Solutions for Silence

We make the world a bit more quiet

RAIL DAMPERS



Innovative noise mitigation on railways

Schrey & Veit

Shock, Vibration & Noise Control

www.sundv.de

INNOVATIVE NOISE MITIGATION ON RAILWAYS

RAIL DAMPERS

Rail dampers are based on the latest technologies to reduce broadband railway noise at its source. The vibration level within the rail during a train passing by will be damped. The Formation of rail corrugation will be reduced significantly.

To achieve maximum noise reduction, dampers need to be adapted to the individual shape of a rail at first (e.g. UIC 60).

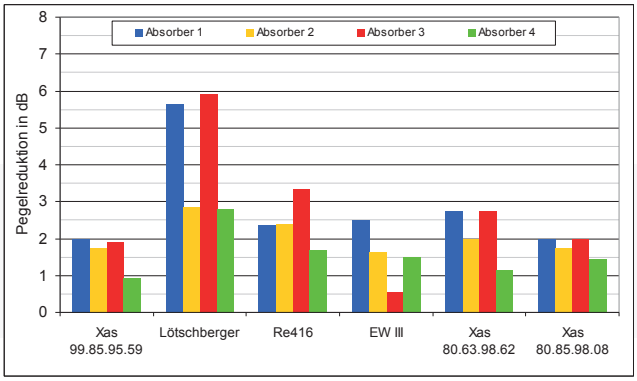
Different measurements on various tracks including > 600.000 assembled rail dampers worldwide proved an average noise reduction of 2-8 dB(A).

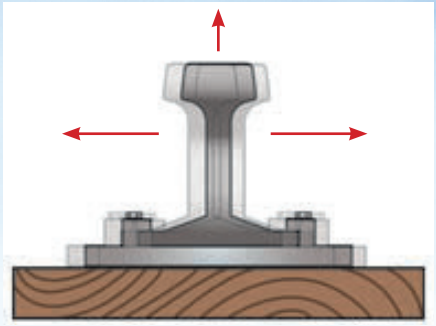
In the next step dampers are mounted on a test track in our laboratory. A passing train is simulated by exciting the rail with a special shaker.

Finally dampers are tuned to reduce emitting noise best possible at corresponding frequency range. The individual tuning of dampers enables application on all kinds of tracks such as ballasted track, ballastless track and high speed tracks.

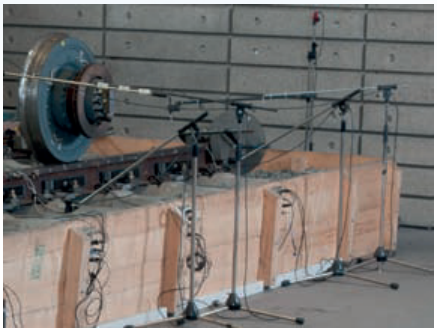
Performance of different rail dampers during various passing trains

Source: Stieglitz/Czolbe: „Effectivity of rail dampers", Speech DAGA 2012, Prose AG





Vibration of rail



Test track in our laboratory



Tuned Dampers assembled on ballast track



Tuned Dampers on ballastless track

ASSEMBLY OF RAIL DAMPERS

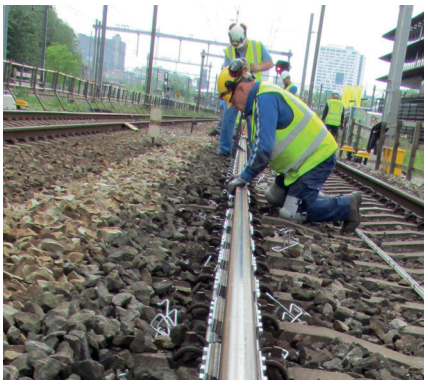
First a minor quantity of ballast will be removed with a ballast clearing tool controlled by a road rail excavator at front side.



At the same time the excavator draws a supply unit of rail dampers for distribution on the track and assembly can start right away.



The mounting of the rail dampers is done with special designed clamps and the fixation with a simple assembly tool. Since the rail dampers are not glued they can be dismantled without problems when changing rails.





It takes an average manpower of 18 track workers to assemble 300 m/hour (track). By deploying 3 teams of that size an average output of 1,000 meters/hour is possible.



MAINTENANCE AND LCC

Based on their components, rail dampers have a long life cycle and need no maintenance. After the wear limit dampers can be easily dismounted and recycled.

In case of a track replacement the dampers can be dismantled quickly, put aside the track and reinstalled on the new track.

Installed systems: > 600.000, worldwide

Test tracks: > 10,000 (Switzerland, Belgium, Denmark, France, USA , Australia)

Rail grinding does not interfere with rail dampers since their components are heat resistant.

Tamping machines can also operate without interference.



Tamping machine



Rail grinding

Schrey & Veit

Shock, Vibration & Noise Control

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SEKISUI

Calmmoon Rail | Calmmoon



RAILWAY TECHNOLOGY

State of the Art



Annual turnover SEKISUI Chemical Co., Ltd.

[Billion EUROS]

2011	8.259
2012	8.604
2013	9.259

For over 60 years the Sekisui Chemical Group has been one of the world's leading producers of synthetic products.

Sekisui Chemical is represented worldwide with more than 200 subsidiaries and around 20,000 employees; the company generates a combined annual turnover of approximately 9.2 billion Euros (as at 2013).

Sekisui has extensive experience in polymer technology and is constantly developing innovative products.









SEKISUI Chemical Co., Ltd.

Sekisui Chemical is split into three main business areas. The ”Housing“ segment produces well over 10,000 prefabricated houses every year for the Japanese market, each equipped to a superior quality level. Every house is individually built to the customer‘s specific needs and meets the most up to date standards as regards energy efficiency.

The ”High-Performance Plastics“ segment covers many industrial applications including laminated safety glass foil for windscreens and architectural glass, cross-linked polyolefin foams for use in vehicle construction and many more industrial applications. The ”Medical Engineering“ segment offers a wide range of pharmaceuticals, diagnostic products and medical equipment. Further business areas within this segment manufacture fine chemicals, special chemicals and industrial adhesive tapes and foils.

The ”Public Infrastructure and Environmental Technology“ segment is concerned primarily with the creation of environmentally friendly technologies for pipe rehabilitation and very successfully produces wide dimension piping made of glass-fibre-reinforced plastic. This area is rounded off by an extensive range of industrial piping systems, building products and the railway engineering segment.



Technology

The Calmmoon Rail web noise protection system acts like a compact noise insulation wall on the rail. Sound waves emitted by the rail where Calmmoon Rail is fitted are reflected back and forth repeatedly between the rail and the shielding plate. Sound energy is absorbed firstly by an air chamber and long-life foam material, and secondly by the Calmmoon sound suppression sheeting, the latter converting it into a different form of energy. Calmmoon Rail web noise protection system comprises thin, extra long-life galvanised and coated sheet steel as a support element, Calmmoon sound suppression sheeting bonded to this, polyethylene sound-suppressing material and two clip fastenings.

