NEIGHBOUR NOISE: A RATIONAL APPROACH

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1. Introduction

Although there are local differences, in EU countries most people have neighbours. The number of detached houses is traditionally low. Apartment buildings – up to 4 neighbours – are common, and even in new terraced residential areas you still have to deal with 2 neighbours. It easy underestimated that this living close may require considerable social skills, and the cases where neighbours quarrel are countless. A frequent motive for discontent between neighbours is noise.
The usual thing that happens when it gets out of hand is that the police is called to stop the offenders. An awkward situation, because it doesn't improve the relations and it best it gives a temporal relieve, and easily it makes things worse.
Although a number of countries have policies to reduce neighbour noise, often these miss to present a complete coherent approach to limit the total impact on the population. In this paper the impact of neighbour noise on health is explored and the contours of a rational approach are put on the map.

2. Neighbour noise in Europe

Although neighbour noise is known to be a major problem consuming a lot of resources, there is not much statistical information about the impact. In [1] an attempt is made to gather information about complaints, but the actual data collected is fragmentary. Complaints however don't seem such a reliable indicator for the impact on the population due to differences in registration practices. They may be a good indicator for the authorities for the amount of personnel dat be dedicated to the task of dealing with the complaints.
A better indicator may be derived from the random surveys on noise like the one proposed by WHO [3] which give the percentage of the population annoyed and sleep disturbed.

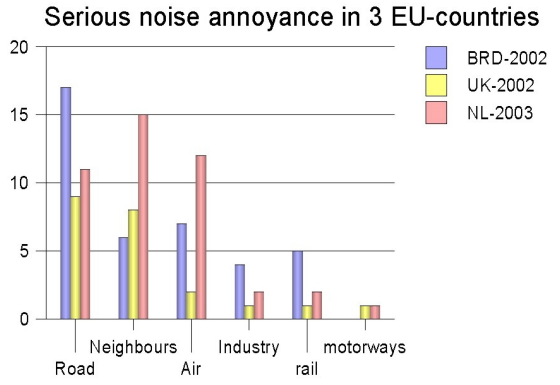

Figure 1: Relative position of annoyance by neighbour noise amongst other main causes of annoyance.

Figure 1 shows the relative shares of sources of serious annoyance in UK, Germany and the Netherlands (together 1/3 of the EU population).A direct comparison between countries cannot be made with too much confidence due to somewhat different ways of interviewing, but it is clear that neighbour noise ranks in the top 3 as main causes of annoyance. For reasons of comparability, with regard to neighbour noise the total of inside and outside noises are presented. Apart from annoyance, also a fair amount of sleep

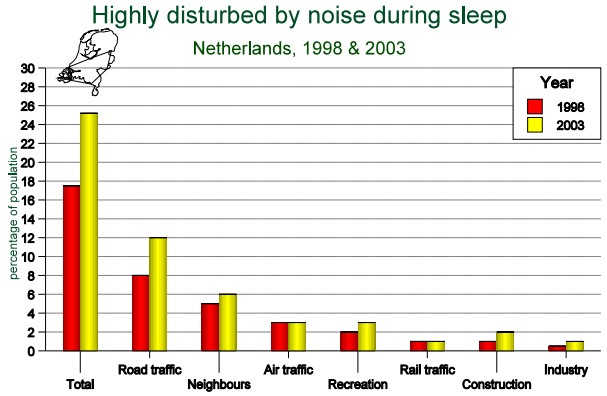

Figure 2: Highly sleep disturbed by neighbour noise in the Netherlands

disturbance is caused by neighbour noise. In the UK 18% of the people interviewed state that rest and sleep are disrupted by neighbour noise, which is the same percentage as for road traffic noise. In the Netherlands 6% of the population is seriously disturbed in their sleep by neighbour noise (12% by road traffic and 2% by aviation noise), as shown in *figure 2.*
While it is tempting to speculate on causes of differences between countries, it should be observed that there are large differences between these studies, and although care has been taken to make the results as comparable as possible, there is still a large range of error. From the time series within a country the results can be shown to be reproducible.

3. Ways to control neighbour noise

Broadly, measures to deal with neighbour noise fall in 3 categories:
- excess control/complaint handling: the police or a specialised body (like the Health officer in UK, or mediators) intervenes upon complaints.
- insulation between dwellings: by improving the insulation quality of the construction the audibility of sounds from adjacent buildings can be reduced.
- influencing behaviour through education, information, (financial) incentives etc

Most of the effort in the EU-countries goes into measures of te first category, but little is known about their effectiveness. Ironically, a successful complaint handling organisation may even lead to more complaints, because people learn that filing a complaint may be an efficient way to live in peace.

The relation between insulation and annoyance is relatively well studied [2,6]. Although the definitions of insulation values differ considerably, according to [2] a reasonable comparison can be made.

