NOISE INNOVATION PROGRAMME

FOR ROAD AND RAIL TRAFFIC

Summary

Despite the efforts that have been made in recent years the problems caused by noise in the Netherlands have become more rather than less. As the amount of traffic on the roads and railways has increased so has the noise nuisance. The present standard methods used to reduce noise nuisance are more and more subject to objections from society as a whole, and as well as this the costs of these measures are rising excessively. There is an urgent need for alternatives that are more cost effective and above all will not be subject to so much resistance from society. The possibilities afforded by innovative measures must be used in the best possible way.

The Noise Innovation Programme (IPG) consists of a balanced set of projects leading to the introduction of a coherent range of new measures and methods for the reduction of the noise caused by road and rail traffic. This involves not only new technical measures, some of which are already available, but also the necessary adaptations to legislation and ways of working.

It is expected that if the Innovation Programme is carried out successfully the costs of noise reduction measures can eventually be reduced by half.

Acknowledgements

The Innovation programme would not have been realised without contributions from many colleagues, experts, business and research institutes. The contribution made by colleagues from the Road and Hydraulic Engineering Institute (Erik Vos) in preparing a programme for road traffic that has been incorporated to a large extent in the Innovation programme must be mentioned.

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Background material, such as the reports from the literature list, minutes of expert meetings and full lists of possible ideas can be obtained on request from Robert Smaak, email: robert.smaak@dgp.minvenw.nl.

1 Introduction: the context

1.1 Aim of the Noise Innovation Programme

At the present time the standards applying for noise levels from roads and railways are exceeded in many places in the Netherlands. The growth in traffic is causing the relevant authorities enormous problems in the field of noise nuisance. For both road and rail traffic it is no longer possible to enforce the existing legislation in full and this problem will only increase in the future. Combating noise nuisance with the present measures results in significant objections from society and the costs of such measures, such as noise barriers, are very high (€ 4.1 billion). Apart from this, the measures used often replace noise nuisance with visual nuisance, particularly because of the height that is sometimes required for a noise barrier. An alternative measure – maintaining a suitable distance from the source of the noise – has major economic consequences.

There is, therefore, an urgent need for alternatives that are more cost effective and above all will not be subject to so much resistance from society. The possibilities afforded by innovative measures must be used in the best possible way. It is expected that if the Innovation programme is carried out successfully the costs of noise reduction measures can eventually be reduced by half.

Definition of an Innovation programme (from van Dale): a programme through which innovation must take place.
Definition of Innovation (from van Dale): implementation of something new.

The aim of the Noise Innovation Programme is to give an extra impulse to the development and above all to the application of innovative techniques and methods. The focus, therefore, is on the introduction of new measures and not on new inventions. The challenge is to ensure that the best ideas are actually implemented.

The new measures must satisfy the following requirements:
- be more cost effective and efficient than the present measures
- provide more diversity in solutions to the problem of noise
- be more acceptable to society than the present measures

What does the Innovation programme not attempt to do? The programme will not coordinate all activities in the field of noise reduction. Current research and development projects and pilot projects will continue to exist alongside the Innovation programme. The programme will, however, give a powerful impulse to a number of promising, innovative and attractive measures, so that these will now get off the ground and be applied on a large scale.

1.2 The content of the programme

The programme has been started by making an inventory of those possibilities for innovation that have the greatest chances of success. These possibilities are described in this document. There are no really new inventions here. This was also not found to be necessary because there are already more than enough promising ideas that have already passed the basic research stage.

The following phase will be one in which these innovative ideas are researched. This is not restricted to R&D, but pilot projects will also be carried out in which the new methods and techniques will be demonstrated. This phase will last four years. A start has been made with eight promising ideas in advance of further decision making. The implementation phase, in which the innovations will actually be implemented, will follow after this.

The Innovation programme is aimed at the reduction of noise from both road and rail traffic, and is divided into a large number of mutually related projects. Innovation can introduce new methods of noise reduction, for example new types of road surface, but also new methods of working in order to achieve the aim.

1.3 Relation to policy

The Innovation programme fits closely with the present policy of the national government. Improvement in the quality of the living environment has a central place in the Nationaal Verkeers- en Vervoersplan (NVVP) (National Traffic and Transport Plan) and the Nationaal Milieubeleidsplan (NMP) (National Environment Plan) that form part of cabinet policy. Noise reduction programmes in order to achieve the aims stated in the cabinet policies in the NVVP and NMP have been started by both the Ministry of V&W and that of VROM. These are coordinating programmes in which all the activities of these departments in the field of noise and policy towards noise come together.

1.4 Layout of this document

The vision of the Innovation programme is described in Chapter 2, in sections dealing with road and rail traffic. Both through rail traffic and railway yards are discussed in the section dealing with railway noise. Chapter 3 contains an overview of the content of the programme, again divided into sections to deal with road and rail traffic separately. The various projects are described in principle. A summary of each of the project plans is included in the appendices.

2 The vision

2.1 Introduction

The aim of the Innovation programme is to make the national traffic infrastructure and vehicles quieter. This must be done in a cost effective manner, and above all the measures must be socially responsible and the possibilities that innovation affords must be used in the best possible ways.

2.2 Relation to policy and society

Government policy with regard to noise has for some years now been aimed at achieving a change from tackling the effects to tackling the source of the noise. Three types of measures are available for tackling too much noise:

- at the source (making the infrastructure and the vehicles quieter);
- in the propagation path of the noise (using noise barriers or by maintaining sufficient distance);
- at the receiver (insulating dwellings).

Measures taken at the source of the noise are much more effective than the other two. However, in practice application of noise reduction measures at the source have proven to be very complicated, so that there has been less progress in this field than expected. At the same time, the government paper NVVP has recognized that the present range of measures does not provide enough possibilities for keeping traffic noise within the legal limits.

It is, therefore, necessary that a policy of combating noise at the source must be realised in the near future. What is missing here is the step between policy and actual practice. The Innovation programme is intended to force a breakthrough, and it is for this reason that the emphasis in the Innovation programme is not only on technology but also on legislation.

The Innovation programme is intended to offer attractive alternatives for the noise reduction methods available at present. The result of the Innovation programme will be a new generation of noise reduction measures for road and rail traffic. The existing methods will be supplemented with methods that are particularly aimed at tackling the sources of the noise.

Legislation will also be developed within the Innovation programme that will enable the government to gain a grip on the implementation of noise source reduction measures. It will then be possible for government to ensure that the most desirable combination of methods is introduced. Only then will it be possible to remain within the current and future legal frameworks during the next fifteen years, and only then will it be possible to achieve the aims from the cabinet policies as described in the NVVP and the NMP. This new approach is also essential seeing the growing resistance from society to both noise barriers and noise nuisance.

2.3 Composition of the programme

2.3.1 Collection and analysis of information - national and international

A broad inventory has been made of the available information and ideas for making road and rail traffic quieter. Netherlands experts have met together in expert meetings many times to prepare this. As well as making an inventory and collecting information they have also carried out an analysis and discussed the composition of the Innovation programme (see Literature list Lit.3).

A broad inventory of the international developments in the field of quieter road and rail traffic has also been made (Lit.1). As well as this, an extensive working visit was paid to Switzerland specifically aimed at rail traffic (Lit.2). During this visit representatives of the Swiss Ministry of Transport and the Environment as well as of the Swiss railways discussed the new Swiss approach to the problem of railway noise with representatives of the Netherlands government and the organisations involved.

2.3.2 Criteria used in compiling the programme

The broad inventory provided a large amount of information and a wide range of possible ideas. Choices were made when compiling the Innovation programme using the following criteria:

- the parts of the Innovation programme must be aimed at reducing the problem of noise from road and/or rail traffic;
- the parts of the Innovation programme must lead to better cost effectiveness;
- the parts of the Innovation programme must lead to less application problems;
- the parts of the Innovation programme must have a logical relationship with each other;
- optimum use with maximum noise reduction from measures taken at the source of the noise is an important aspect for road traffic;
- the emphasis for through rail traffic lies on measures that can be applied easily and with a better use of the existing rail network;
- measures taken for railway yards must at least make it possible to operate within the existing environmental nuisance permits.

2.3.3 Accents for road and rail

An extensive programme has been prepared for road and rail traffic consisting of a set of mutually related projects. As well as this, for the railways in particular, there is a strong focus at the beginning on implementing technical innovations that are more or less ready for implementation at the present time. There is a greater need to invest a lot of energy in more fundamental research and development for road traffic. This difference between the roads and the railways is clearly seen in the programmes and the defined projects. The programme also has a non-technical section both for the roads and the railways that has as aim the stimulation of the large-scale introduction of new techniques as they become available. This will be through national and European legislation that will enforce and/or stimulate the application of these new techniques.

2.4 Road traffic: first the source, then propagation

The section of the Innovation programme for road traffic aims at:
- quieter road surfaces that primarily suppress the frictional contact noise resulting from contact between the tyres and the road surface and as well reduces the propagation of drive train noise;
- quieter vehicles whereby the design and positioning of the tyres and drive system have an optimum noise reducing effect.
- noise barriers with a more effective protecting effect.

2.4.1 Background

At the present time the predominant source of the noise of road traffic is frictional contact noise, that is the noise that arises as a result of contact between the tyres and the road surface. This noise is predominant over almost the entire speed range on national roads and to some extent on inner city roads also. Therefore, the greatest amount of attention in the short term needs to be paid to reducing this frictional contact noise. This can be reduced both by paying attention to the nature of the road surface and to the tyres. A secondary approach is to reduce the drive train noise of vehicles, particularly that of heavy goods vehicles.

road surface

The best chance in the near future lies in improving the road surface. Rapid gains can be made by applying 2-layer ZOAB (zeer open asfalt beton or very porous asphalt concrete). The first step in this programme is the implementation of the project "Further decisions on 2-layer ZOAB")[1]. At the present time work is being carried out on the third generation of quiet road surfaces as successor to the project "Roads to the Future".

noise from vehicle and tyres

In order to tackle the noise nuisance caused by road traffic in built-up areas at the source it is necessary to reduce the noise produced by the engine and the exhaust. Achieving an international and effective approval method with accompanying limits is the approach to be used here. As well as this, ways will be sought to stimulate the purchase of quieter vehicles (naturally combined with clean and economical).

Noise reduction can be achieved by a change in the type of tyres used. This will require introduction of an environmental approval system in the short term and research into the possibilities of stimulating the use of quieter tyres financially. Attention must also be paid here to safety, European legislation and the costs of implementation. Further gains by tightening the noise limits in the European tyres directive are only to be expected in the long term.

Further noise reduction can be found in new vehicle concepts with the application of innovative axle configurations, different body models and new drive technology.

barriers

Noise barriers owe their effectiveness to the bend at the top of the barrier. Intelligent design of this top significantly increases the effect for the same barrier height, so that existing constructions need not be changed as far as the main structure is concerned.
The primary effort for improvement must be sought in the configuration and the choice of material to be used for the top of the barrier. The effect of the barrier will be further

[1] This project has been set up in close cooperation between Rijkswaterstaat (Directorate General for Public Works and Water Management), DGP and DGM (Directorate-General for Passenger Transport/Environment).

increased by application of anti-noise. However, the development and application of anti-noise is still in a relatively early stage and further research is necessary. It is not expected that there will be a widespread application of anti-noise before the next ten or twenty years.

At the present time noise barriers along roads are a considerable distance from the vehicles passing by. Reduction of this distance thereby increasing the effect of the barrier is possible by combining existing and new crash barriers with noise barriers. In the long term the effect of noise barriers can be increased further by new vehicle designs incorporating enclosed wheels.

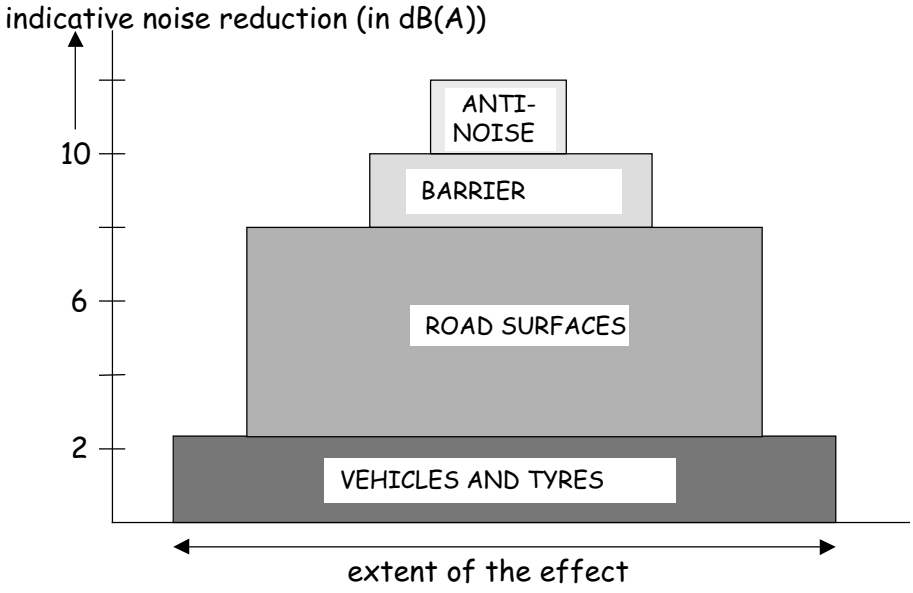


Figure 1 Indicative effects on noise of different measures and the extent of the effect

Figure 1 shows the estimated effects of the measures in dB(A) and an illustration of the spatial extent of the effect. Making the vehicle population quieter is a measure with a very wide impact because the noise reduction of the vehicle applies over the whole of the Netherlands. Quieter road surfaces have a greater effect in dB(A), but this effect operates over a much smaller area from a spatial point of view. The extent of the effect of a barrier is even smaller, since noise barriers can only be placed over relatively small distances.

2.4.2 The way to quiet or quieter traffic

The Innovative programme will be most effective with the following approach:
by tackling the most important components with practical measures in the short term;
at the same time by working on the development of measures for road surfaces, tyres and vehicles that will have an effect in the longer term.
The Innovation programme must also pay attention to the development of knowledge about quieter road surfaces, tyres and anti-noise in order to be able to support the development and practical implementation of these areas.

When a start is made in implementing a particular measure the full result is not achieved immediately. Some measures, such as the use of 2-layer ZOAB, do give rapid results. Others, such as the stimulation of the use of quieter tyres, will only realise a benefit in the long term. Figure 2 shows how this applies to the various measures.

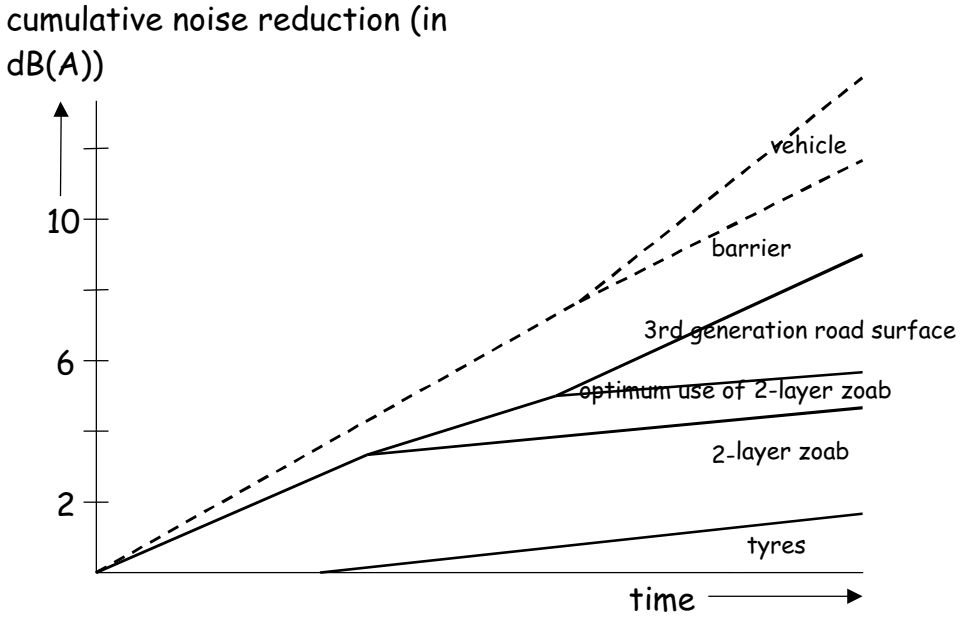


Figure 2 Indicative effects of noise measures over time

In order to achieve a significant reduction in the noise levels over time work must be carried out on all important aspects (road surfaces, tyres, vehicles, barriers). If the measures taken are finely tuned to each other it will be possible to achieve a reduction in noise levels of about 10 dB(A), for example, in 2010. This means that there will be a range of measures available for all the bottleneck situations allowing a reduction of 10 dB(A) to be achieved. The moment at which these effects can be achieved depends on the moment when the research and the implementation of the measures are started.

