Sound Level of Motor Vehicles
Abstract

This report summarises the presentations and discussions at the Workshop on the Sound level of motor vehicles, held on 11 April 2012. The aim of the workshop was to allow an exchange of views between the European Commission, MEPs and stakeholders of the motor vehicle industry, transport and environment NGOs, and academia.

Topics for discussion included the impacts of the Commission legislative proposal for a Regulation of the European Parliament and the Council on the sound level of motor vehicles (COM(2011) 856).

The workshop was chaired by MEP Miroslav Ouzký, ENVI Rapporteur for the Commission Proposal on “The sound level of motor vehicles”.

LIST OF ABBREVIATIONS

**ACEA** European Automobile Manufacturers Association

**dB** Decibel

**EEA** European Environment Agency

**EUROCITIES** Network of major European cities

**GPG** Good Practice Guide on noise exposure and potential health effects issued by EEA in 2010

**ERF** European Road Federation

**ETRMA** European Tyre and Rubber Manufacturers Association

**IMCO** Committee Internal Market and Consumer Protection

**Lden** Day-evening-night noise indicator as defined in directive 2002/49/EC

**M1 vehicles** EU general classification of vehicle categories acc. to Directive 2002/24/EC, M1 = no more than eight seats in addition to the driver’s

**UNECE** United Nations Economic Commission for Europe
EXECUTIVE SUMMARY

The workshop was held on 11 April 2012 at the European Parliament in Brussels to discuss the Commission legislative proposal on the sound level of motor vehicles (COM(2011)856).

The proposal by the European Commission for a regulation on the sound level of motor vehicles with stricter noise emission limits for cars, vans, lorries and buses was transmitted to the European Parliament and the Council on 9 December 2011 for the first reading. The proposal for a Regulation aims to repeal and replace the EU’s existing vehicle noise directive (70/157/EEC).

Currently (May 2012) there is a report being drafted by the ENVI Committee (Rapporteur: MEP Miroslav Ouzký; Shadow Rapporteurs: MEP Salvatore Tatarella, MEP Judith Merkies, MEP Holger Krahmer, MEP Satu Hassi, MEP Sabine Wils, MEP Oreste Rossi). The Rapporteurs for opinion are MEP Anja Weisgerber/IMCO and MEP Gilles Pargneaux/TRAN and the vote in the ENVI Committee is currently scheduled for 10.7.2012.

In this legislative proposal the European Commission proposes noise limits for all road vehicles as well as a new test cycle for passenger cars.

The objective of the EC proposal is to ensure a high level of health and environmental protection and to safeguard the internal market for motor vehicles as regards their sound level. The proposal aims at reducing environmental noise by introducing a new test method for measuring noise emissions, by lowering the noise limit values and by including additional sound emission provisions in the type-approval procedure. It aims also at ensuring road and occupational safety by introducing requirements regarding the minimum noise for electric and electric-hybrid vehicles.

The proposed ‘step 1’ and ‘step 2’ limits for cars, vans, buses and lorries would be introduced in 2015 and 2017.

The European Commission’s proposal served as a basis for analysis and discussions among experts and stakeholders.

There was broad consensus among experts on the strong need to protect human health against traffic noise in Europe as high noise levels can cause adverse health effect. Although views on the most appropriate ways and methods for lowering the noise burden differed among the participants, the principal aim of lowering noise levels at source as an effective measure was not questioned and the combining of measures into an integrated approach with a long-term focus was considered necessary.

In addition to the Commission proposal, it was stated that measures such as noise labelling (similar to CO2 labelling) for passenger cars would be an additional benefit. Also, 3rd phase noise limits were mentioned by several speakers as a necessity, with industry being open to discussion, although highlighting timing and cost/benefit issues.

Industry representatives expressed a clear willingness to support the lowering of noise limits and, as a consequence, the noise burden for Europe’s citizens, but they also mentioned the additional burden arising due to higher compliance costs and the tough timing constraints in the Commission proposal. Additionally, they also stressed the need for an integrated approach in order to achieve a major overall effect in the end.

This document describes and summarises the debate and the discussions that followed the presentations of the participants. All presentations given by the listed speakers are therefore displayed in the annex of this paper.
WORKSHOP PROCEEDINGS

PART 1: THE ENVIRONMENTAL NOISE FROM MOTOR VEHICLES

Opening Remarks

MEP Miroslav Ouzký, ENVI Rapporteur

After welcoming the participants, MEP Miroslav Ouzký, ENVI Rapporteur, outlined the programme of the workshop, which was divided into two Parts, with the first Part giving a more academic background and the second part providing an opportunity for stakeholders to present their points of view. Then MEP Ouzký gave the floor to Mr. Philip Jean from DG Enterprise who presented the Commission proposal on “The sound level of motor vehicles”.

Introduction of the proposal by the European Commission

Mr. Philip Jean, Head of Unit F1, Automotive Industry, DG Enterprise & Industry, European Commission

Mr. Jean outlined the 3 main objectives of the Commission proposal, namely the functioning of the internal market, environmental objectives and maintaining competitiveness. He stressed that an ambitious target would promote competitiveness but also mentioned that the proposal came during difficult economic circumstances. The cost benefit ratio of such a proposal would need to be clearly identified. Previous measures have not led to the expected results - also because of the applied measurement method -, an aspect which has been dealt with in new proposal. The new proposal comprises 3 main elements:

1. New test method measuring the noise of vehicles
2. Adopted noise limits
3. A proposal for electric vehicles (which are too silent in some driving situations)

These elements should contribute to minimising the impact of noise on the environment.

Presentations on the environmental noise from motor vehicles

Exposure to environmental noise: risks for the health and environment

Dr. Wolfgang Babisch, Federal Environmental Agency Germany

Mr. Babisch summarised the state of the art in noise research and outlined the burden of disease from environmental noise in Europe. He specified annoyance, disturbance of sleep, cognitive impairment, cardiovascular risks and other effects as possible adverse health effects of noise and pointed out that contrary to e.g. chemical exposure, individual perception plays an important role in the effects of noise exposure.
Mr. Babisch also mentioned the number of people exposed to certain levels of noise, as published by the Member States for the purpose of reporting under the Environmental Noise Directive.

In this context, he estimated, for instance, the number of people exposed to night-time levels of 55 decibels or more to be 30 million EU-wide, and in agglomerations at 18 to 20 percent of the population, while the WHO considers that already this interim target for the night increasingly poses a risk to public health. The WHO concludes that more than one million healthy life years are lost per year in European cities due to noise.

Cost/benefit calculations show a high cost of noise exposure.

According to Mr. Babisch, it can be shown that a noise reduction in all noise bands has a higher effect than only focusing on the highest noise levels. Therefore the most effective measure, also in terms of cost benefits, is a reduction at the source, which calls for stricter sound level limits from road vehicles.

**The role of vehicles in road traffic noise**

**Mr. Heinz Steven, HS Data Analysis and Consultancy**

Mr. Steven outlined the basic aspects of road traffic noise. While propulsion noise is mainly a function of speed and engine load, tyre/road noise is a function of tyre, road surface and speed.

At speeds greater than 30 kph rolling noise becomes the dominant source, apart from acceleration phases in the case of passenger cars. For trucks, tyre/road noise becomes important at speeds of 65 kph or more. A comparison shows that trucks emit sound levels which are up to 13 decibels higher than those emitted by passenger cars. Therefore trucks account for about half of the total noise emissions under real urban conditions although the main part of the fleet consists of cars and light duty vehicles. On the basis of these findings, Mr. Steven proposed the following priorities for noise reduction: as regards tyre/road noise, priority should be given first to passenger vehicles, then to light duty vehicles followed by heavy duty vehicles. For propulsion noise the order should be heavy duty vehicles before light duty vehicles and passenger vehicles.

With regard to the introduction of lower limit values in the 1980s and 1990s, Mr. Steven stated that only a very small reduction of real traffic noise levels had been achieved for passenger cars, while the situation had improved for heavy duty vehicles.

Mr. Steven also said that for many vehicle manufacturers no action was required with regard to the first step of the Commission proposal. To achieve a reduction of 3 decibels in real traffic, however, further reduction steps for tyres and for M1 vehicles will be required.
Effectiveness of EU legislation on road traffic noise reduction

Mr. Christian Popp, LÄRMKONTOR GmbH

Mr. Popp in his presentation on the EU Environmental Noise Directive - displaying noise exposure and the mitigation measures required as a consequence - said that the Environmental Noise Directive would require the elaboration of action plans with the aim of a quieter Europe.

Mr. Popp referred to the problem faced by local authorities - namely that they are often responsible for action plans but have no or only a minor influence on major noise sources, as the responsibility for that is at Member State level. He also noted that there were no binding criteria for action plans or mitigation measures.

Mr. Popp outlined the general principles of traffic volume versus noise level as well as the proportional impact of heavy duty vehicles and passenger cars. One heavy duty vehicle can emit as much noise as 20 passenger cars, depending on the speed, which leads to the conclusion that heavy duty vehicles should be kept out of residential areas. After describing further "set screws" (i.e. regulatory measures) like traffic management, speed limits, road surfaces and traffic planning (taking into account problems and resistances), Mr. Popp sees the highest priority in reducing tyre/road noise and introducing lower speed limits.
Questions & Answers - Part 1

MEP Krahmer and Shadow Rapporteur, asked the first few questions. Question number one was directed at Mr. Jean and referred to the proposed minimum sound emission for quiet vehicles, and in particular to a sound level below which vehicles are regarded as being too quiet for use in traffic (when does the Commission think that a vehicle is too quiet - is it 67dB, i.e. 1 dB less than in the other legislation?). He also raised the question whether provisions for quiet vehicles fitted in with the context of the Commission proposal (which was a piece of legislation for environmental health), or whether it should not fall under regulations for the automotive industry.

Mr. Jean explained that the definition of quiet vehicles was based on UNECE expert findings. He also stated that the need for minimum sound emission had become obvious when the proposal was made but confirmed that there is no definition for quiet vehicles. He added that the minimum sound emission should not be mandatory. Requirements for quiet vehicles had been considered in the proposal because impacts on road safety (e.g. electric and hybrid vehicles being too quiet for pedestrians) had been foreseen. Mr. Steven mentioned in addition that the issue of minimum sound emission is only relevant at speeds below 20 kilometres per hour.

MEP Krahmer’s next questions were directed at Mr. Babisch and referred to the noise tolerance of human beings and whether there are scientific findings that this noise tolerance has changed over time (whether we become ill more quickly at lower noise levels, or whether our individual tolerance has been reduced). His other question referred to a WHO study which puts the numbers of people dying earlier every year because of noise pollution at 1-1.6 million and Mr. Babisch’s scientific opinion on these figures, whether we can really prove how many people die earlier in Europe every year because of environmental noise. Mr. Babisch replied that dose-response effects had not changed over time, or at least not for road and rail traffic noise. Only for aircraft noise does sensitivity seem to have increased. Noise tolerance is dependent on the disturbance of activities – a simple toxicological concept (as is the case for air pollutants) does not work for noise. With regard to premature deaths due to noise, he explained that the figure given by the WHO did not refer to 1m lethal cases but to ‘disability adjusted life years’, namely a 1m loss of healthy life years, and that the amount that heart diseases and heart attacks contributed had been found to be below 10%. What Mr. Babisch pointed out, however, was that annoyance (e.g. sleep disturbance) must be considered as a health effect.

Another question by Mr. Kinzer from ETRMA was directed at Mr. Steven and referred to the potential for tyre road noise reduction, i.e. road related reduction (10dB) and tyre related reductions (accounting for 5 dB). He pointed out the fact that the effects of available silent road surfaces (which could reach a 4dB noise reduction) had not been considered in the reduction scenarios presented by Mr. Steven (achieving only 3 dB overall) since the model used in the presented study from Mr. Steven dated back to November 2003. Mr. Kinzer thought it might be useful for the current state of technology to be reflected in the study and raised the question whether different results would be achieved if different varieties of available silent road surfaces were included. Mr. Steven replied that if he included these, he would gain more than that but pointed out that a quiet road surface only works where it actually is and stated that all contributions are needed to achieve a ‘quieter Europe’ (quoting Mr. Popp) – from tyres, vehicles and road surfaces.
With regard to a 5-10 dB reduction potential, he stated that this referred to the span of type-approved tyres on the market (the quietest tyre compared to the loudest tyre) and that he expected that the 5 dB span would be reduced once the limits came down (such as heavy duty vehicles being close to limits which are quite tight already) and that with respect to road surfaces, 10 dB included pavement stones whereas about 5 dB could be achieved when disregarding pavement stones.

The last question by Mr. Gruber from AUDI was directed at Mr. Babisch and referred to the GPG (Good Practice Guide) published by the EEA in 2010. He asked whether exposure-response relationships were also valid for quiet road surfaces or whether the number of people highly annoyed was probably lower on quiet road surfaces. Mr. Babisch replied that exposure-response relationships referred to a large variety of different traffic situations within a community and that the common indicator of the exposure was the Lden under the EU Environmental Noise Directive, regardless of the individual situation, and that the exposure-response relationship referred to the expected average number of subjects in the community that will be highly annoyed at certain noise levels. There may be individual variations, but for policy making it is preferable to refer to the average perception of sound. Mr. Gruber then asked whether the number of people on quiet road surfaces could actually be lower, given the different exposure-response curves for these surfaces. Mr. Babisch replied that noise annoyance was not only determined by the noise level, but also by other factors (e.g. psychological) – usually 30% of noise annoyance was due to the sound level, another 30% to personal disposition and the remaining third was unknown. A low noise surface combined with a nicer environment may have the result that people respond with lower annoyance, which is, however, a specific situation which is not accounted for in a dose-effect curve which has a use for general purposes. Mr. Gruber finally asked whether annoyance in terms of a health endpoint was the main contributor to healthy life years lost and Mr. Babisch replied that sleep disturbance contributed most to the 1 million healthy life years lost, followed by annoyance in the second place and heart attacks in the third.

MEP Ouzký closed Part one of the workshop and gave the floor to MEP Tatarella, ENVI Shadow.
PART 2: ROUNDTABLE ON THE IMPACT OF THE EC PROPOSAL – SESSION 1

Opening Remarks

MEP Salvatore Tatarella, ENVI Shadow Rapporteur

MEP Tatarella opened Part 2 of the workshop with the remark that the sheer number of participants showed how important the topic was, and not only for the automotive industry. MEP Tatarella mentioned that a more down to earth approach would be pursued during Part 2 of the workshop and referred to the efforts undertaken to provide a balanced workshop programme. Then MEP Tatarella gave the floor to Mr. De Graaff.

Presentations Roundtable - Session 1

The interaction of the European Commission proposal on Sound level of motor vehicles with other legislation

Mr. Erik de Graaff, M+P

Mr. De Graaff described the interactions of the European Commission proposal on the sound level of motor vehicles with other legislation, especially with tyre legislation. Mr. De Graaff focused on the new test procedure and explained that a change of the test method was necessary and a step forward. According to Mr. De Graaff, up to 99% of all traffic situations can be covered with the new test method, taking also into account the role of the tyre in an adequate manner. Due to the tyre noise limits coming into force in 2013, the effect of the proposed first step of limit values for vehicles will only be a minor one, while the second step will have a significant effect. The proposed vehicle noise limits will steer the market forces towards tyres with the lowest available noise emission. Since vehicles are driven with replacement tyres during 90% of their life time, regulations to guarantee reduced noise emissions after replacement should also be taken into account. Mr. De Graaff also proposed a reduction of the truck limits as the measurement method has changed. However, some issues will remain open, and therefore a third legislative step may have to be included in the Regulation.

The challenges for the car industry

Mr. Ivan Hodac, European Automobile Manufacturers' Association

Mr. Hodac reminded the audience in his presentation that the automotive industry was the key to the EU economy which, however, was under constant regulatory pressure. His intention at the workshop was not to complain but to state facts. He mentioned the three basic problems with the Commission proposal, namely the proposed vehicle categories, the noise limits themselves and the lead time required. All those - as stated in the Commission proposal - do not match the industry’s views. Mr. Hodac also mentioned the discrepancy between an electric vehicle performing during the new test at currently 68 decibels and the proposed limits for conventional passenger cars in the current proposal.
Generally, the affordability of vehicles would be affected by the new proposal and the business costs for the automotive industry would rise. Mr. Hodac put the costs for implementing the proposed regulation at 1500-3000 Euros per truck and at 300-600 Euros for cars.