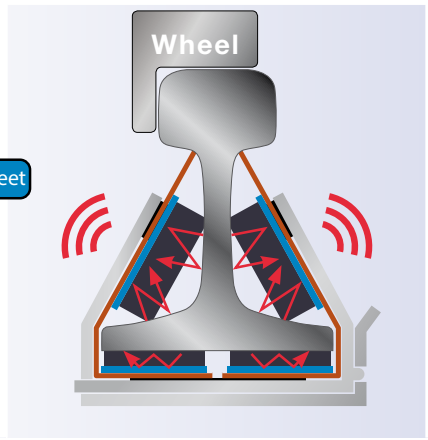
The key technology of this entire system is the Calmmoon noise suppression sheeting. Owing to the unique composition of this material, it converts the sound energy emitted by the rail web into heat.

Germany | DB AG | Löf on the Moselle



A web noise shielding element of the Calmmoon Rail web noise protection system







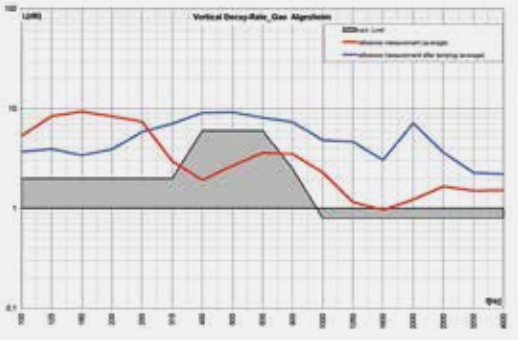
Together with sound absorbing polyethylene foam, this results in the most effective combination for reducing noise emitted by the rail web and foot.

One system unit of Calmmoon Rail to shield the rail noise in one sleeper crib consists of two shielding elements attached on the left and right of the rail web as well as underneath the rail. These two elements form a triangular shape around the rail and are secured to each rail compartment and rail by two steel securing clips. Each securing clip consists of two steel elements ideally matched to the damper shape.

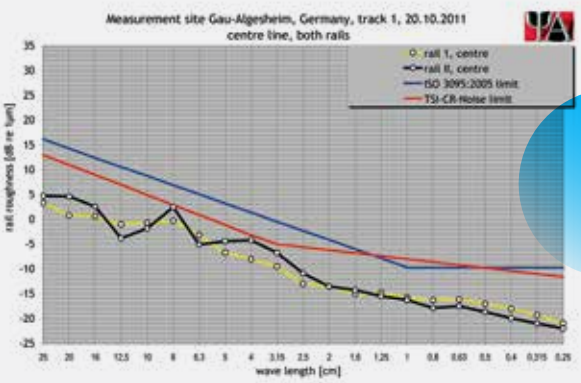
The dimensions and shape of Calmmoon Rail are defined by the rail profile that is to be deadened, the length of the rail compartment, the type of sleeper and the rail fastening used on it. This achieves optimum adaptation to the particular local circumstances of the track, with effective deadening of the maximum area of rail web.

Manufacturing tolerances of Calmmoon Rail dimensions are +/- 2mm.

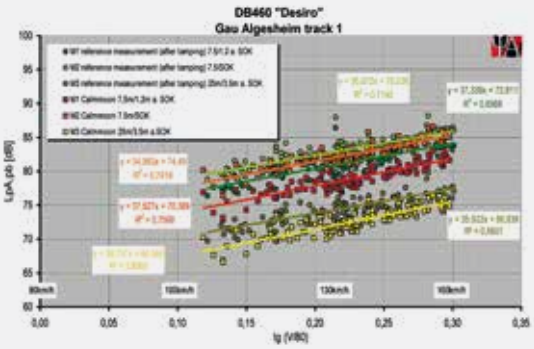
Calmmoon Rail is fitted to each rail compartment by two securing clips with a fastener that can be heard to engage, thereby ensuring a long-lasting connection and functioning.



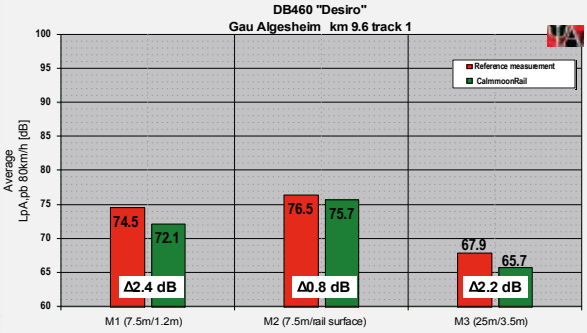
Vertical track decay rate (TDR)



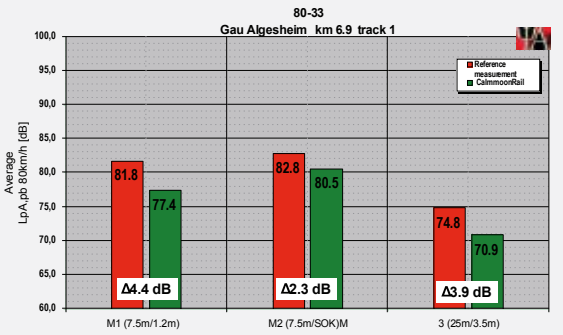
Rail roughness



DB460: A-rated drive-by level



DB460: Noise reduction averaged for 80 km/h



80-33: Noise reduction averaged for 80 km/h



Freight: Noise reduction averaged for 80 km/h

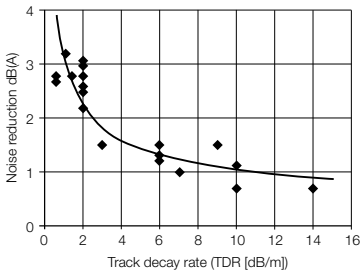
Technical characteristics

On 21st April 2010 the German Federal Railway Authority (EBA) granted approval for the use of Calmmoon Rail in the German railway network infrastructure.

The Calmmoon Rail web noise protection system weighs about 4 kg per linear metre of track.

Calmmoon Rail technology has no effect on the vibration of rails and therefore does not affect the decay rate of the track system either.

Conventional mass-spring systems increase the decay rate of the track system and thereby reduce the noise emitted by the railway. Where track systems have a very good decay rate, the effect of mass-spring systems is reduced accordingly. This is clearly evident in the diagram[1] of track decay rate versus noise reduction.



In a number of field trials, Calmmoon Rail technology has shown that, even with high decay rates of say, 8 dB/m (TSI) [500 – 2,000 Hz], a reduction in overall noise level of up to 4.4 dB can be achieved in practice, depending on the type of train. The rail roughness here was below the specifications of the TSI and ISO standards.

If you look at the 8 dB/m decay rate in the mass-spring system diagram, you will see that the potential noise reduction lies in the 1.0 to 1.5 dB range.

[1] Innovative measures for reducing track noise and vibration emission, M. Beier, Th. Lölgen, C. Gerbig, 11th International Workshop on Railway Noise



Noise reduction potential of different technologies

	Technology	Effect [dB] acc. to Schall 03 [1990]	Rating
1	Rail web damper (SSD) / Rail web shielding (SSA)	2 (SSD) 3 (SSA)	SSD: 4 Manufacturers SSA: 1 Manufacturer

- Economic stimulus programme KP II was financed by Germany's Federal Ministry of Transport and Digital Infrastructure (BMVI) and implemented between 2010 and 2012.
- Deutsche Bahn tested 16 different technologies for the reduction of railway noise.
- Calmmoon Rail was installed on 40 km of DB AG track.
- Calmmoon Rail was categorised as rail web shielding because of the way it works.
- The measurement results of DB AG showed that on average Calmmoon Rail reduces railway noise by 3 dB.
- Of five rail damper technologies, only Calmmoon Rail with an average noise reduction of 3 dB was able to fulfil the requirements of the Schall 03 [2012] German railway noise prediction model.

