

**EUROPEAN COMMISSION
DG RESEARCH**

**SIXTH FRAMEWORK PROGRAMME
PRIORITY 6
SUSTAINABLE DEVELOPMENT, GLOBAL CHANGE & ECOSYSTEMS
INTEGRATED PROJECT – CONTRACT N. 516288**



PROCEEDINGS OF THIRD SILENCE SEMINAR

Brussels, 11 June 2007

Deliverable no.	J.D7
Dissemination level	Public
Work Package	WP J.1 Dissemination and Networking
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Status (F: final, D: draft)	Final
File Name	SILENCE_J.D7(3)_120707_POLIS
Project Start Date and Duration	01 February 2005, 36 months



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Third SILENCE Seminar **Reducing Road Transport Noise in Urban Areas**

1 Purpose of the Seminar

This third SILENCE seminar was mainly targeted at road transport stakeholders in noise abatement and aimed to inform this target group of the relevant road transport noise abatement techniques and strategies that are being studied and tested in SILENCE, as well as point out the noise reduction potential of these measures.

2 Agenda

The seminar programme was developed by Polis in such a way that it gave an overview of the different road transport activities that are being developed within the SILENCE project, in relation to road vehicles and tyres, as well as road surface and traffic management. The agenda was as follows:

10.00 Registration and Welcome Coffee

10.30 Overview of the SILENCE project
Franz Brandl, AVL-List

11.00 Parameters Influencing Road Transport Noise
Heinz Steven, TÜV Nord

11.30 Vehicle-Tyre-Road Interaction
Ernst-Ulrich Saemann, Continental

12.00 Road Vehicle Noise
Eugène Nijman, Centro Ricerche Fiat

12.30 Questions

12.45 Lunch

13.45 New Production Technologies for Urban Low-Noise Road Surfaces
Ulf Sandberg, VTI and Oliver Ripke, Bast

14.15 Improved Systems for Maintenance of Quieter Road Surfaces
Manfred Haider, Arsenal

14.35 Noise Classification Methods for Urban Road Surfaces
Guy Descornet, Belgian Road Research Centre

14.55 Coffee Break

15.15 Controlling Noise through Traffic Management

Lars Ellebjerg, Danish Road Institute

15.35 Driver Assistance Systems for Quiet Vehicle Operation

Emma Johansson, Volvo

15.55 Questions and Conclusions

16.15 End of the seminar



The seminar was chaired by Alexander Holleis from AVL-List, the coordinator of SILENCE.

3 Participation

The seminar was well attended by a wide variety of around 70 stakeholders. The list of participants is included below.



Surname	First name	Company/organisation
d'Antoinio	Simone	Anci Ideali
Baroni	Maria	Anci Ideali
Berckmans	Dries	KU Leuven
Bergs	Horst W.	Bundesministerium für Verkehr, Bau und Stadtentwicklung
Blaszczyk	Cezary	Regional Office of Silesia
van Blokland	Gijsjan	M+P
Brandl	Franz	AVL
Callens	Karim	STIB
Castagneri	Marta	Regione Piemonte - President's Cabinet
Cinaralp	Fazilet	ETRMA
Coda	Alessandro	EUCAR
Cordero	Roberto	Fundación CIDAUT
Corradin	Rosa	Regione Piemonte - Office of Brussels
Cremezi Charlet	Cora	UIC
Decauwers	Daniel	STIB
Dekoninck	Luk	University of Ghent - INTEC
De Roo	Foort	TNO Science and Industry
Descornet	Guy	Belgian Road Research Center
Dixon	Max	Greater London Authority
Doucy	Florence	Michelin - Délégation permanente auprès de l'UE
Ellebjerg	Lars	Danish Road Institute
Figge	Holger	Bundesministerium für Verkehr, Bau und Stadtentwicklung
Grimes	John	Dublin Institute of Technology
Guérin	David	Bruitparif
Haider	Manfred	Arsenal
Holeis	Alexander	AVL
Houtave	Peter	A-Tech
Johansson	Emma	Volvo
Jung	Oliver	Polis
Kindt	Peter	KU Leuven
Kiss	Judit	Brussels Representation of the West Pannon Region
Kortbeek	Boudewijn	Dutch Ministry of Environment
Kragh	Jorgen	Danish Road Institute
Kray	Ellen	Representation of Land Brandenburg to EU
Kuprys	Povilas	Association of Local Authorities in Lithuania