**The Perspective of the Tyre Industry**

**Ms. Fazilet Cinaralp, Secretary General of the European Tyre & Rubber Manufacturers’ Association**

Ms. Cinaralp reminded the audience that a similar discussion, also about tyre noise limits, had taken place three to four years ago. In general, the tyre industry was ready to meet the limits set at the time. But bearing in mind the burden for the tyre industry - due to the recent tightening of tyre noise limits -, Ms. Cinaralp also said that road noise mitigation required an integrated approach from the start, taking into account road pavement, vehicle and tyre. In this context, a road pavement grading system would be beneficial.

**Question & Answers - Part 2, Session 1**

MEP Hassi, ENVI Shadow Rapporteur, asked Mr. Hodac, referring to Mr. Popp’s statement that the noise of one truck corresponded on average to the noise of 20 passenger cars, and given that the least noisy small passenger car, according to ACEA classification, emitted only 64 decibels, while the noisiest sports car emitted over 76 decibels (thus making the noise of almost 20 silent passenger cars). She asked whether there should be – in line with the view of Mr. Popp that it makes sense to reduce truck traffic in residential areas - limits to the driving of such noisy sports cars in cities and residential areas. Mr. Hodac replied that first and foremost, they were proposing to lower the noise levels from sports cars, and that in each of the three categories there were cars with lower and higher noise levels, that each constructor was working in a different way and that everybody was trying to reduce the noise. He pointed out that the sports cars – i.e. the third category - represented 0.03 percent of all the cars, which meant that the total noise from those cars was limited. He did not believe that they should be limited in residential areas as the impact of those few cars was extremely limited. He said, however, that they were proposing to limit the noise from those cars, first for the upper 10% - the noisiest cars – and as a second step, 6 years after the adoption of the Directive or 5 years after the first step, they were planning to limit the noise of 50% of those sports cars. MEP Hassi then asked, with reference to the low percentage of sports cars mentioned by Mr. Hodac, whether there should be legislation keeping this percentage low. Mr. Hodac replied that he did not believe that there was a place to have legislation to keep those sports cars off the road.

MEP Krahmer asked Mr. De Graaff what exactly the limit values he proposed were and whether he could accept that these limit values differentiated between different vehicle categories. Mr. De Graaff replied that he was there in the role as an independent expert and was not the one who had proposals for limit values at all. He was just evaluating the proposal of the Commission (as one of the proposals on the table). With respect to categorisation, he stated that more different categories of the vehicle fleet might be effective in that they have more pronounced or lower limits for the lowest emissions – which might in the end be more effective.
MEP Krahmer also asked Mr. Hodac whether he had heard of any complaints from people about sports cars and whether the car industry would be willing to take further steps to reduce the limit values – i.e. reduce the noise levels - after the 6 years of the Commission proposal. Mr. Hodac said that he did not have an answer to the question about how many complaints there are about noise from sports cars. As mentioned before, the number of these cars, according to Mr. Hodac, was very limited and he did not believe that there was a reason to take them off the road.

He referred to the two steps for lowering the noise from sports cars which were in the proposal. On the limit values, he informed the audience that they were looking at the M1 vehicles, the AB and C, 72 to 73 and 75 as a first step, and then down to 70, 71 and 74 respectively as a second step. He also clearly stated that the car industry was always open for reduction and had never said that they would not be willing to discuss a potential future reduction, which would depend on the lead time and the costs.

Then MEP Weisgerber, IMCO Rapporteur, gave her opinion on the issues of consumer aspects and limit values and directed four questions at Mr. Hodac:

1. Should there be a further differentiation of vehicle categories, to provide a clearer breakdown of limit values (Category passenger vehicles M1)? (Her impression being that the Commission was open to setting out the categories in a different way – perhaps a different differentiation would be a better solution).

2. Should there be a clearer distinction between the times for which the limit values should be in application – e.g. for cars and heavy goods vehicles, reflecting their different product cycles (e.g. for cars 5-7 years over a product cycle and for lorries more than 10 years, with longer time periods for heavy goods vehicles since their life cycle is nearer 12 years) Could the industry give more planning certainty here which would also have a positive effect on the environment?

3. Would a long term target (similar to CO2 legislation) be sensible?

4. What is the industry’s view on noise labelling (similar to CO2 labelling), as noise labelling would provide information that might be useful to the consumer, or traders?

Mr. Hodac answered these questions in the following way.

1. 3 categories (as proposed by ACEA) are based on monitoring and reflect the actual situation of the vehicles on the road. The question is if the Commission wants to discuss this.

2. Reflecting different product cycles would be beneficial.

3. Not answered by Mr. Hodac.

4. ACEA has no position on labelling as yet. They are open to discussions.

On the question of the categorisation of vehicles, Mr. Steven added that, as Mr. Hodac had already mentioned, the Commission’s proposal had an outdated categorisation (at least 4 subclasses in which vehicles no longer existed on the market).

Mr. Hodac added that there were also vehicles in certain (new) classes that had not been there before. He pointed out that the ACEA reflected much more the present situation on the market.
Then MEP Merkies, ENVI Shadow Rapporteur, directed two questions at Mr. De Graaff and added that noise labelling should have been included in the Commission proposal:

1. Would sharp vehicle noise limits stimulate the production of silent tyres and would be a matter of phase-in?
2. Driver behaviour is an important factor for road noise. Is there any method for gauging driving behaviour?

Mr. De Graaff gave the following answers:

1. He believed that one of the principal aims of the Commission proposal was to measure total vehicle noise from now on. If limits are set tight enough, this will drive (i.e. lead to new) technology, depending on the level of limits and the sound performance of other vehicle components. Lowering the limit enough would mean that the tyre would be dominant, and if that tyre did not exist (yet), the tyre industry would have to do more. Future limit stages would be technology forcing rather than technology following as up to now (setting limits according to available technology). So he confirmed that there was an interaction with the tyres and that it would lead to new technology.

2. Generally, the consumer buys noisier vehicles and the fleet consists of more heavy and powerful vehicles, with wider tyres than in the past. Driving behaviour in past and current tests has been more aggressive. It is envisaged that in future tests it will be less aggressive, a mixture of cruising and slow acceleration, pointing more towards the tyre industry, which will then have an effect on the demands of the vehicle industry towards the tyre industry.

Mr. Hodac added the following:

1. Generally, there should be an obligation to teach ecodriving in driving schools in order to reduce CO₂ emissions. 1 hour of ecodriving school reduces CO₂ by 10 percent. If a car is driven in that way, noise is also reduced. This is a question of enforcement.
2. Tyre noise (and width) and safety are factors that go hand in hand.
3. With regard to the sports car: Even a sports car cannot be driven at more than 50 km per hour in residential areas, but this is an important question of enforcement.

In general, according to Mr. Hodac, traffic management is also an important factor when it comes to noise, since stopping at every traffic light causes considerable noise and CO₂ pollution, but he also pointed out that it seemed more difficult to impose on Member States a traffic management system through e.g. dynamic traffic lights, than imposing new limits on the tyre industry and the car industry. He stated that a balance should be found in this field.
PART 2: ROUNDTABLE ON THE IMPACT OF THE EC PROPOSAL - SESSION 2

Presentations Roundtable - Session 2

Traffic noise in the urban environment

Mr. Jan-Harko Post, EUROCITIES/City of The Hague

Mr. Post described in his presentation the noise situation in Europe’s major cities and the processes that lead to noise action planning in cities. The main source, by far, for noise disturbance is traffic noise, causing severe health effects in human beings. Mr. Post stressed that measures taken at the source of the noise are by far the most effective measures and gave the following clear recommendations:

- The Commission should think about a faster timetable and add a further step going beyond the currently proposed limits.
- Research on noise and noise abatement should be encouraged and the topic needs an integrated approach.
- There is strong support for noise labelling of vehicles.

Finally Mr. Post stated that there was no excuse for inaction.

How road infrastructure can contribute to noise reduction

Ms. Irene Fusco, European Road Federation

Ms. Fusco from ERF explained in her presentation how road infrastructure can contribute to noise reduction. She stressed that in this matter, several elements were acting together, namely cars, tyres, road infrastructure, road users, planners and authorities. When it came to road surfaces, noise was only one thing that needed to be taken into account. Noise reduction, according to Ms. Fusco, needed a holistic approach. A major problem, according to Ms. Fusco, is that silent road infrastructure is more expensive than conventional infrastructure, which is a problem for the authorities who tend to make purchase decisions on the basis of costs, especially in economically critical situations. One possible solution might be to include road infrastructure in green public procurement - by labeling road surface types, which would be a necessary prerequisite.

A Sound Investment Reducing Vehicle Noise

Ms. Nina Renshaw, Transport and Environment

Ms. Renshaw from Transport and Environment pointed out that changes were urgently needed to ensure that noise levels were cut without delay, and mentioned that current standards had no effect at all. One of the reasons, according to Ms. Renshaw, was that previously test methods always changed ahead of new limits, with the result that no effect was achieved at all.
About 63% of passenger cars and 34% of heavy duty vehicles - according to Ms. Renshaw - already meet step 1 limits of the proposed Commission legislation. Ms. Renshaw also highlighted the need for a long-term strategy, including 3rd step noise limits and the speeding up of the timetable, since – according to the proposal - there would be no significant changes until 2019. This would give industry enough time to anticipate future requirements, she said. In the same context, Ms. Renshaw mentioned that compliance costs for the industry would not be substantial.

**Questions & Answers - Part 2, Session 2**

MEP Krahmer referred to Eurocities and information about dropping limit values in the Commission proposal and mentioned in this context a brochure of the German Environment Agency on urban traffic noise, stating that only small noise reductions could be expected from limit values (or reducing them) e.g. on bus routes. He referred to Mr. Steven’s remark about outdated categorisations in the Commission’s proposal and wanted to know the reasons for using such categorisations in the proposal.

Mr. Jean from the Commission confirmed that the same categories had been used in order to provide a comparison between the two types of test and that a review by the Council and Parliament was expected. He said that he presumed that the Commission would adopt a pragmatic position and would be open to proposed amendments to the proposal in order to make it more effective, in particular to have the same level of objectives in terms of road effectiveness.
CONCLUDING REMARKS

MEP Ouzký closed the workshop by showing his appreciating for the positive atmosphere in which the discussions had taken place. He promised that in his draft report he would focus on efforts to protect public health while at the same time ensuring that proposed measures would be feasible and workable for the automotive industry.
ANNEX I: AGENDA

WORKSHOP ON
SOUND LEVEL OF MOTOR VEHICLES

Wednesday, 11 April 2012 from 9h30 to 12h30
European Parliament, Room Altiero Spinelli 5G3, Brussels

The event is open to the public. Interpretation will be available in EN-DE-FR-CS-IT

9.30 Welcome MEP Miroslav Ouzký, ENVI Rapporteur

Part 1: The environmental noise from motor vehicles

9.35 The European Commission proposal on "The sound level of motor vehicles",
Mr. Philippe Jean, Head of the Automotive Industry Unit of the Commission’s Enterprise and Industry Directorate-General, European Commission

9.50 Exposure to environmental noise: risks for the health and environment
Dr. Wolfgang Babisch, Federal Environmental Agency Germany

10.00 The role of vehicles in road traffic noise
Mr. Heinz Steven, HS Data Analysis and Consultancy

10.10 Effective results of the current EU legislation on road traffic noise reduction
Mr. Christian Popp, LÄRMKONTOR GmbH

10.20 Q&A, open discussion

10.40 Conclusions by MEP Miroslav Ouzký, ENVI Rapporteur
Part 2:  Roundtable on the impact of the EC proposal

10.45  Introduction by MEP Salvatore Tatarella, ENVI Shadow

10:50  The interaction of the European Commission proposal on Sound level of motor vehicles with other legislation,
       Mr. Erik de Graaff, M+P

11.00  The challenges for the car industry
       Mr. Ivan Hodac, ACEA (European Automobile Manufacturers' Association)

11.10  The Perspective of the Tyre Industry
       Ms. Fazilet Cinaralp, Secretary General of ETRMA (European Tyre & Rubber Manufacturers' Association)

11.20  Q&A, open discussion

11.30  Traffic noise in the urban environment
       Mr. Jan-Harko Post, EUROCITIES/City of The Hague

11.45  The role of road infrastructure in noise reduction
       Ms. Irene Fusco, European Road Federation

11.55  A Sound Investment - Reducing Vehicle Noise
       Ms. Nina Renshaw, Transport and Environment

12.05  Q&A, open discussion

12:25  Conclusions from MEP Salvatore Tatarella
ANNEX II: SHORT BIOGRAPHIES OF EXPERTS

Philippe Jean, Head of the Automotive Industry Unit of the Commission’s Enterprise and Industry Directorate-General, European Commission

Philippe JEAN was born in 1956 and joined the European Commission in 1983. He has worked in a number of areas, such as trade negotiations, steel policy, functioning of the internal market. From 1999 to 2002, he was Deputy Head of Cabinet of the Enterprise Commissioner, Mr. E. Liikanen, where he was responsible for industrial files, including those relating to the automotive sector.

In January 2008, he took up his present position as Head of the Automotive Industry Unit of the Commission’s Enterprise and Industry Directorate-General.

He looks after aspects of automotive industry competitiveness and is responsible for the legislative framework for type-approval of vehicles.

He graduated in law and economics at the University of Paris and is an alumni from the “Institut d’Etudes Poliques” of Paris.

Wolfgang Babisch, Senior Research Officer at the German Federal Environmental Agency

His research focus is on noise epidemiology, particularly the auditory and nonauditory health effects of noise. Besides this, Mr. Babisch is a member of the International Commission on Biological Effects of Noise (ICBEN); a temporary advisor to the WHO on health effects of noise and a Member of the EEA expert panel on Noise.

Between 1981 and 1990 Mr. Babisch worked as 1981-1990 Scientific Officer at Federal Health Office in Berlin. His research focused mainly on the following topics: laboratory studies on physiological effects of noise-stress, epidemiological studies on cardiovascular risk of traffic noise and epidemiological studies on hearing in adolescents. In 1991 Mr. Babisch became First Scientific Officer at the Federal Environmental Agency in Berlin. Since then his research concentrates mainly on subsequent topics: Epidemiological studies on cardiovascular risk of traffic noise and occupational noise, Epidemiological studies on pulmonary effects of air pollution and Hearing damage due to loud music.

Heinz Steven, Consultant Engineer at HS Data Analysis and Consultancy

Since 2008 Mr. Steven is involved in amendments of vehicle regulations for noise and exhaust emissions. He is a specialist for in-use driving behaviour data analysis and emission factor development. Furthermore he developed models for the calculation of noise and exhaust emissions for road vehicles. From January 2002 until November 2008 Mr. Steven was Manager at TUEV Nord Mobilitaet which is an Institute for vehicle technology and mobility. He was Manager on the domain of "Noise, Measurement Technology and Modeling". Between 1969 and 1974 Mr. Steven studied Electrical Engineering at the Rheinisch-Westfälische Technische Hochschule in Aachen.

Christian Popp, Lärmkontor GmbH

LÄRMKONTOR GmbH is a consulting firm that is specialised in noise protection and air pollution. Between 1991 and 1998 Mr. Popp was Branch manager at FIGE GmbH and from 1978 until 1978 he was consultant and Deputy Head of Division at the Building authority of Hamburg. In addition Mr. Popp is a long-standing board member of the German association for noise prevention and a long-standing member of various committees and panels to draft noise protection regulations. He is for instance a member of the Research Association for Roads and Transportation (FGSV), the German Association of Acoustics and the EU work group "Noise Mapping" (WG4). To conclude, Mr. Popp studied engineering at the University of Applied Sciences in Hamburg from 1975 until 1978.