On 15 June 2012 the BMVI published the final report "Innovative measures for shielding noise and vibration on the permanent way". Calmmoon Rail web shielding is listed in this report as achieving an average noise reduction of 3 dB.

The measurements on which this result is based were carried out on behalf of Deutsche Bahn AG.

Calmmoon Rail is cited as the only shielding technology that reduces noise right at the source rail and fulfils the new Schall 03 [2012] criteria.

Calmmoon Rail reduces only the noise emitted by the rails – and does so optimally. When Calmmoon Rail is installed, the quality of the rail surface is determined only by the rolling stock used. The oscillation of the rails and hence also their reaction on the wheel or of the wheels on the rails therefore remain unaffected.

Measurement of rail roughness



Installation

Calmmoon Rail is manufactured in the factory for the particular rail profile and sleeper distance and then delivered to the work site.

By the end of 2014, Deutsche Bahn AG will have fitted Calmmoon Rail web shielding to more than 80 km of track.

Calmmoon Rail web shielding can be fitted quickly and easily during normal railway operation, if the client so wishes. In this case, the infrastructure operator retains full and unrestricted availability of the track system.

Competently performed maintenance on the ballasted track, such as tamping, the use of a ballast plough, rail grinding etc. does not alter the effectiveness or secure fastening of Calmmoon Rail to the rail.

Germany | DB AG | Hamburg - Cartons of Calmmoon Rail for installation



Shielding elements prior to installation



Pressing shielding onto rails



Clip fastening installation



Calmmoon Rail web shielding after installation

The requirements of Deutsche Bahn are met in full with regard to durability and effectiveness in a temperature range of -20°C to +60°C due to weather or up to + 80°C due to the action of eddy-current brakes.

Calmmoon Rail weighs about 8 kg per metre of track in its installed state.

Packaging units of elements for ten compartments, which arrive on pallets, are manually distributed before installation along the track system that is to be shielded.

At the same time, ballast forks are used to remove ballast from under the rails to a depth of about 10 cm, so that the shielding elements and fastening clips can be easily installed. The packages are then opened and the individual parts of the system are distributed along the track.

The two shielding elements are now brought up against the rail in the left and right rail compartment until they are seated on the rail. The clip fasteners are fitted one after another. The clicking sound of the clip fasteners indicates to the worker that the fastener is now secured long-term. The track ballast removed earlier is then returned to its original place by hand.

Upon request, the roll marks of the rails can be transferred with permanent visibility onto the Calmmoon Rail elements.



Installing Calmmoon Rail during track possession at night



Germany | DB AG | Installation stage of Calmmoon Rail in Hamburg

Any cables near the rail foot remain fully functional after Calmmoon Rail is fitted but are now also afforded extra protection against unintended actions during maintenance work.

Calmmoon Rail affords these fixtures additional protection from damage. In practical use, Calmmoon Rail can be easily and neatly adapted to the circumstances at bridges, including different sleeper spacing in the transition area, cable guides on the rail or other features.

Calmmoon Rail is quickly adapted to the given situation on site using conventional tools.

Where work on the track necessitates dismantling existing elements and refitting them upon completion, the clip fasteners are simply undone for each sleeper compartment and rail.

After the work is complete, the dismantled Calmmoon Rail elements are quickly refitted.

Calmmoon Rail is easy to fit to the rails during normal rail operation and just as easy to remove when necessary.



Projects

The Calmmoon Rail web noise protection system reduces airborne noise emission from the rails but not the oscillatory energy of the rails. Low mass elements are one of the main characteristics of this technology. The oscillatory energy of the rails induced by a train passing over them is emitted unattenuated as airborne noise.

However, the Calmmoon Rail shielding effectively reduces radiation of the airborne noise into the surroundings.

Calmmoon Rail technology achieves this by effectively placing a ”housing“ around the rail. In the Calmmoon Rail form of construction, an air chamber is created between the web noise shielding and the rail. As a result, the energy of the rails‘ emitted airborne noise is reduced by reflection cycles between the rail and shielding, and by absorption in the elements of Calmmoon noise suppression sheeting and foam material. Therefore, this technology does not reduce structure-borne noise in the rail but instead prevents emission of airborne noise from the rail web and foot. This mechanism resembles that of a mini sound barrier.

The track decay rate [dB/m] remains unaffected by this system.

Germany | DB AG | Calmmoon Rail at Boppard main railway station



From 2010 to 2012, Calmmoon Rail was installed and tested in 12 highly diverse locations on 39,820 km of track in total, as part of the German KP II stimulus programme.
The sites were:

- Hamburg Harburg
- Hamburg Hausbruch
- Hamburg Rahlstedt
- Hamburg Tonndorf
- Hamburg Mariental
- Leipzig Güterring
- Leipzig Wahren
- Emmerich – Oberhausen
- Bremen
- Löf on the Moselle
- Gau Algesheim on the Rhine

The IBP II (Infrastructure Stimulus Programme II) for the reduction of noise and vibration in Germany allocated a budget for lowering infrastructure noise. This budget was to be used in 2013 and 2014 for innovative technologies to shield noise on the rail-bound infrastructure. Preference was to be given here to areas already subject to high noise pollution but with limited options for using conventional noise barriers.

Calmmoon Rail at the railway station





Germany |DB AG | Project Leubsdorf on the Rhine



Germany | DB AG | Project Trechtingshausen on the Rhine

The findings from the invitation to tender under KP II were then incorporated in the invitation to tender for IBP II. In the course of the wide-ranging tenders, SEKISUI as best bidder was awarded contracts for its rail web shielding technology (SSA) to the extent of more than 40 km of track.

