Freight noise
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UIC NOISE NETWORK/UIC ACTION PROGRAMME NOISE REDUCTION FREIGHT TRAFFIC
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TACKLING FREIGHT NOISE: THE EUROPETRAIN PROJECT

By Johannes Gräber

24 railways and the sector organisations UIC, CER and EIM signed the "Joint Resolution of the Chairmen of the European Rail Operators on "EuropeTrain" on September 5th 2009 to speed up and improve LL brake block testing in operations. The project shows the clear will of the sector to support a successful development of LL brake blocks as a means for cost-effective noise reduction at the source.

The new project EuropeTrain will serve as a tool to speed up the solution of the open points in the homologation of LL-blocks, which are the "Study on Equivalent Conicity" and too limited insights in LCC (see background information). The train will consist of about 30 wagons and will run throughout Europe only for the in-service testing of LL brake blocks. The central aim of the project is to validate wheel wear, wheel profile evolution and solutions for equivalent conicity, in order to be able to homologate LL-blocks in 2011.

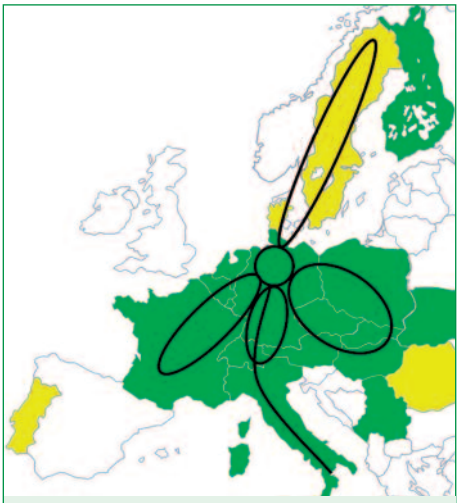
The in-service test will last more than a year, taking into account all climatic seasons. All operational conditions relevant for Europe have to be covered in a balanced way, e.g. running on different gradients with different operational modes, arctic winter areas and high temperature zones. This will be achieved by the definition of five different loops (ca. 12.000 km each), specifically dedicated to certain conditions, always starting and ending at one central point (Minden, Germany) for regularly measurements, inspections and possibly maintenance:

Loop 1 Scandinavian loop (winter flat loop)
Loop 2 France / Rhine valley loop (summer flat loop)
Loop 3 Transalpine loop (winter and summer conditions)
Loop 4 Eastern loop
Loop 5 Italian loop (summer mix loop)

In sum a mileage of appr. 300.000 km has to be achieved for sufficient results, so each loop will have to be run several times.

To guarantee a high return of results compared to the considerable effort necessary for the realization of this project, the project focuses on solutions for s-wagons and for already pre-homologated products.
As an overall result it is expected to have a recommendation for the use of the already existing, pre-homologated LL blocks for s-wagons as a basis for economically feasible retrofitting of the majority of the existing wagons.

As already laid out in the Berlin resolution, the contributions of the Railways will be mainly "in kind" in form of free track access, free traction, free wagon provision and free manpower for project management, measurements and analysis. So it is expected that the real costs (= marginal costs) for the railways are much lower than the estimated overall cost of approx. 4 Million Euro.
At this moment many people are working hard to finish the preparation of the EuropeTrain project. The wagons that will be used are selected and are provided by several UIC Members. Furthermore the definition of the loops in detail is nearly finished. To be allowed to run the train, discussions with the NSA's and ERA concerning the acceptance of wagons and the results of the project is ongoing. A final decision of UIC Members regarding the start of the project is still pending. This final decision is expected on the next meeting of the CEO's in Rome on June 26th 2010. ■



5 DIFFERENT LOOPS THROUGH EUROPE

BACKGROUND INFORMATION

The main conclusion of the synthesis report LL blocks, presented in June 2009, was:

