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EURANO99: POLICY TOOL FOR STRATEGY OF RAILWAY NOISE

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ABSTRACT
This paper presents Eurano99: A noise policy tool for monitoring and prediction of large scale impact of railway noise. This tool was recently used for two mayor European studies: (1) Cost-Benefit Analysis for European Rail Noise Abatement, to support the decision making process of the UIC brake block initiative and (2) Economic study for Silent Track, Silent Freight and Eurosabot, to support the decision making process of introduction of source measures on railway noise. Eurano99 Data Manager is the tool for data collection used by DB-AG, SNCF, SBB and NS Technisch Onderzoek. The Eurano99 database has information on two mayor European freight railway lines Rotterdam-Köln-Basel-Milano and Bettembourg-Lyon. Eurano99 Analysis calculates for source reduction scenarios, noise legislation scenarios and/or traffic scenarios the noise impact and cost and extent of forced noise measures.

1 - INTRODUCTION

Eurano99 is an improved and enlarged tool of the Gerano software. Development of the Gerano concept started in 1995. Eurano99 combines two comprehensive tools (1) Data Manager for collection of national data and (2) Analysis for calculation of noise impact and cost and extend of forced noise measures for different scenarios. For the UIC sponsored Cost-Benefit Analysis (CBA) study data collection was undertaken by a team of noise researchers in Germany (DB-AG Forschung Zentrum), France (SNCF Direction de la Recherche), Switzerland (SBB) and The Netherlands (NS Technisch Onderzoek). Data exchange to a central data set was undertaken with internet connection. For both the CBA study and the Economic study calculation of noise scenarios was undertaken for one combined data set on a central computer. Figure 1 shows the way above mentioned companies work together with the Eurano99 software tools.

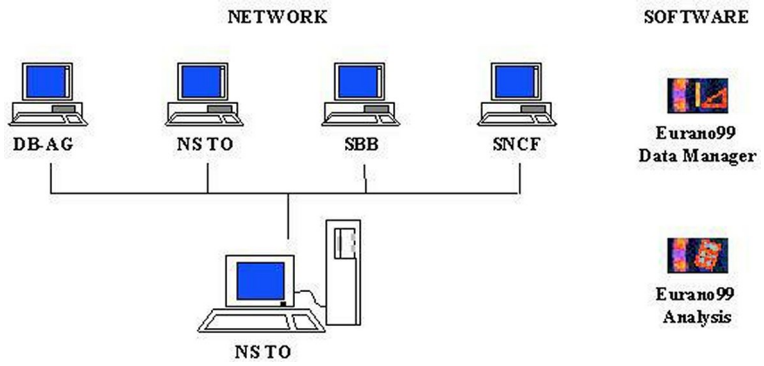

Figure 1: Network configuration and software tools for collection of national data and for noise calculation.

2 - EURANO99 DATA MANAGER

Geographical data collection is undertaken on the basis of 1:25.000 topographical maps. Geographical elements are railway lines, urban areas and individual houses. Figure 2 gives two samples along the Germany and French part of the railway line. Data collection is undertaken by individual railway companies within national co-ordinate systems. This concept gives many opportunities to use national general topographical information and to use available railway data within the company.

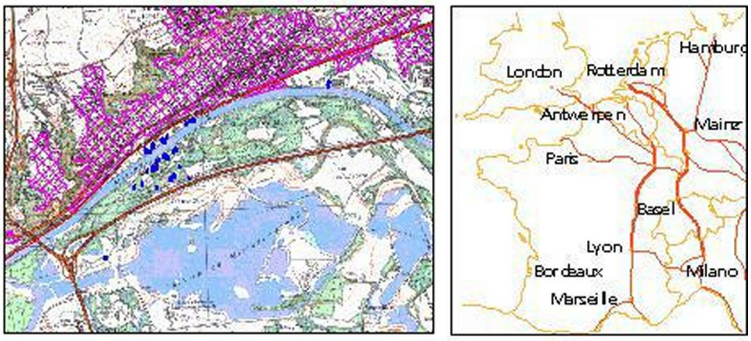

Figure 2: Sample of geographic data collection with Eurano99 Data Manager along the French part of the railway line and an overview of the European dataset.

The input of the railway line related data is undertaken by the geographical interface. In the Eurano99 data model railway line related data does not have geographical information. A connection to the geography is made by a code of line number and meter position. This concept in combination with the use of a database improves performance and keeps data sets compact. Railway line related data is supported for number of (meter) trains per hour, train speed, track construction, tunnels, noise barriers and track height. To meet local noise prediction methods Eurano99 supports a combination of 30 train types and 30 track types. Figure 3 gives two samples.

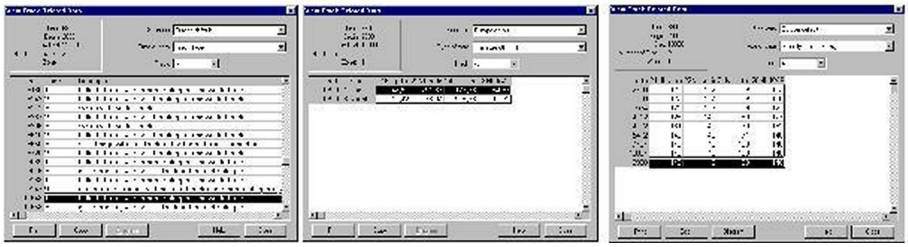

Figure 3: Sample of railway line related data collection (track type, number of trains and train speed).