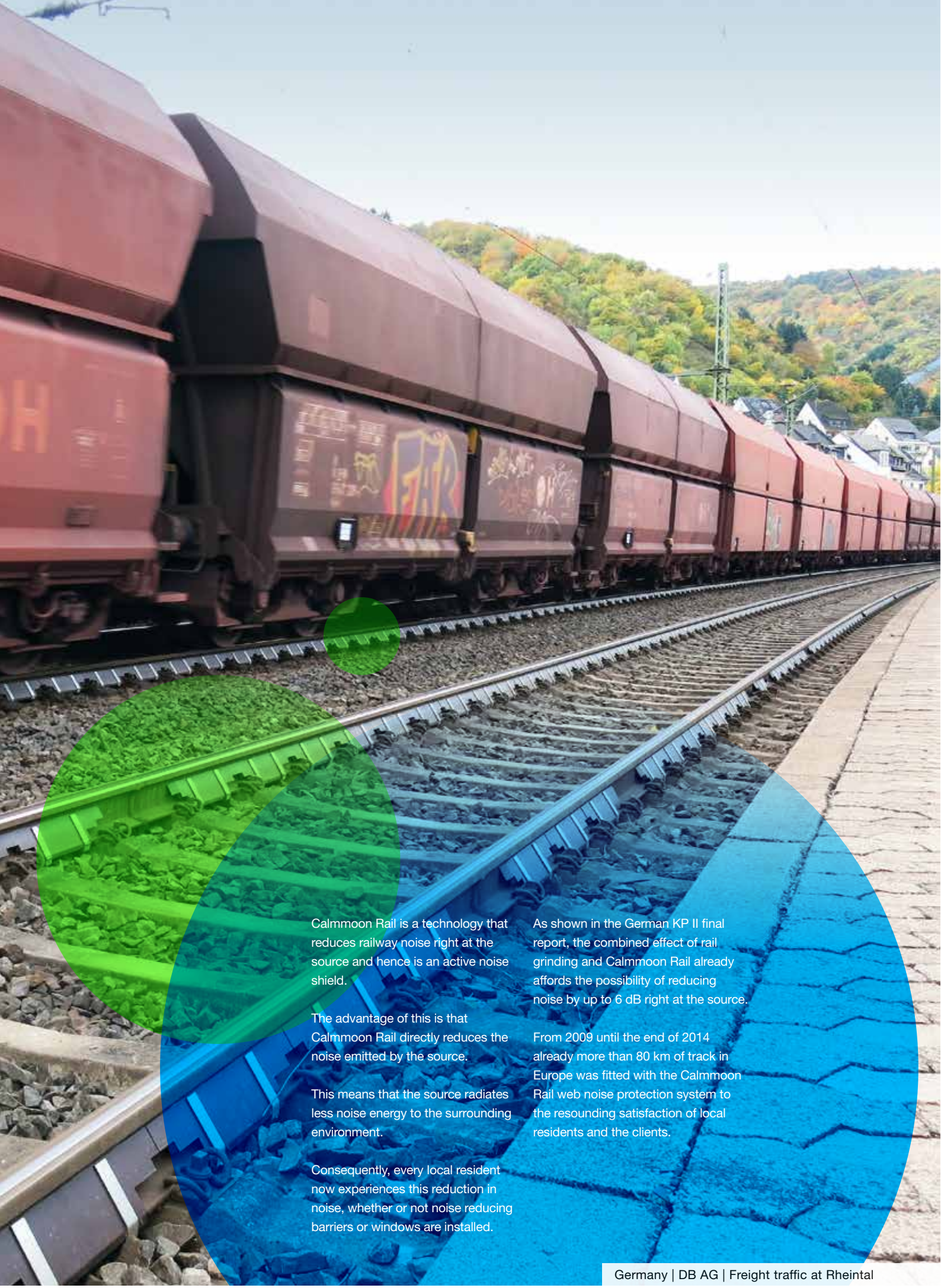
The implementation of these projects at sites on the left and right sides of the river Rhine, as well as on the Karlsruhe - Basel line, was at the following places:

- Linz/Rhein
- Boppard
- Trechtingshause
- Niederheimbach
- St. Goar
- Leubsdorf
- Brey
- Hirzenach
- Hammerstein
- Kamp Bornhofen
- Bacharach
- Valendar
- Rüdesheim
- Lorchhausen
- Assmannhausen
- Müllheim/Auggen

This was done in night-time possessions to Deutsche Bahn‘s specified deadlines and absolute satisfaction.

Calmmoon Rail technology is recognised as conforming to German Schall 03 [2012].

In future projects, Calmmoon Rail is also to be applied in combination with other noise shielding measures.



Calmmoon Rail is a technology that reduces railway noise right at the source and hence is an active noise shield.

The advantage of this is that Calmmoon Rail directly reduces the noise emitted by the source.

This means that the source radiates less noise energy to the surrounding environment.

Consequently, every local resident now experiences this reduction in noise, whether or not noise reducing barriers or windows are installed.

As shown in the German KP II final report, the combined effect of rail grinding and Calmmoon Rail already affords the possibility of reducing noise by up to 6 dB right at the source.

From 2009 until the end of 2014 already more than 80 km of track in Europe was fitted with the Calmmoon Rail web noise protection system to the resounding satisfaction of local residents and the clients.

Germany | DB AG | Freight traffic at Rheintal



Calmmoon Rail installed



Ballast brush



Lifting rails | Ballast tamping

Operation/Maintenance

If a section of rail needs to be removed and a new section inserted on a track fitted with Calmmoon Rail, and moreover this section of rail must be elongated through artificial heating, Calmmoon Rail can be quickly and easily removed from the entire track section that is heated artificially.

Two clip fasteners are undone per sleeper compartment and rail and the Calmmoon Rail elements are removed and placed to the side. Once the rail has cooled down, the same clip fasteners are refitted quickly, easily and lastingly.

If temporary measures such as fixed barriers of construction work, slow approach signals or other activities at the rail foot need to be carried out, Calmmoon Rail can be quickly and easily removed from the rail compartment concerned, and then permanently refitted using the same clip fasteners once the temporary measure has finished.

The rails on which Calmmoon Rail is permanently mounted can be lifted up at any time in the usual way by machinery with standard roller or lifting clamps. Regardless of this, secure mounting and dependable operation of Calmmoon Rail are always assured.

The newly developed clip fastener and associated further optimised rail shielding components offer optimum and unrestricted track maintenance.



Ballast plough



Setting up for ballast tamping



Ballast tamping and sweeping on the track at Niederheimbach on the Rhine

Using conventional ballast tamping machinery and ballast ploughs with sweeping machines. These can now work on the the track without the restriction of reduced working speed.

However, it is important here that the on-site worker responsible is always aware that Calmmoon Rail is installed on the rails before carrying out this maintenance work. This is clearly laid down in Deutsche Bahn‘s document TM 2013-1024 I.NVtT4 along with the exact procedure that must be followed.

Video link for track maintenance: http://www.sekisui-bahntechnik.de/media/mpeg/2013_CalmmoonRail-brushing1-internet.mp4

If welding is required on a rail fitted with Calmmoon Rail, the elements of Calmmoon Rail must be removed from the rail compartment where electrothermic welding is to be done, as well as from the two adjacent rail compartments. Once the rails have cooled down to a temperature below 80°C, the previously removed elements of Calmmoon Rail can be refitted.

The same self-securing clip fasteners are used for a reliable long-lasting attachment.

Competently performed maintenance work does not affect the effectiveness and durability of Calmmoon Rail.



Calmmoon | Technical characteristics

Calmmoon noise suppression sheeting consists of a 0.5 - 1.0 mm layer of synthetic resin on a 0.3 - 0.8 mm metal substrate. This results in a weight of 3.8 - 6.9 kg per square metre. Calmmoon has a very long service life.

The metal substrate and the fire-resistant synthetic resin contribute to the high fire-resistance values of Calmmoon. Based on the results of non-combustibility tests, the Japanese Railway Rolling Stock & Machinery Association and the Japanese Ministry for Land, Infrastructure and Transport granted approval for the use of Calmmoon in rail vehicles in the latest Shinkansen formations and also in the shipping sector.

A reduction in noise level of up to 6 dB(A) was achieved, depending on the particular application. The noise damping elements already start to take effect at a frequency of 35 Hz.

An up to 5 dB reduction in structure-borne noise was measured from this frequency upwards.

