Cities cannot solve their noise problems solitarily

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Introduction

The European Green Paper on Future Noise that was published in 1996 estimated that around 20 per cent of the European citizens were exposed to noise levels that scientists and experts consider to be unacceptable. This correspond with 80 million people, based on the EU 17. The green paper said also that an additional 170 million people were living in areas with noise levels that annoyed people seriously during day time. The Green Paper was the starting point for the European Commission to set up a directive on noise. This directive 2002/49/EC of the European Parliament and of the Council relating to the Assessment and Management of Environmental Noise was published in June 2002. In this paper the directive will be abbreviated as END which stands for Environmental Noise Directive. The aims of this directive are twofold, namely:

1. To define a common approach intended to avoid, prevent or reduce, on a prioritized basis, the harmful effects, including annoyance, due to exposure to environmental noise.
2. To provide a sound basis for developing community measures to reduce noise emitted by the mayor noise sources, in particular road and rail vehicles, infrastructure, aircrafts, outdoor and industrial equipment and mobile machinery. Ultimate 18 July 2006 EC should submit European Parliament and European Council with appropriate legislative proposals.

Actually is the overall aim of the directive to lower the number of annoyed and exposed people all over Europe. Now, almost twelve years after the publishing of the Green Paper and seven years after the establishment of the END a first round of Noise mapping is done in agglomerations and around important roads, railway and airports. Furthermore, the question is: " What is achieved in terms of percentage of people that are relieved from annoyance" and if not what could be done more to achieve this? In this paper is focussed on road noise and the measures that decrease the number of annoyed people in urbanized areas.

Current situation in Europe

Knowing that approximately 70% of the European people is living in cities and that this percentage is still increasing the main focus of noise abatement must be put on noise in cities. In 2008 Working Group Noise of EUROCITIES[1] carried out a noise questionnaire among the members of EUROCITIES. The noise questionnaire was sent to all 130 large cities. A huge amount of cities has responded (57) which means a response of 44%!! The filled in noise questionnaire was analyzed and reported by the Working Group Noise of EUROCITIES. The findings showed us that more than 50 per cent of the citizens in cities are exposed to noise levels higher than 55 dB L_{DEN} and 15 per cent of the citizens are exposed to noise levels higher than 65 dB L_{DEN}.

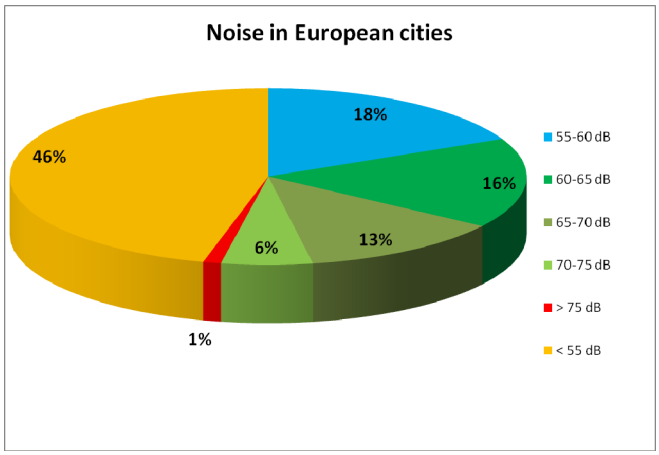

Figure 1: Noise in European Cities based on Noise Questionnaire EUROCITIES 2008.

The data for this percentages are based on the Noise Maps made by or for cities according to the END. One has to realize that the data is not agreed yet by the European Commission, so the data must be considered as provisional. Most of the people involved in the European Noise Networks know that the erected noise maps are not perfect. But it is the best there are until know because in earlier time the number or percentage of exposed people in Europe was a best guess. It's also known that a certain part of those noise maps is not comparable because of numerous reasons. Some of them are:

- The END doesn't give a clear interpretation on a lot of entities like agglomeration, quiet areas et cetera.
- There are differences between the national methods and the interim methods (both were allowed to use)
- A lack of data was found, especially traffic data (speed, road characteristics,..)

Furthermore there are a lot of reasons why noise maps are not comparable to a certain extent.

