WSDG EDU Webinar Series
Lessons of Electric Lady
Hosted by John Storyk, June 23, 2020 12:00 ET

1. What software can you recommend for prediction/auralization for the phone/computer and what resource (books, websites, articles) do you find most helpful for someone starting up?
We use CATT Acoustics and EASE (AFMG) - working on PC computers.
Here's a BIG list of interesting reads - it should keep your busy!

Theory of Acoustics – entry level

Acoustic Design and Noise Control, Michael Rettinger, Chemical Publishing Co., Inc.
Acoustic Techniques for Home & Studio, F. Alton Everest, Tab Books
Acoustics in the Built Environment, D. Templeton, Architectural Press
Architectural Acoustics, M. David Egan, McGraw Hill,
Architectural Acoustics, Thomas D. Northwood, Dowden Hutchinson & Ross
Architectural Acoustics, W. J. Cavanaugh, J.A. Wilkes, J. Wiley & Sons
Building a Small Budget Recording Studio, F. Alton Everest and Mike Shea, McGraw Hill
Environmental Acoustics, Leslie Doelle, McGraw Hill
Recording Spaces, P. Newell, Focal Press
Simplified Design for Building Sound Control, J. Ambrose & J.E. Ollswang, J. Wiley & Sons
The Master Handbook of Acoustics, F. Alton Everest, McGraw Hill

Theory of Acoustics – advanced level

Acoustics for Studios and Auditoria, B. S. Mankovsky, Hastings House
Auditorium Acoustics, edited by Robin Mackenzie, Halsted Press Book
Elements of Acoustics, Samuel Temkin, John Wiley & Sons
Fundamentals of Acoustics, Kinseler & Frey, Wiley & Sons, Inc.
How They Sound - Concert and Opera Halls, L. Beranek, Acoustical Society of America
How to Design. Build and Test Complete Speaker Systems, David B. Weems, TAP Books
Musical Acoustics, Carleen M. Hutchins, Dowden Hutchinson & Ross
Noise and Vibration Control, Beranek, McGraw Hill
Physical and Applied Acoustics, Meyer Neumann, Academic Press Book
Room Acoustics, Heinrich Kuttruff, Halsted Press
Secrets of Noise Control, Thumann & Miller, Fairmont Press
Sound Control and Thermal Insulation of Buildings, Paul Close, Reinhold Publishing
Sound System Engineering, D. & C. Davis, Focal Press
Speech Intelligibility & Speaker Recognition, Mones E. Hawley, Dowden Hutchinson & Ross
Theory of Sound. Vols. I & II, J. W S. Rayleigh, Dover Press
Vibration & Sound, Philip Morse, American Institute of Physics

Acoustical Measurements

Acoustic Measurements, Leo Beranek, John Wiley & Sons
Acoustic Noise Measurements, J.R. Hassall & K.Zaveri, Bruel & Kjaer,
Acoustical Tests & Measurements, Don Davis, Howard W Sams & Co.
Frequency Analysis, R. B. Randall, Bruel & Kjaer,
Handbook of Noise Measurements, Peterson & Gross, General Radio
The Measure of Audio, AES Proceedings UK Conference
Time Delay Spectrometry, AES Anthology,

History of Acoustics and Audio Technology

Collected Papers, Vern Knudsen, Acoustical Society of America
Evolution of the Audio Recorder, P. V. Praag, EC Designs
From Tinfoil to Stereo, W.L. Welch & L.B.S. Burt, Univ. Press of Florida
Music, Physics & Engineering, Harry F. Olson, Dover Publications (orig. 1952)
On the Sensations of Tone, Herman Helmholtz, Dover Press

Studio, Broadcasting and Recording Technology

Handbook of Multichannel Recording, Alton Everest, TAP Books
Magnetic Recording, Charles E. Lowman, McGraw Hill
Modern Recording Techniques, Robert Runstein, Howard W Sams & Co.
The New Communication Technologies, M.A. Mirabito, Butterworth-Heinemann
The New Stereo Soundbook, R. Astreicher & F. Alton Everest, Audio Engineering Associates
The Recording Studio Handbook, John M. Woram, Sagamore Publishing
Tonmeister Technology, Michael Dickreiter, Temmer Enterprises, Inc.,
TV Sound Operations, Alkin, Hastings House
Yamaha Sound Reinforcement Handbook, G. Davis & R. Jones, Hal Leonard,

