THE TIME GAP
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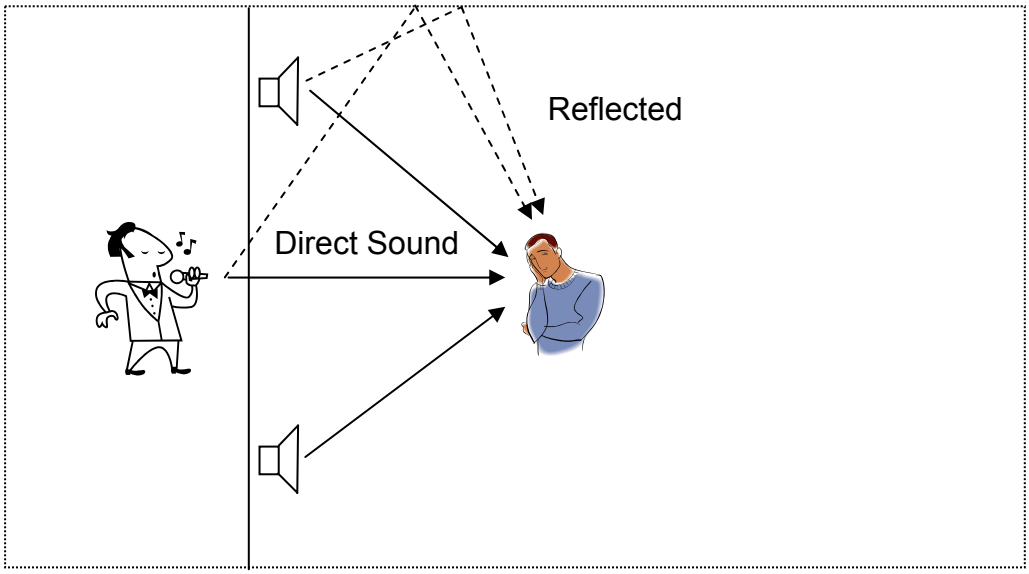
THE INITIAL TIME-DELAY GAP (ITDG)

The initial time delay gap is the distance between the arrival of the direct sound and the first significant reflection, reflected form the surfaces of the room. It corresponds with the impression of clarity and intimacy for the audience. If a space has a relatively short ITDG, it is said to be more intimate; a longer ITDG indicates less intimacy. In smaller halls, enclosing surfaces are closer together, so reflections occur more frequently than in large halls where surfaces are farther apart. Therefore, smaller halls generally have shorter initial time-delay gaps.



INTIMACY

In concert halls, intimacy refers to the feeling of being close to the source of the music. This impression is usually present in smaller halls, but it is often difficult to achieve in larger spaces. In large halls and multi purpose halls that have not been designed with intimacy in mind, the audience may feel remote and detached from the performance. In general, halls are more successful if they have shorter ITDG's, somewhere between 10 and 25 milliseconds.

DEFINITION AND CLARITY

Clarity refers to the transparency of sound. A hall is said to have definition when the sound is clear and distinct. A hall lacking in definition gives music a blurred or muddy quality and bad intelligibility for speech. Multi purpose halls and even churches, seldom ideal for music and speech, could improve clarity and intelligibility a lot by adding early lateral reflections.

OPTIMUM VALUES

How to design:

To decrease the length of the ITDG, one should shorten the distance from the first reflecting surface to the audience area. In larger spaces, this may be accomplished by adding ceiling reflectors or protrusions from the walls.
Clarity is produced when a room has a high ratio of early sound energy to later reverberant energy. Early sound energy is that which arrives at the listener within 80 milliseconds of the direct sound from the source to the listener.

SUBJECTIVE QUALITY

Clarity refers to how clear the sound quality is. Can you hear every separate note of a fast-tempo soloist's coda distinctly, or do the notes tend to blur into one another? Some blending is often desired for music, but for speech and opera, greater clarity leads to better speech intelligibility.

How to design:

To increase clarity, one should increase the amount of early sound energy relative to late sound energy. This could be accomplished by adding absorption in areas farther from the sound source.
To increase lateral reflections, add irregularities to the hall: use reflective surfaces, ornate decorations, or sculptures, particularly on the sides of the audience.

ELECTRONIC SOLUTION

You have installed a very nice sound system (either permanent or a rental or temporary system) and you have serious intelligibility problems. The system sounds muddy; you feel very bad about this and, worse, your customer is blaming you for it, while it is basically an acoustic problem. The acoustical problem cannot be resolved due to time, cost or architectural problems. What can you do to solve this problem? Well, it is time to perform a miracle on the spot. That is, if you have one or two RDL RU-ADL2 DSP AUDIO DELAY units with you (and in this business you should!). We have learned that you need early reflections, preferably lateral early reflections, which are not acoustically available (or strong enough). We will simulate those reflections using our sound system. Insert one or two RDL RU-ADL2 units into your sound system in such a way that the 2 or 4 delay times are summed to one input of your sound system. You could use an RDL RU-MX4 PROFESSIONAL MIC/LINE AUDIO MIXER for this purpose. Feed the output of the mixer to the sound system amplifier. If possible, send the signal to the front house speakers only; if this is not possible

send the signal to the whole system. Now set the delay times at 20, 30, 40 and 60 mS (you might have to play with the delay times for the best result) and adjust the level of the individual delay signals and the level of the delay mix while playing music and or a speech signal until you have reached the desired result. You will be amazed and your customer will be very happy.

For test purposes the CD, Prokofiev: Peter and the Wolf is an excellent choice; you have speech and music, a high dynamic range and excellent quality.