Mission

“Enhancing the stature and effectiveness of the acoustical consulting profession for the mutual benefit of the public and the member firms”

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Established in 1962
Congratulations! I am happy to announce that the NCAC Newsletter was recognized with an Award of Excellence for Outstanding Newsletter from the Indiana Society of Association Executives during their annual Star Awards in December. The newsletter was entered into the category for organizations with overall annual budgets of $750,000 or less.

I have really enjoyed working with the NCAC leadership and newsletter editors over the last year. It is especially exciting to be able to publish color photos and drawings to illustrate the articles.

After you read President Van Wyk’s message on the next page, I want to encourage you to take his words about “accolades” to heart. The NCAC Newsletter is always happy to publish your company news and project details. Rest assured that the newsletter is one place where your hard work on a project will “get some respect.”

We are actually still needing two content editors on the topics of mechanical and industrial noise control and environmental noise. Please let me know at rdaeger@raybourn.com if you work in these categories and are willing to contribute, or recruit a contribution, for one issue per year.

Thank you to Jack Randorff, Randorff Associates, for coordinating this month’s look at Forensic Acoustics.

Rachel Daeger, Editor
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Update your Spring Wardrobe!

NCAC Shirts for Sale
NCAC has polo shirts available for sale with the new logo. Shirts include a pocket and are available in sizes S-XXL. Cost is $25 + Shipping. For more information and to order a shirt contact Emily Flock at eflock@ncac.com or call 317-328-0642.

The NCAC Newsletter is published quarterly by the National Council of Acoustical Consultants as a service to its membership and all interested parties.

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Of Awards, Accolades, and Acquaintances

Last week I was standing in front of a dozen posters at the Construction Association of Michigan annual awards presentation. Four of the posters were created by our clients who submitted them for “Project of the Year” award consideration. I was pleased that three of the posters included Acoustics By Design with proper recognition as “Acoustical and AV Consultants” for the project.

But, we were nowhere to be found on the university project poster. The poster described in great detail the acoustical challenges and the unique technology improvements made on campus to propel it to become the health professionals education leader of the future. Would it have killed them to include us? Of course not, and I’m sure it was just an oversight. But that feels like it happens all the time. I often wonder if Rodney Dangerfield was referring to acoustical consultants with his infamous quip, “I don’t get no respect!”

Awards

In comparison to many other industries, my observation is that the acoustical consulting industry offers very few awards. I just picked up my copy of the CISCA (Ceilings & Interior Systems Construction Association) Construction Excellence Awards application. The application has a spot for contractor, distributor, manufacturing representative, manufacturer, and architect - but no acoustical consultant! I sent off a nice email to Shirley Wodynski, Executive Director at CISCA, requesting that “acoustical consultant” be given a proper spot as well. I’ll keep you posted on whether my plea is acknowledged.

Speaking of awards, I am proud to announce that the National Council of Acoustical Consultants will present the inaugural Laymon N. Miller award, developed with the Institute of Noise Control Engineering, to an individual who has practiced acoustical consulting in an exemplary manner over a sustained period of time to improve acoustical environments in and around buildings, transportation systems, work places, recreational and other occupied spaces such that the quality of life for citizens and communities is significantly enhanced.

If you would like to nominate someone for this award, please do so by March 6, 2015. See details on page 25 of this issue. The winner will be announced at the NCAC Annual Meeting on August 7-9, 2015 in San Francisco. By the way, you will be there to congratulate the awardee, right?

Accolades

Do you know where your next project is coming from? Do you sit by the phone and hope that it rings? When the phone does ring, do you know why the caller decided to call you? Did they find you on the web, receive a recommendation from one of your clients, or (heaven forbid) find you in the Yellow Pages?

For many firms, “accolades” consist of a few nice quotes from clients on your website. Nothing wrong with that, but do you know what each of your clients think about you? In Pete Blackshaw’s book Satisfied Customers Tell Three Friends, Angry Customers Tell 3,000: Running a Business in Today’s Consumer Driven World, he highlights that blogs, social networking pages, message boards, and product review sites make it easy for clients to broadcast their review of your work. Even though we operate in a Business to Business purchasing cycle, our end users or clients are “consumers.” The negative weight of even a single negative post can cause harm.

Perhaps just as frustrating as a negative review is to read the accolades of your work without being properly recognized. In one magazine, The National WWII Museum U.S. Freedom Pavilion in New Orleans, LA, description goes on and on about the “acoustician” but only names the architect and manufacturer.

In my fresh copy of the magazine College Planning & Management, two projects were highlighted with obvious acoustical emphasis: the New Mexico State University Center for the Arts, and the Boston Conservatory Studio Building. The article on the latter project talks about the “frequently loud ambient noise,” “minimized windows into the rehearsal studios,” and “box within a box” construction. continued on page 4...
continued on page 3...

Yet, there is no mention of the acoustical consultant. Right now, those acoustical consultants are complaining, “I don’t get no respect!”

On a sad note, I report the sudden passing of Gary Kinsella. His obituary, reprinted on page 30, reads, “Many signature commercial buildings, entertainment and sports venues, and residential highrises built since the 1970s in Dallas, South Florida and other cities across the U.S. and abroad owe their acoustical qualities to the work of Gary.” Perhaps there is no greater accolade? What else needs to be said?

Acquaintances

Over the years, I have worked on many multi-family projects. We all know that it doesn’t matter how well the project is designed, the lack of attention to detail in the field can destroy all the hard design work. Before the recession, an architect acquaintance of mine attended a lunch and learn session I conducted on the acoustics of lab and field ratings of partitions. He later moved to a design-build firm. About a year ago, that design-build firm called up and said they were interested in educating their field supervisors (all 80 of them) on what to look for regarding acoustical details and construction in the field.

It turns out they had quite a few multi-family projects coming up and wanted to make sure they were “top in their field.” They were quite surprised to find out that acoustical caulking really does work, and that there were products on the market to help with blocking sound and isolating plumbing noise. Not only has this firm become a major source of work for us, but they also regularly refer us on to out of town clients. This reminded me to never underestimate the importance of maintaining relationships with your clients and keeping track of their careers.