2.5 Rail traffic: implementation – innovation

The section of the Innovation programme for rail traffic aims at:
- implementation of available techniques
- developments of new noise measures

2.5.1 Background

At the present time the predominant source of noise from rail traffic is the rolling noise, the noise that is made because the wheels and rails are in interaction. Techniques to reduce this noise are already partly available. However, in practice it is apparent that transport operators do not modify their noisy rolling stock, even if these measures are more cost effective than sound barriers. The separation between exploitation[2] and management[3] of the rail network has a disadvantage effect here. Transport operators have little direct interest in investing in measures to make their rolling stock quieter, because the national and local government bears the full costs of providing higher noise barriers. However, government is becoming less prepared to do this. The present impasse can be broken by giving government more grip on the application of measures to combat noise.

It is also necessary to carry out trial projects so that an inventory of possible technical problems can be prepared and solved. These projects will in particular be aimed at measures to be taken to rolling stock that are already available. A further noise reduction will be required in the long term, both for the infrastructure and the rolling stock after these phase 1 projects have been completed. This will be carried out in phase 2. Finally, phase 3 will attempt to make the combination of rolling stock and track even quieter.

2.5.2 The way to quieter rail traffic

Two main ways in which the Innovation programme should be developed have become clear after processing all rail ideas:

- the technical line: this is aimed at the development of a new generation of noise reduction measures, at removing technical obstacles for the application of these and on trail projects in which the measures will be introduced on a limited scale, but as a permanent feature, to actual Netherlands rail traffic;
- the implementation stimulation line: this is aimed at stimulating the large-scale application of the measures developed in the technical line.

These two main lines of the Innovation programme are aimed at ‘standard’ trains running on ‘standard’ track so that the large-scale national problem can be tackled. Locally, engineering works such as bridges and viaducts, can, however, significantly spoil the quality of life for large numbers of people and these problems will be tackled in a branch of the programme.

the implementation stimulation line with ‘stick and carrot and consultation’

A range of measures will be developed in the implementation stimulation line to stimulate the large-scale implementation of measures to tackle noise production at the source. Part of this will be to provide government with the powers to restrict the freedom of movement of noisy rolling stock and to apply these powers. The system will be one of the stick and the carrot. By this is meant rewarding the use of quieter rolling stock, for example by lower charges for use of the system and priority when allocating capacity, while using enforcement measures, such as strict noise limits for allowing rolling stock onto the network, banning noisy rolling stock at particular times or from particular routes or from using particular railway yards.

Alongside this, consultation between the national government and the transport operators will be stimulated from the Innovation programme. The aim of this is to make agreements about the implementation of measures to combat noise at the source on the basis of consensus. These agreements can be laid down by the parties in a covenant or in the form of concessions or performance contracts in which the government and the transport operators can also incorporate many other agreements. The recent declaration of intent by the parties

[2] by NS Reizigers, Railion and other transport operators
[3] by Railinfrabeheer

operating on the Netherlands railway system regarding attempts to reduce noise levels is a promising outlook for the readiness of these parties to make agreements with the national government.

the technical line'balanced and coherent'
The technical line consists of a programme that is constructed from a carefully selected set of measures, varying from measures that are in the initial phase of technological development to measures that are already almost fully developed. The chance of technical success, cost effectiveness and practical feasibility were considered when selecting the most promising measures. Carrying out the programme will gradually lead to a new range of noise reduction measures becoming available. The various measures can be applied separately but also supplement each other. The order in the programme has been well-thought out. The measures will be investigated and implemented in three phases. Each successive phase is one step further than its predecessor and is often only effective if the previous measures have already been applied. In this way the process will work towards an arsenal of technical measures which combined will result in a noise reduction of about 18 dB(A)[4].

The backbone of the programme is a simple system of noise classification for railway rolling stock (see Figure 3). Preparations are also being made within Europe to classify railway noise in classes in this way. Each of the three phases of the Innovation programme results in the noise from a passing train moving into a quieter noise class.

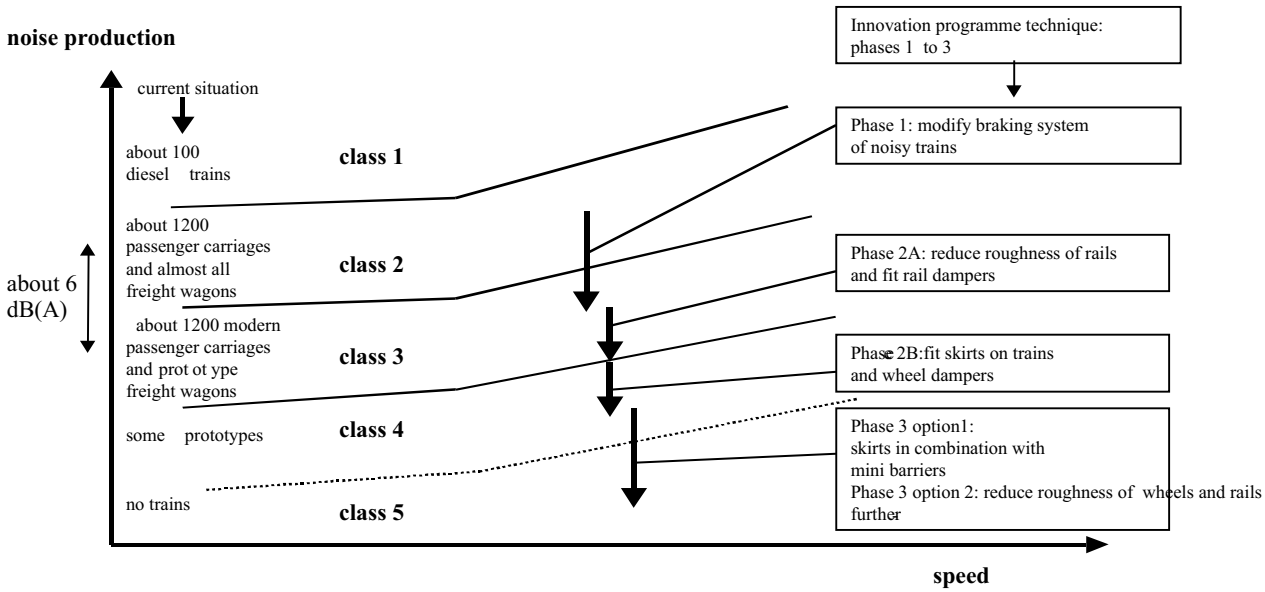


Figure 3 Noise classes of railway noise and the structure of the Innovation programme

[4] This reduction is relative to a train that is fitted with cast iron brake blocks riding on standard rails laid using concrete sleepers in ballast.

Phase 1
The approach to railway noise begins with tackling the noisy passenger and freight trains from noise class 2. These are the trains that use cast iron brake blocks on the rims of the wheels. A relatively simple modification to the braking system will move these trains[5] into the quieter noise class 3. As far as technical certainty, cost effectiveness, acoustic effect and practicality are concerned, this measure is far ahead of all the others. The Innovation programme provides for pilot projects whereby the modification will be tried out on a few passenger carriages and freight wagons first. After that the implementation programme will result in the modification of all national passenger trains fitted with cast iron brake blocks in order to reduce the noise they cause. Measures taken on the rails themselves have no point at this stage.

Phase 2
After carrying out the measure from Phase 1 the rails and the rolling stock will contribute equally to the production of noise. In order to further reduce the noise the rails as well as the rolling stock must, therefore, be tackled. Phase 2 is aimed at modifications to both the rails and the rolling stock to reduce the noise produced by a moving train to noise class 4.
The measures that will be implemented to the rails (Phase 2A) are technically already well developed. These are rail dampers and the reduction of the roughness. The last measure in particular only has effect on trains that are already in noise class 3. Measures to be taken on the rolling stock (Phase 2B) consist of fitting wheel dampers and screening the wheels by fitting skirts to the train.

Phase 3
Phase 3 is the most ambitious phase. In this phase an attempt will be made to make a combination of train and rails from noise class 4 even quieter. Again, this will only be possible in this phase by carrying out measures to both the rolling stock and the rails. The first option is to further reduce the roughness of the wheels and rails (possibly in combination with laser cladding). The durability of the reduction in the roughness is of great importance here. The second option is the development of skirts for the trains that fit very closely to mini barriers next to the track. At this stage there is considerable technical uncertainty about both options so that the Innovation programme will concentrate on both of them.

2.5.3 Engineering works: ballastless rail constructions and steel bridges

Constructions without ballast are used regularly on concrete engineering works and for light rail. Because there is no ballast to absorb the noise these often produce a great deal more noise than a standard track laid in ballast. The Innovation programme pays attention to possible ways of making ballastless constructions quieter and aims to carry out a practical test in combination with the mini barriers and skirts from Phase 3.

The noise from steel rail bridges is experienced locally as extremely annoying. These local nuisances hardly figure in calculations made in various models, however. This is largely because the low tones, such as the deep rumbling noise from a steel railway bridge, are strongly reduced by the A weighting factor. As well as this, the spread of the noise from the bridge to the surrounding areas at greater distances is sometimes underestimated. In practice, parts of villages, such as Culemborg, Westervoort and Hedel, experience significant nuisance from the large steel railway bridges over the rivers while the legislation applying would appear to give no reason for making these bridges quieter.

[5] An implementation programme is at present being undertaken in Switzerland whereby this modification is being made to all national trains. (See Lit.2).

The Innovation programme aims to extend the existing set of noise reducing measures for steel bridges with a new technique. This technique consists of active damping and as well as possible higher noise reduction also has as advantage that the additional weight is less than that introduced by other measures.

2.5.4 No new research into improving noise barriers

Extensive research was carried out into increasing the effectivity of noise barriers along railways in the late nineteen-nineties. This research was given the title Euroécran and was carried out by the most important European railway companies and prominent research institutes. Euroécran did not result in a new shape for the barriers or the tops of these that had a higher effectivity than conventional barriers. The wonder barrier, a barrier that reduces noise by more decibels for the same height, was not discovered.

The railway section of the Innovation programme does not include new research into the effectivity of noise barriers. The reason for this is, on the one hand that the relevant knowledge and experience for railways is available from the Euroécran project, and on the other hand that the roads section of the Innovation programme does contain research into increasing the effectivity of barriers. The way in which this research will be carried out is such that the results can easily be converted to apply to rail traffic.

2.6 Railway yards: legislation – process – technology

The section of the Innovation programme for railway yards aims at:
- legislation
- the process in the railway yards
- technology

2.6.1 Background

The problem in railway yards is already great and urgent. Many railway yards do not have an environment permit or do not comply with the one they do have. In some cases this has led to a court case with a demand that the yard be shut. It is necessary to bring the activities that take place in the yard and the environment permit into agreement with each other to avoid inevitable closure. The problems of railway yards have already been registered and analysed in projects such as PRIL and dEMP[6]. It is apparent that innovation is particularly necessary in the areas of legislation, process and technology.

A great deal of importance is given to the design of two extremely quiet railway yards as examples within the Innovation programme. An overcapping, possibly partial, will form part of the design of one of these yards. Everything possible will be done in terms of the above three points in both yards to reduce the propagation of noise to the surrounding areas.

2.6.2 The way to quieter railway yards

Legislation
The following possibilities will be investigated within the aspect of legislation:
- together with the appropriate authorities investigate different ways of applying the present legislation, as described in "Assistance for dealing with industrial noise and issuing permits", so that there will be more room available for negotiation and reaching a consensus
- lay the basis for capacity management in railway yards and being able to confer the correct authority to the permit holder within the present Railways act

[6] The present work to reduce the noise from railway yards will continue as normal.

- Use the Infrafonds (Infrastructure fund) more widely and anchor subsidies.

The process
A great deal of noise reduction can be achieved by making changes to the way processes are carried out in railway yards. In the first instance the Innovation programme proposes pilots in which processes will be managed on the basis of noise. As a result of these it will be seen what can be achieved on a voluntary basis and what can be achieved by enforcement. RIB, Railned and the transport operators will be involved in the implementation of the possibilities that are available through the Railways Act.

Technology
A number of technical measures to make railway yards quieter are already available. It is emphasized that what is envisaged here are not noise barriers or overcapping but measures to be taken at the source of the noise. These are measures to be taken to prevent squealing at bends, fitting housings around compressors, changing the rail layout, providing supply in depot and improving welds and junctions. There are still no adequate technical solutions for some of the causes of squealing noises. The technical research in the framework of the Innovation programme will, therefore, concentrate in particular on these sources. This includes the reduction of noise when braking and when coupling wagons.

Example railway yards
All the possible technical, logistic, financial and legal aspects will be worked out for two example railway yards. When doing so there will naturally be a close relationship with the project dEMP.

One of these example railway yards will be a yard where no dangerous substances are handled. This yard will be close to or even in a town and cannot operate within the terms of the environment permit. A complete overcapping, including the possibility of building above the overcapping, will be worked out. As well as a solution with complete overcapping attention will also be paid to solutions with partial overcapping.

The second railway yard will also have problems with the permit. An option without overcapping will be worked out here but using all the other possibilities relative to technology, process and legislation.

Elements from both example railway yards will be applied in practice. It is possible that one of the example railway yards may be virtually completely constructed.

A manual “Layout of quiet railway yards” will be prepared on the basis of the results from the example railway yards.

2.7 Carrying out the Innovation programme

It is only natural that the organisations who carry out work on the roads and railway, that is Rijkswaterstaat and Railinfrabeheer, should be given a central role in carrying out the Innovation programme. Both are capable of carrying out the proposed projects and ensuring that this is done coherently. Rijkswaterstaat and Railinfrabeheer have an extensive network and know those parties in the market who would be interesting partners in implementing the programme. Apart from this, the management of knowledge that is specific to roads and railways forms part of the core activities of these organisations, so that they have an up to date oversight of the knowledge of how to quieten road and rail traffic respectively and are active in increasing that knowledge, both nationally and internationally. They can ensure that the new knowledge provided by the Innovation programme will not become splintered over various parties in the market but instead will be bundled, together with knowledge coming through other channels, and will remain readily available to all. Finally, it is Rijkswaterstaat and Railinfrabeheer who will have great influence in the future on the large-scale introduction of new technology and methods.

2.8 Points for attention and the risks

This report describes a balanced programme with innovations. Explicit attention has been paid to the risks that there might be in getting the measures implemented when setting up and carrying out the Innovation programme. The most important points for attention are described below. An estimate of the reduction in noise that could be achieved has been given in the previous paragraphs on the basis of current knowledge. These are provisional estimates. The risks and points for attention are included in the following points:

Europe

possibilities for subsidizing quieter technologies (tyres, road and rail vehicles); dossiers are not handled by the correct departments (DG Trade and DG Transport versus DG Environment);
limited input from the Netherlands;
interoperability principles block possible differentiation on the basis of noise emissions.

