



DIGITAL PERFORMANCE ON TRACK®

Diagnostic and monitoring
technologies for infrastructure



DIGITAL PERFORMANCE ON TRACK®

DIAGNOSTIC AND MONITORING TECHNOLOGIES FOR INFRASTRUCTURE

Your goal is to transport millions of people and freight quickly, safely and efficiently every day. Increasing demands on infrastructure and the requirement for 24/7 availability mean that you are being confronted by unprecedented challenges worldwide. Rising maintenance costs are often the result. But in order to survive in competition with other modes of transport, optimized life cycle costs are essential for you.

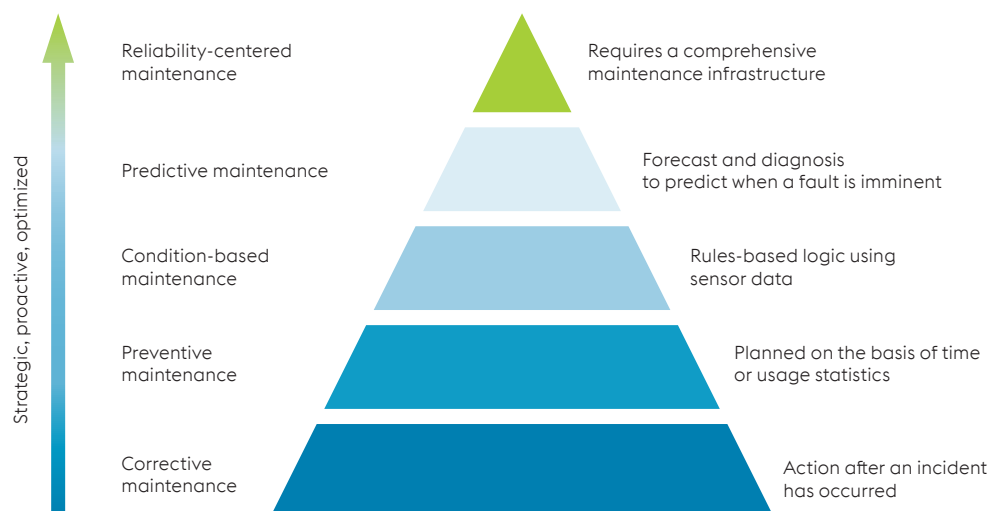
With our intelligent diagnostic and monitoring system ROADMASTER®, we record the condition of your infrastructure permanently. This enables proactive condition based maintenance. For the highest levels of availability. With the lowest lifecycle costs.

That's what we stand for. Digital Performance on Track®.

WHY USE DIAGNOSTIC AND MONITORING SYSTEMS?

- » Increasing traffic volumes, the megatrend towards urbanization and evolving customer requirements are predicated on 24/7 availability
- » Significantly increased utilization places greater stress on the track infrastructure
- » Further optimization of maintenance is required to cope efficiently and safely with increasing demand
- » Delays and interruptions lead to dissatisfied customers and lost revenue
- » Up-to-date asset information enhances tools for planning and delivery of maintenance work

ROADMASTER® is the answer to the increased demands in rail transport worldwide. We enable maximum route availability at the same time as optimizing lifecycle costs, thus contributing to increased profitability. In addition, we provide an effective support tool when maintenance work is required.



Our recommendation

A reliability-centered approach ensures a made-to-measure, successful maintenance strategy for each individual asset. The ability to plan maintenance and repair work guarantees you optimized costs over the entire lifecycle.

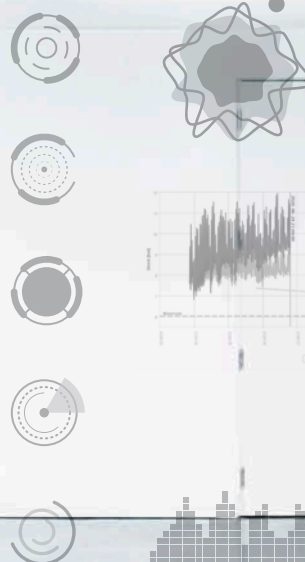
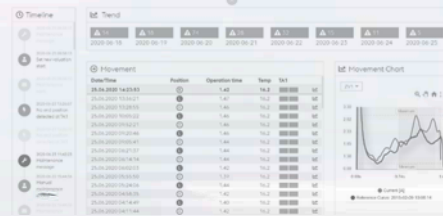
OUR CONTRIBUTION - YOUR ADVANTAGES

