RAILWAY SYSTEMS
by voestalpine

TRAIN DETECTION
MONITORING

RAIL CROSSING
MONITORING

SWITCH CONDITION
MONITORING

SIGNALING POWER
MONITORING

TRACK AND RAIL
MONITORING

ROADMASTER® TRM

Diagnostic and monitoring technologies
for track and rail infrastructure

voestalpine Signaling
www.voestalpine.com/railway-systems

voestalpine
ONE STEP AHEAD.

DIGITAL PERFORMANCE ON TRACK®

DIAGNOSTIC AND MONITORING TECHNOLOGIES FOR INFRASTRUCTURE

With our intelligent system ROADMASTER®, we record the condition of your infrastructure permanently, which enables you to remotely monitor rail movements and changes in temperature. Both areas can have a significant impact on the operability of the track, installed assets and rail expansion joints. ROADMASTER® TRM offers the possibility to detect arising problems at an early stage. For maximum safety and availability.

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

TRACK & RAIL MONITORING WITH ROADMASTER® TRM

Sensors continuously record vertical and lateral movements, rail breaks, as well as temperature differences and transmit the collected data to a server. The measured values obtained in this way provide valuable information both for the reliability of track systems and for the structural integrity of bridges, and thus allow a comprehensive longterm analysis as a basis for efficient maintenance. The data is evaluated and compared with corresponding reference data. Impending failures are detected at an early stage, even before rail operations are negatively impacted. As a result, you reduce failures and derailments, and simultaneously increase safety.

No matter what rail transport or application area – TRM can be used by all railways:

Why use diagnostic and monitoring technologies for track and rail infrastructure?

» **Increased strains** on the infrastructure caused by higher train frequency, faster speeds and greater axle loads

» **Challenging environmental influences** such as dirt, snow and sand

» **Track systems and the structural integrity of bridges** are critical for railways – problems in these areas can cause derailments

» **A reduction in site visits** by maintenance staff reduces their exposure to the operational railway and thus contributes to a safer railway
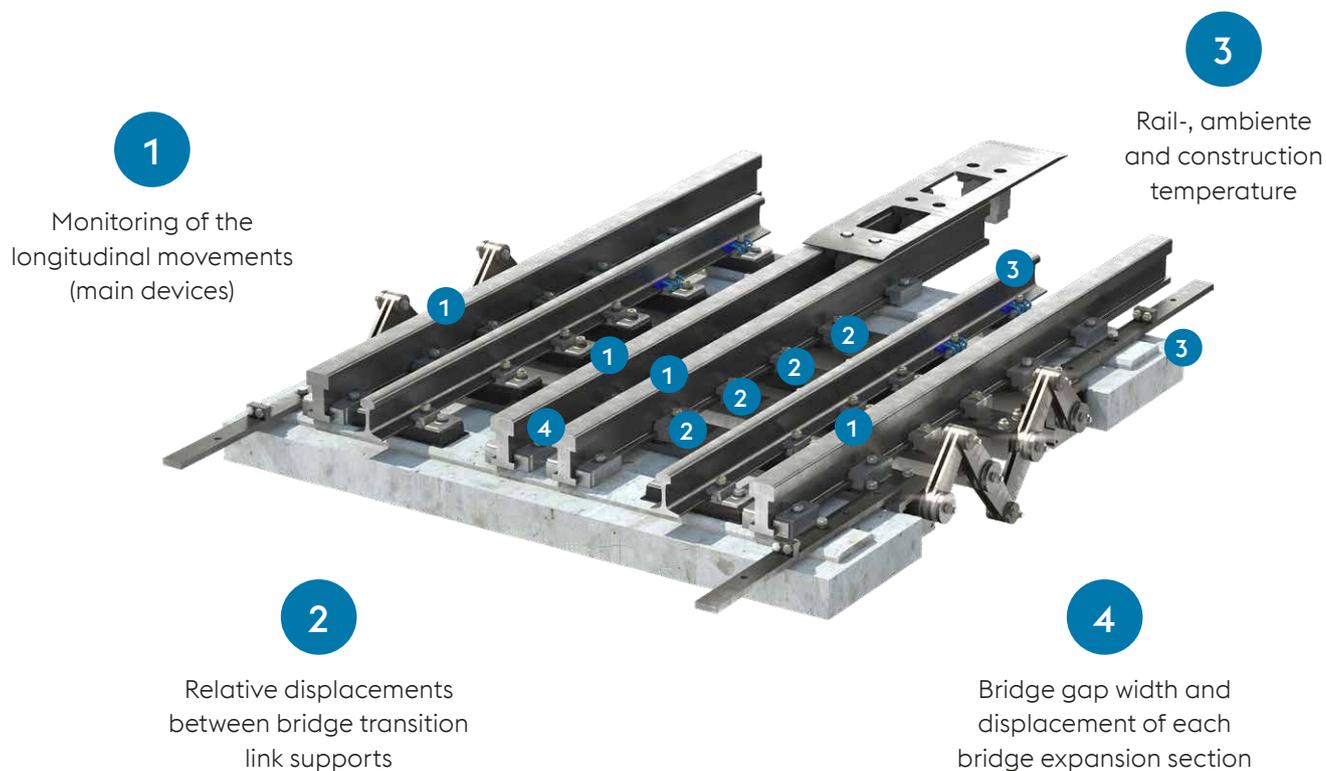
ACTION / REMEDY

