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Rail technology experts at Corus offer a comprehensive range of services to improve operational efficiency and network integrity.

Our multi-disciplined team of consultants has a thorough understanding of rail system behaviour. Drawing on many years of experience in the railway industry, our consultants offer expertise in metallurgy and materials technology, mathematical modelling, track monitoring and welding technology. This expertise is matched by our proven track record in project delivery and by our extensive appreciation of the issues facing modern networks. We use this knowledge and expertise to help our customers get the best from their track systems.

We work in partnership with our customers to tackle key issues with an impact on infrastructure performance. These include operational issues, such as the demand for railways to carry larger volumes of traffic, and issues that affect the bottom line – such as economic pressures to reduce life cycle costs. Network safety is always an integral part of our work. Through the application of both theoretical and practical investigative techniques, we are able to devise technical solutions and management strategies to improve and prolong track life and to reduce costs.

Our growing list of satisfied clients – both in the UK and overseas – encompasses major mixed traffic railway networks and inner city light rail systems.

We offer a range of track monitoring services to identify track degradation and help our customers to avoid disruptive and costly unscheduled maintenance.

Track monitoring

A track system suffers from many types of degradation. A practical understanding of that degradation is vital if it is to be corrected, slowed down and managed. Developing this understanding requires precise, methodical and expert observation, accurate measurement of track conditions and monitoring of the track system's response to the passage of rail vehicles.

Our multi-disciplined team has spent many years studying the in-service performance of rail networks – monitoring both plain line and switches and crossings.

Our monitoring techniques range from detailed visual inspection and survey to the use of precise instrumentation and non-destructive testing. All inspection and survey work is conducted in strict accordance with relevant line and safety standards.

Our skills in data analysis mean that we can translate our findings to identify the cause and rate of degradation and to predict future track system behaviour. We then work closely with our customers to develop appropriate techniques for controlling track quality.

All inspection and survey work is conducted in strict accordance with relevant line and safety standards.

Our experience shows that computer modelling is an invaluable tool in the accurate prediction of system behaviour. Not only that, it saves time and money too

