# THORBURN ASSOCIATES INC.
# Acoustic and Technology Consultants
# eNewsletter

## May 2005

In this issue:



## Greetings

Welcome to the May 2005 issue of our eNEWSLETTER.

InfoComm '05, one of the largest AV Industry conferences and tradeshows, is June 4 to 10 in Las Vegas. InfoComm's renowned InfoComm Academy Conference, with the invaluable assistance of ICIA's Professional Education and Training Committee, has streamlined tracks for the over 100 seminars and workshops provided at this year's show. Attendees will be able to sort through sessions by various industry disciplines (design, staging/rental, sales, systems integration, or technology manager) or by technology (audio, control, display/projection, networking/IP, signal distribution, video, conferencing or streaming). The conference also offers business-oriented sessions to help owners and managers address the challenges of competition and organization for today's environment. At the time of this writing there are still openings in the following sessions led by Thorburn Associates.

Steve Thorburn:
- Facilities Design for Universities
- Super Tuesday: Project Management
- How to Issue an RFQ and RFP for AV Designers and AV System Contractors
- Advanced Acoustics

Eric Cronwall:
- Behind Digital Signage: Applying AV Products and Techniques to the Retail Environment

Brandon Haberman:
- Acoustics for Presentation Facilities

Jim Horn:
- Defining the Perfect Teaching Station for Colleges and Universities

Derek Meares:
- Presentation Facility Design and Integration Considerations

Find our more at: http://infocomm05.expoexchange.com/ - See you there!

As always if you have an idea, question, suggestion please drop us a note at TA@TA-Inc.com for general information or eNews@TA-Inc.com for specific comments about our eNewsletter.

## Welcome Wing Ko, PE

Wing Ko, PE joined our Castro Valley Office last month. Wing is a registered Mechanical Engineer. He is a specialist in environmental noise measurement, modeling and mitigation and has extensive mechanical engineering experience.

His personal project experience includes mass transit railways, traffic management, harbor noise, pumping stations, subways, office buildings, and multi-family housing.

Wing began his career by earning a BSME degree from the University of Sunderland, United Kingdom, followed by a MSME degree from California State University, Los Angeles and most recently a second Master of Science degree in Environmental Engineering and Science, from Stanford University.

In between earning these degrees he has amassed 16 years of experience working on environmental noise and vibration projects in Asia, England and the US. His experience provides additional depth that will allow TA to continue to provide our clients with a single point of contact for their acoustical, environmental, and audiovisual/technical systems solutions.

## Environmental Acoustics

Determining if what one hears is "sound" or "noise" can be a difficult task. What is music to one person is a loud racket to another – just ask any parents with teenage children! It also depends on the time of day that the sound is heard. Sounds heard during the day can often be ignored, but the same sound at night can be extremely annoying (such as your neighbor's barking dog, or a low flying jet).

During the planning process for a project, noise is just one of the many components reviewed. Will the project increase the community noise levels? Will there be a noise impact on the neighbors during the construction process? Environmental Impact Reports (EIRs) must include an assessment of the future noise impacts.

The following provides a summary of the various terms used when discussing environmental noise. Most likely you have heard the term decibel, but perhaps LEQ, dBA, or LDN are less familiar.

To understand the subjective response to sound, we have to understand three basic aspects of sound: *level*, *frequency content*, and *time varying characteristics*.

The first term, *level*, is the first one that many people think of when describing a sound. It is a measure of intensity or loudness, generally expressed as decibels (dB).

Another way people speak of a sound is "high and whining", or "low and rumbly". This refers to the pitch, or *frequency*. Frequency is expressed in Hertz (Hz).

Because the human ear perceives extremely low and high frequency sounds as less loud than mid frequency sounds, weighting scales have been developed. Environmental measurements are commonly made using the "A-weighting" scale. This scale represents the subjective "noisiness" of a sound and more closely corresponds to the sensitivity of human hearing. Sound levels measured with an A-weighted scale are referenced as "dBA".

Although the A-weighted noise level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. This leads us to the third characteristic, *time varying characteristics,* which look at how sound levels change over time and how sensitive humans are to those changes. Most environmental noise includes a combination of noises from distant sources (traffic, wind in the trees, waves crashing on the beach, etc.) These create a relatively steady "background noise" in which no one source is identifiable. The amount of noise above the "background noise" will vary over time, therefore it is helpful to know the A-weighted noise level that was statistically exceeded during 10%, 50%, and 90% of a stated time period. These levels are referenced as L10, L50, and L90. A single number descriptor called the LEQ is also widely used. The LEQ is the equivalent A-weighted noise level during a stated period of time.