Lehming	Berud	Senate of Berlin
Lenz	Olivier	FIA
Libbrecht	Robert	ERTRALCO
Liberko	Milos	Enviconsult
Lucca	Julie	Polis
McAdam	Victoria	Great Manchester Brussels
Miller	Sarah	Great Manchester Brussels
Morcillo López	Miguel Ángel	Fundación CIDAUT
Mos	Martyna	Brussels Office of the City of Lodz
Nijman	Eugenius	Centro Ricerche Fiat
Ostrowska	Dominika	Brussels Office of the City of Lodz
Patel	Trupti	Urban Vision
Pascal	Thomas	Lille Métropole
Pluymers	Bert	KU Leuven
Poisson	Franck	SNCF
Ranschaert	Nele	Milieudienst Stad Gent
Renshaw	Nina	European Federation of Transport & Environment
Richters	Arne	Toyota Motor Europe
Ripke	Oliver	Bast
Saemann	Ernst-Ulrich	Continental AG
Sandberg	Ulf	VTI
Schguanin	Gregor	Bundesamt für Umwelt
Schmitz	Pierre	Brussels Region
Serbruyns	Martine	Flanders - Afdeling Mobiliteit en Verkeersveiligheid
Simons	Jean-Laurent	Bruxelles environnement
Sitran	Alessio	Union Camere del Veneto Brussels Office
Steven	Heinz	TÜV Nord
Stevens	Mary	National Society for Clean Air & Environment Protection
Stilo	Johanna	Europabüro der bayerischen Kommunen
Van Beek	Pieter	TNO I&T
Vancluysen	Karen	Polis
Vanek	Ivo	National Noise Observatory Czech Republic
Vanhooreweder	Barbara	Flanders - Afdeling Wegenbouwkunde
Williams	Amy	East of England European Partnersip
Wolfram	Bartolomaeus	Bast
Wurzel	Dietmar	ECTRI Secretariat

4 Presentations

4.1 Overview of the SILENCE Project



Franz Brandl from AVL-List presented the overall aim, partnership and structure of the SILENCE project, including the specific objectives that each Sub-Project has set itself.

The full presentation is included in Annex 1.

4.2 Parameters Influencing Road Transport Noise

Heinz Steven from TUEV Nord Mobilitaet focused on which parameters actually influence road transport noise. He looked into specific emissions of vehicles of different categories in terms of propulsion noise and tyre/road noise. He also illustrated noise emissions in real traffic for single vehicles and statistical pass by noise and showed the contribution of vehicle categories to L_{den} and L_{night} . Heinz Steven concluded his presentation with the effects of different noise reduction measures and a ranking of the order of these measures.



The full presentation is included in Annex 2.

4.3 Vehicle – Tyre – Road Interaction

Ernst-Ulrich Saemann from Continental presented the SILENCE activities that look into the production of low-noise tyres as well as the optimisation of the interaction between the vehicles, its tyres and the road surface. More particularly, design as well as hardware solutions are being developed to reduce the noise of passenger cars, with respect to vehicle/tyre/road integration, under typical urban and suburban traffic conditions. The improvement will be based on an increased understanding of noise generation and radiation mechanisms gained by the further development of experimental and simulation techniques. The aim is also to establish fundamentals for new standards and directives on the European level. The presentation further focused on tyre model development, road model development, absorbing materials on vehicles, and of course low noise tyres.



The full presentation is included in Annex 3.

