

August 27, 2008

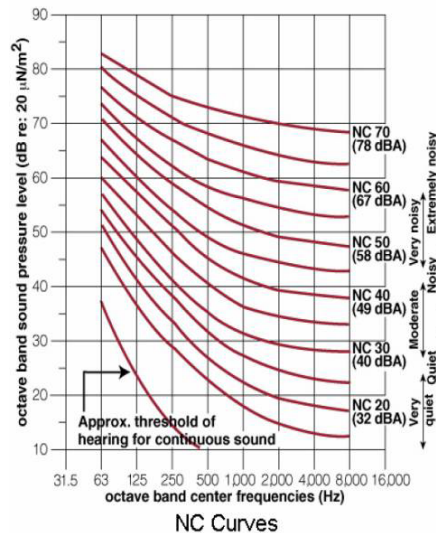
Auditorium Acoustics: Short note

Acoustics:

Acoustics for the Performing arts auditorium is the most critical acoustical design among all. Basic considerations for acoustical performance of any auditorium are

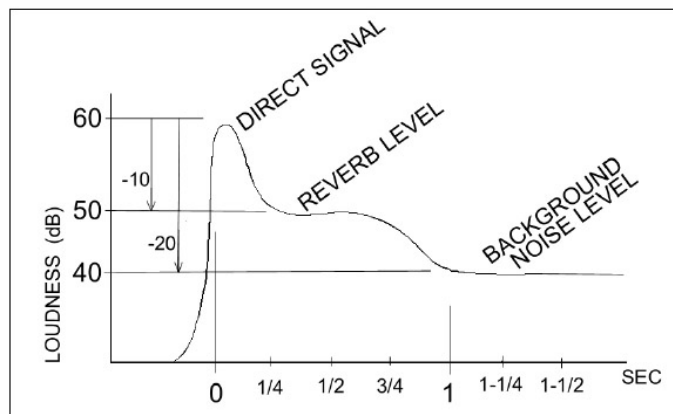
- Noise
- Reverberation Time
- Acoustical reflections
- Acoustical diffusion.

Noise: As for any performing art auditorium there is always a limit for maximum gain we can give to sound reinforcement system before it gives feedback, internal noise level is very critical factor in auditorium. Ideally inside noise for such auditorium should follow NC 35 curve (38 dB in simple words) Secondly more the noise, we loose our ability to hear clearly as noise always mask the original signal. To achieve perfect speech clarity we should have signal level 25dB above the noise level. In other words for a given signal level we must reduce the noise to a level 25dB less than signal.

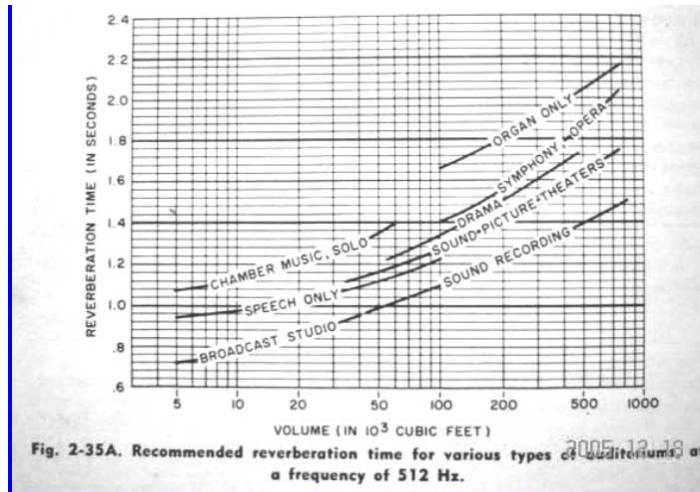


Our first objective is certainly to control internal Noise level below 38dB A.

Reverberation Time: This is another important factor in auditorium acoustics (many people understand as this is the only one factor but it is not). Reverberation is a stored energy of sound waves, which gradually decay. It is the time taken by the sound energy to decay by 60 dB from its original value.



Speech clarity is inverse function of reverberation time, but it does not mean that ideal 0 Sec of reverberation time will give the best effect in the auditorium (by applying as much as sound absorption we can). Some reverberation is always needed for liveliness of the sound, weather it is speech or music. This optimum reverberation time can be derived from, auditorium volume, available surface area, number of seating & the purpose of the auditorium. We have to consider & calculate the absorption of each & every material used inside the auditorium (flooring, wall paneling, carper, drapery & even the chairs)



Our objective is to achieve, through perfect absorption, optimum reverberation time for the Auditorium

Acoustical Reflections: The third most important acoustical factor in auditorium designing is sound reflections. All these reflections are directly affect the definition of the sound. Most of the sound we hear in any enclosed hall is reflected sound & not the direct sound. These reflections can be sub divided in 3 parts

1. Early reflections : These are good reflections & normally adds to improve the definition of the sound & increase the clarity.
2. Late reflections: These are bad reflections & ruin the clarity.
3. Reverberation: Reverberation is really function of very late & diffused reflections.

