



EIONET Noise Newsletter

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1. Editor's Note

Dear EIONET Noise Newsletter readers,

This is the Millennium Issue! A special year? Well, hopefully yes, for whatever regards noise issues in Europe! The best way to start is with this really interesting Newsletter which contains lots of information from many activities in different areas.

We should begin with the main issue of the new EU Noise Policy preparation process. The September Review has set the pace and the Working Groups are starting to deliver.

Thanks to the European Commission (DG-Environment) which is promoting transparency through the whole process, it was possible to obtain and publish the progress reports from all the active WGs. At this point I should mention that these reports were produced by the WGs and in that respect they do not necessarily reflect the official opinion of the European Commission and they do not commit in any way the WGs themselves.

However, they will give the necessary information on the way in which the various noise issues are developing and contribute to an open and meaningful discussion for the best possible preparation of the future EU Noise Policy.

Some time ago (June 1998) the Joint Transport and Environment Council invited the European Commission and the European Environment Agency to set up an indicator-based Transport and Environment Reporting Mechanism (TERM). The first report from a series of regular reports on the transport sector was published in December 1999 and it is entitled "Are we moving in the right direction ?" From this report, I present in our Newsletter, a section prepared for the noise indicators on transport and environment integration in the EU. Your comments on this work are most welcome.

Noise was highlighted among the top four priority areas for policy action in Norway according to a Government report to the Parliament at the end of 1999. A short presentation of that document has been prepared for our readers and can be found in the following pages.

A subject of particular importance is the work on noise issues undertaken by national institutes throughout Europe. So I introduce this series of insights into the work for noise starting with the RIVM in Netherlands. RIVM is a public health and environment institution which currently is responsible for the preparation of the national noise mapping.

This Newsletter includes as well the conclusions from a meeting in the Municipality of Madrid of European experts on acoustic pollution.

Last but not least, we are expanding our noise national reference centres/contacts in Europe to the central and eastern European countries (CEECs). Many countries such as Czech Republic, the Former Yugoslav Republic of Macedonia, Poland, Slovakia and Slovenia have responded to our invitation to follow our work and co-operate with us exchanging experience and knowledge. In the next Newsletter I hope to have contact information on the nominated noise experts and reactions from more countries. This approach was realised thanks to the help from our in-house PHARE team.

A major challenge for the years to come is to ensure proper dissemination of information to the general public, this is why a decision was taken to publish this Newsletter on the Agency's website. You are invited to visit it in the <http://themes.eea.eu.int/theme.php/issues/noise> where you can also find a lot of information for WG4.

I would like to take this opportunity to wish every happiness to you and your families on the occasion of this new year.

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2. EU Noise Policy News

The first meeting of the Steering Committee on Environmental Noise Policy was held on 22-23 September 1999. The Steering Committee consists of representatives of the Commission services, member States delegations, Industry representation from Road Transport, Railway, Industrial machinery and Aviation sectors, NGOs and Local Authorities networks. Its task is to support the Commission with the development of the noise policy by monitoring the work of technical working groups and by discussing policy options.

WG1 has finished its work and presented its Position Paper on the indicators for noise exposure. This Position Paper will form the basis for the harmonised indicators in a proposal for the future Directive on Environmental Noise.

The WGs on Dose/effect, Computation and measurement, Noise mapping and Abatement methods presented annual reports and the WGs Cost-benefits and Research presented progress reports.

Furthermore, DG-Environment's preliminary ideas on a proposal for a Framework Directive that reflects the principles of the Noise Policy were discussed on the basis of a document circulated during the meeting. The Steering Committee supported in general terms the principles of the preliminary draft for a Framework Directive meanwhile a more complete draft will be ready in some months, in time for a further Spring meeting.

The intended directive includes among others the harmonisation of indicators and assessment methods for local noise mapping, aircraft noise and the presentation of proposals to Council and Parliament on EU goals, strategies and measures.

Below you can find the EU Noise Policy WGs annual progress reports.

We received the progress reports from the European Commission (DG-Environment). As already stated in the beginning, be aware of the fact that these reports were produced by the WGs and in that respect they do not necessarily reflect the official opinion of the European Commission, the EEA or any other European Communities institutions. Furthermore they do not commit in any way the WGs themselves.

We have not received any paper regarding the WG3 Computation and Measurement progress yet. As soon as we got news from this Group we will try to publish it as a supplement.

2.1 WG2 Dose/Effect

WG 2 - DOSE / EFFECT FIRST YEAR PROGRESS REPORT November 1999

Terms of reference

In order to assist the preparation of EU's Future noise policy, WG 2 has launched a 4 year work programme on dose/effect issues. This programme started one year ago, after the Conference held in Copenhagen (September 1998) and will be finalized in 2002.

According to the terms of reference this programme will:

1] Provide dose/effect relationships for annoyance, sleep disturbance, speech interference (and other effects if necessary) specifically addressing types of noise, combined effects and vulnerable groups.

2] Provide proposals for remaining noise indices (covering cases not comprised by proposals of WG 1).

3] Define needs on dose/effect research and play an active role in the initiation and co-ordination of that research.

4] Make proposals for the dissemination of information to the public and to authorities (national, local and regional).

5] Make a proposal for the setting of targets by authorities making use of harmonised dose/effect relationships.

6] Co-operate with WG 1, WG research, ISO WG and ICBEN.

Since the Copenhagen Conference four meetings were held: Paris (January 1999), Leiden (February 1999), Lyon (June 1999) and Brussels (September 1999).

Members of WG2 are experts from different EU countries and also representatives of NGO, WHO, Industry and cities.

Work carried out in 1999

Work carried out in 1999 focused on tasks 1 to 3 and 6.

Task 1: Provide dose/effect relationships

An outline of skeleton report for the position paper based on a consensus is available. So far current knowledge has been identified in first draft working papers prepared by: B. Berry (Noise concept, forthcoming meeting, September 1999), B. Berglund (Health concept, February 1999), I. Lopez-Barrio (Noise pollution and sustainable development, February 1999), S. Thompson (Psycho-physiological effects of noise, February 1999), and H. Miedema (Exposure-response relationships for noise annoyance, forthcoming meeting, September 1999).

a) Annoyance

- Sufficient scientific evidence but less known for cultural factors. Dose-response curves as well as threshold levels are available for road, rail and aircraft noise (strongest reaction) but uncertain for industrial noise and lacking for other environmental noise sources.