4.4 Road Vehicle Noise

Eugène Nijman from Centro Ricerche Fiat focused his presentation on the reduction of noise generated by the vehicle itself, i.e. the engine. He explained that today the automotive industry is characterised by rapidly changing prototypal configurations and extremely quick time-to-market requirements. The automotive industry still lacks advanced tools for the accurate and reliable prediction of the acoustical performance of vehicles. The aim of the vehicle related SILENCE activities is therefore to further develop experimental and numerical tools allowing car manufacturers



to translate global vehicle emission requirements into detailed technical indications and to develop novel noise reduction technologies. Eugène Nijman then presented the advanced simulation tools for vehicle noise reduction that are being developed, the advanced experimental source identification and ranking, as well as the advanced noise reduction technologies for vehicles.

The full presentation is included in Annex 4.

4.5 Questions

- Which type of road surface was used for the research and tests?
 - Heinz Steven: Stone-Mastic asphalt 0/11
 - Ulrich Saemann: ISO asphalt, but further tests will be carried out on new surfaces in the coming period
- Which SILENCE training activities are planned for the coming period?
 - Karen Vancluysen: The first SILENCE training event takes place on 13 September, within the framework of the European Summer University in Clermont Ferrand. Main target group of this Summer University are young engineers. A second training event is planned for November in Warsaw and aims to mainly attract public authorities from New Member States. A final and multi-stakeholders training event is scheduled for May 2008.
- What is the advantage of using intensity instead of sound pressure for calculations with engines?
 - Eugène Nijman: In order to reconstruct the volume velocity distribution of the engine using the pressure distribution, the sound transfer function matrix must be known. This matrix can be calculated if the engine bay geometry is available. In the absence of engine bay data the engine volume velocity distribution can still be reconstructed, but in this case both the pressure as well as the volume velocity distributions over a closed surface around the engine have to be known.
- Flanders has many 30 kph zones in cities. As was shown, second and third gear cause a lot of engine noise, which are the gears you mainly use when driving around 30 kph. What could be the effect then of a 30 kph policy on noise?
 - Heinz Steven: In 30 kph zones, the average speed is 37 km if you don't have additional enforcement. The noise still remains lower than in 50 kph zones, where the average speed is a bit above 50. So you do have a reduction of noise. It's different however for trucks in these zones, compared to cars the effect is much smaller.
- Was any research carried out on the noise impact of acceleration and braking of vehicles on urban roads, at crossings, in 30 kph zones with speed bumps, etc.?
 - Heinz Steven: An increase in acceleration clearly relates to an increase in emission. It depends on the design of the 30 kph zones: if you have many speed bumps with acceleration in between, then there's clearly a negative impact on noise. It's better to obtain a low constant speed, which has positive noise impacts.
- Who will force the manufacturers to make more quiet engines, tyres and road surfaces? How to find a better balance between research and implementation?
 - Heinz Steven: The EU can enforce stricter noise limits for engines and tyres through regulations and directives. As a regional or local authority you cannot do much in that respect. You do have the possibility and competence to implement low-noise road surfaces however.
 - Franz Brandl: You can also buy a quieter car fleet or use low noise tyres.

- Alexander Holleis: The leading organisations in SILENCE are from the industry. The industry only produces a product if there is a customer who is willing to buy it.
- In the Netherlands, the Dutch Ministry is funding a low-noise tyre stimulation project. The main problem encountered however, is the lack of information coming from the industry on its products. The government has to measure tyres in order to obtain the necessary information.
 - Heinz Steven: A similar problem occurs for vehicles.
 - Eugène Nijman: It is not so easy to provide such information, a standardised test method for the urban environment would be needed first.
 - Ernst-Ulrich Saemann: Modern tyres are all in the range of 1-3 dBA, so no labelling is necessary as you have similar numbers for all tyres.
- It was said that EU legislation has become increasingly stringent. The aim of such legislation is harmonisation. It puts the industry in a better position for competition and it also applies to non-EU manufacturers. In 1996, a noise regulation for vehicles was issued with rather liberal limits. Since then, limits have been three times sharpened but this is compensated with changes in the methods and many allowances, so there's no effective change. Limits remain very liberal, are easy to fulfil and hardly imply any costs.
 - Eugène Nijman: The competition is very heavy. We try to make a car with as little absorbing material as possible. You spend what you have to, not less, but not more either.
 - Franz Brandl: Legislation and limits did change over the last 30 years, with a reduction of 11 dBA for trucks and 8 dBA for cars. The main reason why a lack of change is perceived is because traffic volumes have increased tremendously over the last 30 years.

