



**BRITISH  
STEEL**



# INTERACTIVE PRODUCT GUIDE

Unlocking the potential with steel

BUILDING **STRONGER** FUTURES

# RAIL







### THIS IS AN INTERACTIVE E-BROCHURE:

You can navigate directly to the content that interests you by simply clicking on any hyperlinked text.



Links in green will take you to other content within the product guide.

## INTRODUCING BRITISH STEEL

British Steel is one of the leading steel manufacturers in Europe, producing around 3 million tonnes of quality steel products every year. We have manufacturing facilities across the UK and France, supplying premium products around the world. We also have a global network of regional sales teams, so our global customers receive local service.

British Steel was created when Greybull Capital bought the Long Products Europe business of Tata Steel in June 2016. It's a new start for us and is based on 150 years of heritage.

But we're not stuck in the past – we're looking to the future. We're moving forwards with a more streamlined organisation, more efficient processes and a more responsive approach.

## CONTENTS

Proud of our heritage - looking to the future	5
Understanding industry issues	6
How our products can help you succeed	12
Technical services to keep you on the right track	18



You can view your desired page by clicking on each page link.







# PROUD OF OUR HERITAGE - LOOKING TO THE FUTURE

At British Steel, we have a long history in rail manufacturing, having been previously known as Tata Steel, Corus, British Steel Corporation and Sogearail.

Rail production began in Workington in the mid-nineteenth century, when the first public railways were making a major impact on transport throughout the world. The plant stayed at the forefront of rail production for well over a century, until the rolling capability was moved to Scunthorpe where the cast steel was manufactured.

The company acquired the French rail manufacturer Sogearail and its Hayange rail mill in north-eastern France in 1999, allowing us to provide rail solutions to western Europe and across the globe.

The Hayange mill was the first in Europe to manufacture rail for high speed lines – its rail, manufactured for SNCF in France, included the east line of the high speed network where a TGV train broke the world speed record in 2007, reaching 356mph (574.8km/h).

Our innovations have included several world firsts including the Bessemer conversion method of steel production, continuous casting of rail steel, non-destructive testing technologies and the perfection of the universal rail-rolling process.

This is a tradition we strive to maintain with our continued commitment to the development of world class rail products and manufacturing processes.

## **Building stronger futures for the rail industry**

British Steel has been providing high performance rail products and technical services to the international rail industry for over 150 years.

We work in partnership with rail customers to understand their demands and develop products that directly address their needs. That means we play a central role in helping the rail industry rise to the challenges of higher traffic volumes, heavier axle loads and faster train speeds.

As a diversified steel manufacturer, British Steel not only supplies specially designed, premium rail products, but also a broad range of structural steel components to support all rail sector construction and engineering projects.





# UNDERSTANDING INDUSTRY ISSUES

**Our team of technical consultants offers unrivalled expertise and experience in track technologies. They are among the world leaders in metallurgy and possess in-depth knowledge of track product design, manufacture and performance.**





## ADDRESS WEAR

### Engineered for wear-resistance and longer life

Wear-resistance is a crucial consideration for rail selection in all projects and maintenance situations. From high-speed railways to heavy-duty freight tracks, modern vehicles, track geometry and support conditions can all result in extremely rapid rail wear. British Steel rises to the challenge of providing consistency in long, straight and flat rails, combined with high dimensional accuracy and assured steel integrity. In addition a range of premium wear-resistant grades have been developed which improve vertical and side wear-resistance to reduce lifetime costs where wear is limiting life. Specifying the right wear-resistant product for your rail project can make the difference between trouble-free, longer service life, and a poor performing, maintenance-heavy track.

**British Steel has supplied more than 1 million tonnes of heat treated, wear-resistant rail across 6 continents.**



See our products for addressing wear here

## COMBAT RCF

### Reduced fatigue for maximum rail life

Rolling contact fatigue (RCF) is one of the key degradation mechanisms leading to reduced rail life. The ever harsher demands imposed on railways, such as increased axle loads, vehicle speeds, traction control and traffic densities, have served only to exacerbate the problem. By working with our partners and continually investing in innovative R&D, British Steel has developed a range of products that is specifically engineered to combat RCF, while maintaining optimum performance. Improved resistance to RCF means rail grinding requirements are greatly reduced, increasing rail life whilst decreasing maintenance, resulting in lower rail life cycle costs.

