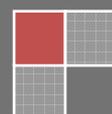


2010

声学术语

英语版

《声学术语》英语版由声屏障信息门户网（www.sooooob.cn）和声学材料信息网（www.cnasc.org.cn）联合整理贡献给业界参阅。运营总监龚世华



声学术语

ACOUSTICS: The science of Sound. Its production, transmission and effects.

ACOUSTICAL:The properties of a material to absorb or reflect Sound (adjective)

Acoustically, (Adverb).

ACOUSTICAL ANALYSIS: A review of a space to determine the level of reverberation or reflected sound in the space (in seconds) influenced by the building materials used to construct the space. Also the amount of acoustical absorption required to reduce reverberation and noise.

ACOUSTICAL CONSULTANT: A professional usually with an engineering degree who is experienced in providing advice on acoustical requirements, and noise control in a variety of situations.

ACOUSTICAL ENVIRONMENT: The acoustical characteristics of a space or room influenced by the amount of acoustical absorption, or lack of it in the space.

AIRBORNE SOUND: Sound that reaches the point of interest by propagation through air.

ARCHITECTURAL ACOUSTICS: The control of noise in a building space to adequately support the communications function within the space and its effect on the occupants. The qualities of the building materials used determine its character with respect to distinct hearing.

ARTICULATION CLASS: A single number rating used for comparing acoustical

ceilings and acoustical screens for speech privacy purposes. AC values increase with increasing privacy and range from approximately 100-250. This classification supercedes Speech Privacy Noise Isolation Class (NIC) rating method.

ARTICULATION INDEX (AI): A measure of speech intelligibility influenced by Acoustical Environment rated from 0.01 to 1.00. The higher the number the higher the intelligibility of words and sentences understood from 0-100%.

ABSORPTION: The properties of a material composition to convert sound energy into heat thereby reducing the amount of energy that can be reflected.

AREA EFFECT: Acoustical materials spaced apart can have greater absorption than same amount of material butted together. The increase in efficiency is due to absorption by soft exposed edges and also to diffraction of sound energy around panel perimeters.

ASSISTIVE LISTENING DEVICE: An electronic device that provides amplification of sound to a hearing impaired person. Device include personal hearing aids, magnetic induction loops, FM radio systems and infrared systems. All have advantages and disadvantages and some may be dependent on good acoustical environment for optimal performance.

ATTENUATION: The reduction of sound energy as a function of distance traveled. (See also Inverse Square Law).

A WEIGHTING: An electronic filtering system in a sound meter that allows meter to largely ignore lower frequency sounds in a similar fashion to the way our ears do.

AMBIENT NOISE/SOUND: Noise level in a space from all sources such as HVAC or

extraneous sounds from outside the space. Masking sound or low-level background music can contribute to ambient level of sound or noise.

[B]

BACKGROUND NOISE: The sum total of all noise generated from all direct and reflected sound sources in a space that can represent an interface to good listening and speech intelligibility. (Hearing impaired persons are especially victimized by background noise).

BAFFLE: A free hanging acoustical sound absorbing unit. Normally suspended vertically in a variety of patterns to introduce absorption into a space to reduce reverberation and noise levels.

BARRIER: Anything physical or an environment that interferes with communication or listening. A poor acoustical environment can be a barrier to good listening and especially so for persons with a hearing impairment.

BOOMINESS: Low frequency reflections. In small rooms acoustical panels with air space behind can better help control low frequency reflectivity.

[C]

COCKTAIL PARTY EFFECT: Sound in a noisy crowded room generated mostly by conversation. Levels rise and fall as people compete with one another to be heard. Perception of speech can be nearly impossible in high levels of noise.

CYCLE: In acoustics, the cycle is the complete oscillation of pressure above and

below the atmospheric static pressure.

CYCLES PER SECOND: The number of oscillations that occur in the time frame of one second. (See **FREQUENCY**.) Low frequency sounds have fewer and longer oscillations.

[D]

DAMPING: The dissipation of vibratory energy in solid media and structures with time or distance. It is analogous to the absorption of sound in air

DECIBEL (dB): Sound level in decibels as a logarithmic ratio. Sound intensity described in decibels. i.e.: Breathing 5 dB, office activity 50 dB, Jet Aircraft during takeoff at 300' distance 130 dB.

DEFLECTION: The distance an elastic body or spring moves when subjected to a static or dynamic force. Typical units are inches or mm.

DIFFUSION: is the scattering or random reflection of a sound wave from a surface. The directions of reflected sound is changed so that listeners may have sensation of sound coming from all directions at equal levels.

[E]

ECHO: Reflected sound producing a distinct repetition of the original sound. Echo in mountains is distinct by reason of distance of travel after original signal has ceased.

