilty. We have now obtained a license for this latest version. It allows us to model directly more complex constructions that we previously had to do in parts. As with any software, we have to be careful of limitations and potential errors.

Where NOT to use Fiberglass Ceiling Panels – Ask what is the best ceiling panel one can buy and answer often seen is Fiberglass, products such as Armstrong Optima, USG Halcyon ClimaPlus, and Certainteed Symphony f. In one regard that answer is right. However, in many situations these are the WORST ceiling you can have. Where they excel is in not reflecting sound. However, part of the way they accomplish this is that sound passes through them very easily. Thus, if you need to block the passage of sound, you do not want these ceilings. The most common mis-application is in the ceilings of closed private offices. The fiberglass ceiling is the ideal panel for open office areas. However, when there are closed offices or conference rooms adjacent to the open offices, those closed areas must have a mineral fiber ceiling panel. Such mineral fiber ceiling also should extend for about 4 feet into adjacent open areas. All three of the manufacturers know this and produce fiberglass and mineral fiber panels with IDENTICAL appearance so they can be used in adjacent areas and still look right.

General Liability Insurance, Additional Insureds – We have upgraded our general liability insurance so that all clients henceforward will be covered as "additional insureds." Only a small percentage of clients ask to be covered as "additional insureds" but with a growing number it was becoming impossible to keep track of them in a situation where most projects last only a few weeks, though some projects last much longer. Please note that only the clients are covered as additonal insureds, not other parties such as customers of the client. Also, this does not mean that the client is listed on the policy. Special arrangements may be made in the case of large, long-term projects.

Testing Sound Isolation – New Speakers for Sound Sources - One of the services we offer is the testing of sound isolation between spaces in the field, primarily interior testing of the Noise Isolation Class (NIC) between spaces or the Apparent STC (ASTC) of partitions and floor-ceilings. Occasionally there is also testing of exterior facades. For this we need loudspeakers capable of high sound levels, preferably with built in amplification, and light in weight. We are enhancing our abilities in this area with the acquisition of a pair of QSC K10 speakers. These speakers are about 10 dB more powerful than our existing speakers while also being smaller and lighter.

Fred Schafer – updates from F.C.Schafer CONSULTING, L.L.C.

THE R.F.P (A Tale of Woe, or Whoa!) Why are so many Requests for Proposal inferior? As a consultant in acoustics and AV/Performance Systems Design I routinely see Requests for Proposal (R.F.P.) involving these systems. Thinking about this situation I began asking, "What is a Request for Proposal?" I realized that a recent trip to my local bakery to order a birthday cake and associated pastries involved the creation of a Request for Proposal. For me to receive what I wanted I needed to provide my baker with all kinds of information; what size cake, how many layers, what flavor cake and frosting, what color frosting, did I want decorations on the cake, if so what kind, and what, if anything, did I want written on the cake. Similar information was required for the assorted pastries. Had I written this same information down and requested a cost estimate I would have effectively created a Request for Proposal.

So, a Request for Proposal is just that – a request for services to design and/or build facilities or systems. It should also serve as a guide, describing the end goal, services desired, existing conditions that may apply, and references to any standards, building codes, test procedures, etc. pertinent to the project. This being said, it is reasonable to conclude that information in the R.F.P. would provide a clear definition or description of the owner's or client's desired goal - a pretty straight forward process. Yet, sitting in front of me was a R.F.P. requesting audio, video and performance technology systems design services for a sizeable project that was effectively the same as my leaving a note for my baker saying, "*Please provide birthday cake with all other necessary stuff, will pick up tomorrow morning. Thanks*".

I suspect your reaction to this situation may be similar to mine, "Who wrote this and how can they expect anyone to respond without additional information?" Unfortunately, I am finding this type of R.F.P. is only the tip of the proverbial iceberg. The counterpoint to this underdeveloped R.F.P. may be characterized as over achieving, obsessive compulsive twin sisters. The first provides too much information, defining everything from basic terms to installation details. The second refers to the current "standard". Unfortunately, many of the "standards" referenced, with which the project must comply, may actually be guidelines for the architect, are not applicable for the intended project, or simply do not apply.. While concerns for installation details are important they are secondary to the actual function of the various technical systems. A specification developed by the owner/user on a "One Size Fits All" basis does not work for systems that must integrate into very different spaces. Sadly, these are also typically plagued with obsolete or inappropriate equipment. The aforementioned R.F.P. examples have the potential to, or will definitely, end in a tale of woe. Or maybe, we should consider this a tale of Whoa!