- » Domain expertise, competence and experience in the international turnout business for more than 160 years
- » Constant condition monitoring enables predictive, early fault detection and prediction of system performance
- » Remote monitoring of your assets guarantees highest cost-efficiency
- » Targeted information is available 24/7 – from situational awareness of the infrastructure to performance details of individual assets
- » Predictive maintenance reduces downtime and ensures maximum line availability
- » Better planning results in a reduction in maintenance-related overtime as well as optimizing maintenance management and spare parts logistics
- » Contribution to system networking to support the vision of Smart Cities
- » Provision of a digital tool for skilled personnel to implement optimized maintenance and right first time results
- » ROADMASTER® can be used by all sectors in the rail industry, and irrespective of infrastructure concept and age:



RAILWAY SYSTEMS

ROADMASTER® CATEGORIES





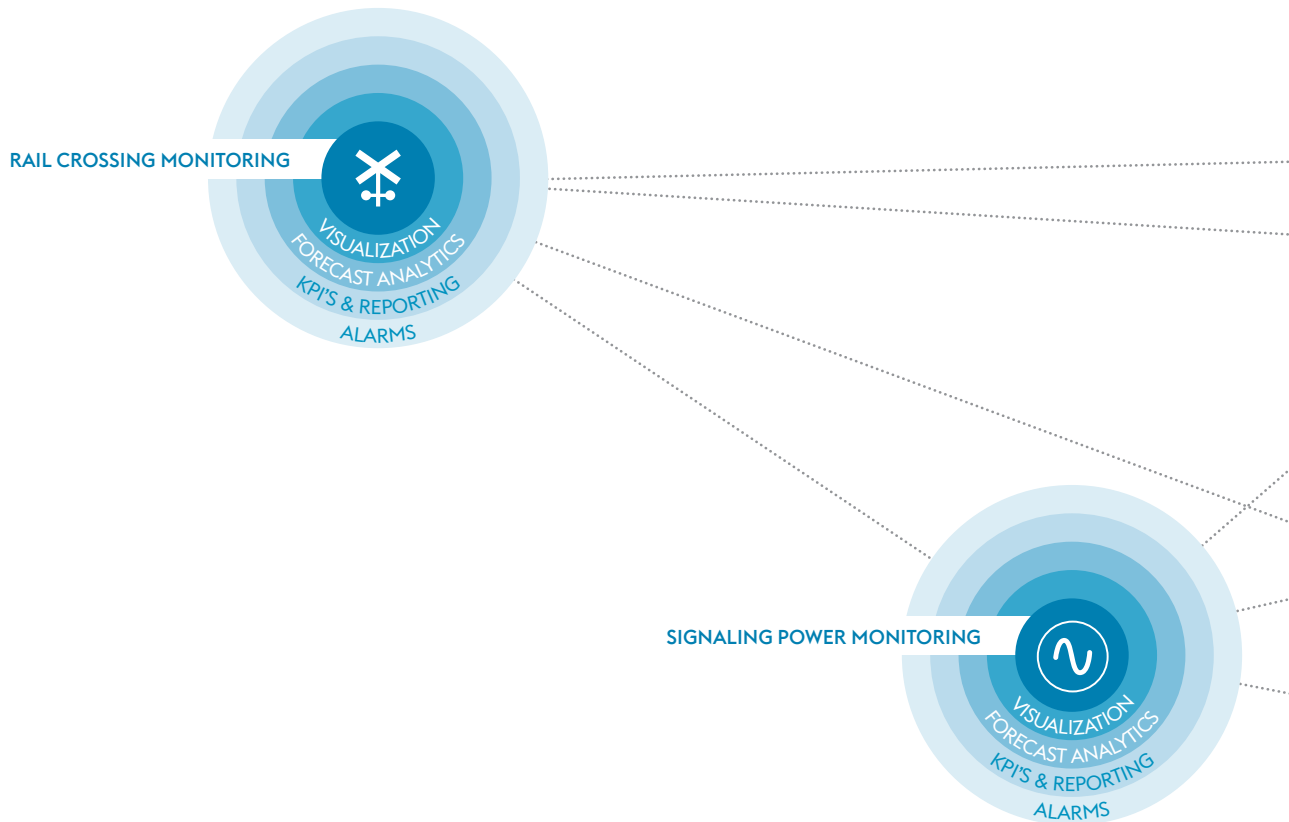
RAIL CROSSING
MONITORING

