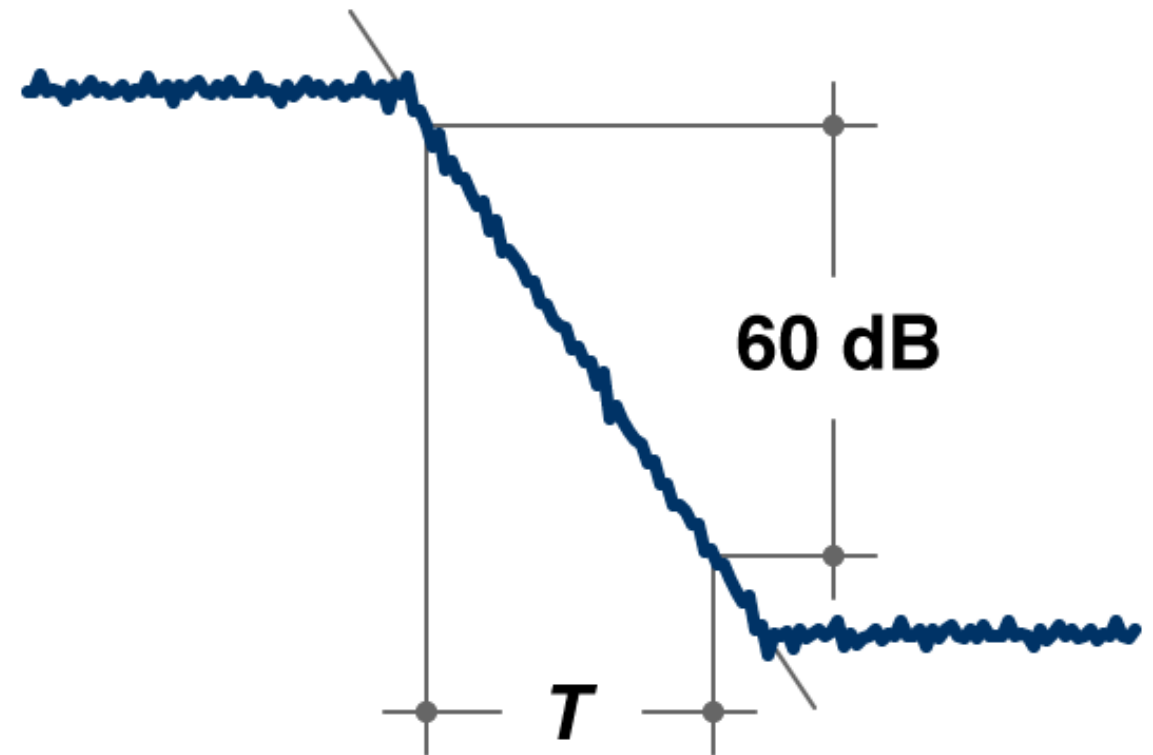
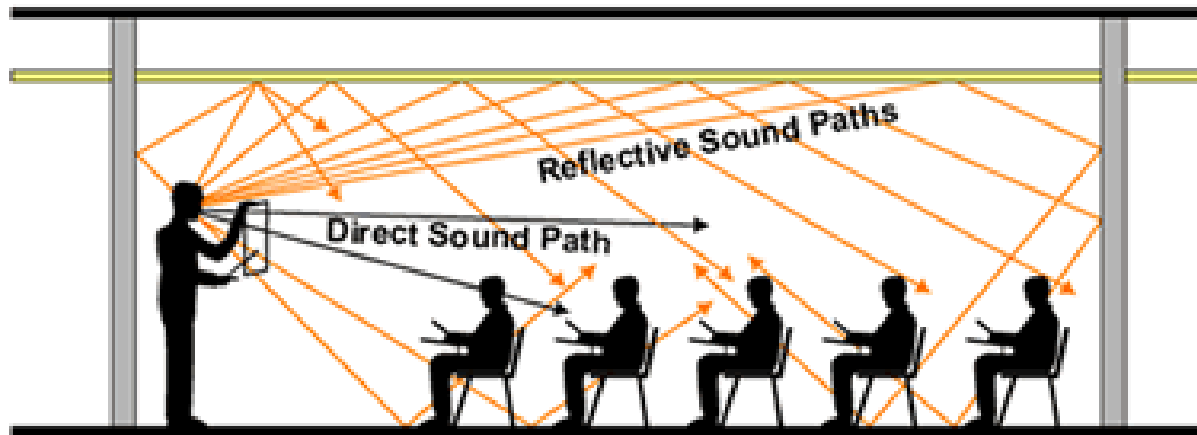


TENTANG REVERBERATION TIME

REVERBERATION

The time it takes for reflected sound to die down by 60 decibels from the cessation of the original sound signal (measured in seconds).

- Reflected sound tends to "build up" to a level louder than direct sound. Reflected sounds **MASK** direct sound.
- Late arriving reflections tend to **SMEAR** the direct sound signal.