- Questions to be addressed: Appropriate to simply use % highly annoyed? What is the best noise metric to predict annoyance? Effects of insulation and quiet side? Causes of between study variation? Annoyance due to combined noise sources?

b) Interference with speech communication

- Sufficient scientific evidence for tonal and white noise, but less is known for real environmental sounds like road, rail and aircraft noise as well as for combined effects and vulnerable groups.
- Dose response curves as well as threshold levels are lacking for long term exposures to environmental noises (exist for self-reported speech disturbance).

c) Sleep disturbance effects

- Sufficient scientific evidence for effects; dose response curves as well as threshold levels are available only for probability of awakening but less is known for time to fall asleep, difficulty to fall asleep after awakening, early awakenings in the morning, and after effects (in the day) as well as for combined effects.
- Questions to be addressed: Is sleep disturbance adequately covered by awakenings - Most studies used small samples - Disagreement between results of field and laboratory studies - Effects of building insulation - Sensitive groups and persons with sleeping problems.

d) Effects on performance (reading acquisition, learned helplessness) and productivity

- Sufficient scientific evidence on performance (complex tasks, different environmental noises) including reading acquisition in children due to aircraft noise but not due to road and rail. Less is known for productivity and learned helplessness.
- Dose response curves as well as threshold levels are however lacking
- Questions to be addressed: Reading acquisition in children due to road and rail noise – Dose-response curve for aircraft noise on reading acquisition in children.

e) Other effects

- Non definitive or inconsistent evidence for mental health effects (hospital admissions, aggressiveness, psychological health) and for psycho-physiological effects (stress complex, hypertension, ischemic heart disease, birth weight) with the exception of a potential effect for traffic noise on ischemic heart disease.
- Dose response curves as well as threshold levels are lacking.
- Questions to be addressed: Dose-effect for combined effects (e.g., annoyance + sleep disturbance + hypertension) and especially for vulnerable groups (children, hearing impaired).

Task 2: Remaining noise indices

Ongoing task in WG 2. Points under discussion: number of noise events or/and Lmax for specific effects (e.g. for sleep disturbance or for speech intelligibility) or for specific sensitive environments or for sensitive time periods (nights in particular).

Task 3: Research needs

An inventory of existing materials on dose/effect relationships based on the literature (1994-98) has been carried out.

More than 140 studies carried out in industrialized countries (Europe, USA, Japan and Australia) have been compiled. Most of the studies deal with annoyance, sleep disturbance or physiological effects of noise.

From this inventory as well as from a supplementary inventory of recent lists of research needs published by for example WHO, U.K. IEH and the Dutch HCN, current research needs were identified. A list of 36 short and long term research topics were proposed to be relevant to the terms of reference of WG 2, and were then prioritized. After a general discussion (Leiden meeting) a program proposal of research (including 10 basic projects) on dose/effect relationships in the short term were prioritized by WG 2:

Project 1: Dose-response relationship for annoyance (H. Miedema, I. Lopez-Barrio, J. Palma)(*)

- Effects of the degree of insulation and of a quiet side of the building on dose-response for annoyance for road, rail and air traffic.

- Cultural differences including social behaviour restrictions between countries (north/south)

Project 2: Dose-effect relationships for school performance in children (S. Stansfeld, M. Haines, S. Hygge, B. Berglund, E. Ohrström, E. Lebrecht)(*)

- Effects not perceived or complained about, e.g. auditory comprehension, language acquisition, early learning targeted on children (aircraft, road and railway noise)

Project 3: Dose-effect relationships for sleep disturbance (B. Berglund, E. Ohrström, B. Griefahn, W. Passchier-Vermeer)

- Effects of the degree of insulation and of a quiet side of the building on dose-response for sleep disturbance (road, rail and aircraft noise)

- Effects on sleep during night-time including annoyance the following day(s), delay in falling asleep and early morning effects (broader concept of effects than awakenings)

Project 4: Dose-effect relationship for multiple noise sources and joint effects (H. Miedema, J. Lambert, B. Berglund, T. Gjestland)

- Multiple noise source effects (combined sources or combinations of effects) - comprehensive studies in the 3 large areas of transport (road, rail and aircraft)

Project 5: Information to and from the general public and local authorities [J. Palma]

- Level of knowledge of the general public and the local authorities concerning noise effects

Project 6: Time trends in dose-response curves for annoyance

Project 7: Link between annoyance and more severe effects

Project 8: Dose-response relationships between low frequency noise (including vibration) and annoyance

Project 9: Dose-response relationships for industrial noise annoyance

Projects quoted (*) have been submitted to the Commission at the first tour of the 5th Framework Programme in June 1999 (Project 5 possibly to be submitted to EEA).

WG2 Research Program

A detailed but brief research program concerning Projects 1-4 has been prepared by B. Berglund (Lyon meeting, June 1999) and is submitted by WG2 to the WG Research meeting in Brussels (September 1999).

Task 6: Co-operation with WG 1 - WG research - ISO WGs - ICBEN

Co-operation with other Working groups dealing with noise effects assessment have been ensured by members of WG 2 involved in these other WG.

a) WG 1

WG 1 contact is M. van den Berg (chair) who was invited to the Paris meeting for a presentation of the WG 1 draft report on noise indicators. M. Vallet (WG 1) contributed to WG 2 work with an oral presentation of the current knowledge related to sleep disturbance (Lyon meeting). H. Miedema (WG 2) contributed to the work of WG 1 and provided recommendations for the preparation of the WG 1 report on EU noise indicators, research issues were particularly:

- urgent need for information on population activities over time (especially sleeping behaviour)
- need for a better understanding of the influence of quiet periods over the year and seasonal variations
- need for a better understanding of the influence of the number of noise events on effects
- effort should be made to harmonise impulse noise (definition and penalties)
- need to increase the knowledge on the effects of industrial noise

b) WG research

WG 2 representative is B. Berglund (co-chair WG 2).

c) ICBEN

ICBEN contact is B. Griefahn, ICBEN chair. Representative of WG 2 is B. Berglund (who is active Past-chair of ICBEN) and B. Berry (who is member of Team 9 - regulations and standards).

d) ISO WGs (TC 43/SC1) on Acoustics and Noise

- WG 40: Impulsive sound propagation for environment noise assessment
- WG 45: Description and measurement of environmental noise (WG2: B. Berry)
- WG 49: Assessment of noise annoyance by means of socio-acoustic surveys (WG2: J. Lambert)

Jacques Lambert, Chair
Birgitta Berglund, Co-Chair

2.2 WG4 Noise mapping

WG4 ANNUAL PROGRESS REPORT

October 1999

COMMON UNDERSTANDING OF NOISE MAPPING

1. Context of the Directive

The overall objective of developing the EC noise policy initiative is to have, with a minimum of delay, coherent environmental noise policies across Europe in order to improve the quality of life and the health of citizens. These objectives will be achieved in practice by reducing exposure to unacceptably high and undesirably high levels of environmental noise and by identifying, eventually protecting and in some cases creating quiet areas.