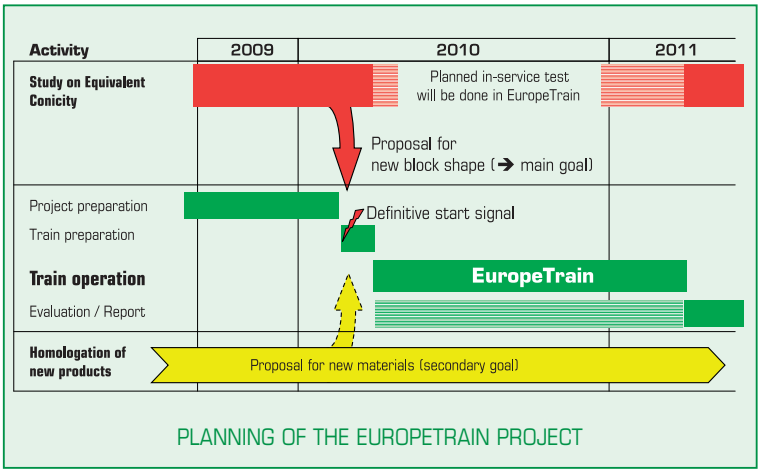
"LL brake blocks are proving to be a promising cost-effective noise-reducing measure for existing freight wagons, but LL brake blocks still require further improvement in LCC concerning block and wheel wear and especially with regard to the development of the wheel profile, showing an unacceptable fast degradation of the equivalent conicity which may affect safety aspects."

UIC therefore started a "Study on Equivalent Conicity" in 2009 with the two branches "Investigation on the influence of brake block shape" and "Validation of equivalent conicity limit values". The first branch will lead to a proposal of a new block shape and modifications of the brake rigging to be tested under operational conditions. The other branch evaluates the present limit values for equivalent conicity. If the limit value can be heightened this will help the economical feasible use of LL-blocks. ■

WORKSHOP ON NOISE DIFFERENTIATED TRACK ACCESS CHARGES AND OTHER RAIL NOISE DEVELOPMENTS AT EU LEVEL

By Wil van Roij and Jasper Peen

A new step taken by the European Commission in the development of a policy to stimulate the use of composite brake blocks has been a study executed by KCW. The aim of this study was to develop and harmonise important elements for noise differentiated track access charging schemes (NDTAC).



PLANNING OF THE EUROPETRAIN PROJECT

On April 27th 2010 the EC organized a workshop in which the results of this study were presented and discussed with the railway sector. Director of DG MOVE D, Enrico Grillo Pasquarelli stated in his opening speech the problem that the industry faces. About 35 million inhabitants of the EU suffer to high noise levels due to railway noise. In its regulatory role the EU follows the principles that the polluter pays and abatement should start at the source. In this case it concerns the wheels of freight wagons and retrofitting wagons with composite brake blocks.

The results of the KCW study were presented by the consultants. The study is based on an earlier conclusion of the EC that a NDTAC system is the preferable method to stimulate the use of composite brake blocks. The Commission states that there should be a relation between the mileage of a wagon (and thus the contribution to noise reduction) and the financial stimulation received. By making the incentive mileage dependant the assumption is that wagons with high mileage will be retrofitted with priority by the wagon keepers. As wagon keepers regularly don't know where their wagons are in operation it is obvious that the stimulation should be paid to the railway undertaker and passed on to the wagon keeper. To keep the system as simple as possible the railway undertaker can claim the stimulation funds (or bonus) on a basis of self declaration. In this system a control body has to be enforced.

The first part of the workshop tackled how the sector should be stimulated and financially compensated. Basically the sector, represented by CER, feels that direct funding to the wagon keepers instead of NDTAC is the best and simplest way of compensating the sector for the costs to retrofit all 360.000 wagons within the EU-area with standard gauge track at a high speed.

At first glance the position of the Commission and the member states stands diametrical to the position of the sector. Common is that both the Commission and the sector feel that noise abatement is a mutual interest and that the sector is an important instrument in the transport policy of the Commission. Also the Commission is willing to compensate the additional costs for the sector during a limited period of time.

