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**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN  
PARLIAMENT AND THE COUNCIL**

**Rail noise abatement measures addressing the existing fleet**

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## Rail noise abatement measures addressing the existing fleet

### 1. INTRODUCTION

#### Problem of railway noise

Noise is one of the most widespread public health threats in industrialised countries. The abatement of noise is therefore necessary not only for comfort but also to lessen its adverse effects on health, for example cardiovascular problems and cognitive impairment.

Rail is generally considered one of the most environmentally friendly transport modes. However, the contribution of rail transport to noise pollution is significant, with about 10% of the population exposed to noise levels above the threshold for “serious annoyance”<sup>1</sup>.

In some European regions there is substantial public opposition to rail noise, demanding political initiatives to reduce it. If no remedial action is taken, this could lead to restrictions on rail traffic along the most important European rail corridors, in particular freight trains, and the resulting bottlenecks would be likely to have adverse effects on European economies. Furthermore, a possible modal shift from rail to road on these corridors would lead to increasing environmental impacts, in particular greenhouse gas emissions as the specific CO<sub>2</sub> emissions of rail freight are significantly lower than those of road haulage. This would happen at a time when the Community is considering the opportunity to develop a rail network giving priority to freight<sup>2</sup>.

#### Action already undertaken

The European Community has already acted on this issue, adopting measures in the environmental and rail interoperability fields.

The Environmental Noise Directive 2002/49/EC<sup>3</sup> provides for strategic noise maps (to be set by June 2007) and action plans (by June 2008) for major railways and large agglomerations.

In 2003 experts<sup>4</sup> identified rolling noise of freight wagons as the biggest source of rail noise. The braking technology currently used (cast-iron brake blocks braking on the wheels’ surface) produces rough wheel surfaces and subsequently leads to a high level of vibration of rails and wheels. As freight trains often operate at night, their noise emission is even more critical.

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<sup>1</sup> European Environment Agency: TERM 2001. According to this publication 30 % of the population is seriously annoyed by road noise.

<sup>2</sup> Communication COM(2007) 608 from the Commission “Towards a rail network giving priority to freight”.

<sup>3</sup> Directive 2002/49/EC (OJ L 189, 18.7.2002, p. 12).

<sup>4</sup> Working Group Railway Noise of the European Commission: Position Paper on the European strategies and priorities for railway noise abatement, Brussels 2003.  
<http://ec.europa.eu/transport/rail/ws/doc/position-paper.pdf>.

Experts recommended giving priority to measures at source (vehicles and tracks) as they are more cost-effective. Nevertheless, according to recent figures<sup>5</sup>, a total of 150-200 million euros is spent annually in Europe on the construction of noise barriers. Noise barriers could admittedly be an effective element of noise abatement programmes where necessary, for example in dense urban areas. If barriers are coupled with measures at source, the length and/or height of barriers can be reduced, leading to significant cost savings.

In order to solve the problems at source and achieve interoperability along railway lines, in December 2005 the Commission adopted technical specifications for interoperability relating to rail noise (Noise TSI)<sup>6</sup> introducing limits for rolling stock used in the European Union. These limits apply to new and renewed rolling stock including freight wagons, which have to be equipped with low-noise brake blocks reducing the noise emission by about 50%.

### **Need for further action at European level**

However, given the long lifetime of rolling stock, it will take several years before overall noise emissions from freight trains can be reduced significantly under existing legislation and if no additional measures addressing the existing fleet are introduced.

Today, about 50% of rail freight transport is international and as a consequence a large number of wagons run across a multitude of national networks. As even a small number of noisy wagons have a significant effect and determine the noise impact, national abatement strategies alone cannot solve the problem sufficiently. Also, differing national approaches could negatively impact on cross-border corridors and give some players a competitive advantage over others.

Therefore, the effective reduction of rail noise can best be achieved by supplementing actions already taken by Member States with Community action on rail noise abatement.

## **2. OBJECTIVES AND SCOPE OF COMMUNITY ACTION**

The aim of Community action is to reduce the exposure of citizens to rail noise by promoting the establishment of rail noise abatement programmes to curb noise emissions of freight trains without jeopardising the competitiveness of rail freight mainly by retrofitting freight wagons with low-noise brakes as the most cost-effective type of measure.