The discussion is drawn to a close by the chairman and participants break for lunch.

4.6 New Production Technologies for Urban Low-Noise Road Surfaces

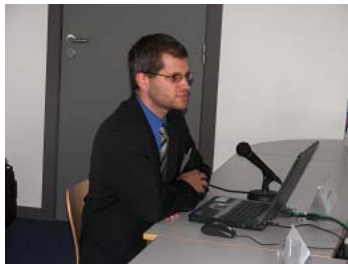


Ulf Sandberg from the Swedish National Road and Transport Research Institute (VTI) focuses the first part of the presentation on new production technologies for *urban streets*. More particularly, he presents the developments on noise reduction for paving stone surfaces for streets of high cultural or historic importance, on texture-optimised surfaces and on noise reduction technologies for low-noise street utilities.

The second part of the presentation is brought by Oliver Ripke from the German Federal Highway Research Institute (BAST), who focuses on new production technologies for surfaces on *urban main roads*. This includes the optimisation of existing construction techniques to reach the appropriate noise reduction level for surfaces on main roads, the development of new technologies for the novel road surfacing materials, and finally the use of existing road building materials in new combinations or new construction technologies.

The full presentations are included in Annex 5.

4.7 Improved Systems for Maintenance of Quieter Road Surfaces



Manfred Haider from Arsenal explains the importance of maintenance in preserving the quality of quieter road surfaces. He presents the principles and methods of acoustic pavement monitoring, as well as detection systems for pavement discontinuities, illustrated with concrete examples.

The full presentation is included in Annex 6.

4.8 Noise Classification Methods for Urban Road Surfaces



Guy Descornet from the Belgian Road Research Centre presented measurement methods for the influence of different urban road surfaces on noise on the basis of which a noise classification of road surface types has been developed. Furthermore, he described the impact of local road surface discontinuities and illustrated the use of the noise performance development model.

The full presentation is included in Annex 7.

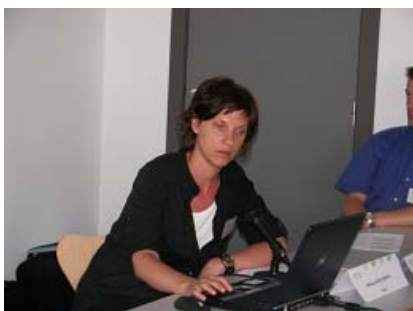
4.9 Controlling Noise through Traffic Management



Lars Ellebjerg from the Danish Road Institute presented the results of the literature study carried out in order to assess the potential of traffic management measures for controlling noise. More precisely, he looked into the reduction of traffic volumes, the impact of driving patterns, traffic calming, humps and cushions, chicanes, roundabouts, gateways, junctions, calming green waves, speed restrictions, congestion charging, night time restrictions and city logistics.

The full presentation is included in Annex 8.

4.10 Driver Assistance Systems for Quiet Vehicle Operation



Finally, Emma Johansson gave an overview of the SILENCE work in relation to driver assistance systems for quiet vehicle operation. Such systems have been identified and are further developed. Existing initiatives, functions and systems include infrastructure related measures such as separate traffic flows for heavy traffic and access restrictions, systems influencing acceleration, deceleration and the control of rpm, such as speed adaptation and limitation, alternative propulsion technologies such as hybrid and electric engines, systems

to reduce the noise coming from the cab/interior, and information and driver training. These were evaluated through focus groups and questionnaires, on the basis of which a set of functions will be implemented and tested in a Volvo truck.

The full presentation is included in Annex 9.

