SmartVision™ Train Condition Monitoring

Developed in collaboration with VR FleetCare

Enabling Condition-Based Maintenance for Trains

EKE

Monitor | Identify | Manage

Real-Time Monitoring of Trains

EKE-Electronics, in collaboration with VR FleetCare, have developed an advanced train condition monitoring system for remotely monitoring the health of trains and their subsystems providing operators and maintainers with a complete condition monitoring solution enabling the implementation of condition-based maintenance.

SmartVision™ Train Condition Monitoring is a modular system, that is compatible with a range of on-board train control and diagnostics systems, not just EKE's TCMS solution. SmartVision™ Train Condition Monitoring provides flexibility and scalability to grow your condition-based maintenance and digitization ambitions over time.

Field validation tests have been performed with our collaboration partner, VR FleetCare, for bogie condition monitoring to extend the service interval.

We have an open data policy giving you access to the measured data via the SmartVision™ user interface.

Being continuously aware of the condition of your train assets enables you to optimize your maintenance operations.

Added Value from SmartVision™ Train Condition Monitoring

Efficient management of operations and service through real time awareness of the status of your fleet.

Remote support for drivers by remotely accessing the driver's display directly from the SmartVision™ user interface.

Quick and easy access to data, automatically sent to the cloud for analysis, eliminating the need for manual data download.

Increase fleet availability with well-planned, short visits to the service workshop for maintenance based on the actual condition of trains.

Easily perform root cause analysis of faults through data conveniently available in the SmartVision™ user interface.

Extend service intervals by monitoring the condition of all critical components of the bogie.

Improve service availability by avoiding unexpected failures on the line.

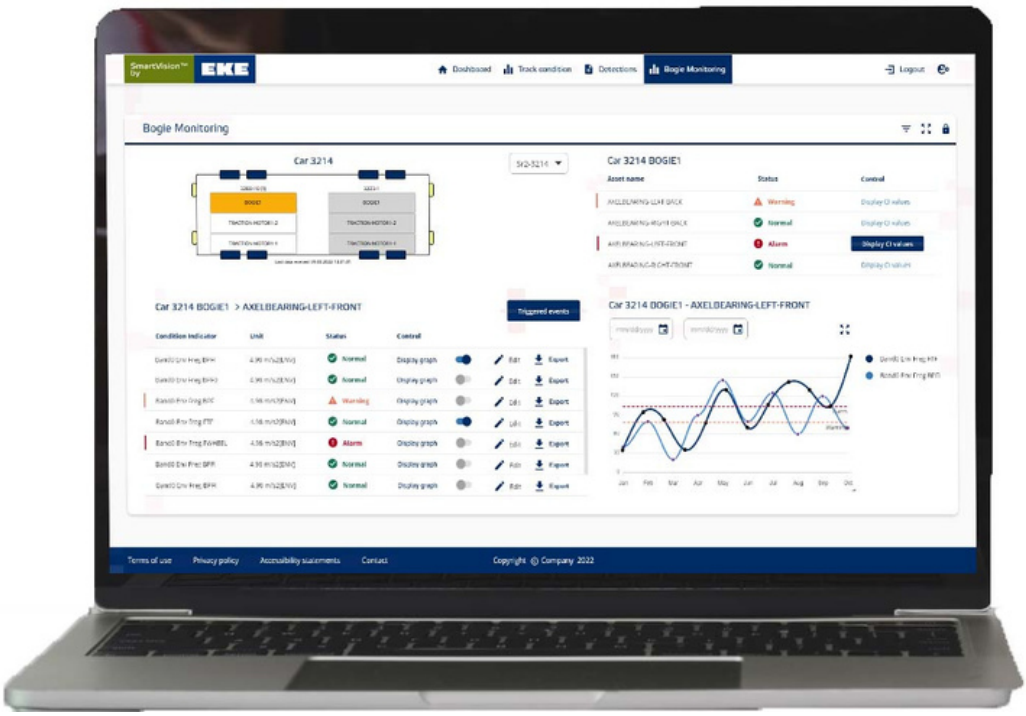
Increase customer satisfaction with less delays.

Make full use of all existing data on your trains and add extra sensors only when there is a clear business case.

User Friendly Visualisation

SmartVision™ for Train Condition Monitoring's easy-to-use web-based user interface turns data into actionable information to make informed business decisions about when to perform maintenance based on the condition of your fleet.

Our system allows you to view the status of your whole fleet in one place. SmartVision™ Train Condition Monitoring increases fleet availability, helps avoid unexpected faults and enables transition to condition-based maintenance.



Different user profiles can be created for different functional groups and each of them will have user interfaces optimized for their specific tasks. Thus, operating centre, maintenance planning, depot or fleet management personnel can all be provided with a SmartVision™ graphical user interface tailored to their specific needs.

Our open data policy, gives you access to the measured data via the SmartVision™ user interface. Users can download this data to enable further analysis using their own tools.

SmartVision™ is accessible via a standard web browser. EKE recommends performing user authentication via integration into the operator’s single sign-on environment.

Detection Capabilities of SmartVision™ Train Condition Monitoring

By monitoring data from existing onboard control and diagnostics systems, SmartVision™ Train Condition Monitoring can offer many benefits for the operation and maintenance of different types of rolling stock.

In addition, where there is a business case for it, additional sensors can be installed on critical or troublesome components. This will further enhance the early detection of developing faults and prediction of the remaining useful life.

Some examples of where the monitoring system has provided valuable information are:

- Real-time awareness of onboard statuses and events reduces disruption to operations and improves rail management
- Root cause analysis by conveniently and rapidly analysing data collected by the onboard event recorder in the SmartVision™ user interface
- Remote support for the train driver by remotely accessing the driver's display
- Detection of early signs of fault in e.g. wheels, axle bearings, gearboxes and traction motors for extension of service intervals and avoiding unplanned faults on the line
- Move towards condition-based maintenance to extend life expectancy

Onboard Data Acquistion

The SmartVision™ Data Acquisition Gateway collects data from existing train control and diagnostics systems by accessing the onboard data buses. Such data typically includes process and message data giving a comprehensive overview of the status of the train. EKE has more than 35 years of experience of interworking with different types of onboard solutions and has a complete set of EKE-Trainnet® hardware modules for interfacing them. The SmartVision™ Data Acquisition Gateway is equipped with a suitable set of modules and processing power depending on the type of train and desired functionalities.

I/O modules can be added to collect additional information for condition monitoring purposes from e.g. HVACs, doors or pneumatic systems with various types of sensors measuring e.g. temperature, pressure or current.

A bogie-mountable sensor gateway can also be utilized for detecting early signs of faults developing in various components of the bogies utilizing temperature and high-frequency vibration sensors with sophisticated edge processing functionalities.

The onboard measuring system provides a more accurate measurement of the condition of train assets than wayside measurement solutions as it measures the real-time operation in its dynamic environment; something that is difficult to replicate by the wayside or in a workshop.

The SmartVision™ Data Acquisition Gateway is installed in each train where it collects data from the train and sends it via 3G/4G/5G or Wi-Fi to the cloud using the versatile and secure SmartVision™ API protocol.

Example of a SmartVision™ Data Access Gateway

Bogie-mountable Sensor Gateway

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