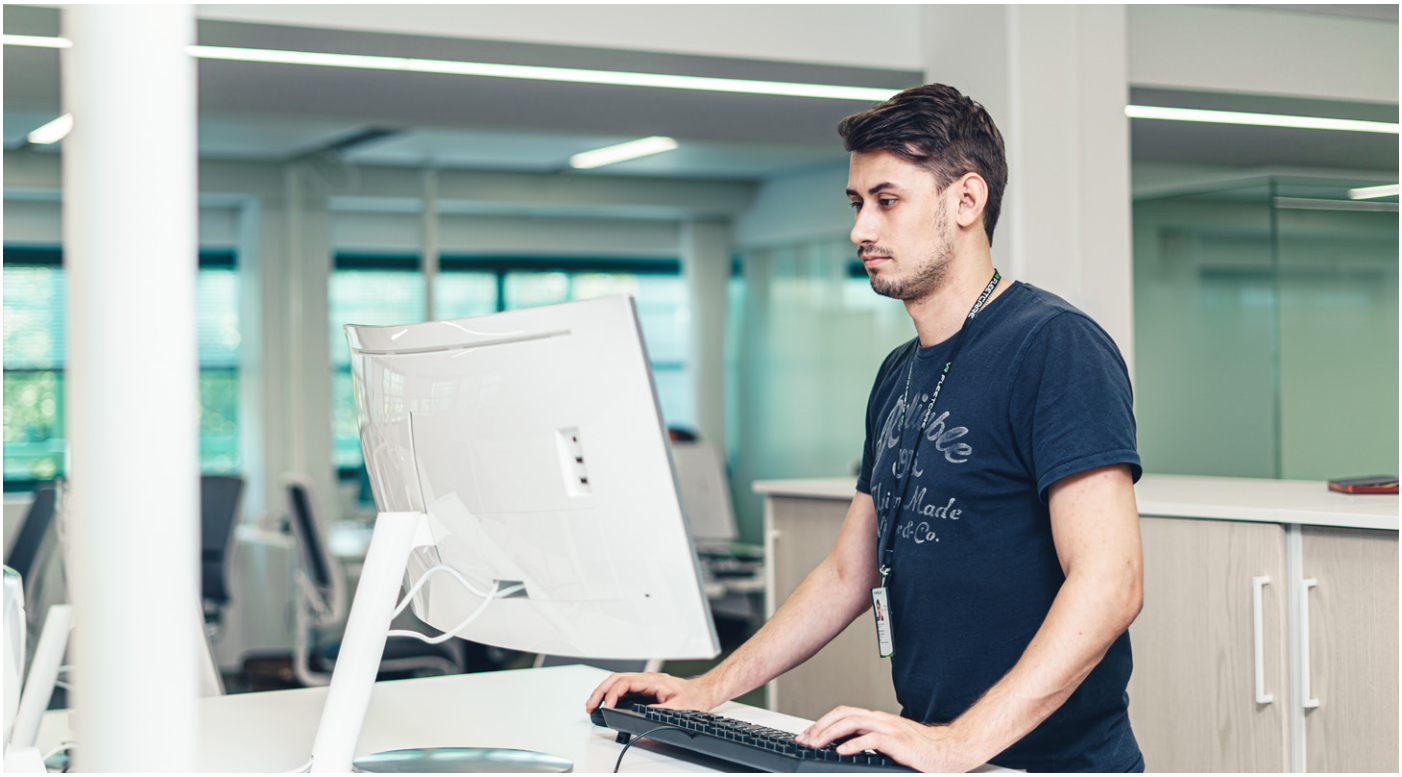
VR FleetCare

Data and Maintenance of Rolling Stock – How to Get the Most Out of the Combination



Digitalisation is strongly making its way to the maintenance of rolling stock and railway infrastructure. Amidst all the hype, it is worth remembering that collecting data is only one part, the essential thing is to understand how to use it.

The Finnish rolling stock maintenance company VR FleetCare has been investing in the use of data analytics for several years. The company has an in-house data analysis team and platform for processing data.

"In practice, we collect data using a variety of IoT measuring

Collected data is used for developing maintenance systems

devices, analyse the data and use it for developing rolling stock-related maintenance work," say VR FleetCare data scientists Curtis Wood and Otto Sormunen.

Data can be used to obtain operational impacts, such as the optimisation of maintenance intervals, and changes relating to the actual process. As an example, Wood cites the measuring device located at the entrance route of the Helsinki depot, which VR FleetCare began to use, among other types of data collection, for measuring the wheel profiles of the InterCity trains passing by.

"The lifecycle of a wheelset is approximately 10 years, and it is re-profiled at regular intervals. Between lathings, the wheel profile wears, which affects the safety and usability of the rolling stock, among other things. Especially if the wear is uneven.

"We collected millions of lines of data to analyse during the two-year pilot. Based on the data, we developed the most suitable wheel profile for InterCity trains running on the Finnish railway network. We were also able to specify the optimum interval for the reprofiling," says Wood, explaining the results.

The new wheel profile made it possible to concretely improve the safety and reliability of the rolling stock, which will result in significant cost-savings for rolling stock owners and operators.

"It is easier to make decisions about process changes when you have data to support you," Wood emphasises.

From Reactive towards Proactive Measures

In 2019, VR FleetCare took a major leap in rolling stock maintenance when it, together with EKE-Electronics introduced a service that predicts the maintenance needs of bogies. The technical solution was innovative even on a global scale.

The forecast is based on the collected data and its analysis. For example, in an ideal world, bogie-related faults can be identified months in advance. It is easy to understand its impacts on costs and the smoothness of on-time traffic.