SWITCH CONDITION
MONITORING

TRAIN DETECTION
MONITORING

TRACK & RAIL
MONITORING

SIGNALING POWER
MONITORING

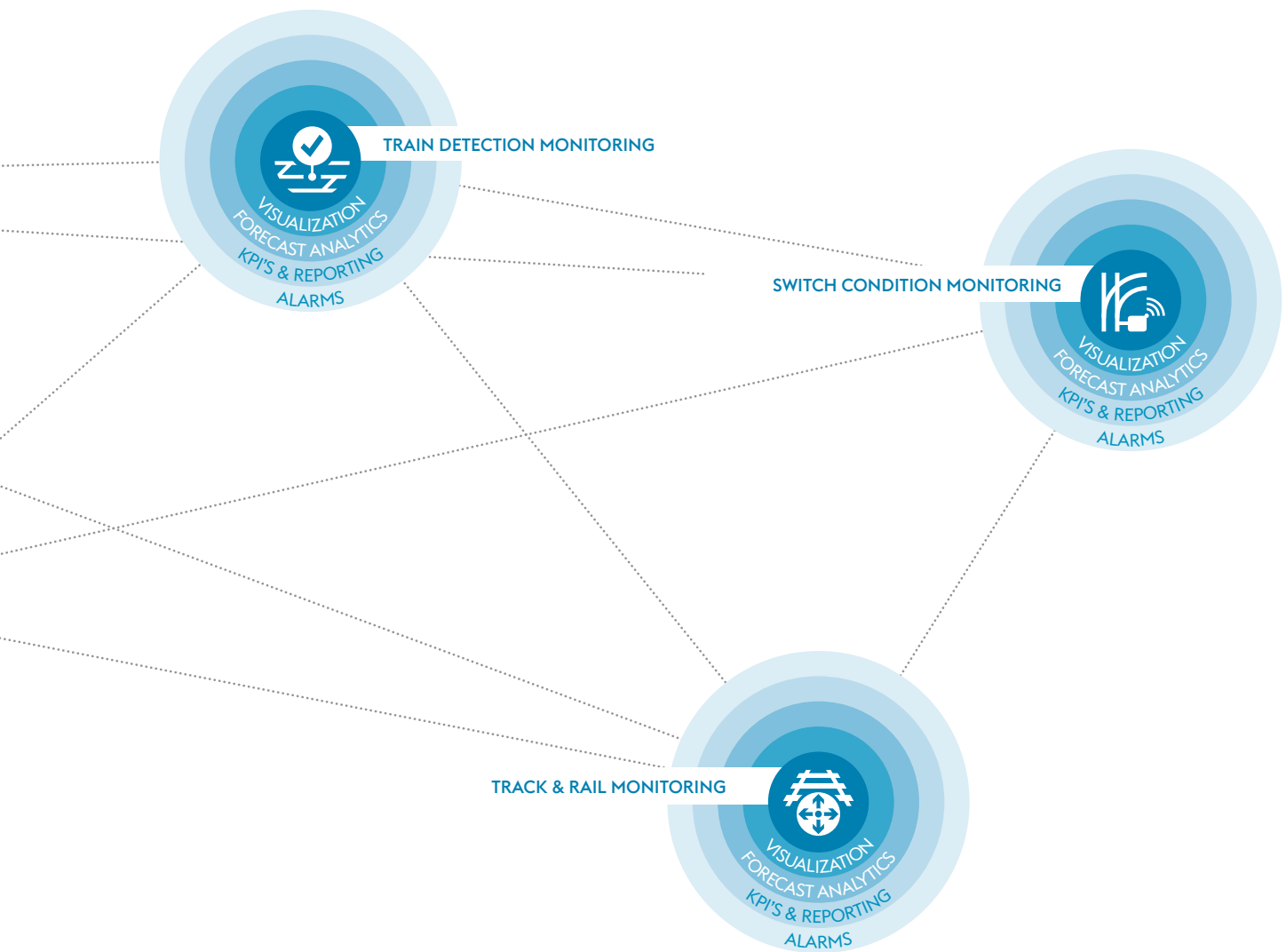


ROADMASTER®

ROADMASTER® offers a fully digitalized and intelligent monitoring system for trackside and fixed assets that can be individually adapted to the customer's needs. All categories and functions are available within an integrated software platform.

ADVANTAGES THAT CONVINC

- » Simple and intuitive operation from desktop or mobile devices
- » Multilingual user interface
- » Early detection of future fault sources
- » Real-time condition monitoring
- » Visualization of the as-is and to-be condition of the monitored assets
- » Data interpretation enables recommendations for action and thus predictive maintenance planning
- » Customizable user interface, reporting function and KPI's
- » Alarm function in the event of a deterioration or critical system condition



MADE-TO-MEASURE FUNCTIONS

Highly customizable functions make it possible to meet your precise needs, ranging from data acquisition to reporting functions.