FORECAST

INFORMATION

COLLECT DATA

RAIL EXPANSION CONDITION MONITORING – RECM

The Rail Expansion Device (RED) accomodates the longitudinal movements of the primary bridge structure arising from superimposed loads, weather conditions, temperature change and the action of the RED itself.

Long bridges naturally require large expansion joints, because the larger the structure, the greater the expansion. A Rail Expansion Device allows the switch and stock rail to move longitudinally freely one part relative to the other. They expand and contract normally. RED's are one of the most critical system components in a bridge superstructure. In order to detect problems at an early stage and to make the tracks safer, RECM monitors the following points:

WHAT WE ARE MONITORING

1
Monitoring of the longitudinal movements (main devices)

2
Relative displacements between bridge transition link supports

3
Rail-, ambiente and construction temperature

4
Bridge gap width and displacement of each bridge expansion section

BENEFITS FOR THE CLIENT

Rail expansion devices are structural components and therefore subject to wear and tear which will need maintenance during the service life of the bridge.

A Rail Expansion Condition Monitoring system is able to predict the remaining service life of expansion joints based on monitoring data. The approach to achieve the above mentioned goal may consist of the following steps:

» Development of regression models to characterize the normal correlation pattern between monitored displacement at expansion devices and environmental conditions (e.g. structural temperature).

» Development of models for forecasting future conditions.

» Simulation of cumulated displacements at expansion devices using the development regression and models to estimate remaining service life (i.e. time at which cumulated displacements reach a pre-defined threshold).

» Monitoring such critical components has a considerable influence on a risk assessment at the upcoming hazard identification process.

» Real time understanding of the condition of "Rail Expansion Devices" and failure rates enables maintenance and inspection to be more efficient, reducing the Life Cycle Cost of the asset.

» A reduction in site visits by maintenance staff reduces their exposure to the operational railway and thus contributes to a safer railway.

GENERAL OVERVIEW OF ROADMASTER®

We integrate all collected data into the software platform ROADMASTER®. In the platform all RED's and the related information are clearly visualized. In addition, alerts and prognoses are displayed so that you are informed of potential problems at an early stage. This will reduce breakdowns and shutdown times.