Sometimes, accolades and acquaintances collide together. One of the privileges of the NCAC Presidency is to visit international conferences and to bring greetings on behalf of each one of you. I recently visited Brian Marston at BGMA, our sole NCAC member in Sydney, Australia, on my way to InterNoise 2014.

In anticipation for my adventure, I brushed up on my Australian euphemisms. While enjoying lunch at the local Rugby Club, Brian shared many stories, including one of his recent “accolades” from a neighbor who was opposed to a proposed industrial operation. One of the mitigation

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strategies was to use an earthen berm to create a natural barrier. After the project was completed, Brian went out to do follow up measurements and ran into the neighbor once again.

When Brian explained that the plant was already up and running, the neighbor stared at him in disbelief. When Brian showed him the trucks running back and forth behind the berm, the neighbor responded colorfully with his “glowing” accolade of Brian’s work, “Why, you lying bastard!” I knew that Australians have interesting words for many things, so I can only presume this is the Australian translation of, “Well, you did a heck of a job.” When we recently received an inquiry about a small arts center near Sydney, I had no problem referring the inquiry, using my own accolades, to my new acquaintance Brian Marston!

So, how are you recognized for your great work? Do you consider payment for the job the ultimate award? Do you rely on the accolades of others? Or do you toot your own horn? Do you wait for an architect to include you on her submission for your work on a performing arts center? Or, do you simply sulk in the corner while mumbling the words of Rodney Dangerfield, “I don’t get no respect!”

From the Vice President Membership

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As I write this, Old Man Winter is putting the finishing touches on our fourth foot of snow this week here in Maine, and I’m very much looking forward to seeing everyone in sunny (foggy?) California in August for the NCAC Annual Meeting. After all, interacting with other members, whether in person or through our forum is, for me, one of the most valuable benefits of membership in NCAC.

I was in business for several years before I got around to filling out the NCAC application. It was perhaps the best business decision I’ve made to date. And now, after several years of membership, I continue to be amazed by the wealth of collective knowledge and the generosity of our members. Consequently, I was pleased to have the opportunity to move into the position of VP Membership this past year.

I’m happy to report that NCAC membership is strong. While we’ve lost a handful of firms to retirements and corporate restructurings, we have received four new member applications since I took office, and the Membership Committee has been working hard to get them processed and welcome these new firms to our ranks.

I struggled a bit when I was asked to write this piece on membership, since after the statistics had been rattled off, I knew I’d be preaching to the choir. We’re all NCAC members for the same general reasons, and understand how valuable it is to our businesses continued on page 8...

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and our individual professional development. I don't have to talk any of you into joining, so I’ll offer some thoughts on ways that we all can improve the value of our memberships.

One key part of our mission is to provide access to vetted consultants, and I think we should aspire to count among our member firms all of those who are qualified. We all can contribute to this effort by actively recruiting new member firms. This not only adds to our collective body of knowledge and experience, but also bolsters NCAC’s stature among the professional disciplines (architects, engineers, attorneys, etc.) that we value as clients.

As with any trade organization, a balance must be struck between the benefits of collaboration and the drawbacks of contributing to the success of our competitors. Fortunately, we’re in a business with few trade secrets. My experience has been that the benefits far outweigh the pitfalls.

When I’m up against another consultant in court, or asked to peer review another’s work, I know that my job will likely be much easier when it’s a NCAC member firm. And even when I lose a competitive bid, I prefer to have lost it to a member firm, because I can feel confident that I haven’t just been underbid by someone who didn’t understand the scope.

Occasionally, though, I do find consultants in my own market who are clearly qualified for NCAC membership – often others like me who have left larger firms to try out self-employment. And after the dust has settled on the case at hand, I make a point of extending an invitation to join NCAC.

I encourage all of you to do the same. And remember, we have our Membership Incentive Plan to further reward your efforts. For each new firm recommended and accepted into membership, you will qualify for a 25 percent discount on your Firm dues for that year. This offer is valid for up to four new Firm members per NCAC Member Firm per year. Further, we will waive the application fee for recommended firms, and take 50 percent off of their first year’s dues. You can find all of the details and the recommendation form in the Members Only area on the web site. (http://www.ncac.com/documents/membershipincentiveplan.2014.pdf)

Another unadvertised benefit of NCAC membership is the opportunity for direct collaboration between firms. As the economy ebbs and flows, our workloads vary, but often not enough to add or subtract employees. Smaller firms, particularly those with only one or two people, struggle with justifying the costs of instrumentation and specialized software. And finally, we work in a small field with an incredibly broad focus. Many of us are in the woods one day and a theater the next. And while most of our business models require us to be generalists to some extent, we each have our own particular areas of specialization.

NCAC provides us a great opportunity to take advantage of each other's specialties. As a one-person firm, such collaborations have been invaluable to my business. I often do contract work for other member firms, and, in turn, rely on them when I need an extra pair of hands or additional instrumentation.

These collaborations are clearly mutually beneficial, and I encourage you to take advantage of this resource if you don't already. The NCAC Forum is a great place to connect with other members and start these relationships.

Talking with other consultants over the past few months, it seems that everyone is busy. The economy is picking up, buildings are being built, noise is being made, and new business opportunities abound. I hope that each of you will take advantage of the opportunity to help grow and strengthen this remarkable organization, and explore the ways that inter-firm collaboration might benefit your business in this time of growth.

See you in San Francisco this August!
When HOK Sports Facilities designed Gillette stadium, K-13 was utilized for its thermal and sound control abilities at the field and concourse levels to insulate the offices and above the luxury suites for sound control and heat loss. With a product that’s Class 1, Class A Fire-Rated, it’s no wonder the Architects at Arrowstreet, Inc. chose to use it in the construction of the various businesses of Patriot Place as well. Acoustic consultants from Metropolitan Acoustics chose K-13 in the Patriot's Hall of Fame, CBS Scene, Showcase Live at Patriot Place, and the Patriot Place Parking Garage. K-13 was the perfect choice to enhance acoustic performance while controlling sound transmission to outside areas.
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**OPTIMIZING THE ACOUSTIC ENVIRONMENT**

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Focus on Forensic Acoustics

Acoustic Investigation to Determine Significance of Witness Statement about Shooting Incident

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Occasionally an acoustical consultant is asked to conduct an investigation to obtain data that can help answer a question that is debatable in court. These assignments are known as Forensic Acoustics. This article is about an investigation conducted to help determine the significance of a statement made by a witness to a shooting after the estate of the victim filed a lawsuit against a city police department for the use of excessive force.