Depending on the application, the recorded data is evaluated and specific condition and service information is developed. On "dashboards", the data is clearly displayed according to the end user in the following levels:

- » Management information
- » Regional overviews for area managers
- » Detailed view of individual assets for expert users

The clear display of asset conditions saves time and guarantees you focus on the essentials.

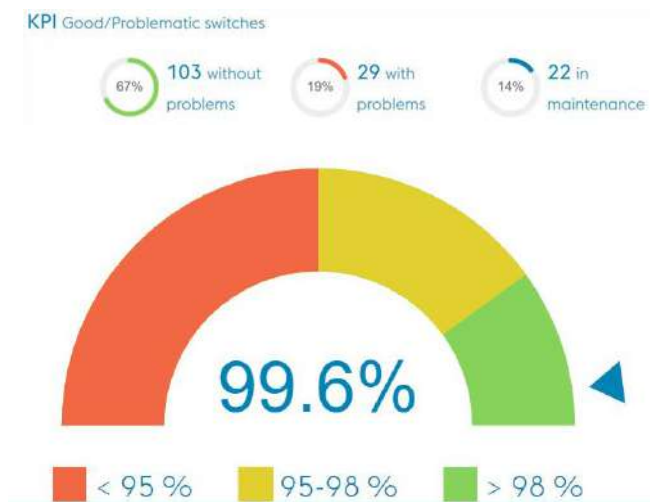
- » VISUALIZATION OF THE SYSTEM CONDITION
- » FORECAST ANALYTICS
- » KPI'S & REPORTING
- » ALARMS



“ THE FAILURE REDUCTION
OF 42 % SINCE USING
ROADMASTER® SCM
HAS CONVINCED US ”

VISUALIZATION OF THE SYSTEM CONDITION

ROADMASTER® visualization solutions ensure a clear display of the actual and target condition of your assets, independent of the browser and the terminal device used (PC, tablet or smartphone). The data is evaluated in a great depth of detail for each application.

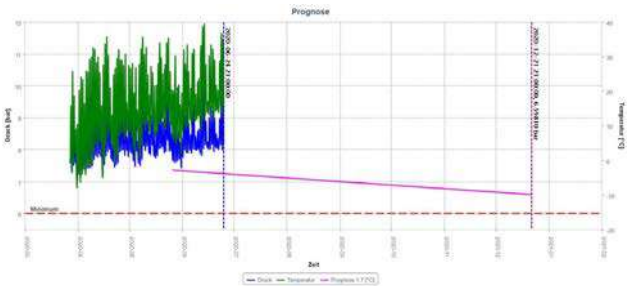


KPI'S & REPORTING

The asset condition is evaluated according to customer requirements and based on defined key performance indicators (KPIs). The graphical display guarantees a concise overview of the asset condition. Color coding (red) means that critical conditions can be seen at a glance. The reports can be generated in user selectable intervals (e.g. daily, weekly, monthly reports) and with content adapted to customer requirements. Based on the measurement data, statistics are generated which, through the application of filters, diagrams and the presentation of KPIs, provide a meaningful overall analysis result.

FORECAST ANALYTICS

The application of mathematical analytics models enables targeted and fact-based prevention of asset failures, taking past and current data into account. Some applications allow the expected remaining useful life of the monitored asset to be predicted even now, taking into account the current operating condition.



ALARMS

You will be given an automatic warning as soon as the asset enters a critical condition; the alarm limits for this can be individually defined. Depending on the type and severity of the fault, different escalation levels are provided and downstream processes such as information to maintenance personnel, diagnostics or fault cause analysis are triggered.





ROADMASTER® CATEGORIES

All available ROADMASTER® categories can be integrated via the diagnostic and monitoring platform, allowing the condition of the track or fixed assets to be analyzed and visualized as a whole.

By using various sensors, measured variables are quantitatively recorded in order to determine the performance and state of the monitored asset. The use of non-invasive technology allows a completely risk-free measurement. Hardware with flexible options that were developed specifically for railway applications, processes the information from the sensors. Special database servers analyze the recorded information and generate performance statistics for all assets, which are the basis for decisions on an availability-based maintenance strategy.