Own organisation(s)

costs and manpower (within the organisation);
continuity and priority for the programme from management and within the organisation;
someone good is needed who is freed of all other duties to push the project along;
existing regulations within the organisations carrying out the tasks (for example: regulations concerning crash barrier guide rails in RWS);
setting up and maintaining good cooperation between V&W, RWS and Railinfrabeheer as well as between V&W and VROM.

Business economics

resistance to extra costs and maintenance of quieter road surfaces;
resistance to extra costs for rail maintenance (grind more often and smoother);
financial side of subsidy regulations;
lack of quality standards;
influence of international industry (on tyres and vehicles);
patents (barrier tops, road surfaces, rail dampers);
insufficient willingness on the part of rail transport operators to carry out noise reduction to their rolling stock at a sufficient pace

Societal

social trends must be reversed (wide tyres);

safety aspects (tyres, road surfaces, rail dampers, plastic brake blocks);
the user does not have any advantage from quieter tyres;
actuators / speakers for anti-noise in barriers are very sensitive to vandalism (and the influence of the weather);
architectonic fitting of barriers into the existing situations;
view of the road user (crash barriers incorporating noise barriers).

3.3 Rail traffic

3.3.1 Introduction

Rail traffic projects have been grouped into four clusters:
Management of knowledge and facilities
The technical line for through rail traffic (divided into phases)
Railway yards
The line for the stimulation of implementation
Clusters 2 and 3 concentrate on making new techniques and ideas applicable to through rail traffic and railway yards respectively. The cluster of management of knowledge and facilities is concerned with bringing knowledge together and making this available as well as setting up and managing noise registration posts. The last cluster concerns projects to stimulate the large-scale introduction of new techniques and methods.

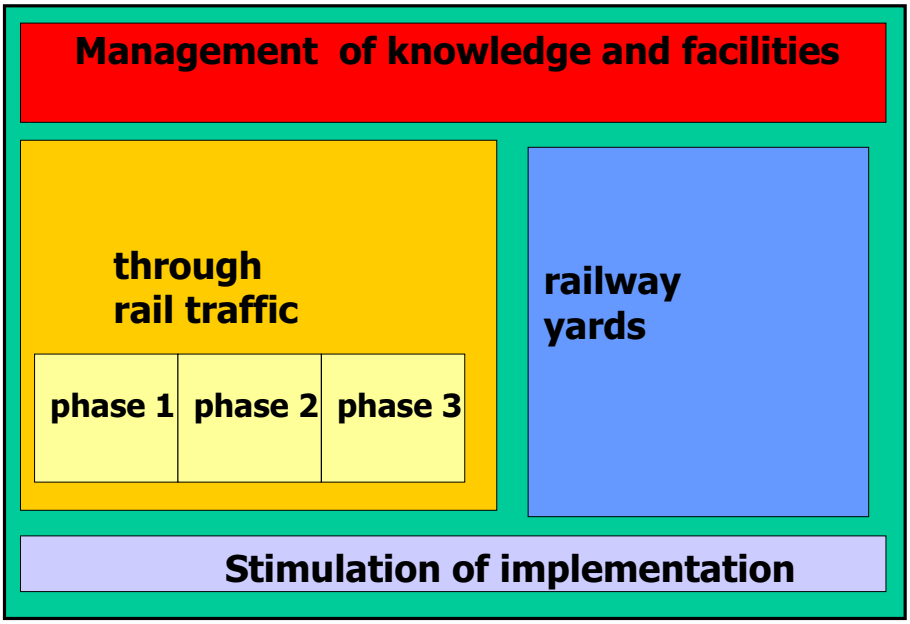


Figure 4: The four clusters for the Innovation programme for rail traffic

3.3.2 Noise reduction and priorities

In order to achieve the maximum noise reduction it is necessary to apply efforts to all parts. However, some parts will give a major reduction very quickly, while others require more time. The figure below shows the expected noise reduction to be achieved for through rail traffic in the short term and over a medium long term by implementation of the Innovation programme. By short term is meant a period of 2 years after the measures of a particular project are available for widespread application. Medium long term means that the measures are available for widespread implementation 3 to 5 years after starting the particular projects from the Innovation programme. The cut-off point between the short and medium long term for through rail traffic is after phase 2A. Phases 1 and 2A can, therefore lead to results within two years. The reductions shown in Figure 13 apply to a train with cast iron brake blocks riding on rails laid with concrete sleepers in ballast. The figure shows clearly how important a combined approach to both rail and rolling stock is.

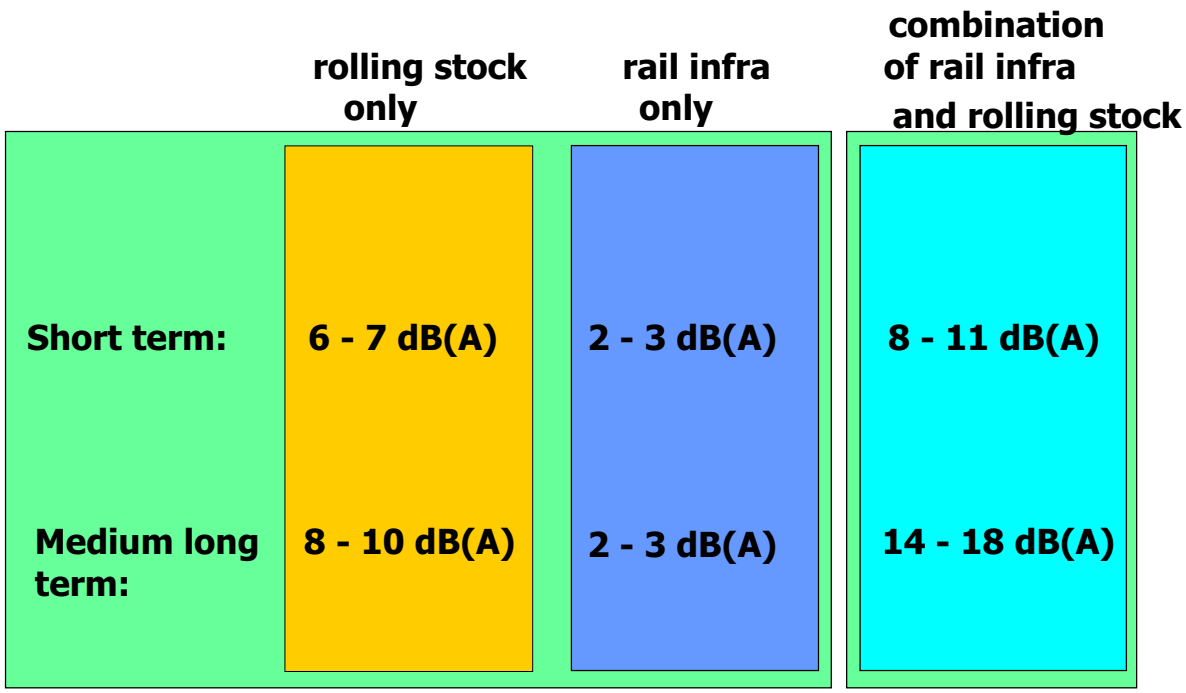


Figure 5 **Expected noise reductions relative to a freight train (or a passenger train with cast iron brake blocks) riding on a track constructed from sleepers in a bed of ballast**

If not all the necessary finance for the Innovation programme becomes available a choice must be made out of the proposed projects. Priorities can then be assigned to projects that:
1. lead to new, attractive and more cost effective solutions in the short term;
2. will not take place without this Innovation programme.

The projects from the Innovation programme for rail traffic are described in paragraph 3.4. The following projects can be distinguished as the most promising on the grounds of the above priorities:

1.1 Knowledge infrastructure
1.2 Registration of noise from permanent monitoring posts
2.1.1 Modification of braking systems on noisy passenger trains
2.1.2 Modification of braking systems on noisy freight trains
2.2.1 Rail dampers
2.2.2 Reduction of roughness of rails
3.1 Integral design of example railway yards
3.3 Research into how railway yards are experienced
3.4 Loc6400: ED braking to zero
4.1 Legislation
4.2 Capacity management
4.3 European lobby

This collection of projects is termed the minimum variant of the programme. All the projects described together form the maximum variant.

3.3.3 Financial paragraph

The table below shows the cost estimates for the various parts of the Innovation programme for rail traffic. The corresponding projects will be carried out over a period of about 4 years. The costs of the projects that have already been started in 2002 are included in the estimates. It will probably be necessary to carry out a further phase of research in order to completely realise the aims for the medium long term. The necessary extra budgetary costs for this are not included in the table.

Table 2 Financial overview of the maximum and minimum variants (to 2006)

part	**Phase**	**maximum variant budget (x €1,000)**	**minimum variant budget (x €1,000)**
1. knowledge management and facilities	-		
2. technical line for through rail traffic	1		
2. technical line for through rail traffic	2A		
2. technical line for through rail traffic	2B		
2. technical line for through rail traffic	3		
2. engineering works: rails without ballast and steel rail bridges	-		
3. railway yards	-		
4. stimulation of implementation	-		
programme management and PR	-		
unforeseen	-		
Total		70,410	21,020

3.4 The four clusters for rail traffic

The clusters mentioned in the introduction are shown completed with their various parts in Figure 14. These are described further in this paragraph and some of the parts are further sub-divided into different projects.
The parts shown in the figure are further developed in 19 projects. These are shown in Figure 15. Projects that were identified in paragraph 3.3.2 as deserving of priority are printed in bold in this figure. Details per project are elaborated in complete project plans that are included as appendices.

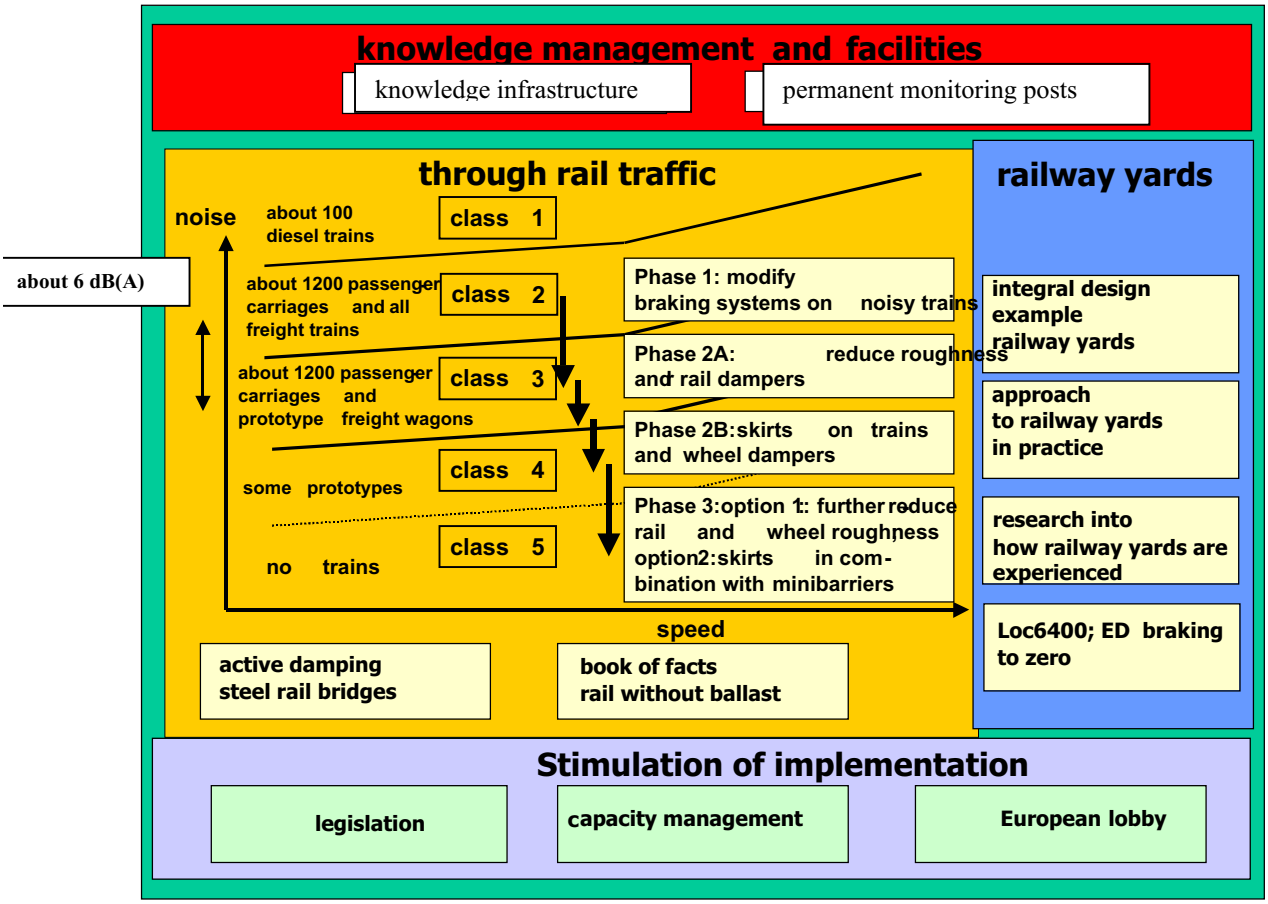


Figure 14: The sections within the four clusters

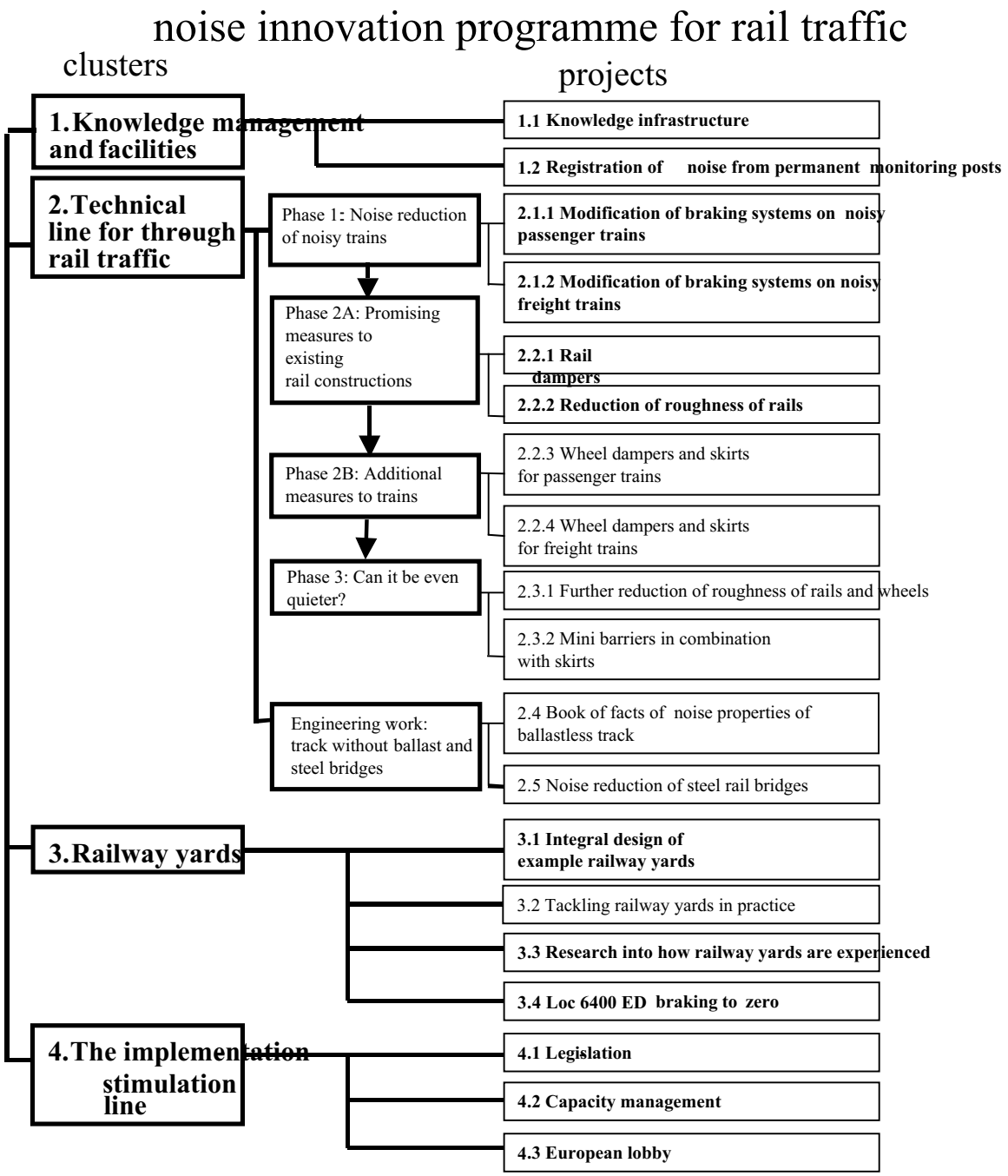


Figure 15: the 19 projects of the Innovation programme for rail

3.4.1 Knowledge management and facilities

3.4.1.1 Knowledge management (project 1.1)

Knowledge management organises the experiences, knowledge and results that come available from the other parts of the Innovation programme and analyses these in relation to each other and knowledge that is already present. The most important results of this part are:
to bundle the infrastructure required to manage knowledge and results easily so that this is accessible and available for sharing with others;

to make insights and practical experiences obtained both within the Innovation programme and from parallel R&D programmes widely available and to exchange these;
to exchange knowledge with the parties implementing the road traffic part of this Innovation programme;
to exchange knowledge with parties abroad.