The Incident

On the evening of June 16, 2007, an interagency city-police and state department of corrections law enforcement team attempted to serve a search warrant at the residence of a person who had several outstanding arrest warrants. The ten members of the search warrant service team met at a site near the residence of concern and transferred from their vehicles to a police transport van to travel to the residence.

Shortly after midnight, the group arrived at the residence and the transport vehicle was parked on the front lawn. Two team members were directed to secure the rear of the residence, while two others were told to go to the breezeway between the garage and house to ensure no escape to the garage. The other six officers were assigned to the front door of the residence to announce their presence and use a battering ram, if necessary, to open the door of the house. The third officer in line at the front door opened a glass storm door covering the wood front door and the lead officer positioned himself facing the front door.

The lead officer banged on the door with his boot, announced that the police was there to serve a search warrant and demanded entrance into the home. While waiting for a response, one of the officers, standing to the right of the door, saw a person standing behind the door with a pistol through an opening in the blinds covering the window located near the door. The officer shouted “gun,” and he stepped back and fired his pistol through the window at the person behind the door. The person inside the house was hit and subsequently died at the scene from his wound.

The person killed by the police officer was not the person specified on the search warrant. The estate of the person shot by the police officer sued the department for use of excessive force and one reason given was the fact that a witness located in a motorhome behind the house said he did not hear the police announce their presence.

Daly-Standlee & Associates, Inc. (DSA) was asked to conduct an investigation and determine “on a more probable than not basis” if it would have been possible for the witness in the motorhome behind the house to have heard the police announcement made at the front door of the house.

The Investigation

In December, 2011, over four years after the shooting incident occurred, DSA met with the attorney representing the city police department and discussed how a sound study could be conducted to gather data that could help determine if the witness in the motorhome could or could not have heard the announcement made by the police. The city attorney agreed that it could be beneficial to their case so DSA was authorized to conduct a study which would include sound transmission measurements at the scene and the use of a noise model to demonstrate how the sound from the police announcement would have traveled from the front door of the house to the motorhome behind the house.

To develop the required data, DSA proposed to:

• Review witness statements and photographs taken by investigating officers to learn where people and motorhome were located during the incident and conditions that might have affected the transmission of sound between the front door of the residence and the motorhome and the reception of sound in the motorhome.

• Conduct sound transmission measurements at the residence to document how sound would have traveled from the front door of the residence to the motorhome and the reception of sound in the motorhome.

• Conduct sound measurements around the officer who announced the police presence in a way that would allow the data to be used as reference sound level data in a sound propagation prediction model.

• Use a sound transmission modeling program, along with the sound transmission measurement data, to predict how loud the police

continued on page 12...
Focus on Forensic Acoustics continued from page 11...

officer's entry demand announcement would have been outside the motorhome.

• Predict the amount of sound outside the motorhome that would have been transmitted into the motorhome.

Review of Police Interviews and Photographs

From a review of witness statements and photographs taken during the police investigation, DSA learned:

• The residence had the living quarters of the residence separated from the garage by a covered breezeway. (Photo 1)
• The motorhome was parked behind the house basically in line with the breezeway that connected the front yard to the back yard. (Photo 2 & 3)
• The motorhome was Class A, Swinger Model manufactured by Georgia Boy with a rear door, a front door and several windows on the side of the home facing toward the residence. (Photo 4)
  • The witness was located near the kitchen sink in the motorhome at the time of the shooting.
  • The witness's wife was lying on the bed at the rear of the motorhome with her head near a window that was open approximately 2 inches at the time the shooting occurred.
  • The witness's wife was watching the Late Night Show on a television located in the motorhome on the side of the home opposite the open window when the police arrived.
  • Officers located in the breezeway during the shooting incident heard the police announcement made at the front door of the house.
  • Officers located at the rear edge of the breezeway during the shooting said they heard the police announcement made at the front door of the house.

Interview of Lead Officer

To be as accurate as possible in conducting the sound study, DSA interviewed the officer who made the police announcement and demanded entry into the house on June 16, 2007. Due to the fact the officer was no longer living in the northwest, the interview was conducted over the telephone. DSA learned:

The announcement officer was located just to the right side of the center of the door with the center of his body located approximately in line with the right door jamb.

• The announcement officer was located 1 ½ to 2 feet away from the surface of the door with his body angled approximately 45 degrees toward the center of the door.
• The announcement officer used a “loud” voice level to make the announcement which he said meant it would have been at the loudest level that he could project without causing the sound of his voice to become distorted.
The storm door installed in front of the wood entry door was hinged on the left side of the door frame and it held opened as far back as possible by the officer who had the battering ram at the time the demand for entry into the home was made. *(Photo 5)*

**Field Testing**

After gathering the data about the scene and the actions that took place on the night of the shooting incident, DSA traveled to the residence to conduct sound transmission measurements. The dimensions of the house, the garage and the breezeway between the two were measured and documented to use in generating the noise model.

With the information obtained from police reports and photographs, DSA identified and marked out the place where the motorhome would have been parked behind the house on the night of the incident as well as the location of the officers around the house (Figure 1). Specific points along the side of the motorhome were marked so sound levels could be measured at the points during the sound propagation test. *(Photo 6)* Once the shooting scene was prepared, sound transmission measurements were made by playing pre-recorded pink noise through a loud speaker placed approximately 2 feet out from the front door of the house and approximately 4 feet above the ground.

