

Depot and service network:

A DATA-DRIVEN APPROACH TO TRADITIONAL LOCOMOTIVE MAINTENANCE

Credits: Siemens Mobility (9)



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From the Arctic Circle to the Mediterranean, from the Black Sea to the Atlantic: Every day, Vectron locomotives from Siemens Mobility crisscross Europe, delivering freight and passengers efficiently. At any given time, some 2,000 Vectron locomotives are in operation, collectively clocking up millions of kilometers a year. However, even the most dependable locomotives require proper maintenance to ensure a long service life and continuous uptime.

The Siemens Mobility Rail Services promise focuses on 100% system availability, and that requires a dense network of locomotive workshops. In Germany, for instance, the company maintains its own Rail Service Centers (RSC) alongside a tight network of partner workshops, so that the maximum distance

to a locomotive workshop is less than 150 km. That makes it easy for national operating railway companies to get their locomotives repaired, if necessary, and promises easy access to workshops for light maintenance.

In addition to the sites in Germany, Siemens Mobility customers can rely on a system of locomotive workshops across Europe consisting of RSCs, network facilities, and partner workshops. They are situated at strategically important locations, like ports, freight terminals, and end points or junctions in the international TEN-T railway corridors. That puts the workshops close to where locomotives are in use every day. These sites ensure easy and immediate access to a workshop for locomotives, no matter where the entity in charge of maintenance (ECM) is located and where the locomotive is operated.

This comprehensive network is made even stronger with digitalization, starting with Rail service hub, a solution that brings workshops and locomotives together, for example to schedule maintenance appointments. ►



Siemens Mobility's network of locomotive workshops along the European railway corridors ensures a long service life and continuous availability.

SIEMENS MOBILITY'S EUROPEAN DEPOT AND SERVICE NETWORK FOR LOCOMOTIVE MAINTENANCE

The crown jewels in the Siemens Mobility Rail Services network for locomotive maintenance are the Rail Service Centers (RSC) in Munich-Allach, Germany; Hallsberg and Malmo, Sweden; and Novara, Italy. Further highlights are workshops operated in the framework of joint ventures in Rotterdam, the Netherlands – Locomotive Workshop Rotterdam (LWR) – and Bratislava, Slovakia – Rolling Stock Services Bratislava (RSSB). Technicians at the sites in Munich-Allach and Bratislava are capable of not only providing preventive and corrective maintenance, but also recurrent revisions of the locomotive car body and bogie, as well as renewing the wheelset, including adjustments of all modern train safety systems. Additionally, Siemens Mobility can provide revisions of the car body at the RSCs in Novara, Hallsberg, and Malmo. Soon, the service network will be made even stronger with additional depots at strategically important locations all over Europe.

S.C.



Digital from start to finish

Rail service hub basically digitalizes the ECM III process. The solution is based on Railigent X, the open suite of applications and data services from Siemens Mobility that leverages IoT and AI for rail assets. As such, it takes advantage of Application Programming Interfaces (APIs) to intelligently connect and analyze all available data from locomotives and workshops. This enables Rail service hub to provide fleet managers with information on real-time data, such as current operational status, GPS position, and open work orders for each vehicle. It then balances

these data against available maintenance capacities in connected workshops, which benefit from the ability to better manage their capacities. The outcome is an optimized recommendation for maintenance scheduling, allowing locomotives to be directed to a suitable workshop, reducing empty runs and downtime.

Railigent X also plays a role in processing data from the locomotives – namely the upwards of ►

Rail service hub helps fleet managers and workshop operators keep an eye on all maintenance planning and execution processes thanks to end-to-end digitalization.





The Rail Service Center in Novara, Italy, specializes in preventive and corrective maintenance of all locomotive components, including signaling systems.

four billion data points delivered annually by built-in sensors. The data is consulted for scheduled maintenance, that is, when certain due dates have been reached. And while locomotive maintenance generally takes place in the real world and entails planned downtime in a workshop, some smaller issues can be resolved on the fly based on digitalization.

Should spare parts be required in the framework of maintenance, planners can place orders via

MoBase®, the Siemens Mobility e-commerce platform. Altogether, solutions in Railigent X and MoBase optimize service schedules and thus help owners and operators better manage assets. But what does this all look like in practice? The following use cases provide an overview of the types of maintenance activities carried out using these digital tools in collaboration with the Siemens Mobility Rail Services network: ►

MORE FREIGHT TO BE TRANSPORTED BY RAIL

Road freight transport still dominates in the European Union. However, more and more goods are being transferred to the rails, with Germany recording the highest rail freight transport performance in the EU in 2022. In line with the European Green Deal, transport emissions need to be decreased by 90 percent by 2050. To achieve that goal, more freight will have to be moved within Europe on rail. According to prognoses, with 2015 as a base year, rail freight will double by 2050. S.C.