3.4.1.2 Registration of noise from permanent measurement posts (project 1.2)

Gathering objective factual material in the form of long-term registration of the noise caused by rail traffic is an essential part of the Innovation programme. Instead of registering incidental situations the monitoring posts will register the development of the noise produced by rail traffic over a long period. In the first place, these facts will be an important supplement to the factual measurements obtained within these projects. The registrations are also of great importance in research into the relationship between maintenance methods and the production of noise. It must be prevented, for instance, that trains that have been modified, are allowed to lapse into noisier classes again because of poor maintenance. The posts will also play an important part in relation to the noise classification and noise use regulations that the project capacity management (project 3.2) aims to introduce. They will be the means of registering the actual noise produced by the rolling stock used by the transport operator. The monitoring posts will also register the progress of the large scale implementation of the measures to tackle noise at the source. Finally, the factual material supplied by the monitoring posts is necessary to determine the sustainability and size of the noise reduction achieved so that this can be taken into account when drafting legislation governing the methods of determining the noise produced by rail traffic.

3.4.2 The technical line for through rail traffic

3.4.2.1 Phase 1: Noise reduction of noisy trains (projects 2.1.1 and 2.1.2)

About half of the passenger trains at present in use on the Netherlands rail network and almost all of the freight wagons in use in Europe can be made about 7 dB(A) quieter with a relatively simple modification to the braking system. This measure is by far the best of all measures as far as cost effectiveness, technical practicality and noise reduction are concerned. For this reason a programme has been started in Switzerland to fit trains with different brake blocks, termed K blocks.

Switzerland
The Swiss government has started a programme to modify all the Swiss passenger and freight rolling stock and has set up a programme together with the railway companies to do this. The programme is now fully operational and will be completed in 2010. Civil servants from V&W and VROM inspected the Swiss noise reduction programme during a work visit[7]. The conclusion from this visit is that the Netherlands should copy this programme. An additional motivation for doing so is that K blocks are already in use on a large scale in the USA, Canada, Australia and South Africa.

[7] See the report "Workshop Railway Noise Switzerland, large-scale implementation of source measures on trains"; Lit.2.

A start will be made in projects 2.1.1 and 2.1.2 to fit some test trains with modified braking systems so that these can be tested by the transport operators under situations prevailing in the Netherlands. Project 2.1.1 is aimed at passenger trains and the part project 2.1.2 at one freight train at present. A programme for the conversion of all the noisy passenger rolling stock at present in use on the Netherlands rail network also forms part of project 2.1.1. The aim is that the parties concerned in executing this project will reach agreement in combination with project 4.1 about the execution of this project[8].

Research and measurements

Attention will be paid to typical railway technical aspects such as the braking power of the converted trains, braking characteristics of different types of train rolling stock, train detection, adhesion (because of safety) and reliability of operation. The availability of rolling stock when planning an execution programme will also receive attention.

The achieved noise reduction will be measured in two ways:

1. Measurements on the rolling stock during the conversion phase. This will give insight into the noise reduction achieved in the pilot trains and will be proof that the conversion has been successful. It is possible that equipment will be fitted on the trains for this. These measurements form part of the logistics of the conversion project and are therefore included in this project.
2. Noise measurements from permanent monitoring posts along the network are included as a separate project in the Innovation programme (see paragraph 3.4.1.2 project 1.2). Noise registrations from the permanent monitoring posts will be available for use in projects 2.1.1 and 2.1.2. However, they will also serve as objective factual material for the person in charge of these projects and will also play a role by inclusion of the trains with K blocks in the Calculation and Measurement Regulations for Rail Traffic Noise. The permanent monitoring posts will be universally usable and controlled by Railinfrabeheer. It is expected that these monitoring posts will continue to play an important part in the long term also by registering the progress of the large scale implementation of measures taken to tackle source noise in trains, for example. These posts will show whether the noise reduction achieved with the pilot trains is maintained in the long term, also in comparison with other train rolling stock. They will also provide insight into the effects of maintenance and will be available for different uses in the future.

On the basis of the successful Swiss conversion programme and the fact that plastic brake blocks have been in use abroad for decades, it is expected that application in the Netherlands will not cause problems. However, there are still points requiring extra attention. The points are described in the text block below. Should serious problems unexpectedly arise there are other ways of achieving the same amount of noise reduction. The cast iron brake blocks can be replaced by magnetic brakes operating on the rails or by disc brakes. These alternatives are a factor of 4 or 8 times more expensive than K blocks, but are still cost effective in comparison to sound barriers. It is also possible that as technology continues to advance new alternatives for cast iron brake blocks will become available in the short term that are more attractive than K blocks. This could be the perfection of the anti-blocking system (ABI) on trains whereby the brake blocks are simply an additional braking system (such as the ICM and the IRM). This could mean that the brake block would no longer be necessary at all. It is, however, not desirable to have to wait for the development of new technology with the result that the implementation of the programme would experience delays.

[8] The execution of this modification programme can continue up to five years after this Innovation programme.

Points requiring special attention when using K blocks
During lengthy heavy braking on mountain slopes, for example, the K block causes higher temperatures in the wheel bands than the present cast iron blocks and this can lead to cracks in the wheel bands. The Swiss programme, therefore, involves changing the wheel bands as well as the brake blocks. The alternative wheel bands are more resistant to higher temperatures. The Swiss experts think that it will not be strictly necessary to replace the wheel bands in the relatively flat Netherlands situation but this requires further research. There is also uncertainty about the performance of K blocks when braking at very low temperatures and in powder snow. Some of those involved are also concerned about train detection. However, many of these uncertainties also occur when using cast iron blocks and are dealt with by operational measures. This is why the Swiss have continued with the programme of conversion to K blocks (see Lit.2). If the nature and extent of these limitations of the K blocks is known then they can be accommodated by operational measures. It is also a fact that trains fitted with K blocks have already been in use in the USA, Australia and South Africa for many decades. The reason for this is actually the cost saving in comparison with the use of cast iron blocks. The UIC (International Union of Railways, European Railways Organisation) has recently authorised the use of K blocks in freight wagons for cross-border traffic for a period of three years.

At the end of the pilot conversion period it must be ensured that there is not a lapse into the application of noisy technology when new train series and types are taken into service after implementation of the Innovation programme. This does not appear to be very likely but is not unthinkable. For this reason there is a strong relationship with projects involving legislation and capacity management (4.1 and 4.2) and with the permanent noise monitoring posts (project 1.2).

3.4.2.2 Phase 2: Promising measures to existing railway constructions and additional measures to trains

Phase 2 is aimed at follow-up measures that will be useful after the introduction of measures from Phase 1. In order to achieve a significant reduction in noise in this phase it is necessary to tackle both the rails and the rolling stock. The phase will start with tackling the rail constructions (phase 2A) because these measures are already in an advanced state of technical development. It is expected that a reduction of between 2 and 4 dB(A) will be possible. Even if this reduction is relatively small it is still an interesting measure to take in order to be able to keep the expected growth in rail traffic operating within the noise ceilings. The measures from Phase 2B to the rolling stock will also be needed, however, to achieve a quieter class. The total noise reduction in Phase 2 then comes to between 5 and 8 dB(A).

3.4.2.3 Phase 2A: Quieter rail infrastructure (projects 2.2.1 and 2.2.2)

The standard railway track in the Netherlands consists of rails fitted to monoblock concrete sleepers in ballast. A particular type of foundation is used for this. This construction is quieter than almost all other track constructions available at present so that it is not easy to make it even quieter. Two measures are being considered, namely rail dampers and reduction of the rail roughness by grinding.

Rail dampers can be applied to the existing railway construction (project 2.2.1). Tests abroad and simulation in the Netherlands have shown that a reduction of about 2 to 3 dB(A) should be attainable. The other measure, reducing the roughness of the rails even further, project 2.2.2, will be carried out by grinding the rails even smoother using a special technique. The development of a monitoring system to show when and where grinding is required forms part of the project. The monitoring system will ensure that the reduced level of roughness is maintained.

Reducing the roughness of the rails only has a noise reduction effect for trains in which the roughness of the wheels is already low, so has no effect on the present rolling stock with cast iron brake blocks. Grinding will only be effective, therefore, when Phase 1 of the Innovation programme has been implemented or along lengths of track where only rolling stock with smooth wheels is used. Projects 4.1 and 4.2 are aimed at being able to ban rolling stock that has not yet been converted, for example, on tracks that have deliberately been maintained in a very low roughness condition.

3.4.2.4 Phase 2B: Additional noise measures on trains (projects 2.2.3 and 2.2.4)

This phase will be used to determine whether trains with converted braking systems from Phase 1 can be made even quieter by simple means. Experiments have been carried out with wheel dampers and skirts in the past, but the noise reduction effects of these were not spectacular. However, further research into these measures will be carried out in Phase 2B. There are two reasons for this:

A small effect of about 2 dB(A) is not spectacular but from the point of view of a legal system with noise production ceilings and more efficient use of the railways this can certainly still be attractive. For example, 60% more traffic is possible within this 2 dB(A).

The measurements made in the past on the effectiveness of wheel dampers and skirts took place on railway constructions that made a relatively large contribution to the noise propagated. The effect of wheel dampers and skirts in combination with the quieter railway construction from Phase 2A will probably be greater.

The skirts and wheel dampers will be fitted to one of the pilot passenger trains from project 2.1.1 and on a number of the wagons from the pilot freight train from project 2.1.2. A choice of wheel dampers is expected to be made from those present on offer in the market, possibly with minor modifications to provide optimum damping effects for the type of wheel concerned[9]. A skirt will probably have to be custom designed for the particular train wagon. It is possible that attention will also be paid to skirts fitted to the axle or the wheel rather than attached to the train itself in this phase.

3.4.2.5 Phase 3: Can it be even quieter? (projects 2.3.1 and 2.3.2)

This phase aims at making rail traffic even quieter after the measures from the following phases have been implemented. Two approaches will be researched:

1. A further reduction in the roughness of wheels and rails;
2. Closing off the track and wheels by constructing mini barriers along the track that fit to the skirts on the trains.

These are measures for which the necessary fundamental research still has to be carried out. Some background information is given in the text blocks below.

[9] The bound wheels in common use in the Netherlands may require a different solution to the available wheel dampers that are mostly designed for full wheels.

Further reduction of the roughness
About 4 to 6 dB(A) lower noise levels are usually found when approving types of disc braked passenger trains than is found with the same trains after the wheels have been in use for some time in normal service. Clearly the wheels and track are in prime condition during the approval tests. Research will, therefore, be directed at how to maintain this prime condition for as long as possible. One possibility may be the use of rail brakes and electrodynamic braking (on the engine). There is still not enough known about the effect of rail braking on the roughness of the rails. It is also possible that a different maintenance technique or the large scale use of hardened running surfaces (both on the wheel and the top of the rail) could achieve a great deal. A running surface can be hardened by melting the surface or rolling in other material (laser cladding).
The processes that result in roughening of the rails can also be investigated and it may be possible that by changing these the necessity for regular grinding can be reduced or avoided altogether.

Mini barriers and skirts
Closing off the track and the wheels by a combination of mini barriers along the track and skirts on the train will be difficult to achieve within the technical conditions applying to free-lying tracks in the Netherlands and Europe. Therefore, a light rail connection, that may still have to be constructed, will be chosen for this project. This choice provides more freedom for the integral design of rail infrastructure with mini barriers and rolling stock with skirts. In light rail projects the rolling stock and infrastructure are very often in the hands of the same organisation which offers advantages for the realisation of an integral design. As well as this, there will be a need for measures to be taken at the source of the noise because of the high frequency of the trains and the highly built-up environment.

3.4.2.6 Rail constructions without ballast (project 2.4)

Concrete sleepers in a bed of ballast is one of the quietest rail constructions at present available. This construction is in standard use by Railinfrabeheer and it does not appear likely, at least for the foreseeable future, that constructions without ballast will be used on the existing Netherlands railway network on a large scale. The Innovation programme does pay attention to constructions without ballast, though, because they can provide significant advantages from a rail maintenance point of view and it must not be ruled out that there could be a change of policy towards the use of ballast in the future. Some constructions without ballast are used at present in particular situations, such as concrete bridges and viaducts, because of the lower construction height required, and constructions without ballast are often chosen for metro and fast tram connections. The HSL-Zuid will also be constructed almost entirely without the use of ballast. A great deal of attention will be paid to noise reduction in this project so that the ballastless track will not be any noisier than a track laid in ballast. This is necessary because standard ballastless rail track in practice generally makes more noise than one with a bed of ballast. If insufficient attention is paid to noise reduction at the design stage a construction without ballast can create up to 8 dB(A) more noise than a traditional track laid in ballast.

The Innovation programme devotes attention to ballastless tracks in project 2.4. The aim of this project is to provide clarity about the noise properties of existing ballastless constructions in practice. The basis for this will be an objective list with factual material gathered from noise measurements on ballastless constructions in use both at home and abroad. The final product will be a book of the factual noise properties of ballastless rail track. This book can provide decision makers on rail projects with the correct information when taking decisions about the possible use of ballastless constructions. The book will also ensure that the facts are fully available if a change to the widespread use of ballastless constructions should be considered. A possible follow up project could then be started to deal with the necessary acoustic improvements. A test section of rail, on which different constructions could be tested rapidly and effectively, would be very desirable for this.

The possibility exists within project 2.3.2 (mini barriers and skirts) to design a low noise ballastless construction at the same time as the integral design for the use of mini barriers and skirts. This is because light rail constructions are often designed without the use of ballast. The book of facts will be a useful aid here.

