Combined noise effects and noise protection planning – the need of regulation

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Introduction

The increasing density of the population centres has the consequence that in urban planning and traffic planning concerning with the evaluation of the acoustic situation of usually different sources of noise will be regarded and combined if necessary to have. On the basis of a realistic case - study the acoustic situation is to be pointed out and possible solution sets to evaluation will be proposed.

Example

For a view of total noise a case study of a residential area from daily practice is presented, in which the impact of different kinds of noise occur. The case study stands on behalf ever more frequently becoming cases, whose effect must be mastered in urban planning.
The residential area the following noise sources of permissible extent affect:

- a federal motorway at larger distance
- a local road
- an existing suburban railway line
- a high speed railway line
- industrial noise of a neighbouring discounter
- sport noise of an athletic ground (e.g. football field)

For these sources of noise special laws and guidelines are to be considered during the planning process and/or in the context of urban planning. These are among other things the orientation or limit values of DIN 18005, TA – Lärm, 16. BImschV or 18. BImSchV.

In the case study all these limits and orientation values for the individual sources are in the residential area straight kept. The average levels, which can be expected then in the residential area, are made of tab. 1 evidently:

Averaging	level pours L_{Aeq} [dB(A)]	
	Day	Night
motorway	54	49
local road	54	45
suburban traffic	51	54
NBS – Highspeed.	57	49
Industrial noise	44	40
sport noise	46	-
Sum	**61**	**57**

Table 1: noise levels

Acoustiocal Items

The noise effects of the different sources of noise differ at an immission point among other things in the course both in the daily temporal process over approx. 24h and in the short-time-process. Further acoustic differences, e.g. frequency spectrum, impulsive sound, tonal sound, are not regarded here.

Daily noise-time pattern

With the daily temporal pattern in particular differences result in the case of the reduction of the averaging levels at the night (figure 2). While with the suburban railway line the averaging levels increase at night typically, reductions of the averaging levels arise at night around approximately 10 to 15 db (A) with the road traffic. The high-speed railway line and also the industrial noise as well as the sport noise wise phases of the complete night rest up, here however pronounced points are to be registered during the evening rest period

Short-time noise-time pattern

The brief level process points both continuous noises out and the road traffic noise of the motorway and intermittent noises from the local road and from rail traffic. The industrial noise and sport noise may be impulsive, e.g. with impact noises or tennis facilities (see figure 2)

Legal aspects

A view of total noise is usually employed neither with the planning of new traffic routes nor with the abatement of noise of existing traffic routes.; rather only the traffic routes, which are to be changed, are regarded. With the industrial noise or sport noise is usually regarded at least the sum effect of the sources of the same type, to which the regulation, applies. However the noise of the surrounding traffic routes is not regarded in this cases. In the context of urban planning traffic noise on the one side and industrial, leisure and sport noise is been judged seperately.

Noise effects

In the research of noise annoyance dose –response relationships have been examined by extensive "Meta - analyses" concerning the different effects of road -, rail - and aircraft noise. These are based on collection of noise disturbance and annoyance separatly for respective sources [1]. The refer to L_{DEN} of the periods day, evening and night

differently weighted. Industrial noise and sport noise were not regarded with these analyses.

Discussion

A summation of the average levels of the different noise sources can lead to noise levels, which lie in the health-endangering range, even if for the respective kind of noise source the relevant limit value is kept. A view of total noise is therefore necessarily. The approach suggested by [1] makes an overlay possible at least of traffic noise sources. However the dose-response-relationships do not appear suitable for a view of total noise.

By averaging the results of a multiplicity of different investigations of the respective noise sources differences between the types of noise concerning noise-time patterns vanish. A differentiated evaluation of the noise impact due to the course is not possible and a false estimate of the subjective noise impact is pre-programmed. Therefor it is necessary to determine dose-response-ralationships beyond the up to now available data, which represent in particular distinctive with respect to the course. The inclusion of industrial noise and sport noise appears inevitably.

