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ENVIRONMENTAL NOISE REDUCTION OF LARGE INDUSTRIAL PLANTS

I. Dombi*, M. Bite**

* PLC for Quality Control and Innovation in Building, DiószegI UT 37, H-1113, Budapest, Hungary

** Institute for Transport Sciences Ltd, Than K. UTCA 3, H-1119, Budapest, Hungary

Tel.: (36-1)361-40-46 / Fax: (36-1)361-40-46 / Email: idombi@mail.emi.hu

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ABSTRACT
The evaluation of noise reduction in a large Hungarian power stations needs such methods which are capable to follow the expected results of planned technical solutions in noise reduction. Using our method we may have the expected results without establishing technical structure of the noise reductions. The method is based on the SOUNDPLAN computer program. The actual poster lecture presents a total acoustical planning procedure including ways of noise pollution's reduction.

1 - INTRODUCTION

In order to evaluate noise reduction of large industrial and power plants and to monitor the effects of changes in power plants, the claim to prepare a calculation that provides the possibility to monitor noise emission has arisen. This goal has been reached by means of preparing the studied industrial plant's environmental noise emission map, based on the data of the noise sources of studied industrial plant, of the auxiliary measurements performed, and of both the planned and the already realized noise reduction work, processed with the noise emission- calculating program **SOUNDPLAN**. The resulting noise emission map makes noise distribution and the effects of changes visible. Map representation of noise area gives an effective aid to planning.

2 - APPLIED METHOD

The method applied is color-code map representation (areas at equivalent noise pressure level are the same color), based on computer-aided area analysis checked by on-the-spot (calibrating) measurements. We prepared the examined power (industrial) plant's noise emission map by processing data from the upkeep completed with on-the-spot emission measurements. The applied mathematical model was connected with the real area by a suitable number of reference measurement points in the emission area, practically "calibrating" calculation this way. Measured and calculated emission values were put together with correcting sources' noise power data. With the suitable concord, such a graphic noise area has been available, which immediately shows the effects of any planned noise reduction of noise sources without really building up a noise reductive structure. Due to calculation's precision being determined by precision of available data, it is highly important that noise sources' emission data must be as precise as possible! Sources' data must be of **noise power** character. In case of large noise sources, real noise power is very difficult to be determined − there is not even any internationally accepted measurement method to that. Making source data more precise requires **"calibration" references points** and applying them when putting real and model noise area together. By means of **a database built up by this "approximate" correction**, model noise area can be precise enough to show the effects of changes.

3 - RESULTS

We have prepared 11 possible versions of the noise reduction of the shown industrial plant, considering basic cases claimed by the upkeep.

Calculation results are documented in 11 map sheets. There is a sample figure attached too, to illustrate representation form of the results (Entire poster lecture includes 11 maps.) Immission points' noise load values have been numerically given too, in case of all the 11 versions in map. (Numeric data are also in poster.) Data illustrated in noise area maps **include only power-plant-originating noise pressure levels!** Other sources (e. g. public road traffic, other plants' noise emission, etc.) are not illustrated in the maps because they are **not part of the power plant's noise emission!** In reality, noise load can never be measured so precisely by on-the-spot studies because the plant's constant or slightly oscillating noise load is generally comparable with or is close to the noise pressure levels of the broad dynamic ranged (background) noise originating from other sources, or is even within the dynamic range of that. Situations illustrated in the maps have been selected considering experiences with many years' noise reduction activity, and noise reduction plans and ideas brought up during the work. Due to high costs of noise reduction work, only those ideas have been realized whose efficiency had been able to be proved by means of measurements. **In our opinion, the power plant has reached such a stage of noise reduction when, thanks to the technical reshaping, distribution of noise load has been homogenized, that is to say, there are no noise sources giving excessive noise load**.
Individual treatment of the many sources with slight noise power difference results only small effects in the distant immission points and cannot even be proved by measurements in the immission points. **Except at very late night, power-plant-originating noise load has been cut down beneath public road noise load in several points**.
Noise map makes industrial area effect analyses more precise, determination of noise-load-concerned area more effective and decisions relating to noise load easier.

