Up and running, guaranteed

The Alliance for Availability provides proof that 100% system availability is feasible

One hundred percent availability of vehicles and infrastructure over their entire service life is the basis for efficiently functioning railway systems. The Customer Services Business Unit of Siemens Mobility has been proving for many years, in the UK, Russia, Spain, Thailand and other countries, that practically 100% system availability can be achieved.

The rail industry and the operation of rail networks is technically and organisationally highly complex and requires ever more specific skills and knowledge. Siemens Mobility Customer Services sees itself as a partner that brings together the most diverse processes, technologies and specialist know-how in an open ecosystem. This new Alliance for Availability combines the forces of the rail industry, suppliers, operators, partners and universities. The common goal is to optimally utilise the expertise of all participants to achieve 100% system availability, optimise efficiency and costs, and protect investments.

PARTNERSHIP

In the partner network of the Alliance for Availability, not only customers and suppliers but also highly specialised companies such as the bearing manufacturer SKF, Knorr-Bremse, voestalpine signalling, Strukton Rail and other suppliers of vehicle, line and train safety components are working together within Siemens' Railigent Application Suite. The network is open and capable of permanently processing and analysing the operators' operational data to ensure availability. Timetables, track occupancy, vehicle deployment, route- and time-dependent train configurations can be included as well as weather data to plan the de-icing of contact lines, points and vehicles or timely preheating. Major events and disruptions due to line construction measures are taken into account in order to provide additional trains and transport capacities and to avoid delays. Detectors installed on the lines automatically record the condition of wheelsets to identify sources of faults and schedule necessary repairs. The condition of points can also be analysed. The data for the vehicles, train control systems and infrastructure converge in the Railigent Application Suite in the worldwide network of data centres of Siemens Mobility Customer Services. There, scientists from various disciplines and engineers are using artificial intelligence and machine learning to develop sophisticated algorithms for the analysis and evaluation of the data, visualising it for various user groups. The data specialists rely on an industry-leading network of depots and experts. The data analyses provide valuable, highly up-to-date information for process control, smart monitoring and smart prediction, each focused on the individual needs of the data users.

The digital services provided by Siemens Mobility Customer Services include, for example, analyses for the management of vehicle and infrastructure operators, recommendations for the rail company's control centres, instructions for maintenance personnel and, last but not least, real-time information for passengers and the shippers and recipients of cargo. 100% availability combined with high efficiency is the most important objective for all evaluations and visualisations.

Predict and prevent: an RRX multiple-unit enters the automatic vehicle identification and measurement (AVI) system at the fully digitised depot of Siemens Mobility Customer Services in Dortmund, Germany.

PREDICT AND PREVENT

Predictive maintenance is a successful method of attempting to predict the probability of a fault in a vehicle as accurately as possible. To this end, data is continuously collected and evaluated for locomotives and multiple-units from Siemens Mobility, but also from other manufacturers. Sensors on the track or in the depot also register the condition of bearings and wheelsets. In the data centre, the data is visualised and algorithms are searched for that predict a failure, depending on the mileage or defined in terms of time. The analysis of stress curves, noises, vibrations, sensor data and other measured values results in instructions for the driver, who can continue to proceed to the destination despite a malfunction or a possible warning, because the consequences are known.

At the same time, the depot is notified which maintenance work must be carried out with the highest priority or on occasion in order to safely avoid a breakdown. Just one sluggish door, which signals mechanical problems due to high power consumption, could disrupt operations. Smart Prediction reduces the maintenance work required for doors by over 50%.

The reliability of critical infrastructure such as point machines is ensured in a similar way, because here too the power consumption is an indication of the need for lubrication and service work. Blocked points or failed signals have a direct influence on the punctuality of trains and line capacity.

Instead of rigid maintenance cycles, Smart Prediction enables flexible maintenance appropriate to status instead of rigid deadlines, because the status of the components is known. In this way, wheelsets and wearing parts can be used up to the specified limits, and maintenance costs and waste can be reduced. Thanks to predictive planning, several jobs can be carried out simultaneously on one date. This reduces downtimes to a minimum in a cost-saving manner and has a positive effect on availability.

SPARES

Spare parts are of utmost importance for the availability of vehicles and infrastructure. MoBase is the online portal of Siemens Mobility Customer Services, which ensures the fast and smooth procurement of spare parts. Here you can find not only parts used or produced by Siemens, but also offers from suppliers and partners. Siemens Mobility has also developed a concept that enables automatic identification of parts using a tablet computer or smartphone.

Since, usually, only frequently needed spare parts can be kept in stock or ordered at short notice, Additive Manufacturing (AM) came into play. With its worldwide Additive Manufacturing network, Customer Services manufactures spare parts made of flame-retardant plastics and metal that are needed only rarely, are no longer available or are only needed in small quantities. The AM competence centres also have know-how and design engineers who, for example, scan broken parts and improve them by re-engineering them in the CAD system to eliminate weak points and increase stability. More than 100 clients make use of this competence and have already had more than 10,000 parts printed.

The range of services offered by Siemens Mobility Customer Services is unique in the industry and is constantly being expanded by the Alliance for Availability.