The speaker was faced toward the breezeway and pink noise was projected at a volume high enough that the level of the speaker-radiated sound would be above the ambient noise at the motorhome location behind the house. Placing the speaker to face toward the door to simulate the officer’s position was not necessary for continued on page 15...
the sound transmission measurements because the goal of the measurements was to determine how sound traveled from the front door of the house, to and through the breezeway to the location of the motorhome, not to simulate the sound produced by the officer. *(Photo 7)*

Once an adequate level of sound was established in the motorhome area, measurements were made at points of interest along what would have been the side of the motorhome, the breezeway and at the positions where each officer of interest was located at the time the police presence was announced.

After the sound transmission measurements were made with the speaker located at the front door, the speaker was moved into the front yard, away from sound reflecting surfaces, and a reference level was measured 10 feet in front of the speaker. This step was taken to provide information that could help understand how the roof extending out over the front porch affected the transmission of sound generated from the front door toward the breezeway area.

**Measurement of Lead Officer Voice Levels**

The final piece of data required to predict the police officer’s announcement voice level at the motorhome was a reference sound level for the officer who made the announcement. Because the officer was living in the Las Cruces, New Mexico area, DSA retained Bill Holliday of Sound Solutions of Tucson, Arizona (an NCAC member firm) to meet with the officer in a remote location and conduct voice level measurements. *(Photo 8)*

Measurements were made 10 feet from the officer at eight positions...
while the officer made the announcement that would have been made on the night of the shooting incident, using the “loud” voice level that would have been used on that night. The measurement locations were directly in front of the officer and the points 45, 90, 135, 180, 225, 270, and 315 degrees away from the initial measurement point. The measurements were made 10 feet from the officer because that distance was used when measuring the speaker level during the sound transmission measurements at the scene of the shooting incident.

**Officer’s Voice Sound Transmission Modeling**

DSA produced a computer model of the sound that would radiate from the front door at the residence to the motorhome behind the residence using the 2011 version of SoundPLAN, an environmental sound propagation modeling program. The physical dimensions measured during the visit to the residence and the voice level data collected from the lead officer were used to help ensure the model’s accuracy.

The model initially included the barrier effects from both the house and garage, but when the levels predicted by SoundPLAN were compared to what would have been expected using the sound transmission field testing data, the predicted levels were found to be a few decibels lower than expected. Once reflective properties of the elevated horizontal surfaces, such as the breezeway ceiling and awnings were added to the model, predicted sound levels at the various points of interest were consistent with measurement results.

The SoundPLAN model was then used to predict the announcing officer’s voice levels at the motorhome and at the positions of the officers located in and around the breezeway. The announcing officer’s voice was predicted to be in the range of 60 to 75 dBA at the officer locations in and around the breezeway.

The announcing officer’s voice was predicted to be in the range of 53 to 55 dBA at the various points along the edge of the motorhome. Figure 2 presents a contour map of the sound levels contours predicted by the SoundPLAN model between the officer at the front door of the house and the motorhome at the rear of the house predicted by the SoundPLAN model.

**Analysis Results**

The results of the SoundPLAN model predictions indicated the announcing officer’s voice level would have been approximately 53 dBA near the rear window of the trailer. Information in police reports indicated the front window on the side of the motorhome facing the breezeway was open approximately 2 inches. That fact was substantiated in photographs taken on the night of the incident and the day after the incident.

Sound passing through a slightly open window is typically expected to be reduced by about 10 dBA due to a change in the impedance of the air when the sound passes through the opening. DSA concluded that the announcing officer’s voice level would likely have been around 43 dBA immediately inside the open window of the motorhome.

The witness who was the subject of the study stated that around the time of the incident, he was located near the kitchen sink and his wife was lying on the bed watching television. The witness said his wife did not hear the police announcement and that he would have expected her to have heard it if the announcement had been made as stated by the police.

However, when people watch television it has been DSA’s experience that they tend to turn the television volume up to a level that is higher than that typically occurring between two people using a “normal” conversation level (a level of between 57 dBA and 63 dBA). This is believed to be due to the presence of the television’s small speakers projecting unbalanced sound.

DSA concluded that the sound at the woman’s ears coming from outside the motorhome most likely was masked by the sound coming from the television and by the sound coming from the kitchen sink where the witness was clearing away dishes with water running in the sink.

Both officers located in the breezeway and the two officers at the rear of the breezeway stated they clearly heard the officer at the front door make the announcement that police were present and demanding entry into the house. The voice levels predicted at each of their positions were at a level that was well above the ambient noise level expected in the breezeway at the time of the event. So, DSA concluded that the noise model results corroborated the officer’s statements and did not create a conflict with the conclusion reached relative to the sound levels inside the motorhome.

**Conclusions**

The results of the sound study undertaken by DSA supported the conclusion that the officer’s voice, on a more probable basis than not, would have been masked by noise inside the motorhome and consequently been inaudible to the witness. The DSA study report was provided to the attorney representing the estate of the victim and, according to DSA’s client, report was instrumental in getting the case settled without having to go to court.
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at booth #1112
Yamaha Active Field Control System installed at the new Tony Bennett Concert Hall in New York City

In 1999, singer Tony Bennett and his wife Susan Benedetto, then a public school teacher, were inspired to start a public high school for young artists. They envisioned a school that would integrate the arts with rigorous academics, require a commitment to community service, and help students cultivate a lifelong love of, and dedication to, their artistic passions and crafts.

Over the next several years, the Bennett’s received assistance from the New York City Department of Education, local leaders, and the not-for-profit Exploring the Arts, founded by the two, in raising the necessary funds to turn their dream into reality. In 2001, The Frank Sinatra School of the Arts, in tribute to Mr. Bennett’s long-time friend, opened in temporary quarters with its first 250 students.

With the help of many friends and supporters, in 2009, the school opened its new extraordinary home, located at the Kaufman Astoria Studios complex, in Astoria, Queens, and Tony’s cherished hometown. Ennead Architects LLP, New York City, formerly Polshek Architects, designed the school, under lead architect Susan Rodriguez.

