HOW URBAN HUM BECAME THE NOISE LIMIT IN ONTARIO

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Since 1978 MOE has used the equivalent sound level of urban hum, that amalgam of distant traffic and other sounds which forms the background noise in most urban and suburban areas, as the primary limit for assessing the noise impact from industry and other sound sources. This means that the limit to be used at a specific location is based on the sound actually received at that location, rather than an arbitrary number. This has made sense to industry, residents and consultants, who have used this limit for over 25 years. It has also been used in a Federal-Provincial guideline and many practical limits are found to be based indirectly on urban hum. In this paper, the origins of this limit are explored and some of the issues which were examined at that time and later are discussed. How urban hum behaves, how widespread it is and how it is used as a limit are also reviewed.

1. INTRODUCTION (12PT FONT)

In 1978, the Ontario Ministry of the Environment published their Model Municipal Noise Control Bylaw[1]. This document included both a qualitative (no measurement required) and a quantitative noise bylaw and included NPC documents giving the procedures required for measurement and assessment under the quantitative bylaw. With a few updates to the procedures, this publication has formed the guideline used throughout the province for controlling noise. These guidelines have also been adopted and used in large part within the Federal Provincial Guidelines on Noise[2]published by the Federal Government and provinces.

The heart of the guidelines is NPC 205, which is an update of the original NPC105. This document states:

"the sound level limit expressed in terms of the One Hour Equivalent Sound Level (L_{eq}) is the background One Hour Equivalent Sound Level (L_{eq}) typically caused by road traffic".

This is subject to a minimum limit where there is little traffic noise as follows:

"No restrictions apply to a stationary source resulting in a One Hour Equivalent Sound Level (Leq) or a Logarithmic Mean Impulse Sound Level (LLM) lower than the minimum values for that time period specified in Table 205-1.

TABLE 205-1
Minimum Values of One Hour Leq or LLM by Time of Day
One Hour Leq (dBA) or LLM (dBAI)

Time of Day	Class 1 Area	Class 2 Area
0700 - 1900	50	50
1900 - 2300	47	45
2300 - 0700	45	45

This table is the main difference between NPC 205 and the original NPC105, where the limits were 50, 45, 40 for Day, Evening and Night in all urban areas.

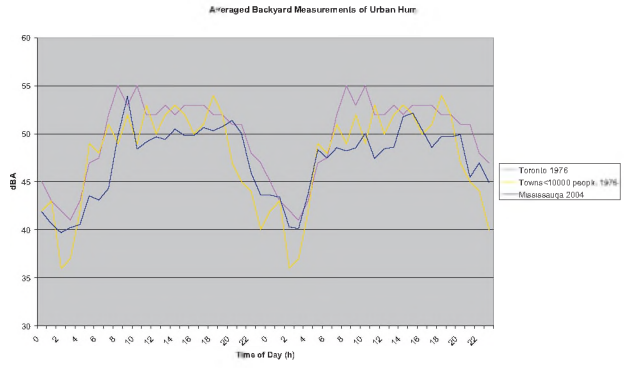
In any case, subject to lower limits, the bylaw restricts noise from industrial, commercial and some residential sources to produce an equivalent sound level no higher than the background equivalent sound level due to road traffic, i.e. the background in the absence of the noise source under investigation.

The original draft of the bylaw had not used this approach. Instead, it had set sound level limits by time of day and area. This was a common approach to regulating noise at the time and is still widely used. The idea was that the municipality would define these areas. The difficulty was that there was no established method for doing so and in any case it would end up being an ongoing job as the municipality grew and changed.

A study was carried out to examine how sound levels varies across communities.[3,4] It quickly came to the conclusion that almost all urban communities of any size were dominated almost exclusively by road traffic noise. This could be predicted successfully from traffic volumes, mix and speed on nearby roads. This has now advanced sufficiently that the EU uses the principle to map entire cities. It also found that away from major roads, in backyards and other sheltered areas, sound levels tended to minimum values which were consistent across communities. These sound levels, which were typical of urban areas, were given the name "urban hum".

Figure 1 shows the results of averaged community noise measurements from 1976 carried out at that time in areas dominated by urban hum. They show the typical near plateau during the day and drop of 10 dB at night found in all urban areas. It also includes some more recent measurements in a community in Mississauga which are

very similar and indicate that urban hum is a stable limit, i.e. similar values are found in most urban areas and the measurements are reproducible. The author has measured similar values in the Caribbean and in a town in South Africa. Even in areas dominated by specific roads, the same 10 dB variation with time of day was observed. The values are simply elevated.



It was clear in 1976 that the sound level limits or L_{DN} used in most legislation was simply a crude attempt to codify the variation seen in traffic noise in urban areas.[5] Almost all community noise regulations included a 10 dB drop at night, in some form or other.

Given that it was necessary to measure the offending source anyway, the extra time required to measure traffic noise at the same location or nearby for a similar length of time. For sources which could not be turned off the option of using a traffic noise prediction or typical values for urban hum, whichever was higher, was available.

The one change between NPC105 and NPC 205 is that the former used a lower limit based on a linear regression to measured urban hum values while the latter uses more arbitrary figures. NPC 205 also requires identifying an area as Class 1, 2. (There is a Class 3 for rural areas). This usually does not cause an issue because they both have the same lower limits at night and during the day and are only minimally apart in the evening.

In the late 70's (and even now) the concensus of many studies of noise descriptors measured against community reaction to noise showed L_{eq} to be as good or even a better description of people's reaction to noise than other descriptors. Even when a specific class of noise is measured using a descriptor designed for it, e.g. NEF for aircraft noise, L_{eq} proves nearly as good a descriptor. By 1975 MOE had determined that 1h L_{eq} was the best way to assess noise sources and it made eminent sense to compare it directly to the 1h L_{eq} of traffic noise.

This procedure, with some minor changes has been in place since 1978. Generally it has proved satisfactory to the public, to consultants and to regulators. The only difficulty is that while it is generally easy to prove an excess above the limit by showing an increase in L_{eq} when the source is operating, it is more difficult to prove that a source is in compliance by comparing two measurements and a variety of different approaches have been used over the years to get around this difficulty. However, the criterion has proven to be sufficiently successful to still be in use today. While some members of the public would consider any audible noise to be offensive, most understand a limit where industry muut not be louder than other noise sources in the area, when measured the same way.

REFERENCES

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