An essential part of the process, through which the overall objective will be achieved, is to communicate noise-related information in an effective and successful manner. This communication needs to take place not just with the users of this information (for example Member States, the European Environment Agency and the European Commission), but also to the general public who suffer the effects of the actual noise. Noise mapping, eventually using harmonised methods of calculation and presentation, is the tool through which this communication can take place and is the start of an ongoing process through which real reduction in environmental noise can be made.

2. What is noise mapping ?

Noise mapping covers the whole mapping process from the collection of raw data, the storage and retrieval this data for computation/modelling, to the presentation of information related to outdoor sound levels, sound exposure, noise effects or numbers of affected persons (see section 3). This presentation can be in either a graphical or numerical form.

The precise techniques used through the mapping process will depend on the levels of accuracy and definition required for the intended use of the results (see section 4) and the user type (target group). The precise form of presentation of the results will also depend to a large extent on this target group (e.g. politicians, the public or noise professionals) and their intended of the results.

Note :

- Indicator choice and definition is the result of WG1's work;
- Exposure level and dose effects are in the scope of WG2;
- Computation and measurement methods are in the scope of WG3;
- The results of **WG4's deliberations** are to be used for noise abatement planning by WG5.

3. Examples of noise mapping

It is important to appreciate that mapping can be carried out and presented in a variety of forms.

- Simple maps of measured noise levels at spot locations;
- Colour coded lines, produced from measurements or calculations, representing kerbside road traffic sound levels and/or track side railway sound levels;
- Contour lines of sound immission levels from selected noise sources. The areas between the contour lines are normally coloured in and colour coded for effective visual presentation;
- Contour lines of noise exceedance or noise conflict levels showing where noise limits are being exceeded;
- Contour lines showing the effects of noise on the inhabitants of an area. For example, maps showing areas of 'high annoyance' to noise or possible sleep disturbance;
- Colour coded lines representing number of inhabitants, e.g. with health risks or sleep disturbance, per transportation route;
- Maps of buildings colour coded to identify the sound immission level on the façades;
- A database of sound immission levels, noise exceedance/conflict levels, or noise effects at noise sensitive properties.

In addition, mapping in its various forms can be derived for different periods of the day or night and by using different noise indicators, noise dose-effect relationships, calculation heights, calculation techniques and so on. As a result of all these possible variations, virtually every noise mapping exercise carried out in Europe to date has been unique. However, evidence suggests that when managed effectively the production of noise mapping information can generate the political commitment to resource and achieve environmental noise reduction. Furthermore, when mapping is carried out using modern interactive computer-based technology, these techniques can be used to model noise reduction initiatives and establish the likely costs and benefits. This permits the development of action plans for noise reduction.

4. Uses of noise mapping

At this stage it appears that the main uses of noise maps are to:

- Identify and quantify the scale of noise problems at local, regional, national and European level;
- Provide information to the public and politicians on these problems;
- Provide an objective basis for town planning and traffic plans;
- Monitor trends in environmental noise;
- Set objectives for noise reduction;
- Make more effective use of local, regional and national planning procedures to control and reduce noise;
- Provide a basis for the assessment of specific developments with respect to noise;
- Develop action plans to reduce noise from existing sources and compare different scenario's;
- Monitor the effectiveness of planning procedures and action plans and communicate on the results;
- Provide a platform for further research into noise and annoyance, noise and sleep disturbance, noise and health issues (basis for epidemiological studies) and into noise and town planning;
- Derive data on noise exposure for the entire population of a country;
- Influence decision makers and as a result obtain funding to carry out noise reduction actions

5. List of noise mapping target groups

Three distinct target groups have been identified:

- Politicians or more general decision makers;
- Technicians including private consulting engineers, public officers, experts in acoustics as well as planners and environmental engineers;
- Public.

6. Future work (the challenges!)

To identify:

- The target groups (decision-makers, technicians, and public) for noise mapping information.
- The noise sources that should be mapped and the source data required to carry out mapping of these sources.
- The types of noise maps required.
- How the results of noise mapping can be communicated to the target groups through effective presentation.
- How to use noise mapping information to control noise from new developments (planning actions).
- How to use noise-mapping information to achieve real noise reduction from existing environmental noise sources.

7. WG4 future work programme

The Working Group 4 "Noise Mapping (WG4)", created by DG XI in order to contribute to the preparation of the future EU noise policy, has to provide guidelines for noise mapping. However, the provision of these guidelines cannot be achieved solely from discussions held within the group. Consequently, in the document called 'Common Understanding of Noise Mapping (WG4 - June 1999) a number of issues have been identified for future work (the challenges). As a result of WG4's most recent deliberations five specific studies have been identified from these challenges. The results of these studies will answer some of the outstanding questions which concern noise mapping issues, will help achieve the current objectives and deliverables of WG4 (an inventory of existing methodologies for 2000) and will feed the future work of the group.

The aim of each of these studies can be described as follows:

• Methods

In several member states (MS) noise mapping is already a common practice. Some of these MS also have official guidelines others do not. This study will result in a collection and evaluation of the different existing noise mapping methods used in the MS. The output will also include a detailed description of each method.

• Data

Successful and effective noise mapping heavily depends on the availability, accuracy and quality of input data (e.g. information on sources, geographical situations, etc). Therefore, it is vitally important to develop a thorough knowledge of what data is available in the various MS, the format of this data and the cost of this data. At present no comprehensive information exists on this vital issue. Consequently, a study needs to be carried out in order to get a clear view on the data situation in all of the MS. One of the outputs from such a study will be a proposition on data requirements and format relating to noise mapping.

• Presentation and communication

Information produced through noise mapping can be presented in variety of ways The precise techniques employed depend on the purpose, target group etc. This study will result in a commented evaluation of the different ways of presenting noise mapping information which takes into account the different purposes for producing noise mapping information and how this process can lead on to the development of actions plans to reduce noise. One of the outputs will consist of a survey of the communication aspects including benefits, constraints, difficulties and achievements.

- **Interactions with other WGs**

The framework for the preparation of the future EU noise directive will be based on the deliberations of the 5 WG's, who are currently studying noise immission issues. In order to integrate each WG's progress, a study of the impact and the consequences of each WG's work on the other WG's work is most needed. However, as WG1 has already produced a position paper the implications of WG1's recommendations for the work of WG4 will form the main part of this particular study. It will also have to consider the relationship between indicator and level limits used. Nevertheless, an overview concerning the potential implications of the other WGs related to WG4 will also be produced. From the study on the existing methods and data also some requirements on the work of the other WGs can be derived e. g. to WG 3 with respect to level of accuracy and details of calculations for the different levels of maps and target groups.

- **Assessment**

As a result of studies 1 to 4, described above certain outputs will be achieved. In this study an integration of these outputs will be undertaken which will result in the production of a first preliminary commented draft inventory of noise mapping methodologies. The report, detailing this inventory, will also include comments on awareness and priorities related to the use of noise mapping. Additional outputs from this study will reflect the use of noise mapping for planning. The report will be used to form the first interim Position Paper of WG4.

