



RAILWAY
SYSTEMS
by voestalpine

MIXED TRAFFIC

Availability Up – Cost Down
Intelligent Saving with the Technology Leader



SYSTEM COMPETENCE FOR CONVENTIONAL RAILWAYS

Today greater train frequencies, increasing travelling speeds, new drive systems and higher axle loads are already making extreme demands on the public infrastructure network. They also fundamentally impact on the mobility of tomorrow: There will also be a growing demand for larger capacities based on smart, environmentally compatible, economical, comfortable and safe transport solutions in passenger and freight traffic. This demand is placing tremendous requirements on rail infrastructure throughout the world. Tracks must be robust, ride comfort high, and noise should be avoided as far as possible. The need to look after our environment calls for modern, sustainable manufacturing processes on the part of suppliers. Fulfillment of these requirements requires innovative and intelligent products designed with a provider's expertise – including integrated system and service solutions. As a global technology leader voestalpine Railway Systems offers its customers trendsetting concepts on all continents – and so for all climatic conditions. We apply these to improve service life, availability, reliability and ease of maintenance

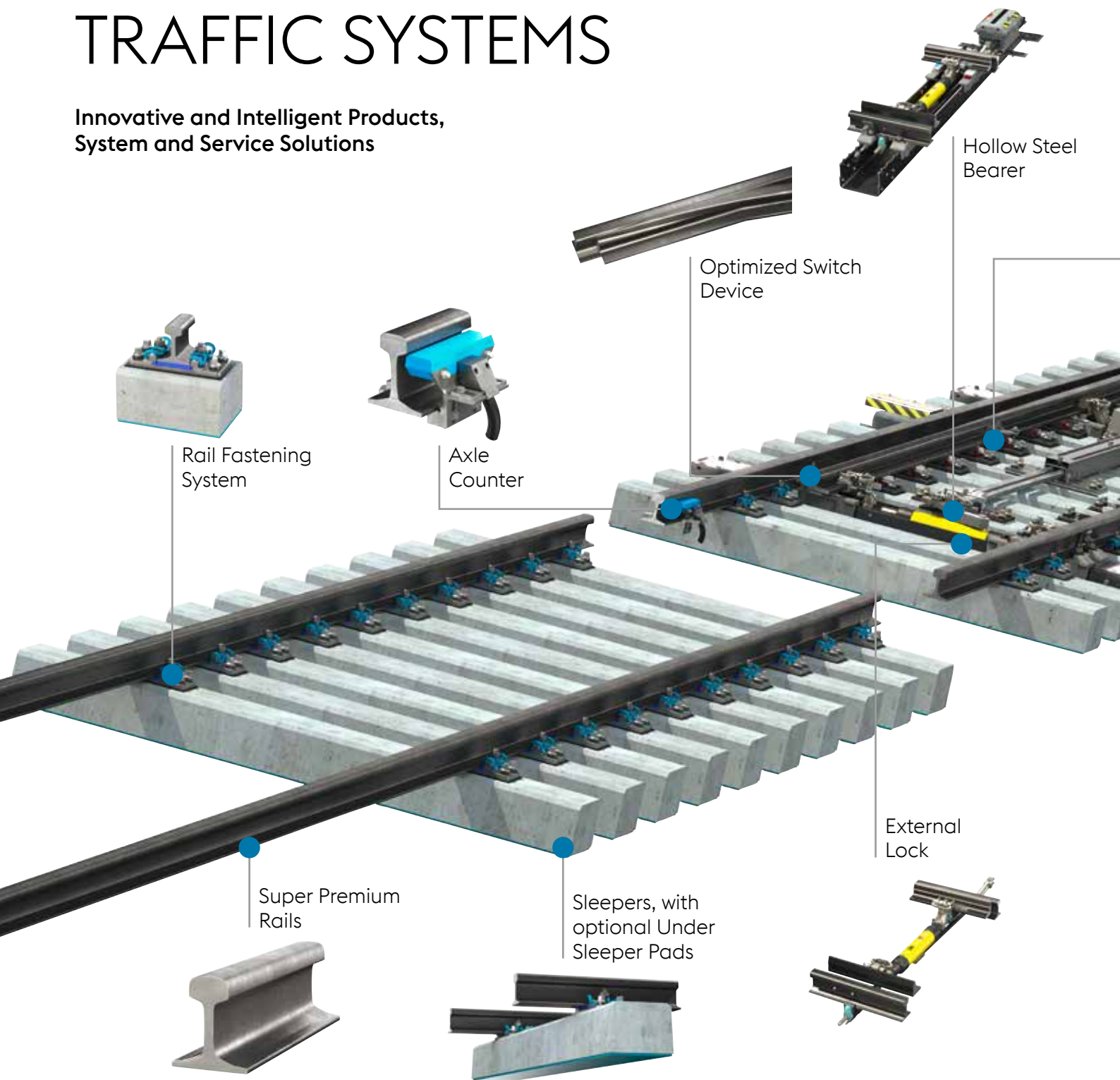
for rails, turnouts and signaling technology, in addition to monitoring/diagnostic processes.