Retrofitting should in principle include all European freight wagons with an annual mileage of more than 10 000 km and a remaining life expectancy of at least five years. Given their sporadic use wagons with a mileage of less than 10 000 km per year (15% of the fleet) account for less than 3% of the overall transport performance of the freight fleet. Priority should therefore be given to retrofitting wagons with a high yearly mileage to maximise noise reduction at an early stage. These two exemptions would significantly reduce the cost of retrofitting without jeopardising the noise reduction objective.

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<sup>5</sup> UIC: Noise Reduction in European Railway Infrastructure. Status Report 2007.  
[http://www.uic.asso.fr/download.php/environnement/reductionbruitinfra\\_en.pdf](http://www.uic.asso.fr/download.php/environnement/reductionbruitinfra_en.pdf).

<sup>6</sup> Commission Decision 2006/66/EC of 23 December 2005 (OJ L 37, 8.2.2006, p. 1).

The target date for completing the retrofitting exercise would be 2015. The impact assessment<sup>7</sup> demonstrated that the European wagon fleet could feasibly be retrofitted by this date providing appropriate technologies for retrofitting were used.

Although the impact assessment focussed on the 1435 mm gauge system (as within these European standard-gauge networks action is needed at EU level because of the limited effectiveness of national measures), the proposed measures can also be applied to wide-gauge systems. Where necessary the cooperation of neighbouring countries needs to be ensured.

### 3. RETROFITTING: OBSTACLES AND BENEFITS

In the past 10 years, several types of composite brake blocks have been developed by industry in order to replace the conventional cast-iron blocks as the main source of rail and wheel roughness. These brake blocks allow perceived rolling noise to be reduced by up to 50%. So-called K-blocks<sup>8</sup> are a proven technology used for new wagons but entail high costs for retrofitting. Other types, so-called LL-blocks<sup>9</sup>, are thus being developed explicitly for retrofitting. In early 2008 one type of K-blocks received definitive UIC homologation<sup>10</sup> while three types of LL-blocks have provisional homologation.

According to the impact assessment study up to 370 000 wagons need to be retrofitted, about two thirds of them owned by incumbent railway undertakings and one third privately owned (including combined transport operators and small railway undertakings).

With today's technology retrofitting would lead to investment costs in the range of 200–700 million euros (LL-blocks) or 1.0–1.8 billion euros (K-blocks) and to additional maintenance costs in the order of magnitude of 200–400 million euros (aggregated until 2025, for both technologies).

The main benefit of retrofitting is the reduction of freight train noise emission by up to 50% and hence the decrease in the number of people highly affected by rail noise by about 16 million. The results of the cost-benefit study show considerable net benefits of retrofitting in the range of 3 to 10 as compared to costs. This is without taking into account major benefits

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<sup>7</sup> PriceWaterhouseCoopersAdvisory: Impact Assessment study on rail noise abatement measures addressing the existing fleet. Final report December 2007.  
[http://ec.europa.eu/transport/rail/studies/index\\_en.htm](http://ec.europa.eu/transport/rail/studies/index_en.htm).

<sup>8</sup> K-blocks are made of organic composite material and possess different braking characteristics to conventional blocks. Retrofitting therefore requires adjustments to the braking system, leading to additional initial costs of up to €10 000 per wagon. They are very effective in noise abatement (reduction of up to 10 dB, equivalent to 50%) and are in general regarded as cost-neutral for new vehicles.

<sup>9</sup> LL-blocks only require minor adjustments of the braking system. They are designed to have a braking characteristic quite similar to those of cast iron. They are made of either organic composite material or sinter metal and they offer noise reduction of the same order of magnitude as K-blocks. Although their development started already in 1999, due to the very demanding technology in early 2008 they have not received definitive homologation.