The first four studies will be carried out parallel to each other. The fifth study is based on the results of the other studies and will be undertaken immediately after completion of the first four studies.

Without the support of the outputs from the 5 projects it is unlikely that WG4 will be able to achieve the objectives defined in the Terms of Reference within the expected time schedule.

2.3 WG 5 Noise abatement

WG5 : Noise Abatement

October 1999

Progress report of 1.9.1998 – 1.9.1999

WG5 Targets

WG5's scope is

- to make guidelines to be used by local authorities for designing noise abatement plans and their execution. The guidelines shall be applicable for the municipalities or parts of it.

WG5's work programme includes e.g.:

- an inventory of the various mitigation methods;
- a survey of the experience with mitigation methods and their combination;
- an investigation of the possibilities to combine local noise control policy on other environmental factors; and
- guidelines for the development of cost effective noise abatement plans and the execution of those plans.

WG5 shall consider the noise at least from road, rail and air traffic, but it is free to include other sources if appropriate.

WG5 shall provide recommendations for the format of the action plans.

Interpretation of Terms of Reference

WG5 will study the different noise mitigation methods at the local level without limiting itself to the "local authorities" as the opening phrase in the terms of reference states. The responsibility for these methods may also belong to the authorities at the regional and/or national level.

Inventory of mitigation methods

A logical starting point for WG5's work has been an inventory of different mitigation methods. In this respect the aims of WG5 have been, on the one hand, to prepare a solid and compiled report on the basis of numerous studies and reference books available on the noise abatement, and, on the other hand, to prepare proposals for appropriate and effective noise abatement measures.

Following the discussions that have taken place within WG5, a draft report on inventory of noise mitigation methods has been prepared. The draft report is based on existing material and it aims to provide an assessment of effectiveness of different noise abatement measures. Such an assessment should also provide a summary table providing information on how much noise could be reduced, what are the weak points and costs of various measures and how they comply with the polluter-pays-principle.

The first draft for a background report on mitigation methods was discussed at the second meeting of WG5 in February. On the basis of comments received the second version of the report was discussed in detail at the meeting on 21-22 September. Presently, the chapters of the inventory follow the classic textbook division into three: the generation and propagation of and the exposure to sound energy. In this context the report contains information on the noise reduction at the source, limiting noise propagation and protective measures at the receiver.

Compared to the first version the second draft report provides more detailed information especially on the noise reduction at the source and on the appropriate economic instruments for noise abatement as well as on social regulating methods, e.g. increasing usage of low-noise means of public transport, community development or increasing the public awareness on noise matters by providing information. The methods related to the actual emission of noise sources (e.g. motor vehicles, trains, aircraft) are left to be worked upon by respective emission control groups and are excluded from the scope of this work. The comments received at the last WG meeting for the draft report were supportive and the report will be completed in Autumn 1999.

Survey of experiences

The next phase of the working programme is to gather information on the experiences of different mitigation methods. In order to fulfil this task WG5 needs help from the Member States and their local authorities. In this respect WG5 invited the parties involved to provide their experiences of different mitigation methods and appropriate noise abatement measures at the local level. So far WG5 has not received much contribution from other parties.

WG5 invites again all the parties who have such an information available to send their contribution to the Commission.

Research needs

WG5 has provided a preliminary analysis of strategic research needs in the area of noise abatement for the evaluation of Working Group on Research. The most urgent priorities are a survey on the experience with mitigation methods and their combination as well as a feasibility study on how to combine local noise control policy with other environmental policy sectors. More long-term strategic areas where research is needed are effectiveness of noise abatement measures and decision making process regarding the noise abatement measures.

Cost/benefits of abatement measures

WG5 and Working Group Costs and Benefits are going to start their co-operation with the discussion of a note by the two working groups on techniques for carrying out a cost benefit analysis of different mitigation methods. The first joint meeting is planned to take place in October 1999.

WWW Page

WG5 has its own WWW page (http://www.kfs.oeaw.ac.at/noise/web_001.htm).
The intention is to provide information for all interested parties.

Meetings

WG5 has so far held three meetings since the EU Copenhagen conference:

- 8-9.11.1998 in Vienna
- 25-26.2.1999 in Brussels
- 21-22.9.1999 in Brussels.

The next meeting will be held in Rome in January or February 2000.

WG5 Members

Sirkka-Liisa Paikkala	FIN	chairman	
Werner Talasch	Local authority (AT)		co-chairman
Tor Kihlman	S		
Ionna Nikitara	GR		
Elke Stöcker-Meier	D		
Brian Ross	Commission		
Salvatore Curcuruto	I		
Frank Clinton	IRL		
Jan Kuiper	NGO (NL)		
Erkki Pärjälä	FIN	secretary	

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2.4 WG Costs / benefits

WG C/B

INTERIM REPORT

PRESENTED TO PLENARY SESSION OF STEERING COMMITTEE AND WORKING GROUPS

BRUSSELS 22 September 1999

Introduction

1. The Working Group welcomed the working draft proposal for a Directive since it had helped them to prioritise and focus their programme of work. The Group concluded that this work programme should be;

i) to advise on the proposals in the draft directive on harmonisation of indicators and noise mapping;

ii) to provide guidance to accompany this Directive on economic evaluation of all relevant strategies and initiatives to reduce noise annoyance and for use in the setting of targets;

iii) to review recent studies on the costs of noise and benefits from reducing noise annoyance and to assess the relevance, applicability and transferability of these studies to other circumstances and in particular to strategies and initiatives which might feature in targets and action plans to reduce noise;

iv) to provide relevant and timely advice on the evaluation of costs and benefits to the other Working Groups.

Proposals in the Draft Directive requiring Economic Evaluation

a) Harmonisation of Indicators

2. The group considered the likely costs to Member States of harmonising noise indicators. It thought that, so long as harmonisation was being done only for strategic planning purposes, it is unlikely to impose additional costs on all Member States. However, the Group recognised that those Member States which have already undertaken mapping exercises may incur expenditure in changing the indicators used in these maps. The Group concluded that more information was needed about the requirements of noise mapping and details of mapping carried out to date in Member States. It would therefore review the recently completed study of the costs of noise mapping before deciding on how best to assess the costs of harmonising indicators.

b) Noise Mapping Costs and Benefits

3. The Group turned its attention to the costs of noise mapping and the costs and benefits that would arise from different approaches to mapping. For some months the Group had been intending to research the options for mapping to assist Member States in establishing what financial commitment they must make and what other resources will need to be set aside to fulfil the obligations of the Directive. However, the Group had not taken this further since they were awaiting a report by a consultant let by the Commission on the range of costs incurred by countries that have undertaken noise mapping. A presentation on this report had been given to the Costs and Benefits and Mapping Working Groups earlier that day.

