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Budapest Noise Mapping Project I. - Experiences

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Abstract

The hungarian capital Budapest, and their agglomeration have recently finished their first strategic noise map. According to the hungarian noise regulations and to the European Directive 2002/49/EC, this is a legal obligation. The main part of the costs was supported by the EU. The preparation of the strategic noise maps based on a computer model and describing the present noise situation of the municipalities, should be seen as the first step to build a true noise information and management system, based on the computer model initially developed.

It is well known: for accurate noise mapping, topographic, traffic and acoustical informations are essential. The first (and the biggest) problem was: how to get in the accurate topographic and traffic informations for such a big area, how can we use this existing datas – or how can we produce the missing datas? The assumption of a successful noise mapping project was the excellent cooperation between the different specialities.

The main parameters of the project were:

- the planned area: 1100 qkm
- number of dwellings 440 thousand
- length of the mapped roads ca. 2000 km

This paper based on the experience of 23 municipal noise maps - Budapest and other 22 settlements in the agglomeration.

We finished successfully the project in time – the results (all maps) can be found on the internet-page: http://terkep.budapest.hu/website/zajterkep

The first paper deals with the technical experiences of the project, the second shows the results of it.

1 Introduction

Budapest Noise Map has been developed by a consortium of 7 firms collecting tho most sophisticated experts of Hungary in the fields of geodesy, traffic planning, noise control and informatics.

After some pilot works in noise mapping – managed by the Ministry for Environment and Water Management – there has been outlined, what problem are to be solved, which fields of experts are to be called in. These maps had been drawn of **Sopron** (west-Hungary), **Szentendre** (north of Budapest), **motorway M1-M7** and **railway No.1** near Budaörs (west of Budapest), and **three districts of Budapest** (III, V and XI).

We are glad to have had a highly qualified and expertized team to fulfil the first phase tasks of Directive 49/2002/EC. The maps of motorways, railways and Ferihegy Airport was developed by expert Institute of Ministry for Economy and Traffic.

You find our results on the website

http://terkep.budapest.hu/website/zajterkep_html/,

but the next paper in this session deals with our results too.

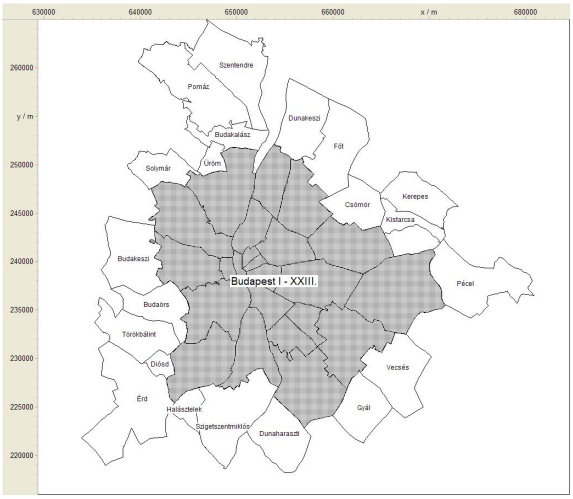
I will tell you about the experiences of our work in collecting necessery data and developing the noise model.

2 Geodesy

The working area of the Budapest-agglomeration consists the grey area of Budapest, and the white ring of the first neighbour ring of 22 settlements:

The whole area is cca. 1100 km^2, number of altitude points 75 million, number of buildings 436 thousand, inhabitants 2,1 million, total length of modelled roads 1870 km.

The geodetic model was defined in EOV (Hungarian Standard Ellipsoid)-coordinates, was delivered in Arc-View shape format, and had a characteristical accuracy of 0,5 – 1,0 m.



The working area

The model was defined in shp-layers with the topics as follows:

- administrative borders;
- land register borders;
- altitude points;
- altitude lines;
- bridges;
- walls;
- green areas (forests and fields > 1 ha);
- buildings (more categories: various schools, hospitals, buildings with and without inhabitants etc.);
- road and railway axes;

The data set was resulted from stereo fotogrammetry. It was very interesting to learn the different way of thinking of

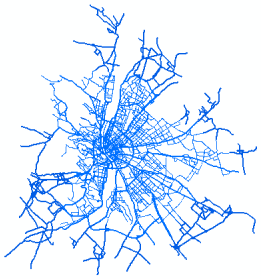
geodesy and noise modelling: for example in defining the ground height around bridges.

3 Traffic planning

The traffic network of the town was drawn up by two expert teams: the traffic planners and the geodetes. There was defined the points of the graph (crossings, ends of homogenic street sections), then the network was built in the geo-model.

It was not easy to define which streets are to be modelled. The tender consisted a list of streets, but it was not equal weight of functions. A little village has a different point of view as a capital when rating the importancy of a street.

Our team of traffic planners had a model of the town that has been developed since many years, but that was the first time to use it as a whole network. They had a task to modell it on a greater area to have little discrepancies an the working area border (see figures).



Traffic network on the working area

Used network to calculate traffic data on the border of the working area

The traffic data were collected in shape data set, and consisted all parameters that are needed to calculate noise: traffic volume in three sections of the day, traffic speed, section widths, overlays etc. Some problems were with interfaceing with other noise mapping works (e.g. on the working area border with the motorway data).

The data related to railways and little airports (there are 5 on the working area) were collected from the timetables or by declaration of the airport.

4 Industry

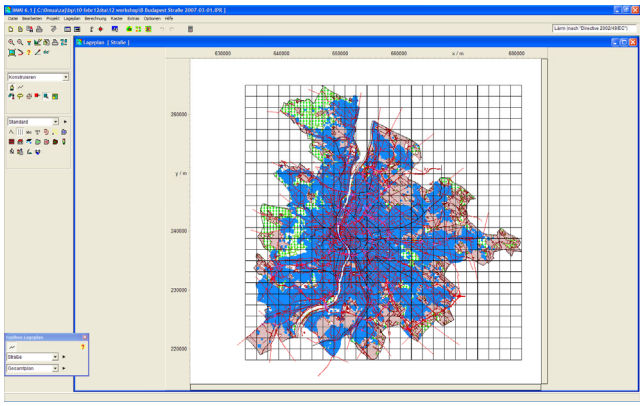
The main question was: what kinds of idustrial plants are to be mapped?

There are a lot of little, but noisy “industries”, whose noise makes conflicts in their neighbourhood. But there are large industrial areas too, that have noise, but no effect on dwelling areas.

On the noise map of Budapest we dealt only with so called “IPPC-plants”. Their data were collected by declaration or by measurement.

5 Calculation

The noise map was calculated with software IMMI, with the technique “segmentation” (625 segments were defined). The software was runned on 60 machines



Segments defined for calculations

The whole documentation consisted of 133 maps (hardcopy in format A0), noise imission maps, conflict maps for road, rail and air traffic as well as for industry – both Lden and Lnight. The metric was 1:15 000.

All the data gathered and calculated were built into the informatic system of Budapest Town Hall. We hope, that this database will serve as the basis of next planning works – not only of noise.