



Add value.  
Inspire trust.

## Refurbishment services

Ensure safe retrofit and upgrade of your existing rail fleet.

### Your challenges

The challenges associated with renewing and upgrading railway systems – in particular rolling stock – have increased significantly in recent years. Hardware and software lifecycles are shrinking in comparison with the decades-long lifecycles of the electro-mechanical systems that they interact with. Meanwhile, operational stress is on the rise due to higher performance requirements and busier schedules. Handling the process of upgrading and system modernisation can be further complicated, as certain parts will have to be renewed due to wear and tear, while other parts are simply no longer available from the original supplier. Operating companies are also facing additional pressure from higher safety requirements and increased passenger demands.

### What role does rolling stock play?

Rolling stock is an essential part of a railway system. As a moving system, it is subject to external influences from the environment and static loads. Rolling stock must also

bear the stress of dynamic loads and wear (by friction), particularly on the load-bearing mechanical parts, such as the car body and bogie.

### Why is refurbishment important for your business?

While new rolling stock is designed for a certain projected use (in terms of operating conditions, passenger needs, etc.) and a defined lifespan, it is financially preferable for rail operators to operate these valuable assets for as long as possible. Some subsystems may need to be replaced or rebuilt on a scheduled or unscheduled basis for various reasons. This includes meeting rising passenger expectations (comfort, communication, safety), enabling more frequent use and increasing passenger capacity while ensuring safe and reliable operations until the end of the planned lifespan. Extending the lifespan of rolling stock through retrofit or upgrade work is often economically more efficient than buying new rolling stock.



## How can we help you?

TÜV SÜD is internationally recognised for its extensive technical knowledge of rolling stock. We provide assessment and testing services to help you monitor quality, reliability and safety across your fleet of vehicles. Our expert team supports you by improving maintenance efficiency while reducing cost. With nearly 50 years of experience in the rail business, the quality assurance we offer inspires greater trust in your rolling stock.

## Our rolling stock refurbishment services

We offer quality assurance and safety assessment through the following services:

- Acknowledgement of intended improvements of the refurbishment
- Inspection of rolling stock with regard to remaining lifespan
- Evaluation of changes and analysis of imposed risk (CSM)
- Obsolescence management
- Assessment of new subsystems to be introduced or parts to be replaced
- Analysis and assessment of necessary control software to ensure functional safety with new hardware units
- Analysis of reactive effects of changes on other subsystems and the total system (total weight and weight distribution, clearance, safety against derailment, braking system, electric power supply, fire safety, EMC, operation modes, qualification of staff and maintenance)
- Definition of required inspections and tests
- Verification of final design
- Production inspections
- Assessment of conformity to EN standards and other international or national standards
- EC-assessment and certification
- Homologation management, coordination with authorities
- Assessment of maintenance procedures

- Upgrade of the technical documentation to match the refurbished situation

## Your business benefits

- **Save time and money** – through our experience with various infrastructure projects. We help you meet safety requirements while avoiding costly and time-consuming rework of requirements and specifications.
- **Minimise risk** – of time-consuming delays and rework, especially at the latter stages of your project.
- **Work with a competent partner** – that brings the experience gained from dozens of successful projects as well as technical and process knowledge. We support railway operators in particular with decision-making on replacement or refurbishment of rolling stock. This ensures a reliable and independent basis for the renewal process.

## Why choose TÜV SÜD?

TÜV SÜD's reputation as an independent third-party technical service provider ensures reliability and certainty when planning your construction project. We have been in the rail business for almost half a century and possess a sterling track record in independent assessment and engineering support for rail infrastructure safety. TÜV SÜD is recognised around the world as a railway safety assessor by many railway operators, manufacturers and national safety authorities.

## Add value. Inspire trust.

TÜV SÜD is a trusted partner of choice for safety, security and sustainability solutions. It specialises in testing, certification, auditing and advisory services. Through 24,000 employees across 1,000 locations, the company adds tangible value to customers and partners by enabling market access and managing risks. By anticipating technological developments and facilitating change, TÜV SÜD inspires trust in the physical and digital world to create a safer and more sustainable future.

## Related services

TÜV SÜD provides the following related services:

- Rolling stock services
- Urban rail system services
- Operation and maintenance of railway systems
- Rolling stock valuation services