Erik de Graaff, Senior Consultant for M+P - Consulting Engineers

M+P is an internationally operating consultancy and research agency in the field of sound, vibration, air and building physics. More than 30 members of staff work on long-term solutions aimed at the organisation and improvement of the quality of the living environment, commissioned by the government and the business sectors. As Senior Consultant Ir de Graaff specialized in issues related to noise. Some of his presentations include: Internoise 2011; “Stimulation of low noise road vehicles in the Netherlands“ Erik de Graaff and Gijsjan van Blokland, M+P Consulting Engineers; Internoise 2009; "Additional sound emission provisions in new European type approval method for exterior noise of road vehicle", B.J.F. Kortbeek, D.F. de Graaff, D. Welkers, G.J. van Blokland; Internoise 2008; "Exterior noise, grip and rolling resistance levels of C1, C2 and C3 tyres in relation to the tyre noise directive (EU directive 2001/43/EC) and consumer interests", D.F. de Graaff, G.J. van Blokland.
Ivan Hodac, Secretary General of the European Automobile Manufacturers Association (ACEA)

Building on a large experience in EU affairs, he maintains close relationships with the European Commission, the European Parliament and the representatives of the EU Member States. Representing 18 European automobile manufacturers in Brussels, Hodac is also counterpart for other industry associations, NGOs and consumer organisations.

Mr. Hodac, born in Czechoslovakia, started his career in 1976 as an assistant at the College of Europe in Bruges and has later worked as a consultant and as Secretary General of a worldwide and EU trade association in the food sector. From 1992 to 2001, he was Senior Vice President and Head of the European office for AOL Time Warner, the leading communications and media group in the world.

Mr. Hodac holds a degree in Mechanical Engineering and in Economics and Political Science.

Fazilet Cinaralp, Secretary General of the European Tyre and Rubber Manufacturers' Association (ETRMA)

The primary objective of ETRMA is to represent the regulatory and related interests of the European tyre and rubber manufacturers at both European and international levels. To work effectively ETRMA is involved in continual dialogue with the relevant EU and international institutions, national agencies and other industry sectors. Ms. Cinaralp worked for the American Group "Champion Spark Plugs Inc" at their European Headquarters from 1984 until 1991. Since then she joined BLIC (Bureau de Liaison des Industries du Caoutchouc de l'Union européenne) in June 1991 as Advisor to Health, Safety and Environmental matters. In 1996, she was appointed Secretary General. In May 2006, ETRMA (European Tyre & Rubber Manufacturers' Association) replaced BLIC.

Jan-Harko Post, European Policy Advisor at the Environmental Department of the City of The Hague

In addition Mr. Post is a member of the Dutch national review teams for the Environmental Noise Directive (END) and the Directive Environmental Impact Assessment (EIA). As Project manager he is also responsible for the local implementation of the Environmental Noise Directive (noise mapping and noise action plan) and advisor on general policies regarding environmental noise and urban planning.

Mr. Post is as well a member of the Eurocities Environment Forum, Eurocities Working Group on Noise and Eurocities Working Group on Air Quality, Climate Change and Energy Efficiency. EUROCITIES is the network of major European cities. Founded in 1986, the network brings together the local governments of more than 130 large cities in over 30 European countries. The organization gives cities a voice in Europe, by engaging in dialogue with the European institutions on all aspects of EU legislation, policies and programmes that have an impact on cities and their citizens.
Irene Fusco, Project Manager at European Road Federation

Irene Fusco joined the ERF in 2008 after some work experience at the OSCE (Organisation for Security and Cooperation in Europe). She is responsible for the research activities related to sustainable roads and Intelligent Transport Systems. She is currently in charge of implementing ERF’s activities within several EU co-funded projects, including QUIESST (QUIetening the Environment for a Sustainable Surface Transport). Irene Fusco also manages and animates the European Noise Barrier Federation (ENBF) meetings and the ERF working programme dedicated to the environmental noise issue.

Her areas of expertise include freight transport and logistics, ITS/GNSS road applications and sustainability.

Nina Renshaw, Deputy Director and Policy Officer at the European Federation for Transport & Environment

T&E has become the principal environmental organisation campaigning on sustainable transport at the EU level in Brussels. The NGO represents, and is supported by around 50 member organisations working to promote an environmentally sound approach to transport across Europe. Ms. Renshaw is T&E’s specialist in freight, infrastructure and noise policy. She joined T&E in 2006 having previously worked at LKW Walter and as a trainee at the European Commission, DG Transport and Energy. She studied European Politics and Policy at the University of Bath and the Humboldt-Universität and International Business & French/German at the Aston University.
ANNEX III: PRESENTATIONS AND BRIEFING NOTES

Presentation and briefing note by Wolfgang Babisch

Workshop on Sound Level of Motor Vehicles
Brussels, 11th April 2012

Exposure to environmental noise:
Risks for the health and environment
Road traffic contribution to
burden of disease from environmental noise in Europe

Wolfgang Babisch
Department of Environmental Hygiene
Federal Environment Agency, Germany

Health Endpoints
Environmental Noise

- Hearing loss
- Annoyance
- Sleep disturbance
- Cognitive impairment
- Physiological stress reactions
- Cardiovascular risk
### Relationship Between Noise Level And Annoyance

Percentage "Highly Annoyed"

![Graph showing the relationship between noise level and annoyance]

- **WHO Guidelines for Community Noise (1999)**
  - \( L_{	ext{day},	ext{A}}\): "Serious annoyance"

### Noise Exposure \( L_{\text{DEN}} \) (EU-27)
Large agglomerations and major roads outside agglomerations

- **131 agglomerations:** 103,715,627 inhabitants (21% of EU-27 population)
  - \( \geq 55 \text{ dB(A)} \): 56,001,200 (54%) EU citizens
  - \( \geq 65 \text{ dB(A)} \): 15,754,500 (15%) EU citizens

- **Major road outside agglomerations**
  - \( \geq 55 \text{ dB(A)} \): 33,437,244 EU citizens
  - \( \geq 65 \text{ dB(A)} \): 7,657,083 EU citizens

**Sum**
- \( \geq 55 \text{ dB(A)} \): 89,438,444 EU citizens
- \( \geq 65 \text{ dB(A)} \): 23,411,583 EU citizens

**Status:** June 2011
**Workshop on the Sound Level of Motor Vehicles**

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**Reported Sleep Disturbance By Noise Level**

Percentage "Highly Sleep Disturbed"

![Graph showing reported sleep disturbance by noise level](image)

- **Aircraft**
- **Road**
- **Railway**

**WHO Night Noise Guidelines for Europe (2009)**

- $L_{NIGHT}$: "Night noise target" 
- $L_{NIGHT}$: "Interims target"

---

**Noise Exposure $L_{Night}$ (EU-27)**

Large agglomerations and major roads outside agglomerations

- **131 agglomerations: 103,715,627 inhabitants (21% of EU-27 population)**
  - $\geq 50 \text{ dB(A)}$: 40,213,200 (39%) EU citizens
  - $\geq 55 \text{ dB(A)}$: 18,697,000 (18%) EU citizens

- **Major road outside agglomerations**
  - $\geq 50 \text{ dB(A)}$: 22,699,288 EU citizens
  - $\geq 55 \text{ dB(A)}$: 10,681,332 EU citizens

- **Sum**
  - $\geq 50 \text{ dB(A)}$: 62,912,488 EU citizens
  - $\geq 55 \text{ dB(A)}$: 29,378,332 EU citizens

**Status: June 2011**

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*Source: European Parliament, Brussels 11 April 2012*
III-Health
Cardiovascular Effects Of Noise

Sound level

Direct pathway
Nerval interaction (physiological stress)

Indirect pathway
Cortical perception (emotional stress)

Autonomic nervous system
Endocrine system

↓
Dysregulation
Long-term health effects

Cardiovascular Diseases
Meta-Analyses

Road traffic noise – Hypertension (24 studies)
$L_{Aeq16h}$: range ~ 45-75 dB(A)
• 7% increase in risk per 10 dB(A) increase in noise level

Road traffic noise – Myocardial Infarction (6 studies)
$L_{Aeq16h}$: range ~ 55-75 dB(A)
• 17% increase in risk per 10 dB(A) increase in noise level

Road traffic noise – Stroke (1 study)
$L_{DEN}$: range ~ 50-75 dB(A)
• 14% increase in risk per 10 dB(A) increase in noise level
Cardiovascular Diseases
Meta-Analyses

Road traffic noise – Hypertension (24 studies)
\[ L_{\text{Aeq16h}} \]: range \sim 45-75 \text{ dB(A)}
- 7\% increase in risk per 10 \text{ dB(A)} increase in noise level

Road traffic noise – Myocardial infarction (6 studies)
\[ L_{\text{Aeq16h}} \]: range \sim 50-75 \text{ dB(A)}
- 14\% increase in risk per 10 \text{ dB(A)} increase in noise level

Road traffic noise – Stroke (1 study)
\[ L_{\text{DEN}} \]: range \sim 50-75 \text{ dB(A)}
- 20-40 \% increase in risk

Source: see references below (2012, before 2009; Gent et al., 2019)

European Parliament, Brussels 11 April 2012
Babisch - 9

Quantitative Risk Assessment
Health Impact Assessment

- Hazard identification
- Exposure assessment
- Exposure-response relationship
- Risk characterization
  - Attributable risk
  - Regulatory options
- Risk management

EU-Noise Directive

END = EU Environmental Noise Directive

European Parliament, Brussels 11 April 2012
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Environmental Noise Burden Of Disease
WHO Disability Adjusted Life Years (DALYs)

Every year in the EU cities, at least:
- 61,000 DALYs for ischaemic heart disease
- 45,000 DALYs for cognitive impairment
- 903,000 DALYs for sleep disturbance
- 22,000 DALYs for tinnitus
- 654,000 DALYs for annoyance

1~1.6 million healthy life years are lost every year from traffic noise in the EU cities.
Sleep disturbance and annoyance related to road traffic noise comprise the main burden.

Economic Valuation
Cost-Benefit

Valuation of healthy life years lost (VOLY):
One healthy life year has been valued 40,000 to 80,000 Euro in previous studies in the health sector (air pollution research).

1 Million DALYs ⇔ 40 Billion Euro loss
Crude estimate (includes uncertainties, use with caution)
Noise Mitigation Measures

Noise insulation at the receiver:
- Beneficial for individual subjects

Noise reduction at the propagation path:
- Beneficial for exposed areas and larger groups of people

Noise reduction at the source:
- Beneficial for the whole population
- It takes time until the vehicle fleet is renewed

➡ Stricter limit values for motor vehicles

Thank You
- Documents -

WHO, 2009

EEA, 2010

WHO, 2011
Exposure to environmental noise: risks for the health and environment

by Wolfgang Babisch

It is well understood that noise levels below the hearing damaging criterion cause annoyance, sleep disturbance, cognitive impairment, physiological stress reactions, endocrine imbalance, and cardiovascular disorders. Public health policies rely on quantitative risk assessment to set environmental quality standards and to regulate the noise exposure that is generated by environmental noise sources in the communities. According to the European Directive on the Assessment and Management of Environmental Noise (END) the member states have assessed and documented (noise maps) the noise exposure from environmental noise sources in their countries, including road, rail, aircraft, and industrial noise. Currently only the noise exposure of people who live in major agglomerations (1st phase of noise mapping: >250,000 inhabitants) or near major transport routes is assessed. Noise from transport is by far the most widespread source of noise exposure, causing the most annoyance, sleep disturbance and public health concerns. The cardiovascular effects of noise have deserved the growing interest in recent years. This is because — on the one hand — evidence has increased that community noise affects cardiovascular health. High blood pressure and ischemic heart diseases (including myocardial infarction) — on the other hand — have a high prevalence in industrialized countries and are a major cause of death. A good acoustical quality at home and undisturbed sleep are most important for the physical and mental recovery, and brain restoration during sleep. Noise-disturbed sleep, must be considered as a particular potential pathway for the development of cardiovascular disorders. It should be noted in this context that no complete habituation to noise takes place during sleep. Subjects that have been living for many years in exposed dwellings show a physiological stress reaction in response to acute noise events. Even subjects who are subjectively not disturbed by the noise show acute electro-physiological and vegetative reactions to single noise events. Adverse noise effects occur, in particular, when intended activities are disturbed, such as concentration, communication, relaxation or sleep.

Road traffic noise contributes substantially to the burden of disease in the European Union (EU). The World Health Organisation’s (WHO) "Night Noise Guidelines For Europe" (2009) confirm that night-time noise levels ("Lnight") above 55 decibels (dB) are "increasingly dangerous for public health" and cause adverse health effects. The noise maps for agglomerations and transport infrastructures are made available by the Environmental Noise Directive and published online in the NOISE database of the European Environmental Agency (EEA). The data, which refer to the status of June 2011, prove that in this sample of people living in 131 major agglomerations or on major roads outside agglomerations (21% of the EU-27 population) 29 million people in the EU are exposed to road noise levels of 55 dB or more at night, and 34 million people to levels between 50 and 54 dB. Regarding the weighted day-evening-night noise indicator L_{DEN} which can be viewed as an approximate indicator of the noise exposure during daytime (approximation for road traffic excluding motorways: L_{Day,16h} \approx L_{DEN} - 2 dB), the data show that 89 million people in the EU (EU-27) are exposed to road noise levels of over 55 dB or more, and 23 million people to levels of 65 dB or more. According to the WHO Guidelines for Community Noise, 55 dB (L_{Day,16h}) should not be exceeded to avoid serious annoyance during daytime. Noise levels above 65 dB during daytime have been shown in noise studies to be associated with a substantial increase in risk of cardiovascular disorders, including high blood pressure, ischaemic heart diseases and stroke.
Using the available evidence and research data, the World Health Organisation (WHO Regional Office for Europe, supported by the Joint Research Centre of the European Commission) has estimated the burden of disease from environmental noise for the WHO Euro-A region. The results are published in the most recent report "Burden Of Disease From Environmental Noise" (2011).[9] Noise annoyance, sleep disturbance, cardiovascular disorders, cognitive impairment and ringing in the ears (tinnitus) were considered as health endpoints. Established exposure-response curves were used for the calculation of the number of affected people due to the noise exposure. EEA also made available the exposure-response curves in its "Good Practice Guide On Noise Exposure And Potential Health Effects".[10] The results of the WHO assessment of the burden of disease were expressed in terms DALYs ("disability-adjusted life years"). DALYs are the sum of potential years of life lost due to premature death and the equivalent years of healthy life lost by virtue of being in states of poor health or disability. This concept is commonly used by the WHO to assess the global burden of disease of populations.[11] Different health endpoints were combined in using different weights dependent on the severity of the health endpoints. It is estimated that DALYs lost from environmental noise in western European countries are 61,000 years for ischaemic heart disease, 45,000 years for cognitive impairment of children, 903,000 years for sleep disturbance, 22,000 years for tinnitus and 654,000 years for annoyance. If all of these health endpoints are considered together, the range of burden would be 1.0-1.6 million DALYs. This means that at least 1 million healthy life years are lost each year from traffic-related noise in western European countries, including the EU Member States. Sleep disturbance and annoyance related to road traffic noise constitute most of the burden of environmental noise.

Cost-benefit analysis is often a standard procedure in policy making. In previous studies in the health sector (mainly air pollution research) one healthy life year has been valued at 40,000 to 80,000 Euros by economists.[12,13] As a crude estimate of the economic costs, 1 million healthy life years lost from traffic-related noise would then have an equivalent of approximately 40 billion Euros as a minimum. This figure, however, should be used with caution due to uncertainties. Based on the "willingness to pay" concept, the European Commission Working Group Health and Socio-Economic Aspects (WG-HSEA) recommends the use of 25 Euros per household per decibel per year as a benefit of noise reduction of noise levels above LDEN 50-55 dB.[14]

Noise mitigation measures, in principle, can be made at the noise source, the noise propagation path, and on the recipient's side. The latter is beneficial for the protection of individual subjects (e.g. sound insulation of the dwelling). The inhibition of sound propagation is beneficial the protection of exposed areas and larger groups of people (e.g. noise barrier). Noise reduction at the source, however, is beneficial for the whole population (e.g. less noise emission of vehicles). However, while the first two measures work immediately, the latter needs time until the vehicle fleet is completely renewed. Shifting noise levels downwards in all noise bands has a greater impact on the reduction of the burden of disease than acting only on high noise levels. This calls for a rapid update of limit values for motor vehicles according to technically available standards.
References:


Presentation and briefing note by Heinz Steven

Road traffic noise

The role of vehicles in road traffic noise, effects of type approval limit value reductions

Heinz Steven

10.04.2012

Influencing parameters

- The impact of people affected by road traffic noise is influenced by the vehicle speed, the road category and the sound propagation situation.
- The vehicle speed is decisive for the level of the noise emission and the contributions of the two main sources: propulsion noise and tyre/road noise.
- The road category is decisive for the number of vehicles and the composition of the fleet (shares of different vehicle categories).
- The propagation situation influences the noise impact at a specific location where people are affected.
- Road traffic noise is characterised by the fact that these influencing parameters vary depending on location and time.
Influencing parameters

- The propulsion noise increases with increasing engine speed and engine load.
- The tyre/road noise depends on the tyre/road surface combination and increases with increasing vehicle speed.
- The tyre influence on a given road surface is currently about 5 dB(A), but a decrease of this range can be expected in future due to 2009/661/EC (further reduction of tyre noise limits).
- The road surface influence is currently for cars even higher (> 10 dB(A) between uneven pavement stones and drainage asphalt surface layers).