**British Steel's HP335 has been adopted by Network Rail as its premium rail of choice to combat RCF and wear.**



See our products for combating RCF here



## REDUCE FOOT FATIGUE

### The most foot fatigue-resistant grades available

Rail foot fatigue is a major cause of rail breakages across the industry, impacting old rail towards the end of life in any conditions and also on relatively new rail in the most challenging conditions. It's particularly damaging as no track inspection system can identify foot fatigue deterioration ahead of rail failure.

We've invested €12 million in expanding our patented heat treatment process at our rail mill in Hayange, France, to create a range of rail products with enhanced hardness that provide further protection against the risk of rail failure. Our unique rail heat treatment process produces our Stress-Free steel grades (guaranteed <50MPa foot stress), offering extreme wear-resistance combined with an unparalleled low residual stress, substantially reducing foot fatigue. These unique properties make British Steel the supplier of choice for the most arduous track conditions, with products that are able to resist wear on tight curves, heavy axle loads and high duty locations, and provide a step change reduction in risk of foot fatigue.

*Our state-of-the-art plant at Hayange produces Stress-Free heat-treated rails of up to 108m, providing a unique to world combination of exceptional wear- and foot fatigue-resistance.*



See our products for reducing foot fatigue here



## PREVENT RAIL CORROSION

### Combating the most rapid corrosion

Harsh environments, such as coastal routes, salt pans, tunnels, level crossings and areas of stray electric current can cause considerable corrosive damage to steel rails. Wet or salt conditions have the potential to significantly reduce the lifespan of rails, meaning a dedicated approach is needed.

Thanks to our continuous commitment to research and innovation, British Steel has developed corrosion-resistant rail coatings, such as Zinoco®, that offer increased protection against corrosion and can vastly extend rail service life.

*Since 2009, more than 40km of our coated rail has been installed in level crossings, stray current environments, tunnels and coastal routes, typically extending corrosion protection by 5-10 times.*



See our products for preventing rail corrosion here





## EXTEND GROOVED RAIL LIFE

### Outstanding quality and performance

We have extensive experience in the manufacture of grooved rail for urban mass transit systems. In fact, British Steel grooved rail is installed on most European urban networks, and many more prestigious transport systems worldwide.

Our proven manufacturing expertise and stringent production standards – from bloom manufacture to final testing – ensures our grooved rails deliver exceptional quality and optimum performance every time. Capitalising on our deep understanding of the application of steel in urban environments, we work closely with our customers to develop innovative grooved rail products that maximise rail life, reduce life cycle costs and minimise the carbon impact of tramway networks.

*British Steel grooved rail is installed on projects all over the world, including Belgium, France, Germany, Italy, Morocco, the Netherlands, Portugal, Switzerland, the UAE and the UK.*



See our products for extending grooved rail life here

## REDUCE NOISE

### Meeting legislations for noise reduction

As the popularity of rail travel continues to grow all over the world, so too does the need for rail systems that allow for quieter rail traffic, for the benefit of local residents and businesses. There is also an increasing need to comply with expanding noise-related legislation, especially in Europe.

British Steel engineers have teamed up with experts from Southampton University's Institute of Sound and Vibration Research to develop SilentTrack®, an innovative system that cuts rail traffic noise by up to 50%, by absorbing noise generating vibrations within the rail.

*SilentTrack® has been installed on more than 175km of track worldwide.*



See our products for reducing noise here



## ENSURE ELECTRICAL CONTACT

### Constant contact

Surface corrosion on the head of rails can often lead to track circuit signal failures due to poor electrical contact between rail and vehicle. A traditional solution is to lay a stainless steel zig-zag weld bead along the top of the rail. However, there are a number of disadvantages with this method, such as increased noise, an imposed low speed limit on treated track, coupled with the high cost of applying the weld in service and an increased risk of spalling of the applied bead.

By working closely with our customers to understand their needs, British Steel has developed Sogenox®, an innovative solution that provides proven, fully reliable connectivity between vehicle and track ensuring track circuit continuity at full line speed.