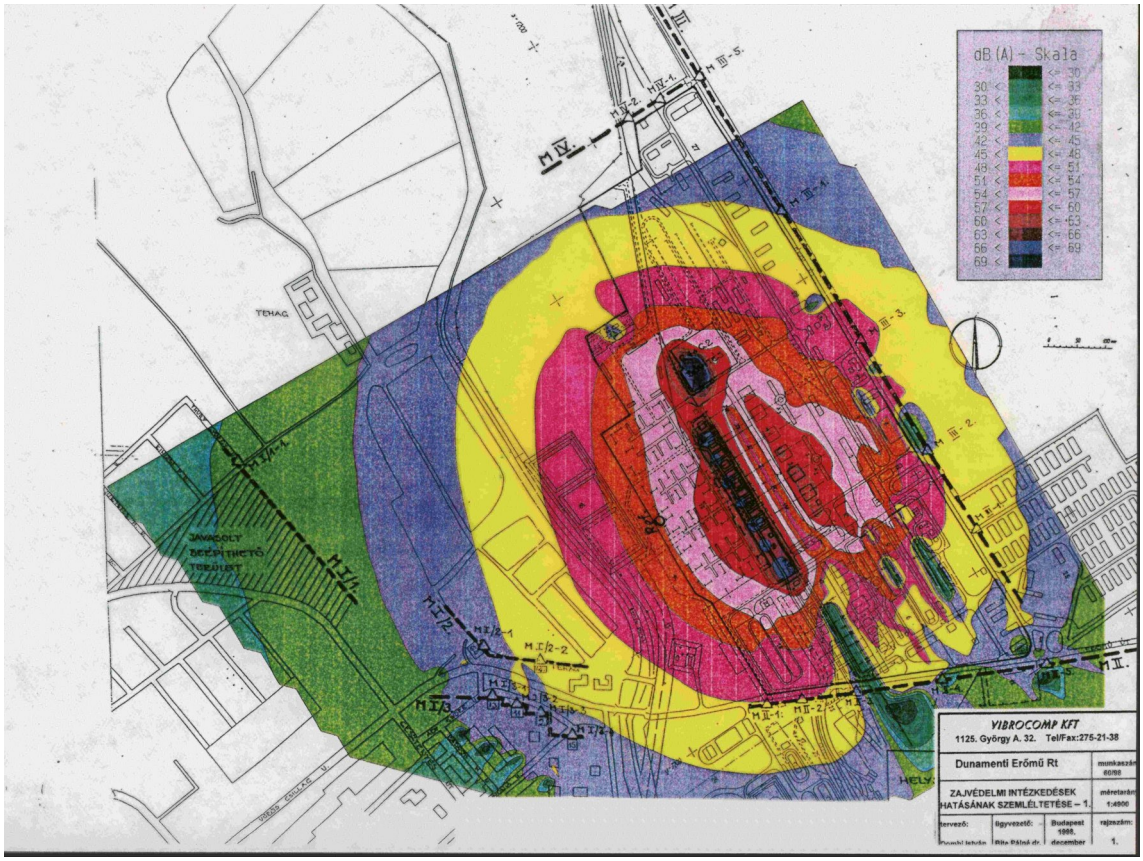

Figure 1: Noise map of a power plant.

4 - CONCLUSION

Map illustration of noise load makes determination of real noise load more precise than do the on-the-spot measurements because it clearly illustrates the entire area to be protected and it considers only the studied source's noise load. Due to its precision, it is appropriate to aid official decisions, to be applied when preparing noise-reduction-related economic decisions and to preliminary effect-analyses of technical

noise reduction plans. Using noise maps in environmental protection is an efficient, cost-effective planning method.

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