For a more complicated/realistic room:

$$A = A_1 + A_2 + A_3 + A_4 + \dots A_N = \sum_{n=1}^{N} A_n$$
$$= a_1 S_1 + a_2 S_2 + a_3 S_3 + a_4 S_4 + \dots a_N S_N = \sum_{n=1}^{N} a_n S_n$$

for N objects (surfaces) in room.

The "Optimum" Reverberation Time:
* If reverberation time is too short, room sounds "dead"
* If reverberation time is too long, room sounds muddled/obscured

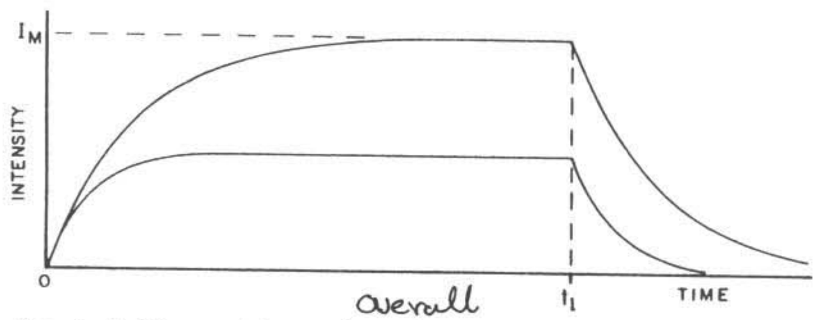

FIG. 4. Buildup and decay of overall sound intensity in an auditorium when a source of steady sound is present.

Max Intensity $I_{\max} = P/A$, where P (*Watts*) = acoustic power of sound source and A = total absorption (measured in square meters).

Suppose *e.g.* we input P = 1 *Watt* of acoustic power into a room, allow time for the sound to build up to a steady level, and then use an *SPL* meter, *i.e.* a device to measure the max *SPL* (in *dB*) in the room. Suppose we find (*i.e.* we measure) max *dB* = 99.54.

We then invert the *dB* formula: max $dB = 10\log_{10}(I_{\max}/I_o)$ to obtain: $I_{\max} = 10^{9.954} I_o = 0.009\ W/m^2$.

Thus:

$$A = \frac{P}{I_{\max}} = \frac{1\ Watt}{0.009\ W/m^2}$$
$$= 110 \text{ square meters}$$
$$\simeq 1200 \text{ square ft (= 1200 absorption units)}$$

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