A pioneer in the consideration of economic (LCC) and technical (RAMS) optimization potential, we have developed data resources and a wealth of experience that allow us to come up with customized further developments. With some 60 sites all over the world we are able to bundle our knowledge, helped by the combination of cutting-edge technology and systems expertise for all rail track. This means we can supply customers with localized products and services which are tailored to their needs and offer them added value. voestalpine Railway Systems stands for overall solutions with maximum efficiency – so helping customers get ahead in terms of technology and competition.



RETHINKING MIXED TRAFFIC SYSTEMS

Innovative and Intelligent Products, System and Service Solutions



Options:



Alternative Switch Device



Built up Crossing



Alternative Rail Fastening System



Switch Machine with Integrated Locking / Setting System



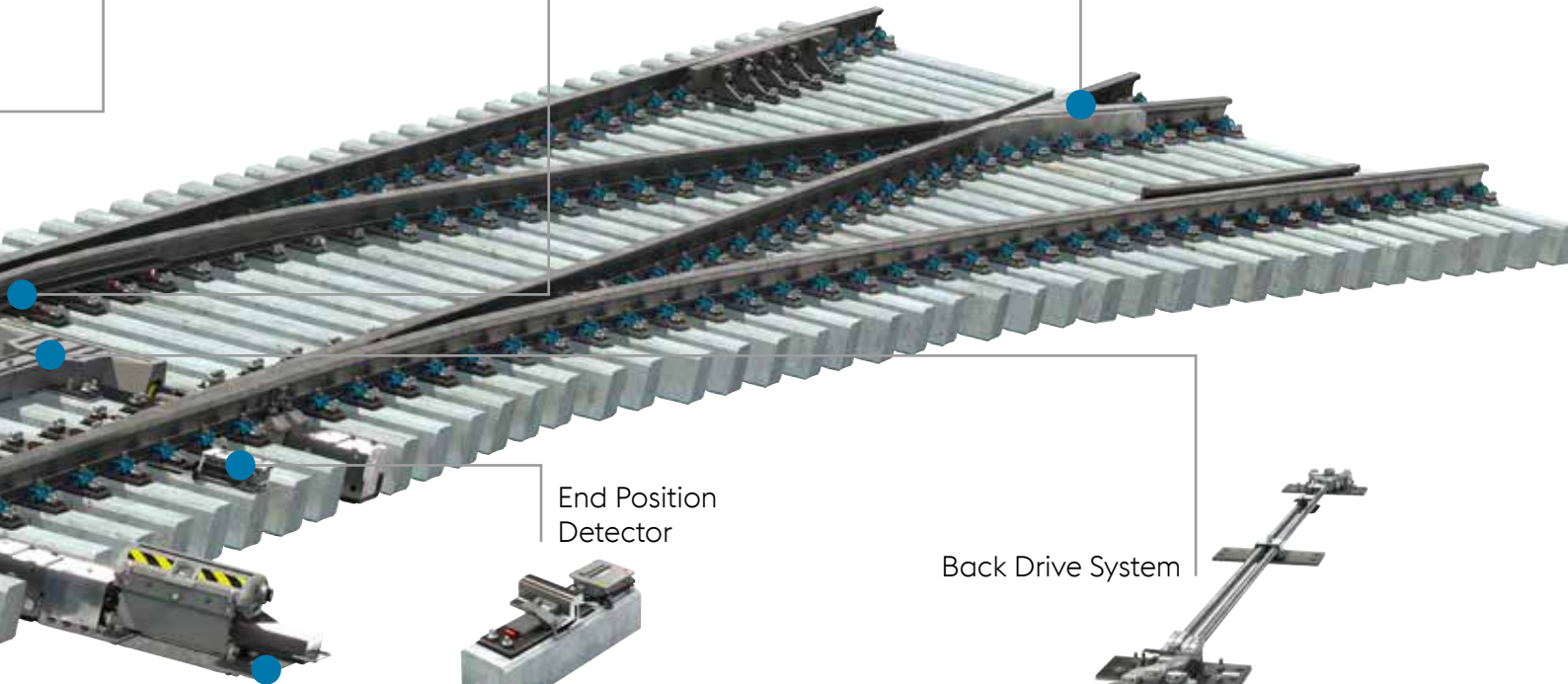
Inner Stock Rail Fastening



Integrated Roller System



Manganese Crossing



End Position Detector



Back Drive System



Point Machine for External Lock

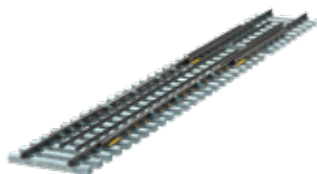


zentrak Ecosystem

Diagnostic, Monitoring and Asset Management Systems for Infrastructure and Rolling Stock



Insulating Joint



Rail Expansion Joint



Coated Rail



OPTIMIZED RAIL TRACK WITH RAIL GRADE 400 UHC[®] HSH[®]



Railroad rails are one of the steel products subject to the greatest stress. Network operators all over the world are thus faced with daily challenges such as rail wear, crack formation and other damage to rails occurring during operation. All damage mechanisms have one thing in common: They significantly impair track performance and can be overcome only with major financial expense and at the cost of reduced system availability. We can however counter this with the widest range of heat-treated high-performance grades to be found in the world – the result of our HSH[®] technology, which has been continuously developed based on unparalleled experience.

