
NOISE ELEMENT

Appendix F

DESCRIPTION OF NOISE

Characteristics of Noise:

Sound is the result of a sound source inducing vibration in the air. Sound has three variables: amplitude/loudness, frequency/pitch, and pattern of time.

Amplitude/loudness is the sound pressure measured in decibels (dB). Decibels are based on a logarithmic scale because the range of sound intensities is so great that it is convenient to compress the scale to encompass all the sounds needed to be measured.

Frequency/pitch is the rate at which a sound source vibrates or makes the air vibrate. The means by which it is measured is known as Hertz (Hi), which is the number of cycles per second.

Pattern of time and level produces different sounds such as continuous (long periods at a constant level, e.g., waterfall); intermittent (short periods, e.g., aircraft takeoff); impulse (extremely short span of time, e.g., band clap); fluctuation (variations in level over time, e.g., traffic sounds at a busy intersection).

The time when sound occurs contributes significantly to the objectionable nature of sound. Sound levels that normally occur during daylight hours and are not considered objectionable, may be excessive when they occur at night, a period when most people demand quiet.

Measuring Sound:

Individual sounds can be expressed in terms of A-weighted decibels (dBA). The A-weighted scale is a frequency dependent rating scale. It de-emphasizes the very low and very high frequency components, thus placing greater emphasis on sound frequency within the sensitivity range of the human ear. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). The average level of conversation ranges from 60 to 80 dBA. Sound becomes physically painful at 120 dBA.

The Leq is the energy average of a fluctuating noise source over a specified period of time. The energy average (Lea) of each hour of the day, weighted for the more sensitive time periods within 24 hours, describes the Community Noise Equivalent Level (CNEL) or Day Night Average (Ldn).

Mitigation of Noise:

The transmittal of sound involves three statistical components: source, transmission path, and receiver. Noise can be mitigated by treatment of any of the three components such as: The effect of noise on the community can be achieved by reducing the noise produced by the source, increasing the distance between the source and the receiver (path), and placing a barrier between the noise source and receiver, and insulating the receiver. The following are examples of these mitigation measures:

Fixed noise sources: A doubling of distance (transmission path) will produce a 6 dBA reduction in sound level.

Transportation sources: A doubling of distance (transmission path) will produce a 4.5 dBA reduction in sound level. A row of two-story buildings will provide a reduction of about 10 dBA.