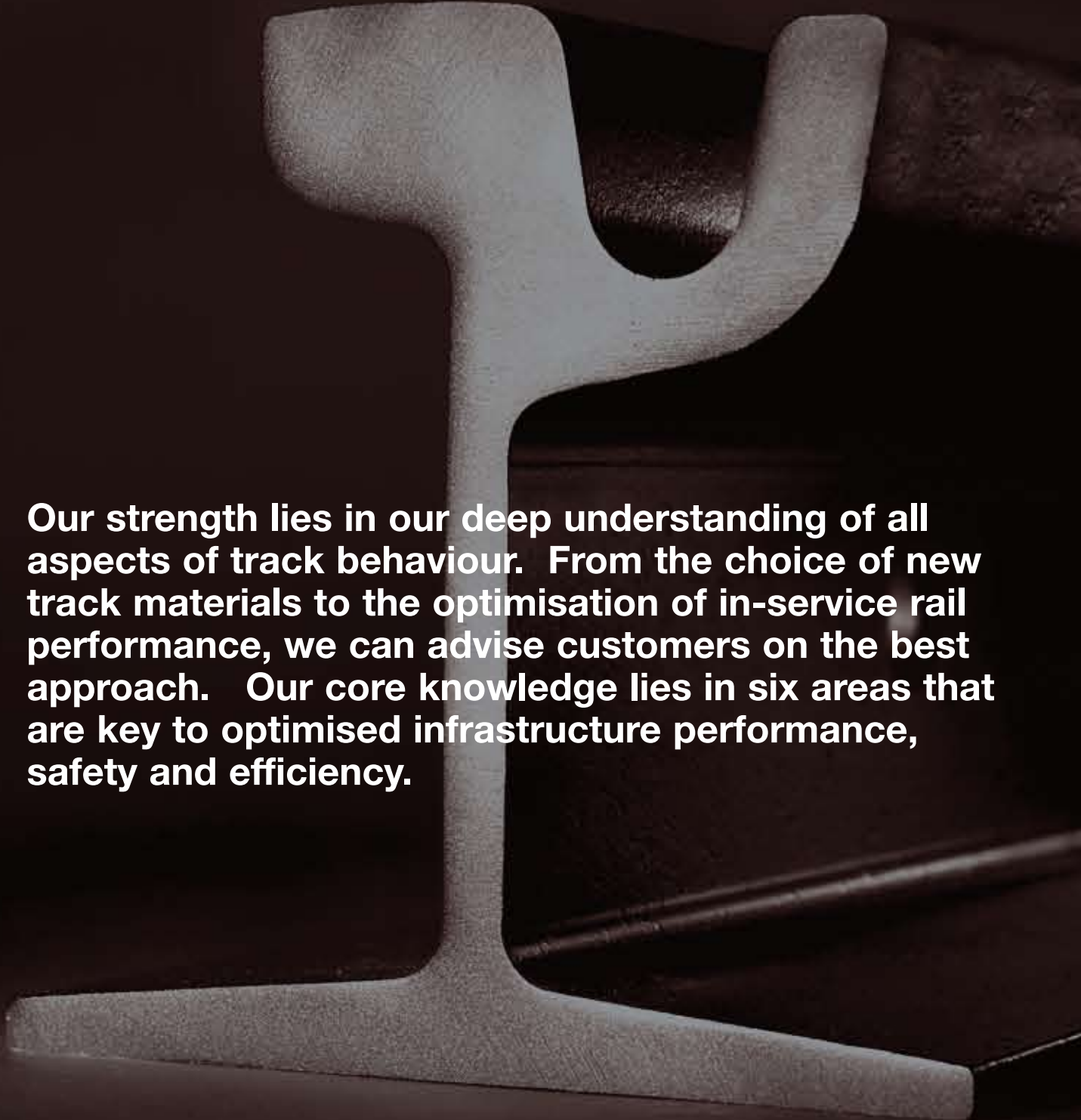
Track system modelling

Our modelling specialists combine site data with proven track and vehicle models to examine track behaviour in detail. It is quicker and more cost-effective than conducting track trials. It also enables sensitive 'what if' studies – such as the evaluation of proposed new track components or vehicles – with no risk or disruption to the railway system.

Skilled use of our sophisticated modelling tools provides several

other benefits. It means we can determine the future effects and consequences of track degradation through the simulated acceleration of degradation processes. This information can be crucial in the development of cost-effective maintenance and renewal policies. System modelling also provides a detailed understanding of the interaction between individual track components and assemblies – helping customers to manage their track assets effectively.

more than expertise



Our strength lies in our deep understanding of all aspects of track behaviour. From the choice of new track materials to the optimisation of in-service rail performance, we can advise customers on the best approach. Our core knowledge lies in six areas that are key to optimised infrastructure performance, safety and efficiency.



Broken and defective rails can have serious safety implications for network operators and users. We apply our expertise in failure analysis to help our customers avoid the unthinkable.

Failure analysis

In addition to the safety implications, component failure is a significant source of disruption to railway operations. We understand how critical it is to identify individual failure modes and to formulate and apply corrective and preventive action.

Our knowledge and experience in the field of railway component fatigue and fracture analysis is second to none. In particular, we are recognised for our expertise in the examination of defective rails – a capability bolstered by our extensive knowledge of rail steel metallurgy and our detailed

theoretical and practical understanding of fracture mechanics.

Our technologists and analysts use a comprehensive array of investigative techniques to establish the root causes of failure. They include microscopy, image and composition analysis, mechanical testing and non-destructive testing. Using this knowledge, we are able to recommend corrective and preventive actions to reduce the number of broken or defective rails and to improve operational performance and safety.

Our knowledge and experience in the field of railway component fatigue and fracture analysis is second to none.