*Sogenox® has been approved by SNCF and has been used on all track types, including high speed lines.*



See our products for ensuring electrical contact here



## REDUCE TRACK RENEWAL COSTS

### Reduced ballast requirements for ease of installation

Track renewal is a very costly procedure, requiring not only rail, sleepers and their delivery, but also spoil disposal along with the associated costs of labour, plant and track possession.

Working closely with our customers to understand their individual requirements, steel sleepers from British Steel are designed and configured to meet axle loads, line-speeds, rail profiles and fastening systems. With lower ballast requirements than concrete, quicker installation times and ease of transportation due to their ease of stacking, steel sleepers help reduce the overall cost of track construction and renewal.

*British Steel has a long and proud history of supplying steel sleepers worldwide, with strict quality assurance processes in place to ensure every delivery will have a long life in service.*



See our products for reducing track renewal costs here





We combine dedicated customer service with world-class design and technical consultancy to develop and deliver high quality rail solutions that add value to your business.



# HOW OUR PRODUCTS CAN HELP YOU SUCCEED





## Led by innovation, developed by experts

As a leading global steelmaker, British Steel combines state-of-the-art metallurgical expertise with in-depth rail industry knowledge and a collaborative ethos. This enables us to develop and manufacture premium steel products that directly address your unique rail needs.



You can click on each title in these tables to read more.

### Rail to survive track degradation

	Address wear	Combat rolling contact fatigue	Reduce foot fatigue	Extend grooved rail life
MHH range	*****	***	***	
SF range	***	**	***	
HP335	***	***	*	
BLF range	*	*****	*	
R260 For comparison	*	*	*	
R350HT For comparison	***	**		
ML Range	***	**	*	*****

Stars indicate multiples of life per attribute versus standard grade rail

### Rail products to solve environmental challenges

	Prevent rail corrosion	Reduce noise	Ensure electrical contact	Reduce installation costs
Zinoco®	*****			
SilentTrack®		****		
Sogenox®			*****	
Steel sleepers				*****

## MHH RANGE

### Unique heat treatment for exceptional wear-resistance

Our specialist rail mill in Hayange, France, creates a range of rail products that maximise head hardness, including the world's most wear-resistant, Maximum Head Hardness (MHH) grades, MHH375 and MHH388.

MHH is the most wear-resistant rail in our heat-treated range. Composed of the finest pearlitic microstructure, MHH provides exceptional resistance to wear and rolling contact fatigue, control of plastic deformation along with a world-beating low residual stress (<50MPa) to provide a step change improvement in foot fatigue resistance. Available to CEN, AREMA and other specifications, it provides the highest levels of wear resistance for the most demanding conditions. Designed for use on tightly curved and heavy haul tracks, it reduces rail degradation and foot fatigue, extending rail life.



For more information, download our SF range datasheet



## SF RANGE

### A step change improvement in foot fatigue performance

Wear-resistance and uniquely low residual stress for reduced foot fatigue are the hallmarks of SF, British Steel's Stress-Free heat-treated range.

Our SF rail is produced using a unique patented heat treatment process that ensures good wear-resistance. The low longitudinal residual foot stresses (<50MPa) achieved during manufacture substantially reduce the risk of rail foot fatigue failure compared to all other heat treatment methods. Designed for use on curved and heavy haul tracks, it is available to EN, AREMA and other national and international standards.



For more information, download our SF range datasheet



## HP335

### Excellent wear-and RCF-resistance

HP335 is our High Performance non heat-treated rail grade and is our most wear-resistant non heat-treated rail. Its patented composition is metallurgically engineered to offer improved resistance to both wear and rolling contact fatigue (RCF) compared to other non-heat-treated rails.

HP335 is the ideal solution for areas where rolling contact fatigue and wear are key issues. The improved resistance to both degradation mechanisms means that rail grinding and track maintenance requirements are greatly reduced, delivering extended rail life and reducing rail life cycle costs. Previously known as HPrail®, it is designed for curved track and other high duty areas. HP335 received full product approval from Network Rail (UK) in July 2012.