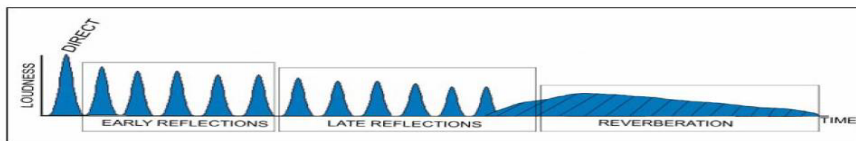


FIG-3
Late reflections and echoes interfere with understanding.

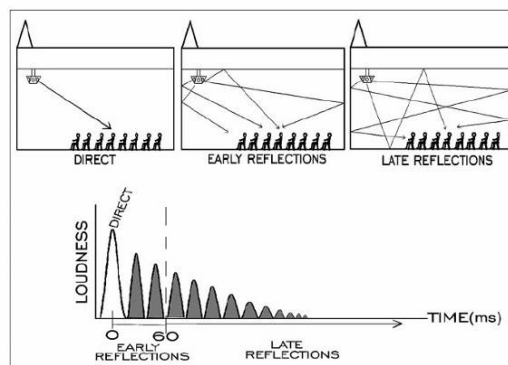


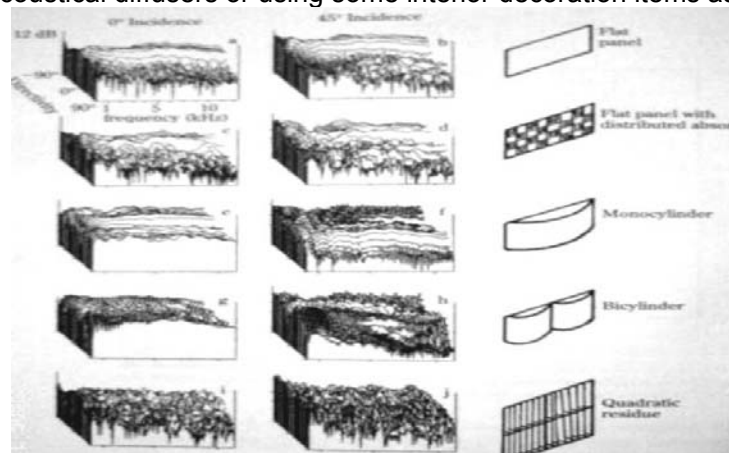
FIG-3
Three types of sound: direct from the speaker, early reflections, and late reflections.

These reflections can be controlled by giving proper shapes to the reflecting surfaces like ceiling & wall paneling. (Ref the ceiling of Marathi Natya Parishad auditorium Mumbai & Balgandharv, Miraj)



Our Objective is to, through perfect reflecting panels & ceiling shape, receive maximum of good reflections so as to increase the speech clarity & acoustic gain.

Acoustical diffusion: Diffused sound field is always needed (& is basic assumption in all acoustical calculations) for natural, lively experience of the performance. This can be achieved by providing proper acoustical diffusers or using some interior decoration items as diffusers.



One can always find the combination of absorbing panels & diffusers in any good auditorium like balcony tip in Alpbachat bhavan or use of wooden strips as wideband diffuser-absorber.



Our objective is to, through strategic use of diffusers, achieve the diffused sound field for lively sound experience.

Audio System:

State of the art audio system will be provided using the combination of best of the Brands. General microphones, Podium microphones, Drama microphones (floor as well as hanging), along with Mixer, equalizer & amplifiers will be used.

Ideally there should be only 2 speaker arrays, having proper coverage pattern, suspended in front of proscenium, giving uniform coverage to each & every seat in the auditorium. Target figure will be maximum +/- 3 dB level difference. Just like in the picture below.



The same audio system can be used for all the programs including occasional screening of Movies.

If required, for surround sound effect (at the time of movie) we will also add surround sound equipments to this audio system.

Projection:

LCD projector 5000 + Lumens can be used to project the image on 6000 wide (300" Diagonal) motorized screen. This can be used for all type of presentations (including corporate) as well as occasional screening of Movies.

Conclusion:

In short, acoustical treatment of any place is a carefully designed combination of Absorption, Reflection & Diffusion fluently merged with interior aesthetics, in a noise controlled envelop.

Our aim for acoustical performance will be to achieve a successful Drama play even without using audio system for 900 seating auditorium. (we have achieved this at Marathi Natya Parishad Auditorium, Mumbai).

That for Audio system is to provide best of the best audio experience to the audience for any type of the performance, weather it is a Dram, Music or Conference etc.

We, with having much increased experience in the field of auditorium consultancy & availability of better acoustical as well as electronic materials we defiantly will achieve the perfect results in this auditorium & this will become one icon in Auditoriums in Mumbai.

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