I have deduced that the source of this situation is the inherent disconnect between our interface with the common audio/video devices in our everyday lives, like our smart phone, home computer or television system, and the requirements of systems that handle audio and video program material in large and/or complex spaces. At first glance the answer would appear quite challenging given the exploding number of options we have in new technology and the equipment that it generates. However, I would suggest that the solution is not so complicated or challenging. Rather than concentrate on the fine details of various technological options, the R.F.P. should probably begin by listing or describing the functions or activities that the space in question must accommodate, or concerns that must be addressed. The next section would be to provide a description of how the various systems that will be included as part of the project should function or operate and interact. The third element would restate a clear definition of the goals to be achieved along with any pertinent standards, guidelines or codes that apply to the project. While the entire R.F.P. document is important this last part is of particular importance and where the services of a professional will keep you from referencing conflicting or inappropriate "standards". With this approach we may avoid having a project become a "Tale of Woe".

Leo Beranek, 75 years in the Acoustical Society of America, revises his 1954 book Acoustics – Leo Beranek turns 99 in September and is still active. At the International Congress of Acoustics in Montreal in June, Leo was awarded the first Diamond Certificate of the Acoustical Society of America recognizing 75 years of active membership. Leo probably also holds a record for years between editions of a book. On December 31, 2012 he released (with a new co-author Tim Mellow) a revision of his pioneering 1954 book Acoustics, now retitled Acoustics: Sound Fields and Transducers. That is 58 years between the original and revision. Anyone know of anything that beats that? That is Leo, center, in the photo at right with Ken Roy of Armstrong, left, and Bob Coffeen of University of Kansas, right, at a reception in Leo's honor at the ICA in Montreal..

J. Christopher Jaffe 1927-2013 – Chris Jaffe passed away of Leukemia in May. Chris first got a degree in chemical engineering and then a masters in theater and combined those interests to develop a plastic theater shell system as his first major acoustical contribubution. He founded Jaffe Acoustics (now Jaffe Holden Acoustics headed by Duke graduate Mark Holden) becoming a leading concert hall acoustician. He developed the first practical and relatively simple electronic reverberation enhancement system. He taught acoustics at several schools and help found the architectural acoustics graduate program at Renssaeler Polytechnic Institute. In 2009 he joined Acentech, and in 2010 he published a book on the acoustics of performance halls, and in 2011 was awarded the Wallace Clement Sabine medal of the Acoustical Society of America.

Amar Bose 1929-2013 - Perhaps the most recognizable name in acoustics, passed away July 12. Though best known for his many audio contributions, he was the recognized as the best teacher on the MIT faculty where he served from 1956-2001. The two major awards for teaching excellence at MIT are both named for him. Before his death, he transferred majority ownership of Bose Corporation to MIT on a non-voting basis. When you have an hour, this video is worthwhile. http://video.mit.edu/watch/dr-amar-g-bose-last-lecture-of-fall-96-acoustics-course-6698/

Acoustical Product News

Armstrong Create! – Armstrong continues the trend to artwork on acoustical panels by offering an option to incorporate original artwork on their Ultima and Optima ceiling panels. http://www.armstrong.com/common/c2002/content/files/69305.pdf

Certainteed AirRenew Gypsum – This special gypsum wall board from Certainteed is said to remove volatile organic compounds from the air. It is the same weight as normal gypsum and thus is probably acoustically comparable. http://www.certainteed.com/resources/CTG-2620_AirRenew_Brochure_Eng.pdf

Privacy Board and Return Air Silencers from Acoustigard – This is an innovative way to close off the space above walls in ceiling plenums for privacy. The boards are inch-thick 2 by 4 foot mineral board covered in foil. They can be cut to fit plenums up to 4 feet high and taped together. A silencer system is provided to allow air passage. http://www.acoustiguard.com/privacy-board/

Music in Your Shower – Would you like music with your shower? Kohler has introduced the Moxie showerhead with a removable battery-powered, Bluetooth-enabled speaker. You can link your IPod or other device to it for music as you shower. The speaker will also function outside the shower head so it can become a portable wireless speaker to use at other locations in the home. The shower head is available in 2 and 2.5 gpm versions.

Floorfolio Enviorquiet Luxury Vinyl Tile – We have experienced a new flooring product that some of our clients are using in apartment floor systems. It is a vinyl tile with a 3 mm crumb rubber backing similar to floor underlayments used for impact control. http://www.floorfolio.com/Products/EnviroQuiet.aspx We have observed that when tapping on this product the impact sound in the source room is much less than when tapping on a hard surface. The system actually reduces the impact sound generated, so less is present to transmit through. Laboratory test results on a wood frame floor were IIC 54. Our results were less impressive, though we believe it was due to problems in the ceiling installation.