Sources:

eurostat: Railway freight transport statistics
https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Railway_freight_transport_statistics
European Commission: Green Deal: Greening freight for more economic gain with less environmental impact
https://ec.europa.eu/commission/presscorner/detail/en/IP_23_3767
European Union Agency for Railways: FOSTERING THE RAILWAY SECTOR THROUGH THE EUROPEAN GREEN DEAL, REPORT, Part 2 – Freight https://www.era.europa.eu/system/files/2022-11/fostering_the_railway_sector_through_the_european_green_deal_-_freight_p.pdf



The Rail Service Center in Hallsberg, Sweden, went into operation in October 2022, making it one of the latest additions to Siemens Mobility's depot and service network. The center's experts provide locomotive maintenance, with a focus on overhauls and accident repairs.

Use case: Planned maintenance according to time or mileage intervals

When a certain due date has been reached, and a locomotive is covered by a Siemens Mobility Railcover® contract, the operator is contacted to arrange an inspection at a workshop. In this use case, the Vectron locomotive is operating between Rotterdam, the Netherlands, and Novara, Italy, and is due for inspection after 37,500 km of service. The operator can choose between the Locomotive Workshop Rotterdam (LWR), which Siemens Mobility operates with a partner in the port of Rotterdam, or Siemens Mobility's RSC in Novara. After just one day, the locomotive is released back into service. A similar approach is taken for other routine maintenance needs, like work on time-related components, for example,

train safety systems. Some maintenance interventions require special infrastructure. For the major revision after 1.2 million km or eight years, the locomotive is generally directed to the Siemens Mobility RSC in Munich-Allach or to Rolling Stock Services Bratislava (RSSB), a workshop Siemens Mobility operates with a partner in Bratislava. Both workshops are equipped to perform the necessary revisions on the car body and the bogies, including wheelset changes. Alternatively, Siemens Mobility's RSCs in Novara or Hallsberg, Sweden, can take care of the major revision. While the modular revisions on the car body are performed on location, the bogies are sent to Munich-Allach. In the end, no matter where maintenance is performed, the results are the same, thanks to a highly qualified – ►



The Rail Service Center in Munich-Allach is Europe's leading location for locomotive maintenance at Siemens Mobility. Right next door is the production site of the Vectron vehicle family.

and growing – team and standardized processes and tools in all RSCs and partner workshops.

Use case: Corrective maintenance

Diagnostics in Railigent X detect an impending issue, here a failure on one of the engines in a locomotive in operation in Germany. Luckily, in Germany the longest distance to the next depot or workshop is no more than 150 km. Aside from saving time to reach a service location, this concentration has the added advantage of lower expenditures for track usage. And because these service centers are located at strategic locations, like freight terminals and industrial areas where locomotives are heavy in operation, downtime for corrective maintenance can be kept to a minimum. Time savings are also achieved by dispatching spare parts from MoBase within 24 hours.