Data can be used in a variety of mantenance work. VR FleetCare's SmartCare service portfolio includes a train scanner for inspecting large rolling stock volumes and digital services for the condition monitoring of track circuits, among other services.

"In addition to IoT equipment, data can also be collected in an analog way. For example, we implemented a project in which mechanics measured the wear and tear of brake pads. Based on the data, we could specify simulation models of wear and tear and assist experts in deciding on the correct maintenance intervals," Sormunen says.

In an ideal world, bogie failure can be foreseen months in advance

VR FleetCare uses modern platforms and systems – the whole package from data collection and integration to calculation, analysis and visualisation.

"We have the capability to integrate different data sources to an AWS database in the cloud, making it possible to collect all relevant rolling stock-related data in a single system. This allows us to combine and enrich data, which facilitates more extensive analyses," Sormunen says.

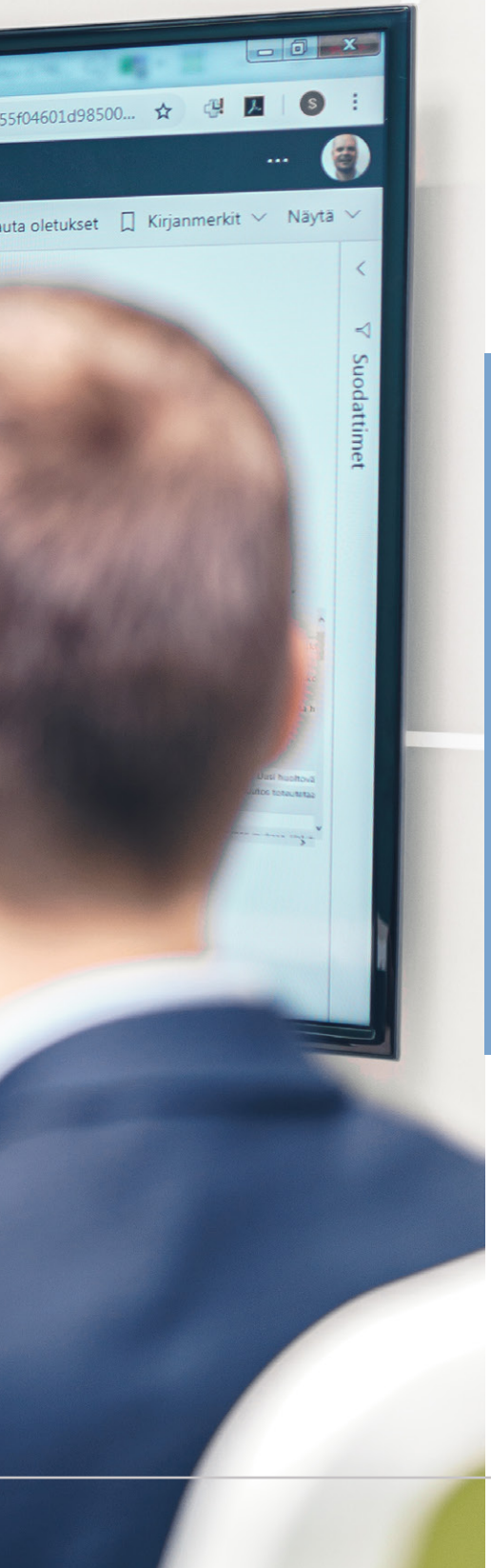
"In addition, we can generate automatic reports and alerts of observed deviations from the system," Wood adds.

Data and Industry Expertise Provide a Competitive Edge

Data analytics is often outsourced to a consulting firm that understands numbers, but their professional skill lacks expertise in the customer's sector. The in-house data team is an absolute competitive asset for VR FleetCare as the data scientists are familiar with the railway sector and can thereby provide higher-quality and more diverse analyses, especially in support of development work.

"When a rolling stock engineer and a data scientist practically sit at the same table, data exchange and co-operation are seamless. I find it important to also get to see the operations at the depot. It helps to

Data can and should be utilised in the maintenance of rolling stock



understand the whole as well as the important details," Wood stresses. Both data scientists emphasise the importance of the role of data in the future of rail traffic maintenance. The full potential of data has not yet been realised.

"Early on, the cases were relatively easy, but we are continuously reaching deeper and more complicated cases. The kind that cannot even be done without advanced algorithms such as machine learning. It will create completely new dimensions for maintenance in rail traffic," Wood says.

"The development of IoT technology has made the use of data increasingly profitable in terms of costs as well," Sormunen says.

The main lesson learned from investing in data analytics has been that data can and should be utilised in the maintenance of rolling stock. However, digitalisation is not replacing expertise – quite the opposite. With the help of data, VR FleetCare professionals have developed rolling stock maintenance programmes and improved the predictability of maintenance needs and the optimisation of work.

Read more about VR FleetCare's SmartCare services:
vrfleetcare.com

Benefits of having data scientists in maintenance:

1. Safer rail traffic
Analysing data helps to observe sudden and undesired faults in advance

2. Lower lifecycle management costs
Maintenance interval based on actual condition, up to several dozen percent longer maintenance intervals

3. Improved usability and reliability of rolling stock
Deviations are observed in time and they can be reacted to before they cause major harm

4. Increased efficiency of planning and maintenance
Better demand forecasting and algorithm-based allocation and optimisation of different resources

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VR FLEETCARE

We are on the same track

150 years of experience

1000 top tier experts

100 different types of rolling stock

1500 different components

400 rolling stock units under condition monitoring

From Smart Maintenance to SmartCare Business

VR FleetCare is a maintenance service provider and a partner in responsible lifecycle management. We improve the competitiveness of our customers by combining innovative technology and strong rail traffic expertise into one customer-oriented service.

The best rolling stock expertise in the industry at your service – get familiar with our services.

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