RAILWAY SYSTEMS
by voestalpine

zentrak TDM CONNECTING EVERYTHING

Train Detection Monitoring

voestalpine Signaling
www.voestalpine.com/railway-systems

voestalpine
ONE STEP AHEAD.

DIGITAL PERFORMANCE ON TRACK®

DIAGNOSTIC AND MONITORING TECHNOLOGIES FOR INFRASTRUCTURE

With our smart diagnostic and monitoring system zentrak we record the condition of your infrastructure continuously and comprehensively. 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 safety and efficiency of the rail network. The zentrak module Train Detection Monitoring (TDM) reliably identifies deterioration in performance and issues alerts to allow maintenance interventions before failures occur. This ensures short response times, optimum availability of the signal systems and allows the implementation of proactive condition-based maintenance.

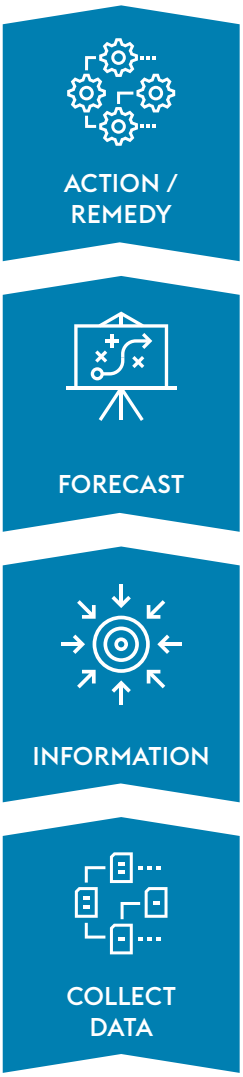
That's what we stand for. For Digital Performance on Track®.

TRAIN DETECTION MONITORING WITH zentrak TDM

Train detection methods keep trains safely apart and are connected to the interlocking. A train is detected as the leading axle enters each block or passes the axle counter and detected on the last axle leaving.

The TDM concept is based on a modular design, which allows easy expansion to include additional monitoring and integration with existing railway and IT systems on a number of levels. The system consists of sensors to measure physical or electrical parameters, field units including loggers and network equipment to collect, format and transmit the real time data and a back office server to analyze the accumulated data, announce alarms as required and host the web based user interface. The sensors are powered directly by the logger and do not require a separate power source. Usually everything is located inside control cabinets or equipment rooms.

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



Why use diagnostic and monitoring systems for train detection?

- Reduction in maintenance work time schedules
- Reliability-centered maintenance necessitates the use of diagnostic and monitoring technologies
- Valuable data on the condition of train detection systems
- Anticipate breakdowns and reduce fault respond times
- Enables comprehensive diagnosis of problems in train detection systems
- Ensure optimal availability of network operation

TRACK CIRCUIT CONDITION MONITORING (TCCM)

TCCM – a subcategory of zentrak TDM – continuously monitors the health and performance of track circuits. Track circuit problems are often intermittent and difficult to investigate but account for a significant proportion of infrastructure related delays. Various solutions using non-invasive sensors have been developed to reliably identify deterioration in many common types of track circuit equipment, including DC, AC and audio frequency. The information collected enables maintainers to respond proactively to abnormal track circuit behavior and restore performance before operations are affected.

For more information please follow the QR code

Benefits

- Reduce track circuit failures
- Detect rail head and wheel contamination
- Monitor ballast condition (contamination/flooding)
- Detect insulation joint or bonding failure
- Enables condition based maintenance
- Diagnose and fix faults first time

Key Features

- Proven with leading railways
- Non-invasive measurement
- Solutions for DC, AC, audio frequency and high voltage pulse types
- Can be installed without track access
- Trial can be configured for multiple systems
- Compact data acquisition unit

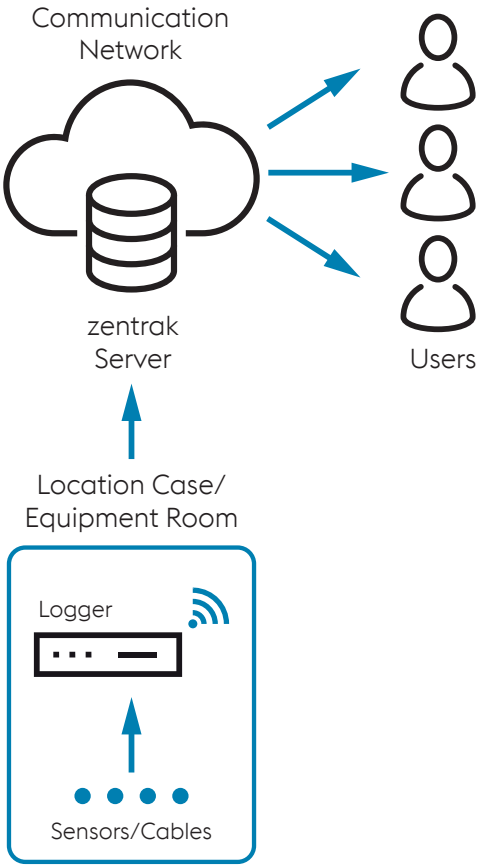
TCCM PRINCIPLE

Different measurement technology and data processing is applied dependent on the track circuit type.