Encyclopedias and Miscellaneous

IAC Noise Control Reference Handbook, M. Hirschorn, industrial acosutics,
Audio & HiFi Engineer's Pocket Book,V. Capel, Butterworth-Heinemann,
Audio Cyclopedia, Howard Tremaine, Howard W Sams & Co.
Handbook for Sound Engineers, G.M. Ballou, Sams,
NAB Engineering Handbook, National Association of Broadcasters,
Sound Engineer's Pocket Book, M. Talbot-Smith, Focal Press,
Telecommunication Engineer's Pocket Book, S. Winder, Newnes,

2. Can you describe the difference between near and mid-field monitors? Also, what do you think about monitors that are implementing a filter to attenuate desk/console reflection (such as Genelec 8050's)? How important is the loudspeaker position regarding the room?

Seems that the terms "near field" and "mid-field" monitoring are marketing and size adjectives, rather than terms associated with any science. There have been many good reviews in the industry magazine community recently, outlining the pros and cons of each. Again, size seems to be the cutoff. WE are seeing a trend towards studios using midfield monitoring as the primary monitoring platform - often with one or two subs and a bass management system. Desk/ Console filtering (presumably to eliminate or mitigate a console bounce - comb filter) is an interesting idea, but we would always prefer to solve this problem geometrically. For me, it seems easier to simply eliminate the console bounce architecturally rather than electronically. Loudspeaker (monitor) positioning is possibly the single most important element in accurate control room design.

3. How does heavy construction for isolation impact on low frequencies in control and tracking rooms? Can you give us any tips on how to control these low frequencies in small spaces?

These two questions prompt the most fundamental concept in studio design, which is to understand the difference between ISOLATION ACOUSTICS and INTERNAL ROOM ACOUSTICS! - and that virtually everything in acoustics is frequency dependent. As it turns out low frequency isolation usually is easier with "heavy" construction (I assume this question refers to more massive construction), such as concrete or masonry. This is not typical in USA - much more common in Latin America and parts of Europe. The disadvantages of course is weight and often cost. Internal low frequency control is possibly the most complex design element to address in control room, particularly small rooms, where there is little room for deep trapping. Geometric positioning (i.e. stay out of nulls in the room); accurate sub woofer placement; and correct and targeted low frequency damping modules (i.e. membrane absorbers or Helmholtz resonators) can combine to produce accurate monitoring response in the critical listening position.

4. I have noticed a number of your designs have un-angled windows directly in the path of first order reflections, how do you deal with that?

It is not always necessary to angle control room glass. Typically a downward angle works, but ultimately the reasons for angled glass (or angling any reflective material) is to effectively control first and second order reflections. Testing first order reflections is relatively easy to do with basic CAD software during design. In an existing space, a pocket mirror does the trick! (If you see the speaker in the mirror, the speaker sees you - the mirror marks the location to deal with (absorption or angling or both

5. When designing your reflection free zones what is the maximum angle of dispersion from the loudspeakers that you assume, and how wide/long do you make the zone?

Depends on the speaker - but we would usually not be concerned with angels above 45 degrees.

6. Doesn't symmetry create more standing wave patterns, room modes? Wouldn't be better to have asymmetric designs to break lateral waves and room modes?

I have never seen an argument against symmetry in control room design (assuming your monitor system is stereo and beyond - i.e. immersive). Standing waves are not bad - I personally don't like the term - much prefer to refer to them as room odes or eigen tones. It is the distribution of these modes that is important. If there are no room modes, you are not in a room or you are in an extremely dead / non - reverberant room! "Breaking lateral waves" (not entirely sure what that means) is best accomplished with diffusion.

7. When it comes to immersive sound with the addition of more sources, does that create more sound interference between waves etc.?

Immersive monitoring (more sources) does present interesting challenges - more speakers, more first order reflections - and certainly more comb filtering possibilities. Creating a reflection free zone becomes challenging. Low frequency (LF) response is still the most important issue and remains quite similar, regardless of immersive speaker count. Our primary analysis concern is LF analysis below the Schroder frequency (typically max 2-300 hz for most control rooms). And again, there is no argument agains symmetry in room design.