### LET'S TALK

If you'd like to receive more technical information on HP335's in-track performance, please email [rail@britishsteel.co.uk](mailto:rail@britishsteel.co.uk)



For more information, download our HP335 datasheet

For details of our steel grades

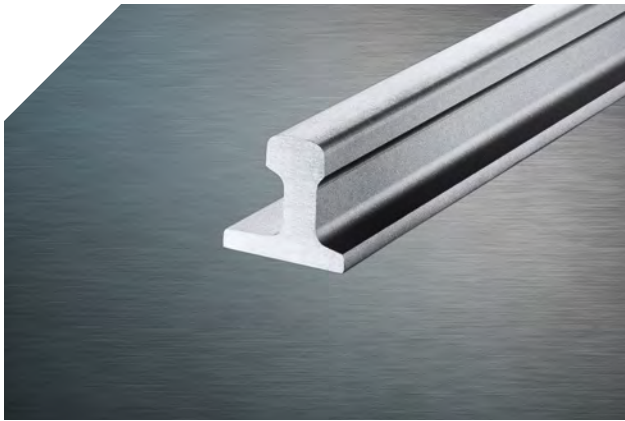
please click here >

For details of our flat-bottomed vignole rail dimensions and properties

please click here >







## BLF RANGE

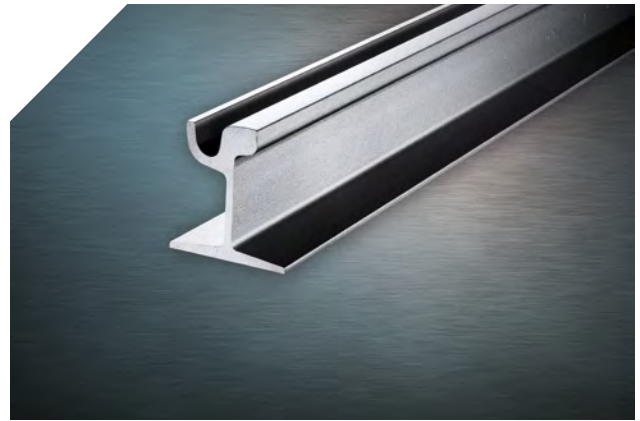
### Durable design for movable points and switchblades

The unique microstructure of our Bainitic Low Fatigue (BLF) rail provides exceptional resistance to rolling contact fatigue (RCF), even under extreme traffic densities and arduous conditions. The increased protection against RCF of this low carbon, carbide-free product leads to reduced maintenance requirements and lower life cycle costs.

Available in two grades, BLF320 and BLF360, it is designed for switchblades and mobile points on high speed track that have a higher risk of rapid premature failure. Its performance is proven by over a decade of use in France, Switzerland and the Channel Tunnel. With its proven reliability, all new French high speed movable points are now manufactured using our BLF rail.

*For dimensions and properties of our special rail*

[please click here >](#)



## ML RANGE

### Extending life time-after-time

British Steel's Multi-Life grooved rail (e.g. ML330) is engineered to provide the best wear-resistance and weld-restorability of any grooved rail on the market.

Ideal for tight curves prone to high rates of wear, its resistance to vertical and lateral wear is comparable to the hardest grooved rail grades and can avoid the need for hard-facing prior to installation.

Our ML grooved rail range typically extends the first use phase by a factor of three. What's more, its unique composition and microstructure means side wear can be robustly and repeatedly restored in-track using our patented low pre-heat welding process, postponing rail renewal and reducing life cycle costs.



**For more information, download  
our Grooved rail brochure**

*For dimensions and properties of our grooved rail*

[please click here >](#)





## ZINOCO®

### Unbeatable corrosion protection

Coated rail from British Steel provides superior protection against corrosion for longer rail life. Zinoco®, the most durable corrosion protection solution available, is ideal for arduous conditions such as coastal environments, tunnels, level crossings, sabkhas and areas of stray current as, unlike traditional coatings, it offers two lines of defence. Not only does it provide a durable barrier to combat corrosion, it also provides sacrificial protection, which means it still works even if the coating is damaged.

Perhaps the most telling demonstration of our coated rail's effectiveness is the 20 times life extension observed in a level crossing application, which led to our product approval by Network Rail. And with over 40km of our coated rail installed since 2009 in some of the most challenging environments, customers can be assured of exceptional corrosion protection.