Use case: After an accident

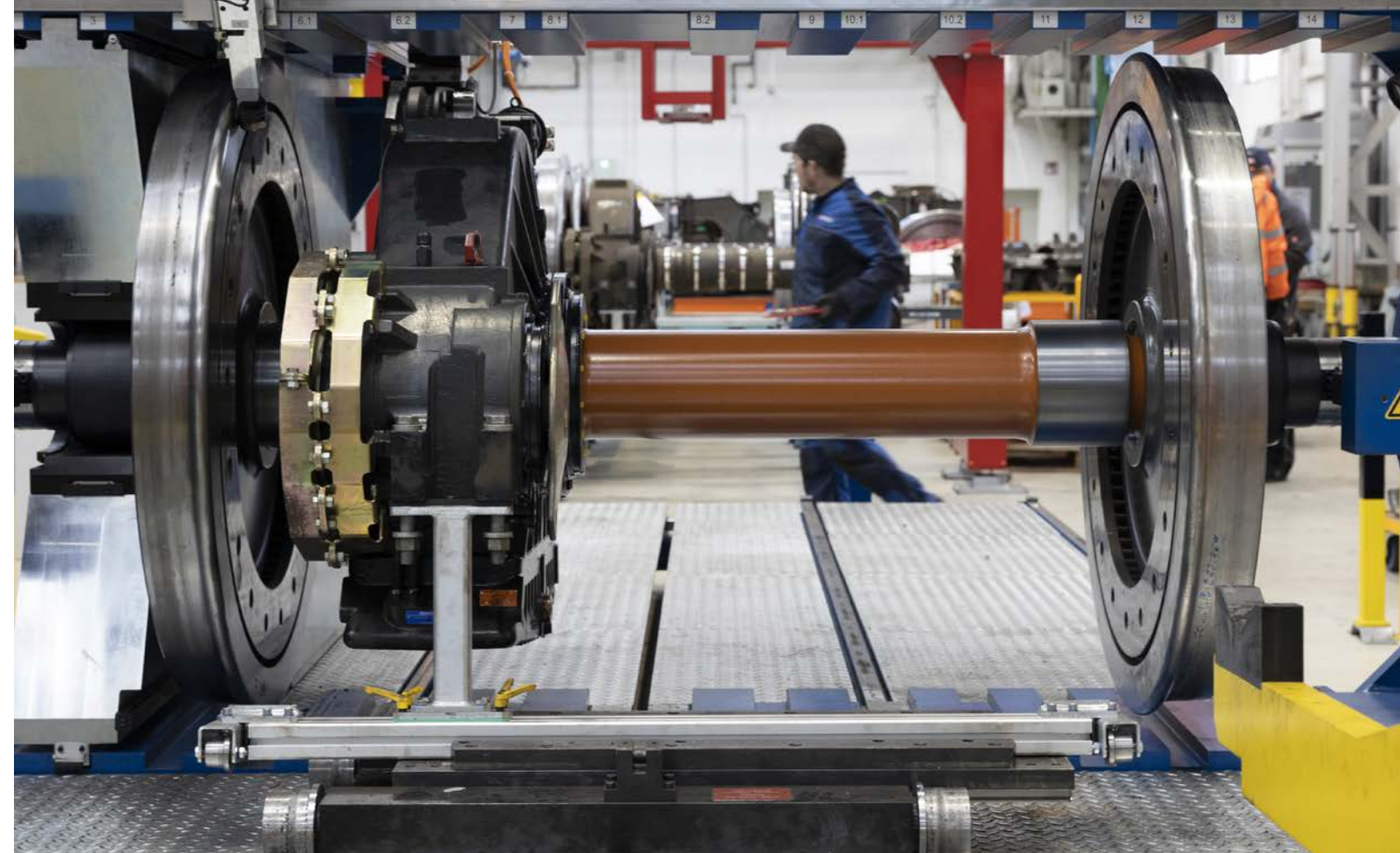
Should a Vectron locomotive be involved in a major accident, like a collision with a truck at a crossing or a derailment in a train yard, it can be sent to the

Siemens Mobility RSC in Munich-Allach. The specialists there can repair even the severest damage thanks to the close relationship with manufacturing colleagues, who are also at the site. Services after an accident include rebuilding the car body's mechanics and electronics, changing the front ends, and changing and repairing gearboxes and engines. For the latter, support comes from Siemens Mobility repair facilities in Nuremberg. When all work is done, the repaired locomotive is as good as new and the asset retains its value, despite the accident.

Damage from small and midsize accidents requiring wheelset changes and repairs to gearboxes, engines, and pantographs is taken care of locally, for example at the RSC in Novara, or the workshops in Hallsberg or Bratislava. The latter can also perform repairs on bogies and older locomotives, such as the BR189 and the Taurus.