In the past decades enormous work has been done by several working groups, projects and programmes to find suitable noise measures to prevent or to take away the noise. Despite all those activities less result, in terms of the number of exposed people that has dropped, can be seen yet. The main reasons for this are:

[1] EUROCITIES is a network organization of 130 large cities in Europe, see www.eurocities.eu

a. The competent bodies[2] have not finalized their Noise Action Plans yet and some of them did not even finalize their Noise Maps;

b. The competent bodies must deal with other (environmental) priorities like air pollution and climate change; noise has to compete with other priorities;

c. The competent bodies are saying that they do not have the means and resources to implement the measures; in our opinion they are saying we do not give priority to noise reduction.

d. The measures that can be taken at a local level are not sufficient to reduce the number of exposed people drastically

Furthermore, some more other reasons too which will not be mentioned here.

It must be noticed here that according to the figures of EUROSTAT the number of car movements and the number of cars will still increase. This despite the economical crisis nowadays. The increase in mobility, in urbanisation and mechanisation will lead to higher numbers of exposed and annoyed people if measures stay behind.

What could be done at a local level?

At a local level a lot could be done to lower the noise. Assuming that the political willingness and funding are present, numerous measures could be taken. A few of these measures could be reported like traffic management, a measure that comprises e.g. speed reduction, smoothing traffic flow, restrictions or bans for Heavy Good Vehicles in certain areas or during the night or peak hours. The last measures are often find in the cities' centres. Other measures that could be taken are charging the road use, parking charge, less parking facilities, park and ride facilities and many things more. To curb Heavy Good Vehicles from the city centres many cities have already introduced the so called Environmental Zones or Low Emission Zones. Only if the driver has an exemption he or she is allowed to enter this kind of zones. In a limited situations quiet road surface can be applied on municipal roads. Thin layer are most suitable and can result in an initial reduction of 3-4 dB and on lifetime basis an average reduction can be expected of approximately 2 dB. It must be stated as well that normal asphalt (DAC) will become more noisier as well after some years. Not as steeply as thin layer, but is does! If the traffic is dominated by Heavy Good Vehicles one knows that at lower speed the engine noise of HGV is dominant above the rolling noise. As most experts now, the measures aforementioned do not result in massive reduction, on the contrary the effects of those measures are limited. Just a few dB can be achieved. More result can be achieved by shielding the road noise. But in an urban situation noise shielding is limited viable. Only at places near the rings and motorways noise barriers are feasible because in the city barriers are not the most favourable option because they split the city, pollute the horizon and landscape and they are a wanted object for graffiti artists as well.

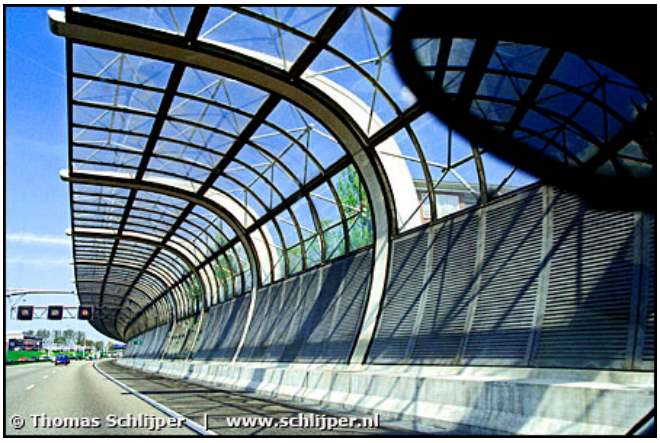

Figure 2: Noise barrier along motorway near dwellings

Other measures that are available for the city council to apply are to promote public transport and other forms of collective transport like school buses, buses for enterprises or economical zones. The city council can also promote and stimulate the shift to soft modes like walking, biking and even skeelering as an alternative for short distance transport. The possibilities of ICT are an interesting options as well. Using e-services and smart Intelligent Transport Systems a lot of unnecessarilly movements can be avoided. But still we know that the noise reduction of those type reductions together with the traffic management reductions are not sufficient to lower the number of annoyed people dramatically. Reduction of the noise does not automatically mean that the annoyance is taken away or is reduced. On the contrary, many situations are known were measures were taken and reduction were achieved but were no significant reduction of the annoyance was obtained. People living nearby did not notice that that de reduction was obtained because for several reasons. One of the reasons was the little reduction (3-4 dB) which could not be perceived. In other cases the measure failed but the residents were very satisfied because the frequential distribution of the noise changed in a more comfortable noise. This type of experiences has been the reason that cities did consider to use soundscapes to mask the noise. Masking the traffic noise by adding noise caused by fountains, small waterfalls, trees et cetera is often found in cities (soundscaping). Insulation of the façade is often seen as a last resort when other measures do not work, are too expensive or technically inapplicable.