Influencing parameters

- The typical situation with respect to propulsion noise and tyre/road noise contribution is shown in figure 1 for a mid size car and in figure 2 for a big truck.
- Figure 3 shows a comparison of the average noise emissions of different vehicle categories (see [1]).
- Figure 4 shows the contribution of the different categories to the overall noise emission for an urban main street with a speed limit of 50 km/h.
- The road surface for all figures is stone mastic asphalt 0/11 (SMA 0/11).
Comparison of propulsion and rolling noise

Figure 1

Comparison of propulsion and rolling noise

Figure 2
Comparison of average emissions for different vehicle categories

![Graph showing comparison of average emissions for different vehicle categories.](image)

Noise emissions in real traffic

![Graph showing noise emissions in real traffic.](image)
### Priorities for noise reduction measures

- Conclusions with respect to priorities for noise reduction measures:
  1. Reduction of tyre/road noise by
     - Low noise road surface layers,
     - Low noise tyres for
       - cars,
       - light duty vehicles,
       - heavy duty vehicles,
  2. Propulsion noise reduction for
     - heavy duty vehicles,
     - light duty vehicles,
     - cars.

### Noise limitation within type approval

- The noise emissions of a vehicle in real traffic is dependent of vehicle speed and gear use and thus covers a wide range of operating conditions.
- Within the type approval procedure only a few (for cars up to 4) different conditions are controlled and limited with respect to the corresponding noise emission.
- The reduction of type approval limit values between 1981 and 1996 up to today is 8 dB(A) for cars and 11 dB(A) for heavy trucks.
- The reduction in real traffic for cars based on measurements from different investigation periods (see [1]) is 3 dB(A) for acceleration conditions and 0 dB(A) to a slight increase for free flowing traffic conditions.
- Fortunately the situation is better for heavy duty vehicles (reduction in real traffic 4 – 5 dB for constant speed and 5 – 7 dB for acceleration conditions.)
Impact on noise emission in real traffic

- There are two main reasons why the reduction of noise limits within the type approval procedure did and do not lead to a corresponding reduction of the noise emission in real traffic.
- One reason is the fact that the reduction measures applied to the vehicles by the manufacturers are of course focused on the type approval operating conditions and thus do not necessarily have the same impact on other operating conditions in real traffic.
- Another reason is related to the fact that a limit reduction does not affect all vehicles at all or to the same extent, especially in case of cars. (see figure 5).
- Figure 5 shows that 25% of all car types included in the noise monitoring procedure fulfill already today the final stage of new noise limits proposed in Com (2011) 856 final.
- Another 22% need to be improved by only 1 dB(A).
Impact on noise emission in real traffic

- An own assessment of Com (2011) 856 final was performed by order of the German Environmental Agency (see [3]).
- Concerning the limit values the assessment focusses on the limit values for the second stage (phase 2 and phase 3), because they determine the final effects on the noise impact in real traffic.
- Com (2011) 856 final would lead to a noise impact level reduction of 1.7 dB(A) in combination with 2009/661/EC (see table 1). In order to achieve a 3 dB(A) noise impact level reduction in real traffic, further reduction steps for tyres and M1 vehicles will be required.

Effects of different limit value reduction scenarios on real traffic

<table>
<thead>
<tr>
<th>Number</th>
<th>Scenario</th>
<th>Description</th>
<th>reduction of $L_{den}$ in dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>urban</td>
</tr>
<tr>
<td>1</td>
<td>2009/661/EC, tyre noise limitation</td>
<td>-1.0</td>
<td>-1.3</td>
</tr>
<tr>
<td>2</td>
<td>COM(2011) 856 final</td>
<td>-1.7</td>
<td>-1.6</td>
</tr>
<tr>
<td>4</td>
<td>scenario 1</td>
<td>further limit value reduction step for tyres, 2 dB for C1 and 1 dB for C3/C4/C3 tyres without any reduction steps for urban</td>
<td>-1.9</td>
</tr>
<tr>
<td>5</td>
<td>scenario 2</td>
<td>3rd reduction step added to a combination of COM(2011) 856 final and the German proposal for vehicle category classification</td>
<td>-1.9</td>
</tr>
<tr>
<td>6</td>
<td>scenario 3</td>
<td>combination of scenarios 1 and 2</td>
<td>-3.1</td>
</tr>
<tr>
<td>7</td>
<td>scenario 4</td>
<td>3rd reduction step added to a combination of COM(2011) 856 final and the German proposal for vehicle category classification but only for M1 and N1 vehicles</td>
<td>-1.9</td>
</tr>
<tr>
<td>8</td>
<td>scenario 5</td>
<td>scenario 4 but further limit value reduction step of 2 dB for C1 tyres and 1 dB for C3/C4/C3 tyres</td>
<td>-2.9</td>
</tr>
</tbody>
</table>
Literature


The Role of Vehicles in Road Traffic Noise, Effects of Type Approval Limit Value Reductions

by Heinz Steven

1. Influencing Parameters

The impact of people affected by road traffic noise is influenced by the vehicle speeds, the road category and the sound propagation situation. The vehicle speed is decisive for the level of the noise emission and the contributions of the two main sources: propulsion noise and tyre/road noise.

The road category is decisive for the number of vehicles and the composition of the fleet (shares for different vehicle categories). The propagation situation influences the noise impact at a specific location where people are affected.

Road traffic noise is characterised by the fact that these influencing parameters vary depending on the location and the time. The two main sources of the noise emission of a single vehicle are propulsion noise and tyre/road noise.

The propulsion noise increases with increasing engine speed and engine load. At the engine speed where the engine delivers its maximum power (rated engine speed) the propulsion noise of a car is only a little lower than the noise of a heavy truck and the propulsion noise of a (legal) motorcycle is even higher.

That heavy trucks are nevertheless on top of the rank order of road vehicles with respect to the noise emission is due to the fact that the average engine speeds of trucks are much closer to rated speed than for cars and motorcycles.

The tyre/road noise depends on the tyre/road surface combination and increases with increasing vehicle speed. The tyre influence on a given road surface. The tyre influence on a given road surface is currently about 5 dB(A), but a decrease of this range can be expected in future due to 2009/661/EC (further reduction of tyre noise limits). The road surface influence is currently for cars even higher (> 10 dB(A) for cars between uneven pavement stones and drainage asphalt surface layers).

The typical situation for a mid size car is characterised as follows: Tyre/road surface noise is the by far most important source in real traffic. Propulsion noise contributions play only a role in 1. And 2. gear and at vehicle speeds below 30 km/h. The corresponding situation for a heavy truck is as follows: Propulsion noise is the main source for vehicle speeds up to 60 km/h and dominates the overall noise emission on urban streets. But for rural roads and motorways tyre/road surface noise plays also an important role and becomes dominant from 70 km/h on.

The relative contributions of the different vehicle categories are vehicle speed dependent. At low speeds (urban streets) a heavy duty trucks has a contribution to the noise impact levels which is equivalent to 8 to 16 cars, on motorways the equivalence values are 2 to 4. The traffic load as well as the fleet composition are correlated to a great extend to the road category. On urban main streets with a share of 4,8% rigid trucks and 2,7% trailer trucks (typical values) the contribution of the trucks is almost as high as the contribution of cars and light duty vehicles (48% for each group), the remaining 4% is related to motorcycles and scooters. If the two-wheelers are of no importance, cars and LDV on one hand and trucks on the other hand have nearly equal contributions. On motorways the contribution of cars and LDV is roughly 58% and thus even higher than on urban main streets although the fleet share is lower.
2. Priorities for Noise Reduction Measures

This leads to the following conclusions with respect to priorities for noise reduction measures:

1. Reduction of tyre/road noise by
   a. low noise road surface layers
   b. low noise tyres for
      i. cars,
      ii. light duty vehicles,
      iii. heavy duty vehicles,
2. Propulsion noise reduction for heavy duty vehicles,
3. Propulsion noise reduction for light duty vehicles,
4. Propulsion noise reduction for cars.

3. Noise Limitation within the Type Approval Procedure

The noise emissions of a vehicle in real traffic are dependent on vehicle speed and gear use, and thus cover a wide range of operating conditions. Within the type approval procedure only a few (for cars up to 4) different conditions are controlled and limited with respect to the corresponding noise emission.

The time history of type approval limit values results in a reduction of the limit values for cars between 1981 and 1996 up to today is 8 dB(A). The corresponding reduction in real traffic is 3 dB(A) for acceleration conditions and 0 dB(A) to a slight increase for free flowing traffic conditions.

Fortunately the situation is better for heavy duty vehicles (red. in real traffic 4 – 5 dB for constant speed and 5 – 7 dB for acceleration conditions.

There are two main reasons why the reduction of noise limits within the type approval procedure does not lead to a corresponding reduction of the noise emission in real traffic.

One reason is the fact that the reduction measures applied to the vehicles by the manufacturers are of course focussed on the type approval operating conditions and thus do not necessarily have the same impact on other operating conditions in real traffic.

Another reason is related to the fact that a limit reduction does not affect all vehicles at all or to the same extent, especially in case of cars: e.g. the results of the noise monitoring procedure shows that 25% of all car types included in the noise monitoring procedure fulfil already today the final stage of new noise limits proposed in COM(2011) 856 final. Another 22% need to be improved by only 1 dB(A).
4. Assessment of COM(2011) 856 final with Respect to the Noise Reduction in Real Traffic

An own assessment of COM(2011) 856 final was performed by order of the German Environmental Agency\textsuperscript{1}.

Concerning the limit values the assessment focuses on the limit values for the second stage (phase 2 and phase 3), because they determine the final effects on the noise impact in real traffic.

In a first step the effects on the average Lurban was assessed. The Calculation of the effective noise reduction for vehicle categories resulting from COM(2011) 856 final is based on the frequency distributions of Lurban in the monitoring database.

COM(2011) 856 final would lead to a noise impact level reduction of 1.7 dB(A) in combination with 2009/661/EC (see table 1). In order to achieve a 3 dB(A) noise impact level reduction in real traffic, further reduction steps for tyres and M1 vehicles will be required.

Table 1: Comparison of the effects of the different scenarios on the Lden reduction in real traffic

<table>
<thead>
<tr>
<th>Number</th>
<th>Scenario</th>
<th>Description</th>
<th>urban</th>
<th>rural</th>
<th>motorway</th>
<th>overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Scenario 1</td>
<td>2009/661/EC, tyre noise limitation</td>
<td>-1.0</td>
<td>-1.3</td>
<td>-1.3</td>
<td>-1.1</td>
</tr>
<tr>
<td>2</td>
<td>COM(2011) 856 final</td>
<td>Further limit value reduction step for tyres, 2 dB for C1 and 1 dB for C2/C3 tyres without any reduction steps for Lurban</td>
<td>-1.7</td>
<td>-1.6</td>
<td>-1.6</td>
<td>-1.7</td>
</tr>
<tr>
<td>4</td>
<td>Scenario 1</td>
<td>Further limit value reduction step for tyres, 2 dB for C1 and 1 dB for C2/C3 tyres without any reduction steps for Lurban</td>
<td>-1.9</td>
<td>-2.5</td>
<td>-2.3</td>
<td>-2.0</td>
</tr>
<tr>
<td>5</td>
<td>Scenario 2</td>
<td>3rd reduction step added to a combination of COM(2011) 856 final and the German proposal for vehicle category classification</td>
<td>-1.9</td>
<td>-1.7</td>
<td>-1.7</td>
<td>-1.9</td>
</tr>
<tr>
<td>6</td>
<td>Scenario 3</td>
<td>Combination of scenarios 1 and 2</td>
<td>-3.1</td>
<td>-3.0</td>
<td>-2.9</td>
<td>-3.0</td>
</tr>
<tr>
<td>7</td>
<td>Scenario 4</td>
<td>3rd reduction step added to a combination of COM(2011) 856 final and the German proposal for vehicle category classification but only for M1 and N1 vehicles</td>
<td>-1.9</td>
<td>-1.7</td>
<td>-1.7</td>
<td>-1.8</td>
</tr>
<tr>
<td>8</td>
<td>Scenario 5</td>
<td>Scenario 4 but further limit value reduction step of 2 dB for C1 tyres and 1 dB for C2/C3 tyres</td>
<td>-2.9</td>
<td>-2.9</td>
<td>-2.8</td>
<td>-2.9</td>
</tr>
</tbody>
</table>

\textsuperscript{1} Heinz Steven, Proposal for a Limit Value Reduction Scenario for Road Vehicles compatible with the German National Traffic Noise Prevention Package II, by order of the German Environment Agency, 26.02.2012.
5. Literature

Presentation and final remarks by Christian Popp

Impact of EU legislation on road traffic noise reduction

Dream Directive 2002/49/EG – The idea

- Strategic noise mapping
- Participation of the public
- Information of the public
- Action planning

www.Laermkontor.de
Impact of EU legislation on road traffic noise reduction

**Directive 2002/49/EG – The idea**

- Application of harmonized calculation methods
- Use of uniform parameters \( L_{DEN} / L_{Night} \)
- Calculation and display of noise impact
  (noise maps and numbers of inhabitants exposed)

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---

Impact of EU legislation on road traffic noise reduction

** Directive 2002/49/EG – The noise mapping results**

### Tables

<table>
<thead>
<tr>
<th>LACN (dB)</th>
<th>Belastete Menschen – Strukturanteile</th>
<th>LACN (dB)</th>
<th>Belastete Menschen – Strukturanteile</th>
</tr>
</thead>
<tbody>
<tr>
<td>über 55 bis 60</td>
<td>1570</td>
<td>über 50 bis 55</td>
<td>1530</td>
</tr>
<tr>
<td>über 45 bis 54</td>
<td>1040</td>
<td>über 50 bis 45</td>
<td>1510</td>
</tr>
<tr>
<td>über 38 bis 44</td>
<td>706</td>
<td>über 45 bis 65</td>
<td>810</td>
</tr>
<tr>
<td>über 20 bis 37</td>
<td>892</td>
<td>über 65 bis 70</td>
<td>336</td>
</tr>
<tr>
<td>über 70</td>
<td>6</td>
<td>über 70</td>
<td>6</td>
</tr>
<tr>
<td>Sonstige</td>
<td>4376</td>
<td>Sonstige</td>
<td>3276</td>
</tr>
</tbody>
</table>

- Geschätzte Zahl der von Lärm an Hauptverkehrsstraßen belasteten Menschen in der Stadt Neumünster\(^1\), nach VBEB, Lärm (24 Stunden), Lärmpegel (22 bis 6 Uhr), Stand 30.06.2007

### Noise maps

www.Laermkontor.de
Impact of EU legislation on road traffic noise reduction

**Directive 2002/49/EG – The idea**

- Application of harmonized calculation methods
- **Use of uniform parameters** (Indices $L_{DEN}$ / $L_{Night}$)
- Calculation and display of noise impact
  (noise maps and numbers of inhabitants exposed)
- Information of the public (noise mapping)
- Elaboration of action plans
- Participation of the public (action planning)
- **Collection of exposure data** (to be forwarded to the EU)

The aim of the END is a quieter Europe!

www.Laermkontor.de

**Mitigation** (potentials for road traffic noise)
Impact of EU legislation on road traffic noise reduction

**Set-screws**

1. Traffic volume (+)

www.Laermkontor.de

---

Impact of EU legislation on road traffic noise reduction

**Explanation:** many cars – one car

- 60 dB(A)
- 60 - 1 = 59 dB(A)
- 60 - 3 = 57 dB(A)
- 60 - 10 = 50 dB(A)
- 20 %
- 50 %
- 90 %

Source: Lärmkontor GmbH

www.Laermkontor.de
Impact of EU legislation on road traffic noise reduction

Set-screws

1. Traffic volume (+)
2. HGV-proportion (+ bis ++)

Explanation: one lorry – many cars

20 Pkw
30 km/h

Source: Lärmkontor GmbH

www.Laermkontor.de
Impact of EU legislation on road traffic noise reduction

**Set-screws**

1. Traffic volume (+)
2. HGV-proportion (+ bis ++)
3. Speed (+ bis +++)

**Explanation:** the faster – the noisier

![Graph showing the impact of speed on road traffic noise reduction]

Source: Lärmkontor GmbH

www.Laermkontor.de
Impact of EU legislation on road traffic noise reduction

▶ Set-screws

(1) Traffic volume (+)
(2) HGV-proportion (+ bis ++)
(3) Speed (+ bis +++)
(4) Traffic flow (+ bis ++)
(5) Road surface (+ bis ++++)
(6) Screening (++ bis ++++)
(7) Urban planning (+ bis ++)

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Impact of EU legislation on road traffic noise reduction

▶ Problems and resistances

(1) Responsible for action planning are in most of the EU MS the municipalities.