Adding another element into this mix is the fact that noises tolerable at 3 pm are unbearable at 11 pm. Light traffic on a nearby street may only be 70 dB, but at night, the exterior background noises are so much lower that the same amount of traffic becomes noticeable. To account for this human sensitivity to nighttime noise levels, a descriptor, LDN (day/night average sound level), was developed. The LDN divides the 24-hour day into the daytime hours (7 am – 10 pm) and nighttime hours (10 pm – 7 am).

The nighttime noise levels are "penalized" or weighted 10 dB higher than the daytime noise levels (thus a sound that would be weighted at 40 dB during the day is given a rating of 50 dB at night). Another 24-hour average sound level, the Community Noise Equivalent Level (CNEL) is also used and includes both an evening (7 pm – 10 pm, 5 dB Penalty) and nighttime weighting (10 dB Penalty).

We hope this helped clarify some of the issues surrounding environmental acoustics. (In our Spring 2000 newsletter we discussed Environmental Acoustics and whether what you heard was "sound" or "noise". The complete text of that article can be found at http://www.ta-inc.com/PDF/Newsletter/2000-Spring.pdf)

## Video Conferencing Over the Public Internet

We have been told that you can video conference over the public internet for a few years now. TA has been skeptical about the quality of these types of calls. Historically, the internet did not support a continuous presence. By this we mean that when you are using the internet to view a page there is a lot of network activity in down loading the page to your computer, you then set and read/scroll through the page with no network traffic. However when you are on a telephone call, that network connection has constant network traffic, that pause in your conversation might be important and just not a stutter caused by the Internet. This "bursty" nature of the Internet did not allow for the constant connection. However, new tunneling products have been developed to address this issue. Tunneling products undo what the public Internet does – they hides the issues created when transmitting real-time data over bursty networks. To do this, the tunneling product increases reliable delivery and re-times data so that packets arrive in the same order and timing in which they were sent.

Last month we tested a system between our Raleigh Durham area office and our San Francisco area office. To begin with you need video conference units (CODEC – coder/decoder) that are H.323 compliant. This is standard on almost all reputable units from manufactures such as Tandberg, Polycom, ClearOne, etc. H.323 is the international standard that allows CODEC's to communicate over a private (company wide) IP network. Then we installed a Bulldog Easy-VC E107 tunneling box between the CODEC and our Internet connection at each office. The results were pleasantly surprising. We still do not consider it "business" quality at this point in time, but it is very useful for engineering and other intra company meetings.

We spent a great deal of time with both the CODEC manufacturer and with Bulldog. At last count we replaced one CODEC and updated the operating system 3 times. The added cost of the Bulldog (about 1500 dollars at each end) would pay for itself in about 10 months (assuming 1 hour weekly meeting) over the cost of a 3-line ISDN call. So if you do not need to conference with a client, then this might be a solution.

## Demolition Noise and Vibration Monitoring

Last month one of our High Tech clients came to us with a neat problem. They will be tearing down a warehouse building built in the early 70's. The problem is that the building shares a party wall and interlocked footings with the adjacent building. On the other side of the party wall, is a computer test lab that needs to run 24/7. Scheduled shut downs require almost a month's notice to prevent interruptions to test runs.

The goal was to determine how close the demolition could be, before the ground borne vibration and noise would exceed the computer's operational criteria. A CAT 350 with a ramhoe would complete demolition (i.e. a really big backhoe with a really big jackhammer attached to the end of the hoe arm). Because the building is a single story building slab on grade supported on piles we were able to use the far end of the building to measure the actual ground borne vibration and noise from the unit that would be completing the demolition. The building was approximately 600 by 600 feet square. By completing the tests over 500 feet from the computer room we knew there would be no effects on the computer room equipment.

We measured the vibration in the floor at 10, 20, 40, 50, and 80 feet from the jackhammer as it broke through the slab. The measured levels were compared to the computer equipment operational vibration levels and to ISO (International Standards Organization) building vibration standards. It was determined that they could work within approximately 40 feet of the common wall without requiring the computer lab

to be shut down. All in all, a fun project with really big toys.

## Acoustical Plaster

At the AIA National Conference in Las Vegas earlier this month, Pyrok introduced their new acoustical plaster system. In the past Architects and Interior Designers have been concerned with the rough texture finish of Pyrok's original systems. The new acoustical plaster system is smooth and at a distance of 3 feet has the appearance of a traditional plaster surface. It can be installed on lath or over gypsum board. Full acoustical laboratory tests are available. For more information visit www.pyrokinc.com.



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