

## The European challenge for a better acoustic environment

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**RESUMO:** A Europa é, actualmente, líder nos assuntos de ruído ambiente, tanto em termos das políticas e estratégias como de programas de investigação, especialmente em áreas urbanas.

O esforço é evidente não apenas ao nível europeu, mas também a nível nacional em diferentes estados membros. No âmbito da política europeia sobre ruído ambiente, foi criada uma rede de especialistas europeus, de diversos países, em várias áreas da acústica ambiente, organizados em grupos de trabalho, que tem prestado assistência à Comissão Europeia antes e após a publicação da Directiva 2002/49/EC relativa à avaliação e gestão do ruído ambiente. Diferentes países tais como Portugal, Itália e Polónia, por exemplo, aprovaram legislação nacional que incorporou exigências e requisitos constantes da nova Directiva, ainda antes da sua publicação. A Espanha foi o primeiro país a transpor a Directiva para o seu regime jurídico nacional, como lei nacional. Outros países têm vindo a seguir caminhos semelhantes.

Após tratar outras componentes ambientais, a Europa considera actualmente o ruído como um assunto sério. As políticas seguidas e em curso nesta área estão a ser observadas e seguidas como exemplo em outras partes do mundo, sendo reconhecidas como as estratégias mais avançadas.

Após séculos de desenvolvimento económico e social em que os efeitos no ambiente sonoro não foram considerados nem questionados, os aspectos ligados ao ruído ambiente estão a ser considerados como uma prioridade nas políticas de desenvolvimento sustentado e como cruciais para a qualidade de vida dos cidadãos.

Encontram-se em discussão e estudo estratégias de gestão e redução do ruído. Estuda-se a qualidade do ambiente sonoro e as paisagens sonoras percebidas pelas pessoas. A definição e o estabelecimento de zonas tranquilas, como áreas de preservação do ambiente sonoro, estão em curso em diversos países.

Neste trabalho, será apresentada uma visão geral e resumida das acções em curso e programadas no sentido da construção de um ambiente sonoro europeu mais confortável para os seus habitantes.

**ABSTRACT:** Europe is currently leading the world on policies and research concerning noise and the acoustic environment, especially in urban areas.

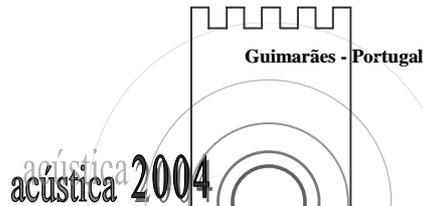
The effort is not just at the European level but also comes from the different member states. Within the framework of the current European noise policy various Working Groups of experts on various acoustic fields from different member states were set up. They provided advice prior and after the publication of the Directive 2002/49/EC on assessment and management of environmental noise. Different countries, such as Portugal, Italy and Poland, for example, have approved national legislation already integrating noise policies included in the Directive, before its publication. Spain was the first country to effectively transpose the Directive as a national law. Others countries are following suit.

After tackling other environmental components, Europe is considering noise as a very serious matter, since the mid nineties. Its noise policy is being watched carefully in other parts of the world and followed as an example, in terms of both legislation and strategies.

Following centuries of economical and social development where the effects on the acoustic environment were disregarded, the noise issues are now being considered as a factor to be accounted for in a sustained development policy and as crucial for the quality of life of citizens.

Noise management actions are being developed and set up. Urban soundscapes are being studied. Quiet areas are investigated and defined in many countries.

An overview will be presented on the challenge that Europe is leading to build a (more) comfortable acoustic space for the European citizens to live in.



## 1. THE EUROPEAN NOISE POLICY

Following centuries of economical and social development where the effects on the acoustic environment were disregarded, the noise issues are now being considered as a factor to be accounted for in a sustained development policy and as crucial for the quality of life of citizens.

Noise Directives regarding noise emissions from different sources, such as motor vehicles, railway, aircraft, household appliances and construction machinery have been passed since the early 70's.