(2) Often there is no or only minor influence on noise mitigation for major roads (railways and airports)

(3) There are no binding criteria for the elaboration of action plans, which are defined by the EU.

(4) There are no concise criteria for implementation of noise mitigation measures.

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Impact of EU legislation on road traffic noise reduction

- **Set-screws**

1. Traffic volume (+)
2. HGV-proportion (+ bis ++)
3. Speed (+ bis +++)
4. Traffic flow (+ bis ++)
5. Road surface (+ bis ++++)
6. Screening (++ bis ++++)
7. Urban planning (+ bis ++)
8. Vehicles + tyres (+ bis ++++)

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Thanks for your attention!
Impact of EU legislation on road traffic noise reduction

Final remarks by Christian Popp

The Directive 2002/49EC (END) was a relatively big success in the first phase. Currently, many municipalities are on the way to implementing noise reduction measures at local level. But, they have very often problems to realize planned measures, because these measures are targeting on noise sources which are not in the responsibility of the municipalities. In these cases it could be helpful, to define limit values for the action planning. This could be a task of EC and EP.

Nevertheless, the efficient options to reduce noise pollution have to concentrate on measures at source (such as reduction of traffic volumes, speed reductions, change of road surfaces, etc.). Especially the potentials of speed reduction and of change of road surfaces have to be connected with vehicle and tyre-road noise influences. That means: There is a strong need for further actions at source.
The interaction of the EC proposal on Sound level of motor vehicles with other regulations

Input paper for the EP workshop on Sound level of motor vehicles
Brussels, April 11, 2012
Erik de Graaff (role: independent expert)

MBBM MÜLLER-BBM GROUP

Reminder: Why a new vehicle noise test

<table>
<thead>
<tr>
<th></th>
<th>1970</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicles</td>
<td><img src="image1.png" alt="Vehicles" /></td>
<td><img src="image2.png" alt="Vehicles" /></td>
</tr>
<tr>
<td>Noise sources</td>
<td><img src="image3.png" alt="Noise sources" /></td>
<td><img src="image4.png" alt="Noise sources" /></td>
</tr>
<tr>
<td>Gear boxes</td>
<td><img src="image5.png" alt="Gear boxes" /></td>
<td><img src="image6.png" alt="Gear boxes" /></td>
</tr>
<tr>
<td>Method</td>
<td>EC 70/157</td>
<td>COM(2011)856</td>
</tr>
</tbody>
</table>

The new vehicle noise test is designed to test modern vehicles and to unveil options for noise reduction in real traffic.
Interaction with other regulations

- Test method and test track
  - UN/ECE R51, ISO 362 and ISO 10844 technical updates available

- Replacement silencers
  - UN/ECE R59 discussion ongoing if new method more vulnerable to loud RESS

- Tyre noise
  - EC 2001/43 and EC/2009/661

- Labeling and incentives for low noise products
  - Facilitates voluntary steps and procurement
  - Examples:

Members of GRB and ISO offered to provide feedback and options to update the COM proposal to the latest stage of discussion

Tyre noise regulation history and future

- EC/2001/43
  - started with liberal noise limits: 99% pass

- EC/2009/661
  - more stringent noise limits (in force 2012/2013): 40% to 80% pass
  - Safety and fuel consumption guarded by triple demands

What is going to happen to the noise emission of tyres in future?

now  push  pull

The updated tyre noise limits will have serious effect on traffic noise. Further use of tyres with the lowest noise emission will increase this effect.
Workshop on the Sound Level of Motor Vehicles

Relation vehicle noise versus powertrain and tyre noise
- The “playing field” of current technology

- \( P + T = V \) or \( \text{Powertrain noise} + \text{Tyre noise} = \text{Vehicle noise} \)
  - Example in graph: low noise powertrain + medium noise tyre = 68 dB vehicle noise

- 95% of the passenger cars in the database are within the yellow area.

Relation vehicle noise versus powertrain and tyre noise
- Possibility to balance the noise sources

<table>
<thead>
<tr>
<th>Total vehicle noise</th>
<th>Powertrain noise</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Tyre noise</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Low</td>
</tr>
</tbody>
</table>

- The vehicle manufacturer can choose the balance between the noise sources
- Lowest noise levels are achieved if all sources are treated
Relation vehicle noise versus powertrain and tyre noise
- Effect of various limitations

- 2013: The new tyre noise limit
  - 2015?: Phase 1 limit of the Commission proposal for vehicle noise limits
    - 40% of vehicles will need tyres that are more silent than the 2013 limit
  - 2018?: Phase 2 limit of the Commission proposal for vehicle noise limits
    - 95% of vehicles will need tyres that are more silent than the 2013 limit

Average noise emission will be reduced by 2 a 3 dB, depending on the tyre choice

The proposed vehicle noise limits will lead to a market force towards tyres with the lowest available noise emission

Will the vehicle noise directive be an incentive for low noise tyres beyond current technology?

- All depends on the limits
  - Loose limits will be business as usual under the tyre noise directive
  - Sharp vehicle noise limits will stimulate low noise tyres

- Safety of tyres guarded in EC2009/661 by triple demands

- Tyre industry shows high tech potential
  - First products already on the market
  - Vehicle industry expected low noise tyres as spinoff
  - Regulation can stimulate high tech industry

Sharp vehicle noise limits will stimulate development of new technology
How to maintain noise emission over life time?

- Current noise emission stable over lifetime
  - Thanks to back to back testing of replacement silencers

- Future noise emission will depend on tyre choice
  - Vehicles drive 90% of life time on replacement tyres
  - Options to guarantee the noise emission after replacement
    - Extra step in tyre noise limits to follow vehicle noise limits
    - Use of Tyre noise label

Silent replacement tyres will ensure a stable vehicle noise emission over life time

Influence of truck tyres on vehicle noise

- Truck test changed after monitoring (traction tyres replaced by rib tyres)

- No market force for truck traction tyres like passenger car tyres
  - All reduction has to come from the tyre noise directive (not very tight for trucks)

- Limit discussion: EU dBase has to be corrected for tyre change
  - Japan tested N3 with rib tyres
    - Data up to 3 dB lower
    - Limit proposal 1 dB lower

Reduction of Truck limits by 1 a 2 dB will compensate the after monitoring tyre change
Conclusions

- New method OK
  - for modern vehicle technology
  - For reducing main street traffic noise

- Effect depends on limits
  - COM phase 1: small effect beyond 2013 tyre noise limits
  - COM phase 2: significant effect + market force on tyres
  - 3rd step or vehicle noise label: technology brake through

- Remaining issues:
  - Noise of replacement tyres
    - Use tyre label or additional limit step in tyre noise directive for car tyres?
  - Changed measurement method Trucks
    - Reduce truck limits by 1 a 2 dB?
  - Truck tyres are not treated in the vehicle noise directive
    - Additional limit step in tyre noise directive for truck tyres?
Sound level of motor vehicles

The challenge for the car industry

Ivan Hodac
11 April 2012

Noise Abatement

- 4 EU Directives since 1970 to reduce sound levels of motor vehicles (~90%)
- Last Directive (1996) fixed a 74 dB (A) for passenger cars and 80 dB (A) for commercial vehicles
- Lowering the Noise level of a vehicle was not reflected in the Noise perception of citizens:
  - Other factors influence noise levels
  - The test-method used did not reflect actual driving behaviour and traffic conditions
The new test method

- A new test method was devised at UNECE level and adopted in 2005;
- Following the adoption of the new method a monitoring databank was established by measuring the sound levels of vehicles with the old and new methods during 3 years;
- The data bank was then analysed by TNO for the Commission and by UTAC/TuV for ACEA (see: [www.acea.be/missives/uploads/files/monitoring_procedure_in_the_vehicle_noise_regulation.pdf](http://www.acea.be/missives/uploads/files/monitoring_procedure_in_the_vehicle_noise_regulation.pdf));
- The aim: to establish a reduction of the noise limits of the vehicle which will work out in real life (and remain feasible for the industry!)

The industry’s 3 biggest issues

- Categorisation
  - Limits
  - Lead-time
Vehicle categorisation

- The Commission used – with very minor changes – the same categorisation as previously based on the fleet in 1985.

- ACEA on the other hand proposes to adapt the vehicle categorisation by:
  - distinguishing from the noise monitoring databank clusters of noise levels and connecting these to certain vehicle characteristics.

- To:
  - Reflect more accurately the current and (future) fleet running on the roads and the different usage made of the vehicles
  - Set appropriate limits for each category.

Vehicle categorisation - Clusters of Noise
Passenger cars
(Source GRB 53-04)
Policy Department A: Economic and Scientific Policy

Vehicle categorisation - Clusters of Noise
Trucks
(Source GRB 53-04)

![Diagram of vehicle categorisation and noise clusters]

Lead-time and Limits

- An engineer would probably tell you that any limit is reachable **BUT**
- Substantial noise reduction requires a fundamental redesign of the vehicle
- Other regulations (i.e. safety, emissions, fuel consumption) impact vehicle noise and must be compensated for in design
- Lengthy research horizon needed for devising advanced acoustic solutions
- These constraints have an impact on the cost of reductions and lead-time necessary
First step

- One year after publication: a first step with limits ranging from 72 dB(A) for M1 to 82 dB(A) for the heaviest N3 vehicles

- The limits are derived from the monitoring data bank and are set at such a level that about 10% of the vehicles will be affected;

- The limits proposed by the Commission 2 years after publication would on the other hand affect 50 to 80% of the fleet of each OEM, generating engineering difficulties and too high a cost!
Second step

- 6 year after publication: a second step with limits ranging from 70 dB(A) for M1 to 81 dB(A) for the heaviest N3 vehicles
- This step will require fundamental redesign of the vehicle and for some vehicles possibly some advanced acoustic solutions
- Hence the 5 year lead-time required to remain cost-effective

Limits values
Passenger Cars, Buses and Coaches

<table>
<thead>
<tr>
<th>Vehicle Category</th>
<th>Description of vehicle category</th>
<th>Limit values expressed in dB(A) (decibels (A))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Limit values for Type-approval of new vehicle types</td>
<td>Limit values for Type-approval of new vehicle types</td>
</tr>
<tr>
<td></td>
<td>Phase 1 valid from (1 year after publication)</td>
<td>Phase 2 valid from (8 years after publication)</td>
</tr>
<tr>
<td></td>
<td>General</td>
<td>Off-road</td>
</tr>
<tr>
<td>M</td>
<td>Vehicles used for the carriage of passengers</td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>no of seats ≤ 9, ≤ 125 kW/ton</td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td></td>
<td>72</td>
</tr>
<tr>
<td>M1</td>
<td>no of seats ≤ 9, 125kW/ton &lt; power to mass ratio ≤ 150kW/ton</td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td></td>
<td>73</td>
</tr>
<tr>
<td>M1</td>
<td>no of seats ≤ 9; power to mass ratio &gt; 150kW/ton</td>
<td></td>
</tr>
<tr>
<td>M2</td>
<td></td>
<td>74</td>
</tr>
<tr>
<td>M2</td>
<td>no of seats &gt; 9; mass ≤ 2.5 tons</td>
<td></td>
</tr>
<tr>
<td>M2</td>
<td></td>
<td>74</td>
</tr>
<tr>
<td>M2</td>
<td>no of seats &gt; 9; 2.5 tons &lt; mass ≤ 3.5 tons</td>
<td></td>
</tr>
<tr>
<td>M2</td>
<td></td>
<td>74</td>
</tr>
<tr>
<td>M2</td>
<td>no of seats &gt; 9; 3.5 tons &lt; mass ≤ 5 tons; rated engine power &lt; 150kW</td>
<td></td>
</tr>
<tr>
<td>M2</td>
<td></td>
<td>75</td>
</tr>
<tr>
<td>M2</td>
<td>no of seats &gt; 9; 3.5 tons &lt; mass ≤ 5 tons; rated engine power &gt; 150kW</td>
<td></td>
</tr>
<tr>
<td>M2</td>
<td></td>
<td>76</td>
</tr>
<tr>
<td>M3</td>
<td>no of seats &gt; 9; mass &gt; 5 tons; rated engine power ≤ 180kW</td>
<td></td>
</tr>
<tr>
<td>M3</td>
<td></td>
<td>75</td>
</tr>
<tr>
<td>M3</td>
<td>no of seats &gt; 9; mass &gt; 5 tons; 180 kW &lt; rated engine power ≤ 250kW</td>
<td></td>
</tr>
<tr>
<td>M3</td>
<td></td>
<td>76</td>
</tr>
<tr>
<td>M3</td>
<td>no of seats &gt; 9; mass &gt; 5 tons; rated engine power &gt; 250kW</td>
<td></td>
</tr>
<tr>
<td>M3</td>
<td></td>
<td>77</td>
</tr>
</tbody>
</table>
## Limits values

**Light and Heavy Commercial Vehicles**

<table>
<thead>
<tr>
<th>Vehicle Category</th>
<th>Description of vehicle category</th>
<th>Limit values expressed in dB(A) [decibels (A)]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Limit values for Type-approval of new vehicle types</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Phase 1 valid from (1 year after publication)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General</td>
</tr>
<tr>
<td>N</td>
<td>Vehicles used for the carriage of goods</td>
<td></td>
</tr>
<tr>
<td>N1</td>
<td>mass ≤ 2.5 tons</td>
<td>72</td>
</tr>
<tr>
<td>N1</td>
<td>2.5 tons &lt; mass ≤ 3.5 tons</td>
<td>74</td>
</tr>
<tr>
<td>N2</td>
<td>3.5 tons &lt; mass ≤ 12 tons; rated engine power &lt; 150KW</td>
<td>77</td>
</tr>
<tr>
<td>N2</td>
<td>3.5 tons &lt; mass ≤ 12 tons; rated engine power ≥ 150KW</td>
<td>78</td>
</tr>
<tr>
<td>N3</td>
<td>mass &gt; 12 tons; rated engine power ≤ 180KW</td>
<td>79</td>
</tr>
<tr>
<td>N3</td>
<td>mass &gt; 12 tons; rated engine power &gt; 180KW</td>
<td>81</td>
</tr>
<tr>
<td>N3</td>
<td>mass &gt; 12 tons; rated engine power &gt; 250 kW</td>
<td>82</td>
</tr>
</tbody>
</table>
The challenges for the Car Industry

by Ivan Hodac

Since 1970 four EU Directives have been issues to reduce the sound levels of Motor Vehicles up to 90%. The last Directive fixed the noise levels at 74 dB(A) for passenger cars and at 80 dB(A) for commercial vehicles.

Over the years however, it became clear that the reduction of the noise levels of vehicles did not result in a reduction of the noise levels to which citizens were exposed. The reason for the above was that other factors influence the noise perception of people and that the vehicle test methods did not reflect the actual driving behaviour and traffic conditions, i.e. the test methods did not reflect the real operating conditions of the vehicle.

To remedy that, a new vehicle test method was developed. Following the adoption of the new method in 2006 new approved vehicles were measured with the old method and with the new method during three years. In that way a monitoring databank was established containing about thousand vehicle noise data. The data were analyzed by TNO (The Netherlands Organization for Applied Scientific Research) for the Commission and by UTAC/TÜV for ACEA. The aim of the analysis was to set new limits which would have a real effect on the noise perception of citizens. The proposed reduced limits should be feasible for the vehicle industry.

The three main issues for the vehicle industry with regard to the Commission proposal are about categorization, limits and lead-time.