4. The Group's initial response was that the Report provided valuable information. It represented a good and thorough assessment of the costs per head of population in cities that have produced noise maps. The cost estimated by the consultant ranged from 0.15 to 2.00 euros per resident of the larger urban areas. (Broadly areas with a population in excess of 250,000 inhabitants).

5. As far as the Working Group understands, all of these cities have most of the input data needed for producing such maps. This includes data on traffic levels, mix by vehicle type, speeds and the necessary geographical data to produce noise maps. In addition, the cities are usually defined according to administrative boundaries in order to simplify the classification of the data.

6. The Working Group on costs and benefits intends to find out how representative of all urban areas which would be subject to the Directive is the sample of cities studied in the research report. The Group proposes to work in conjunction with Working Group 4 (mapping) to establish the number of relevant urban areas which lack some or all of the information needed for producing noise maps. The Group wishes to determine what it might cost to collect the minimum amount of data needed to satisfy the mapping requirements. The Group also needs to understand what additional benefits might come from collecting that information other than its use for noise mapping purposes. For example, it would provide an opportunity for the analysis both of noise and air quality action plans.

Economic Evaluation Methods

a) Methodology Guidelines

7. The Working Group is concerned to ensure the use of good economic methodology. The Group is of the view that there would be value in the provision of guidance on methods of economic evaluation. It suggests that such guidance should be provided as an Annex to the Directive to enable those responsible for actions and strategies at a local, national or European level to carry out a full appraisal of the costs and benefits of each option. The Group thought it unlikely that they would be capable of listing all possible means of reducing noise nuisance. However, the Group recognises that any guidance on evaluation must provide methods for evaluating all possible measures. In particular, the guidance must be applied to packages of measures and assist in the prioritisation of measures which differ in their costs and effectiveness. The guidance would also assist in providing an economic basis for the setting of targets. The Group therefore decided to draw up terms of reference and seek funding so as to commission the drafting of a guidance note on economic evaluation techniques.

b) Benefit Transfer and Review of Values

8. The Working Group had debated some of the current concerns in applying cost benefit analysis. It is, of course, fundamental that those responsible for implementing the EU Noise Strategy are in a position to demonstrate the benefits of reducing annoyance from noise by using a number of techniques for measuring these benefits. In many cases the Group would expect to put money values on these benefits. The Group intends to review recent studies in Europe and elsewhere on the benefits of reducing noise annoyance. The review would reach certain conclusions about the relevance of the values derived in these studies to the evaluation of measures to reduce noise in Member States. The Group would consider whether further work on the issue of benefits transfer - applying values derived from studies of noise nuisance in one location to other places - merited further work.

Advice to Other Working Groups

9. The Group did not see its main role as being responsible for setting up new studies. Its main purpose was to ensure that studies carried out by other Working Groups took full account of the costs and identified clearly the benefits of their proposals. A useful meeting with Working Group 4 on the costs of noise mapping had taken place. After reviewing the consultant's report on the costs of noise mapping, the Costs and Benefits Working Group would consult Working Group 4 on the case for further work to identify noise mapping costs in locations where less data are available. A meeting is to be arranged towards the end of October with Working Group 5 to discuss the application of cost and benefit techniques to the assessment of abatement options.

London, 24 September 1999

2.5 WG Research

**Working Group Research
Progress report September 1999
28 September 1999**

Background

The working group was officially established April 1999 with chair or co-chair from working groups 2, 3, 4 and 5 as members together with Commission representatives from DG XI, XII and XIII. The working group is intentionally started later than the other working groups. This is in line with the terms of reference of the working group which states that the working group shall collect, prioritise and qualify the research needs linked to the establishment of the noise policy on the basis of input from WG 2, 3, 4 and 5.

First calls for proposals in FP 5

WG 2, 3, 4 and 5 had until spring 99 not had the opportunity to assess in connection with their work, the corresponding needs for research. It was decided to wait with an overall assessment and prioritisation until September 1999 and act on an ad hoc basis in relation to the first calls for proposals to the 5th Framework Programme where the deadlines for submissions were in beginning of June 1999.

The chairman of WG Research was notified of two proposals intended for submission in relation to work in WG 2.

These first submissions and following results of the evaluation will give valuable experience for WG related submissions for the next calls for proposals expected to be published by the end of 1999.

Research priorities linked to the noise policy directive

The working group met officially for the first time on September 21st 1999. Lists of research needs had been received from all four working groups. All research subjects were presented by the WG members and the importance in relation to establishment of the noise directive was assessed.

The input from all working groups will be the basis for a strategy document, which is going to be elaborated in a draft form within the next months. This document will give the priorities of the different needs of research as expressed from the other working groups. The strategy paper will split priorities in three parts: Needs related to establishing the first draft directive, needs related to the first revision of the directive and research needs linked to the noise policy initiative.

This list of priorities can be used as a reference by proposers when proposals are submitted to the 5th Framework programme. This would make a strong justification on the socio-economic part of the evaluation. Working groups and future consortia should on the other hand be aware that proposals are submitted in competition with several other proposals and that a strong socio-economic justification is not a guaranty for selection. Proposals will have to comply with the different key actions requirements on scientific and technical quality in competition with other proposals and fall within the priorities of these specific key actions for the actual calls.

Overview of ongoing and planned national research

Collection of information on ongoing and planned national research linked to the establishment of the noise policy, is under way. Submission of information from member states has taken longer than first anticipated. Information has until now only been received from: UK, DK, A and D.

Working Group Research, Members:

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Wolfgang Boch	Co-chair, Commission DG XIII
Birgitta Berglund	Repr. WG 2
Dieter Gottlob	Repr. WG 3
Catherine Bouland	Repr. WG 4
Sirkka-Liisa Paikala	Repr. WG 5
Tjeert ten Wolde	Commission DG XI
Tom Worsley	Chairman WG Cost & Benefits (decided during meeting on 21 st Sept.)

Per Kruppa
Chairman of WG Research
DG XII CII-1

Annex: Terms of reference of WG Research
(not included)

3. EEA Transport Environment Reporting Mechanism (TERM) Project

Background

The Amsterdam Treaty identifies integration of environmental and sectoral policies as the way forward to sustainable development. The European Council, at its Summit in Cardiff in 1998, requested the Commission and the transport ministers to focus their efforts on developing integrated transport and environment strategies. At the same time, and following initial work by the European Environment Agency on transport and environment indicators, the joint Transport and Environment Council invited the Commission and the EEA to set up an indicator based Transport and Environment Reporting Mechanism (TERM).