The high-grade pearlitic steel 400 UHC[®] HSH[®] (conforming to Euronorm R400HT) combines this technology with an innovative materials concept. It is able to reduce damage in the track by a factor of 6 in comparison with standard grades (R260), and by a factor of 2 compared with heat-treated rails in the conventional performance category (R350HT). The ‘green’ low alloy concept (non-alloy rail steel) also ensures first-rate weldability here. Where economics are concerned, the resistance to all types of rail damage – previously unknown in the mixed traffic sector – offers major optimization potential in the track: It is possible to save an entire investment cycle.

Added Value for You:

- » **Maximum resistance to rolling contact fatigue, wear and corrugation**
- » **Maximized operational availability with minimum life cycle costs**
- » **Simple to weld thanks to the innovative materials concept of a non-alloy pearlitic rail steel**
- » **Noise attenuation effect through minimized corrugation**
- » **Customized application recommendations via our interactive Rail LCC tool, including a comparison with different investment and maintenance strategies (“path-to-optimum” access)**
- » **Years of outstanding experience with the standard application**

EFFICIENT TURNOUTS FOR VERSATILE DEMANDS

Whether facing snow or ice, sand in the desert or extreme temperatures – the railway network has to be safe and sustainable as well as economical and comfortable at the same time, functioning properly in all corners of the world. We have therefore made it our objective to optimize this system and offer smart and innovative products and services to deliver solutions fit for the future: Besides classical switch products in all rail sections and gauges, we also manufacture special track components such as rail expansion and insulating joints or transition rails. We offer solutions for growing demands – for both automated and self-adjusting systems and checks – and this way improve the availability and service life of rail track, which is set to play an increasingly important role in the mixed traffic sector in coming years.