But, as stated afore noise in cities could not be reduced sufficient. From the Noise Questionnaire that was set out by EUROCITIES among 130 large European cities and provisional data in the CIRCA database of the European Commision it is clear that noise levels above 65 dB L_{DEN} and 55 dB L_{NIGHT} are found and even noise levels above 75 dB L_{DEN} occur! A reduction of 6-7dB as a result of all possible

[2] A competent body is the institute or administration that is obliged to set up the Noise Maps and Noise Action Plans according to the legislation set up by the Member States.

measures is a realistic guess because one might not add up all individual measures in a simply way because that would lead to an overestimation. Thus, cities cannot solve their noise problems at their selves, even if they want and have enough money available. National Governments have to support their cities with additional measures and actions like

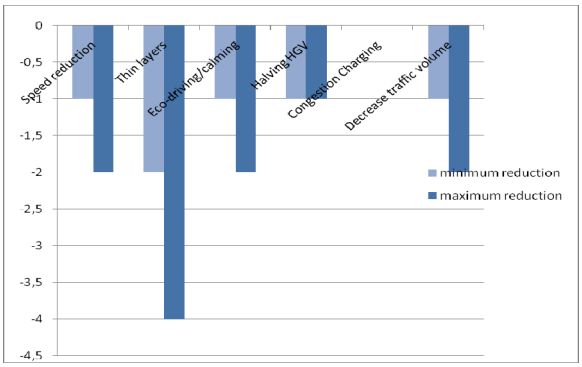

Figure 3: Effects of proposed measures in cities

Fiscal instruments which are environmental friendly. E.g. low noise cars and vehicles do not get the full tax burden but something less. Other instruments are funds for research on Noise, Noise effects and Noise measures. Good noise legislation is more or less a condition sine qua non. Furthermore the national government can provide good infrastructures for public transport and for electric cars or other alternative fuelled cars. The national government needs to promote integrated approach of noise together with air quality, energy and road safety. But even when national governments support the cities in their efforts to tackle the noise, the result will not be sufficient. Therefore actions on European level are needed. The European Union (European Commission and the Euro Parliament) must tighten the permissible sound levels (limits) for approval of vehicles (cars, trams, trains, tyres, airplanes, outdoor equipment, motorized two and three wheelers, mopeds, scooters etc.). By introducing tighter limits, charging or other incentives the noise of sources can be lowered to a noise level that is technically seen as realistic these days. The test methods for approval are far away from real driving conditions, they are more or less optimized to comply with the EU limits. A better test method that nears the real driving conditions would be preferable. Beside this EU and Member States should think about enforcement of the vehicles in use. E.g. by a compulsory annual test for noise like the tests for air quality (MOT, APK) or by carrying out at random samples taken from vehicles on the road. Some last actions that can be mentioned here are the anti-tampering measures that should be taken for two and three wheelers because 35% of the motor bikes are driving with illegal –noisy- parts and even 65% of the mopeds and scooters are equipped with illegal parts that make more noise than the legal parts. Within the framework of the review of the Environmental Noise Directive is can be considered to ad targets and deadlines to this directive.

Conclusions

Measures at a local level cannot solve all local noise problems. On hotspots tailor made solutions must be taken like barriers, tunnels or cuttings and if insufficient façade insulation. This means that additional measures are needed at national level, see before. But a combination of local and national measures will not be sufficient too. The best way to tackle the noise as we know from our education in noise is to take measures on the sources. Therefore stricter noise limits enforced by the European Commission and/or European Parliament are needed. By introduction of these more stricter limits the number of exposed/annoyed people in cities will drop dramatically. This cannot be reached in another way. An estimation carried out by the city of Rotterdam pointed out that the number of annoyed people could be lowered with approximately 20% if low noise road surfaces (thin layer) will be applied on 60% of the municipal roads. When the same percentage of vehicles are foreseen with quiet tyres then the number of annoyed people drops to 30% and if vehicles could be 2-3 dB quieter the percentage drops even to more than 50%. This cannot be realized by only taken local measures.

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