TERM has been designed to help EU and Member States to monitor progress with their transport integration strategies, and to identify changes in the key leverage points for policy intervention (such as environmental regulations, investments, economic instruments, spatial planning and infrastructure supply). Seven questions are addressed which policy-makers in the EU regard as key to understanding whether current policy measures and instruments are influencing transport/environment interactions in a sustainable direction:

1. Is the environmental performance of the transport sector improving?
2. Are we getting better at managing transport demand and at improving the modal split?
3. Are spatial and transport planning becoming better coordinated so as to match transport demand to the needs of access?
4. Are we improving the use of transport infrastructure capacity and moving towards a better-balanced intermodal transport system?
5. Are we moving towards a fairer and more efficient pricing system, which ensures that external costs are minimised and recovered?
6. How rapidly are improved technologies being implemented and how efficiently are vehicles being used?
7. How effectively are environmental management and monitoring tools being used to support policy and decision-making?
- 8.

To answer these questions, a selection of 31 indicators was made, dealing with the various aspects of the transport and environment system. The indicators cover all the most important aspects of the transport and environment system (Driving forces, Pressures, State of the environment, Impacts, and societal Responses – the so-called DPSIR framework) and include eco-efficiency indicators.

A first report ('TERM-zero') was prepared as input to the Helsinki Summit and the Transport Council (December 1999). The current indicator list is a long-term vision of an 'ideal' list and some of the proposed indicators could not at this stage be quantified. Where data availability has prevented an EU15 analysis, national examples or proxy indicators were used. The report is currently being prepared for publication.

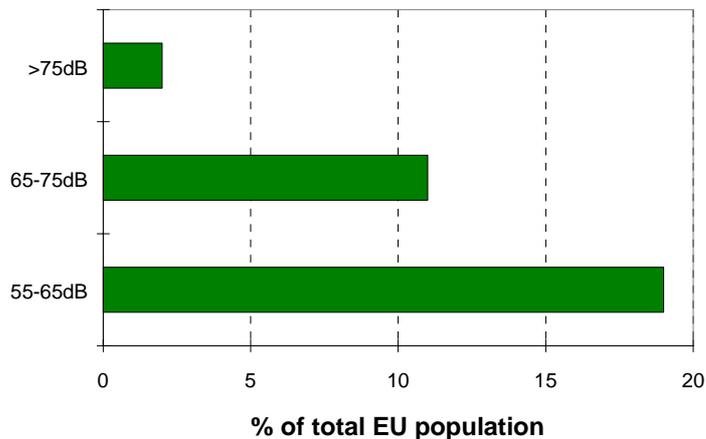
3.1 TERM noise indicators: a first assessment

Developing noise indicators at the EU level is particularly difficult as harmonised methods and data are lacking. TERM is furthermore to provide a multi-modal assessment framework, and indicators should therefore allow to compare various transport modes (road, rail, air, shipping).

In TERM-zero, the following indicators are assessed:

- % of population exposed to four transport noise exposure levels (in LDN)¹: <55 dB, 55-65 dB, 65-75 dB and >75 dB.
- % of population highly annoyed by traffic noise of the various modes.

Figure 1 : Percentage (%) of population exposed to different road traffic noise levels (EU)



Source: EEA, 1999

Note: the category <55 dB is not included because the estimation of exposure to low noise level cannot be accurate enough

The assessment shows that even though noise emission limits have been considerably tightened since 1972, traffic noise remains a major environmental problem as transport demand continues to grow. The magnitude of *exposure* varies according to the sources (i.e. transport mode):

- it is estimated that approximately 32% of the EU population (about 120 million people) is exposed to road traffic noise levels above 55 LDN dB on the façade of their houses (EEA, 1999), and More than 50 million people are exposed to noise levels above 65 LDN dB.
- some 37 million people (10% of the EU population), are exposed to rail noise above 55 LAeq dB, according to an estimate based on data from France, Germany and the Netherlands (Lambert J. et al, 1998);
- EU-wide data on exposure to aircraft noise are currently the least reliable, but an estimate of the number of people exposed to more than 55 LDN dB around selected airports gives an indication of the scale of the problem (table NOISE-TARG). These airports differ considerably in magnitude of traffic, fleet mix and lay-out in respect to noise-sensitive areas.

Assessing the impact of noise requires exposure data to be transposed into annoyance estimates. A 'noise annoyance' assessment at the EU level has been hampered by gaps in data and knowledge, but recent research (Miedema, H *et al.*, 1998) allow estimates of annoyance to be inferred from exposure data.

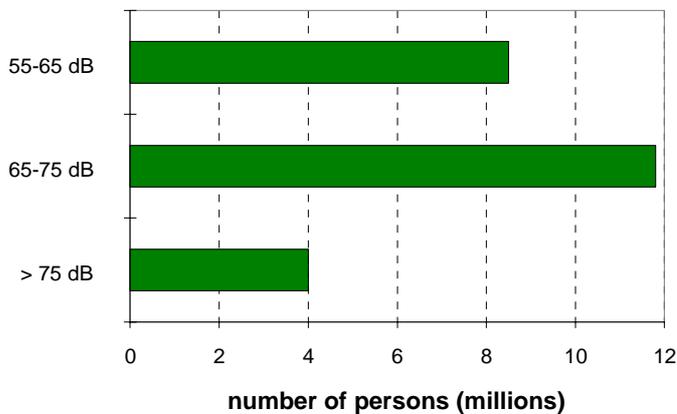
- A first try out of this new calculation method at the EU level shows that around 24 million

¹ LDN i.e. a day-night level, is a descriptor of noise level based on the energy-equivalent noise level (Leq) over the whole day with a penalty of 10 dB(A) for night time noise (22.00-07.00 hrs)
LAeq is equivalent sound pressure level in dB(A)

people are highly annoyed (HA) by road traffic noise higher than 55 dB. This estimate excludes the category 45-55 dB because of information lacks. However, this is a category where annoyance can also be caused.

- Applying a similar methodology to recent rail noise data (Lambert, 1998) suggests that about 3 million people are highly annoyed by rail traffic noise.
- Aircraft noise, noise with low frequency components or accompanied by vibration, and noise that interferes with social and economic activity are more annoying than other noise (WHO, 1999). However, the number of people highly annoyed by aircraft noise in the EU cannot be accurately estimated, because much annoyance is caused by noise levels of 45-55 L_{DN} dB on which there is a lack of information. An earlier assessment (INRETS 1994) suggest that some 10% of the total EU population may be highly annoyed by air transport noise.

Figure 2 : Preliminary estimate of people highly annoyed by road transport noise



Source: EEA

Future work on TERM noise indicators

Combining noise exposure and population data with dose/effect relationships should enable the following indicators to be calculated:

- the number of highly annoyed people, per transport mode;
- the number of people whose sleep is disturbed, per transport mode.

Future Community noise level targets will probably be expressed in L_{DEN}. This measure is similar to L_{DN}, but with an additional penalty of 5 dB(A) for evening noise.