Innovative Products and System Solutions for Maximum Requirements:

- » Intelligent System turnouts and diamond crossings
- » Design-optimized switch devices
- » Movable point frogs
- » Manganese frogs
- » Built-up crossings
- » (Elastic) ribbed base-plates/roller systems
- » Rail expansion joints/special designs
- » Sleepers made of concrete/plastic/wood/steel
- » Fastening components
- » Comprehensive service package



Added Value for You:

- » Systems expertise and responsibility (integrated safety assessments/verifications)
- » Tailor-made solutions for all customer requirements (innovative, environmentally friendly and economical)
- » Combination of global experience (under different environment/load conditions) from the boundary of the high speed and heavy haul sector for optimization in mixed traffic
- » The only manufacturer with an integrated rail basis and comprehensive expertise in rail track
- » In-depth knowledge of manganese casting
- » LCC and availability-optimized products
- » CO₂-optimized manufacturing processes
- » Large in-house fleet of tilted-load freight cars for delivery of turnouts / pre-assembled ready for laying
- » Global cooperation with Getzner Werkstoffe for optimization of elasticity levels in the track (innovative, high-quality components for under sleeper pads, rail/base-plate pads, etc.)

INNOVATIVE SETTING, SIGNALING & MONITORING TECHNOLOGIES



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Innovative Switching, Locking and Monitoring Devices

Years of experience and extensive knowledge about turnout systems allow us to offer innovative solutions which are compatible with a wide range of interlocking technologies.

- » Complete setting systems, point machines (with/without integrated locking), locking systems, back drive systems, end position detectors and
- » Turnout control systems, point heatings, axle counters and wheel sensors

Intelligent Monitoring and Diagnostic Systems

Cutting-edge technologies allow voestalpine to offer fully digitized smart monitoring in the following areas:

- » Monitoring of track systems and fixed infrastructure assets (incl. turnout diagnosis, monitoring of track movement or track circuit)
- » Monitoring of rolling stock (incl. monitoring of box and brake disk temperature, wheel defects, train profiles or environmental conditions)

The direct recording of the asset condition and assessment of targeted information through our Central Management Software zentrak, allows optimized asset management, efficient maintenance planning and to avoid unnecessary preventive maintenance.

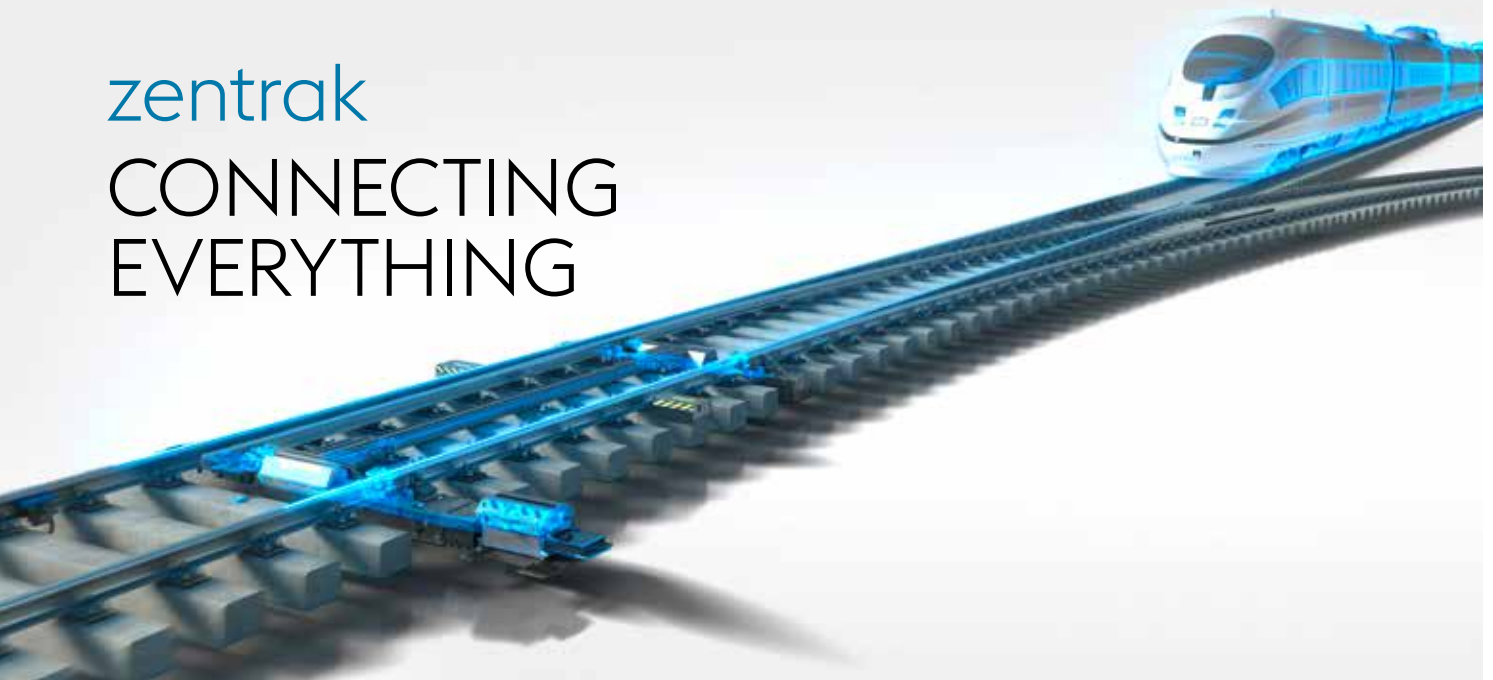
Added Value for You:

- » Compatible with a wide range of interlocking technologies
- » Encapsulated components
- » Minimized space requirement
- » Can be retrofitted
- » Extended inspection intervals and optimized asset management
- » Modular diagnostic platform and planning instrument
- » Integration in higher-level systems possible

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CONNECTING EVERYTHING



THE INTELLIGENT, CONSCIOUS AND LIVING RAILWAY ECOSYSTEM

Your railway network keeps the world moving forward: but your infrastructure is only as strong as the technology that holds it together. That's where zentrak comes in: our intelligent, living railway ecosystem enables you to create and manage the most efficient, reliable, and high performing railway track assets in the world.

zentrak's three modules Rolling Stock Monitoring, Infrastructure Monitoring, and Asset & Maintenance Management combine as a catalyst for cost effective digitalization and sustainable, long term growth: building a future in which your railway network thrives intelligently.

Infrastructure Monitoring

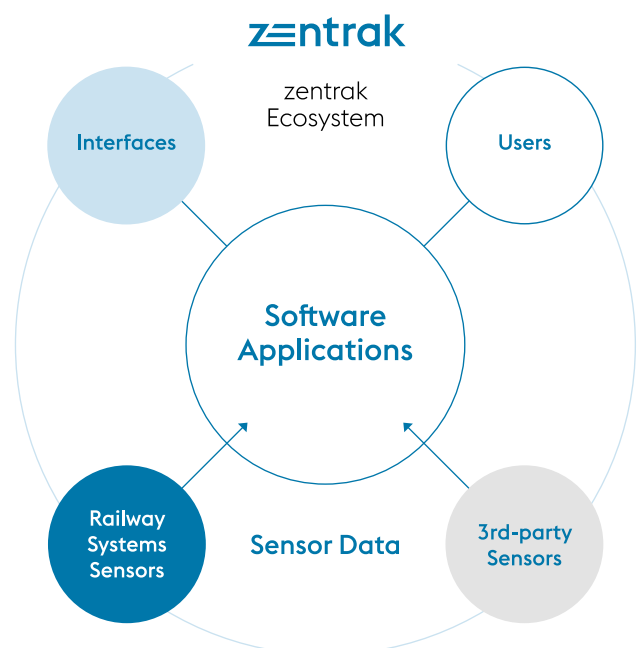
- » Continuously records the condition of your infrastructure
- » Enables proactive condition-based maintenance for maximum availability and the lowest lifecycle costs