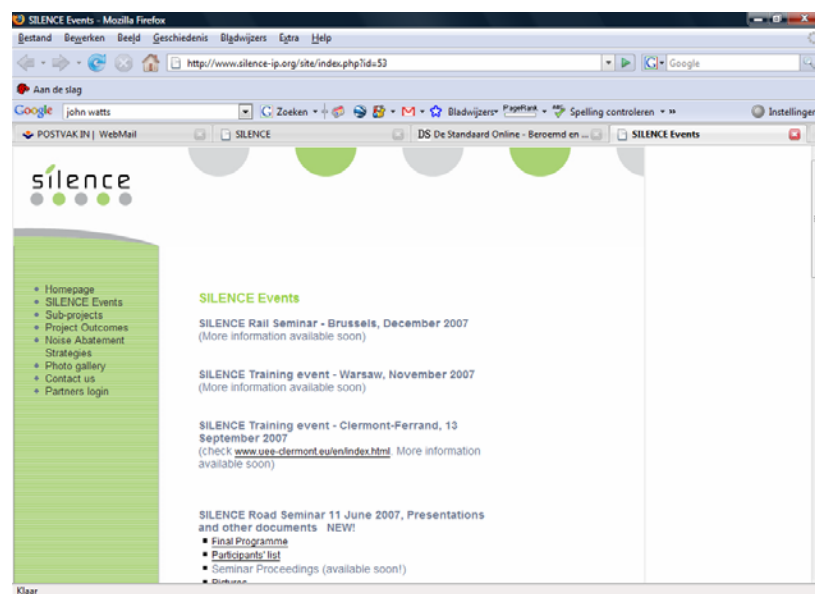
4.11 Questions

- Will you correlate effectiveness with acceptability in the traffic management toolkit that is being developed?
 - Lars Ellebjerg: Acceptability relates to both planners and citizens. A survey about the feasibility of certain measures was carried out among a selection of cities, but apart from that we will not particularly look into this matter. Also, most of the measures are quite commonly used, except for the driver aiding systems, where we do look into their acceptability.
 - Emma Johansson: Focus groups were organised to estimate the acceptability of these measures among the different stakeholders. Very general questions were asked, for example in relation to working in shifts in order to estimate drivers' willingness to change to night shifts.
- Do you use a classification of quiet vehicles?
 - Emma Johansson: It's difficult to classify quiet vehicles and we didn't use a specific definition for what a quiet vehicle is. However, one example of quiet vehicles could be the new electrical hybrid waste collection vehicles from Renova in Gothenburg.
 - Heinz Steven: It's difficult to classify quiet vehicles. Some garbage trucks have also been retrofitted. Modern vehicles have enough power to reduce noise by 5 dBA. If the EC would provide different steps for lowering noise, then a vehicle from a future stage that comes on the market could be considered as a quiet vehicle.

After the question round, the chairman thanked the organisers and participants and informed the audience that all presentations of the seminar would also be made available on the SILENCE website.

5 Annexes

The following annexes include the presentations that were given by the different speakers at the seminar. They have also been made available on the SILENCE website at www.silence-ip.org.



Annex 1: Overview of the SILENCE Project – Franz Brandl, AVL-List

Annex 2: Parameters Influencing Road Transport Noise – Heinz Steven, TÜV Nord

Annex 3: Vehicle – Tyre – Road Interaction – Ulrich Saemann, Continental

Annex 4: Road Vehicle Noise – Eugène Nijman, CRF

Annex 5: New Production Technologies for Urban Low-Noise Road Surfaces – Ulf Sandberg, VTI and Oliver Ripke, Bast

Annex 6: Improved Systems for Maintenance of Quieter Road Surfaces – Manfred Haider, Arsenal

Annex 7: Noise Classification Methods for Urban Road Surfaces – Guy Descornet, Belgian Road Research Centre

Annex 8: Controlling Noise through Traffic Management – Lars Ellebjerg, DRI

Annex 9: Driver Assistance Systems for Quiet Vehicle Operation – Emma Johansson, Volvo

All Annexes are available at <http://www.silence-ip.org/site/index.php?id=53>