3.4.2.7 Measures to steel bridges (project 2.5)

Steel railway bridges often cause a great deal of local noise nuisance. Constructions for short spans have been developed that are almost as quiet as a normal earth track. Low noise designs are available from amongst others the “Stichting stille bruggen" (Society for quiet bridges). Railinfrabeheer has developed measures for existing bridges with long spans such as a softer bed for the track (in combination with rail silencing), cast rails and sandwich damping. There are two reasons for researching the applicability of new measures to steel bridges:

the noise reduction achieved by the existing measures is limited; in general the bridge noise remains a dominant feature in the surrounding area;

the available measures cannot always be applied well to existing bridges; existing bridges cannot always take the extra weight necessary.

A solution may be possible by applying active damping to the bridge. This is a technique that is similar to anti-noise. It is expected that the noise reduction achieved can be greater but the additional weight lower relative to existing methods. The feasibility of this technology will be investigated in this project.

3.4.3 Railway yards

3.4.3.1 Integral design of example railway yards (project 3.1)

Some example railway yards will be designed from scratch from the drawing table upwards. The intention is that the existing customs and regulations are to be ignored as far as possible so that completely new types of solutions can be given a chance. The choice for example railway yards has been made because this allows the visualization of the results of combining measures in one package. Solutions for the complex problems are only possible by taking all sources of noise into consideration both technically and as a process in an integrated approach. The individual effects of most of the measures to combat noise are already known (see the summary lists of this Innovation programme for example). Trains with dangerous substances will also be used in one of these railway yards. The example railway yards have been selected according to geographical situation and the user functions and are derived from a combination of practical situations where there is a major noise problem. Choices can be made in defining the example railway yards whereby the functionality is restricted to just a few types of train, for example, or to a few specific processes. The question as to what you should be able to do in a particular railway yard and what not forms an essential part of the study. Naturally, the example railway yards must be able to function within the Netherlands railway system and it is in fact the intention that they are based on actual situations.

The project will be split into a number of phases. During the definition phase of the project the parties involved (Railned, Railion, NS Reizigers, NS Internationaal, NS Vastgoed and possibly other transport operators) will determine the framework for the example railway yards under the direction of Railinfrabeheer. This phase involves the close cooperation of experts from the above parties in a multi-disciplinary project team under expert leadership. As far as possible, existing patterns and habits will be avoided just as in the further continuation of the project. In this stage it is important that the parties also work on backing, support and understanding. This process continues during the following phases of the project.

The following phase is that of the design in which as many as possible existing and immediately available solutions will be applied in new combinations and in a new perspective. The traditional physical and logistical layout of railway yards will also be abandoned during the design phase and the designs must lead to completely worked out solutions for the present noise problems.
Designing a complete or partial overcapping forms part of the study for the example railway yards in which dangerous substances are not to be handled. This overcapping can also be used for other purposes. The financial aspects of this, such as building construction on the overcapping and the exploitation of this, will be clarified here. Logistics as well as the technology, in combination with the arrangement of the processes to take place, will receive particular attention. The design is intended to be complete, that is all aspects will be worked out to the level of a provisional design. Sketches and estimates of costs form part of the design to be supplied. The use of the available space naturally plays an important part in the cost aspects, including alternatives for the space not required by the railway yard itself. Aspects of safety and costs play a role in the design process alongside those of noise reduction.

A confrontation with the present regulations and standards will follow after the design phase. This will provide insight into the restrictions on achieving attractive solutions caused by these regulations. An analysis will be carried out after this confrontation and choices made. The designs will be completed on the basis of this. The designs supplied are to be modular so that it will be possible to apply separate attractive components easily in practice.

After the definition phase consideration may be given to awarding some multi-disciplinary consultants (or a consortia of specialised consultants) an identical order to supply an innovative design for a low noise railway yard. This will create a competitive environment and a wider range of solutions.

3.4.3.2 Tackling a railway yard in practice (project 3.2)

The results from project 3.1 will be used to determine which components can be applied to a railway yard where there is a major noise problem. It may be that one complete example railway yard will be constructed. The chosen design or the chosen components will be developed into a definite design and specifications, followed by tendering for the construction. The effect will be evaluated thereafter.

3.4.3.3 Research into how railway yards are experienced (project 3.3)

Railway yards are regarded in the legislation as industrial premises so that the same priority noise limits as for industrial noise apply. In practice this leads to major bottlenecks. Less strong limits apply to the noise produced by passing rail traffic, for one reason because the noise of through rail traffic is experienced as less of a nuisance. The layout of railway yards on industrial sites is not, however, based on research into the amount of nuisance caused by the noise from the yard. How this noise is experienced will be investigated in this project. The results of this will show whether it is realistic from a nuisance point of view to bring the limits for noise from railway yards in line with those for through rail traffic.

A number of groups of people living close to railways and who are subject to comparable noise levels but where the source of the noise differs will be selected. Research will be carried out to find out whether noise from railway yards is experienced as more of a nuisance than that from a normal railway producing the same levels of noise. In particular, the study will concentrate on the differences in nuisance caused by continuous or near continuous noise and peak noise. As well as this, the relationship with noise from the free-lying track, that is also an important source of noise in the neighbourhood of a railway yard, will also be investigated.

3.4.3.4 Loc6400: ED brakes to zero (project 3.4)

Peak noises are a difficult part of the noise caused by railway yards. One of these peak noises is the squealing of brake blocks just before a train stops. The type 6400 locomotives are used in railway yards for shunting purposes and this brake squealing is, therefore, a very common occurrence. By carrying out a modification to the braking system of these locomotives it is possible to stop by using the electrodynamic brake (the ED brake) and thus avoid the brake squeal. The brake blocks are then only used as parking brake and for an emergency stop. This project entails the modification of all the type 6400 locomotives (about 120).

3.4.4 The implementation stimulation line

Three projects are defined in this cluster of dealing with railway noise. These are aimed at legislation, capacity management and influencing legislation, and agreements about railways at the European level.

3.4.4.1 Legislation (project 4.1)

The present legislation will probably be reviewed in its entirety. First of all there will be a new Railways Act at national level. This act regulates the authority and responsibilities of parties involved with the railway and forms the framework within which capacity management is applied if there is limited environmental capacity. It is possible that the Noise Nuisance Act will also be reviewed under the regime of MIG (Instruments for the modernisation of policy towards noise) to give municipalities more authority. Noise production ceilings will be established for through rail traffic (and possibly also for railway yards). The way in which these will be enforced is at present uncertain. Finally, new regulations concerning noise are expected from the European Union. There may well be noise emission limits values with permit requirements. This means that the system of international access to railways and rolling stock through UIC fiches will be partly superseded also.

An investigation will be made in this project as to what elements in the new legislation will be regulated differently to in the existing legislation and how the various initiatives will interact with each other. Where possible the legislation will be modified and directed. What possibilities there will be for forcing and stimulating parties to tackle noise reduction at source will be investigated. As far as this is concerned the recent declaration of intent from the task organisations and the transport operators NS Reizigers and Railion means that there is a big chance of achieving progress voluntarily. An investigation will be made as to which subsidy arrangements from the national government are likely to have the desired effect. An investigation will also be made as to how minimum noise requirements at national level could be phrased for permitting the use of railway rolling stock and what the legal consequences of this would be, for example in concessions for regional or national lines.

This project has a close relationship with the project for capacity management (4.2).

3.4.4.2 Capacity management (project 4.2)

Capacity management in terms of noise reduction can provide a solution to exceeding noise standards. Effective capacity management can prevent excess noise from resulting in too little capacity. This applies both within the present and future legislation. The role of the capacity manager, both in the railway yard and free-lying track, is crucial for maintaining noise limits and stimulating noise control at the source.

The aim of this project is to bring into operation a system of acoustic permit levels maintained by the capacity manager of the railway network. An integral system of capacity management will be the aim, whereby account is taken not only of noise, but also of the traditional aspects that determine capacity, such as the physical limitations of the track, including the aspect of external safety.

Two components are required for noise capacity management:

1. An objective and efficient system for classifying trains on the basis of their noise characteristics.
2. Noise use regulations that can be maintained by allocation. These regulations will result in certain cases in trains that produce a large amount of noise having less rights to the use of the infrastructure capacity.

A classification system will be established within the project. The monitoring posts from project 1.2 may have a role to play here. At the same time a starting date for the application of noise use regulations will be established and there will be intensive consultation with the transport operators so that they will be able to prepare in good time for the introduction of these noise use regulations. Being able to ban noisy trains on certain routes and at certain times after due consideration is one of the aims of this project.

The existing and future legislation, both national and European, form important conditions for this project, but this project will also expose those issues that are not well organised. This last forms the input for project 4.1 (Legislation).

3.4.4.3 European lobby (project 4.3)

The national noise policy for railways is strongly dependent on what happens at the European level. The Netherlands policy can experience long delays if Europe does not also move at the same time. European restrictions are not only thrown up by the European Commission, but also by agreements that railway transport operators (and in the future, possibly also infrastructure managers) make with each other. In this respect, it has been extremely difficult to get measures that international research has shown to be effective, accepted and applied internationally.

Within this project work will be carried out on achieving consensus at the European level about the line to be followed and the way in which the aims can be achieved. A coherent set of decisions need to be taken by the countries and organisations involved on the basis of this. Other countries (Switzerland, Germany) also have a strong national interest here. Much should be possible to be achieved in this respect by directed lobbying by representatives of VROM and V&W. It is important to build up an international network of like-minded, influential key figures at the same time. If the Netherlands, and possibly Switzerland, have already arranged a great deal nationally it will be possible for the Netherlands to act as an example and fulfil a pioneer's role. Important elements at the European level are:

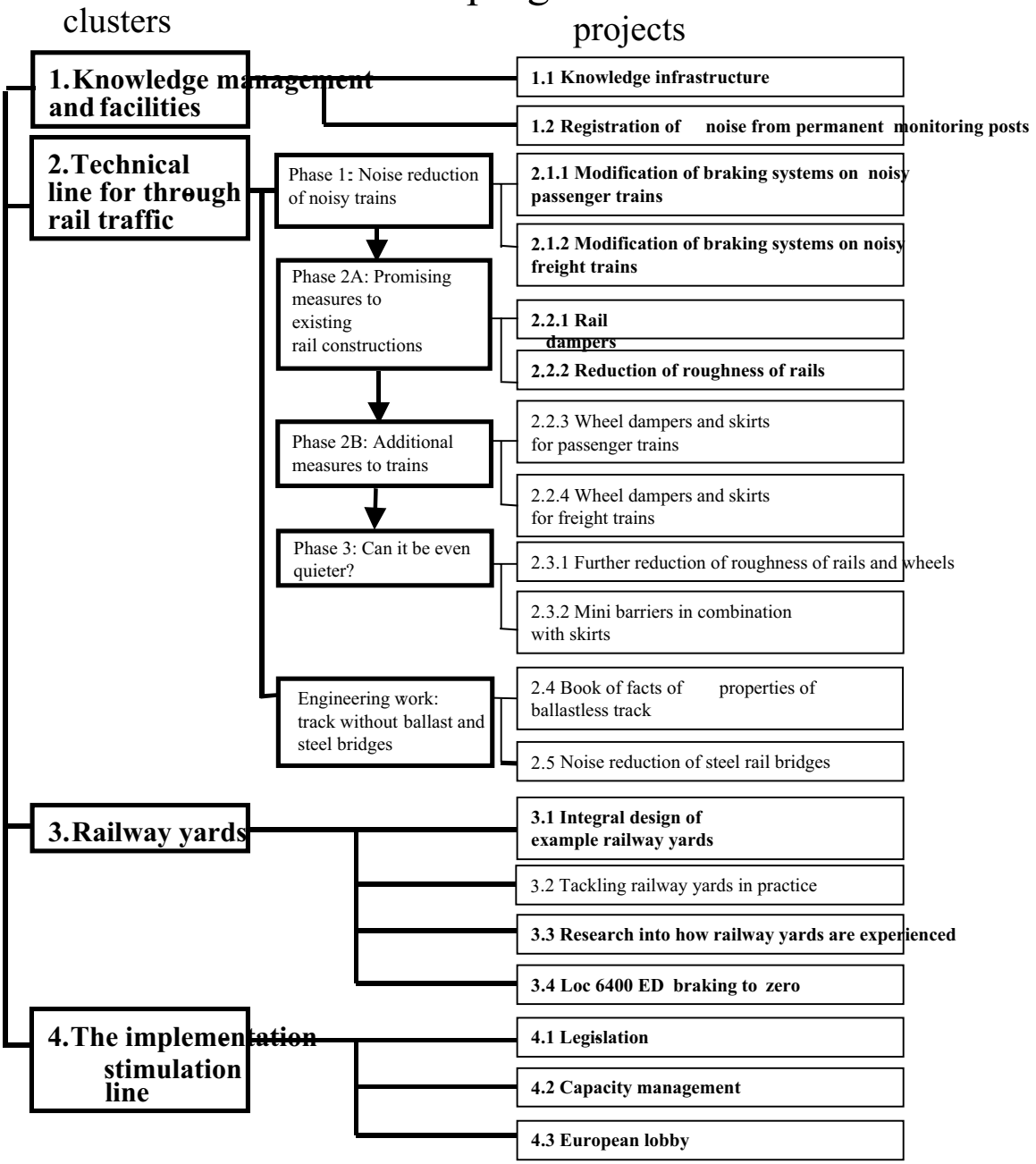
- EU directives about surrounding area noise (noise maps and action plans); evaluation of the source policy (ex. article 10) from this directive (see also the programme for road traffic) provides a chance for establishing sub-directives for sources of noise;
- EU directives regarding tolls and the allocation of capacity;
- EU directive on interoperability;
- realisation of TSIs with noise requirements for rolling stock
- the UIC action programme for reducing the noise caused by European freight wagons.

PROJECT PLANS FOR RAIL TRAFFIC

Noise Innovation programme

overview of projects for rail traffic

noise innovation programme for rail traffic



Knowledge management and facilities

Noise Innovation programme

Project 1.1: Knowledge infrastructure

name of project:	**forms part of cluster:**	**number/version:**
Knowledge infrastructure	Knowledge management and facilities	project 1.1 May 2002

aim:

To make developed and existing knowledge readily and simply available in order to meet the aims of the IPG; to have an information system available in which up to date and relevant information is readily accessible.

by order of:	**contractor:**	**parties with relevant knowledge include**
Ministry of Transport, Public Works and Water Management	Railinfrabeheer	

project parts:

Development of technical tools

Technical tools will be used to collect, manage and bundle knowledge and to make this readily accessible. The systems will be designed to fit existing knowledge management systems and the systems that are already in use by the organisation charged with carrying out the knowledge management as closely as possible. It is possible that the Internet will play a part.

Carrying out knowledge management

The knowledge manager will collect and bundle all relevant knowledge that is available within the Innovation programme and combine this with the present knowledge and knowledge that becomes available from other projects. As well as this the knowledge manager will ensure that this knowledge is easily accessible by third parties.

Exchanging knowledge

The communication of IPG knowledge developments with national and international railway experts and acoustic experts will take place through newsletters, possibly an internet site, and by participation in and organisation of conferences. The project will also involve taking part in the setting up of a platform for the exchange of information and strategies for the various Dutch representatives and government organisations in an international context in the area of noise policy and legislation as described in project 1.1 for the road section. Special attention will be paid to the exchange of knowledge with the person dealing with knowledge management for road traffic.

project part:	**planning:**	**estimated costs:**	**status**
TOTAL	2002 - 2006		
technical tools	2002 - 2006		
carrying out knowledge management	2002 - 2006		
exchanging knowledge	2002 - 2006		

expected effects on other policy areas

The National Platform will have strong links with other policy areas.

relation with other projects in the Innovation programme:	**relation with programmes and projects outside of the Innovation programme**
All projects	All relevant knowledge development Knowledge Centre Noise (Rotterdam Rijnmond)
international component	**risks, impediments, problems with implementation**
Communication with the international science field is one	Limited use of project results can hinder the optimal exchange of knowledge in an outside the IPG; policy with regard to

of the most important points of this project.	contracts must include the free use of results and exchange of developments of knowledge. The exchange of knowledge between road and rail projects must be explicitly regulated.