ROADMASTER®
Server

Field Modem

Communication Network

Field Modem
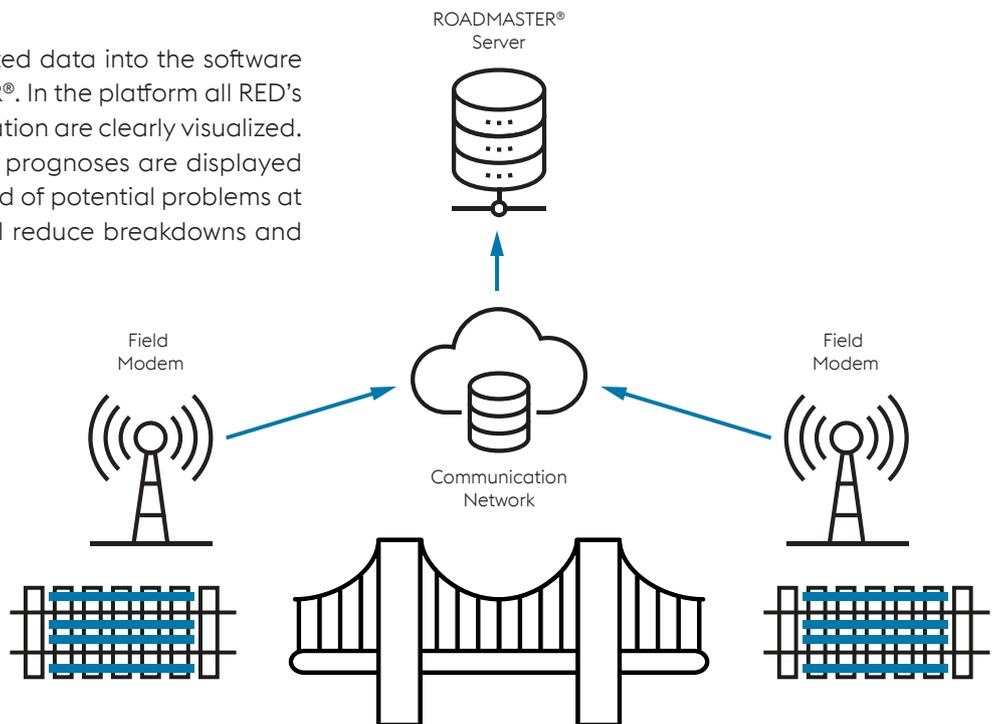
RECM SOFTWARE MODULES

All modules are clearly displayed on the RED within ROADMASTER® RECM and can thus be assigned to the respective area of the RED at a glance. The modules listed are to be seen as a diagnostic suggestion and can be extended or adapted if required.