On the issue of vehicle categorization, the Commission is still using the vehicle categorization as established in 1985. ACEA recommends instead that the vehicle categorization is adapted to the current fleet and based on the monitoring databank. Clusters of noise levels can indeed be identified and connected to certain vehicle characteristics, in this case power to mass ratio. For each category distinguished appropriate limits can be set.

Before deciding on limits it is important to understand that substantial reductions require a fundamental redesign of the vehicle, that compliance with other regulations have to be taken into consideration and that, to develop advanced acoustic solutions, a lengthy research horizon has to be envisaged. The mentioned constraints have an impact on the cost of reduction and on the necessary lead-time.

Vehicle noise sources are manifold and achieving a reduction of the overall noise of the vehicle will necessitate a careful balancing exercise to address the different sources depending on their contribution to the overall noise, without impacting negatively other performances of the vehicles (e.g. fuel efficiency, polluting emissions, safety, etc.)

ACEA proposes a two step approach. The first step – affecting about 10% of the vehicles – will apply one year after publication already. The limits suggested are derived from the monitoring databank and range from 72 dB(A) for passenger cars to 82 dB(A) for heavy commercial vehicles.
The second step, representing a significant reduction in term of the fleet covered, would be enforced 6 years after publication. The limit reduction should represent a 2 dB(A) reduction for passenger cars and a 1 dB(A) for commercial vehicles. This second step will call for a fundamental re-design of the vehicles and therefore explains the longer lead-time necessary to achieve it while remaining cost-effective.

The Commission also adopts a two-step approach. However the limits proposed for the first step to be introduced after two years will affect 50-80% of the vehicle fleet. Such limits in so short a time period would generate engineering difficulties and disproportionate costs for the manufacturers.

The second step only 3 years afterwards would require even more significant modifications of the vehicles. The Commission proposes for example a limit of 68 dB(A) for M1 below 125 kW/t. For comparison purposes, the average type-approval value of 6 battery-electric vehicles currently available on the market is 68,2 dB(A). It is questionable how and at what cost all conventional-engine vehicles could be made to reach the same value.

In conclusion the automobile industry is ready to accept ambitious limits as long as the time given to reach them enables it to do so cost-efficiently and without threatening research and progress on other performances of the vehicles. It asks for pragmatism and an integrated approach involving all stakeholders. These are the prerequisites to ensure that the desired objectives will be reached.
Presentation and briefing note by Fazilet Cinaralp

Workshop on Sound level of motor vehicles

The perspective of the tyre industry

Fazilet Cinaralp, Secretary General
European Parliament, 11 April 2012

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2. Tyre Rolling Noise requirements
3. Balance amongst tyre performances and the role of tyre labelling to reduce noise
4. Global approach to road noise
5. 2011/856 vis-a-vis existing legislation
6. Road pavement potential

➢ CONCLUSION
1. EU Regulatory Framework & test methods

From Directive 2001/43 to Regulation 661/2009

The reduction requested from tyre rolling noise in less than 10 years is:

- up to 5 dB for Passenger Car tyres
- 3 dB for Truck and Light Truck tyres

Test method for tyre rolling noise:

1) Same test method for 2001/43 and 661/2009
   ➔ Data can be directly compared (unlike the vehicle test method);

2) No engine power interference
   ➔ The objective of 661/2009 test method is to measure “tyre rolling noise” and not the engine (power train) interference.
1. EU Regulatory Framework & test methods

Scope of 661/2009 (and of 2001/43) Tyres delivered to OEM Replacement Tyres

This means that tyres are first tested for type approval for the tyre rolling noise according to 661/2009; and are also tested as part of the whole vehicle according to COM 856/2011
- two testing using two different test methods with different objectives!
- There exists no correlation between the two test methods!

The proposal from the Commission 2011/856 limits the distortion created by the new vehicle test method

Vehicle Noise

From Dir. 70/157 (and subsequent amendments) to COM 856/2011

Different test methods:

In Dir. 70/157:
- Vehicle accelerated at wide open throttle.

In COM 856/2011:
- Vehicle accelerated with partly opened throttle to deduce the gear to be used for the test which aims to consider the potential noise source of a vehicle at normal urban conditions (Passenger cars)
  - Reference speed 50km/h
  - With specified rpm (LT & Trucks)

Consequence for Passenger Cars, higher gears are used
- the power train contribution to the vehicle noise is reduced
- the relative tyre noise contribution to the whole vehicle noise raises from a range of 20 - 35% to a range of 18 - 75% (OICA vehicle data base)

Consequence for LT and Trucks: the new noise test procedure is rather sensitive to the choice of the tyre type and addresses the most important noise source during driving in urban areas by wide open throttle conditions. The tyres have to be representative of the vehicle.
2. Tyre Rolling Noise requirements

Current Limits 2001/43/EC

<table>
<thead>
<tr>
<th>Tire Class</th>
<th>Normal</th>
<th>Snow</th>
<th>Special</th>
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<tbody>
<tr>
<td>C1A &lt;= 145</td>
<td>72</td>
<td>73</td>
<td>74</td>
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<tr>
<td>C1B &gt;145, &lt;=185</td>
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<td>74</td>
<td>75</td>
</tr>
<tr>
<td>C1C &gt;185, &lt;=215</td>
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<td>75</td>
<td>76</td>
</tr>
<tr>
<td>C1D &gt;215, &lt;=235</td>
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<td>76</td>
<td>77</td>
</tr>
<tr>
<td>C1E &gt;235, &lt;=255</td>
<td>76</td>
<td>77</td>
<td>78</td>
</tr>
</tbody>
</table>

New EU requirements

<table>
<thead>
<tr>
<th>Tire Class</th>
<th>Normal</th>
<th>Snow Reinforced</th>
<th>Special</th>
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<tbody>
<tr>
<td>C1A &lt;= 185</td>
<td>70</td>
<td>71</td>
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<tr>
<td>C1B &gt;185, &lt;=215</td>
<td>71</td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>C1C &gt;215, &lt;=235</td>
<td>72</td>
<td>73</td>
<td></td>
</tr>
<tr>
<td>C1D &gt;235, &lt;=255</td>
<td>73</td>
<td>74</td>
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</tr>
<tr>
<td>C1E &gt;255</td>
<td>74</td>
<td>75</td>
<td></td>
</tr>
</tbody>
</table>

Noise limit change from 2001/43 to REG 661

Timing
Nov. 2012
(+ 4 Years for Replacement)
(+ 30 months for Stock Selling Off)

4. The importance of looking at all tyre performances

Both 661/2009 and 1222/2009 have the merit of looking at tyres’ performances in a balanced manner

- Safety through wet grip limits;
- Fuel efficiency through rolling resistance limits;
- Sound through noise limits.

Both as minimum thresholds + grading
5. Road noise mitigation requires global approach

where the main actors are
the pavement, the vehicle & the tyre:

*Tyre/road noise in real life is generated on a wide range of different road surfaces.*

+ Traffic flow management & driver behaviour
6. 2011/856 vis-a-vis existing legislation

EC Impact Assessment on the Regulation on the Sound Level of Motor Vehicles recognizes that:

“...In particular, 2011/856 complements the previous initiatives that have addressed the issue of noise from roads such as Directive 2001/43 and Regulation 661/2009 covering tyre noise...”

6. PROPOSAL
Road pavement potential

To obtain substantial reduction of the rolling noise in Europe, political will to support the setting of minimum road pavement rolling noise requirements/grading. This will result in efficient and rapid reduction of “black spots” identified through noise mapping.

This Requires:

- Definition of harmonized testing procedures for low noise pavements
- Making use of the standard reference tyre for road/surface interaction evaluation.
CONCLUSION

- Tyres new rules (661/2009 & 1222/2009) apply as of November 2012 and cover all categories of tyres: Tyres fitted on new vehicles and tyres destined for the replacement market
  - Avoid double regulation for tyres

- The joint efforts towards road noise mitigation measures to be pursued ➔ pavement grading + minimum requirements

- Focus on market surveillance to make sure that current legislation is effectively applied

- Wait for the full implementation of 661/2009 + 1222/2009 before further steps are considered for tyre rolling noise

Thank you
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www.etrma.org
The perspective of the tyre industry

by Facilet Cinaralp

Aspects to be taken into consideration when evaluating Regulation 2011/856

The European Tyre Industry supports EU efforts to further reduce environmental noise in order to improve the quality of life of European citizens. However, ETRMA would like to draw the attention of the legislator to the following aspects that must be taken into account when assessing the impact that the new proposal aiming to reduce the sound level of motor vehicles could have on tyres:

- Specific noise requirements for tyres have recently been tightened through the General Safety Regulation (EC) 661/2009 and UN Regulation 117.02 (the first tyre noise limits were set in Directive 2001/43/EC). The new rules apply as of November 2012 and cover all categories of tyres: tyres to be fitted on new vehicles and tyres destined for the replacement market. The European tyre industry is already making significant efforts to comply with them. This new regulation will reduce tyre noise of an average of 3.8 dB(A).

- Both regulation 661/2009 and the tyre labelling regulation 1222/2009 will enter into force in November 2012. Any proposal for further reduction of tyre noise should wait for this legislation to be fully implemented and assessed. The following should also be taken into consideration:
  - All tyre performances – those that are regulated by 661/2009 (wet grip and rolling resistance together with noise), but also others – are interdependent. This means that changing one has a direct effect on the others. No one tyre characteristics should be regulated in isolation from the others!
  - Tyre labelling is expected to positively contribute to achieve better tyre performances. The rolling noise grading includes the possibility of having tyres up to 3 dB(A) lower than the limits imposed by 661/2009.

- The most immediate action that can have a direct impact on tyre noise after the implementation of 661/2009 and 1222/2009 is that of market surveillance. It is our experience that not all players in the market accept to play by the same rules with the result of distorting both the effects of this legislation and competition. Furthermore, illegal tyres pose a serious threat to the safety of European drivers and to the environment.

- COM 856/2011 introduces a new test method whose results cannot be compared with the test method in 661/2009 and which shifts part of the noise burden from the vehicle to the tyre. This effectively results in double legislation which could mean that the same tyre could be compatible with one regulation, but not with the other one.

- The noise produced by tyres greatly depends from the type of pavement on which the tyres roll. Recent studies underline that a significant reduction – up to 11 dB(A)¹ – can be achieved by changing the type of road. Concrete proposals to tackle also this contributor to road noise include:
  - Definition of harmonised testing procedures for low noise pavements
  - Making use of the standard reference tyre for road/surface interaction evaluation for a road grading procedure.

ETRMA recommends:

- ETRMA notes that the Commission draft proposal (COM 2011/856) limits the distortion created by the new vehicle test method therefore minimising the double regulatory impact on tyre rolling noise emissions (as requested within Cars21\(^2\), Interim Report).

- Major improvements in tyre’s noise performance will be achieved through General Safety Regulation 661/2009.

- The proposed implementation time for the two steps must take into consideration the time necessary for technological developments and should therefore not be less than 5 years between each step.

- The request for stringent limits on the overall vehicle noise must not disregard the contribution from other stakeholders, more specifically from the road, which plays a role in environmental noise reduction. Concretely, ETRMA proposes that:
  - Definition of harmonised testing procedures for low noise pavements
  - Making use of the standard reference tyre for road/surface interaction evaluation for a road grading procedure.

---

\(^2\) Tackling vehicle noise emissions – recommendation 5, page 22,
Presentation and briefing note by Jan-Harko Post

Vehicle noise: the urban dimension
Jan Harko Post & Henk Wolfert

Extent of noise exposure
1st round of noise mapping (source: EEA)
Exposure to noise at night

- L_{night} > 50 dB
- L_{night} > 55 dB

% of population

Effects of exposure to noise

**Health effects**
- (severe) sleep disturbance
- high blood pressure
- cardio-vascular diseases
- heart attacks
- strokes
- More than 1 million DALYS annually
- cognitive functioning

**Social costs**
- health costs
- devaluation house prices
- production loss
- car accidents (tiredness)
- learning disabilities
Noise action planning in cities

TMP The Hague city centre
TMP The Hague city centre

- 30% reduction in surface exposed to noise levels over 55 dB
- 35% reduction of dwellings exposed to noise levels over 55 dB
- 30% reduction of people exposed to noise levels of more than 55 dB

Some elements for discussion

- A faster timetable for introducing the new standards
- Adding a third step for further noise reductions
- Encouraging/establishing a long term research framework on quieter vehicles
- Noise measuring as part of roadworthiness tests for motor vehicles
- A noise label for vehicles similar to the existing tyre and energy labelling
Thank you for your attention!

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henk.wolfert@dcmr.nl
Abstract of presentation EUROCITIES on Vehicle Noise
by Jan-Harko Post

Noise is the forgotten environmental factor Mr. Jo Leinen (Member of European Parliament) said at one of the meetings of the EUROCITIES Environment Forum earlier this year. Notwithstanding the fact that the 6th Environmental Action Programme announced that a noticeable reduction of the number of people exposed to noise should be realised, it can be concluded that this intention of the 6th EAP is not on course yet and that the distance to target seems to be further away than ever.

Nevertheless cities continuously strive to improve quality of life and health of their citizens. EUROCITIES members have long worked on reducing environmental noise, and they are committed to further improvement. The Environmental Noise Directive has been crucial in assessing the extent of noise burden all over Europe. From the first round of noise mapping it appeared that 60 million people in urban areas are exposed to noise levels above 55 dB LDEN and 40 million above 50 dB LNIGHT. Another 40 million people are exposed to noise levels above 55 dB LDEN from major roads. Around 30 million are exposed above 50 dB LNIGHT, caused by noise from major roads. We think that this is just the tip of the iceberg as these results are from the first round of noise mapping. We expect that the second round of noise mapping which is currently in process, will show even larger numbers.

In 2007 CE Delft reported that 40% of the EU citizens are exposed to harmful noise levels. EEA data show that in urban areas noise levels can reach up to 70-85 dB LDEN. It should be obvious that such a noise burden can not be without consequences for human health. This was already reported by numerous reports from authoritative institutions like the WHO. Reports show that at least 1 million DALY’s per annum occur in EU [5]. Beside serious health effects, like high blood pressure, cardiovascular diseases, heart attacks and strokes, other negative effects are reported, like devaluation of the house prices, production loss, reading impairment, learning disabilities, car accidents and severe sleep disturbance[3,6]. The social costs due to the noise burden in EU27 amounts at least EUR 40 billion per annum [3].

Traffic is reported to be the main source of noise in the EU. Under the Environmental Noise Directive cities should solve noise problems within their jurisdiction by applying measures. However, local measures are not sufficient to tackle noise problems. Even applying a combination of measures, solving the noise problem based on local measures is a mirage. At best 5-7 dB reduction can be realised.

Although the future looks bright by curbing all conventional fuelled vehicles from urban areas it should be noted that the effects of replacing the car fleet by hybrid and electric vehicles is limited where noise is concerned. Reason is that passenger cars are only slightly quieter at low speeds (< 35km/hr) [12]. However, for Heavy Good Vehicles a higher reduction can be realised when changing to electric traction. The enormous increase of Heavy Good Vehicles over the last decades has affected the noise burden significantly, so changing to electric traction in urban areas would be part of the solution. The proposed warning sound adding noise to these vehicles will be counter productive and last but not least the penetration of the e-vehicles will take many decades, in numerous reports its given that in 2020 the share of electric vehicles will amount 10-15% max. Depending on the percentage of lorries, the noise reduction is marginal and not audible (less than 1 dB).

---

1 DALY stands for Disabled Adjusted Life Year or lost healthy life years
2 Due to the tiredness (sleep disturbance, concentration loss) of the driver
3 Quiet road surfaces, barriers, restricted zones, traffic management, smoothing traffic flow, speed reduction, speed humps, etc.
Even curbing all conventionally fuelled lorries from urban areas results in a minor reduction at this low share of e-vehicles (1.5 dB). That is why EUROCITIES embraces the action of the White Paper on Transport [11] that says that by 2050 all conventional fuelled vehicles should have vanished from urban areas. This means electrification of lorries and vans to be used in urban areas and from [12] we know that this results in significant noise reductions (5-12 dB depending on the speed).

All this is why EUROCITIES embraces the proposal from the European Commission COM(2011)856 final to strengthen the Emission Limit Values. Since many years EUROCITIES pleads for noise measures at source because those measures are the most efficient and less costly. However, the two steps proposed in the Commission’s proposal should be strengthened/amplified for the reasons that, from a technological perspective, further reductions are possible [12,13] and quieter vehicles are the only way to lower the number of exposed people all over Europe drastically.