Operating as part of Corus, it probably comes as no surprise that we have extensive knowledge of steel including all rail grades. But did you know that we also have considerable experience of rail grinding and the use of stainless steel and coatings to prevent corrosion?

Metallurgy and materials technology

The track system is a complex assembly of components that must meet a range of duty requirements. As pressure grows on railways to carry larger volumes of passenger and freight traffic, those duty requirements are increasing and the opportunities for maintenance are decreasing. That's where we come in.

Our metallurgists and materials technologists recognise the importance of designing and selecting track system components to meet duty requirements. We also understand that those components must be chosen with reference to track design and vehicle parameters and to all the issues surrounding installation and maintenance.

We work closely with network operators and maintainers to help them make the right choice of components and to enhance network performance and safety. We offer advice on current standard rail grades and how to optimise their use and we also share our expertise in new hard steels and specialist steels and in rail grinding. For network areas with specialist requirements, our materials technologists can advise on the application of composites and we have considerable experience in the use of stainless steel and coatings to prevent corrosion.

Our many decades of work within the railway industry have provided us with considerable experience in rail welding. We can advise on a range of welding techniques and we use our know-how to develop cost-effective welding schedules.

Welding technology

We have a thorough understanding of all the welding techniques commonly used on railways throughout the world. We work with customers on a wide range of projects related to flash butt (both plant-based and mobile), aluminothermic, gas pressure and repair welding. For instance, we have undertaken independent approval testing of mobile flash butt welding plant and conducted analysis of aluminothermic weld

process defects. In the field of gas pressure welding, we have modelled a heating and forging mechanism to assist in the development of modified burner manifolds to ensure tight control of weld geometry and profile.

Our welding technology consultancy services aim to assist customers to reduce weld maintenance costs and extend weld life. We do this through the development of welding

schedules designed to control weld geometry, optimise weld process control and enhance process monitoring and analysis.

We can also advise clients on the optimisation of the weld process to ensure adherence to national and international specifications. This could involve streamlining of the welding process itself or the improvement of stripping and grinding procedures.



We have a thorough understanding of all the welding techniques commonly used on railways throughout the world.

Our wide-ranging expertise in track-related technologies means we are able to offer a variety of track system support services. These include bespoke technical training, independent evaluation and services designed to reduce life cycle costs.

Systems management support

Our consultants combine their expertise and experience to work with network operators and maintainers towards a better understanding of track system management issues and improved system performance. For instance, our track monitoring experience has provided us with a clear insight into the short-term operational pressures and the long-term strategic goals pertaining to the rail industry. When we combine that with our system modelling capability and our knowledge of processes such as high-speed rail grinding, we are in

a unique position to help our clients develop maintenance practices to reduce life cycle costs.

Our support services include independent evaluation of products and systems designed for use on the railway network. For example, we can prepare and conduct thorough validation programmes to test the capability of new equipment against appropriate performance standards. We also regularly provide several methods of condition monitoring technology to the railway industry – enabling

detailed knowledge to be gathered on the current condition of both track and vehicle assets.

In the field of training, we offer bespoke technical training designed to raise awareness of track system issues and to develop competencies across a broader range of railway industry employees. The result is a workforce better equipped to detect track defects in their early stages and classify them correctly – enabling cost-effective corrective action.

Over the years, our close working relationships with customers have resulted in a string of success stories.

more than a partnership

Expertise is a valuable commodity. But we recognise that it has to be applied in the right way to make a difference. That means having an understanding of the everyday issues and long-term goals of the railway industry. Our long and extensive experience within the industry is invaluable to us on this front. But using our knowledge to find viable solutions for our customers also means that we need a detailed appreciation of the specific challenges facing them. We try to put ourselves in their shoes and to ensure that our service is the most appropriate for the task in hand.

