

## CONSULTING & ENGINEERING

Comprehensive consulting services and sustainable engineering for diagnostic and monitoring technologies of rolling stock

Location analysis – Assessment of the track for Wheel Impact and Load Detection (WILD) – Definition of optimized installation location

We help the customer choose the correct system locations in order to obtain the maximum benefits from the acquired data. On the one hand, this concerns the use of existing infrastructure as well as the optimal positioning of the systems in the customer's network. In addition to general best practices regarding the location selection, voestalpine Signaling Group provides measurement technology, such as mobile measurement stations, to assess the reactivity of the superstructure.

Consulting on the maintenance of wheel bearings

Our diagnostic and monitoring systems make it possible to monitor wheel bearings for wear and specific damage. The systems generate precise measurement results, which make it possible to draw conclusions about the type of damage (damage to the running surface, defective rollers or broken bearing cages). Information is also provided about the extent of the wear in conjunction with damage to the remaining service life. We use these data to develop optimal maintenance strategies together with the customer. At the same time, the risk of bearing defects in operation (hot box) as well as the costs of preventative maintenance are reduced.



## CUSTOMIZED SOLUTIONS

### Consulting when creating alarm criteria

Due to the large number of international customers, we have comprehensive experience in the implementation of alarm criteria as well as their effects in operation. We support the customer with knowledge from the areas of high-speed, mixed, freight and urban traffic. In addition to the individual consulting activities, we organize user group meetings in which customers can exchange their experiences as part of a conference.

### Consulting on wheelset management

We help our customers optimize the maintenance of their wheelsets. It is expensive to overhaul wheelsets and it has been done at fixed intervals so far. We measure the degree of wear of the wheels and use it to calculate the optimal time of maintenance. This reduces unnecessary time in the workshops to the degree absolutely necessary.



## CERTIFIED TRAINING

Comprehensive range of instructions and training courses in dealing with diagnostic and monitoring technologies of rolling stock

### Service training / Train the trainer

We offer a broad training portfolio for all products. This provides content for target groups, such as planners, commissioning engineers, service technicians or operators. In this way, the operator's employees are able to fully utilize the potential of the systems and ensure the maximum service life. In addition to pure training, we offer workshops for technical personnel that focus on the practical relevance and the exchange of experience between the technicians. It is possible to train customer trainers as multipliers. They receive a particularly intensive training with set re-training dates.

### Installation training

The installation of diagnostic and monitoring systems may be carried out by the customer or the customer's service providers. We take care of the installers' training and the monitoring of the installation. This ensures a high level of installation quality and thus usability of the measurement results. The responsibilities during installation are coordinated with the customer individually and transparently in the run-up to the projects.



## AVAILABILITY THROUGH EXPERTISE

### Customer specific software adjustments

The environment of railway systems is characterized by a high level of heterogeneity and a multitude of historically evolved solutions. We support the customer in the seamless integration of diagnostic and monitoring systems in the existing infrastructure. This includes the documentation/definition of interfaces and the implementation, operation and monitoring of interfaces throughout the entire life cycle of the product. Software changes are deployed and maintained throughout the product's life cycle.

### Support for external planning / consulting companies

We offer training for planning and consulting companies. These training sessions offer a procedural view of diagnostic and monitoring technologies. The focus here is on the planning phase, the requirements for the infrastructure and the integration into the customer's best practices.

### Data Evaluations and Analysis

On behalf of the customer, we assess the generated data of the diagnostic and monitoring systems and provide it to the customer in legible form that can be interpreted. In conjunction with the global experiences of voestalpine Signaling Group, recommendations for action are derived from these data in cooperation with the customer, which fit exactly into the customer's process landscape. The data evaluation allows the customer to use the systems economically in order to save money during ongoing operation and to avoid interruptions in operation. This is done by continuously using the data if systems are connected directly to the service center via a data connection or through offline data, which are transmitted by the customer as needed.



