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Noise Mapping in Eastern Europe - Problems and Solutions

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1. INTRODUCTION

In this presentation - based mainly on the Hungarian example - we discuss the legal, technical, professional and administrational experiences, problems and solutions of the region's members states.
After the acceptance and implementation of the Environmental Noise Directive (END) noise mapping began in Eastern Europe.

2. IMPLEMENTATION OF THE DIRECTIVE

The implementation of the regulation was completed by almost all member states in the area in due time.
Difficult problems of the legal regulation had not appeared in the technical or professional issues but in defining and recording the implementation/performing competences.

- Who shall be the obligor?
- What roles and tasks each person has in the implementation and control?
- How could this method be implemented into the already existing administrative system?

It was especially complicated considering the agglomerations.

- Which settlements should be concerned in the noise agglomeration and what kind of cooperation should be among them?
- Is it necessary to point out a project coordinator or director?
- How can the cooperation be realized between the towns?

All these questions necessarily arise with a financial point of view as well....

Approximately half of the member states that replied to our questions solved the problem by neglecting the agglomeration outside the cities, marking out the project borders same as the administrative borders of the cities with the population number 250 thousand or more. Therefore, they prepared the noise maps and action plans only for the cities instead of the whole agglomeration areas! This way most of the problems of competences and coordination were solved.

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We also had to face another difficulty in Eastern Europe as environmental noise being the „stepchild" of environmental protection. It means that the towns obliged to prepare noise maps do not employ a trained and experienced professional or an executive assistant...

3. THE BUDAPEST-AGGLOMERATION

Budapest and its agglomeration area expands not only to the borders of the city but it includes further 22 neighboring settlements. Next to this problem, the 23 partly independent district municipalities within Budapest made it even more difficult to define the competences.

It practically means that in this project 46 municipal administrations had to / should have had to cooperate in an area where they absolutely lacked previous experience. (It was/should have been particularly important when the action plans were prepared...) Next to solving the technical and professional problems, it also has to result in financial agreements.

Along with the question of competences, it was necessary to uniformly define certain matters among the towns of the agglomeration.
For example: Which roads should be consider on the strategic noise maps? A city of 1,5 million inhabitants looks differently at this question than a town of 5000 people. In order to make a uniform strategic noise map for the agglomeration, these questions had to be answered – and the regulation did not specify requirements concerning them.
Smaller towns sent data of roads with trifling traffic volume while in Budapest some main roads of significant traffic load were not indicated to be shown on the noise map. These differences had to be harmonized in a single system.

It was the task of the local professionals and administration to decide the requirements for the noise calculation. The directive was open to the opportunity for using national methods. Most of the region's member states made their calculations according to the interim methods. In the Hungarian case the calculation method that had been used for decades was altered according to the requirements of the directive, and the noise maps were prepared with this method accordingly.

4. NOISE MAPPING OF INDUSTRIAL NOISE SOURCES

Making the noise map for industry raises a special issue. What details and accuracy are necessary to represent the caused noise immission?

It is a sensitive question since in the IPPC method the critical noise immission is usually measured independently from the noise mapping, making measures only in certain singular measurement points. However, the map has to show the actual noise immission in all rasterpoints of the environment. Accuracy is a delicate question in this case since it is not at all irrelevant from the owner's point of view what noise pollution around his factory is presented to the wide public. For him, it has an immediate economic and financial effect – for example he can lose money due to the changing stock exchange rate. (This problem has actually occured in Hungary.)

In order to obtain correct results however, a detailed noise source analysis should be performed for all noise sources of the industrial plant (noise power level, direction, etc.), because these data are not available at present. The production of these takes a significant amount time and money.

One solution for this problem was to show the whole area of the plant with a uniform area source. However, with its problematic accuracy the previously mentioned questions arise.

5. THE MAI PROBLEM: THE MISSING OF DATA

And as we reached the problem of basic data, we have to emphasize that the biggest difficulty in the region's noise mapping was the missing basic data.

What were the most critical elements of it:

- The terrain modell of the investigated area was not available – most of the available plans did not contain height data;
- Neither road traffic, nor railway traffic data were available separately for daytime, evening and night;
- A reliable database regarding the function of the buildings did not exist (in Budapest for example, the Ferenc Puskás Stadium was indicated as a residential building...)
- The buildings and the related number of residents were parts of two different databases. Assigning them to each other was also a complex task...
- The problems in connection with the industry has already been mentioned.