The Tony Bennett Concert Hall, named for its founder, is a state-of-the-art performance venue built specifically for the use of the students at the Frank Sinatra School of the Arts. The 800-seat venue hosts the school’s annual musical, instrumental, vocal, dance performances, and screenings of work by film and media students, who are able to experience their art on a 40 ft.-wide proscenium stage constructed with a permanent sprung floor, a 35 line set fly system, digital audio system, 244 circuit theatrical lighting system, and digital projection.

Mr. Bennett’s desire is for high school student artists to experience performing in a venue that is comparable to that of a professional venue.

The Tony Bennett Concert Hall, along with two black box theatres, initially opened in 2009, but it wasn’t until late 2012 that the theatres were complete. During the early design phase of the hall back in 2005, sound engineer and designer, Tom Young, who worked with Mr. Bennett for close to 20 years, was brought in to oversee the sound design of the theatres. He had an idea on how to make the theatre acoustically appealing for the various genres of music taking place by the students.

In October of that year, he took the Bennett’s to preview the Yamaha Active Field Control System, AFC, installed in the New York City Fifth Avenue location of Yamaha Artist Services, to determine how AFC could benefit the students and the theatre. “We were all impressed with the sound of the system and how it created a natural reverberant field in a room with a drop ceiling and rectangular in shape,” states Young. “After hearing the system, it was definitely something we wanted for the Tony Bennett Concert Hall.”

Active Field Control is a reverberation enhancement system that adjusts and enhances the acoustic characteristics of a facility while preserving natural characteristics. This is achieved by creating feedback loops of microphones and speakers located in the reverberant field of the room to “recycle” the reverberant energy, thus extending the RT time. Yamaha AFC is used to create varying RT settings to suit different performance applications.

continued on page 20...

Manufacturer’s Corner

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www.kineticsnoise.com/ultraquiet
within the same facility. The system can be used to add spaciousness to under balcony or stage areas so all audience members and performers can enjoy the same sense of connection to the music for a greater shared experience. AFC systems can also be used to add early reflections or as crowd enhancements systems.

“The Frank Sinatra School of the Arts, and more specifically, the concert hall, was a project that encompassed a dream come true for me personally,” says Young. “Over a span of 30 years working as front of house engineer for Frank Sinatra and Tony Bennett, my personal goal was to create one of the best sounding theatres in New York City. The original audio design by David Harvey of Harvey, Marshall, Berling Associates and I initially was a typical value-engineered system required by any New York City school but with the added mission of creating a good sounding space.” In addition to the AFC System, Young and Harvey envisioned a more traditional left/right line array sound system that would accommodate any level of performers including headline acts that would be brought into the school for master classes as well as one that would meet the rider of national acts.

The project, which began prior to 2008, had some uphill battles to solve; namely, the school education authority process for approvals. During that period, the late Lon Brannies of Yamaha Commercial Audio Systems in California and Takayuki Watanabe from Yamaha Japan began the process of initial room measurements followed by the design of the AFC system. By February 2010, a site survey was conducted by Yamaha Systems Design Engineer, Joe Rimstidt, and working on both an EASE model and NEXO GeoSoft model, discussed with the team options for the main sound system. During the original construction phase, the house PA system was changed back to a center cluster of NEXO Alpha EF and EM cabinets, and the AFC system was tabled for later installation/retrofit.

Eighteen months later, during the fall of 2011, the planning of the AFC retrofit got back underway and was finally completed in the fall of 2012 with assistance from ACIR Professional, Egg Harbor Township, NJ, and project manager Bobby Harper, electrical firm Striano, Long Island City, NY, Yamaha’s Rimstidt, and school technical director, Andre Vasquez.

The theater had already installed a Yamaha M7CL-48 as its front of house console. The M7CL-48 is using Yamaha AD8HR remote preamps continued on page 22...
Pyrok Inc.'s Vogl perforated gypsum board product is a sound absorbing, seamless and finished system.

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914-777-7070 or 914-277-5135 for acoustic data and samples
Manufacturer’s Corner
continued from page 20...
located in the racks over the stage controlled via Ethersound.

“The newly installed AFC system, virtual band shell, and line array system have dramatically changed not only the quality of the way our productions sound but how the students perform,” states Vasquez. “Patrons who attend our productions have come up to me countless times to express how much they enjoyed not only the show but the sound of the show. The performers can hear one another so well that now the level of readiness has increased in all students resulting in one great performance after another. Mr. Bennett and Susan, Tom Young, and Yamaha have given us a system that has changed not just the audience experience, but the performers experience on the stage as they produce their art.”

The final main system is a NEXO GEO S12 system consisting of two main clusters, each containing six GEO S1210 cabinets and one GEO S1230; the bottom two cabinets on each side are equipped with FLG kits for 120° of horizontal coverage; two NEXO RS18 subwoofers per side; three NXAMP4X4 amplifiers equipped with EtherSound cards connected to the existing EtherSound network; and four Yamaha DSR115, self-powered Yamaha speakers for stage fills/monitors. The NEXO line arrays were flown to an existing catwalk that is located right outside of the proscenium and motors were brought in to raise the array to the exact location, and then the speakers were dead hung from the catwalk.

The theatres AFC system is a hybrid AFC3/LAP3 system with both the standard AFC3 system utilizing a new AFC-FIR card for processing and the enhanced option of using a dedicated FIR processing computer with the LAP3 external computer. Four microphones above the proscenium feed two different AFC systems. “System 1 is for reverberation enhancement in the house and under balcony areas,” notes Rimstidt. “This system includes four Yamaha S8AFC speakers mounted above the proscenium reflector and 15 S8AFC-D speakers placed in the ceiling above the audience area. There are also 14 S8AFC-D ceiling speakers in the ceiling to cover the under balcony seating area. Nine Yamaha XM4080 4-channel amplifiers power these speakers. This AFC set up enables variable room RT characteristics to be changed to be more suitable for the performance material and enables audience members sitting under the balcony to share the same sense of spaciousness as those seated out in the open room area.”

HAVE YOU HEARD?