Additional or alternative indicators that could be considered are:

- budget allocations to noise abatement measures (with particular indication for spending on noise control at source), indicating levels of awareness and concern in the Member States;
- the ratio of the number of people annoyed by transport noise to the number of passengers for air traffic or passenger-km for road and rail traffic. Such indicators would link noise annoyance with personal mobility for different transport modes;
- similar indicators linking noise annoyance with freight tonnage for air traffic or tonne-km for road/rail/air traffic.

Another possibility for a national noise indicator, which could be introduced rapidly but may be rather expensive, is through direct random field social surveys; this is already being done in the

Netherlands on a national basis every 5 years. A similar type of questionnaire for use by all Member States would provide comparative results for the EU.

Future work to improve the TERM noise indicators will build on the findings of the working groups of the Future Noise Policy.

For more information on the general TERM Report you can directly contact :
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4. Norwegian Noise Policy

The Norwegian government presented in the 29 October 1999 an integrated statement on its environmental policy jointly with a state of environment report. The statement establishes an annual practice of reviewing the development with environmental issues and defining targets on the issues identified. This year the noise issue was highlighted among the top four priority areas for policy action.

The noise national target is 25% reduction within 2010 from 1999. It is recognised that noise is the environmental problem directly affecting the most citizens in Norway. A third of the population is exposed to noise at their dwelling, and of these 500 000 are exposed to noise above 60dB. 5% of the population declares to have problems with sleep caused by noise.

Progress towards the target will be quantified using an index developed in the Netherlands (Miedema and Vos, 1999). The units of the index is generated from the number of people exposed to noise at various levels and a nuisance function translating the fraction of annoyed persons by the noise level from the particular source. The index is a simple means to compare noise annoyance between sources and noise levels.

The statement contains a preliminary and incomplete index for 1999 (unit number of annoyed persons): Road traffic 411 000, industry 74 000, air traffic 25 000, rail traffic 24 000, construction activity 22 000, shooting ranges 12 000, motorsport 5 000, shooting fields 1 000.

The instruments and measures mentioned are the continued insulation of buildings and construction of noise barriers; reduction at source by taxes, ecolabelling, and information; increased funding on noise research; and emphasis on participation in EU noise activities. More concrete measures will be proposed in cooperation between the transport and environment administrations. In the European framework an initiative will be taken on research towards reduced noise from car tyres.

This is a summary translation kindly prepared for the EIONET Noise Newsletter by Gabriel Kielland and Roar Gammelsæter. SFT, 18 November 1999

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5. RIVM - A model for noise mapping in the Netherlands

Paper prepared for the EIONET Noise Newsletter by Ton Dassen and Jan Jabben
Laboratory for Air Research, RIVM, September 16, 1999

At the Dutch National Institute for Public Health and the Environment (RIVM), a noise mapping model is used to present the noise load and annoyance caused by road, rail and air transport. The model is developed in a co-operation between the Netherlands Organisation for Applied Scientific Research (TNO), the Ministry of Spatial Planning and the Environment, and RIVM. It is designed primarily to determine the current situation, and the future developments on a national and regional scale.

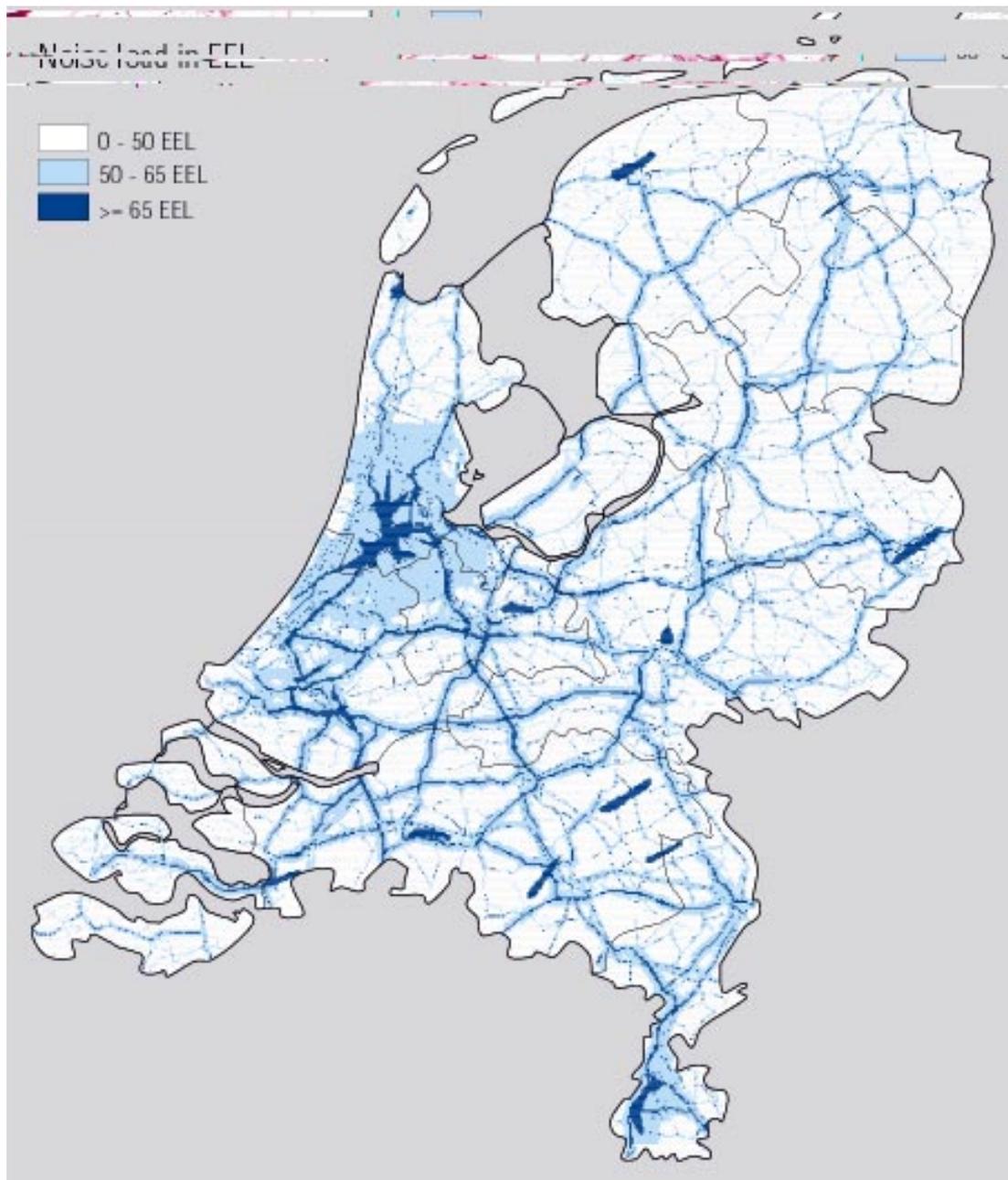
The basis of the LBV-model is a Geographic Information System (GIS). In the GIS, data about the location and intensity of noise sources (roads, railways and airports) and land-use data are combined to obtain the input for the acoustic calculations. The modelling of the acoustic emission and transmission is based on standard calculation methods (SRMs) for road, rail and air transportation noise, as they are part of the Dutch noise legislation.

