*The evaluation options range from the current status overview of the vehicle fleet to the complete documentation of the maintenance history and the component-specific tracking of weak points and warranty claims to the operating diary and optimal investment planning.*

## Digital workshop
# Manage rail vehicles smartly

**To ensure that rail vehicles are reliably and safely available for operation at all times, the right maintenance measures must be carried out at the right time.**

The challenge lies in the fact that vehicles are becoming more and more technically complex and there are fewer and fewer employees who "know" a vehicle type in all its details. In addition, a lot of data already accumulates in transport companies in the form of documentation of operation, incidents, repairs and maintenance measures, but these are often processed separately from each other. Statistics, evaluations and status displays make maintenance steps transparent and enable better workshop utilisation and higher vehicle availability.
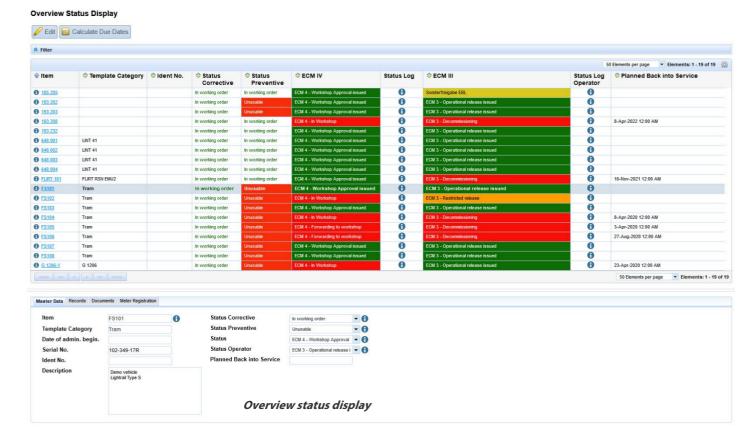
Senftenberg-based ZEDAS GmbH has developed the software solution zedas®asset for the digital control and optimisation of workshop processes in vehicle maintenance. zedas®asset can digitally transfer and merge the required operating data, measurement data, historical data, plan data and maintenance data from interfaces, mobile applications or workflow management and also link them with the experience of the employees and other planning data. With zedas®asset, these very large data volumes can be evaluated centrally and across the board. All data previously considered in isolation can be used for maintenance control and workshop planning as well as for recording faults or calculating due dates. Necessary maintenance measures or an optimal maintenance strategy can also be derived from this.

## Central analysis of existing data

In this way, the data available in the transport company is used to create a new, major added value. The evaluation options range from the current status overview of the vehicle fleet to the complete documentation of the maintenance history and the component-specific tracking of weak points and warranty claims to the operating diary and optimal investment planning. This also makes zedas®asset interesting for vehicle manufacturers for the documentation of commissioning and LCC evaluations - or for vehicle lessors, who can use it to map rental contracts and invoicing. As an analytical information system, zedas®asset takes over, for example, condition and operating data directly from the on-board units of the vehicles and combines it with the measure-

ILLUSTRATIONS: ZEDAS

*Overview status display*

## Transparency in the entire maintenance process

ment data from maintenance. This provides an overview of the various vehicle conditions during operation. By analysing this data, critical conditions are identified on the basis of a standardised error catalogue. Serial faults and weak points can thus be identified at an early stage and corrective and preventive maintenance measures can be planned and optimised efficiently. The system can output the necessary measures in checklists and work packages. As a result, workshop processes can be further improved, workshop resources utilised more efficiently and vehicle availability increased. At the same time, zedas®asset documents compliance with safety regulations (ECM, BOS-trab) and vehicle status information, and also calculates LCC and RAMS key figures. Through continuous data collection, analysis, planning and forecasting, the system "learns": It incorporates usage or load data and thus continues to improve its forecasting accuracy.

Furthermore, a condition-oriented and anticipatory maintenance strategy can be derived from the forecast of the future vehicle condition based on current and historical data or simulations (for example, to test the effects of an increase in usage intensity). Since this is continuously compared with the actual condition of the vehicle, the expected maintenance condition of each vehicle can be derived at any time. In this way, the influence on scheduling and availability can be recognised at an early stage, so that work processes can be rescheduled if necessary.

In the course of development, the software has just been supplemented with several dashboard evaluations: This means that all relevant information on work packages or vehicles, for example, is available at the respective work stations or workshop tracks at all times. The graphic

representation via a traffic light system facilitates the overview.

In this way, the user of the zedas®asset product suite always keeps a close eye on the history and current status of his assets as well as their future development. Further evaluations based on the real data are also conceivable: For example, the Invest Manager module allows an exact forecast of future and necessary investments.

With an integrated asset management system, rail vehicles can be operated reliably and economically. This enables consistent and continuous monitoring of the vehicle condition in real time. ■