Calmmoon noise suppression sheeting is used on steel bridges in railway construction, on the noise-emitting girders of the bridge support. Here Calmmoon is optimally effective in the prevailing circumstances as the individual material thickness of the resin and metal support layers is adapted.

Austria | ÖBB | Sound deadening on bridge at the Hainburg project



Calmmoon noise suppression sheeting

Installation of Calmmoon Noise suppression sheeting

Calmmoon noise suppression sheeting is supplied ex works in the standard sizes w/l/h = 30/50/0.13 cm. The layer of synthetic resin is self-adhesive and covered in easy-to-remove backing foil for transportation purposes.

To ensure a clean and even surface for adhesion, the elements to be damped are cleaned of all dust and grease before Calmmoon noise suppression sheeting is stuck on. The backing foil is peeled from the Calmmoon elements, after which they can be professionally stuck onto the surface.

Should it prove necessary to adapt the size of the standard elements to the situation encountered, this can be done quickly and easily using conventional tin snips. The edges of the cut surfaces on the supporting element then need to be levelled out with a roller to achieve a perfect optical surface.

After affixing Calmmoon, it can be painted the same colour as the bridge structure. The only thing that the user or passer-by notices is the reduction in noise.

Japan | JR | Sound deadening on bridge in Tokyo



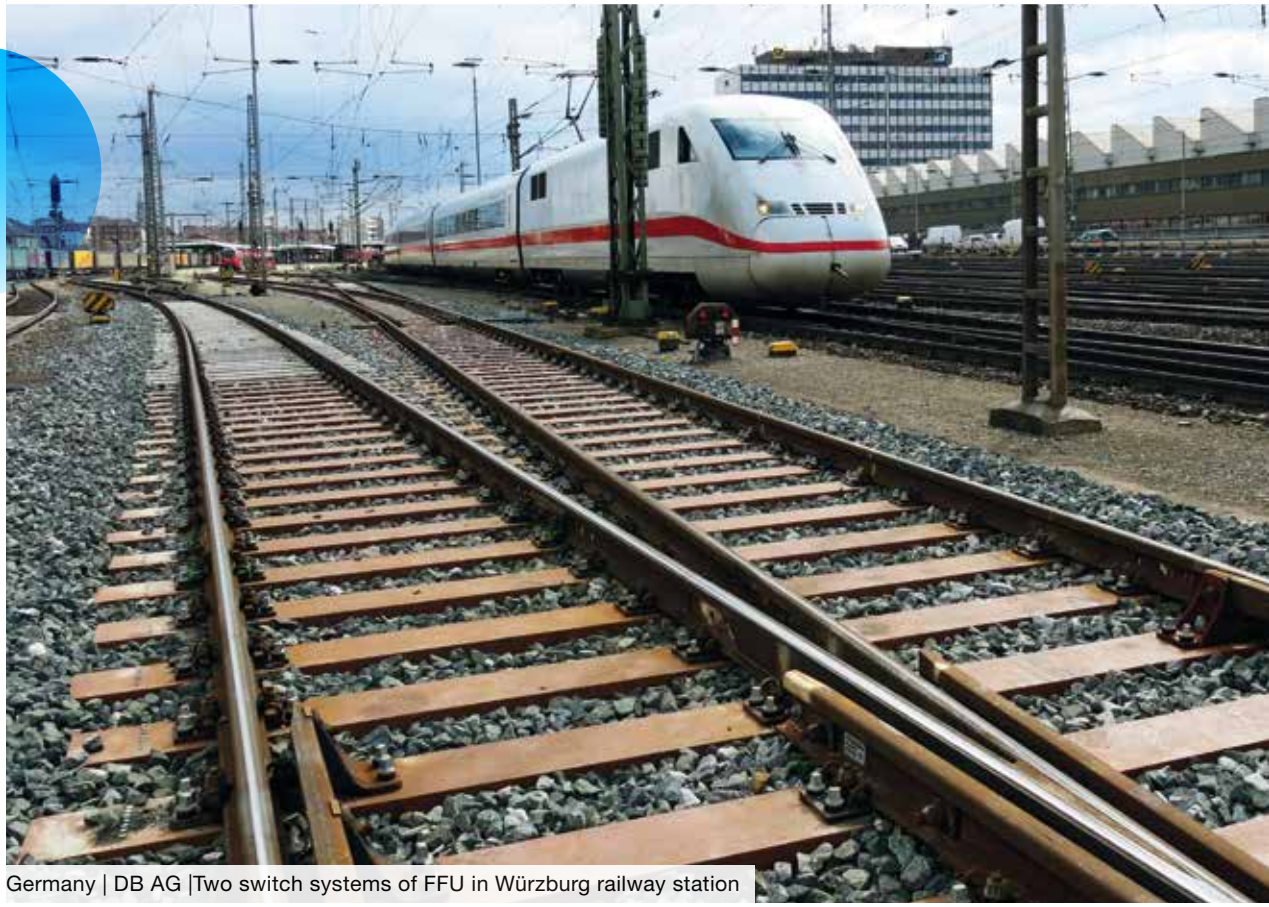
FFU flat sleeper



FFU bridge sleeper



Drilling in FFU on a project



Germany | DB AG |Two switch systems of FFU in Würzburg railway station

FFU® synthetic sleeper

Technology:
A highly durable railway sleeper of polyurethane and continuous glass-fibre strands. Manufactured by a pultrusion-extrusion technique. Any conceivable form you can depict on paper is prefabricated to exact size in the works. Machining is carried out in the same way as for wood but with higher quality tools.

Area of application:
Switch systems, bridge sleepers, flat sleepers, railway crossings and special cases where reliability, durability, high quality, low maintenance and high availability of the track system are called for.

References:
More than 1,400 km of track has already been fitted with FFU synthetic sleepers from 1980 until 2014. This was done in ballasted track, slab track, and by direct mounting, primarily at switches and railway bridges.

Recycling:
FFU synthetic wood is 100% recyclable if it needs to be removed after 50 years in service.