Reverberation Time ←-----→

AKUSTIK RUANG

- volume ruang (termasuk ruang-ruang yang berhubungan)
- bentuk dan proporsi ruang (panjang: lebar, tinggi: lebar)
- *finishing* (seleksi dan penempatan)
- *layout audience* (elevasi lantai, jarak dari sumber suara ke audiens)
- susunan tempat duduk dan perabot lain
- perlakuan khusus (reflektor gantung, penyerap resonan, diffuser)

INSULASI SUARA

- karakteristik bentuk tapak (level suara, karakter, durasi)
- barrier luar, bangunan-bangunan sekitar, vegetasi, dan pengolahan kontur tanah
- penempatan aktivitas-aktivitas di dalam bangunan (*zoning*, ruang-ruang penghalang suara)
- konstruksi dinding, lantai, dan plafon
- kriteria bising latar belakang (sistem HVAC, peralatan elektronik)
- koordinasi dengan akustik ruang

MATERIAL AKUSTIK

ELEMEN-ELEMEN POKOK DARI ARSITEKTURAL AKUSTIK

BAHAN INSULASI BUNYI

SISTEM PENGUAT BUNYI ELEKTRONIK

- kompatibilitas sistem dengan akustik ruang
- pemilihan, penempatan dan orientasi loudspeaker
- sistem-sistem komponen dan pengontrolan
- masking latar belakang (layout loudspeaker, spektrum suara)

SISTEM BISING MEKANIKAL DAN VIBRASI

- karakteristik bising peralatan
- lokasi dan peralatan mekanikal
- insulasi vibrasi (pegas, bantalan)
- penanganan saluran-saluran dalam bangunan (pelapisan-pelapisan, saringan-saringan, perlambatan-perlambatan)
- bising latang pelakang dari *outlet* udara (koordinasi dengan sistem insulasi suara)

- Kualitas suara dalam ruangan
- Mempengaruhi kejelasan Suara
- Dapat memberi efek
- Perlu diperhatikan pada ruangan auditorium, studio rekaman, ruang rapat, tempat ibadah

←-----→
Wanted Sound

←-----→
Unwanted Sound

KUALITAS AKUSTIK & REVERBRATION TIME

	.8 - 1.3	1.4 - 2.0	2.1 - 3.0	Optimum**
Speech	Good	Fair - Poor	Unacceptable*	0.8 - 1.1
Contemporary music	Fair - Good	Fair	Poor	1.2 - 1.4
Choral music	Poor - Fair	Fair - Good	Good - Fair	1.8 - 2.0+

STANDAR REVERBERATION TIME BERBAGAI RUANGAN



STANDAR REVERBERATION TIME BERBAGAI RUANGAN

Application	125Hz	500Hz	2000Hz
Classroom	0.9	0.6	0.6
Church or theatre for speech or amplified music	1.3	1.0	1.0
Amplified music Church or theatre for music	1.8-2.0	1.5 - 1.8	1.5 - 1.8
Convention facility	1.8	1.5	1.5
Gymnasium for teaching	1.8-2.0	1.5 - 1.8	1.5 - 1.8
Small arena (500 -2000 seats)	2.75	2.0	2.0
Large arena (2000+ seats)	3.25	2.75	2.75

MENGHITUNG REVERBERATION TIME SUATU RUANGAN

<https://www.omnicalculator.com/physics/reverberation-time>

Number of doors

Windows

Windows height 120 cm

Windows width 90 cm

Number of windows

Absorption coefficients

Walls 0.05

Ceiling 0.05

Floor 0.15

Doors 1

After some time, the sound gets reflected so many times that most of the energy becomes absorbed. As this happens, the [sound pressure level](#) (SPL) decreases. The time between sound emission and the moment when the drop in SPL reaches 60 dB is called the **reverberation time**.

Reverberation is strongly dependent on the frequency of sound, so it must be carefully considered while preparing an architectural design. Learn another important tool in acoustic engineering with our [Helmholtz resonator calculator](#) or pair this tool with the [delay and reverb calculator](#) to create beautiful post-production effects.

RT60 equation

There are two ways to measure the reverberation time. The first one is to use a dedicated device - a level recorder that

Material	Sound Absorption Coefficient ¹⁾ - α -
Acoustic belt, 12 mm	0.5
Acoustic tiles	0.4 - 0.8
Asbestos, sprayed 25 mm	0.6 - 0.7
Brickwork, painted	0.01 - 0.02
Brickwork, unpainted	0.02 - 0.05
Carpet, heavy on concrete	0.3 - 0.6
Carpe, heavy on foam rubber	0.5 - 0.7
Concrete block, coarse	0.3 - 0.4
Concrete block, painted	0.05 - 0.07
Cork sheet, 6 mm	0.1 - 0.2
Fiberboard on battens, 12 mm	0.3 - 0.4
Floor, concrete or terrazzo	0.02
Floor, linoleum, asphalt, rubber or cork tiles on concrete	0.03
Floor, wood	0.06 - 0.1
Hardwood	0.3
Glass, large panes heavy plate	0.03 - 0.05
Glass, ordinary windows	0.1 - 0.2
Gypsum board, 12 mm	0.04 - 0.07
Mineral wool, 100 mm	0.65
Persons, each	0.2 - 0.5
Plaster walls	0.01 - 0.03
Plywood panel, 3 mm	0.01 - 0.02
Polystyrene, expanded on 50mm battens	0.35
Polystyrene, expanded rigid backing	0.15
Polyurethane foam, flexible	0.95
Rubber sheet, 6 mm porous	0.1 - 0.2
Slag wool or glass silk, 50 mm	0.8 - 0.9
Snow	0.75
Wood wool cement on battens, 25 mm	0.6 - 0.07

Lakukan eksperimen perhitungan & cocokan dengan standar!