<sup>10</sup> In the absence of relevant European technical specifications brake blocks are homologated by the UIC, the International Union of Railways. The UIC tests brake blocks against their specifications with regard to braking performance, safety and operating issues (such as severe winter conditions). Provisional homologation is granted once the technical tests are successfully completed; in-service tests on a larger scale can then be launched and, where operational experience is positive, followed by definitive homologation.

of retrofitting which could not be quantified, such as the savings due to reduced infrastructure-related noise abatement programmes, reduced maintenance costs for the rail infrastructure and efficiency gains in fleet management.

The main obstacle to retrofitting freight wagons on a large scale is financial as even if retrofitting is widely agreed to be the most cost-effective way of significantly reducing rail noise, stakeholders do not have sufficient resources or incentives to do it.

#### **4. MEASURES TO IMPLEMENT AND SUPPORT RETROFITTING**

To overcome the obstacles to retrofitting, the Commission analysed different measures and concluded that combinations of policy instruments are more suitable and effective than individual measures (see impact assessment report).

A combination of noise-differentiated track access charges, noise emission ceilings and voluntary commitments was identified as the most appropriate solution. The main advantages of this option are the highest benefits in terms of noise reduction (with a benefits/costs ratio of up to 10), potentially lower costs than other instruments such as direct subsidies, and its wide application to wagons registered in different Member States or even outside the EU. The market-based instrument of differentiated track access charges also provides incentives to give priority to highly used wagons. In addition, noise emission ceilings could help to increase the effectiveness of differentiating track access charges as railway undertakings have more incentives for retrofitting

##### **4.1. Introduction of differentiated track access charges**

In line with "Getting the prices right"<sup>11</sup> as the fundamental requisite for efficient transport pricing the introduction of differentiated track access charges constitutes the main element of the set of measures to promote retrofitting of wagons.

At European level, Directive 2001/14/EC<sup>12</sup> harmonises charging principles. One of these principles is that infrastructure charges may take account of the cost of the environmental impact of train operations, including noise. Any charge differentiation should in principle reflect the magnitude of the impact on the environment. Three basic models of differentiated track access charges could be used as an incentive:

- a cost-neutral *bonus-malus system* with reduced charges for silent wagons and higher charges for noisy ones;
- a *bonus system* consisting of charges which are reduced to enable the retrofitting of existing wagons with high degree of noise emissions; the infrastructure manager receives financial compensation from the Member State;
- a *malus system* consisting of increased charges for noisy wagons.

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<sup>11</sup> Communication from the Commission "Greening transport".

<sup>12</sup> Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification (OJ L 75, 15.3.2001, p. 29).

As Directive 2001/14/EC does not allow an increase in overall revenue (unless there are similar charges for competing modes of transport), a *malus system* will be feasible only when a comparable charge is applied for road freight transport. The proposed Eurovignette Directive<sup>13</sup> will introduce an external cost charge for road freight transport and therefore make it possible – in case of charges applied at a comparable level to road transport – to modulate track access charges more widely.

With regard to the *bonus system*, the impact assessment study demonstrated that it would be necessary to provide the necessary economic incentives for the wagon owners to retrofit their wagons in the start up phase. This would be justified by the reason of limiting the shift from rail to other transport modes as a consequence of railways having to bear costs for retrofitting their fleet.

The *bonus system* raises the question of consistency with the rules on state aid, given the public compensation of the rebates on the infrastructure charge. This is why the implementation of this system should be subject to clear and transparent conditions such as:

- its implementation should be for a limited time period to initiate retrofitting and to allow pay-back of the initial investment;
- it should be granted to all users in an equal and non-discriminatory manner;
- its intensity should be proportionate to the purpose, that is to provide a financial incentive in the start-up phase of the retrofitting programme.

*Bonus systems* might constitute State aid and in those cases will have to be notified to the Commission pursuant to Article 88(3) of the EC Treaty and evaluated against the relevant guidelines.

After the start-up phase, which may end when the majority of the wagons considered have been retrofitted, there will be no further need for a *bonus system*. Instead, a cost-neutral *bonus-malus system* could provide incentives to pursue retrofitting programmes and stimulate the introduction of more innovative low-noise technologies going beyond the present TSI limit values.