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AFC system 2 was designed for reverberation enhancement/energy exchange on the stage. This system consists of 18 Yamaha IF2205 speakers mounted above the stage with five XM4180 4-channel amplifiers powering the speakers. “System 2 adds a sense of spaciousness to the normally ‘dead’ sounding stage area and helps performers hear others on the stage,” says Rimstidt. “The microphones are split to feed both systems, and while the systems’ change scenes together, each is tuned individually, with the other system ‘on’ as the two interact and will affect each other’s final RT characteristics.”

Each sub-system has its own master AFC processor, separate output processing, and amplification for each speaker. The Yamaha AFC team created four initial scenes with varying RT times and equipped them with a control to adjust the enhancement for each using a Crestron control system. There is one set of scenes that has a very similar average RT time using the AFC-FIR card for processing, while the other scene uses the AFC-LAP3 computer that will allow for dual system comparisons when required.

In a joint statement the Bennetts said: “Putting the finest sound system in the Tony Bennett Concert Hall at Frank Sinatra School of the Arts has turned it into one of the best sounding halls in the United States. How fortunate we are that both Tom’s team and Yamaha were able to create this for the public school children of New York City.”

by Tom Young and Joe Rimstidt, Yamaha Systems Design Engineer, Inc jrimstidt@yamaha.com
KINETICS™ QuietTile marries a typical mineral fiber acoustical ceiling tile (ACT) with a sound damped mass layer to raise the CAC ratings of what is normally a low performing, CAC 35, ceiling system. Engineered with a damping layer and gypsum backer, and sized to create a snug fit at the ceiling grid, QuietTile improves the CAC rating to 49*. Increase performance to CAC 51 with the optional fiberglass top layer. Greatly improve speech privacy in adjacent spaces where walls terminate at the lay-in ceiling while preserving panel absorption with an NRC of .60*.

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- Maintain NRC rating of mineral fiber tile
- Designer selects finish tiles

*Tested with Armstrong Cortega 2' x 4' tiles but you may specify your preferred ACT.
K.R. Moeller Introduces LogiSon® TARGET

K.R. Moeller Associates Ltd., a global developer and manufacturer of sound masking technology, announced the launch of LogiSon® TARGET, an application that automatically tests and adjusts the masking sound to meet the specified curve.

Acoustics are vital to occupant satisfaction and productivity. Current design trends, including the increased use of open plan, movable walls and sustainable design practices, make today’s facilities even more reliant on sound masking to improve speech privacy and control noise.

LogiSon® TARGET automatically tunes each small zone of one to three loudspeakers to the specified masking spectrum far faster and more accurately than formerly achievable, even by expert technicians. Testing of LogiSon® TARGET has established that tuning time can be reduced by 90 percent or more, with superior results. As a result, many hours or even days can be saved when adjusting an entire facility, while the benefits of the sound masking system are maximized.

Though occupants cannot always subjectively perceive variations in the masking sound, they live with the consequences of poor tuning. Currently, masking system design and performance specifications can allow levels to vary by up to 4 dBA (A-weighted decibels) across a facility and still be considered acceptable, even though it can halve speech privacy and reduce comfort. With little training, LogiSon® TARGET yields overall volume results within 0.5 dBA, as well as exceptional consistency in each third-octave frequency band. By providing detailed reports, LogiSon® TARGET also permits clients to verify the results within their space.

The benefits of LogiSon® TARGET are already being recognized within the architecture and design community. At this year’s NeoCon World’s Trade Fair, it earned a Silver Best of NeoCon Award in the Workplace Technologies category.

Editor’s Note: Information is provided to the Editor for review and editing prior to inclusion in the Newsletter. NCAC does not endorse products featured in this column. Information is provided to keep readers abreast of the latest products in the industry.

NCAC and INCE-USA Announce Laymon N. Miller Award for Excellence in Acoustical Consulting

The Laymon N. Miller Award for Excellence in Acoustical Consulting is an annual award developed jointly by the National Council of Acoustical Consultants (NCAC) and the Institute of Noise Control Engineering of the United States of America (INCE/USA). This award is to be provided to an individual who has practiced acoustical consulting in an exemplary manner over a sustained period of time to improve acoustical environments in and around buildings, transportation systems, work places, recreational and other occupied spaces such that the quality of life for citizens and communities is significantly enhanced.

The award will be vetted and bestowed by NCAC in odd numbered years and by INCE/USA in even numbered years to an individual who has not previously received the award from either INCE/USA or the NCAC, and who is deemed worthy of recognition for his/her outstanding acoustical consulting services and professional contributions that reflect the stated purpose of the award and provide inspiration to professional colleagues. The award will be commonly referred to as the NCAC Laymon Miller Award in those years when it is awarded by the NCAC.

NCAC will have the honor of giving the inaugural award at the 2015 NCAC Annual Meeting being held in San Francisco, August 7 – 8.

The award nomination is March 6, 2015 and is online at: http://www.ncac.com/documents/ApplicationMillerAward_000.pdf

Manufacturer’s Corner
Save the Date!

The 2015 NCAC Annual Meeting will be held prior to the 2015 INCE Inter-Noise Conference in San Francisco, California on August 7-9 at the Hyatt Regency San Francisco.

Registration for NCAC Members will open in March 2015!

Link will be added to the event website and send to members via email, a full registration brochure will be mailed!

Hotel Accommodations
Hyatt Regency San Francisco
5 Embarcadero Center
San Francisco, CA 94111

NCAC has negotiated a discounted room rate of $199.00 per night (plus taxes and fees) for event attendees (this rate is also available two days post/prior to the NCAC Annual Meeting). Please make reservations by Monday, July 13, 2015 in order to receive the discounted rate. Reservations made after the cut-off date will be based on availability. To make online reservations, please visit https://aws.passkey.com/g/29521138. To make reservations over the phone, please call 1-888-421-1442 and reference the NCAC 2015 Annual Meeting.

Schedule

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2015 Annual Meeting Exhibitors*

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*as of 2/24/15

Find more information online at:
http://www.ncac.com/ncaceventspage.php
www.NCAC.com
Last June, two consultants from NCAC member firms participated in an international discussion about noise control engineering. The following summarizes the details about the event, the participants and the topics discussed.