- » INDEPENDENT OF EXISTING INFRASTRUCTURE
- » TESTED FEEDBACK-FREE DATA ACQUISITION
- » APPROVED BY LEADING RAILWAYS ACROSS THE WORLD
- » POSSIBLE INTEGRATION WITH EXISTING IT ENVIRONMENT
- » TOOL FOR THE MAINTENANCE PROCESS



ROADMASTER® SCM SWITCH CONDITION MONITORING

Turnout system faults are normally the most frequent cause of costly delay minutes. By using intelligent switch diagnostic systems, imminent faults are detected at an early stage before the railway operations are negatively affected. In this way the necessary measures can be initiated promptly, failures can be avoided and maximum availability can be ensured.

MEASUREMENT POINTS

- » Measurements at the point machine (e.g. hydraulic pressure, force, current, power, etc.)
- » Position detection of tongue rails
- » Interlocking system (temperature, performance, ...)
- » Numerous other measurement points possible, e.g.
 - Acceleration
 - Temperature / noise emissions
 - Water level
 - Setting movements

ADVANTAGES

- » Independent of drive and interlocking technology
- » Modular design
- » Measuring points can be set as required
- » Simple retrofitting of measurement points
- » Flexible monitoring solution: data acquisition centrally in the signal box or directly at the turnout
- » Various national and international approvals available





ROADMASTER® TRM TRAIN DETECTION MONITORING

The various methods of train detection (including track circuit or axle counter) are a vital part of many signaling systems and maintaining their performance is fundamental to the safe operation of the rail network. TDM reliably identifies deterioration in performance and issues alerts to allow maintenance before failure occurs. Non-invasive sensors monitor for example energy levels in the track circuit and send the data to a central server where it is analyzed using specialist software with preset multiband alarm levels to detect when the operating characteristics of a track circuit start to deteriorate. Alarm events are sent to designated users who can react immediately and initiate necessary corrective actions in a timely manner.

ADVANTAGES

- » Reliably detects functional deterioration
- » Actual data analysis of the system condition
- » Early alarm in case of deteriorating operating behavior
- » Maintenance and initiation of necessary measures are possible before failure occurs



ROADMASTER® SPM SIGNALING POWER MONITORING

Signaling systems represent a central safety critical element in all railways. The performance and reliability of signaling systems is dependent on the quality and availability of the power supply network that feeds them. Signaling Power Monitoring (SPM) offers rail operators the opportunity to remotely monitor power supplies. The measurement of parameters such as voltage, current, battery condition and insulation resistance provides valuable data to the rail operators. This enables a comprehensive diagnosis of problems that may occur in power supplies, which shortens response times and ensures optimum availability of the systems.

ADVANTAGES

- » Reduction in power supply failures which cause significant delays
- » Valuable data on the condition of signaling systems for the railway operator
- » Comprehensive diagnosis of problems that occur in power supplies
- » Reduction in fault response times
- » Ensuring optimal availability of signaling systems



ROADMASTER® RXM RAIL CROSSING MONITORING

Rail crossings are a critical interface between the railway and the public that require regular maintenance and testing to ensure safety. RXM monitors and records the performance of rail crossings to enable proactive maintenance. Event recording produces a precise chronological log of the status of all controls and indications associated with the rail crossing operating system. Condition monitoring enables continuous data acquisition of the rail crossing components and sub-systems that may deteriorate between routine maintenance and inspection. Information is sent over a fixed network or wireless connection to a central server through which the maintainer receives maintenance notifications.

ADVANTAGES

- » Fewer failures and interruptions in operation
- » Possibility of reducing maintenance costs
- » Support in incident investigations
- » Continuous condition monitoring of system performance
- » A large number of monitored parameters (barrier position, motor, light signals, supply voltage, acoustic signals, control relays, etc.)



ROADMASTER® TRM TRACK & RAIL MONITORING

Rail movement and changes in rail temperature can have a significant impact on the performance and reliability of the track, installed assets and rail expansion joints. TRM reliably monitors track movements and rail breakage as well as changes in rail temperature. The measured values obtained in this way provide valuable data both for the reliability of track systems and for the structural integrity of bridges, and thus allow a comprehensive long-term analysis as a basis for efficient maintenance. Sensors continuously record vertical and lateral movements, rail breaks and temperature differences and transmit these values to a server. The data is evaluated and compared with corresponding reference data to enable early fault detection.

