

DAY- NIGHT AVERAGE NOISE LEVEL (DNL)

INTRODUCTION

For an aviation noise analysis, Federal Aviation Regulation (FAR) Part 150 – Airport Noise Compatibility Planning has determined yearly Day-Night Average Noise Level (DNL) to be the FAA's primary metric for measuring the cumulative exposure of individuals to noise energy resulting from aviation activities.

WHEN IS A NOISE ANALYSIS REQUIRED BY THE FAA?

As outlined in FAA order 1050.1E Section 14.6, no noise analysis is needed for airplanes with wingspans of less than 79 feet and landing speeds of less than 166 knots whose forecasted operations do not exceed 90,000 annual propeller operations (247 average daily operations) or 700 jet operations (2 daily operations). Any jet aircraft producing noise levels less than that of the propeller aircraft under the study may be counted as propeller aircraft rather than jet aircraft. In addition, no noise analysis is needed for existing heliports or airports whose forecast helicopter operations do not exceed 10 annual daily average operations with hover times not exceeding 2 minutes. This rule applies to the Sikorsky S -70 with a maximum gross takeoff weight of 20,224 pounds and any other helicopter weighing less or producing equal or less levels.

WHAT IS DAY-NIGHT AVERAGE NOISE LEVEL (DNL)?

The Day-Night Average Sound Level (DNL), expressed in decibels (dB), is a 24-hour average noise level used to define the level of noise exposure on a community. The DNL represents the average sound exposure during a 24-hour period and does not represent the sound level for a specific noise event. A 10 dB correction is applied to nighttime (10:00 p.m. and 7:00 a.m.) sound levels to account for increased annoyance due to noise during the night hours. There are many other metrics that can be used to describe aircraft noise levels; however DNL has been most widely accepted as the preferred metric for determining noise level exposure at airports.

WHAT IS CONSIDERED AN IMPACT?

According to the National Environmental Policy Act (NEPA) the threshold of significance is considered a significant impact when the noise exposures over sensitive areas are at or above 65 DNL. An example of this would be an increase from 63.5 DNL to 65 DNL, 65 DNL being a significant impact.

WHAT IS THE FAA'S INTEGRATED NOISE MODEL (INM) PROGRAM VERSION INM 7.0?

The FAA's Integrated Noise Modeling Program is a computer program widely used by the civilian aviation community for evaluating aircraft noise impacts in the vicinity of airports. The program was developed for the FAA to determine environmental impacts from noise exposure.

HOW IS DNL CALCULATED?

Based on aircraft operations, the INM program uses a mathematical algorithm to calculate the Day-Night Average Sound Level (DNL) in the vicinity of an airport. The DNL is then calculated by taking the average noise generated by aircraft operations that occur within a 24-hour period, with a 10 dB penalty added to nighttime sound levels between 10:00 p.m. and 7:00 a.m. Sound is measured on a logarithmic scale since human hearing is not “linear” and human hearing is very broad in amplitude. Therefore, the DNL exposure cannot be projected on a linear scale. Figure 1 gives an example of single event levels in decibels.

FIGURE 1 – SINGLE EVENT LEVELS (SEL)