#### LET'S TALK

*If you'd like to receive more technical information on Zinoco's in-track performance, please email [rail@britishsteel.co.uk](mailto:rail@britishsteel.co.uk)*



**For more information, download our Zinoco datasheet**



## SILENTTRACK®

### Less noise, more benefits

Our patented SilentTrack® system tackles noise at its source and can be fitted to a wide variety of rail sections with no/low impact on railway maintenance.

SilentTrack uses 'tuned dampers' to reduce the noise generated by rails as train wheels pass over them. Developed in conjunction with Southampton University's Institute of Sound and Vibration Research, the dampers are attached to either side of the rail, absorbing the vibrations and preventing noise generation. The efficient on-track installation process means 1,000 metres can be installed in a single 4-hour track period, keeping possession times to a minimum.

Independent measurements have shown that the SilentTrack system will give overall reductions in train pass-by noise of between 3dB(A) and 6dB(A), depending on the characteristics of the track, and the railway traffic using the track.



**See how much SilentTrack reduces pass-by noise compared to original track**



**For more information, download our SilentTrack brochure**





## SOGENOX®

### Full speed-assured electrical contact

Sogenox® is our innovative solution to combat the risk of electrical contact issues that occur on infrequently used routes due to oxidation. It offers effective electrical connectivity for signalling with no compromise on rail/wheel interface or line speed restriction.

Sogenox rails have an austenitic stainless steel crown that is integral to the rail. Its robust interface between rail and stainless steel layer ensures track circuit continuity at full line speed with reduced maintenance costs and greater track availability.



## STEEL SLEEPERS

### Lower lifetime costs and more efficient logistics

Steel sleepers from British Steel are designed for use in all types of application, from metre gauge railways to mainline passenger and heavy haul freight routes.

Our steel sleepers require less ballast than traditional concrete sleepers, leading to reduced track construction and renewal costs. Also benefiting from a smaller carbon footprint, our steel sleepers are 100% recyclable, making it easier to hit sustainability targets.

Our steel sleepers are stackable and the lighter sections can be manually handled onsite or moved in bundles by a forklift – often requiring only a third of the vehicle movements needed by concrete sleepers, using our steel sleepers helps to keep transportation costs to a minimum.



See how much Steel sleepers can save your track renewal project compared to concrete sleepers



For more information, download our Steel sleepers datasheet

# TECHNICAL SERVICES TO KEEP YOU ON THE RIGHT TRACK





**Our technical team is available to provide advice and support, helping you to optimise your rail selections. Rail products and grades can be matched precisely to track conditions, track types, environmental conditions and a host of other variables to ensure that every rail we deliver provides optimum performance throughout its service life. The wide range of technical services we offer is designed to help improve operational efficiency and network integrity all types of rail networks:**

### **Light rail**

We carry out detailed condition surveys covering all aspects of fixed infrastructure to effectively benchmark assets, monitor their performance and direct maintenance strategies to address degradation such as wear and corrugation.

### **Heavy rail**

We advise networks on the most cost-effective material selection and design for new track installations, as well as adding value by advising upon maintenance strategies for existing infrastructure.

### **Metallurgy and materials technology**

Experienced metallurgists and materials technologists help to design and select track system components to meet specific duty requirements. The team works closely with network operators and maintainers to enhance network performance, reliability and safety.

### **Failure analysis**

Our extensive knowledge of rail steel metallurgy and understanding of fracture mechanics means we can provide a full range of investigative services to establish the root causes of failure, as well as recommending corrective and preventative actions. If you have unexplained track or component failures, then our team can probably help.

### **Track system modelling**

Our modelling specialists combine site information with proven track behaviour data, offering a fast, cost-effective method of track modelling. Our sophisticated modelling tools mean we can determine future defects and consequences of future track degradation, helping customers develop cost-effective maintenance and renewal policies.

### **Track monitoring**

Our multi-disciplined team has vast experience of monitoring the in-service performance of rail networks. Monitoring techniques range from detailed visual inspections to using precise instrumentation and non-destructive testing. Assessments aren't restricted to just on-track environments - noise and vibration evaluation also forms part of the services we offer. Survey results can be used to identify causes and rates of degradation, helping rail operators predict performance and develop appropriate techniques for effective asset control.