ECHO FLUTTER: Short echoes in a small reverberative spaces that produce a

clicking, ringing or hissing sound after the original sound signal has ceased. Flutter echoes may be present in long narrow spaces with parallel walls.

EQUAL LOUDNESS CONTOURS: Curves represented in graph form as a function of sound level and frequency which listeners perceive as being equally loud. High frequency sounds above 2000 Hz are more annoying. Human hearing is less sensitive to low frequency sound.

[F]

FLAME SPREAD: Classification indicating propagation of flame across a sample compared to flame propagation across concrete panels and red oak. Results are obtained through an ASTM E84 or UL723 test.

FLANKING: The transmission of sound around the perimeter or through holes within partitions (or barriers) that reduces the otherwise obtainable sound transmission loss of a partition. Examples of flanking paths within buildings are ceiling plenum above partitions; ductwork, piping, and electrical conduit penetrations through partitions; back-to-back electrical boxes within partitions, window mullions, etc.

FREE FIELD: Sound waves from a source outdoors where there are no obstructions.

FREQUENCY: The number of oscillations or cycles per unit of time. Acoustical frequency is usually expressed in units of Hertz (Hz) where one Hz is equal to one cycle per second.

FREQUENCY ANALYSIS: An analysis of sound to determine the character of the

sound by determining the amount of sounds at various frequencies that make up the overall sound spectrum. i.e.: higher frequency sound or pitch vs. low frequency.

[G]

[H]

HEARING IMPAIRMENT: A degree of hearing loss, temporary or permanent due to many causes. Hearing loss can be caused by illness, disease, or by exposure to excessively high noise levels. Affects 25-50 million people in USA of all ages. Hearing impairment as generally used means a hearing loss of a mild, moderate, or severe degree as apposed to "Deafness" which is generally described as little or no residual hearing with or without the aid of an assistive listening device. Hearing Impaired persons are particularly victimized by long reverberation times.

HEARING RANGE: 16-20000 Hz (Speech Intelligibility) 600-4800 Hz (Speech Privacy)
250-2500 Hz (Typical small table radio)

HERTZ (Hz): Frequency of sound expressed by cycles per second.

[I]

IMPACT SOUND: The sound produced by the collision of two solid objects. Typical sources are footsteps, dropped objects, etc., on an interior surface (wall, floor, or ceiling) of a building.

INVERSE SQUARE LAW: Sound levels fall off with distance traveled. Sound level drops off 6 dB from source point for every doubling of distance.

[J]

[K]

[L]

LIVE END/DEAD END: An acoustical treatment plan for rooms in which one end is highly absorbent and the other end is reflective and diffusive.

LOUDNESS: The average deviation above and below the static value due to sound wave is called sound pressure. The energy expended during the sound wave vibration is called intensity and is measured in intensity units. Loudness is the physical resonance to sound pressure and intensity.

[M]

MASKING: The process by which the threshold of hearing of one sound is raised due to the presence of another.

MASS: The fundamental property of a material relevant to sound transmission loss through that material. Generally, the more massive the material, the greater the sound transmission loss.

MOUNTING: Standards established by ASTM to represent typical installation for purpose of testing materials. i.e.: a mounting test specimen mounted directly to test room surface. D mounting furred out to produce air space behind.

[N]

NOISE: Unwanted sound that is annoying or interferes with listening. Not all noise needs to be excessively loud to represent an annoyance or interference.

NOISE CRITERIA (NC): Noise criteria curves used to evaluate existing listening conditions at ear level by measuring sound levels at loudest locations in a room. NC criteria can be referred to equivalent dBA levels. NC curves are critical to persons with hearing loss.

NOISE ISOLATION CLASS (NIC): A Single number rating of the degree of speech privacy achieved through the use of an Acoustical Ceiling and sound absorbing screens in an open office. NIC has been replaced by the Articulation Class (AC) rating method.

NOISE REDUCTION (NR): The amount of noise that is reduced through the introduction of sound absorbing materials. The level (in decibels) of sound reduced on a logarithmic basis.

NOISE REDUCTION COEFFICIENT (NRC): The NRC of an acoustical material is the arithmetic average to the nearest multiple of 0.05 of its absorption coefficients at 4 one third octave bands with center frequencies of 250, 500, 1000, 2000 Hertz.

[O]

OCTAVE BANDS: Sounds that contain energy over a wide range of frequencies are divided into sections called bands. A common standard division is in 10 octave bands identified by their center frequencies 31.5, 63, 125, 250, 500, 1000, 2000, 4000 Hz.

[P]

PITCH: The perceived auditory sensation of sounds expressed in terms of high or low frequency stimulus of the sound.

[Q]

[R]

REFLECTION: The amount of sound wave energy (sound) that is reflected off a surface. Hard non porous surfaces reflect more sound than soft porous surfaces. Some sound reflection can enhance quality of signal of speech and music. (See Echo).

