



Combined traffic management and physical measures reduce noise

New research in Spain has explored solutions to reducing traffic noise, and suggests that the best option is to combine global measures, such as speed restrictions, and local measures, such as noise screens.

In 2000, it was estimated that more than 44% of European citizens (or about 210 million people) were exposed to road traffic noise levels that exceeded 55 decibels (dB). Excessive noise can be detrimental to health with effects on sleep, mental health and physical performance.

The study is based on a noise-mapping project for the entire city of Palma de Mallorca. The noise maps were created with a model (CadnaA)¹ that used geographic data on traffic, weather and populations. Using the maps, the study analysed possible noise mitigation solutions.

The noise maps revealed that the highest noise levels were near main roads and the highway. **Nearly the whole population is exposed to noise levels of more than 55 decibels (weighted day-night noise level L_{DEN}) and 50 decibels during the night (L_{Night}).**

Based on traffic composition, the study divided the city into two parts: the city centre and the highway, and proposed four possible noise mitigation solutions:

1. A 50% reduction of heavy vehicles (HVs) at the city centre and a speed reduction from 90 to 70 km/hour on the highway.
2. A 50% reduction of all vehicles in the city centre and a speed reduction on the highway down to 60 km/hour for HVs and down to 70 km/hour for light vehicles.
3. A 75% reduction of HVs and 50% reduction of light vehicles in the city centre and on the highway a speed reduction of HVs down to 60 km/hour and down to 70 km/hour for light vehicles.
4. The use of local measures, i.e. tunnels and noise barriers, on the highway.

Using the noise maps and modelling techniques the study compared the impacts of the different scenarios. All solutions reduced the number of people exposed to the highest noise levels. Both global traffic management measures and local physical measures (e.g. barriers) reduce the number of inhabitants exposed to levels above 65 decibels, but it is a combination that yields the best results with a 31% reduction in the population exposed to levels exceeding 65 dB.

Scenario 2, which uses traffic management techniques, is the most cost-effective over one year, but after two years the solution that combines global and local measures (Scenario 3) is the most cost-effective, producing benefits worth €2,821,076 per year and total initial construction costs of €2,221,560. Scenario 3 also offered the highest noise level reduction, with levels reduced up to 5dB (as opposed to 3-4 dB in Scenario 2).

The study noted that some noise measures can interfere with other objectives, such as road safety, energy consumption and congestion. This must be considered when developing mitigation plans by involving stakeholders from other policy sectors, such as transport planning, road maintenance and air quality.

1. See <http://www.datakustik.com/en/products/cadnaa>

Source: Ausejo, M., Tabacchi, M., Recuero, M. *et al.* (2011) Design of a Noise Action Plan based on a Road Traffic Noise Map. *Acta and Acustica United with Acustica*. 97:492-502.

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