General Overview of JAFOE

Engineers specializing in noise control and acoustics gathered with young engineers from several other fields of engineering for the 2014 Japan-America Frontiers of Engineering (JAFOE) Symposium held in Tokyo, June 9-11, 2014. The event provided an opportunity for the engineers who are early in their career to discuss the state of noise control engineering and the frontiers of future research and application.

The JAFOE event is organized and hosted by the National Academies of Engineering (NAE) for both the US and Japanese nations. This most recent JAFOE event was the 8th time for these two organizations to meet and discuss the latest information on four topics in engineering. Each topic included two invited speakers from each country to present their latest research and insights on the topic. This was the first time that noise control engineering had been discussed. We appreciate this year’s inclusion due to support from Proctor Reid at the US National Academy of Engineering and the generous financial contribution of Lawrence S. Finegold and the Michiko So Finegold Memorial Trust for the event.

Noise Control Engineering Session

The Noise Control Engineering session was organized by Hiroshi Sato from the National Institute of Advanced Industrial Science and Technology in Tsukuba, Japan and Jeff Fullerton from Acentech Inc. (NCAC Member Firm) in Boston, MA. Mr. Sato and Mr. Fullerton invited experts in the field of noise control engineering to discuss the topic of Noise Control Engineering in Healthcare Environments. The invited speakers included Shinichi Sakamoto from the University of Tokyo, Erik Miller-Klein from SSA Acoustics in Seattle, WA, Mandy Kachur of Soundscape Engineering (NCAC Member Firm) in Ann Arbor, MI, and Hiroko Terasawa of Tsukuba University, Tsukuba, Japan.

Mr. Sakamoto presented his research and findings on the prediction, control and assessment of environmental noise. During his discussion, he focused on roadway and wind turbine noise assessments, which are issues that affect the public in Japan. Mr. Miller-Klein discussed the changes to the healthcare systems in the United States and how acoustics and noise control will influence these changes. He cited research showing the link between low patient survey scores and the acoustical conditions in the healthcare environments. Ms. Kachur spoke further about acoustics in healthcare environments and what can be done to improve the outcomes of patients and reduce the stress and errors of the staff. She highlighted case studies showing how improved acoustical conditions have been implemented on recent healthcare facility projects. Mrs. Terasawa presented her research of sonification, where bioelectric signals and data are used to provide a positive and motivating feedback mechanism for rehabilitation patients. She also showed events where sonification of physiological data was used to produce modern music and art. The abstracts for each speaker that were submitted for the event appear on the following pages.

The noise control engineering presentations generated positive feedback and intriguing questions about the further uses of the research and findings for improving the quality of life. The US NAE event organizer said she was not sure why the topic of noise control engineering had not been discussed in previous JAFOE events and that it should be included as a topic again in the future.

Introductory slides for the event can be viewed here: http://www.naefrontiers.org/File.aspx?id=45039 continued on page 28...
Presentations

Acoustics and the Patient Experience

Erik Miller-Klein, PE, SSA Acoustics, LLP

The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) surveys have brought increased focus on noise control engineering for healthcare environments. This survey asks a series of questions to recent hospital patients, and the scores have a direct impact on the facilities rating and the government reimbursements for medical services. The HCAHPS survey has one question on noise; “how often was the area around your room quiet at night?” This question does not lend itself well to normal noise control design metrics or mitigation design considerations. This has led designers, researchers and engineers to explore the connections between patient experience, and the noise control impacts that lead to improved scores, medical outcomes, and performance. This question requires a balance between psychoacoustic and effective noise control design to optimize healthcare environments and patient health.

Hospitals are unique and complex acoustic environments filled with numerous noise sources, limited by strict hygienic requirements, and populated with critically sensitive occupants. Healthy soundscapes are paramount to the missions of hospitals: patients need to sleep and heal without environmental stressors; staff, patients, and family need to communicate accurately but privately; staff need to be able to localize alarms and calls for help. Numerous studies show that hospitals are unacceptably noisy. There is also evidence to suggest that poor hospital soundscapes can be detrimental to occupants. For example, noise in hospitals has been suggested to increase patient risk for cardiovascular response, pain, intensive care delirium, fragmented sleep, and reduced recuperation. Highlights will include projects relating noise, room acoustic, medical equipment noise and alarms, and spatial layout metrics to staff and patient response in addition to studies evaluating impacts of acoustic retrofits. Results show that effective hospital soundscapes require a complex choreography of architectural layout, acoustic design, medical equipment and alarms, and administrative processes that is only beginning to be fully understood.

http://www.naefrontiers.org/Symposia/JAFOE/JAFOE-Past-Symposia/41283/45156.aspx (downloaded powerpoint)

Managing Noise in Healthcare Environments to Benefit Patient Outcomes

Mandy Kachur, PE, INCE. Bd. Cert., Soundscape Engineering LLC

Unnecessary noise, then, is the most cruel absence of care which can be inflicted either on sick or well.

Florence Nightingale, 1859

In the 150 years since Florence Nightingale wrote about the adverse effects of noise on hospital patients, others have noted the problem, but it is still not recognized as a major cause of patient harm. Noise control in U.S. healthcare environments has grown as a priority after the publication of landmark papers in 2004, documenting the gradual and detrimental rise in worldwide hospital noise levels since 1960 and the resulting noise-related medical errors. Consequently, noise in healthcare environments is becoming recognized as a serious health issue, increasing staff stress and absenteeism, hindering patient healing, and causing patient injury and fatalities.

In the U.S., new regulations and financial incentives have been put in place in the last five years. Since October 2013, government reimbursement to hospitals is adjusted based on the scores of a standardized patient assessment survey, on which noise is consistently rated worse than any other category. Also, the Joint Commission, an independent, not-for-profit organization that accredits and certifies healthcare facilities, has made alarm safety a national patient safety goal starting in 2014, signaling that hospitals must give it top priority. Regarding the built-environment, the 2010 edition of the Guidelines for the Design and Construction of Health Care Facilities, a document used or referenced in 42 American states and in 60 countries, has a greatly expanded acoustics section covering a wide range of topics from acoustical finishes and sound isolation to paging systems and noise-related safety risk reduction. Furthermore, sustainable building design initiatives, which have become increasingly popular in the U.S., have included acoustics as a design consideration since 2009.