Noise-related track access charges refer to individual wagons and kilometres run by them or their axles on a certain line. The bonus should be granted to all silent wagons (including those already compliant with the technical specifications for interoperability) so that wagon owners investing in the renewal of their fleet are not penalised and to promote the use of silent wagons as only their use leads to noise reduction. Furthermore, for rail lines in noise-sensitive areas and/or at night an additional bonus for silent wagons could provide incentives for railway undertakings to adapt their fleet management to the needs of these areas. If relevant, passenger coaches might be integrated into the charging schemes.

In the impact assessment a practical problem relating to differentiated track access charges was identified: the fact that the entity receiving the noise bonus is not necessarily identical to the entity financially responsible for retrofitting. As the rental of wagons can be regarded as a functioning market, a corresponding adaptation of rental prices is expected: silent wagons causing less cost for track access charges will receive higher rents on the market as the

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<sup>13</sup> Proposal for a Directive amending Directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures.

willingness to pay will increase. Nevertheless, a voluntary commitment of the actors concerned could support this process by providing transparency of financial flows related to retrofitting and charges.

Differentiated track access charges require an automatic identification system and charging software linked to the identification system and the national vehicle registers. Noise measurements are not needed. The deployment of telematics applications for rail freight according to the relevant Technical Specification for Interoperability (TAF TSI)<sup>14</sup> would provide the technical basis for such automatic identification.

According to the Strategic European Deployment Plan delivered by the rail sector all functions including those on individual wagon movements will be implemented by January 2014. Furthermore, a high proportion of the functions will be available at an earlier stage.

Non-harmonised introduction of noise-differentiated track access charges at national level would risk not being effective as the incentive for railway undertakings might not be sufficient if only some Member States introduced such schemes, the timeframes were contradictory and different types of silent wagons were treated differently. Administrative costs for non-harmonised schemes would also be unnecessarily high. This instrument providing the necessary incentives for retrofitting therefore needs to be implemented simultaneously on a mandatory and harmonised basis in all Member States concerned. Beside the harmonisation of the main elements of charging schemes, the development of a common noise classification system for wagons is needed.

For the implementation of differentiated track access charges joint efforts by the rail sector, Member States and the European Commission are required:

**In the course of the recast of Directive 2001/14/EC, the Commission will propose legal requirements for the implementation of noise-differentiated track access charges.**

Infrastructure managers will adapt the charging schemes in accordance with Community legislation. In addition, they are in charge of the installation of identification systems and necessary IT tools. The completion of the retrofitting programmes is expected by the end of 2015 considering a timeframe of three years for the replacement of brake blocks.

In order to prepare the implementation of noise-differentiated track access charges the Commission will launch a study to develop and harmonise important elements for these schemes.

#### **4.2. Introduction of noise emission ceilings as a second step**

The noise emission ceiling limits the average emissions within a determined period at a certain location along the line. For example, current noise emission could be taken as a limit to prevent increasing noise if rail freight transport grows. Under Directive 2002/49/EC, Member States are legally competent to set such limits on environmental noise.

The noise emission ceiling leaves it to the rail sector to find optimal solutions: the railway undertaking may use vehicles with lower emissions to increase the number and/or speed of trains without exceeding the noise limits. The noise emission ceiling therefore gives an

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<sup>14</sup> Regulation (EC) No 62/2006 of 23 December 2005 (OJ L 13, 18.1.2006, p. 1).



incentive to use low-noise vehicles. Noise emission ceilings could directly address noise “hot spots” in the European network as well as the sensitive evening and night periods. Infrastructure-related measures are also covered by this instrument, leading to a holistic approach to rail noise reduction.

**In order to maintain the noise reduction achieved by retrofitting, the European Commission recommends Member States to introduce noise emission ceilings for major rail freight lines as a second step after the initial retrofitting programmes have been completed.** However, cost-benefit analyses should be carried out prior to the introduction of this instrument considering the noise reduction already achieved by retrofitting and other means at that date.

#### **4.3. Voluntary commitments by the rail sector**

Accompanying voluntary commitments can guarantee the effectiveness of differentiated track access charges and help to speed up their implementation even before legal requirements enter into force.