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Calmmoon Rail | Calmmoon





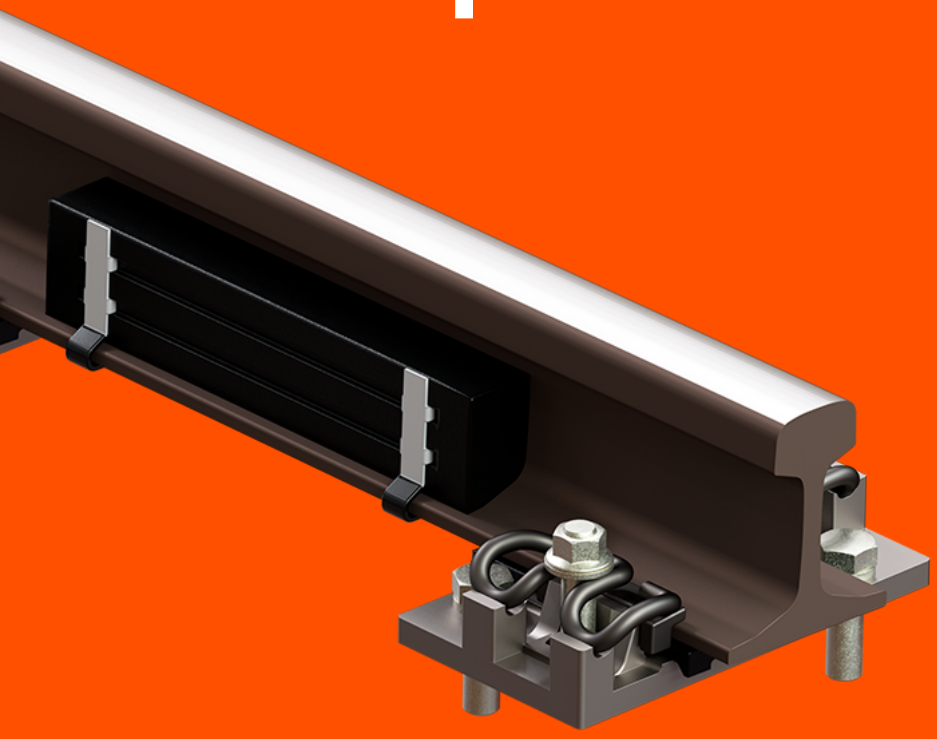
RAILWAY TECHNOLOGY

State of the Art

Status 2014

tiantie group

Rail Dampers



Metro
Commuter
Main Lines
High-Speed Lines

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Applications

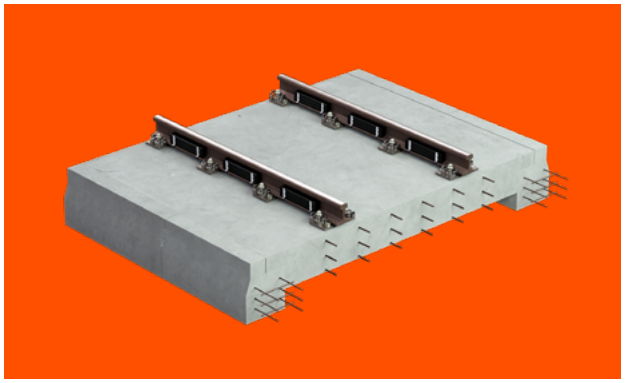
Rail Dampers

Steel reinforced rail dampers are highly effective in reducing broadband railway noise and vibration. In addition, they help to extend the overall rail service life. Rail dampers have also shown to minimize corrugation growth, resulting in reduced rail wear and lower maintenance cost.

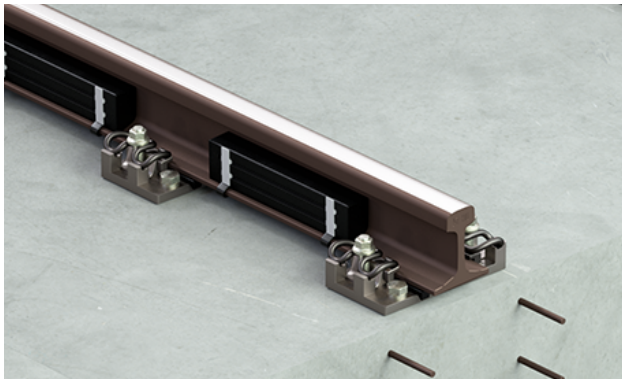
Technical Product Information

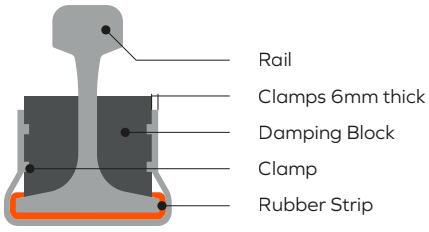
Rail dampers are installed on both sides of the rail, by means of fitted metal clamps. Zhejiang Tiantie rail dampers meet the specifications of all Vignol rail profiles. Based on their design and the materials used, rail dampers are maintenance-free, and have a long service life. When they do reach their wear limit, rail dampers can easily be replaced, and old ones recycled.

Rail grinding does not affect rail dampers, as components are made from heat-resistant materials. Installed rail dampers do not interfere with tamping machines.
To obtain the most effective noise and vibration mitigation effect, the tuning frequency can be adjusted and customized for each rail profile.