ADVANTAGES

- » Valuable data both for the reliability of track systems and for the structural integrity of bridges
- » Rail breaks are reliably detected by means of an ultrasonic detector system
- » Comprehensive long-term analysis as the basis for efficient maintenance planning
- » Comparison of the recorded data with reference data → early fault detection is possible



PERFORMANCE
ON TRACK®

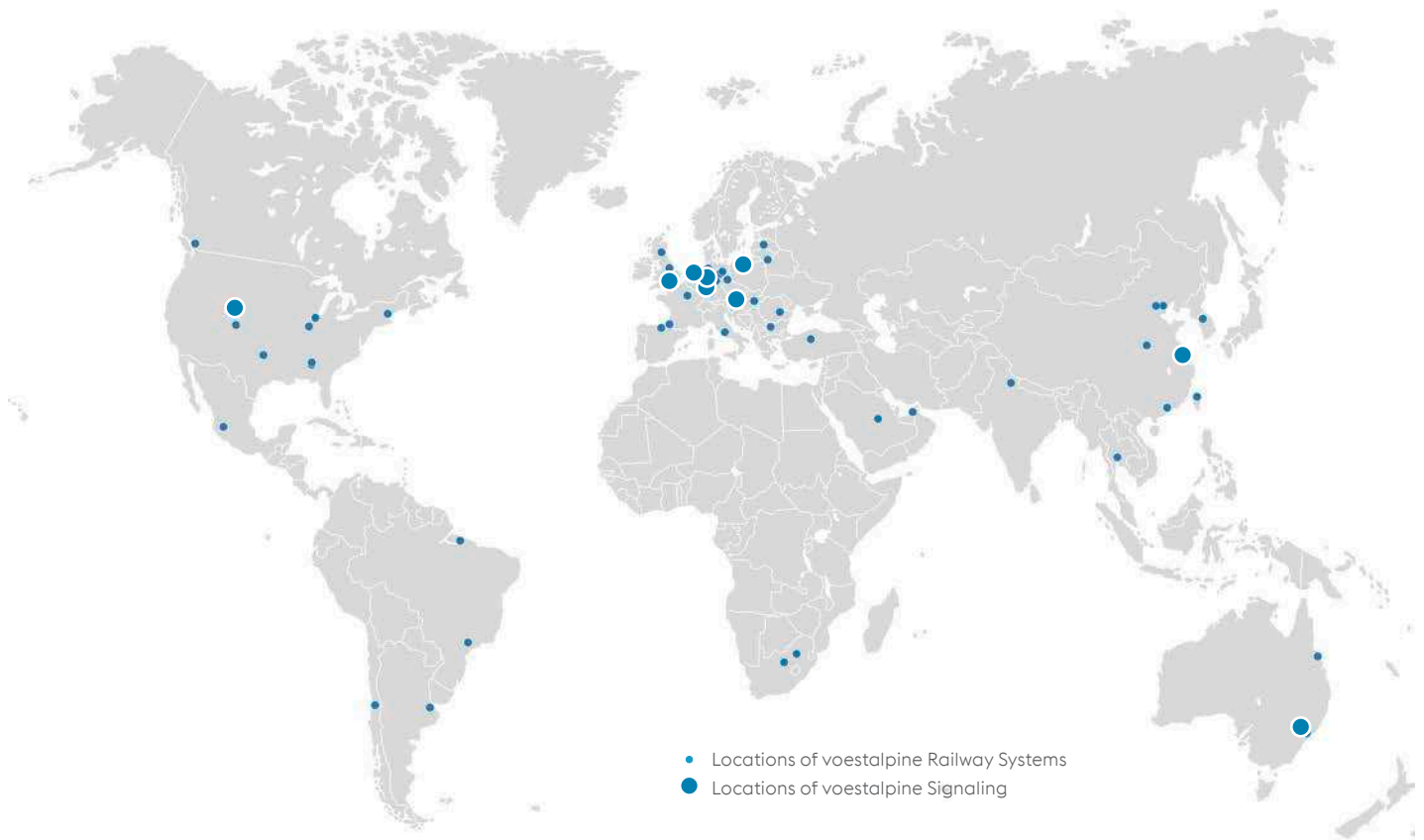
voestalpine RAILWAY SYSTEMS

We are a world leader in system solutions for railway infrastructure, and we offer high-quality products and services (Track Solutions) for rails, turnouts, fastening systems and signaling technology.

We are Performance on Track®.

As part of voestalpine Railway Systems, voestalpine Signaling group is a global trendsetter and innovator. As a one-stop-shop, we offer you turnout setting systems and signaling solutions, as well as diagnostics and monitoring

technologies from one source – tailored to local needs. From consultation through to planning and implementation. With locations and support centers around the globe, we are always close to you.



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