Hiroshi Sato introducing Mandy Kachur’s discussion on the acoustics in healthcare environments.
Noise engineers and medical personnel generally had been working separately on noise issues, with limited progress and implementation of their findings. With the new urgency for improvement, multidisciplinary teams have been formed to produce actionable research and evidence based design initiatives. This collaboration between medicine and engineering has produced data on physiological responses, healthcare outcomes, and economic impact, which all have more influence on policy making than the historic assumption that noise is nothing more than an annoyance. While progress has been made in the built-environment, changing healthcare worker behavior and the healthcare culture has proven to be more challenging.

Though obtaining funding for these studies presents challenges, a growing body of research about the harmful effects of noise in the healthcare environment along with the new financial and regulatory incentives has advanced noise control in healthcare facilities to a top priority. The end goal is improving patient outcomes, increasing staff comfort and establishing a healthy environment for all.  

http://www.naefrontiers.org/File.aspx?id=44944

Prediction, Control and Assessment of Environmental Noise
Shinichi Sakamoto, University of Tokyo

As environmental noise issues, transportation noises from road traffic, railways and aircrafts have been typical problems so far. Among them, the author has been studying prediction and countermeasure of road traffic noise. The prediction methods of noise by computation are roughly categorized in two; the one is an engineering method on energy-base and the other is a precision model based on wave theory. As a research on energy based calculation method, the author has been concerned with development of ASJ RTN-Model, which is now used as the standard engineering calculation model for environmental noise assessment in Japan. In my presentation, the noise prediction model is firstly introduced.

Originally the author studied wave-based numerical analysis on acoustics. Although the application of the wave-based numerical analysis is limited because it focuses on comparably detailed area, the method can be efficiently used as a tool of precision model of road traffic noise. Furthermore, the method also can be utilized for the development of the engineering model. Such applications of the precision model are also introduced.

As a novel environmental noise issue, wind turbine noise problem is being closed up. The author dealt with the issue and performed psycho-acoustical experiments. The outcome of the research will be introduced, and the current situation and the future developments of noise mitigation technology will be discussed.

http://www.naefrontiers.org/File.aspx?id=45024

Augmenting Signals Against Noises: Understanding the Human Body with Data Sonification
Hiroko Terasawa, Tsukuba University

Sound is a medium that connects inside and outside of human being. People observe and understand the surrounding environment by listening to sounds, and express our response back into the environment by making sounds. Our data sonification project borrows this paradigm: We represent biological information with synthesized sounds so that people can intuitively understand and respond to the data in an embodied and enjoyable manner.

In this talk, I will present our research on (1) auditory biofeedback system for physical therapy and (2) brain wave sonification for multi-channel EEG data analysis.

By listening to his/her own motion, people can move more efficiently and easily. Our auditory EMG biofeedback system (AEB) transforms the muscular movement data into sound in real-time, to help blind and sighted people undergo physical therapy with better control and comfort. In the evaluation test, blind people conducted a gripping task more accurately and easily with AEB, while sighted people also reported increased easiness with AEB. Another experiment showed that both auditory and visual biofeedback systems offered comparable efficiency in helping ankle-joint rehabilitation task even for sighted people.

Sonification is valuable as data analysis tool as well: With our EEG data sonification, people without knowledge of neuroscience easily detect the presence of a special kind of brain activity (steady state responses). Furthermore, the synchrony across EEG channels and the location of strong activity are precisely understood by sonification: Our evaluation test showed that subjective judgments with sonification were in agreement with the results of statistical analysis. These studies suggest that sonification can be an intuitive alternative for EEG data analysis to meticulous computational methods.

In Memoriam - Gary Kinsella (1949-2015)

Gary Thomas Kinsella, 65, beloved husband of Janie Wright Kinsella, passed away January 23, 2015. Lifelong aviator, avid boater and sportsman, and aficionado of fine food, wines and cigars, Gary’s motto was “choose your target and go for it.” He certainly did.

Gary was born November 18, 1949, in Louisville, KY. He graduated from Bishop David High School in 1967 and in 1972 was awarded a Masters of Electrical Engineering from the University of Louisville Speed Scientific School. Also an Air Force ROTC cadet at U of L, he went straight into the Air Force, received his pilot’s wings a year later, and spent six joyful years flying T-37 and T-38 fighter trainers as a senior instructor.

In 1978, Gary joined American Airlines and began a 30-year career flying his much-loved Boeing 727s and the 747-SP. Gary and Janie traveled extensively around the world pursuing their shared passions of sailing, snorkeling, scuba diving and, of course, fine dining. For years, they traveled the Florida Keys and Bahamas on their cherished Offshore 48, “Sea Hawk.” Their Miami condo was home port, which fulfilled their lifelong dream of beachfront living.

During those same years, Gary co-founded Pelton Marsh Kinsella, Inc., an acoustical engineering firm, Kinsella Marsh Group, Inc., and, finally, Kinsella Consulting. Many signature commercial buildings, entertainment and sports venues, and residential high-rises built since the 1970s in Dallas, South Florida and other cities across the U.S. and abroad owe their acoustical qualities to the work of Gary and his associates.

Gary was preceded in death by his parents, Joseph and Roberta Kinsella of Louisville. He is survived by his wife of 45 years, Janie; four younger brothers and their wives in Louisville, Dallas and Tucson; brother- and sisters-in-law in Stearns and Louisville, KY; and many nieces, nephews and other extended family across the country. Fly high, Hawk, fly high.

Arrangements are being made for a celebration of Gary’s life, to be held in Louisville later this spring, date to be determined. In lieu of flowers, the family requests that donations be made to a favorite charity.

Published in the Miami Herald on Jan. 29, 2015

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