The contours of a compromise are on the horizon but some technical problems and questions need to be solved first to mitigate the risks for the sector. Very important is that LL-blocks will become available soon as an accepted and homologated technical solution for noise reduction. The second part of the workshop was dedicated to this subject.

Mr Gräber presented on behalf of UIC the status in the development of LL-blocks. The main problems are the equivalent conicity and the uncertainty on the Life Cycle Costs of the LL-blocks. UIC is working on this matter in the "Study on equivalent conicity' in which an optimized brake block contour is developed. Also, the EuropeTrain project was presented as an important tool to speed-up the resolution of the problem in the framework of the study.

The block manufacturers play a major role in the development of composite brake blocks. The first useable blocks were presented by the industry years ago but are still in its homologation procedure. The industry has so far spent quite a lot of money on the development and not earned anything at all. One of the reasons for the high costs was the fact that the development of specifications for the blocks and the development of the brake blocks was more or less a simultaneous process. At the moment the specifications are fixed as is the process for homologation. ERA sees it as its task to develop EU-rules and standards that can be uses in the homologation process for new brake blocks.

The risks concerning equivalent conicity were first evaluated in the Dutch Whispering Train Program by measuring the running behaviour of wagons. The measurements (although limited in numbers and geographical scope) were very enlightening. There seemed to be only a very low correlation between equivalent conicity and the measured running behaviour. With this result frequent maintenance of the wheel profile is not needed and reasonable life cycle costs can be guaranteed.

Also the progress in the German Leiser Rhein was presented. The program focusses both on the technical development and the development of a NDTAC system. The German proposal would be to give bonuses direct to the wagon keepers to

reduce the complexity of the system. Finally the draft results of another study were presented. Concerning a NDTAC system for the Rotterdam-Genova corridor.

At the end, the Commission presented the next planned steps:

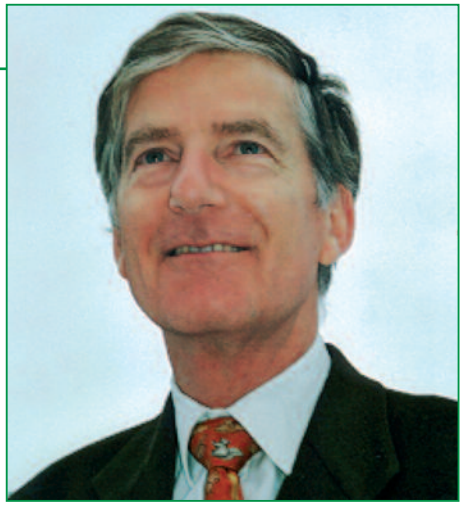
- A harmonisation of NDTAC on the EU-wide scale is necessary for the system to function well. This could be achieved through both legislative initiatives and dissemination of best practices. To this end, a creation of an expert group is planned for the second half of 2010.
- With regard to brake blocks certification, the European Railway Agency should develop technical specifications to allow product manufacturers and rail operators to apply the procedures for authorisation of placing in service in accordance with the established EC legislation (Interoperability Directive). To help to achieve this, a Working Party should be established. ■

FOOTNOTE The KCW Study can be downloaded at: http://ec.europa.eu/transport/rail/studies/doc/2009_10_noise_charges.pdf

FOOTNOTE More presentations can be found on EC's website: http://ec.europa.eu/transport/rail/interoperability/environment_en.htm

INTERVIEW PETER HÜBNER

Peter Hübner is advisor for UIC in the field of noise policy. He was the environmental Director of SBB and Co-Chairman of the former EU WG Railway Noise. He has written several reports for UIC on noise reduction, on noise related track access charges and made evaluation of the study of KCW, Steer Gavies Gleave and TU Berlin for CER and UIC. Wil van Roij and Jasper Peen interviewed him and asked him to summarize his evaluation.



Mr. Hübner, reading your comments, you don't seem to see (m)any possibilities to connect to this study. What are your main objections?