Table 1: Sound insulation between dwellings. Main requirements in European countries 2004 (adapted from [2])

	Airborne: equivalent R'_w, dB		Impact: Equivalent. $L'_{n,w}$, dB	
Country	Multi-storey housing	terraced housing	Multi-storey housing	terraced housing
Denmark	52	55	58	53
Sweden	55	55	56	56
Finland	55	55	53	53
Germany	53	57	53	48

UK	49-52	49-52	57-64	N/A
France	53-56	53-56	53-60	53-60
Switzerland	54-57	59-62	45-52	45-52
Austria	54-57	59-62	43-50	41-48
Netherlands	55	55	54-61	54-61
Belgium	53-56	57-60	53-60	45-52
Italy	50	50	63	63
Spain	50-53	50-53	60-67	60-67
Hungary	52	52	55	47
Lithuania	55	55	53	53

The paper by ms Rasmussen [2] gives a chilling account of the enormous differences in the way the standards are described between countries and the difficulties in making this comparison, but what is interesting is that there seems so to be little effort to demonstrate the effects of this values on overall population well being.

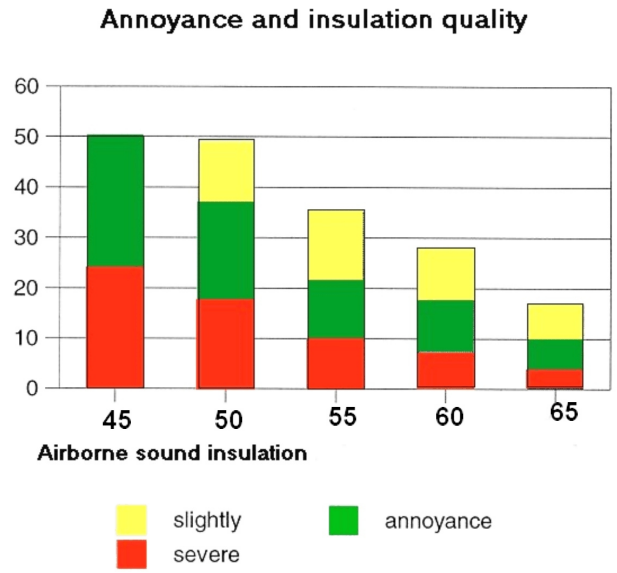

Figure 3. Relation between annoyance and insulation values.

Figure 3 (from [6]) gives a simplified example of the relation between sound quality and annoyance, but that is only the first step in a holistic approach.

The simple question is: what -mix of- measures leads to significant reduction of neighbour noise against reasonable cost? Tightening the building codes for new buildings is certainly a step in the right direction, but it could take some time before all the buildings have been brought up to decent standards. Confronting *table 1* with *figure 3*, it looks like that none of the present requirements in the European countries delivers a long term quality standard. Most of them are indeed so far below, that these countries are now building on the problems of the future.

4. Rational approach

A rational approach would consist of the following steps:
- assess the magnitude of the neighbour noise problem
- assess the effort that is now put in complaint handling
- assess the extra cost of bringing new buildings up to a standard that avoids future noise complaints (that may differ of course from culture to culture, from climate to climate)

- consider other direct and indirect costs of living in a poorly insulated house: intrusion of privacy, health costs of bad sleeping, reduced liberty of behaviour.

In this picture it is important to realize that the insulation of a house once built is very difficult to improve, while in the building stage these costs are relatively negligible.

Building new houses which are up to civilised standards doesn't solve the present problem of course: it is a kind of no-regret-policy. Some unorthodox measures will be necessary to bring about an overall improvement for the population.
A scheme that might work is based on the notion that people differ in their noise sensitiveness as well as in their life style. Also, insulation values between houses show a large variety. At this moment, there is no - publically available- information on each of these elements.
Now, if someone would know that he or she belongs to a noise sensitive person, he should avoid dwellings with poor insulation quality. On the other hand, people with noisy hobbies or habits would prefer houses with an above average insulation in order to avoid being the cause of problems.
This first step in this process is to bring the insulation values of dwellings in the public domain, so they can play a role in decisions. How this can be put in practice will depend on country. If there is a good functioning cadaster this is an obvious choice. Otherwise a special register may have to be constructed. Usually it won't be necessary to go out and measure values (the costs of that would be prohibitive) but modern calculation techniques based on construction data and sample measurements will be sufficient.
The second step is to enable people to assess their sensitiveness. This could easily be achieved by a web-based questionnaire: replying to a limited number of questions is enough to rank a person.
A number of incentives then may be used to bring about a relocation in such a way that undesirable combinations (noisy neighbours next to sensitive persons in low quality housing) may be avoided. To speed up the process real estate agencies with more then 100 houses in their possession could be asked to provide sufficient apartments with above average insulation, if necessary through retrofitting.

Conclusion.

The present level of neighbour noise annoyance and sleep disturbance demands that forces are bundled to bring this down. In many European countries considerable effort is put to resolve complaints, but little attention is given to attack the problem at its roots. Although this seems to be an almost impossible task, with a smart combination of new and old technologies a substantial reduction may be achieved.

References

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