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MAXIMUM NOISE LEVELS IN ROAD TRAFFIC NOISE

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1. INTRODUCTION

Disturbance caused by noise is one of the most important environmental health consequences of the transport apparatus. Over a number of years, investigations in different countries have shown that noise affects different activities and causes sleep disturbance and a poorer life quality. There is thus a great need to control noise caused by transport, which is also shown in an investigation concerning noise in society and the measures that should be taken to reduce that noise.

2. BACKGROUND AND AIM

Investigations of the relationship between exposure to noise originating from different forms of traffic and effects among the exposed population form an important basis for technical measures for limiting the noise generation and regulating noise levels.

Results of these investigations have shown that the optimal way to express noise exposure is to describe it as the number of events over a certain noise level (70 dBA) and the maximum noise level that occurs three to five times per 24-hour period. The number of events is important for the extent of disturbance, but only up to a certain breakpoint, after which a further increase in the number of events does not lead to a further increase in the extent of disturbance. Within each interval of the number of events, the extent of disturbance is determined by the maximum noise level. The principle for this dose-response relationship is reported in Figure 1.

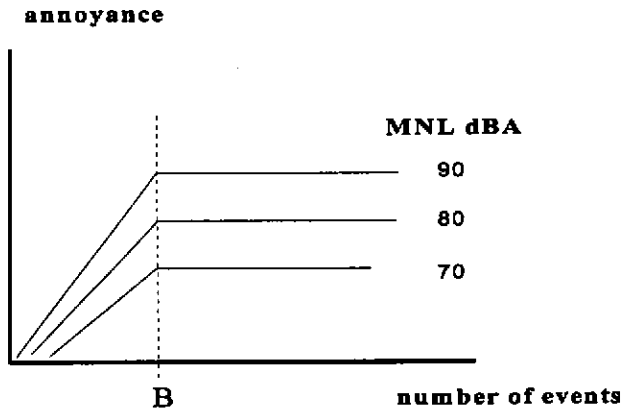

Figure 1. Principle used to establish a relationship between maximum noise level MNL, number of noise events and extent of disturbance. B = Breakpoint for number of events

In short, the principle implies that consideration is taken to the number of noise events that a exceed a particular noise level and the maximum noise level of the noisiest vehicle. These two variables form the basis for the dose-response relationship according to Figure 1 and account for the difference from the equivalent level principle, which weights together all events and their levels in a 24-hour mean energy value.

3. METHODS

To find out the type of vehicle that emit the highest noise levels in ordinary inner city traffic, manual measurements and visual observations of vehicle types and the way in which vehicles were driven were carried out along 13 different streets. The measurements were performed by one person for a period of one hour during the day. The measurements were made during non-rush hour traffic, some time between 10:00 a.m. and 3:00 p.m. The measurement person recorded the maximum noise level of each individual vehicle passage with a noise meter and simultaneously classified the type of vehicle under different classes. The maximum level was read manually on a Brüel&Kjær noise level analyzer, model 4426, in the position dBA FAST. The distance to the nearest driving lane was 2.5 meters. In addition to recordings of the noise level, notations were made of factors that affected the

maximum level, such as deviations in the way in which the vehicles were driven, e.g. extreme braking or acceleration, defective mufflers or the like. In total 1.000 noise events were measured.

4. RESULTS

The results from the noise measurements are presented in the following figures.

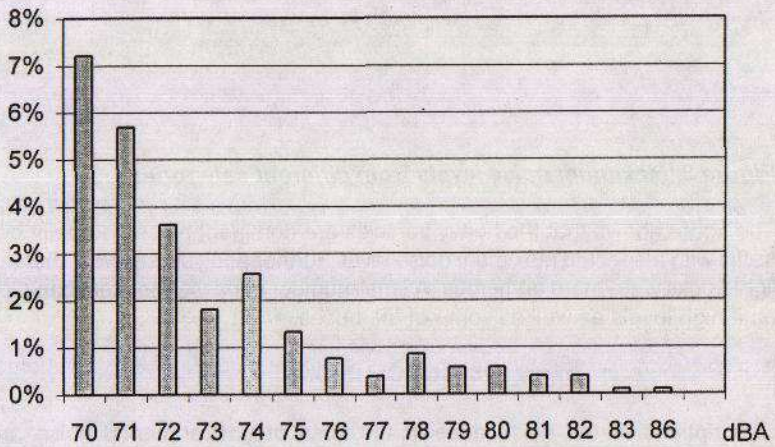

Figure 2. Maximum noise levels exceeding 69 dBA from all categories

The results in Figure 2 show that in areas with inner city traffic (the speed limit was 50 km/hour) would approximately 6% percent of all noise events exceed 70 dBA and less than 1 % would exceed 75 dBA in maximum noise level.

In the next figure the maximum noise levels are divided into the different vehicle categories. The truck category includes both heavy and light trucks.

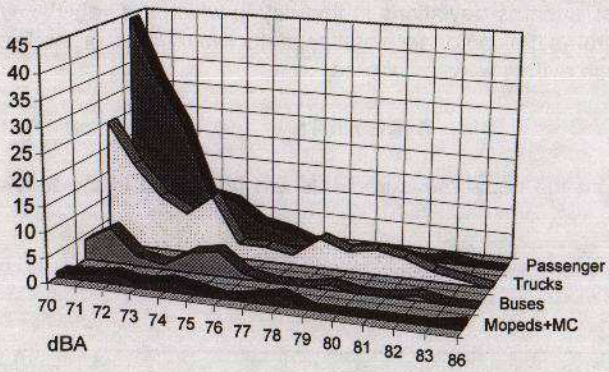

Figure 3. Maximum noise levels from different categories

The figure shows that the heavy vehicles are dominant noise source in city traffic with respect to maximum noise level. Further analysis showed that the light trucks were more numerous. A small number of passenger cars can also emit high levels as well as some of the buses.

5. CONCLUSIONS

Descriptions of the noise dose in the case of environmental noise are generally based on a collective measurement in which all noise events and their levels are weighed together to form a mean value. The results of investigations in our laboratory over a number of years have shown that a better relationship with the medical effects is obtained when the noise exposure is expressed as the number of events over a particular level and the maximum noise level.

The results from this study show that trucks and particular light trucks are an important source of high maximum noise levels in city traffic. This is also supported by experimental measurements conducted under standardised conditions.

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