### **Welding technology**

Our welding technology consultancy service helps customers produce reliable welds, reduce weld maintenance costs and extend rail life. We can develop welding schedules designed to control weld geometry, optimise weld process control and enhance process monitoring and analysis.

### **Laboratory testing**

We can conduct a wide range of laboratory tests to international standards, as well as designing and building bespoke test arrangements. These provide customers with independent certification of the performance of safety-critical railway components. Laboratory testing can also be used to investigate the performance of worn components to optimise their service life.

### **Asset management**

Our theoretical and practical investigative techniques can be applied to enhance understanding of the in-service performance of complete railway systems. This asset data can be used to support informed decisions about inspection maintenance and renewal activities.

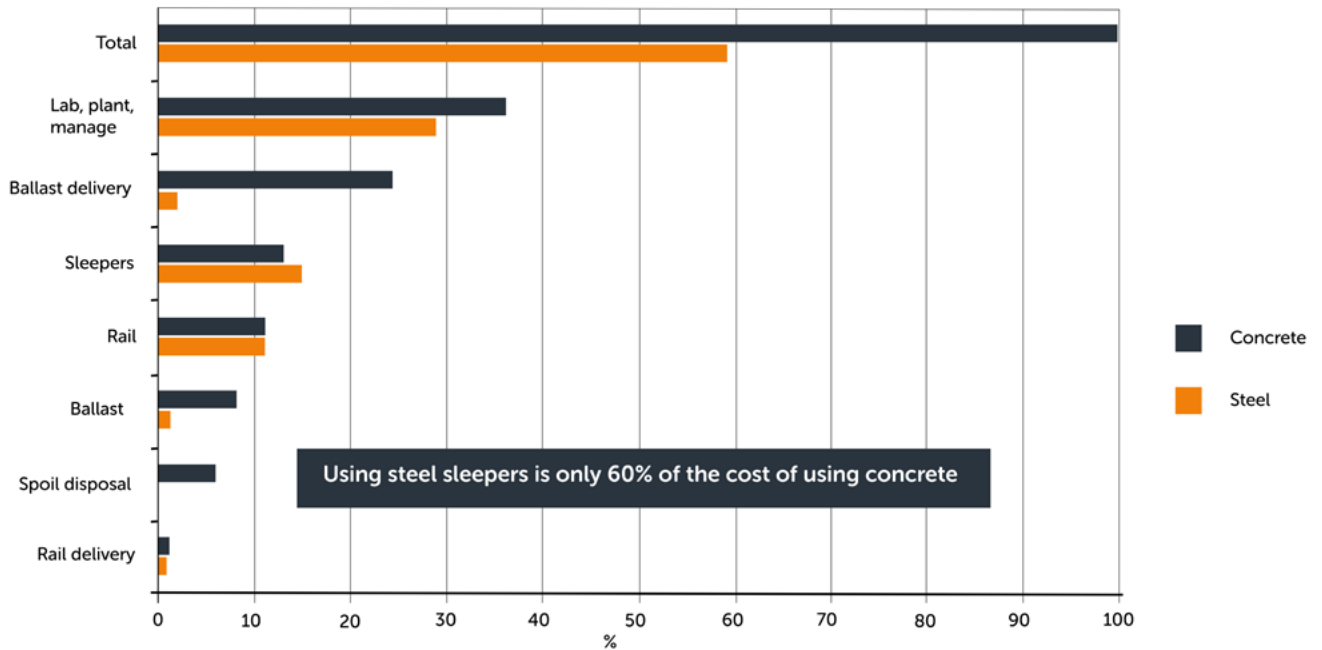


# APPENDICES

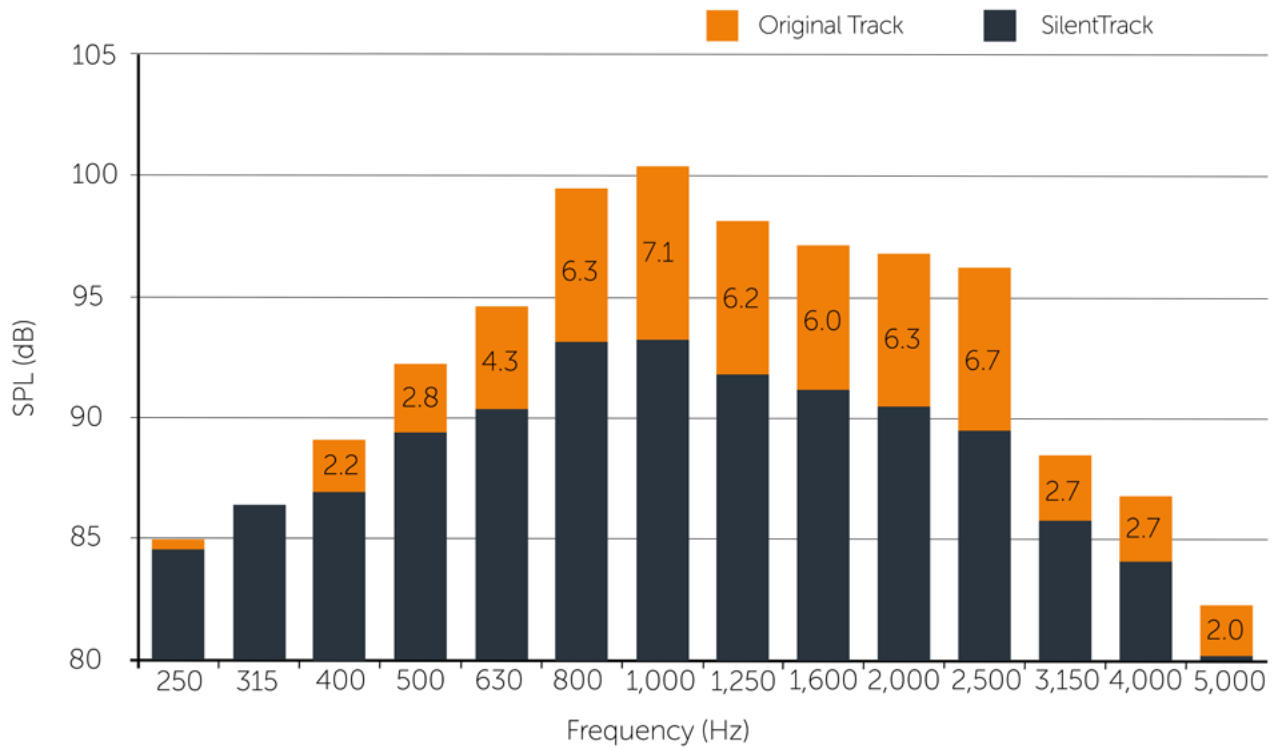


# INSTALLATION COST BENEFITS OF USING STEEL SLEEPERS VS CONCRETE

Installation cost benefits of using steel sleepers vs concrete