And all of these was just one part of the difficulties to be solved. The missing data were mostly supplied by their generation during the project (measurements, on-the-spot checks, measurements etc.). Therefore the production of the missing data became part of the noise mapping project, however in principle it should have been previously available. A significant part of the budget was spent on data production.

Local regulations regarding the requirements of the directive differed in many aspects. These matters do not seem essential, though they are crucial from the performance point of view.

What are these?

For example:

- Is it obligatory to prepare conflict maps? (Lithuania/LT-no, Hungary/H, Poland/PL, Slovenia/SLO-yes)
- Is it necessary to print the maps? (H, PL - yes, LT, SLO – no) In what scale/ratio and how many copies? (For Budapest this obligation means the printing of ca. 3600 colour A0 sized noise maps... – HIGH COST!!

6. ACTION PLANS (??)

Regarding the preparation of action plans much less information is available and we have relatively little experience and practice in the region concerning it. Many member states have not prepared their action plans yet.

Here we present our experience mainly in Budapest.

After the production of the noise maps the obligor administrative body of Budapest compiled its „action plan” which, in this case, meant implementing the already decided, expectedly noise reducing interventions into one system. (In practice there was no new noise reducing decision made based on the results and investigations of the noise maps...)

This list of actions was handed over to us to work on. Since these actions were not compiled by skilled noise experts, they had to be revised and grouped by professional aspects.

It happened according to the following steps:

- Is the noise source controlled by legal regulation? (e.g. the noise reduction of a discotheque is not this kind)
- Does the action result in actual noise reduction? (Or just the opposite – It actually occured in some cases!)
- Is there appropriate data for the evaluation (e.g. actions like „reduction of traffic" – is it a general traffic reduction, or only reduction of trucks, or temporal reduction?)
- Are the data sufficient for the calculations, is it possible to generate the missing data?

After grouping the actions according to the above steps, approximately half of the given actions were appropriate for calculating the number of affected people by noise.

We examined the effect of about 100 actions in Budapest. (Including the construction of a new underground line as only one action for example…)

What were the actions typical in our region (here we took into account information given by other member states):

- Reduction of speed – ca. 20%
- Construction of by-pass roads – ca. 10% (LT – 30% !)
- Reduction of the sources – ca. 5%
- Development of the public transport –ca 4-5% (!!)
- Use of alternative traffic mode (bicycle-roads) – 0-5 %
- Passive protection (noise barriers) – 15-20%
- Renewal of the road surface/railway track – 20%
- Change of the land use – 10%
- Reduction/allowance of the traffic flow – ca. 10%

In performing the action plans most of the inquired member states had to face the following problems:

- Financial difficulties
- Very short deadlines
- Problems of competence
- Inefficient problem-solving methods (lack of expertise, lack of political will…)

Based on the experience of the Hungarian implementation, concerning the action plans we suggest the following:

- Strategic noise mapping and the preparation of action plans must happen parallelly – it is unadvisable to begin the action plans only after the production of the noise maps
- Publicity need to have more importance! (It was realized with serious deficiencies in the area…)

Regarding the economic efficiency of the realization of the noise reducing action plans, in the frames of a university research we developed a process including the adaptable methods of cost-benefit analysis. We found the so-called benefit transfer method the most applicable in our project.

With the method of contingent valuation we investigated what financial sacrifice the different noise-affected population would make in order to reduce the noise. Based on the results we wrote up a guideline showing how much benefit the population gets by reducing the noise level by one unit, or in other words: how much harm is done to the population by increasing the noise level by one unit.

In order to compare the costs and future benefits, it was necessary to determine the time lag and social discount rate next to defining the cost and annual benefit for each alternatives of the action plans.

In the evaluation of the present value of the costs and benefits we used the Net Present Value (NPV) index. If the NPV is a positive number then, for that case, the benefits of the noise reducing action plan exceed the costs; if the number is negative, than the costs are higher than the benefits.

In this presentation we cannot tell you more about our experience, but please feel free to contact us if you wish to hear further information.

Finally, we asked the representatives of the member states that - in their opinion - how far the policy makers use the database and its noise-map-based information content in everyday decision-making.
The answers differed greatly. Showing its results in a ten-digit-scale: they estimated the use between 1 and 7. (That is, seemingly in some places this information is not used at all...)

We have just taken the first steps in the field of noise mapping and preparing action plans. In order to help the realization of the goals, necessary corrections - based on the experiences - have to be made. In spite of the initial difficulties we can already see that the legislation on handling environmental noise does and will help the fight against noise-pollution to a great extent.