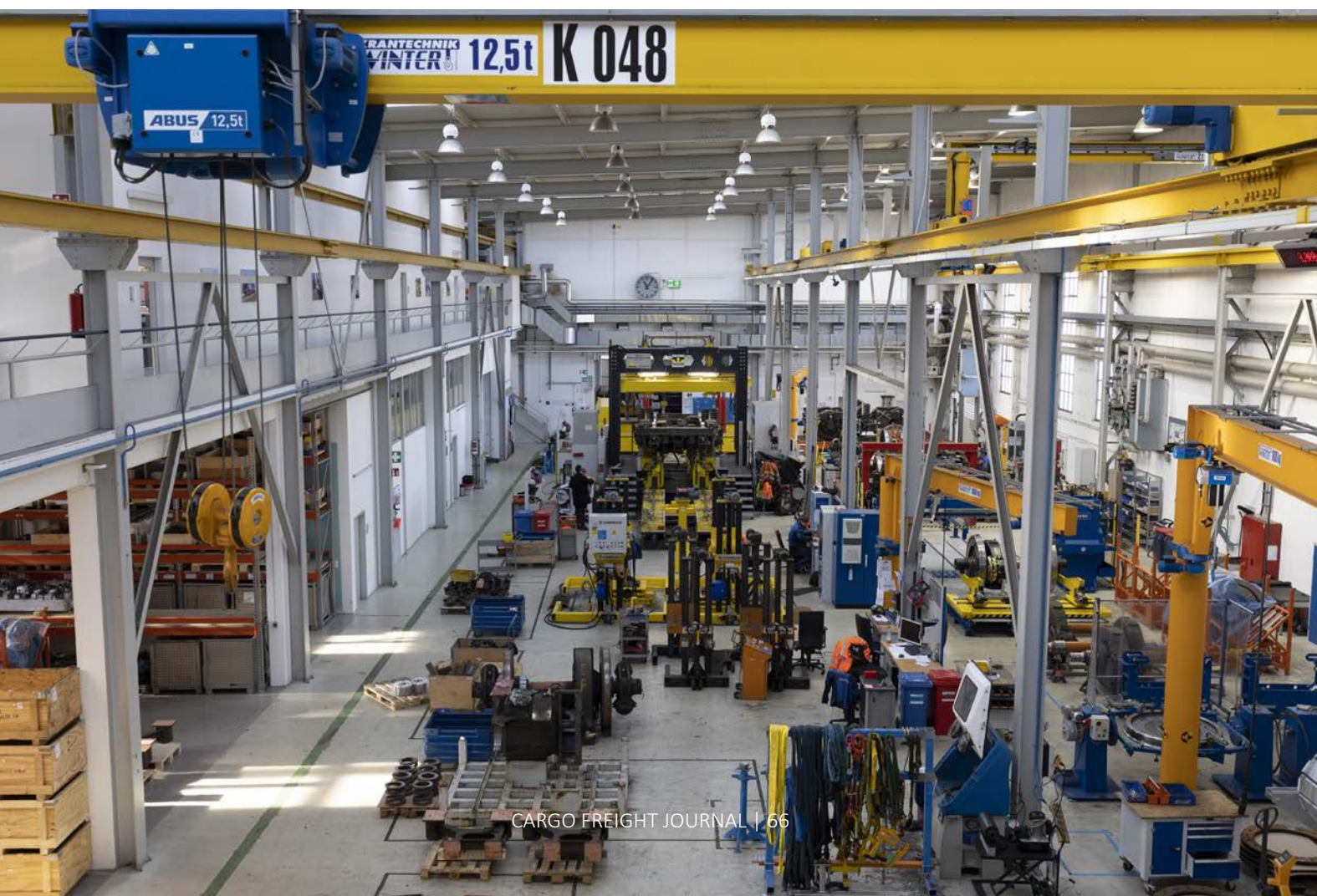
Meeting an expected surge in demand

The Vectron fleet is growing rapidly, not least of all due to the rise in freight transport via rail (see ►



As of 2026, customers of the Rail Service Center Munich-Allach will benefit from additional capacities and a wide offering of preventive and corrective maintenance services.

The in-house bogie service center in Munich-Allach enables complete revisions of bogies, including wheelset replacement.



box). With resources stretched to the limit, operators require the highest availability possible. And in the unlikely event of a failure, they need a speedy response. To be able to keep pace with maintenance requirements, Siemens Mobility is expanding its service locations in Europe by opening new service depots at strategically important locations. At the same time, the European lead RSC for locomotive maintenance in Munich-Allach is being equipped for the future. Along with expanding manufacturing capabilities, additional capacities are being made avail-

able for the wide range of preventive and corrective maintenance offers. Furthermore, the data center in Munich-Allach is also being enlarged in an effort to continually evolve and refine digital services based on Railigent X. This is just one more way in which Siemens Mobility is underscoring its commitment to combining the real and digital worlds to provide service efficiently and to keep locomotives moving.

Railcover: A modular service concept for Vectron locomotives from Siemens Mobility, which includes customer-specific maintenance services from full service to support contracts.



Further information:

Siemens Mobility workshop services:

<https://www.mobility.siemens.com/global/en/portfolio/rail-services/maintenance-services/workshop-services.html>