## SUPPLY, LOGISTICS & INITIAL SERVICES

Initial delivery and installation services for diagnostic and monitoring technologies of rolling stock

Shipping and transport logistics to the construction site

voestalpine Signaling Group has business relationships in over 50 countries around the world and, in the course of market development, has established internal competences for the handling of product and system transports. They use first-class logistics service providers to transport diagnostic and monitoring systems to the site of installation while complying with quality, time and cost targets. This is done in close cooperation with the client in order to ensure that local specifics and directives are observed.

Installation support

A proper installation of diagnostic and monitoring systems is crucial to the service life and future maintenance expenses of the systems. In addition, a proper installation forms the basis for a high quality of the data of the diagnostic and monitoring systems and their subsequent use. Our experts already provide support in project management during the installation phase, train and instruct on-site fitters, provide set-up tips and point out special hazards in order to ensure a high quality installation of the systems.



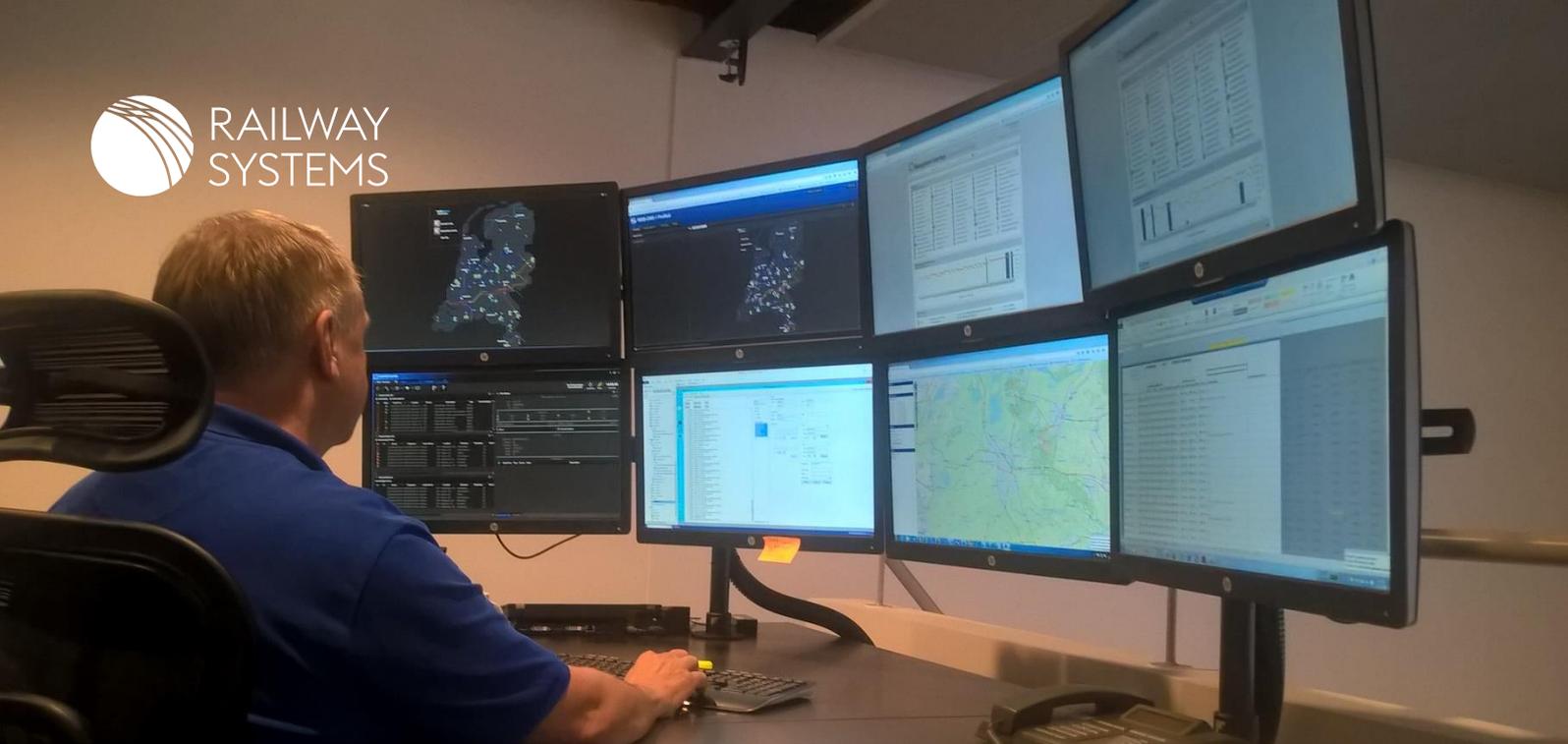
## EFFICIENT OPERATION - RIGHT FROM THE START