The acoustic model allows for expressing the noise load in various indices (e.g. $L_{Aeq_24hours}$, L_{day} , $L_{evening}$, L_{night} , and various Dutch indices). For further processing, the results of the acoustic calculations are fed into the GIS again. Here, the noise load data of various sources can be combined, to obtain accumulated levels or, by using response functions, be used for annoyance analysis. Furthermore, overlay techniques (confrontation of noise load or annoyance data with population data or land use data), allow for various ways of presenting the spatial distribution of the sources and their effects. Besides these spatial (map) presentations, figures of the total surface area with a noise load higher than a certain value, or the total number of (severely) annoyed people, can be calculated.

In the figure, a map of the noise load in the Netherlands in 1998 is shown. The map is included in the chapter on disturbance of the State of the Environment 1999 (Milieubalans 1999). The noise load is here presented as an accumulated Environmental Exposure Level (EEL) in which the contributions of all noise sources are taken into account. This index, although still experimental, is the only possibility to give an overall evaluation of an area where multiple sources are present. For various sources, the same EEL intends to give the same annoyance level. The noise load is distributed among three classes: 0-50, 50-65 and >65 EEL, with the boundary values of these classes selected on the role they play in the Dutch noise legislation. The contributions of road and railway transport are calculated using data on all the (car and truck) transport on the main roads (highways and provincial roads), and all the (passenger and cargo) railway traffic, respectively, as realised in 1998. In these calculations, the presence of noise barriers (road and rail), as well as the type of asphalt (road) are considered. The contribution of air transport is calculated using all the flight movements carried out in 1998 with large civil aircraft (all jet aircraft plus all propeller aircraft with take-off weights >6000 kg) at the airports Schiphol, Rotterdam and Maastricht. For the remaining (1) regional and all the (11) military air bases, use is made of noise zone (contour) data.

At present, the model is developed further and adjusted to the most recent insights and possibilities. On the short term, it envisaged to incorporate a road network with traffic data on local (lower order) roads in urban areas, to optimise the calculation of the sound transmission in urban areas, and to improve the aircraft noise module. Last but not least, attention will be paid to model validation.

Figure : Noise load in the Netherlands in 1998 (contributions from road transport, railway transport and airports)



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6.0 Other News

6.1 Meeting of experts on acoustic pollution

A meeting of experts on acoustic pollution was organised by the Municipality of Madrid in Madrid, Spain from 9 to 12 November 1999.

The main purpose of the meeting was to exchange experience for the present acoustic situation in different European cities, the policies used for control and reduction of the acoustic pollution.

Three main subjects with several issues were discussed :

1. Legal instruments for the control of the acoustic pollution

- National Laws and regulations, municipal regulations

2. Existing environmental noise levels in different cities

- Procedures for its measurement and evaluation, acoustic maps, permanent vigilance networks, mobile vigilance networks
- Predominant noise sources (traffic, industries, leisure)

3. Control and reduction measures

- Source control (vehicles, industries and activities, leisure)
- Urbanistic measures (in new cities and old consolidated cities)

CONCLUSIONS OF THE MEETING (unedited) :

LEGISLATION

1.- It is recognised that legislation and standardisation is a necessary tool of outstanding importance in the fight against environmental acoustic pollution.

2.- In this line, it has been concluded that it is necessary to rely on a firm political willingness, not affected adversely by opportunistic situations, in order to apply rigorously and without exception existing legislation.

3.- The EU's actions directed towards the promulgation of acoustic standards has been positively evaluated. Nevertheless, it is asked for a special urgency in the elaboration of standards to homogenise the criteria for the evaluation, measurement and presentation of results.

4.-A certain flexibility to establish the limits and adapt them to the different peculiarities of the member states is considered necessary.

5.- It is essential that in this basic legislation Directives should be established to measure and evaluate the sound levels generated by air traffic and airport premises, as well as by railway traffic.

6.- The legislation on Environmental Acoustics must constitute a live legislative body and, for that reason, must be subject to improvement and updating when it is necessary due to the evolution of knowledge, the state of the art of techniques and the needs of the population at each moment.

SOUND LEVELS

7.- It has been proven that traffic noise is the most important noise source in all the urban areas in the developed countries. This assertion applies not only to large cities but to those of smaller size as well.

8.- To establish harmonised comparisons among different situations it would be important to use data acquisition methodologies and equivalent measurement procedures in all situations, as well as to evaluate the number of persons exposed to the different noise levels.

9.- Essentially there are no significant differences between the sound levels in the different European cities that have been studied, not only in the same country but also in different countries. This assertion, of course, does not exclude the existence of peculiarities and singular problems that may occur in given contexts and situations.

10.- In the near future the World Health Organisation intends to carry out studies and to propose new and revised recommendations about environmental sound level limits, with the purpose of adequately protecting the citizen's health, this being understood as a state of physical, mental and social welfare.

11.- It is necessary, not only to produce acoustic maps, but also to determine the noise exposure to which the citizens are subjected, and to assess annoyance.

ACTIONS TO BE TAKEN

12.- The fight against the noise in cities needs the co-ordinated application of an extensive ensemble of technical, administrative, educational and management measures, all of them within the frame of a firm political commitment to apply these actions with continuity.

13.- There exist technical means of proven efficiency to approach with success the reduction of the present environmental noise levels in our cities, by interventions at the source, in the way of propagation and at the receptor.

14.- Urban development planning in the cities is the basic element in the fight against acoustic pollution. In this sense, it is necessary to adopt very innovative measures to modify present situations: to change given urban areas into pedestrian ones; to increase the existence of open spaces; to promote the public transportation, to improve the quality of buildings, etc.

15.- Road traffic is the main source of noise in our cities. In that aspect initiatives ought to address more directly and decisively to actions such as restraint of traffic, and even restrictions on the use of particular vehicles in favour of public transportation, favouring of electric vehicles, etc.

GENERAL

16.- We would like to evaluate very positively the initiative of the Branch of the Environment of the Municipality of Madrid to host this meeting of highly qualified European experts in the field of acoustic pollution, and we suggest that such meetings are organised regularly. We gratefully acknowledge the kindness and hospitality of the municipal personnel, congratulating them on their facilities, especially for those put at our service during the meeting.

17.- Finally, we would like to report these conclusions to the European political community responsible for noise matters and to the whole of the society as a contribution to the solution of this environmental problems.

For more information on the above meeting you can contact :
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7. Contact Points

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