RESONANCE: The emphasis of sound at a particular frequency.

RESONANT FREQUENCY: A frequency at which resonance exists.

REVERBERATION: The time taken for sound to decay 60 dB to 1/1,000,000 of its original sound level after the sound source has stopped. Sound after it has ended will continue to reflect off surfaces until the wave loses enough energy by absorption to eventually die out. Reverberation time is the basic acoustical property of a room which depends only on its dimensions and the absorptive properties of its surfaces and contents. Reverberation has an important impact on speech intelligibility.

REVERBERATION TIME: Sound after it is ended at the source will continue to reflect off surfaces until the sound wave loses energy by absorption to eventually die out.

[S]

SEPTUM: A thin layer of material between 2 layers of absorptive material. i.e.: foil, lead, steel, etc. that prevents sound wave from piercing through absorptive material.

SIGNAL TO NOISE RATIO: Is the sound level at the listeners ear of a speaker above the background noise level. The inverse square law impacts on the S/N ratio. Signal to Noise Ratios are important in classrooms and should be in range of 15 to 20 dB.

SMOKE DEVELOPED INDEX: Classification that relates to a comparison of smoke development of a particular material compared to concrete panels and red oak. Results are obtained through an ASTM E84 or UL723 test.

SOUND: Sound is an oscillation in pressure, stress particle displacement, particle velocity in a medium - (in room temperature. In air speed of sound is 1125'/second or one mile in 5 seconds.) Sound produces an auditory sensation caused by the oscillation.

SOUND ABSORPTION: is the property possessed by materials, objects and air to convert sound energy into heat. Sound waves reflected by a surface causes a loss of energy. That energy not reflected is called its absorption coefficient.

SOUND ABSORPTION COEFFICIENT: The fraction of energy striking a material or object that is not reflected. For instance if a material reflects 70% of the sound energy incident upon its surface, then its Sound Absorption Coefficient would be 0.30.

SOUND BARRIER: A material that when placed around a source of noise inhibits the transmission of that noise beyond the barrier. Also, anything physical or an environment that interferes with communication or listening. For example, a poor acoustical environment can be a barrier to good listening and especially so for persons with a hearing impairment.

SOUND LEVEL: A subjective measure of sound expressed in decibels as a comparison corresponding to familiar sounds experienced in a variety of situations.

SOUND PRESSURE: The total instantaneous pressure at a point in space, in the presence of a sound wave, minus the static pressure at that point.

SOUND PRESSURE LEVEL: The sound pressure level, in decibels, of a sound is 20 times the logarithm to the base 10 of the ratio of the sound pressure to the reference pressure. The reference pressure shall be explicitly stated and is defined by standards.

SOUND PROOFING: Building materials that makes structures impervious to sound or insulates against sound.

SOUND LEVEL METER: A device that converts sound pressure variations in air into corresponding electronic signals. The signals are filtered to exclude signals outside frequencies desired.

SOUND TRANSMISSION CLASS (STC): This is a rating for doors, windows, enclosures, noise barriers, partitions and other acoustical products. The rating is in terms of their relative ability to provide privacy against intrusion of speech sounds. This is a one number rating system, heavily weighted in the 500Hz to 2000Hz

frequency range where speech intelligibility largely occurs.

SPECTRUM: The description of a sound wave's components of frequency and amplitude.

[T]

TIME WEIGHTED AVERAGE (TWA): The yardstick used by the Occupational Safety and Health Administration (OSHA) to measure noise levels in the workplace. It is equal to a constant sound level lasting eight hours that would cause the same hearing damage as the variable noises that a worker is actually exposed to. (This hearing loss, of course, occurs over long-term exposures.) Same as LOSHA.

[U]

ULTRASOUNDS: Sounds of a frequency higher than 20,000 Hz. The frequency region containing these frequencies is called the ultrasonic region.

[V]

VIBRATION: A force which oscillates about some specified reference point. Vibration is commonly expressed in terms of frequency such as cycles per second (cps), Hertz (Hz), cycles per minute (cpm) or (rpm) and strokes per minute (spm). This is the number of oscillations which occurs in that time period. The amplitude is the magnitude or distance of travel of the force.

VIBRATION ISOLATOR: A resilient support that tends to isolate a mechanical system

from steady state excitation.

VOLUME: The Cubic space of a room bounded by walls, floors, and ceilings determined by $\text{Volume} = \text{Length} \times \text{Width} \times \text{Height}$ of space. Volume influences reverberation time.

[W]

WAVELENGTH: Sound that passes through air it produces a wavelike motion of compression and rarefaction. Wavelength is the distance between two identical positions in the cycle or wave. Similar to ripples or waves produced by dropping two stones in water. Length of sound wave varies with frequency. Low frequency equals longer wavelengths.

[X]

[Y]

[Z]