Project 1.2: Registration of noise from trains from permanent monitoring posts

name of project:	**forms part of cluster:**	**number/version:**
Registration of noise from trains from permanent monitoring posts	Knowledge management and facilities	project 1.2 May 2002

aim:

The registration of the development of the noise from rail traffic over time at five specific locations in the Netherlands. The monitoring post must be capable of recognizing and registering the relevant train types and the pilot train separately.

by order of:	**contractor:**	**parties with relevant knowledge include**
Ministry of Transport, Public Works and Water Management	Railinfrabeheer	Nedtrain, AEA, TNO, RIVM, RIB, psi-A, M+P, Brüel and Kjaer, LMS

project parts:

Prepare programme of requirements

A programme of requirements for the monitoring posts will be prepared in consultation with the parties involved (Railinfrabeheer, Railned, Ministry of Transport, Public Works and Water Management, RIVM, NS Reizigers and Railion). Attention will be paid to the requirements of the location of the post as well as to the properties of the monitor itself.

Prepare a functional design

A functional design for the monitoring post will be prepared on the basis of the programme of requirements. The technical components (hardware and software) for the system will be determined here. Tendering for the construction of the monitoring post will take place on the basis of the functional design.

Construction of a test post

One test monitoring post including all related systems will be constructed, installed and tested on the basis of the functional design. The functional design will be modified according to the experience gained if necessary.

Construction of four monitoring posts

Four complete monitoring posts will be constructed. These will be installed at different locations throughout the country.

Carrying out and analysing measurements

The noise produced by train traffic including the pilot trains from projects 2.1.1 and 2.1.2 in the vicinity of the monitoring posts will be measured and analysed for a period of three years. Naturally, it is important to take the roughness of the rails at the monitoring locations into consideration when doing so.

Evaluation and advice

Railinfrabeheer will evaluate the functioning of the permanent monitoring posts in relation to its task in the field of noise and prepare an advice for the Ministry of Transport, Public Works and Water Management concerning maintaining or dismantling all the permanent monitoring posts. Consideration can be given at this stage to having the posts taken over by a commercial party.

project part:	**planning:**	**estimated costs:**	**status**
TOTAL	2002 - 2006		
programme of requirements	2002 - 2003		
functional design	2002 - 2003		
construction of test monitoring post	2002 - 2003		
construction of four monitoring posts	2002 - 2003		

carrying out measurements and analysis	2003 - 2006		
evaluation and advice	2004 - 2006		

expected effects on other policy areas

Supplying measurement data for keeping the Calculation and Measurement Regulations for Rail Traffic noise up to date also with reference to noise production ceilings and MIG

Supplying measurement data to RIVM for national environmental monitoring

relation with other projects in the Innovation programme:	**relation with programmes and projects outside of the Innovation programme**
2. 1.1: pilot freight trains (for example, the test monitoring post can be placed in Hoogzand) 2.1.2: pilot passenger trains	Development of permanent noise monitoring posts around Schiphol Development of permanent noise monitoring posts along roads and railways by the RIVM Development of systems of monitoring by different commercial parties Control of noise production ceilings, noise classification and noise use regulations Development of measurement methods in STAIRRS
international component	**risks, impediments, problems with implementation**
Project Metarail	The system must be extremely robust

The technical line for through rail traffic

Noise Innovation programme

Project 2.1.1: Phase 1, modification of braking systems on noisy passenger trains

name of project:	forms part of cluster:	number/version:
Modification of braking systems on noisy passenger trains	Tackling noise produced by noisy trains	project 2.1.1 May 2002

aim:

To set a programme in motion to modify the relatively noisy passenger train series (ICM-III, ICR and Mat64) so that they will be about 7 dB(A) quieter by means of a relatively simple modification to the braking system.

by order of:	contractor:	parties with relevant knowledge include :
Ministry of Transport, Public Works and Water Management	NS Reizigers	SBB Switzerland, Nedtrain Consulting,

project parts:

Preparation of pilots

The conversion of the trains must be prepared thoroughly. The preference of NS Reizigers is first to modify a few trains and gain experience with these before modifying all the noisy trains. For this reason one train from each series will be modified first. The change that has to be made is that all the braking systems will be modified so that all the cast iron brake blocks can be replaced with, in the first instance, plastic brake blocks (K-blocks). It is possible that there will be other alternatives for the cast iron brake blocks such as modifying the anti-blocking system (ABI) or adding magnetic brakes. A choice will be made at this stage of the project based on cost and the chances of success. A choice will be made from the K-blocks available on the market if the choice is made to use K-blocks. Technical information about the conversion will be obtained from Switzerland as well as other sources. The technical changes will be taken to the level of a construction change (CW) on the basis of this information. The logistics aspect will also play a role. Materials will need to be ordered, capacity in the workshops reserved and the trains reserved for the pilot stage.

Carrying out the pilots

This phase of the project consists of carrying out the changes to the braking systems of three trains: a front runner ICM-III (3 carriages) , a slow train Mat64 (2 carriages) and pulled intercity rolling stock ICR (11 carriages)

Carrying out monitoring

After carrying out the modification and first testing to gain approval for use on the rail network the trains will be put into normal service. This will allow experience to be gained with the new braking systems in practice. Braking characteristics, wear on the blocks and the wheel bands, as well as other relevant technical aspects will be monitored. In particular, a great deal of attention will be paid to adhesion and detection as well as to how the trains function in combination with other rolling stock. Noise measurements on a limited scale will also be made to supply specific information to those carrying out this project and to have information directly available about the acoustic effects of every change made within this project. A limited set of noise measurements must be available at the end of the project so that the contractor can demonstrate the effects of the measures on the noise caused by the pilot trains. As well as this, a separate long-term monitoring programme will be set up in which the noise of passing trains will be measured using permanent monitoring posts. See project 1.2.

Preparing the programme to carry out changes to the rest of the noisy rolling stock

A programme will be prepared for carrying out the modifications to the other noisy trains on the basis of the experience and knowledge gained from the three pilot trains. A total of about 1200 carriages must be modified.

Carrying out the programme for the rest of the noisy rolling stock

The remainder of the rolling stock from the three noisy train series will be modified on the basis of the programme prepared. After this operation has been completed all the noisy rolling stock in service with NS Reizigers will have been modified (apart from a few old diesel trains).

project part:	**planning:**	**estimated costs:**	**status:**
TOTAL	2002 - 2005		
preparation	2002		
carrying out pilots (three trains)	2002 - 2003		
monitoring (adhesion, braking power, detection, noise)	2002 - 2004		
preparing programme for the rest of the noisy trains	2004		
carrying out the conversion of the rest of the noisy rolling stock	2002 (- 2010)		

expected effects on other policy areas

Economic: plastic brake blocks result in cost savings when using the rolling stock (LCC costs)

Working conditions: plastic brake blocks are much lighter than the cast iron ones that they replace

relation with other projects in the Innovation programme:	**relation with programmes and projects outside of the Innovation programme**
1.2: permanent noise monitoring posts Work visit to Switzerland 2.3.1 wheel dampers and skirts	SBB conversion programme UIC action programme Eurosabot
international component	**risks, impediments, problems with implementation**
Practical experience of the Swiss government and the Swiss railway company SBB with similar conversion of noisy rolling stock Use of K blocks in the USA, Australia, South Africa	Willingness of NS Reizigers to convert its rolling stock Effects of K blocks on adhesion, braking power, wear, wheel loadings and train detection Willingness of managers in V&W to convince NS to convert its rolling stock

Project 2.1.2: Phase 1, modification of braking systems on a noisy freight train (Dolomite shuttle)

name of project:	**forms part of cluster:**	**number/version:**
Noise pilot Dolomite shuttle	Tackling noise produced by noisy trains	project 2.1.2 May 2002

aim:

To make a complete freight train with fixed composition of about 30 wagons about 7 dB(A) quieter by means of a relatively simple modification to the braking system. The train will remain in normal service after the conversion.

by order of:	**contractor:**	**parties with relevant knowledge include :**
Ministry of Transport, Public Works and Water Management	Railion	SBB Switzerland, Nedtrain Consulting,

project parts:

Preparation of pilot

The conversion of the train must be prepared thoroughly. The change that has to be made is that the braking systems will be modified so that all the cast iron brake blocks can be replaced with plastic brake blocks (K blocks). A choice will be made from the K-blocks available on the market in this phase. Technical information about the conversion will be obtained from Switzerland as well as other sources. The technical changes will be taken to the level of a construction change (CW) on the basis of this information. The logistics aspect will also play a role. Materials will need to be ordered, capacity in the workshops reserved and the trains reserved for the pilot stage.

Carrying out the pilot

This phase of the project consists of carrying out the changes to the braking systems of about 30 freight wagons. One wagon will be converted first as test, followed by planning the conversion of the other 29 on the basis of the experience gained. It may be necessary to carry this out in phases depending on the logistical possibilities.

Carrying out monitoring

After carrying out the modification and first testing to gain approval for use on the rail network, the train will be put into normal service. This will allow experience to be gained with the new braking systems in practice. Braking characteristics, wear on the blocks and the wheel bands, as well as other relevant technical aspects will be monitored. In particular, a great deal of attention will be paid to adhesion and detection as well as to how the trains function in combination with other rolling stock. Noise measurements on a limited scale will also be made to supply specific information to those carrying out this project and to have information directly available about the acoustic effects of every change made within this project. A limited set of noise measurements must be available at the end of the project so that the contractor can demonstrate the effects of the measures on the noise caused by the pilot train. As well as this, a separate long-term monitoring programme will be set up in which the noise of passing trains will be measured using permanent monitoring posts. This information will be used for helping to draft noise calculation legislation. See project plan 1.2.

Evaluation and permission to use

The project will be evaluated on the basis of the experience gained with the pilot train. This evaluation can be used to prepare plans for tackling more freight rolling stock, possibly even at the European level.

project part:	planning:	estimated costs:	status:
TOTAL	2002 - 2004		
preparation	2002		
carrying out pilots	2002 - 2003		
organisation and monitoring	2002 - 2004		
reserve fund for possible conversion back to original state	-		
evaluation	2004		

expected effects on other policy areas

Economic: plastic brake blocks result in cost savings when using the rolling stock (LCC costs)

Working conditions: plastic brake blocks are much lighter than the cast iron ones that they replace

relation with other projects in the Innovation programme:	relation with programmes and projects outside of the Innovation programme
1.2: Permanent noise monitoring posts Work visit to Switzerland 2.3.1 wheel dampers and skirts	SBB conversion programme UIC action programme Eurosabot
international component	**risks, impediments, problems with implementation**
Practical experience of the Swiss government and the Swiss railway company SBB with similar conversion of noisy rolling stock Use of K blocks in the USA, Australia, South Africa	Permission to use K blocks in Belgium Continuity of the Dolomite shuttle Possible effects of K blocks on adhesion, braking power, wear, wheel loadings and train detection

Project 2.2.1: Phase 2A, Rail dampers

name of project:	forms part of cluster:	number/version:
Rail dampers	Quieter rail infrastructure	project 2.2.1 May 2002

aim:

To develop rail dampers as an attractive alternative to noise barriers. This will entail:
- including the noise reduction in the legal Calculation and Measurement regulations
- formal permission for the application of rail dampers and the availability of suppliers independent specifications (and preferably more companies in the market producing rail dampers)
- a competitive price in comparison with solutions using noise barriers

by order of:	contractor:	Parties with relevant knowledge
Ministry of Transport, Public Works and Water Management	Railinfrabeheer	TNO, AEA, Volker Stevin, Corus, Edilon, M+P/Müller BBM, RIB, ISVR, TU Berlin, ERRI

project parts:

Preparation of tests

Two tests using rail dampers will be prepared. Each test consists of fitting rail dampers to both rails on at least 200 metres of track that will then be used normally. One test site will be combined with the tests for reducing rail roughness so that as well as the effect of just using rail dampers the combined effect of smoother rails with rail dampers can also be determined.

Carrying out the test, HSL-Oost and Vera

Rail dampers will be fitted on the track between Zevenberg and Oudenbosch (project Vera) and on the track between Utrecht and Arnhem, near Veenendaal, (as result of the cabinet policy regarding the HSL-Oost). This test will also be combined with reducing the rail roughness (project 2.2.2) at Veenendaal. An extensive programme of noise measurements will be carried out during the test so that all the necessary data will be recorded.

Evaluation of tests

The tests will be evaluated on the basis of the data collected. This will show what data is still missing and what actions must still be taken to achieve the aims. A plan of approach will then be prepared for these activities for the purpose of incorporating the effects of rail dampers in the calculation regulations, for permission to apply this method on a large-scale on the Netherlands railway network and to prepare independent specifications for suppliers.

Carrying out extra tests, Hoogezand Sappemeer

The project makes allowance for carrying out extra tests with rail dampers if the evaluation shows that rail dampers are a serious alternative to the use of noise barriers. The aim of these tests will be:
- to follow a plan for noise reduction prepared by DGG, the municipalities and the province
- to test the measure over a longer length in a built-up area where there are complaints
- to incorporate the effects of rail dampers in the calculation regulations, for permission to apply this method on a large-scale on the Netherlands railway network and to prepare independent specifications for suppliers

Any necessary extra work, such as research, will be carried out on the basis of the above plan of approach. The rail dampers will then be included in the legal Calculation and Measurement Regulations for Rail Traffic Noise, released for application and incorporated together with independent specifications for suppliers in the operational systems for railway management of Railinfrabeheer.

project part:	planning:	estimated costs:	status

TOTAL	2002 - 2003		
preparation	2002		
carrying out tests (HSL-Oost and Vera)	2002		
evaluation of tests	2002		
carrying out extra tests (Hoogezand Sappemeer)	2003		
incorporating in the Calculation Regulations, releasing for large-scale use and independent specifications for suppliers	2003		

expected effects on other policy areas

relation with other projects in the Innovation programme:	**relation with programmes and projects outside of the Innovation programme**
2.2.2: reduction of rail roughness	European project Silent Track Review of the Calculation and Measurement Regulations for Rail Traffic Noise (draft regulations 2002) Development of measurement methods in STAIRRS
international component	**risks, impediments, problems with implementation**
Different railway companies have developed the rail dampers together with industry in the project Silent Track. Up to now the Netherlands is the only party actually to proceed further with this.	Release Costs Strict requirements for the measurement programme in the draft Calculation and Measurement Regulations 2002

Project 2.2.2: Phase 2A: Reduction of roughness of rails (grinding)

name of project:	forms part of cluster:	number/version:
Reduction of roughness of rails	Quieter rail infrastructure	project 2.2.2 May 2002

aim:

To develop reduction of the roughness of the rails by grinding to an attractive alternative for noise barriers. This entails:

- including the noise reduction in the legal Calculation and Measurement regulations
- formal permission (where necessary) for the extra reduction of rail roughness and the availability of specifications and inclusion in the maintenance process
- a competitive price in comparison with solutions using noise barriers

by order of:	contractor:	parties with relevant knowledge include :
Ministry of Transport, Public Works and Water Management	Railinfrabeheer	Speno, DB, TNO, AEA, M+P/Muller BBM, RIB, ISVR

project parts:

Preparing tests

Two tests involving the reduction of the roughness of the rails will be prepared. Each test consists of grinding a length of track extra smooth that will then be used normally. One test site will be combined with tests using rail dampers so that as well as the effect of just using rail dampers the combined effect of smoother rails with rail dampers can also be determined.