3 - EURANO99 ANALYSIS

To be able to calculate different scenarios for one combined European data set, national sets of Germany, France, Switzerland and The Netherlands were combined within Eurano99 Analysis. For compiling this combined data set the tool supports two way geographical transformation between Rijksdriehoeks co-ordinates (The Netherlands), Gauss-Krüger co-ordinates (Germany), Schiefachsige winkeltreue Zylinder-projektion (Switzerland) and Lambert 2 (France) via WGS84.
A schematic presentation of the Eurano99 modules is given in figure 4:

- Management of geographic data.
- Management of traffic scenarios.
- Noise creation (variable).
- Noise propagation.
- Noise legislation (variable).

- Noise annoyance (variable).

Three modules can be adapted to specific policy questions like: What measures are forced to meet a 60 dB(A) limit? What is the consequence of source measures for freight wagons? What is the consequence if the freight traffic volume will increase with x %? Results of Eurano calculations is the noise impact and cost and extend of forced noise measures for a specific noise policy scenario.

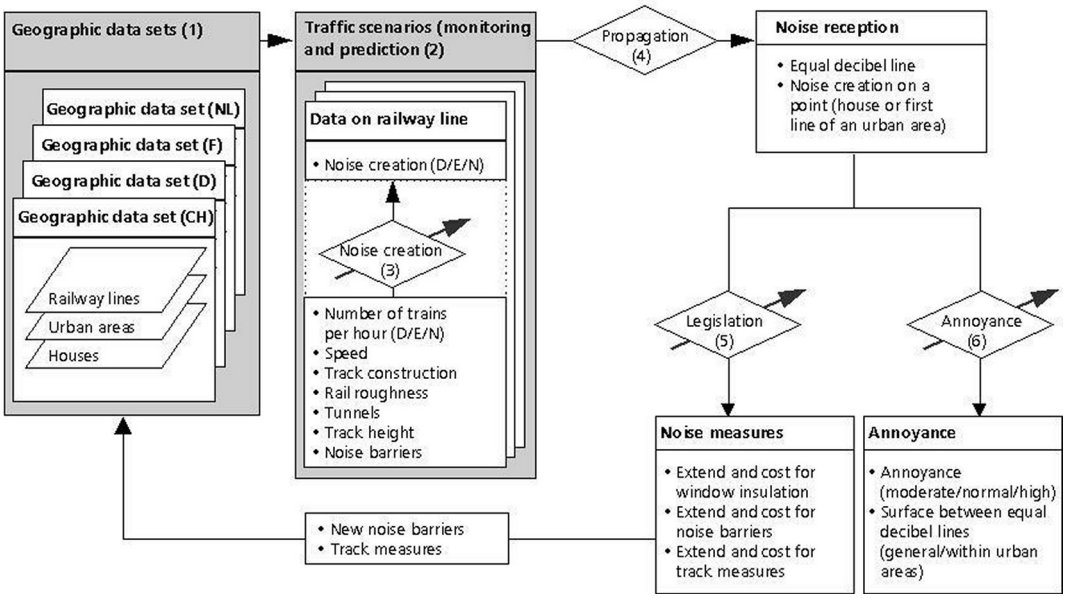

Figure 4: Schematic presentation of the Eurano99 modules: data management, noise creation, noise propagation, noise reception, noise measures and annoyance.

Eurano99 supports 30 different kind of train types. Noise creation values are approximated to national prediction methods. Train types that run on those two freight lines are selected for the purpose of those projects. The noise creation default values are given in figure 5.

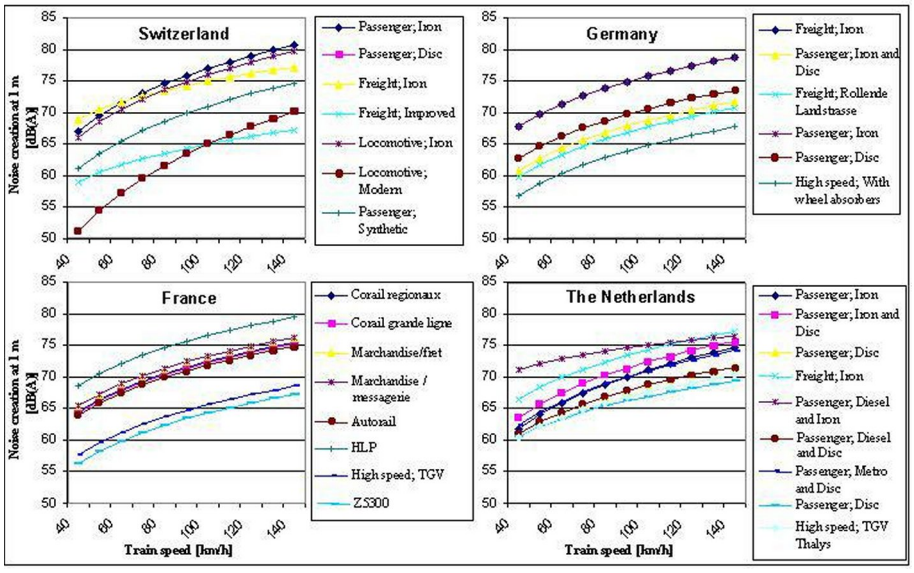

Figure 5: Eurano99 default noise creation values used for the projects [1] and [2].

4 - CONCLUSIONS

Eurano99 is a proven powerful software system for support of large scale noise policy questions. Eurano99 can handle thousands of kilometers railway lines including urban areas and houses within a zone of about

1000 m. A wide variety of questions are tested in the studies Cost-Benefit Analysis for European Rail Noise Abatement [3] and Economic study for Silent Track, Silent Freight and Eurosabot [4, 5]. Further improvement, enlargement and use of Eurano will be made in the EC/UIC sponsored project STAIRRS.

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