We EUROCITIES would advice the following:

1. To add more stages at the Commission’s proposal e.g. for 2021 a reduction of 3 dB could be imposed and for 2025 another 3 dB. We are convinced that these terms are realistic and take into account the lead times usual in the automotive branch.

2. Regarding the proposal of UNECE (to make them aware that the initiatives to add obligatory warning sounds at e-vehicles in order to lower car-pedestrian or car-bike accidents because from [14] it was reported that there is 1.4-4 times more risk for e-vehicles and hybrid vehicles) we plea for a temporary feature. Because, when having only vehicles with electric traction in urban areas, the noise from those vehicles will not be masked anymore by the engine and exhaust noise from petrol and diesel driven vehicles, so there should not be a reason to apply those sound devices anymore. By reviewing the revised vehicle directive periodically, the right moment could be chosen to skip these obligatory devices.

3. To encourage scientific research in order to reduce the noise emissions from passenger cars, vans and lorries

4. In parallel to set out a European policy aimed to encourage, to support (Horizon 2020) and which forces automotive branch to produce quieter vehicles similar to the successful EURO and CO2 approach, giving a boost to innovation and economy. We think that an integrated approach could be more (cost-)effective.

5. To invite Member States that already have legal system according to directives 2010/48/EC and 2009/40/EC in place, to measure noise in all cases by means of a simple test and using a class 2 noise level meter according to IEC651. Inspection of vehicles driving on the road is also needed because a lot of the vehicles, especially mopeds and motorised two and three wheelers are provided with illegal parts resulting in more noise than allowed in the European directives mentioned afore. In our opinion these noise emission limit checks could be in line with the new proposed ELV’s and should be based on the new test method proposed by European Commission and UNECE.

6. Similar to the tyre and energy labelling of cars we would welcome a noise label for vehicles as well.
References:


[9] Quantitative response of children to environmental noise, Prof. S.Stansfeld et all, 2010


[12] Letter from CAETS to Director General of Enterprise and Industry, 5 June 2011


Presentation and briefing note by Irene Fusco

How Road Infrastructure can contribute to
noise reduction

European Union Road Federation (ERF)
Irene Fusco

Road traffic noise: a multifaceted issue

- The noise in a road traffic situation is produced by a series of elements acting together.

- Each situation is characterised by a different combination of these elements and, therefore, requires a dedicated and customised solution.
Policy Department A: Economic and Scientific Policy

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**Tyre / Road: noise generation process**

![Diagram of noise generation process](image)

- **Sound Generation**
  - Vibration of tyre wall
  - Impact noises
  - Friction between rubber and the road

- **Sound Amplification**
  - Stick-slip
  - Air pumping
  - Amplification caused by dihedral effect
  - Propagation
  - Absorption

Stick-slip generates noise when the tyre rubber sticks and slips as a result of the texture of the road surfacing.

Source: Pierre Pingue, Technical Manager Colas France

---

**Silent road surfaces 1**

- Offer improved acoustic performance levels
- More expensive than standard road surfaces (construction and maintenance costs)
- But are still a cost-efficient solutions to reduce noise
- Easy and fast solution to implement
- Need to be customised to the traffic environment (urban, extra-urban, highways, etc.)

Do not forget about:
- Road safety
- Sustainability
- Noise
- Safety
- Sustainability

---

PE 475.114
Silent road surfaces 2

**Porous Asphalt (PA)**
- Reduction up to 4dB at high speed
- No significant reduction at low speed
- Low durability, regular maintenance required
- Special winter maintenance required

**Double layer porous asphalt**
- Better for low speed situation
- Higher maintenance required
- High pressure water jetting (safety issue)
- Expensive

**Stone Mastic Asphalt (SMA)**
- Reduction up to 2dB at 50km/h
- Good skid resistance
- More durable

Other road surfaces solutions for noise abatement are Optimised Cement Concrete, Microlayers, Silent block pavement.

---

**Solution: Noise reducing devices**

- Effective acoustic barriers typically reduce noise levels by 5 to 10 dB(A), cutting the loudness of traffic noise.
- Offer an effective remedial measure in high-traffic density zones or specific high-noise areas.
- Are typically built alongside high-traffic roads and which reduce noise levels by either absorbing the sound, transmitting it, reflecting it back across the road, or forcing it to take a longer path over and around the barrier.
- Important to take into account the environmental impact and citizens opinion.

[European Noise Barrier Federation (ENBF)](www.enbf.org)
Holistic Approach: a success story

The problem: Increasing road traffic noise in Alverna (NL)

1st Solution proposed: a 4 m high noise barriers that would have cut the small village in two

Reaction: Inhabitants criticism and not acceptance

2nd and accepted solution: Basic measures together effective as the four meter high sound barriers:
- Movement: reduce the number of lanes of traffic
- Partly sunken road
- Low-level sound barriers
- Use of special ‘quiet’ asphalt
- Reduce the maximum speed through Alverna

Results: 10dB reduction, inhabitants happy 😊


Need to fill the gaps

Achieving an effective road traffic noise policy requires a concerted approach that balances overall road-related sound emission without affecting citizens’ right to mobility.

Main problem: Missing links in the chain

Noise

Regulations → Industries development → Solutions

Public authorities: Not aware of norms and solutions
Market surveillance: Products not complying with EU norms and standards

more competitive
ERF recommendations

**Information campaigns** targeted at local and national decision-makers as well as citizens in view of raising awareness.

**Deployment guidelines** to assist authorities in the selection, installation and maintenance of road surfaces and acoustic barriers based on European norms and local traffic condition.

A balanced mix of regulation and **market-friendly measures**, such as economic incentives that promote innovation, or road construction contracts that incorporate acoustic performance levels (Green Public Procurement).

Survey the national **market surveillance** authority.

---

**Thank you**

i.fusco@erf.be
How Road Infrastructure can contribute to noise reduction

by Irene Fusco

Introduction

Public concern over noise issues has never been so high, mainly because of the overall increase in road traffic. This has led, as a result, to the adoption of extensive national and European legislation packages as well as an intensification of the industry’s R&D efforts.

Road traffic noise components are to be found essentially in propulsion noise and tyre-road interaction, but the vast array of preventive and remedial measures extend to quieter road technology, noise reducing devices, traffic management and mobility strategies as well as urban planning solutions.

The real challenge therefore lies in identifying for each situation a combination of pragmatic measures that will reduce overall sound emissions without impeding mobility and its associated socio-economic benefits.

This requires a common effort and a shared responsibility of all actors involved.

Road traffic noise: a multifaceted issue

Road traffic noise is a heterogeneous and multifaceted issue, for which simple and general solutions are impossible to find.

The noise in a road traffic situation is produced by a series of elements acting together, namely: road users, traffic management, road surface, car, tyre, urban planning, etc. Each situation is characterised by a different combination of these elements and, therefore requires a dedicated and customised solution. There is no one universal solution to the road traffic noise issue; rather different solutions for different situations.

Furthermore it has to be considered that noise is differently perceived in each European country. In countries like Italy and Greece, for instance, people are more used to the noise emitted by power two wheelers.

Road industry set of solutions

In recent years, as a result also of more stringent European and national legislation, the road industry sector has been increasingly investing in Research & Developments towards quieter cars, tyres and roads.

The progress made in the automotive industry has been matched with the efforts from the road sector itself.

The road industry sector can today offer a set of solutions for both noise absorption and propagation. Silent road surfacing offers improved acoustic performance levels and constitutes an affordable solution to tyre-road interaction noise. Acoustic barriers and other noise reducing devises built alongside high-traffic roads offer effective on-site remedial measures with capacity to cut traffic noise by as much as one half.

Silent road surfaces are considered to be among the most effective means of reducing traffic noise. It is estimated that surfacing relief, road evenness and sound absorption features on a well-maintained road network can reduce noise emission levels by as much as 5dB (A) compared with classic pavement surfaces.
However, the overall benefits of a silent surface need to be evaluated considering the surface as part of a road traffic system where different factors interact. Furthermore other elements like road safety, sustainability and maintenance costs, have to be, carefully, taken into account.

The porous asphalt, for instance, can reduce noise up to 4 dB (A) at high speed, however at low speed there is no significant noise reduction. Therefore for low speed situations the double layered PA seems to be more suitable. Nevertheless PA durability is low and needs intensive maintenance, without which, the acoustical effect drops rapidly.

As an alternative to the PA, the Stone Mastic Asphalt (SMA) is also used. It is characterised by an optimal texture of the surface that offers a noise reduction of maximum 2dB (A) at 50Km/h.

Other road surfaces solutions for noise abatement are: Optimised Cement Concrete, Microlayers, Silent block pavement.

In addition, acoustic barriers and other on-site noise reducing devices (such as absorption treatment or acoustic joints) offer an effective remedial measure in high-traffic density zones or specific high-noise areas. Acoustic barriers are systems typically built alongside high-traffic roads and which reduce noise levels by either absorbing the sound, transmitting it, reflecting it back across the road, or forcing it to take a longer path over and around the barrier. Effective acoustic barriers typically reduce noise levels by 5 to 10 dB(A), cutting the loudness of traffic noise.

**Reducing road traffic noise: the holistic approach**

The high number of solutions available at different levels (vehicle, tyre, infrastructure, traffic management, land-use planning) are not mutually exclusive. On the contrary, they need to be integrated carefully and adapted to each single road traffic noise situation.

Consequently, achieving an effective road traffic noise policy requires above all a concerted approach that balances overall road-related sound emission without affecting citizens’ right to mobility.

**Figure 1:** Influences of tyre, vehicle and road surface properties on the overall traffic noise
Holistic Approach: a success story

As a result of increased road traffic noise; the city of Alverna (The Netherlands), proposed a noise reduction project foreseeing a one-fold solution: to build a 4 m high noise barriers that would have cut the small village in two. The inhabitants reject the proposed project and a new solution was found combining different measures for a noise reduction of 10dB.

In particular, to reduce traffic noise, five basic measures were adopted which, together, would be as effective as the four meter high sound barriers:

1. Move and reduce the number of lanes of traffic
2. Partly sunken road
3. Low-level sound barriers
4. Use of special ‘quiet’ asphalt
5. Reduce the maximum speed through Alverna

It is the combination of these measures that leads to a reduction in noise levels of more than 10 dB.

Fig 2: The final design of the Graafseweg is the result of a carefully coordinated, interactive process between the province, the municipality and the residents and businesses of Alverna.

For this project, the Dutch province of Gelderland and the municipality of Wijchen won the European Soundscape Award 2011.

References:

- FEHRL Report 2006/02. “Guidance manual for the implementation of low-noise road surfaces”
- Historic, sustainable solution for traffic noise reduction in Alverna
Presentation and briefing note by Nina Renshaw

Vehicle Noise Standards
A Sound Investment

EP workshop on sound level of motor vehicles
11 April 2012

Road noise & health

• EU: 210 million people exposed to harmful road noise levels
• 50,000 premature deaths
• 245,000 cases cardio-vascular disease
Real traffic noise 1974 - 2010

Measurement of thousands of vehicles on the same pavement (dense asphalt) in the Netherlands in 1974, 1999 and 2010 in normal, daily traffic

Costs of noise

- Social costs >€40bn per year
  - 1/3 cost of road accidents

- 90% caused by cars & lorries
  - Health, Annoyance, Property values, Public expenditures on remediation

  - Who pays? Sufferers, taxpayers, public authorities
Standards are the most cost-effective

NL: €100m savings for every 1dB reduced at-source
CEDR: Every € spent on quieter vehicle R&D benefits 100x more people than € spent on noise walls

<table>
<thead>
<tr>
<th>CEDR survey of road directorates</th>
<th>Cost per person no longer annoyed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise barrier</td>
<td>€1800 per person/yr</td>
</tr>
<tr>
<td>Facade insulation</td>
<td>€4100/home</td>
</tr>
<tr>
<td>Quiet pavement (porous/thin layer)</td>
<td>€125-900 per person/yr</td>
</tr>
<tr>
<td>Stricter vehicle noise standards</td>
<td>€15 per person/yr</td>
</tr>
</tbody>
</table>

T&E, HEAL, EEB
Position
Cut road noise by 3dB-10dB

• -3dB equivalent to cutting traffic by half
• Consensus: -3dB is feasible for this revision (EC, ACEA, Germany)
• EC proposal: 1.7-4.1dB cut
  – more is needed to assure 3dB overall reduction on all roads
• Overall goal to protect health:
  – -10dB from all measures incl road surfaces

EC proposal only effective from 2030

• No changes to current models – only new types

• Restrictions on sale of non-compliant noisy models only after 2019

• The introduction of tighter standards must be accelerated
  – 63% cars & 34% HGV already meet Step 1
  – 22% cars (+25% only 1dB away) & 5% HGV already meet Step 2
TNO, VENOLIVA report for EC, 2011 (p.111):
“Although the effect of the reduction of limit values proposed under Policy Option 5 will be significant, the impact assessment shows that it will not lead to a decisive reduction of the number of annoyed and highly annoyed people. […]

It is recommended to develop a continuous strategy of regular limit value reductions, until a considerably lower noise emission level is attained[...]

By announcing such a long term strategy in an early stage the industry will be able to anticipate the future requirements in time and to build its development strategy for new vehicle types on this knowledge”

<table>
<thead>
<tr>
<th></th>
<th>Step 1 – 2013</th>
<th>Step 2 – 2015 (Sale 2017)</th>
<th>Step 3 – NEW 2020 (Sale 2022)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cars (M1)</td>
<td>70 dB</td>
<td>68 dB</td>
<td>66 dB</td>
</tr>
<tr>
<td>Vans (N1)</td>
<td>71 dB</td>
<td>69 dB</td>
<td>67 dB</td>
</tr>
<tr>
<td>HGV (N3 &lt;250kW/ &gt;250kW)</td>
<td>77/79 dB</td>
<td>75/77 dB</td>
<td>73/75 dB</td>
</tr>
<tr>
<td>Buses (M3 &lt;250kW/ &gt;250kW)</td>
<td>75/77 dB</td>
<td>73/75 dB</td>
<td>71/73 dB</td>
</tr>
</tbody>
</table>
Step 3: Benefits over 30x greater than costs

Further weakening & long delays?

- ACEA proposal:
  - Step 1: No change
  - Step 2: On average 2.5dB weaker – disguised as reclassifications
  - Only require changes from 2020

- German and JASIC proposals:
  - Only effective 26 years after publication!
Make the test trustworthy

- Current proposal for additional sound emission provision (ASEP) would legalise noise extremes over 100dB.
- Recommendation: Add an absolute not-to-exceed limit of 90dB, eg. under aggressive driving.
- Change in truck test allows testing on extra-quiet tyres that are never used on the road.
- Recommendation: Adjust HGV standards by 1dB to account for traction tyres used in real world driving.
- Recommendation: Update the test track to the current ISO norm.

Transparency & Incentives

- Public procurement standards
- Low Emission Zones – Access restrictions
- Quiet delivery schemes
- Road charging
- City charging
Key messages

1. Accelerate the introduction of the revised standards, with Step 1 to be enforced in 2013 and Step 2 in 2015;
2. Set out a pathway for further noise reductions, by introducing a Step 3 reduction of 2dB in 2020;
3. Ensure testing is representative of real world noise emissions;
4. Introduce stricter limits for highly intrusive peak noise levels above 90 decibels;
5. Require information on vehicle noise to be publicly available and displayed at sales points.
Vehicle Noise Standards: A Sound Investment

by Nina Renshaw

Context

Traffic noise is the most widespread environmental problem in the European Union harming the health of more than one in three EU citizens\(^1\). Road noise imposes disproportionate costs on public authorities and society compared to the modest costs of controlling noise directly from the vehicle. Despite this, noise standards for road vehicles have not been updated for 20 years.

On 9 December 2011, the Commission published a proposal for a Regulation on the sound levels of motor vehicles. The proposal, if adopted by the Parliament and the Council, will replace the existing Vehicle Noise directive (70/157/EEC). With the adoption of the new law, slightly tighter noise emission limits for cars, vans, lorries and buses will be adopted and noise testing method will be updated.