### Project management

voestalpine Signaling operates its own department for planning and handling projects. Our employees are certified according to the International Project Management Association (IPMA) and are continuously trained. This allows for a seamless integration into the organizational structures of customer projects so as to ensure a smooth processing.

### Commissioning / On-site training

voestalpine Signaling Group helps customers to properly commission the installed systems. This measure ensures the validity of the data generated. The system function is documented in cooperation with the customer already during commissioning as a set part of the acceptance procedure.



## CONTINUOUS SERVICE / SERVICE LEVEL AGREEMENT

Services and agreements for diagnostic and monitoring technologies of rolling stock over the entire product life cycle

### Maintenance activities / Maintenance contracts

We offer the customer standardized maintenance activities:

- preventative maintenance
- predictive maintenance
- corrective maintenance
- spare parts provision
- software and hardware upgrades
- 24/7 availability via phone and email

The selection of individual service modules allows for an integration into the customer's service organization. In particular case, we guarantee the customer the availability of the diagnostic and monitoring systems in the field. Details about the service modules are specified in the maintenance contracts.

### Remote maintenance

We continuously (24/7) monitor the systems by using monitoring software or at the customer's request. The continuous monitoring makes it possible to detect error trends on the diagnostic and monitoring systems and their measurement results at an early stage. The remote maintenance processes make it possible to flexibly adjust to customer requirements with respect to internet security.

### Emergency warehouses for customers with maintenance contracts

In close cooperation with the customer, we operate local crash parts warehouses, which ensure the availability of spare parts while adhering to defined response times. The processes for accessing the warehouse are coordinated individually with the customer in order to ensure a smooth integration into their logistics processes. The stocking of the warehouse depends on the required availability of the components and their reliability.



## PARTNERSHIP WITH FUTURE

Smartphone-application with service and logistics functions (tracking function)

A smartphone application for the Apple iOS and Android operating systems helps customers to register and to track repairs. The customer can register defective components, see the state of the repair and download relevant data, such as repair logs and calibration certificates. The app gives the customer an overview (inventory) of his systems installed in the field, enhanced by information about sub-components, warranty data and serial numbers. With one click, the customer can remove defective parts from his "inventory", register for a repair and install new parts.

Dismantling as part of the system replacement  
We help the customer to decommission and dismantle old diagnostic and monitoring systems in order to avoid damage due to improper disassembly. We either properly dispose of the systems or, after the overhaul, give them back to the customer.

Refurbishment / General overhaul of systems or components

Defective components are repaired in the plant and generally upgraded to the current state of development (continuous improvement process). This ensures that no outdated components leave the plant. When registering a defective component, the customer can apply for a pre-replacement. He then receives an already repaired component and does not have to wait for the defective component to be repaired (replacement item process).

As part of upgrade measures, we offer tailor-made packages that upgrade the existing diagnostic and monitoring systems to the current state of technology. However, existing long-lasting and expensive components are recycled. This protects the customer's investments while at the same time participating in technical development.