Following the 1996 Green Paper, the European Commission defined a new framework for noise policy, based on shared responsibility between the EU, national and local authorities. A Noise Expert Network was created to assist the Commission. The new Directive on Environmental Noise was set up in order to address the noise issues, requiring the competent authorities to produce noise maps, inform the public about noise exposure and draw up action plans. Provisions were defined for the follow-up of existing EU legislation on sources of noise. New research studies on noise were approved.

Quiet areas are addressed in the Directive but have already been considered in national legislations, as in the Netherlands, for example. The definition of these areas, considered as acoustical preservation areas, is now being studied in various countries, in terms of their noise limits and their acceptable soundscape.

## 2. NOISE MAPPING

Strategic noise mapping is required in the European Directive for the assessment of noise from major transport infra-structures and in agglomerations with more than 100,000 inhabitants.

The Portuguese Noise Pollution Act, approved in the year 2000, requires that all local authorities draw strategic noise maps for preparing or reviewing their Land Use Plans.

Noise maps are very powerful tools for communicating results of assessment of environmental noise to the public and also for technicians to devise noise correction measures and to study alternative scenarios.

Noise maps can be drawn from measurement or from calculation. The latter is the preferred method, since they lead to models consisting of data bases that can be updated and changed by inputting new land, object or noise source data. The Harmonoise project, which will be finished in the course of this year, is developing a new calculation method for drawing noise maps that is to be adopted by all EU member states. The EU Working Group on Assessment of Exposure to Noise has produced a first version of the "Good Practice Guide for Noise Mapping" which was published in various countries and is available in the internet.

Figure 1 shows an extract of a noise map showing residential and commercial areas and road traffic as the main contributor to the ambient noise.

These maps can be used to study and test new urban scenarios and solutions, in terms of layout or traffic, with checks on the resulting noise.



Figure 1. Extract of an urban noise map.

### 3. ACTION PLANS

Action plans are required in the European Directive and also in different national legislations. They are part of the long-term strategies to reduce the number of people affected by noise. These plans find their most complex application in urban areas. Possible solutions are of various types: technical, behavioural and educational.

Technical solutions are to be applied with the utmost care not to affect the rhythm and socio-economic fabric of the city.

The optimal programme results from the combination of solutions of all types.

Costs have to be programmed and linked to the achievement of results. However, although some benefits can be obtained in the short-term, some will only be apparent in the medium and/or in the long-term.

### 4. SOUNDSCAPING

The improvement of the acoustic environment is achieved not just by reducing the quantity of noise, but also by increasing its quality.

The information in the noise maps is not well correlated with annoyance or perception of noise by the people. They just convey an image of the quantity of noise, overall or from differentiated sources.

Studies are currently being conducted at CAPS/IST, Lisbon, to draw qualitative noise maps using perception of noise as part of the measuring (assessment) process.

Figure 2 shows extracts of a quantitative noise map (A), drawn from calculation of emission and propagation of the sound fields, and of a qualitative map (B) obtained from perception showing the limits of audibility of the prevailing noise source such as it is perceived in the area (road traffic noise).

These qualitative noise maps can be used by urban technicians and architects working with noise in urban areas, since they provide information on how the citizens perceive the urban soundscape.

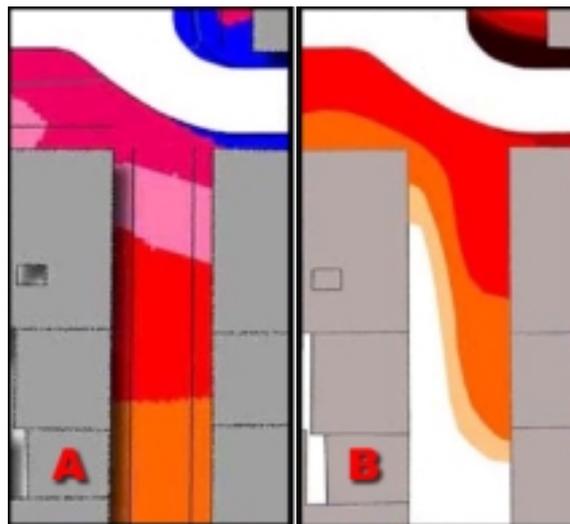


Figure 2. Extract of a quantitative noise map (A) and a qualitative map (B) of the same area.