## PASS-BY NOISE REDUCTION USING SILENTTRACK VS ORIGINAL TRACK





## BRITISHSTEEL.CO.UK/RAIL

### UK - Manufacturing Facilities & Commercial

**A** | PO Box 1, Brigg Road, Scunthorpe, DN16 1BP, United Kingdom  
**T** | +44 (0)1724 404040 **E** | [rail@britishsteel.co.uk](mailto:rail@britishsteel.co.uk)

### France - Commercial

**A** | 2, avenue du Président Kennedy, 78100 Saint-Germain-en-Laye, France  
**T** | +33 (0)1 39 04 63 00 **E** | [rail@britishsteel.co.uk](mailto:rail@britishsteel.co.uk)

Zinoco®, SilentTrack® and Sogenox® are registered trademarks of British Steel in the United Kingdom and/or other countries.

Care has been taken to ensure that the contents of this publication are accurate, but British Steel Holdings Limited and its subsidiaries and associated undertakings (having the meaning set out in the Companies Act 2006) do not accept responsibility or liability for errors or information that is found to be misleading.

Copyright British Steel 2017

British Steel Holdings Limited is registered in England under number 10185111 with registered office at 31 Hill Street, London, W1J 5LS.

BUILDING **STRONGER** FUTURES

RPG:INT:ENG:052017