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NEW INDICATORS FOR OLD; THE INTRODUCTION OF THE SINGLE EU-INDICATOR IN DUTCH LEGISLATION

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ABSTRACT
The Dutch noise legislation uses 5 different groups of noise indicators in various sub categories. This has a number of disadvantages like incomparability of procedures, complicated legislation and unfairness when devising measures. Above all, it is not transparent to the public. A decision has been made to bring all sources under 1 indicator and preferably under 1 regulation. This brings with itself a number of change-over problems, the biggest is the translation of the limit values. The choice of the single indicator and the approach to make the change acceptable which will be discussed.

1 - OLD INDICATORS

The Noise Abatement Act in the Netherlands appeared in 1979, one year after the noise paragraph of the Civil Aviation Act. This was the beginning of a heated debate on noise indicators: the noise Abatement Act was based on LAeq,T and covered road traffic, rail traffic and industrial noise while the Civil Aviation Act had chosen the Kosten-unit, a NNI-like indicator.
The reasons for these different choices were obvious at that time, but are bizarre by nowadays standards. Aviation was at that time still regarded as a mysterious and wonderful means of transport, and therefore aircraft noise couldn't be treated in the same way as other noises from lowly vehicles.
Although this difference in treatment is very evident, it became over time apparent that many other differences in noise indicators came to exist in the Dutch legal system. Some indicators have the same name, but are different, some have different names, but are almost the same.
Table 1 shows an overview of the noise indicators presently in use in the Netherlands

Indicators and noise limits for all sources				
Source and indicator	**Time basis**	**Planning values**	**Maximum for new**	**INSIDE**
local roads **L_{dn-max}**	weekday mean	55	new road + new residential: 65 new road + existing residential: 70	35/40
motor ways **L_{dn-max}**	weekday mean	53	new residential: 58 new road + existing residential: 63	35/40
industry **$L_{den-max}$**	representative average	50	55	35/40
rail **$L_{den-max}$**	year mean	57	70 (73 for existing rail & existing dwellings)	35/37/40
impuls noise $L_{den-max}$	representative average	45	50	35
tonal noise $L_{den-max}$	representative average	45	50	35
background level: **LA95**	representative average	40		
industry **L_{Amax}**	?	70 (day) 65 (evening) 60 (night)	70 (day) 65 (evening) 60 (night)	–
shooting noise **Lr**	representative average	50	–	–
Civil and Military airports: **KostenUnit**	year mean	35Ke	45Ke	insulation values 30 − 39 dB(A)
General aviation: Small aircraft unit **(BKL)**		47	–	–
Airports with night traffic: **LAeq,7 uur (between 23 and 07)**		–	–	26

Table 1: Noise indicators and limit values, simplified overview.

Between different indicators (5), different time basis (3) and different limit values (dozens, for every source there are at least 3 or 4 upper limits) a jungle has sprouted which confuses regularly even those working in the field for years and earned the Dutch noise abatement system a − perhaps justified- fame for exaggerated complexity.

2 - A NEW INDICATOR

Profiting from a general impulse to simplify (environmental) legislation, it was decided to simplify drastically the noise abatement legislation, under the title of Modernization of Noise abatement instruments. The Dutch abbreviation is MIG.

Inside this large program a project was started to reduce the number of indicators and limit values. The first step was to ask advice form the Dutch Health Council, and the second to study the consequences of this advice when this would be introduced.

The results of this study showed that in principal the entire structure of indicators and limit values could be replaced by a system with only 2 indicators (a long term L_{den} and a night LAeq,8hrs) and 2 limit values.
In 1998 a formal decision was made to adapt the Noise Abatement Act and to convert to a single noise indicator, the L_{den}. It was by that time anticipated that this indicator would be chosen by the European Commission as the harmonized noise indicator. In addition it was decided to adjust this indicator for annoyance, so not only one indicator but also one limit value would be needed to cover most of the noise problems. Furthermore this would create a possibility to integrate noise from different sources.
It was then pointed out that the transition should take place in a neutral way with respect to the standing limit values. In other words, no strengthening or loosening of standards due to the conversion process. Although aircraft noise was considered as a separate source in the process, it follows a different legal trajectory.

3 - PROCESS OF CONVERSION

After the choice of the indicator it was decided to proceed in a stepwise fashion:
a) correction factors per source for the conversion from the maximum per period to day/evening/night average
b) the same for the conversion to a year average
c) adjustment for equal annoyance
d) conversion of planning values
e) conversion of limit values
f) unification of planning values
g) unification of limit values.
By way of example, let's take railway noise. The present limit values are 57 dB(A), $L_{den-max}$ as planning value and 70 dB(A) as an upper limit.
Step a): from the railway noise database it was calculated that the mean difference between L_{den} and $L_{den-max}$ for railway noise is 2 dB(A).
Step b): In this case the $L_{den-max}$ is already calculated as a year average, so this gives a correction factor of 0
Step c): Railway noise is less annoying then road traffic noise, and this is level dependent. To obtain the same annoyance as 55 (57-2) dB(A) railway noise, road traffic would be 52 dB(A). Likewise 68 (70-2) corresponds to 60 dB(A) road traffic.
Other sources give different correction values and are sometimes harder to evaluate (the conversion for industrial noise is particularly laborious), but the principle is essentially the same.

4 - UNIFICATION

If steps a) through e) are carried out for all sources, the following results:

Limit values in L_{den}, adjusted for equal annoyance			
Source	**Planning values**	**Upper limit for new residential areas**	**Upper limit for new sources**
urban roads	**54**	**69**	**69**
motor ways	**51**	**56**	**61**
industry	**47**	**52**	**57**
small enterprise	**47**	**47**	**47**
impulsive *	**52**	–	–
rail	**52**	**60**	**60**
Aircraft	**62**	**62**	**62**
General aviation	**42**	–	–

Table 2: Limit values in L_{den}, adjusted (*: according to draft ISO-1996-2: small fire arms, wood and metal hammering, drop-hammer, pile driver, drop forging, pneumatic hammering, pavement breaking, metal impacts of rail-yard shunting, or a sound with a comparable characteristic and degree of intrusiveness; correction applied is +12 dB).

Now that all limits are strictly comparable, it becomes clear that there are large differences in the protection level between different sources. For the planning values the range is 20 dB(A), and for the upper limits 22 dB(A). These differences are mostly historical, and in some cases based on assumptions

which later proved to be different. One example is the difference between urban roads and motor ways. This was based on surveys from the eighties showing that motor ways were more annoying then urban roads at the same noise level. Later analysis with new surveys − set up to find the causes for the difference- however failed to find any distinction.
For reasons of transparency and equity it is tempting to choose for 1 single planning value and 1 single upper limit. From table 2 it is evident that this can no longer be a neutral operation.
It means effectively that the process of limit setting has to start all over again. Although this could imply a considerable effort from the part of the authorities, it also is a chance to make use of the latest scientific progress. Nowadays much more is known of the effects of noise, it has become much easier to calculate the impact of exposure over a population and effective measures are available.
In fact, the importance of limit values is decreasing, in favor of target setting. In stead of specifying in detail what noise levels have to be met in what cases, it is better to state that the total impact on a population will have to be reduced, and what measures can then be used to achieve that. In many cases it can be shown that source measures are much more cost effective then removing black spots one by one.

5 - DISCUSSION

The harmonization of the Dutch noise abatement system is possible with the modern techniques available today and would certainly contribute to making the system more transparent to the citizen. Considerable effort is still needed to set new limit values and transform a system with strict noise control on the spot to a system which induces to using more effective noise measures.