Carrying out tests, HSL-Oost and ´t Harde

A length of track will be ground extra smooth between Harderwijk and Zwolle at 't Harde and on the track between Utrecht and Arnhem, near Veenendaal, (as result of the cabinet policy regarding the HSL-Oost). This test will also be combined with fitting rail dampers (project 2.2.2) at Veenendaal. An extensive programme of noise measurements will be carried out during the test so that all the necessary data will be recorded.

Evaluation of tests

The tests will be evaluated on the basis of the data collected. This will show what data is still missing and what actions must still be taken to achieve the aim. A plan of approach will then be prepared for these activities for the purpose of incorporating the effects of reducing the rail roughness in the calculation regulations, for permission to apply this method on a large-scale on the Netherlands railway network and to prepare independent specifications for suppliers.

Developing system for monitoring track with extra reduced rail roughness

A system will be required that is suitable for monitoring the track where extra reduced roughness is to be maintained. This system must have sufficient guarantees for the surrounding area so that the measures will stand up to objections and appeals.

Carrying out extra tests, Hoogezand Sappemeer

The project makes allowance for carrying out extra tests with rail dampers if the evaluation shows that the extra reduction of the rail roughness is a serious alternative to the use of noise barriers. The aim of these tests will be:

- to follow a plan for noise reduction prepared by DGG, the municipalities and the province
- to test the measure over a longer length in a built-up area where there are complaints
- to incorporate the effects of rail dampers in the calculation regulations, for permission to apply this method on a large-scale on the Netherlands railway network and to prepare independent specifications for suppliers

Any necessary extra work, such as research, will be carried out on the basis of the above plan of approach. The rail dampers will then be included in the legal Calculation and Measurement Regulations for Rail Traffic Noise, released for application and incorporated together with independent specifications for suppliers in the operational systems for railway management of

Railinfrabeheer.			
project part:	**planning:**	**estimated costs:**	**status:**
TOTAL	2002 - 2004		
preparation	2002		
carrying out tests HSL-Oost and ´t Harde	2002		
evaluation of tests	2003 - 2004		
developing a system to monitor reduced rail roughness	2003 - 2004		
carrying out extra tests Hoogezand Sappemeer	2003		
incorporating in the Calculation Regulations and releasing for use	2002 - 2004		

expected effects on other policy areas	
relation with other projects in the Innovation programme:	**relation with programmes and projects outside of the Innovation programme**
2.2.1: rail dampers	Development and introduction of acoustic grinding criteria in the regular rail maintenance carried out by Railinfrabeheer and measurement systems for this Review of the Calculation and Measurement Regulations for Rail Traffic Noise (draft regulations 2002) Relation to programmes for preventive and/or corrective grinding of wave-form wear
international component	**risks, impediments, problems with implementation**
Practical experience gained by Deutsche Bahn (DB) and grinding firm (SPENO) with the *besonders überwachte Gleis* whereby the DB achieved a noise reduction of about 3 to 4 dB(A) by maintaining reduced rail roughness that has been legally recognized.	Confusion with the problem of smooth rails; this test concerns smoothness in the sense of even in the roughness regions that are important for noise; this is not the same as the smooth rail problems that occur in the autumn Exploitation of the length of track treated using relatively quiet trains is necessary (Phase 1 must be completed or noisy trains must be able to be banned (project 4.2)

Project 2.2.3: Phase 2B, Wheel dampers and skirts for quiet passenger trains

name of project:	**forms part of cluster:**	**number/version:**
Wheel dampers and skirts for quiet passenger trains	Additional measures for trains	project 2.2.3 May 2002

aim:

To determine the costs, the technical feasibility and the noise reduction effect of wheel dampers and skirts on a relatively quiet passenger train.

by order of:	**contractor:**	**parties with relevant knowledge include :**
Ministry of Transport, Public Works and Water Management	NS Reizigers (up to the evaluation)	Nedtrain, TNO, AEA, ISVR., ERRI, Vibratec

project parts:

Preparation of the pilot

One of the three pilot trains from project 2.1.1 will be selected for fitting wheel dampers and skirts. A wheel damper will be selected from those available on the market for which the noise reduction effect is regarded as the most favourable. The wheel skirts will be designed specially for the test by a team of acoustic and rolling stock specialists.

Carrying out the pilot

This phase of the project consists of fitting the wheel dampers and skirts to the selected train.

Carrying out monitoring

After the work has been completed the train will be returned to normal service and experience gained with the measures in practice. All relevant railway technical aspects will be monitored. A limited amount of specific noise measurements will be carried out within this project. Use can also be made here of noise measurements made in the monitoring programme using permanent monitoring posts. See project plan 1.2.

Evaluation

The evaluation consists of compiling and analysing all the factual material obtained. This data will then be viewed in the light of the actual and expected noise problems on the track. How far the measures are an attractive alternative for other noise reduction measures and to what extent and within what conditions large-scale application is feasible must be determined during the evaluation.

project part:	**planning:**	**estimated costs:**
TOTAL	2004 - 2006	
preparation	2004	
carrying out pilots (three trains)	2004	
monitoring	2004 - 2006	
evaluation	2005	

expected effects on other policy areas

relation with other projects in the Innovation programme:	**relation with programmes and projects outside of the Innovation programme**
1.2: permanent noise monitoring posts 2.3.2 skirts and mini barriers	Experience gained with skirts in the project STV Scale model by TNO

international component	**risks, impediments, problems with implementation**
Experience gained with skirts in the European projects Silent Freight and Metarail (Low Noise Train)	Noise reduction effects may be disappointing Release for application in connection with safety may be difficult Costs Construction problems are underestimated (STV)

Project 2.2.4: Phase 2B, Wheel dampers and skirts for quiet freight trains (Dolomite shuttle)

name of project:	**forms part of cluster:**	**number/version:**
Wheel dampers and skirts for quiet freight trains	Additional measures for trains	project 2.2.4 May 2002

aim:

To determine the costs, the technical feasibility and the noise reduction effect of wheel dampers and skirts on a relatively quiet freight train.

by order of:	**contractor:**	**parties with relevant knowledge include :**
Ministry of Transport, Public Works and Water Management	Railion	Nedtrain, TNO, AEA, ISVR, ERRI, Vibratec

project parts:

Preparation of the pilot

A number of wagons, to be determined later, from the pilot freight train project 2.1.2 will be selected for fitting wheel dampers and skirts. A wheel damper will be selected from those available on the market for which the noise reduction effect is regarded as the most favourable. The wheel skirts will be designed specially for the test by a team of acoustic and rolling stock specialists.

Carrying out the pilot

This phase of the project consists of fitting the wheel dampers and skirts to the selected wagons.

Carrying out monitoring

After the work has been completed the wagons will be returned to normal service and experience gained with the measures in practice. All relevant railway technical aspects will be monitored. A limited amount of specific noise measurements will be carried out within this project. Use can also be made here of noise measurements made in the monitoring programme using permanent monitoring posts. See project plan 1.2.

Evaluation

The evaluation consists of compiling and analysing all the factual material obtained. This data will then be viewed in the light of the actual and expected noise problems on the track. How far the measures are an attractive alternative for other noise reduction measures and to what extent and within what conditions large-scale application is feasible must be determined during the evaluation.

project part:	**planning:**	**estimated costs:**
TOTAL	2002 – 2006	
preparation	2002	
carrying out pilot	2002 - 2003	
monitoring	2004 – 2006	
evaluation	2006	

expected effects on other policy areas

relation with other projects in the Innovation programme:	**relation with programmes and projects outside of the Innovation programme**
1.2: permanent noise monitoring posts 2.3.2 skirts and mini barriers	Experience gained with skirts in the project STV Scale model by TNO

international component	**risks, impediments, problems with implementation**
Experience gained with skirts in the European projects Silent Freight and Metarail (Low Noise Train)	Noise reduction effects may be disappointing Release for application in connection with safety may be difficult Costs Construction problems are underestimated (STV)

Project 2.3.1: Phase 3, Further reduction of wheel and rail roughness

name of project:	**forms part of cluster:**	**number/version:**
Further reduction of wheel and rail roughness	Can it be even quieter?	project 2.3.1 May 2002

aim:

To determine whether it is technically feasible to reduce the roughness of the wheels and rails even further, and whether this will lead to an attractive amount of noise reduction in relation to the costs and will offer a perspective for implementation on a large scale.

by order of:	**contractor:**	**Parties with relevant knowledge**
Ministry of Transport, Public Works and Water Management	Railinfrabeheer	RIB, AEA, Loughborough University, Duroc, TU Berlin, TNO, ISVR, ERRI, Vibratec, Nedtrain

project parts:

Feasibility investigation

The feasibility investigation will provide answers to the question as to whether there is any point in carrying out a further research programme of the intended noise reduction measure.

Defining the project programme

A decision will be taken as to whether a follow-up research programme should be started and what form this should take on the basis of the feasibility investigation.

Possible further research:

- prepare an inventory of the causes of low noise values found during type approval measurements
- fundamental (in the form of models) research into the effects and possibilities of extra low wheel and rail roughness
- practical research into the effects of extra low wheel and rail roughness on adhesion, braking power and train detection
- evaluation

project part:	**planning:**	**estimated costs:**
TOTAL	2003-2006	
feasibility investigation	2003	
definition of project programme	2003	
possible further research	2004 - 2006	

expected effects on other policy areas

relation with other projects in the Innovation programme:	**relation with programmes and projects outside of the Innovation programme**
2.2.2 reduction of rail roughness	European project Infrastar Bends noise programme RIB
international component	**risks, impediments, problems with implementation**
Make reduced roughness of rails and wheels durable, for example by “laser cladding”	Possible technical problems with braking power, adhesion and train detection

Project 2.3.2: Phase 3, Mini barriers and skirts

name of project:	**forms part of cluster:**	**number/version:**
Mini barriers and skirts	Can it be even quieter?	project 3.2.2 May 2002

aim:

To achieve an integral design for skirts and mini barriers for a light rail connection that is at least one class (6 dB(A)) quieter than the use of the rolling stock envisaged in Phase 2 of this programme.

by order of:	**contractor:**	**Parties with relevant knowledge**
Ministry of Transport, Public Works and Water Management	Manager and operator of a light rail connection or regional authorities	ODS, Bombardier, Alstom, AEA Derby, Holland Railconsult, ERRI, ISVR, Vibratec, RIB, Nedtrain

project parts:

Bringing together the parties involved and selecting a light rail connection

This first phase commences with selecting a suitable light rail connection for this project. Interested parties will then be brought together under the direction of V&W and the regional authorities involved. These parties, that will include the manager and operator of the line, will define the structure and organisation of the project.

Integral design of track construction with mini barriers and rolling stock with skirts

Mini barriers and skirts will be designed within the framework acceptable to the manager and operator to give maximum noise reduction. The integral design of a low-noise, possibly ballastless, track construction will preferably form part of this design. Calculations using models and laboratory tests will be carried out during this stage. Railway technical aspects will be considered at this stage as well as acoustic aspects.

Carrying out tests of the skirts and mini barriers designed with a test train and track

A test track at least 200 metres long incorporating the design with mini barriers will be constructed. This test track will be situated where it is possible to carry out noise measurements properly. At least one train unit will be fitted with the skirts designed at the same time.

Registration of noise reduction

The total noise reduction effect of the construction design will be registered, as will the separate effects of the different measures, such as the construction of the track, the mini barriers and the skirts.

Evaluation

The evaluation will provide insight into the applicability and the advantages of the integral design on a large scale for light rail connections. As well as this the evaluation will concentrate on the possibilities of introducing such an integral design for standard railways. Railway parties such as RIB, Railned, NS Reizigers and Railion will be involved in the evaluation for this purpose.

project part:	**planning:**	**Estimated costs:**
TOTAL	2002 – 2006	
selection of a light rail connection	2002 - 2003	
design of skirts and mini barriers	2003 – 2005	
carrying out tests with test train and track	2004 – 2006	
monitoring	2005 - 2006	
evaluation	2006	

expected effects on other policy areas

relation with other projects in the Innovation programme:	**relation with programmes and projects outside of the Innovation programme**

2.2.3 and 2.2.4 skirts and wheel dampers 2.4 ballastless track	The noise knowledge centre (KCG) Rijnmond that concentrates on local noise problems in the Rijnmond area Scale model by TNO
international component	**risks, impediments, problems with implementation**
Tests carried out in the nineteen-nineties in England Project Low Noise Train (Germany)	Cooperation of regional authorities with light rail plans Construction problems are underestimated

Project 2.4: Facts book for ballastless track

name of project:	**forms part of cluster:**	**number/version:**
Facts book of noise properties of ballastless track	Engineering works: ballastless track and steel bridges	project 2.4 May 2002

aim:

To prepare an overview of the acoustic properties of ballastless track constructions in practice, both in the Netherlands and abroad. Ballastless constructions on viaducts and bridges will also be considered.

by order of:	**contractor:**	**Parties with relevant knowledge**
Ministry of Transport, Public Works and Water Management	Railinfrabeheer	RIB, HR, TNO, AEA, M+P, Dgmr, TU-Delft

project parts:

Making an inventory

The project will start with collecting factual material both from at home and abroad about the noise properties of ballastless constructions, such as data from noise measurements and simulations using models.

Analyzing data

The collected factual material will be analyzed in order to determine what proof there is in practice for the noise properties of ballastless constructions. The analysis must also show where there are chances for improving the constructions and what the perspectives of these are in the short and medium long term.

Writing a report

project part:	**planning:**	**estimated costs:**
TOTAL	2003	
Making an inventory	2003	
Analyzing	2003	
Reporting	2003	

expected effects on other policy areas

relation with other projects in the Innovation programme:	**relation with programmes and projects outside of the Innovation programme**
2.3.2 integral design of mini barriers and skirts for light rail	STV, HSL-Zuid
international component	**Risks, impediments, problems with implementation**

Project 2.5: Active damping of steel railway bridges

name of project:	forms part of cluster:	number/version:
Active damping of steel railway bridges	Engineering works: ballastless track and steel bridges	project 2.5 May 2002

aim:

To determine the amount of noise reduction that can be achieved on existing large steel railway bridges by means of active damping and what the costs of this would be.

by order of:	contractor:	Parties with relevant knowledge
Ministry of Transport, Public Works and Water Management	Railinfrabeheer	TNO, Vibratec

project parts:

Fundamental research
Fundamental research will be necessary before a practical test is possible because active damping is still an experimental technique. Simulations using models and laboratory experiments with test arrangements will be carried out for this.
Selection of bridge and practical test
A bridge will be selected and a practical test carried out. A complete system of active damping will be installed for this purpose and the effects on the noise registered.
Evaluation
The evaluation will give insight into the amount of noise reduction possible and the costs of active damping on large steel bridges. Any impediments to carrying this out on a large scale will also be investigated.

project part:	planning:	estimated costs:
TOTAL	2003 - 2004	
fundamental research	2003	
carrying out a practical test	2004	
evaluation	2004	

expected effects on other policy areas

relation with other projects in the Innovation programme:	relation with programmes and projects outside of the Innovation programme
	Society for quiet bridges
international component	**risks, impediments, problems with implementation**

Railway yards

Noise Innovation programme

Project 3.1: Integral design of example railway yards

name of project:	**forms part of cluster:**	**number/version:**
Integral design of example railway yards	Railway yards	project 3.1 May 2002

aim:

To show that innovative, attractive and cost effective solutions to the present noise problems can be achieved by preparing new integral designs of railway yards from scratch.

by order of:	**contractor:**	**Parties with relevant knowledge**
Ministry of Transport, Public Works and Water Management	Railinfrabeheer	RIB, Railned, NS, Railion, DHV, HR, Arcadis, AEA, Nedtrain (Services), Logitech, NS Vastgoed

project parts:

Definition phase

The definition phase will determine the direction as to what is to take place in the design phase. The framework for the design of the example railway yards will be determined in this phase by the parties involved (RIB, Railned, NS, Railion, NS Vastgoed, other transport operators). This process will take place under expert leadership and with the input of a futurologist and possibly other experts in the field. The product of this phase is a set of definitions of the functionality of the example railway yards, the surroundings in which they are situated, and variants for the direction in which solutions should be sought. These variants describe the principles on which the functionality must be realised. The definition phase will also include providing a description of the way in which the designs are to be evaluated.