References

[1] Position Paper on dose response relationships between Transportation noise and annoyance, EU's Future Noise Policy, WG2-Dose/Effect,

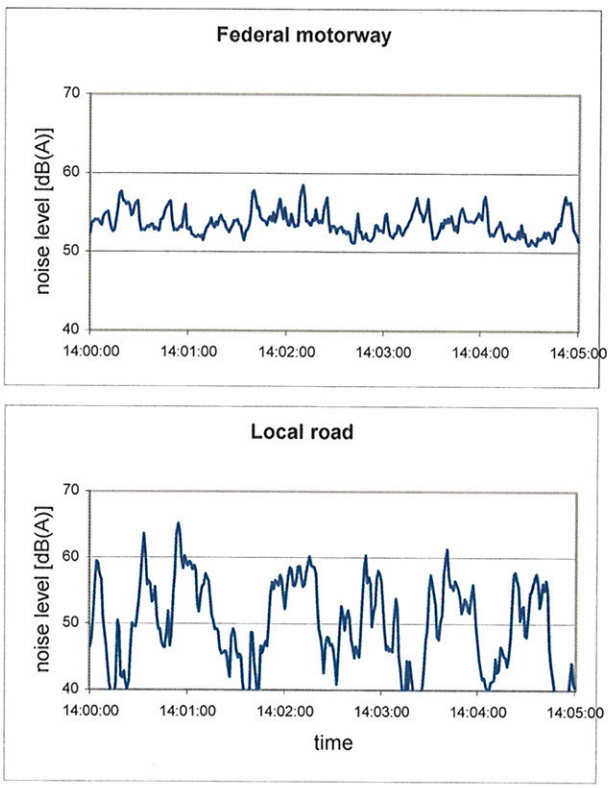

Figure 1: Short-time noise-time patterns of a federal motorway at larger distance and a local rod

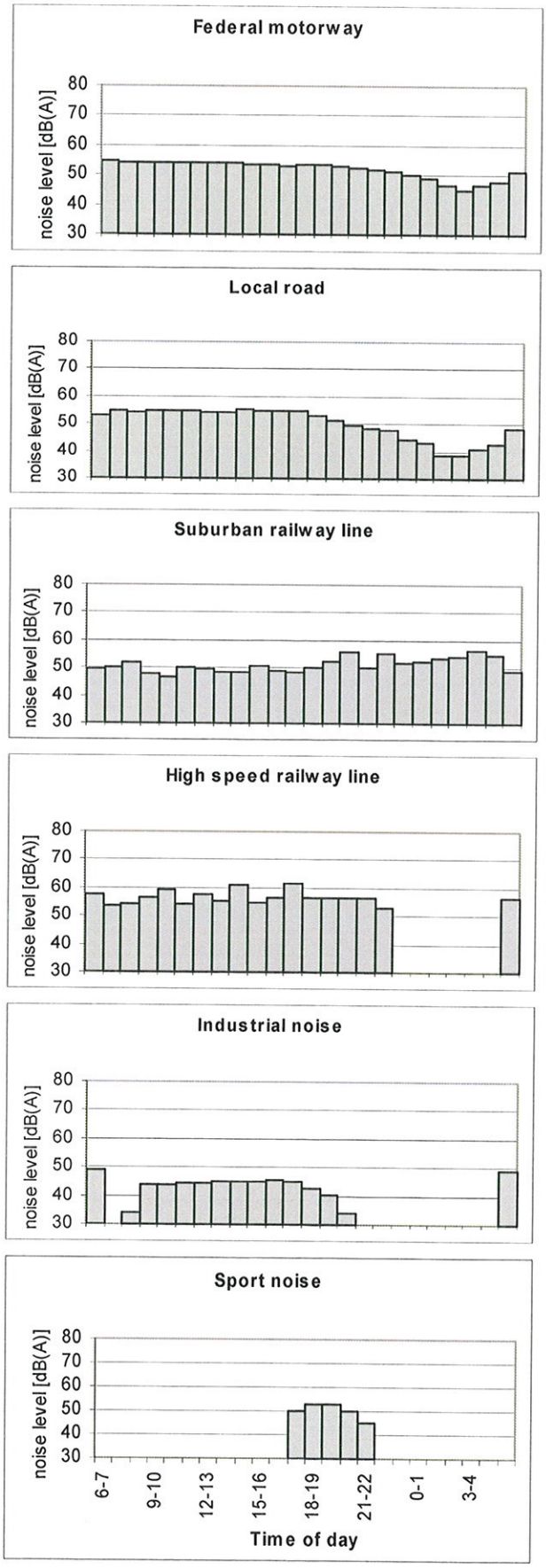

Figure 2: Noise-time patterns of the different noise sources over day