LA/Ontario International
Los Angeles World Airports

Part 150 Noise Exposure Map Update – 2015

LA/Ontario International Airport (ONT) completed its first noise and land use compatibility study per Title 14 of the Code of Federal Regulations Part 150 or "Part 150" in 1990. The Airport is currently updating the Noise Exposure Maps as required by the Federal Aviation Administration (FAA) in order to resume eligibility for federal funding for the residential noise mitigation programs. The following text briefly describes the Part 150 regulation and opportunities for the communities around the airport to be involved in this project.

What is a Part 150 Study?

A Part 150 Study is an in-depth noise and land use compatibility study that involves working with the community to address its concerns and developing a detailed analysis of aviation-related noise levels and the variables that affect them. Los Angeles World Airports selected the noise consulting firm Harris Miller Miller & Hanson Inc. to assist with updating the Noise Exposure Maps that were developed in 1990. Over time, airport operations change, technology changes, and land use patterns can change. The current effort will update the 1990 Noise Exposure Maps based upon current conditions and forecast aircraft operational activity at the airport.

What does a Part 150 Study include?

There are two principal technical elements to a Part 150 Study: the Noise Exposure Maps (NEMs) and the Noise Compatibility Program (NCP). The FAA only requires ONT to update its NEMs at this time to resume eligibility for federal funding for the noise mitigation programs. The NEMs include aircraft noise exposure contours created using the FAA's Integrated Noise Model (INM). The noise contours are presented on a map that depicts the airport's layout and land uses within the communities surrounding the Airport. These contours also reflect the noise exposure from aircraft operations occurring during the year of submission to the FAA (2015 expected) and for a five-year forecast (2020) as mandated by the FAA.

How does the community get involved?

The Part 150 process recognizes the importance of reaching out to interested stakeholders from both the aviation and community perspectives. Therefore, HMMH plans to contact representatives of the communities surrounding the airport, as well as representatives of government agencies, the airlines, general aviation groups, and other interested stakeholders. In addition, public workshops will be held to inform and solicit comments from the nearby communities.

Is the Part 150 Process unique to LA/Ontario International Airport?

Some 250 airports have voluntarily conducted Part 150 Studies to work with communities on managing aircraft noise compatibility. While many of the elements of a Part 150 Study are the same, each airport and community is distinctive. As a result, the needs, the process and the outcomes of the Part 150 Study are uniquely tailored to each airport.

More information on Part 150 and the process can be found at the following FAA website:
http://www.faa.gov/airports/environmental/airport_noise/

How do we Describe Aircraft Noise?

We use a number of terms to describe aircraft noise. These metrics form the basis for the majority of noise analyses conducted at most airports in the U.S.

The Decibel, dB

All sounds come from a source – a musical instrument, a voice speaking, an airplane. The energy that produces these sounds is transmitted through the air in waves, or sound pressures, which impinge on the ear, creating the sound we hear.

The decibel is a ratio that compares the sound pressure of the sound source of interest (e.g., the aircraft overflight) to a reference pressure (the quietest sound we can hear). Because the range of sound pressures is very large, we use logarithms to simplify the expression to a smaller range, and express the resulting value in decibels (dB). Two useful rules of thumb to remember when comparing individual noise sources are: (1) most of us perceive a six to ten dB increase to be about a doubling of loudness, and (2) changes of less than about three dB are not easily detected outside of a laboratory.

The A-Weighted Decibel, dB(A)

Frequency, or "pitch", is an important characteristic of sound. When analyzing noise, we are interested in how much is low-, middle-, and high-frequency noise. This breakdown is important for two reasons. First, our ears are better equipped to hear mid- and high-frequencies; thus, we find mid- and high-frequency noise more annoying. Second, engineering solutions to noise problems are different for different frequency ranges. The "A" filter approximates the sensitivity of our ear and helps us to assess the relative loudness of various sounds.

Maximum A-weighted Sound Level, Lmax

A-weighted sound levels vary with time. For example, the sound increases as an aircraft approaches, then falls and blends into the background as the aircraft recedes into the distance. Figure 1 illustrates this phenomenon. We often describe a particular noise "event" by its maximum sound level (Lmax). Figure 2 shows typical Lmax values for some common noise sources. In fact, two events with identical Lmax may produce very different total exposures. One may be of very short duration, while the other may be much longer.

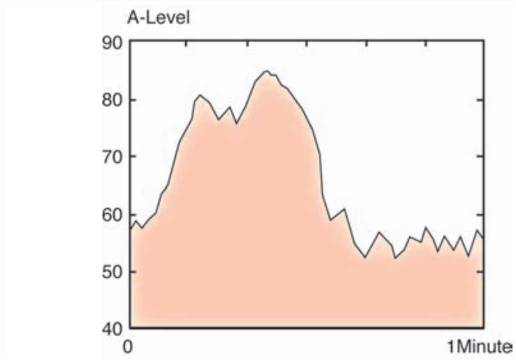

Figure 1. A-weighted Sound Levels Over Time

Sound Exposure Level, SEL, and Single Event Noise Exposure Level, SENEL

SEL is most common measure of cumulative noise exposure for a single aircraft flyover. Mathematically, it is the sum of the sound energy over the entire duration of a noise event – one can think of it as an equivalent noise event with a one-second duration. Figure 3 shows the portion of the sound energy included in this event. Because the SEL is normalized to one second, it will almost always be larger in magnitude than the Lmax for the event. In fact, for most aircraft events, the SEL is about 7 to 12 dB higher than the Lmax. The