A thorough analysis of the relations within the rail freight market is described in the study of KCW, which perfectly reflects the complex relations. But unfortunately these insights are not used in the final conclusions of the study: The study recommends giving a bonus on the track access charges to the freight operators if they run with quiet wagons. However it is not the operator but the wagon owner who needs to do the investment in silent brake systems. The report does not sufficiently answer the the question how the money will flow from the operators to the wagon owners. It is assumed that the market will do this automatically but this assumption is rather speculative. Furthermore I think that the consultants are highly underestimating the additional operational costs involved with the use of composite blocks and also the costs for the administrative burden if such a NDTAC system will be introduced.

Are there any simple solutions thinkable to fund composite brake blocks given the fact that the rail freight sector is a complicated world?

From my point of view the simplest method is to give direct funding to the wagon owners. At the moment the infrastructure managers reserved money to invest in noise screens, but to achieve a fast noise reduction it is much more effective if part of this money is shifted towards the wagon owners to retrofit their wagons. There should be a legal obligation that only wagons are retrofitted using this subsidy if they run more than a certain amount of kilometers per year. This is more or less the system which is currently in force in Switzerland and it works: the noise reduction achieved in Switzerland can be measured!

Isn't there a mileage-depending bonus too in Switzerland?

Indeed operators can get a bonus per axle kilometer if they run with silent rolling stock. This system was introduced by the political process and meant to stimulate also foreign operators to retrofit. But in fact this system is far from effective. It is not used by foreign companies at all. The bonuses are mainly claimed by the local passenger operators who retrofitted their fleet anyhow.

Do you believe that the acceptance of the public of high noise levels through passing freight trains is at stake in the near future? Is there any felt necessity in the industry for additional measures?

Of course the rail freight sector is aware of the rail noise problem. It is a clear fact that today's freight trains are much noisier than passenger trains. This results in fewer complaints from residents living along railway lines with only little or no freight traffic. So the freight sector is aware of the constraints caused by noise and wants, and has to find a solution for it.

The LCC of using composite brake blocks is an important factor in the discussion. There is still much uncertainty about it, mainly due to the discussion on the 'Equivalent Conicity'. How can you discuss about a realistic level of bonuses if there such an uncertainty?

I believe that a bonus should be based on realistic and occurring additional LCC, otherwise it will not be effective at all. However if the wagon keepers will get direct funding, this is less a problem. It is also realistic, that more operational experience using composite brake shoes and i.e. an adjustment of maintenance schemes may help in decreasing the additional LCC costs of composite brake blocks.

continuing on page 4

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One could say that bonuses should have a relation with the benefits for society. If that were the case how can taxpayers in the various countries be explained that a railway undertaking gets more money with K-blocks than with LL-blocks?

I do not see that there should be a distinction in the bonus for the two systems. However do not forget that LL-blocks are at this moment not an available solution yet. As long as this is the case, it should also be investigated which bonus is needed to effectively stimulate the use of K-blocks. And furthermore the use of K-blocks has additional benefits. Overall it is much cheaper for the taxpayer to invest in LL or even in K-blocks than in noise screens, It could be proven in many studies in various countries that retrofitting the freight fleet is by factors more effective that to built noise screens, the savings thus achieved are in the magnitude of the costs of retrofitting.

Is there anything more you want to say concerning the stimulation of the composite brake blocks?

My advice to the politicians to any incentive is: "Keep it simple!" ■

FOOTNOTE The UIC evaluation of the KCW study can be downloaded at: http://www.uic.org/spip.php?article1721

5TH UIC RAILWAY FREIGHT NOISE REDUCTION WORKSHOP

By Jasper Peen - Lloyd's Register Rail

On the 10th November 2009 UIC held its 5th annual workshop on noise reduction in railway freight traffic, in Paris. The initiative for the conference came from UIC's Expert Network Noise & Vibration. Various stakeholders shared the latest developments in the field.