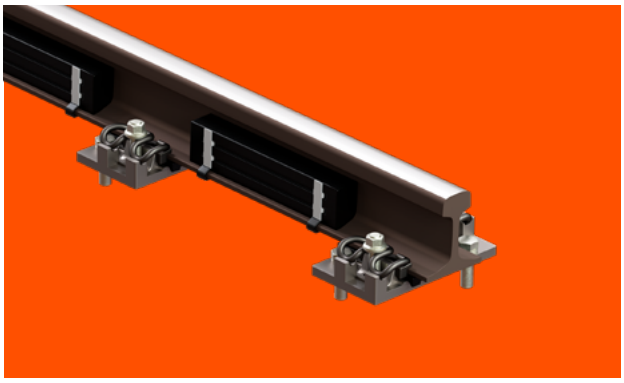


Rail Dampers installed





Rail Damper



Rail Damper Design

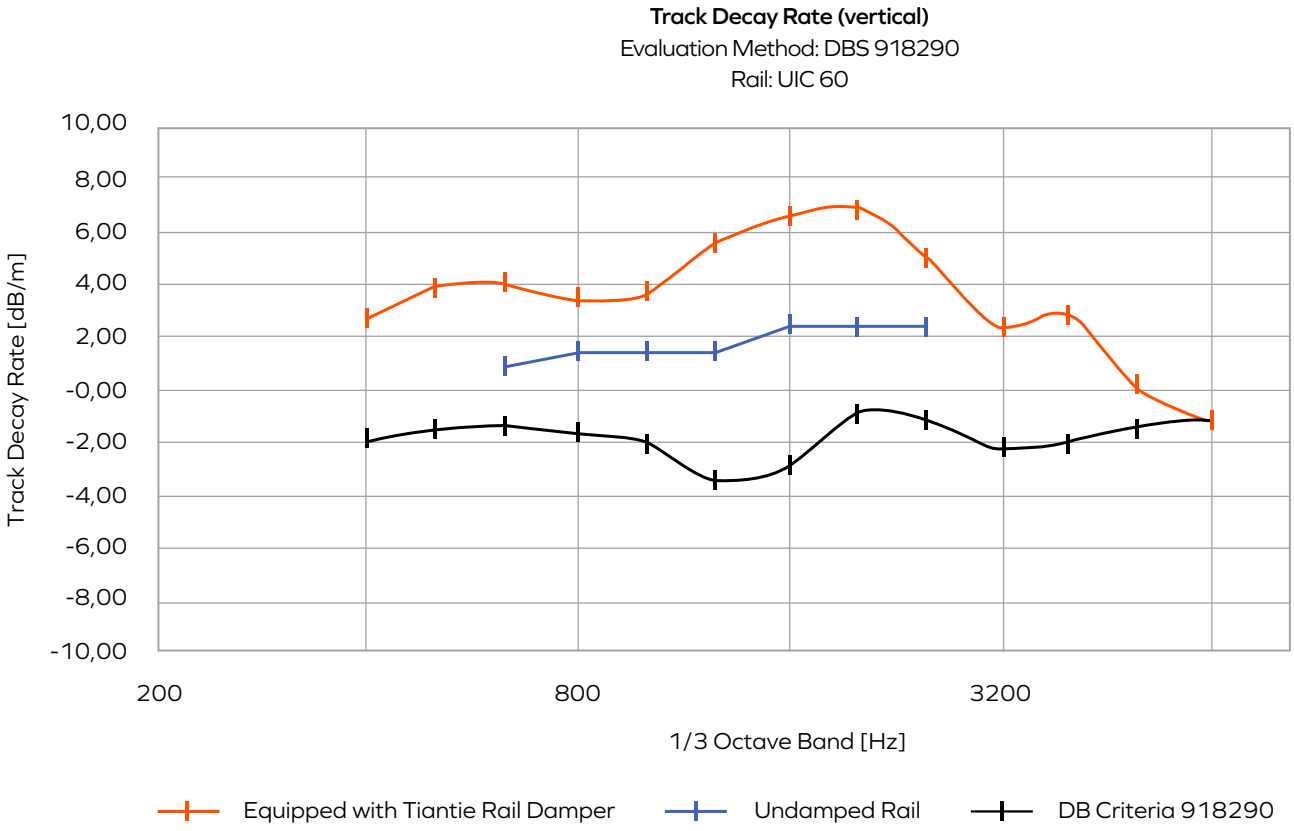
Product Range Specification

Rail type	Sleeper spacing	Dimensions		
		Length (mm)	Width (mm)	High (mm)
50 kg/m rail	500~600mm	380	48	84
50 kg/m rail	500~600mm	400	48	84
50 kg/m rail	500~600mm	440	48	84
60 kg/m rail	500~600mm	380	57	85
60 kg/m rail	500~600mm	400	57	85
60 kg/m rail	500~600mm	440	57	85

Features and Benefits

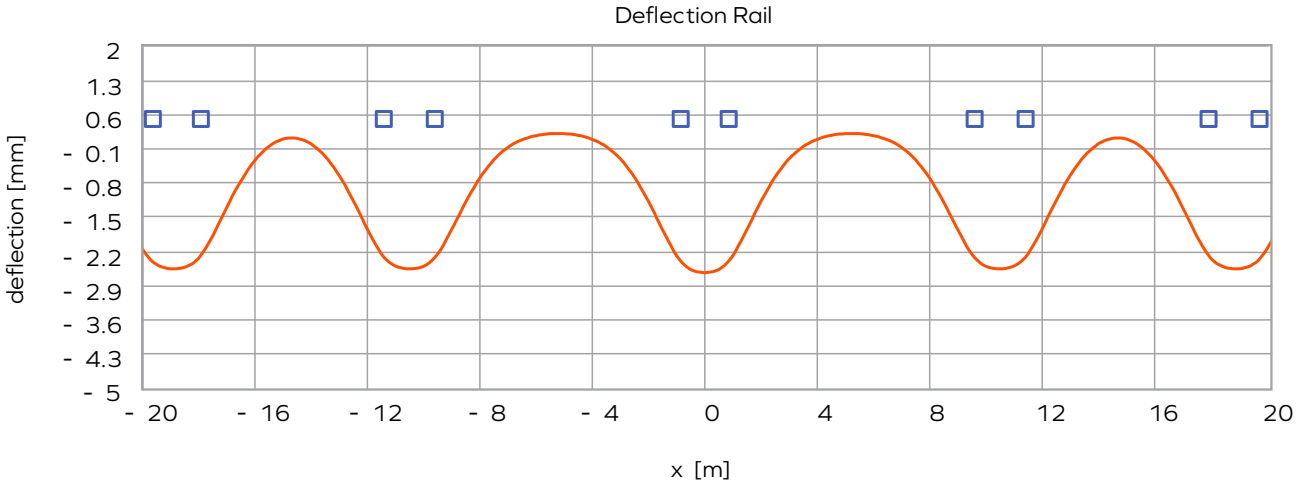
- Average Decay Rate> 3 dB/m
- Adjustable T uning Frequencies
- Available for all Vignol Rails
- Robust, steel-reinforced design
- Easy to Install
  (No Acoustic Contact Material needed)

Noise mitigation effects were measured at multiple track points. Effects are most noticeable in between 1 kHz and 2.5 kHz



Engineering Services

At Tiantie, track dynamics such as rail deflection under various loads, are carefully studied and analysed. Engineers use highly specialized computer modelling, to reliably predict an optimum achievable reduction in vibration.

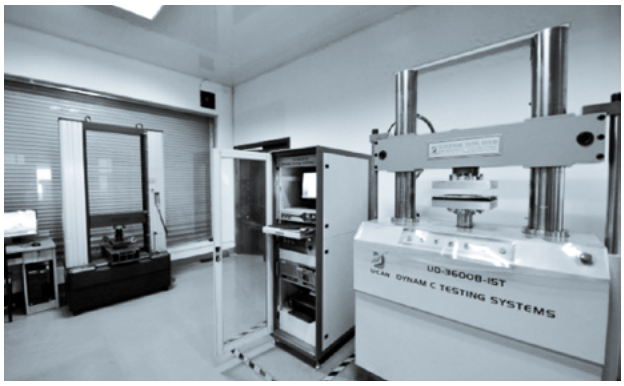


Dynamic Analysis of Railway Tracks

In addition to Tiantie's wide range of noise and vibration mi tigation products, the company also provides expert installation services and/ or supervision. Experienced engineers are available for installation and commissioning of all our products, including on-site monitoring and adjustments. Installation reports confirming "asbuilt" characteristics can also be provided.



Installed Rail Dampers



Inhouse Test Lab

New product development is the essence of Tiantie's corporate philosophy. Our engineering experts are actively participating in national and international committees. Tiantie's commitment to innovation, along with close collaboration with universities, design consultants and end-users, provide a solid basis for the development of next generation stateof-the-art products.

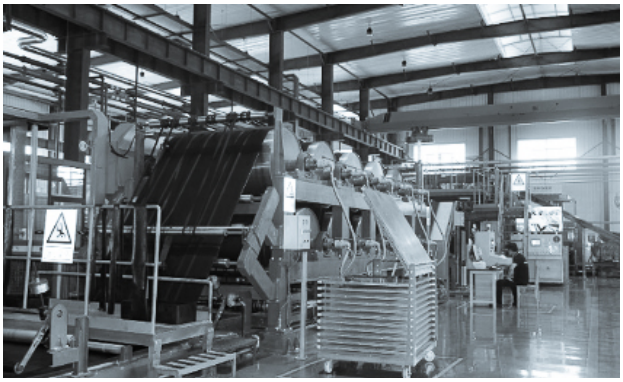
Continuously changing market conditions, evolving technology and new technical requirements, demand timely responses and action. Tiantie's extensive in-house laboratories and testing facilities are well equipped to perform application testing or performance verification testing quickly and effectively.

Production

Wholly-owned Zhejiang Tiantie production plants are large scale manufacturing facilities. State-ofthe-art production equipment and processes ensure highest quality products that meet customer needs, as well as regulatory requirements for the protection of the environment. The rail damper production plant has an annual capacity to cover a track distance of 44 km.



Production Plant, rail damper division



Production Plant

Quality Control

Global markets require compliance with a variety of different standards. Tiantie's Quality Management System ensures that product and process standards are consistent and in compliance and documented in accordance with standards. Test reports, certifications and customer testimonials are available on request.