The proposal is currently being considered in the European Parliament by the Environment Public Health and Food Safety committee (ENVI) with opinions being provided by the committees on Transport and Tourism (TRAN) and Internal Market and Consumer Protection (IMCO). It will also be considered by Ministers under the Competitiveness Council later in 2012.

This paper outlines the case for effective controls on vehicle noise and makes specific recommendations to strengthen the Commission proposal.

Road traffic noise harms the health of 1 in 3 EU citizens\(^2\)

Traffic noise is one of the most widespread environmental problems in the European Union. Some 210 million people, over 44% of the EU population, are regularly exposed to road noise over 55 decibels (L\(_{\text{den}}\) 55dB(A)\(^3\)), the level recognized to pose a serious risk to health by the World Health Organisation (WHO)\(^4\).

People disturbed by traffic noise have increased levels of stress hormones that raise their blood pressure and other risk factors leading to disease and death, as shown in Figure 1. Fifty thousand deaths, a quarter of a million cases of cardiovascular disease and in Denmark 5% of strokes\(^5\) are estimated to be caused by traffic noise. In terms of environmental burden on health, traffic noise is second only to air pollution according to the WHO.

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\(^3\) Decibel levels referred to here are A-weighted (dB(A)) to denote adjustment to human hearing range. L\(_{\text{den}}\) denotes the average sound pressure over all days, evenings and nights during a given year. Noise during the evening and at night is weighted more heavily to reflect increased sensitivity.

\(^4\) WHO (2011) ibid

Traffic noise is also shown to reduce performance at work and to hinder children’s learning\(^6\). Road noise reduces the quality of life of hundreds of millions of EU citizens, is a principal cause of annoyance for urban residents and one of the most common constituent complaints to politicians.

**Figure 1:** WHO Pyramid of Health Effects of Noise

![WHO Pyramid of Health Effects of Noise](image)

**A five step plan to cut traffic noise will deliver substantial health benefits and save money**

The European Commission's proposal\(^7\) would reduce the noise level for cars and vans by 4 decibels and for lorries and buses noise by 3 decibels in two steps from 2014 and 2017 (if the regulation is adopted in 2012). It will also introduce a new noise test that is more representative of real world traffic noise. The proposal is estimated to achieve a 25% reduction in the number of highly annoyed people. But overall road noise would not fall in proportion to the cuts in the limits and the reduction will still be inadequate to protect health.

Initially the new standards will only apply to entirely new types of vehicles, so not require any changes at all to current models. The Commission proposal would only restrict the sale of non-compliant noisy vehicles after 2019. Progress would be painfully slow; benefits would only be fully realised after 2030.

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\(^6\) WHO (2011) ibid

Transport & Environment, the European Environmental Bureau and the Health and Environment Alliance have identified a five step plan to strengthen the Commission's proposal:

1. Bring forward the benefits of the new law by accelerating the introduction of the revised standards, with Step 1 to be enforced in 2013 and Step 2 in 2015;
2. Set out a pathway for further noise reductions, by introducing Step 3 standards in 2020 which are 2 decibels lower for all vehicle classes (compared to Step 2 limits);
3. Ensure testing is representative of real world noise emissions, such as by adjusting limit values for trucks by -1 decibel to account for ultra-quiet tyres used in the test but never used on the road;
4. Require noise information to be available and clearly displayed at points of sale and in promotional material for vehicles and public access to all test data for full transparency;
5. Introduce stricter limits for highly intrusive peak noise levels at 90 decibels, such as when an engine is revved.

**Improved standards are long overdue - vehicle noise can be quickly and cheaply reduced**

Most urban traffic noise originates from the vehicle rather than the tyres. European vehicle noise standards to date have had little impact on noise levels adjacent to roads. Despite this, vehicle noise standards for have not been updated for 20 years.

Cutting road noise levels by just 3 decibels is equivalent to halving the level of traffic and can be quickly and cheaply achieved with currently available technologies. The European Commission proposal is lacking ambition: Nearly 1 in 4 cars and 1 in 3 light trucks tested over the past 5 years already meet the strictest Step 2 standards proposed.

The costs of reducing car noise are also small, at €20 per car per decibel reduction. There are synergies between technologies to reduce CO2 emissions and noise, such as improved aerodynamics, controlled engine speeds, stop-start technologies and hybrids.

The noise standards for heavy trucks are particularly important, as trucks already cause half of the road noise burden across Europe and are a fast-growing share of the fleet. Noise-reducing measures like engine encapsulation were widely used in the 1990’s to cut noise and could be reintroduced. The additional costs of noise abatement technologies for trucks and buses are projected to be €250 per vehicle per decibel reduction, which would be passed to the consumer in a 1% increase in the purchase price for Step 2, or 1.5% price increase for Step 3.

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8. TNO (2012) Reduction of vehicle noise emission – Technological potential and impacts
The benefits of cutting noise outweigh the costs by more than 30 times

Reducing traffic noise will bring enormous benefits and cost savings. Independent consultants TNO, who undertook the analysis underpinning the Commission proposal, have re-examined the costs and benefits of vehicle noise standards using the latest information and undertaken an impact assessment for a further Step 3 to take effect in 2020\textsuperscript{10}.

By adopting the proposed Step 3 limit values, 2 decibel below Step 2 in all vehicles classes, the number of people “highly annoyed” by traffic noise will be reduced by 39%. In addition, 8 million fewer people will be “highly sleep disturbed”, a 29% reduction. The cumulative benefits (health, amenity and abatement savings) over 20 years amount to €326 billion, which is equivalent to increasing EU GDP by 0.1\%\textsuperscript{11}.

The health benefits of significantly cutting the number of people exposed to high road noise levels will contribute €89 billion of the accumulated savings to 2030 from the proposed Step 3 limit value. In addition, increased property prices in quieter areas illustrate the value that people attach to avoiding traffic noise; this benefit is valued at €229 billion for Step 3.

Tackling noise at source from the vehicles also reduces the need for national governments, local authorities and homeowners to install costly noise barriers or sound insulation to homes and public buildings The Step 3 standards for 2020 would also halve the need for noise barriers and reduce the need for noise insulation by a quarter in the long-term, saving €8 billion in public expenditure.

The benefit of stringent noise limits for vehicles outweigh the costs by a factor of over thirty to one\textsuperscript{12}.

Using new information to undertake an updated cost-benefit analysis (according to the European Commission methods), see figure 2, clearly shows the overwhelming case for tighter noise limits:

- For Step 2, benefits of €275 billion far outweigh the costs of €7 billion, a benefit-cost ratio of 39:1.
- For Step 3, benefits of €326 billion compare to costs of €10 billion, a benefit-cost ratio of 32:1.

Ensuring that clear information on noise emissions of each vehicle is available to public authorities and fleets, especially public transport companies and haulage fleets, will empower them to set appropriate incentives to encourage the uptake of quieter vehicles. For example, public authorities could set procurement standards for bus fleets, allow only the quietest delivery vehicles preferential access to certain sensitive areas or times of day, reduce road user charges for quieter vehicles or give fiscal incentives. This could also allow vehicle owners to recoup any small increase in the purchase price.

\textsuperscript{10} TNO (2012) ibid
\textsuperscript{11} TNO (2012) ibid
\textsuperscript{12} TNO (2012) ibid
The road to ruin

The motor industry continues to present a range of misleading and distorted evidence in its attempt to prolong 40 years of failed noise regulation of vehicles beyond half a century. Specifically:

1. The industry argues that there are multiple sources of environmental noise – whilst omitting that the number of people exposed to road noise is at least 5 times greater than all other sources (railways, airports, and industry) put together.\(^\text{13}\)

2. An independent analysis of proposals put forward by The European Automobile Manufacturers’ Association (ACEA), the Japan Automobile Standards Internationalization Center (JASIC) and the German Ministry of Transport shows that their proposed limit values together with reclassifications of vehicle classes actually lead to much weaker and ineffective standards, as shown in Table 1. Any consideration of reclassification of vehicles must ensure the stringency of the Commission proposal is not diluted.

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Table 1: Comparison of the stringency of alternative proposals for vehicle classifications

<table>
<thead>
<tr>
<th>Vehicle category</th>
<th>Step 1</th>
<th>Step 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>German vs. EC</td>
<td>ACEA vs. EC</td>
</tr>
<tr>
<td>Cars (M1)</td>
<td>+2 / +4</td>
<td>+2 / +4</td>
</tr>
<tr>
<td>Medium Buses (M2)</td>
<td>-1 / +1</td>
<td>0 / +2</td>
</tr>
<tr>
<td>Heavy Buses (M3)</td>
<td>+1 / +3</td>
<td>+1 / +3</td>
</tr>
<tr>
<td>Vans (N1)</td>
<td>+1 / +2</td>
<td>+1 / +2</td>
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<tr>
<td>Light trucks (N2)</td>
<td>+1 / +3</td>
<td>+1 / +3</td>
</tr>
<tr>
<td>Heavy trucks (N3)</td>
<td>+1 / +4</td>
<td>+1 / +2</td>
</tr>
<tr>
<td>Average</td>
<td>+1,7</td>
<td>+1,8</td>
</tr>
</tbody>
</table>

3 The industry proposed limits for Step 1 are no step at all! Instead they represent a standstill period during which only the test method changes. The new test method has already been in place (parallel testing) since 2007. This proposal is purely to delay the introduction of tighter limits.

4 The motor industry suggests that an “integrated approach” is needed to reduce vehicle noise and far more should be done through quiet road surfaces, home insulation and noise barriers. Whilst in areas with very high traffic volumes these are complementary options, they are much less cost-effective than taking action on the vehicles. The average cost of protecting one person from noise annoyance is between 8 and 120 times greater for noise walls, insulation and quiet surfaces, compared to making vehicles quieter. Or put another way, 100 times more people can be protected from road noise if the same amount of money is spent on developing and producing quieter vehicles instead of on noise barriers.

5 The industry also focuses on tyres as the main noise source whilst failing to differentiate between different types of road and traffic situations. Whilst tyre noise is dominant in free-flowing traffic, such as on highways, it is overall vehicle (axel, engine, exhaust and tyres) noise that is most relevant in urban centres. We believe the current focus on vehicle noise is correct but also urge the Commission to examine new proposals to further reduce tyre noise later in 2012.

Stricter vehicle noise standards are so cost-effective that 100 times more people can be protected from road noise for every € spent on developing and producing quieter vehicles instead of on noise barriers or sound insulation.

The amendments proposed by the motor industry, if adopted, would significantly weaken and needlessly delay the already inadequate proposals of the Commission. Importantly, by blocking the most cost-effective solution the weaker proposals, if adopted, would oblige cash-strapped public authorities and cities to spend more on expensive abatement measures. The European Parliament has called for noise to be cut in the Sixth Environmental Action Programme and the Ambient Noise Directive – the proposed vehicle noise regulation provides a significant opportunity to improve health and quality of life.


The way to a quieter life

There are several key areas in which the Commission proposal needs to be strengthened to increase the benefits and accelerate the introduction of quieter vehicles:

1. The introduction of the Step 1 and 2 standards needs to be brought forward to 2013 and 2015 respectively;

2. The thresholds for the classes of buses and some trucks and vans should be amended – but not allowing any weakening of the stringency of the limit values proposed by the Commission;

3. Step 3 limit values should be introduced in 2020 (8 years after the proposed introduction of the regulation) to provide a pathway to safer traffic noise levels. This provides industry with regulatory certainty and a long lead time to achieve the necessary reductions;

4. Limit values for heavy trucks need to be reduced by 1 decibel to account for the unrepresentative, ultra-quiet tyres used in testing but not on the road. This will better ensure that the test results and limit values require real world noise reductions. Proposed amendments to limit values, vehicle classifications and compliance dates are summarised in Table 2 below;

5. An absolute not-to-exceed limit of 90 decibels under any driving conditions must be added to the ‘additional sound emissions provision’ (ASEP) to protect the public. This is needed to ensure these vehicles do not create disturbing and damaging levels of extreme noise. The ASEP as currently proposed would legalise high powered vehicles to produce extreme noise over 100 decibels – such as during hard acceleration. A not-to-exceed limit will be easy to measure and straightforward for public authorities to check and enforce;

6. Vehicles must be tested on a test surface which is representative of real world conditions. This can be achieved by ensuring Annex VII of the Commission proposal specifies the test track complies with the current norm (ISO 10844:2011);

7. To speed up the use of quieter vehicles in the future, national and local authorities, as well as public transport and commercial fleets, should have full access to information about noise levels from different vehicles. Full transparency and public availability of the test results is vital as the basis for incentives such as procurement standards for quieter vehicles, preferential access to certain urban zones or delivery times, or financial and fiscal incentives, such as lower road user charges or taxes. Provisions are needed to ensure noise information about each vehicle is available at all points of sale and in promotional materials.

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Table 2: Proposed noise emission limit values and vehicle classification

<table>
<thead>
<tr>
<th>Vehicle category</th>
<th>Vehicle sub-category</th>
<th>Limit values expressed in dB(A)</th>
<th>General</th>
<th>Off-road **)</th>
<th>General</th>
<th>Off-road **)</th>
<th>General</th>
<th>Off-road **)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Valid 1 years after publication for new type approvals (2013)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Valid 3 years after publication for new type approvals; 5 years for all vehicle sales*) (2015-2017)</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>Valid 8 years after publication for new type approvals; 10 years for all vehicle sales*) (2020-2022)</td>
<td></td>
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<td></td>
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<tr>
<td>M</td>
<td>Vehicles used for the carriage of passengers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>no of seats ≤ 8; power-to-mass ratio ≤ 150 kW/ton</td>
<td>70</td>
<td>71****</td>
<td>68</td>
<td>60**</td>
<td>66</td>
<td>67****</td>
<td>67</td>
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<tr>
<td>M2</td>
<td>no of seats &gt; 8; maximum mass ≤ 2.5 tons</td>
<td>72</td>
<td>73</td>
<td>72</td>
<td>73</td>
<td>68</td>
<td>69</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>no of seats &gt; 8; 2.5 tons &lt; max. mass ≤ 3.5 tons</td>
<td>73</td>
<td>74</td>
<td>71</td>
<td>72</td>
<td>69</td>
<td>70</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>no of seats &gt; 8; 3.5 tons &lt; max. mass ≤ 5 tons;</td>
<td>74</td>
<td>75</td>
<td>72</td>
<td>73</td>
<td>70</td>
<td>71</td>
<td>70</td>
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<tr>
<td>M3</td>
<td>no of seats &gt; 8; maximum mass &gt; 5 tons; rated engine power &gt; 250 kW</td>
<td>75</td>
<td>76</td>
<td>73</td>
<td>74</td>
<td>71</td>
<td>72</td>
<td>72</td>
</tr>
<tr>
<td>N</td>
<td>Vehicles used for the carriage of goods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N1</td>
<td>Maximum mass ≤ 2.5 tons</td>
<td>71</td>
<td>72****</td>
<td>69</td>
<td>70****</td>
<td>67</td>
<td>68****</td>
<td>69</td>
</tr>
<tr>
<td>N2</td>
<td>Maximum mass &lt; 2.5 tons; rated engine power ≤ 150 kW</td>
<td>75</td>
<td>76</td>
<td>73</td>
<td>74</td>
<td>71</td>
<td>72</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>3.5 tons &lt; max. mass ≤ 12 tons; rated engine power &gt; 150 kW</td>
<td>77</td>
<td>79</td>
<td>75</td>
<td>77</td>
<td>73</td>
<td>75</td>
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<tr>
<td>N3****</td>
<td>Maximum mass &gt; 12 tons; rated engine power &gt; 250 kW</td>
<td>77</td>
<td>78</td>
<td>75</td>
<td>76</td>
<td>73</td>
<td>74</td>
<td>74</td>
</tr>
</tbody>
</table>

*) Sales include registration, sale and entry into service of all new vehicles.
**) Increased limit values are only valid if the vehicle complies with the relevant definition for off-road vehicles according to article A.4 of Annex II of EU Directive 2008/48/EC
****) For M1 and N1 vehicles the increased limit values for off-road vehicles are only valid if the maximum authorised mass > 2 tons
***** All limit values for N3 vehicles have been lowered by 1 dB(A) to take account of the change of the instructions for the use of tyres in tests method B.

**Yellow marking** The definition of the sub-categories has been modified compared to the Commission proposal

**Orange marking** The limit values have been modified compared to the Commission proposal

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ECONOMIC AND SCIENTIFIC POLICY

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Documents