Henning Schwarz´s (UIC) welcome words were about the efforts the currently made by the railway industry to solve the noise issue. The main 'weapon' for this is obviously the use of composite brake blocks. At the moment the admission of LL blocks is the most important aspect of this.

The European Commission is working on policies towards the reduction of noise. Piotr Rapacz (DG TREN) presented the latest developments in this. The introduction of Noise Differentiated Track Access Charges, which enables a smaller track levy for silent trains than for noisy trains, is one of the most important measures to stimulate the use of composite brake blocks towards noise reduction in railway freight traffic. In his presentation Peter Hübner responded to these plans, on behalf of UIC. His main objection was the complexity of the system, the costs involved and the administrative consequences, landing on the desks of railway companies.

Meanwhile the ERA has started its revision of the TSI Noise. The main objective is a simplification of several aspects of the norm, including the conditions in which a vehicle's noise emission is being established.

Leading the way in the development of composite brake blocks is UIC's B126.13 team. Chairman Stefan Dörsch presented the current state of affairs. Although K blocks are being allowed for quite some time now, UIC is still working on the optimisation of these blocks and the expansion of the number of usable varieties. The development of LL blocks, which have been conditionally allowed, was discussed extensively. One of the biggest problems, still blocking the go-ahead, is the effect of these blocks on the wheels' wear and tear and the so-called equivalent conicity. UIC has started a project to solve this issue. The project studies the maximum level of equivalent conicity and whether it is possible to adjust the shape of the brake block, in order to reduce the level of equivalent conicity. Interim results of the project were presented.

To enhance the development of LL blocks even further UIC also organises the EuropeTrain project. DB's Johannes Gräber outlined the project, in which a test train equipped with various types of LL blocks runs through Europe for a year. The central aim is to validate wheel wear, wheel profile evolutions and solutions for equivalent conicity, the effects on the running behaviour of the train and the life cycle costs of using LL blocks. The project is planned to start in 2010.

The day was rounded up with a couple of presentations on the development of composite brake blocks in various countries. Germany is currently setting up the Leiser Rhein project. An important part of this is the conversion of some 5,000 freight wagons, being used on the Rhine corridor. The conference saw the worldwide announcement of a financial support system for this. The Netherlands presented its latest 'whispering train' results. Within this project a lot of research is being carried out regarding the effect of LL blocks on wheel wearing and vehicle dynamics. The results show that the effects of using LL blocks on the actual running of the train can be minimal. Switzerland meanwhile is making gradual progress with its retrofit programme. A large number of Swiss freight wagons has now been refitted with K-blocks.

The workshop proved that noise reduction in railway freight traffic, is still an issue showing lots of developments. The day provided an interesting overview of these, in a variety of fields such as policy, law and technique. ■

For more information on the workshop please visit www.uic.org/baseinfo/reunion/reunion.php?id=62263

THE DUTCH WHISPERING TRAIN PROGRAMME AN UPDATE

Wil van Roij, Programme Manager

Final results of pilot projects

By the end of 2009 5 pilot projects that were executed within the framework of the Whispering Train Programme came to an end. In these pilot projects LL-blocks were tested on approx. 150 wagons of 5 distinct types from different operators, wagon owners or principals in the rail freight transport. The main goals of each pilot project were established; a proof of the reduced noise levels even after considerable mileages and a clear sight on the LCC in comparison to the use of cast iron blocks. Additionally, since the discussion on equivalent conicity started, measurements on running stability on the various wagon types were performed. For the investigated situations it is shown that LL-blocks can be used safely and are the most cost-effective measure to reduce noise for existing freight wagons. All reports are finalized and are available on the internet through: **www.whisperingtrain.eu**. A part of the pilot projects will be continued to monitor wear and LCC.