Energy levels at the track circuit receiver are monitored non-invasively using a hall effect sensor or current transducers. Depending on the type of track circuit, additional processing of the analogue signal or diagnostic data output from the track receiver may also be incorporated.

Real time data from the output of the sensors is recorded and analyzed by a logger installed in the signaling equipment room or trackside equipment case using a system of multiband alarming to detect when the operating characteristics of a track circuit start to change.

Alarm events and track circuit data are sent to the zentrak server from which users interact with a variety of internal enabled devices and see all sources of alarms and trends for further investigation.



OVERVIEW OF SYSTEM ELEMENTS

Sensors detect a plethora of quantitative measured variables for determining the performance and condition of the train detection system. The use of non-invasive technology means the measurements do not cause reactions and therefore are completely risk-free.

Data recording by means of customer-specific hardware (with flexible options), which has been developed specifically for railway applications. The information gained by the sensors is processed and ensures comprehensive data retrieval.

Software modules on a central server analyze the acquired data to provide the user with information about the asset condition as well as performance statistics using integrated visualization software.

zentrak TDM APPLICATIONS

AC Track Circuits

For AC track circuits that use a phase sensitive ‘vane relay’, a patented synchronous detection technique has been developed that accurately represents the ‘torque’ current driving the relay. Measurement is made using non-invasive current transducers and the logger processes this information to calculate the current energizing the track relay. Interface sources such as DC traction current that do not affect the operation of the relay are rejected to create a realistic picture of track circuit performance

Audio Frequency

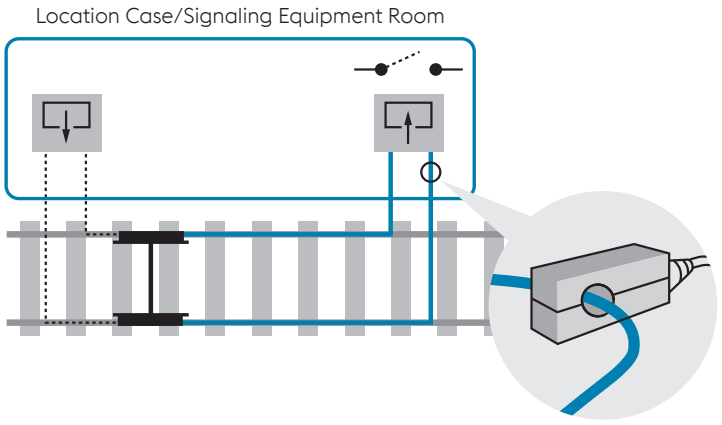
For modern microprocessor controlled track circuit equipment, local diagnostic outputs are often available carrying information about the condition and status of the system. For these situations, an application software that allows the logger to safely communicate with the receiver over a serial link has been specifically developed. One logger can communicate with several receivers and records status information for such as relay drive current, voltage, upper and lower sideband current and average input current.

DC Track Circuits

The track circuit receiver current is monitored non-invasively using a Hall Effect sensor installed in a trackside equipment case or signaling room. Real time data from the output of the sensors is recorded by a logger which uses a system of multiband alarming to detect when the operating characteristics of a track circuit start to change.

Further options

» Pulse » Reed » VT1 » Jointless



HARDWARE & SOFTWARE FROM A SINGLE SOURCE

zentrak TDM 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 zentrak

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

Interfaces include:

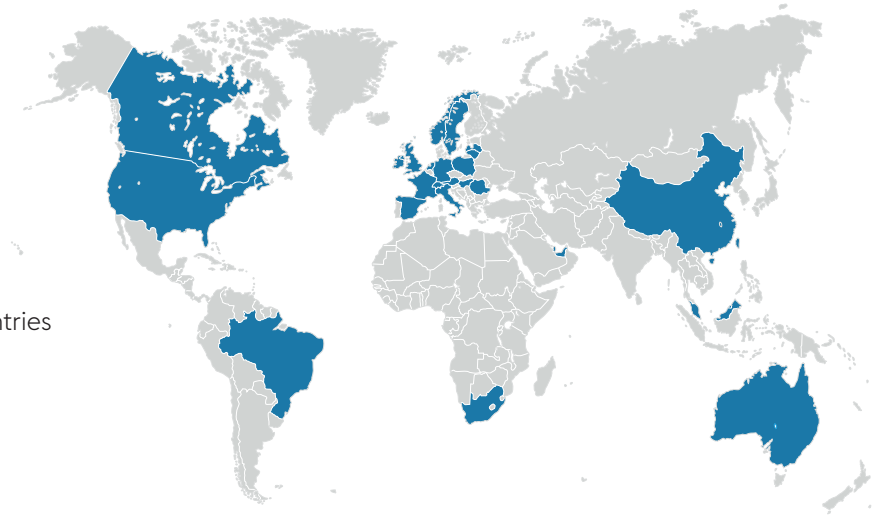
- OPC-UA
- Web services
- Interface development in coordination with the customer is possible

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

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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