Voluntary commitments by railway undertakings on passing the noise bonuses received from infrastructure managers to the wagon owners (where they do not use own wagons) will support market mechanisms to ensure that the noise bonus can be used to finance the costs of retrofitting.

Furthermore, voluntary commitments by the sector to set up and implement individual retrofitting programmes as soon as possible would lead to better coordination of individual activities and would increase the visibility of the action.

In order to reduce rail noise as soon as possible, further to the legislative activities **the Commission recommends voluntary implementation of differentiated track access charges** (as indicated in section 4.1). The voluntary schemes to be introduced by “frontrunners” need to be coordinated at European level. For this purpose the Commission may issue appropriate guidelines and set up expert groups.

**The European Commission urges the rail sector to conclude such voluntary commitments without delay.**

#### **4.4. Reducing costs of retrofitting**

Significant costs of investment and additional maintenance have been identified as the main obstacle to retrofitting. However, the examples of retrofitting freight wagons with (non UIC homologated) composite brake blocks in Portugal and the United Kingdom demonstrate that cost-neutral retrofitting is possible.

Clearly, the technology available today cannot be regarded as sufficient for retrofitting on a European scale. **The Commission therefore urges industry to further develop composite brake blocks in close cooperation with railway undertakings and wagon owners in order to reduce costs significantly. The Commission will continue to support appropriate research and demonstration projects within existing programmes such as FP7 and LIFE+.**

Again during the public consultation, the need for clarification, assessment and acceleration of the homologation procedures for composite brake blocks was identified as an important

accompanying measure also leading to reduced retrofitting costs. **The Commission will therefore review the current process of authorisation in close cooperation with the European Railway Agency in order to make it more efficient, transparent and timely.**

#### **4.5. Monitoring of retrofitting and its impacts**

The noise mapping exercise in the framework of Directive 2002/49/EC and the data reported by Member States to the Commission should be used to assess the success of retrofitting programmes: against the 2007 maps as baseline, the effectiveness of retrofitting programmes will be monitored and the need for emission ceilings can be elaborated.

In return, Member States are advised to consider retrofitting programmes stimulated by differentiated track access charges within the noise action plans under Directive 2002/49/EC.

In addition, the Commission will monitor progress in implementing the proposed measures and progress in retrofitting. **Not later than three years after the adoption of the Communication it will publish a report on steps taken by the rail sector.**

#### **4.6. Setting-up of expert groups**

As the implementation of noise-differentiated track access charges requires several technical issues to be spelled out and harmonised **the Commission will set up appropriate expert working groups** and assure their cooperation in order to assist it in developing guidance material. Areas to be covered by these expert groups include the development of wagon classification systems, specification of identification systems, harmonisation of noise related charging schemes and monitoring of progress in and impacts of retrofitting.

### **5. OTHER MEASURES TO REDUCE RAIL NOISE**

This initiative focuses on a specific measure to reduce rail noise: retrofitting of freight wagons with low-noise brake blocks. Even though this measure is widely regarded as very effective and efficient, it cannot solve all rail noise problems in Europe.

Therefore, outside the scope of this initiative other measures will be assessed by the Commission, discussed with experts, Member States and stakeholders and if appropriate implemented. For example:

- As indicated by experts<sup>4</sup>, infrastructure-related measures (e.g. rail grinding, the use of rail dampers) and additional actions are important to supplement the measures addressing rolling stock (“smooth wheels on smooth rails”). The Commission encourages Member States and the rail sector to implement them in parallel.
- Regular revision of the TSI Noise is considered necessary to take account of technical progress, as beside composite brake blocks, other low-noise technologies have been developed for freight rolling stock.

- State aid for interoperability<sup>15</sup> can also be granted insofar as it can help to remove technical barriers in the European rail services market. In such cases, the eligible costs cover all investments relating to noise reduction both in rail infrastructure and in rolling stock. Alternatively, environmental state aid could also be used<sup>16</sup>.

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<sup>15</sup> Community guidelines on state aid for railway undertakings, adopted by the European Commission on 30 April 2008.

<sup>16</sup> Community guidelines on state aid for environmental protection, OJ C 82, 1.4.2008, p. 1.