New ambitions

Since the pilot projects are finished, new ambitions were set for the coming years. A major issue is the problem of the equivalent conicity which is very complicated through the interaction with the track and wear of wheels. At the moment this issue is blocking the widespread implementation of LL-blocks. A part of the pilot projects will be continued for this purpose. The Whispering train organisation strives to contribute to a better understanding of a safe and economic attractive use of LL-blocks by reporting on in service tests and the contribution to the Europetrain program and the cooperation within UIC SET4.

The positive results of the pilot projects in combination with the current bonus system for quiet wagons have convinced two mayor chemical companies in the Netherlands to start implementing LL-blocks on some of their wagons. These companies will be supported by carrying out the additional activities needed like wheelprofile monitoring. The following months the process of slip tests and retrofitting will start. It is hopeful that principals start to specify that the wagons they use are silent! We hope and expect more companies to make the step towards specifying silent wagons in the coming year. ■

UIC WORKS ON THE OPTIMIZATION OF THE BRAKE BLOCK SHAPE

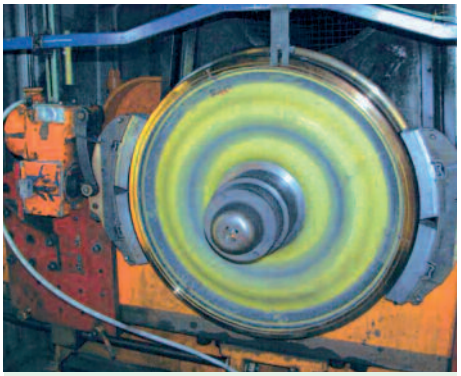
By Jasper Peen - Chairman of B126.13C

A positive effect of the use of composite brake blocks is of course the reduction of noise, because the wheel surface is smoothened. Investigations carried out by UIC during the last years have shown that the use of composite brake blocks increases the wear of the wheel profile. Therefore a project is started to optimize the brake block shape, to reduce the influence on the wheel profile and the equivalent conicity.

The wear pattern of composite brake blocks, especially some types of LL blocks, results in a change of the wheel profile and an increase of the equivalent conicity. This can influence the wheel-rail interaction and subsequently also deteriorate the running stability of a freight wagon. One idea to solve this problem is the modification of the brake block shape.

Since mid-2009 the working group B126.13C has been installed by UIC. The aim is to carry out a project that will lead to an optimized brake block shape, which will have less influence on the wheel profile. In this working group both railway companies, wagon owners and brake block manufacturers cooperate. The first phase of the project, in which the influence of the brake block on the wheel profile is studied by doing test bench tests, is being finalized at this moment. The challenge is to interpret the results of the test bench tests, because in these tests some aspects like the wheel rail contact are neglected. Therefore an important step is to compare the results of the test bench tests with available data from in-service tests that were carried out throughout Europe.

The results of this first phase will be used to define the approach for the next phase of the project. One important step of this phase will be the testing of a first prototype for the modified brake blocks, which is planned to be done on the EuropeTrain. Apart from the block shape also the position of the block in relation to the wheel has shown to have influence. It is planned to modify the brake rigging of some wagons of the EuropeTrain to test this. The results of this second phase can be used for a further optimization of the block. Finally the project will result in recommendations for the brake block manufacturers on how they can design a brake block that will have less effect on the wheel profile. The project is planned to be finished in 2011. ■



TEST BENCH SNCF-AEF IN FRANCE (SOURCE SNCF)

Railway Freight Noise Reduction: 6th annual workshop, Tuesday, 23 November, 2010 *At UIC headquarters in Paris*

UIC promotes silent railways. In a series of annual workshops UIC reports on progress, in particular in terms of the freight rolling stock with composite brake blocks. The speakers will address issues such as the EU policy and planned incentives such as noise related track access charges and how the railways are reacting and plan to react. A major point will also be the current state of the art of K- and LL-block homologation and how the railways are dealing with the technical problems that have been encountered. The scope will also be enlarged to present other UIC projects, the current status on vibration research as well as information on the Stardamp project.

The project programme foresees ample time for discussion and the coffee lunch breaks will allow many opportunities for networking with colleagues from the railway sector as well as government and industry.