1 **Module 1 –** Monitoring of environmental site conditions

3 **Module 2 –** Monitoring of the inner girder conditions

3 **Module 3 –** Monitoring of the outer girder conditions

4 **Module 4 –** Monitoring of scissor system – gap basic information

4 **Module 5 –** Monitoring of scissor system – gap symmetry

5 **Module 6 –** Monitoring of scissor system – gap twisting/shift

6 **Module 8 –** Monitoring of the switch rail movement

7 **Module 9 –** Monitoring of the stock rail movement

8 **Module 16 –** Stress monitoring – torsion plates

9 **Module 17 –** Monitoring of sleeper movement/ displacement – switch rail

10 **Module 18 –** Monitoring of sleeper movement/ displacement – stock rail

11 **Module 20 –** Monitoring of the distance between girders and sleepers

12 **Module 21 –** Inner girder position – horizontal

13 **Module 22 –** Outer girder position – horizontal

xx **Module xx –** ...
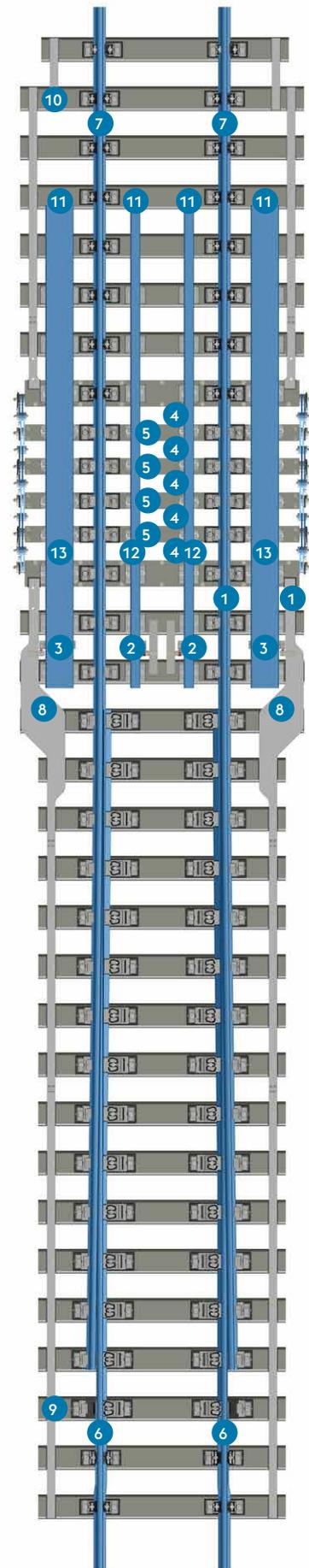
HARDWARE & SOFTWARE FROM A SINGLE SOURCE

ROADMASTER® TRM provides all components, from hardware to software, as a system and complete solution. This means that you save on interfaces and get everything – from data acquisition to data analysis – from a single source. The system versions can be configured to meet your requirements.

Integration of ROADMASTER®

Our visualization software enables easy and intuitive operation via a multilingual user interface. Seamless monitoring of the operating state is possible on any PC, tablet or common smartphone, regardless of platform, by means of web-based software. As a result, the state of the track or of fixed assets is continuously available and is comprehensively analyzed and displayed. A clearly displayed overview of the asset conditions saves time and guarantees that you can focus on the essentials.

» Visualization of the asset condition

» Forecast

» Alarms

» KPIs and reporting

ROADMASTER® TRM can be integrated into external software platforms by system interfaces or visualized by means of our ROADMASTER® diagnostic and monitoring platform (can be expanded with all ROADMASTER® categories).

Interfaces include:

» OPC-UA (e.g. DB DIANA)

» Web services

» Interface development in coordination with the customer is possible

WHY CHOOSE US?

Domain expertise, competency and more than 160 years of experience in the international turnout business guarantee your "digital" Performance on Track®.

» Reference projects in more than 25 countries

» Monitoring of more than 40,000 assets

» Up to 40 % fewer asset failures

» Higher availability of railroad lines
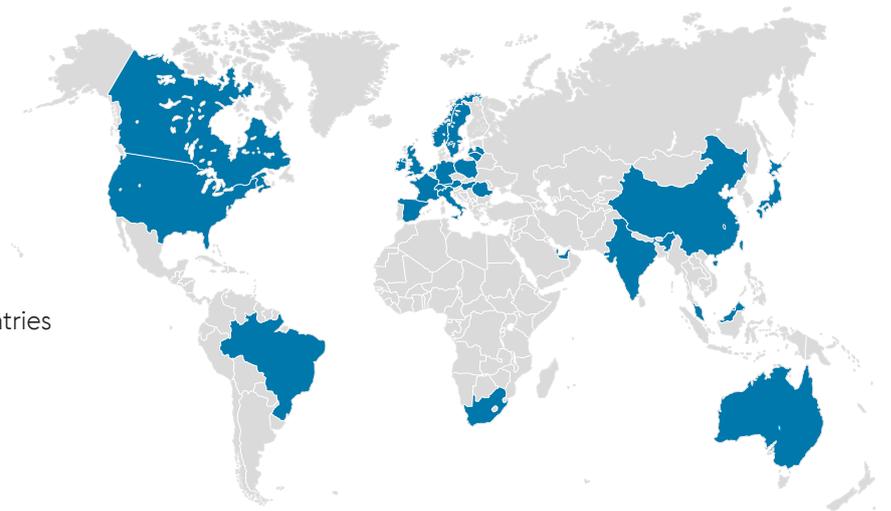
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