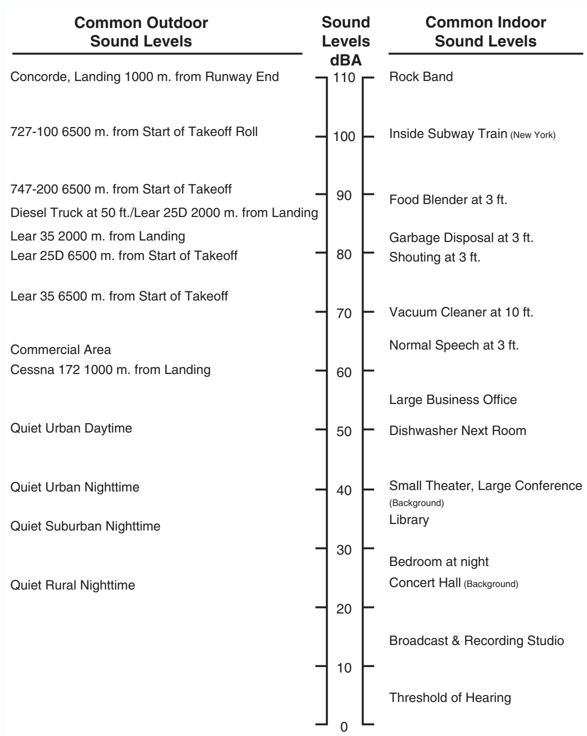

Figure 2. Common Environmental Sound Levels

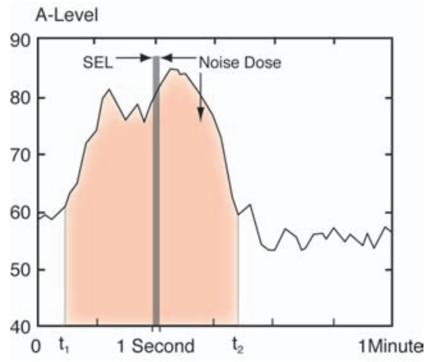

Figure 3. Sound Exposure Level

fact that it is cumulative measure means that a higher SEL can result from either a louder or longer event, or some combination. California law[1] specifies the use of SENEL, which is a slight variant of SEL, in that it considers the noise level over a period during which the noise level exceeds a threshold level, rather than over its entire duration. In most situations, the SEL and SENEL are identical.

Day-Night Average Sound Level, DNL, and Community Noise Equivalent Level, CNEL

DNL and CNEL are measures of cumulative noise exposure over a 24-hour period, with adjustments to reflect the added intrusiveness of noise during certain times of the day. DNL includes a single adjustment period; each aircraft noise event at night (defined as 10 p.m. to 7 a.m.) is counted ten times. CNEL adds a second adjustment period; in addition to the nighttime adjustment, each aircraft noise event in the evening (defined at 7 p.m. to 10 p.m.) is counted three times. The nighttime adjustment is equivalent to increasing the noise levels during that time interval by 10 dB. The evening adjustment is equivalent to increasing the noise levels by approximately 4.77 dB.

Figure 4 depicts a hypothetical daily noise dose. The top frame repeats the one-minute noise exposure that was shown in Figure 1. The center frame includes this one-minute interval within a full hour; now the shaded area represents the noise during that hour with 16 noise events, each producing an SEL. Finally, the bottom frame includes the one-hour interval within a full 24 hours. Here the shaded area represents the noise dose over a full day.

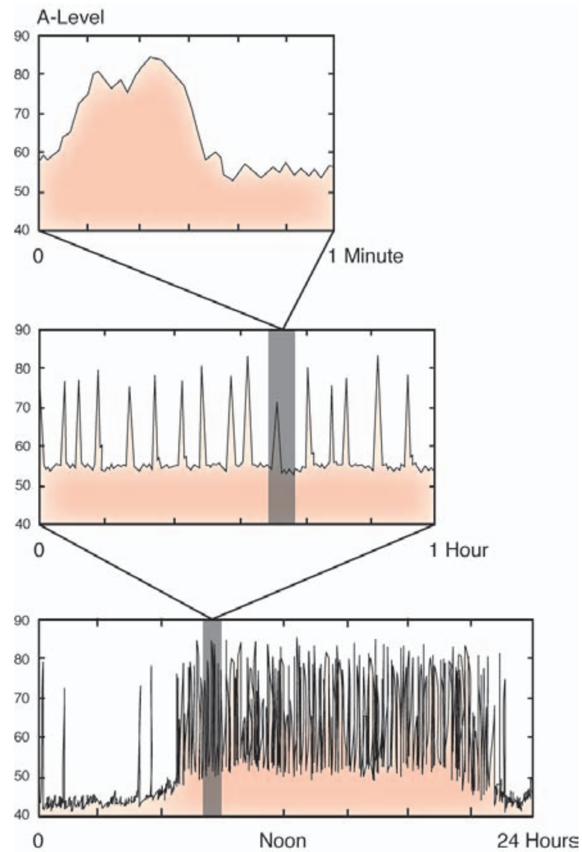

Figure 4. Daily Noise Dose

Most aircraft noise studies utilize computer-generated estimates of DNL or CNEL, determined by accounting for the SEL or SENEL values (as appropriate) from individual events affecting a given point on the ground, adjusted for evening and night as appropriate. Computed values of DNL or CNEL generally are depicted as noise contours reflecting lines of equal exposure around an airport (much as topographic maps indicate contours of equal elevation). California noise regulations require airports in the state to use CNEL. FAA has approved the use of CNEL for that purpose.

[1] "California Airport Noise Standards", California Administrative Code, Title 21, Public Works, Chapter 2.5, Subchapter 6)