The workshop is free of charge. However we ask you to register by Friday 12 November 2010 with Martine Cellier, cellier@uic.org

ENVIRONMENTAL NOISE: CNOSSOS-EU

PREPARING THE COMMON NOISE ASSESSMENT METHODS IN EU

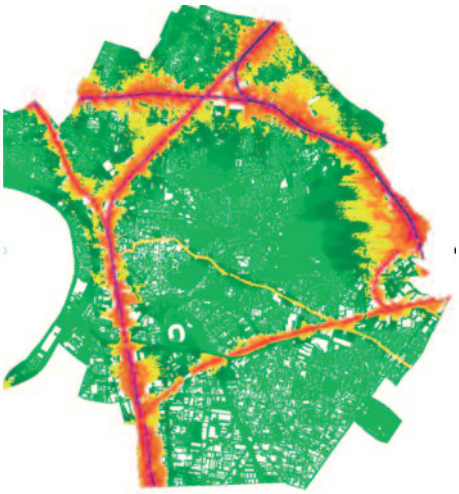
By Franck Poisson

The European Commission is preparing a Common Noise Assessment Methods in EU (CNOSSOS-EU) to be used in 2012 by the EU Member States for producing noise maps and action plans. The outcome of this process will change the way how to produce noise maps of railways and other noise sources.

As required by the EU Environmental Noise Directive noise maps of major cities, roads and railway lines have been produced by the end of 2007. During this first round of noise mapping maps have been calculated by using the recommended method (Dutch RMR method) or national methods. This resulted in noise maps based on several methodologies that are hard to compare. To increase the reliability and the homogeneity of the maps, a common noise assessment method is needed. Two European research projects, Harmonoise and Imagine, have been carried out to provide such a method but the approach was not finalized at the end of these projects.

The Directorate General for the Environment (DG ENV) of the European Commission is supported by the Joint Research Center (JRC) for the implementation of the Directive.
A part of the work of JRC is the preparation of the Common Noise Assessment Methods in EU (CNOSSOS-EU) to be used in 2012 by the EU Member States for producing noise maps and action plans.

In this context, Franck Poisson of SNCF has been selected with others experts by the JRC to review the definition of the railway source in the CNOSSOS-EU draft.



The main objectives are:
- to validate, for a scientific point of view, that the theoretical approach is correct,
- to ensure that the connection with the propagation model defined in CNOSSOS-EU is valid,
- to check that the required input data can be provided by the railway sector to define the railway noise sources.

Today, a complete draft has been reviewed by the panel of experts. The railway noise source definition is mainly based on the definition developed in Harmonoise / Imagine projects. For each definition, two levels are considered: a complete approach, mainly used in the future to design mitigation measures at a given location, and a simplified approach, dedicated to the noise mapping, for which default values are given. In parallel, JRC is drafting the guidelines on "how to use" the CNOSSOS-EU in terms of source definition, propagation model, outputs and other elements in the method. The complete version of the guidelines to cope with both levels of complexity of the 'fit for purpose' framework should be ready by September 2010.
The next step consists in developing the engine of the prediction software and to validate it to be included in the commercial products. The goal is to implement CNOSSOS, the next round of noise mapping in 2012, but the time schedule is tight.
The development of CNOSSOS-EU is organized within the framework of the EU Environmental Noise Directive (Directive 2002/49 CE the 25th of June 2002). The main aim is to provide a common basis for tackling the noise problem across the EU (http://ec.europa.eu/environment/noise/directive.htm). The four major topics of the Directive are:
- Monitoring the environmental problem
- Informing and consulting the public
- Addressing local noise issues
- Developing a long-term EU strategy

The UIC Noise network will follow the developments. Any remarks or questions on this topic can be sent to Lisette Mortensen (mortensen@uic.org) at UIC or to JRC. ■

Example of railway noise map http://www.plainecommune.fr/gallery_files/site_1/704/Plaine_Commune_fer_lden.pdf