



Statens vegvesen
Norwegian Public Roads
Administration

Value for money in noise abatement

Ingunn Milford Norwegian Public Roads Administration (ingmil@vegvesen.no)
Sigve Aasebo Ernst & Young AS
Kjell Strommer Swedish Transport Administration

Objective

To investigate possible strategies for governments to pursue on noise abatement. To give recommendations on which strategy will give the best value for money when it comes to reduction in noise annoyance.

Method

The measures investigated are:

1. Noise barriers
2. Façade insulation of dwellings
3. Porous road surfaces (single and double layer)
4. Thin layer surfaces (dense)
5. Vehicle noise limits made stricter

Spending the same amount of money in Net Present Value (NPV) on each measure makes the different measures directly comparable when it comes to costs. The initial investment on each measure will depend on the spending needed on maintenance, during the 20 year period used for comparison, to maintain the noise characteristics of the measure. There are almost 100 million people annoyed by road traffic noise in Europe. Any noise abatement measure implemented will change the number of annoyed at a certain cost. The cost is divided by the number of the "no longer annoyed" as a result of implementing a certain measure. This is the cost of reducing the noise annoyance score by one.

Results

In a 20 years perspective, the cost of reducing the annoyance score by one varies from € 15 per year to € 1800 per year depending on the abatement measure chosen.

- The most cost effective measure is to reduce the vehicle noise.
- The most expensive measure is noise barriers.

There is ongoing work in the EU to update the current vehicle noise emission standard, and the results illustrates that more stringent noise limits for vehicles will give very good value for money.

CEDR

This paper is the work of CEDR Project group Noise. CEDR, Conference of European Directors of Roads, is a non-profit organisation with 24 member countries.

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Measure	Noise reduction (dB)	Total reduction in annoyance score (million)	Limitations on use	Cost of reducing annoyance by one (per year)
Vehicle noise reduction	3,1	19,7	None	€ 15
Thin layer asphalt	2	2,4	Not motorways	€ 125
Porous asphalt - single layer	2	1,1	Only motorways	€ 280
Façade insulation	8	0,76	None (indoor effect only)	€ 400
Porous asphalt - double layer	4	0,33	Only motorways	€ 900
Noise barrier	8 - 1	0,15	Not in city centre	€ 2100

Road traffic noise exposure in Europe

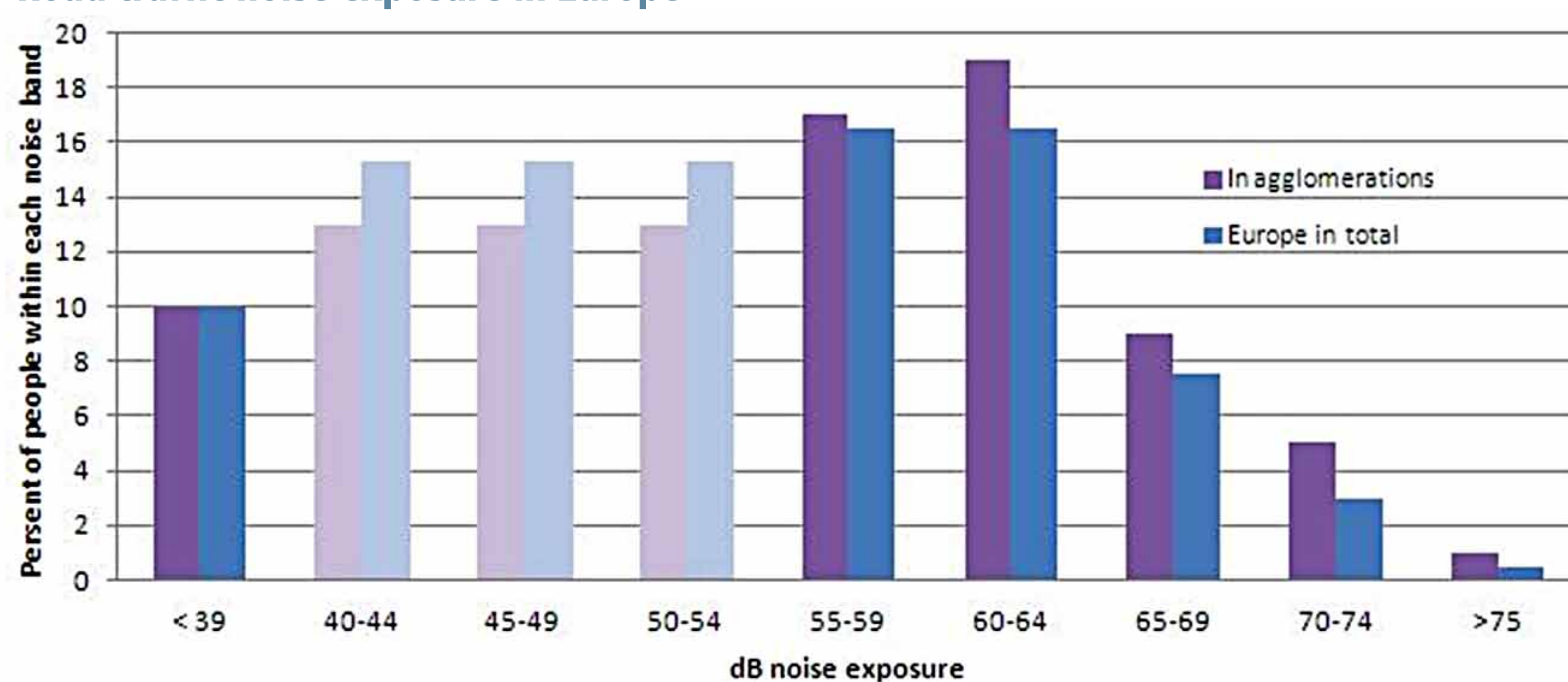


Table 1: The initial investment costs for the different abatement measures leads to a given amount of noise barriers, new windows etc, and from this the number of people who gets a noise reduction is calculated.

	Initial investment in billion €	Cost per unit	Volume of abatement measure	People affected per unit
Noise barrier	3,627	€ 1 600 per m	2 584 km	1000 per km
Façade	6	€ 3000 per dwelling	2 mill dwellings	2,2 per dwelling
Porous asphalt single layer	2,2072	€ 2,14 per m2	40 232 km	1000 per km
Porous asphalt double layer	1,667	€ 10,45 per m2	6 380 km	1000 per km
Thin layer	4,799	€ 1,5 per m2	177 740 km	500 per km
Vehicle op. 5	5,993		All vehicles	All people exposed to traffic noise (> 40 dB)