We like our working relationships with customers to be fuelled by a joint determination to succeed. Our consultants are quick to share knowledge and insight amongst themselves when they form a multi-disciplined team. They also recognise that sharing information and communicating honestly with customers is the best way to guarantee meaningful results.

Over the years, our close working relationships with customers have resulted in a string of success stories. For example, we have shared our knowledge of new, hard steels to improve rail networks that were suffering as a result of rolling contact fatigue and high rates of side wear in curves. In the field of failure analysis, we have developed long-term and beneficial relationships with customers that have enabled accurate and current failure mode data to be maintained. This has meant that failure trends can be determined and addressed through ongoing improvements.

Our partnerships also often extend beyond the bounds of our immediate customers. When we were asked to determine the effect of introducing a new fleet of trains onto an existing track infrastructure, we were careful to involve all project stakeholders including vehicle owners, operators and maintainers, infrastructure owners and maintainers and industry advisory and safety bodies. We felt it was essential to understand and reflect all points of view in order for our study to be of meaningful use.

We enjoy working in partnership with our customers. But our idea of partnership goes way beyond an open and honest relationship and a commitment to shared goals. We want to share our knowledge and strengths. We want to make our customers feel valued. And we want to make a contribution to the long-term success of the railway industry.



We do not shy away from challenges. We face them head on. We use our experience and expertise in rail technologies to develop innovative solutions that will stand the test of time.



more than ideas

As demands on our rail networks grow – and as expectations regarding safety and performance increase – it is important that we keep ahead of the game. At Corus, we believe our technical solutions must not only meet today's needs but must take into account likely future needs.

Our metallurgists and materials technologists keep fully up to date on advances in their fields and are able to offer informed advice on how new material technologies can be exploited to the benefit of track systems. Likewise, our modelling experts take full advantage of the best that modern-day computing technology has to offer.

In addition, we are able to call on the comprehensive expertise of our colleagues within Corus Technology Research Centres. Here, scientists and technicians have established a reputation for excellence as they work with international customers and expert institutes to develop and utilise new products and processes.

Where our customers are concerned, we treat each project and task on an individual basis – seeking the most suitable and cost-effective solution to satisfy their needs. Quite often, this requires thinking 'outside the box' and an innovative approach. This was the case when we were asked to develop a robust method for the repair of grooved rail for a tram network operator. The result was a consistent and robust weld deposition technique – and significant cost benefits for our customer.

At Corus, we believe our technical solutions must not only meet today's needs but must take into account likely future needs.

A close-up photograph of railway workers in bright orange high-visibility safety gear. They are working on a railway track, with gravel and metal rails visible. The workers are focused on their task, and the scene is brightly lit, suggesting a sunny day.

more than a promise

We want our customers to feel confident about working with us. We use best practice in everything we do and we take pride in honouring our commitments and delivering on our promises.



We want everything we do to stand up to scrutiny. We have gone to great pains to ensure that we deliver our service in a professional, safe, consistent and reliable way. Our business processes and our methodologies are all geared to ensuring quality, control and proper accountability.

Our project management service incorporates best practice and clearly defined processes. Risk mitigation planning and visibility of project progress are hallmarks of our work in partnership with our customers. Our experienced project managers have a proven track record in the successful delivery of rail-related projects of varying scope size and value.

We apply validated cost engineering techniques and we use intelligent data analysis to ensure that the work we do is thorough and accurate – and that it will assist our customers in informed decision-making. Our expertise in data analysis supplements all of our project activities and is particularly useful in converting track asset data into meaningful information required by track engineers.

We are fully accredited to ISO 9001:2000 and our management systems ensure all aspects of project delivery are fully auditable and subject to a rigorous continual improvement process in order to deliver customer satisfaction. Several of our consultants are also experienced, fully-trained and qualified auditors. This in-house expertise in quality management and standards enables us to offer our clients related services including training and awareness courses, gap analysis reviews and auditing.

Corus Rail Technologies ...
more than expertise
more than a partnership
more than ideas
more than a promise