Rolling Stock Monitoring

- » Provides a variety of measurement technologies
- » Enables the combination of individual site diagnostic and monitoring functions at a single location
- » Software applications for real-time analysis, interpretation, and presentation of diagnostic results

Asset and Maintenance Management

- » Allows you to manage your assets throughout their entire lifecycle
- » Supports data-driven decisions such as investments and improvements
- » Provides the foundation for a dynamic maintenance strategy



LIFE CYCLE SOLUTIONS – OUR EFFICIENT TRACK MANAGEMENT LEADS TO OPTIMIZED PERFORMANCE AND COSTS

From the idea to implementation, from training to consulting, from products via logistics to maintenance – with our Life Cycle Management for MIXED TRAFFIC we offer an extensive portfolio of services. They not only ensure great ride comfort at high running speeds, but also satisfy the requirements in terms of safety and quality. We stand for customized product and service solutions with minimized life cycle costs. We analyze the needs of our customers and recommend the best technical and most cost-effective solution for rails, turnouts and systems based on precise calculations.



PREPARE

CONSULTING, ENGINEERING & TRAINING

150 engineers are hard at work all over the world, developing specific solutions for our customers – from the planning, development and engineering phase through assisting with installation to optimizing maintenance strategies. At our academies we share our knowledge with customers in the framework of seminars and in-house training programs.



START

SUPPLY, LOGISTICS & INITIAL SERVICE

With our customized availability concepts and just-in-time logistics chains we supply our customers with the railway construction materials they need. Our initial services not only guarantee maximum installation quality – they also pave the way for reduced follow-up costs and an increased service life.



RUN

SMART MAINTENANCE SOLUTIONS

Maximizing availability, minimizing operating costs – those are the strategic objectives of our customers. Thanks to our combined product and service expertise we carry out preventive and corrective maintenance independently: Our service even includes processing scrap materials at the end of the life cycle.



PERFORM

TRACK MANAGEMENT

You want to concentrate on your business and ask capable partners to look after your railway infrastructure? We're the people for the job! Our Track Management with electronic diagnostic systems allows you to plan maintenance. So cutting costs – and guaranteeing high levels of availability.



LEADING THE WAY IN SUSTAINABLE RAILWAY INFRASTRUCTURE

At voestalpine Railway Systems we take our social and environmental responsibilities seriously. As the global leader for railway infrastructure system solutions, we understand the impact our products have on society and the environment.

We are dedicated to providing durable solutions that enable the operation of sustainable transport systems. Our commitment to ethical and legal conduct is governed by the voestalpine Code of Conduct, ensuring impeccable actions throughout our company and supply chains.

Why we need Sustainable Mobility Solutions

The need for sustainable mobility solutions has never been more pressing in a world shaped by urbanization, digitalization, globalization, and demographic shifts. As the demand for mobility driven by these megatrends continues to grow, it is imperative to address the challenges of climate change and resource depletion head-on.

Our Commitment to Eco-Friendly Railway Infrastructure Solutions

We are proud to be at the forefront of providing sustainable railway solutions that promote environmental stewardship, ensure longevity, and adhere to the highest industry standards.

Our focus on sustainability is built on three foundational pillars:

» greentec steel

Our revolutionary greentec steel initiative is at the heart of our environmental strategy. By pioneering new steel production methods, we significantly reduce CO₂ emissions, contributing to a greener planet.

» Longevity Solutions

Our products are designed for durability and resilience, ensuring they stand the test of time. By extending the lifespan of our railway infrastructure components, we reduce the need for frequent replacements, thus conserving resources and minimizing environmental impact.

» Certified Responsibility

We adhere to rigorous certification processes that validate our commitment to environmental and social responsibility. These certifications ensure that our practices not only meet but exceed industry standards, reflecting our unwavering dedication to sustainable development.



Visit us online

voestalpine Railway Systems
www.voestalpine.com/railway-systems

voestalpine
ONE STEP AHEAD.