Building on continuous product improvement, Tiantie engineers collaborate with technical institutes and design consultants, to conduct product performance assessments, on an ongoing basis.



Management System Certification

CERTIFICATE OF CONFORMITY OF ENVIRONMENT MANAGEMENT SYSTEM CERTIFICATION

This is to certify the environmental management system of

Zhejiang Tiantie Industry co., Ltd.

is in conformity with

GB/T24001-2016/ISO14001:2015 standard

IAF CNAS

Environmental Management System according to ISO 14001



Management System Certification

CERTIFICATE OF CONFORMITY OF QUALITY MANAGEMENT SYSTEM CERTIFICATION

This is to certify the quality management system of

Zhejiang Tiantie Industry co., Ltd.

is in conformity with

GB/T19001-2016/ISO9001:2015 standard

IAF CNAS

Quality Management System according to ISO 9001



Management System Certification

CERTIFICATE OF CONFORMITY OF OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM CERTIFICATION

This is to certify the occupational health and safety management system of

Zhejiang Tiantie Industry co., Ltd.

Is in conformity with Occupational health and safety System Standard:

GB/T45001-2020/ISO45001:2018

CNAS

Occupational Health and Safety System according to ISO 45001

References

Based on the proven product features, benefits and performance, Tiantie has successfully installed rail dampers at High-Speed lines, Main lines, Commuter, and Metro lines, covering a track distance of over 40 km.



Changchun Light Rail



Nanjing Metro Line 4



Shenzhen Metro

Selected Projects

Rail Line	Type	Installed Length [m]
Foshan New Public Transportation	Metro	25752
Shenzhen Metro Line 11	Metro	375
Changchun Light Rail Line 4	Light Rail	2780
Shenzhen Metro Line 11	Metro	2390
Beijing Metro Line 8	Metro	1153

tiantie group



Corporate Offices, Tiantai Zheijang

Company

Zhejiang Tiantie Industry Co Ltd.

Competences

Noise and Vibration Control, Rubber Technology

Founded

2003

Industries

Railway, Buildings, Industry

Revenue

$ 140 Mio. USD (Group)

Headquarters

Tiantai, China

Employees

918 (Group)

Affiliates

10

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Rail Dampers

Description

Rail dampers are passive elements that are fixed to both sides of the rail web to reduce air borne noise caused by vibrating rail. They are usually installed after every fastener in problem areas of track.



Depending upon the situation, dampers can be used as an alternative to (or in conjunction with) sound barriers, increased rail grinding & wheel maintenance programs, or train speed reductions.

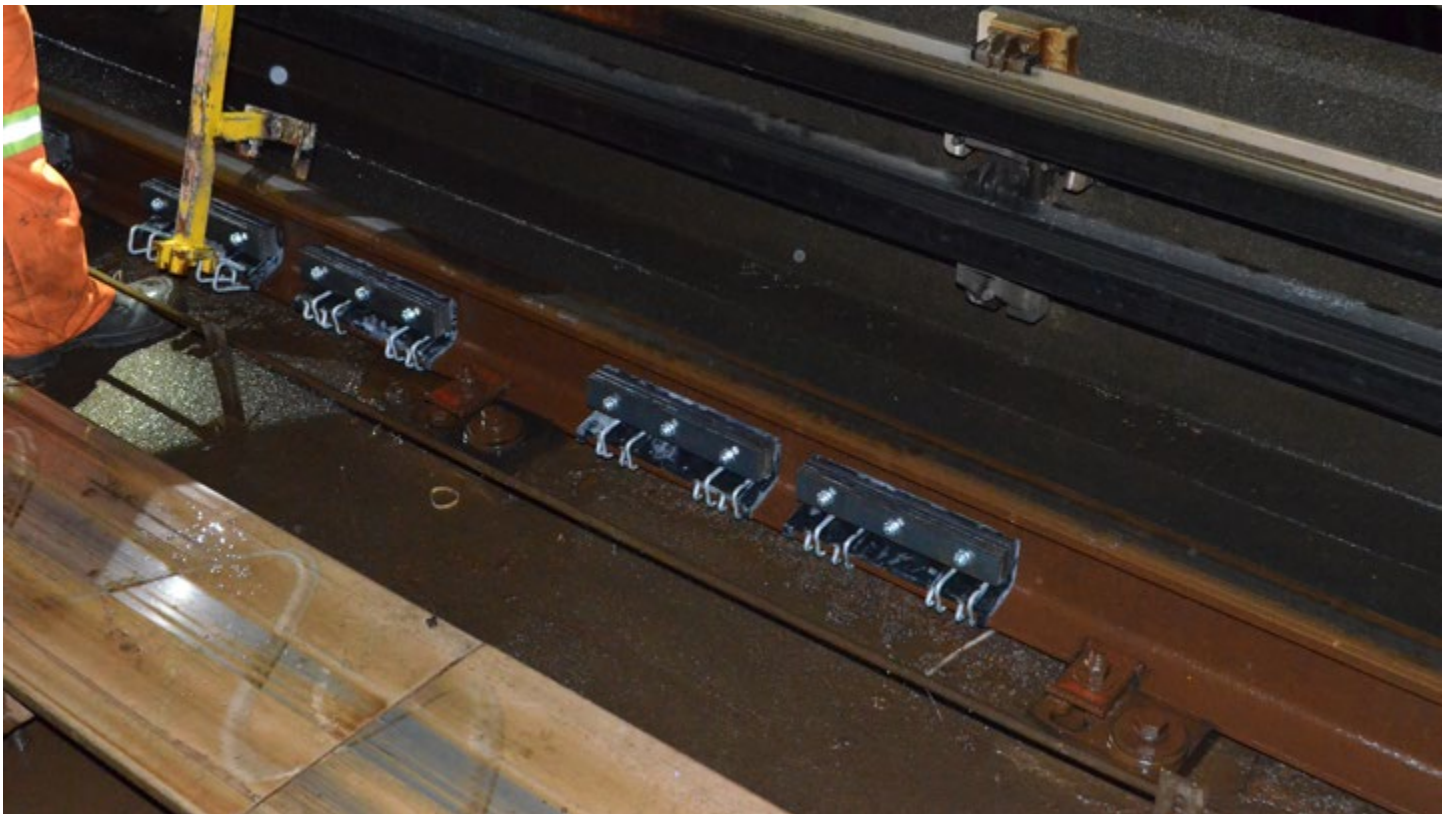
Prominent features:

- Simple installation (no rail drilling)
- Long life
- Maintenance free (visual inspection)
- Low cost
- Made in USA by Nortrak

HOW IT WORKS

By coupling the rail to a steel mass via a damped spring (a sandwich of rubber and steel components), each damper absorbs some of the energy of vibration and dissipates it as heat. This has the effect of increasing the damping factor of the rail, increasing the decay rate of rail vibration as a function of distance from the wheel, and ultimately reducing air borne noise. Each damper design is unique for a particular rail section. We optimize the type and size of rubber used to tune the working frequency of the damper to match the type of rail to be damped.





Thank you very much for your interest. Please visit our web site or contact a Nortrak sales professional if you have any questions or if you need assistance.

Rail Dampers
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