The design process

One or more expert multi-disciplinary consultants will be awarded the order to design creative example railway yards concentrating on the aspects of noise reduction, safety and costs. In particular, the design is to aim at win/win situations, for example in combination with the situation relative to railway network junctions, the use of space and a combination of uses.

Confrontation with legislation and standards

The designs will be tested against the existing legislation and standards.

Analysis

Where conflicts with existing legislation and standards are observed these will be analysed. Decisions will be taken on the basis of this as to which situations are acceptable and which not. The designs supplied will also be evaluated by experts from the parties involved.

Creation of a modular provisional design.

The final product from the consultants employed will be modular provisional designs.

project part:	**planning:**	**estimated costs:**
TOTAL	2002 - 2004	
definition phase	2002 – 2003	
design process	2003 - 2004	
confrontation	2003 - 2004	
analysis	2003 - 2004	
modular provisional designs	2003 - 2004	

expected effects on other policy areas

external safety where dangerous substances are transported by rail

relation with other projects in the Innovation programme:	**relation with programmes and projects outside of the Innovation programme**
3.2, 3.3, 3.4, 4.1 and 4.2	DEMP. PAGE
international component	**risks, impediments, problems with**

	implementation
ICE terminal Munich	

Project 3.2: Tackling a railway yard in practice

name of project:	**forms part of cluster:**	**version:**
Tackling a railway yard in practice	Railway yards	project 3.2 May 2002

aim:

To construct one of the example railway yards designed in project 3.1 in practice. It may also be decided to construct some elements from the designs from 3.1 or to apply the knowledge gained from the example railway yards designed in 3.1 to an existing railway yard with practical problems.

by order of:	**contractor:**	**Parties with relevant knowledge**
Ministry of Transport, Public Works and Water Management	Railinfrabeheer	Major engineering consultants and the parties named in 3.1, RIB (tendering)

project parts:

Selection of railway yard and definition of the project

The parties from project 3.1 involved in the integral design of example railway yards will select an existing railway yard that is suitable for carrying out one of the designs in practice. It is possible that the choice will be made to apply a limited number of the elements that the designs in project 3.1 have produced.

Making a final design

A final design will be produced on the basis of the provisional design and the definition of the project.

Preparing specifications

Specifications will be prepared on the basis of the final design.

Tendering and carrying out

The work will be put out to tender on the basis of the specifications. External control of the work will ensure that sufficient attention is paid to the noise aspects during the construction.

The effects will be evaluated after the integral design of the railway yard has been constructed. The parties involved will evaluate how the railway yard functions.

	planning:	**estimated costs:**
TOTAL	2004 - 2006	
selection of railway yard	2004	
preparing final design	2004	
preparing specifications	2004 - 2005	
carrying out	2005 – 2006	
evaluation	2006	

expected effects on other policy areas

external safety where dangerous substances are transported by rail

relation with other projects in the Innovation programme:	**relation with programmes and projects outside of the Innovation programme**
3.1	DEMP, PAGE PRIME
international component	**risks, impediments, problems with implementation**
ICE terminal Munich	

Project 3.3: Research into how railway yards are experienced

name of project:	forms part of cluster:	version:
Research into how railway yards are experienced	Railway yards	project 3.3 May 2002

aim:

To determine what noise standards should be applied to railway yards by carrying out research into how railway yards are experienced.

by order of:	contractor:	Parties with relevant knowledge
Ministry of Transport, Public Works and Water Management	Railinfrabeheer	TNO PG (Leiden), DHV

project parts:

Definition of research and determining plan of approach

The definition of the research requires a lot of attention. V&W, RIB, Railned and VROM will lay down the principles together with the research institute. Which railway yards and industries will be investigated and how to deal with the noise from the through track at the site of the railway yards will also be determined in this stage.

An important element in this phase is defining the sites at which there is more or less the same amount of noise that in the one case is caused by through rail traffic and in the other as far as possible by noise from the railway yard. Some indicative calculations will have to be carried out to determine this.

Carrying out the research into how railway yards are experienced

The research into how railway yards are experienced will be carried out by a research institute and will consist largely of applying questionnaires.

Analysis of the research results and reporting

The research institute will analyse the material collected, draw conclusions and write a report.

Evaluation

The evaluation will be carried out by V&W, VROM, RIB, Railned and the research institute. Attempts will be made to reach a consensus about the research question during the evaluation and any necessary follow-up actions will be agreed.

project part:	planning:	estimated costs:
TOTAL	2003	
defining research and preparing plan of approach	2003	
carrying out the research of the experience	2003	
analyzing research results and reporting	2003	
evaluation	2003	

expected effects on other policy areas

relation with other projects in the Innovation programme:	relation with programmes and projects outside of the Innovation programme
4.1 Legislation	Research into how railway yards are experienced in the framework of MIG (at present being carried out) Research into how railway yards are experienced by Railned Innovation DEMP, PAGE
international component	**risks, impediments, problems with implementation**
	The result could be that railway yards are found to cause even

	more nuisance than industrial activities.

Project 3.4: Loc 6400, ED brakes to zero

name of project:	**forms part of cluster:**	**number/version:**
Loc 6400, ED brakes to zero	Railway yards	project 3.4 May 2002
aim:		
To convert all 120 locomotives of the 6400 series so that they can brake to 0 km/h electrodynamically (on the engine), so that the brake blocks will only be used as parking brakes and if an emergency stop is required. This has the following advantages: no more peak noises during braking (particularly important in railway yards) wheel bands remain smooth so that the loc will produce less rolling noise.		
by order of:	**contractor:**	**parties with relevant knowledge include :**
V&W	Railion Benelux bv	NedTrain Consulting
project parts:		

project part:	**planning:**	**estimated costs:**	**status:**
TOTAL	2002-2004		

expected effects on other policy areas:	
Working conditions: brake blocks will only require replacement occasionally.	
relation with other projects in the Innovation programme:	**relation with programmes and projects outside of the Innovation programme**
2.1.2: Modification of braking system of noisy freight train (Dolomite shuttle) 1.2: Registration of noise of trains from permanent monitoring post	PAGE dEMP Maintenance programme for locs series 6400
international component:	**risks, bottlenecks, problems with implementation:**

Implementation stimulation line

Project 4.1: Legislation

name of project:	forms part of cluster:	version:
Legislation	Implementation stimulation line	project 4.1 May 2002

aim:

To ensure that the government will stimulate the large-scale application of available quiet techniques by means of acts, regulations and subsidies and that rail traffic takes place within the legal limits established for the production of noise. Naturally, the Railways Act is one of the limiting conditions. Important elements in the project are:

- regulations for imposing exploitation restrictions for noisy rolling stock
- regulations for capacity management in relation to noise production ceilings
- differential infrastructure charges on the basis of the noise produced by trains
- giving government subsidies for noise reduction measures to be carried out to rolling stock
- giving government subsidies for noise reduction measures to be carried out during rail maintenance

by order of:	contractor:	Parties with relevant knowledge
Ministry of Transport, Public Works and Water Management	Transport, Public Works and Water Management	VROM, V&W, RIB, Railned, dBvision, TNO, AEA, SBB, KPMG BEA

project parts:

Railways Act and allocation of capacity

The new Railways Act allows the future railway management organisation a great deal of room to conclude contracts with transport operators about the use of the rail network. The railway management organisation is at the same time also responsible for ensuring that the exploitation takes place within the legal noise standards. In order to do this they will be able to include noise requirements in the various contracts. In this project the government, together with the rail organisations involved, will attempt to draft the noise regulations that will have to be maintained. This will at the same time make it clear where there may be legal problems and what matters still have to be regulated. There is a clear relationship here with European regulations and thus with project 4.3.

Infrastructure charges

How far the infrastructure charges can operate as an instrument to stimulate transport operators to use quieter trains will be worked out in this project. An inventory of the legal risks will be made and the possible effects of differential charges based on the production of noise will be investigated. Naturally, this has a European dimension and, therefore, a clear relationship with project 4.3.

Subsidies

Clear arrangements for subsidies must be made by government that fit closely with the technological projects developed in the Innovation programme. This will stimulate the large-scale implementation of the innovations. The subsidy arrangements mentioned here - ‘Quieter, cleaner and more economical’ and ‘Environmental and energy efficiency for freight transport’ are good examples but have been drafted for other purposes.

Regulations for aiming at reduction of noise when managing the railway infrastructure

The manager of the railways maintains the national main railway network by order of V&W. This maintenance process is aimed at guaranteeing safety and extending the lifetime of the track at as low a cost as possible. A part of this maintenance is grinding the rails. Aiming to reduce noise does not yet play a significant role when preparing the grinding programmes, so that spots in the track that produce extra noise can sometimes remain untreated for a long time. Grinding these spots can produce a local reduction in noise of 10 to 15 dB(A). Including aiming for a reduction in noise during the maintenance process of the national main rail network is in accordance with cabinet

<table>
<tr><td colspan="3">policy. This project part has the aim of establishing agreements between V&W and Railinfrabeheer about including the aim of reduction of noise as a part of track maintenance and arranging the necessary annual financing of this.</td></tr>
<tr><td>project part:</td><td>planning:</td><td>Estimated costs:</td></tr>
<tr><td>TOTAL</td><td>2002 - 2004</td><td></td></tr>
<tr><td>railways act and allocation of capacity</td><td>2002 – 2004</td><td rowspan="4"></td></tr>
<tr><td>infrastructure charges</td><td>2002 – 2004</td></tr>
<tr><td>subsidy arrangements</td><td>2002 – 2004</td></tr>
<tr><td>regulations for aiming to reduce noise during infrastructure maintenance</td><td>2002 - 2004</td></tr>
<tr><td colspan="3">expected effects on other policy areas
Cabinet policy of NVVP, NMP: source measures instead of noise barriers; improvement of surrounding dwelling area and the polluter pays.</td></tr>
<tr><td>relation with other projects in the Innovation programme:</td><td colspan="2">relation with programmes and projects outside of the Innovation programme</td></tr>
<tr><td>4.2</td><td colspan="2">Railways Act
MIG
Subsidy regulation Quieter, cleaner and more economical 2002 (2002/HDJZ/BIM/2002-166; 1 February 2002, no. 23 / page 15)
Subsidy regulation Environmental and energy efficiency for freight transport 2002 (DGG/J-01/007372; 6 December 2001, no. 273 / page 13)</td></tr>
<tr><td>international component</td><td colspan="2">risks, impediments, problems with implementation</td></tr>
<tr><td>EU legislation/ EU policy</td><td colspan="2">?</td></tr>
</table>

Project 4.2: Capacity management of through rail traffic and railway yards

name of project:	forms part of cluster:	number/version:
Capacity management of through rail traffic and railway yards	Implementation stimulation line	project 4.2 May 2002

aim:

To make a system of capacity management that is closely related to national legislation and policy with respect to noise operational and in which discrimination on the grounds of the noise properties of rolling stock is included so that the freedom of movement of noisy rolling stock can be restricted.

by order of:	contractor:	Parties with relevant knowledge
Ministry of Transport, Public Works and Water Management	Railned	Railned, RIB, NS R, Railion, AEA, dBvision

project parts:

System for the objective noise classification of trains

An essential tool for managing the scarce noise capacity on the railway is an objective and efficient system of classifying trains according to their noise properties. A first step for such a system is already available.

Noise use regulations

As well as a classification system it is important to determine how the noise properties of trains will be used in the determination of the allocation of capacity. These noise use regulations will lead to the freedom of movement of noisy rolling stock being restricted by, for example, banning this rolling stock after due consideration from particular routes and at particular times.

Information to transport operators

Transport operators are an important party. It is of the greatest importance to have their backing for the system of management of noise capacity on the railway. The declaration of intent made by the transport operators (NS Reizigers and Railion) and transport organisations shows that they are prepared to think about this and to view the aspect of noise as a serious subject.

Instruments for noise components of capacity management

Technical support will be necessary for carrying out the system of capacity management described above in which the noise properties of rolling stock play an important part. What will be required here are computer programmes and the availability and coupling of electronic data including that from Rail Traffic Control. These instruments will make the link between the available noise capacity on the through lines (noise production ceilings) and in railway yards. They will, therefore, also be suitable for preparing, operating and testing noise use plans.

Making operational and testing

Railned in cooperation with other transport operators will test the system of noise capacity management of the railway in this phase. Noise classification, noise use regulations and the operational computer system will be used here and modified if necessary.

project part:	planning:	Estimated costs:	status
TOTAL	2003 – 2005		
classification system	2002 - 2003		
noise use regulations	2002 - 2003		
information to transport operators	2002 - 2003		
instruments for allocation of capacity	2002 - 2003		
making operational and testing	2003 - 2005		

expected effects on other policy areas	
relation with other projects in the Innovation programme:	**relation with programmes and projects outside of the Innovation programme**
monitoring posts along the track (project 1.2)	Railways Act MIG TOEP policy Standpoint on HSL-Oost (banning noisy trains) STAIRRS noise categorization
international component	**risks, impediments, problems with implementation**
	Resistance from railway parties (Railned and transport operators) to operational restrictions for noisy rolling stock

Project 4.3: European lobby

name of project:	forms part of cluster:	version:
European lobby	Implementation stimulation line	project 4.3; May 2002

aim:

To arrive at a set of coherent decisions by the European countries that will lead to tackling the noise produced by noisy freight rolling stock.

by order of:	contractor:	Parties with relevant knowledge
Ministry of Transport, Public Works and Water Management	V&W, VROM	RIB, V&W, Railned, VROM, V&W, AEA, TNO, dBvision

project parts:

Plan of approach to be prepared by VROM and V&W

VROM and V&W will determine targets and the approach to take to these together; the transport organisations will also be involved. This will lead to an agreed plan of approach.

Seeking allies

Allies will be sought within Europe. The effort made here will be aimed in particular at the national transport and environment ministries, providers of infrastructure and influential institutes.

Preparing strategy with allies

A strategy for influencing EU legislation will be developed together with the allies. This could be through international workshops. What directives have influence, how these effect each other and national legislation, and what changes and additions are desirable will be discussed there. The following directives definitely play a role:

- directive for levies and allocation of capacity
- directive for noise (evaluation of source policy ex. Article 10; possibility of sub-directives about sources)
- interoperability directive

As well as the directives the desired strategy from Brussels and national governments in relation to railways also plays an important role. The aim will be to provide the governments and the EU with a stronger negotiating position in relation to this sector.

Lobbying agreed with allies

Attempts will be made to influence decision-making in Brussels in all possible ways together with the allies. The organisation of meetings, seminars and workshops to be attended by international key figures at which the vision can be publicised will form a part of this.

project part:	planning:	estimated costs:
TOTAL	2002 - 2006	€ 500,000 for hiring experts and running workshops etc.

expected effects on other policy areas

Cabinet policy of NVVP, NMP: source measures instead of noise barriers

relation with other projects in the Innovation programme:	relation with programmes and projects outside of the Innovation programme
All	Noise reduction programme for rolling stock in Switzerland EU directives UIC action plan TSIs (limits for noise emission by rolling stock) 6th framework programme for additional financing
international component	**risks, impediments, problems with implementation**
Ally Switzerland UIC action programme	There are still a large number of technical uncertainties