Mapping noise pollution simply and cost-effectively

To manage noise, it must first be assessed. Several commercial noise prediction tools exist, but they are often complex and expensive. A new Irish study evaluates a simpler tool and demonstrates that it produces very similar results to standard commercial software.

The European Directive on Environmental Noise[1] requires Member States to draw up strategic noise maps and action plans. A noise map consists of a geographical map with areas marked according to the levels of noise they experience, usually in terms of decibels (dB). The maps should be clear, comprehensible and accessible to the public. They should also form the basis for action plans.

The use of commercial strategic mapping software can be difficult for local authorities with limited budgets and resources. This study, partly conducted under the EU HPC-EUROPA study [2], proposes independent in-house software could provide a better alternative. Not only would this be cheaper but it would also encourage more participation at a local level.

The researchers studied an independently developed model that implements the recommended interim method for road traffic noise prediction (XPS31-133), but is structured in such a way that it may accommodate the Harmonoise[3] standard in the future. The study mapped noise in Dublin city centre with both the independent model and standard commercial software and compared the results.

Both maps provided similar results, although there were slight variations in the minimum and maximum level. The difference in mean noise levels was 0.34dB. However, a more notable difference was that the independent model completed the calculations in 26 minutes while the commercial software took over five hours. The independent model was also able to determine the impact of action plans that influenced noise sources without the need for large alterations to the model itself. For example, the study used the software to predict the effect of removing all traffic from a certain area and the effect of a blanket ban on heavy vehicles.

In order to validate the software further, measurements were carried out throughout the area. On the whole, the actual measurements of noise were higher than the levels predicted by the model. Reasons for this could be that the model did not consider reflected sound or ambient noise produced by people walking and talking. However, since the latter is not environmental noise this is not a concern. The study used the actual measurements to apply a local correction method which integrated real and predicted results and produced a more finely tuned noise map.

The study demonstrates the possibility of developing software that is more accessible to authorities. A number of areas for improvement to the model are suggested, such as the inclusion of reflection effects, differentiating between environmental and ambient noise and the benefits of assessing economic advantages of different mapping methods.

The authors suggest a central repository which can supply simple software for authorities across Europe would make noise mapping and action-planning more accessible to local authorities with limited resources.

1 See http://ec.europa.eu/environment/noise/directive.htm
2 HPC-EUROPA (Pan-European Research Infrastructure on High Performance Computing) was supported by the European Commission under the Sixth Framework Programme. See: www.hpc-europa.eu
3 See: www.imagine-project.org

Additional information: For more information on mapping and on methods to manage noise pollution, please see the LIFE funded "Tool box for the integrated planning and management of road traffic noise" project:
http://ec.europa.eu/environment/life/project/Projects/PDF/LIFE98_ENV_B_000248_LAYMAN.pdf