

Rolling Stock Improvement in 2020–2025

FPC is continuously working to improve passenger carriage design with a particular focus on the comfort and functionality of a passenger seat.

Modular third-class open sleeping carriage

The carriage concept development was commissioned by FPC

The carriage features the traditional layout of passenger berths; however, the design and ergonomics were changed dramatically. The primary purpose of these changes was to improve personal comfort and provide passengers with the opportunity to tailor the space to their individual needs.

The concept has kept traditional-layout berths convenient for large groups travelling together or senior passengers but also offers new berths for improved privacy achieved by using individual partitioning sections that can also be used to hold hand luggage and outerwear.

The modular carriage concept provides personal space for each passenger by using:

- individual curtains closing off a berth
- closets for personal items and luggage in the passenger compartment
- ladder and a handrail to access the upper berth
- lighting at the head of each berth and individual reading lights (in addition to general ceiling light)
- individual air nozzles with temperature control
- power sockets (220 V) and USB ports.

Given the planned transition to larger carriages (size T, used for electric trains), the implementation of this concept will enable adding one more passenger compartment to a carriage, increasing the length of berths and fitting a shower into a dedicated cubicle.



A life-size model of a carriage with three compartments featuring this modular interior was presented at the 13th International Forum "Transport of Russia", and the model was showcased during 2020 at railway stations in Moscow and Sochi. During October 2020, the prototype carriage was publicly exhibited to a general audience of potential passengers at Paveletsky railway station square in Moscow. The final decision on whether to develop the concept further will be based on a survey of visitors taking a tour of the prototype carriage. The survey results helped to identify the best combination of compartments with built-in closets and the traditional layout, as well as areas for improvement in design solutions.

The new concept includes a range of measures to ensure:

- fire safety (use of appropriate materials, fire alarm system, fire exits, water suppression system, first-aid firefighting equipment)
- traffic safety – reliability of units (running gear, couplings, gangway platforms, brakes, etc.)
- personal security (a CCTV system).

Upgrading the Carriages

In addition to new rolling stock purchases, FPC focuses on upgrading and improving the equipment of carriages built earlier.

In 2019, the new third-class open sleeping carriage concept, developed by Vagonremmash, was implemented in a pilot batch of carriages converted from traditional mass-produced carriages through overhauls with service life extension.

The main feature of the new concept is the personal space optionality offered to each passenger by using partitions installed along the aisle, and individual curtains. The refreshed third-class open sleeping carriage provides for a modular replacement of interior elements, which will help reduce repair time and costs and also enable changes to the interior over the service life of the carriage.

In 2020, FPC continued to refresh its fleet of third-class open sleeping carriages. Vagonremmash carried out overhauls with service life extension (overhaul reconditioning) and repairs of 55 carriages of this type.

Based on the successful projects for overhaul reconditioning of third-class open sleeping carriages with interior renewal, a refreshed interior design was developed for second-class sleeping carriages 47K slated for overhaul reconditioning. All innovations successfully used in the overhauled third-class open sleeping carriages were also leveraged for second-class carriages.

In 2020, the overhaul reconditioning programme refreshed the interiors of 337 second-class sleeping carriages.

In 2020, the Company launched branded carriages for the Ruskeala Express and Sochi trains as part of efforts to develop rail tourism. The Ruskeala Express interiors were inspired by the famous Nikolaevsky Express carriages, and the Sochi carriages have a retro design in the style of the 1970s–1980s Soviet

Union. All carriages are built using latest technology and fitted with advanced equipment.

Another still focus area is equipping carriages with environmentally friendly toilet facilities.

In 2020, the percentage of carriages equipped with air conditioning units increased by 4.5%, and the number of carriages with environmentally friendly toilet facilities increased by 6.9% of the assigned fleet.

Carriage-2020

Another R&D focus area is double-decker carriages developed under the Carriage-2020 project. Due to the pandemic-induced restrictions on operations, the development project completion was postponed to 2021.

The project features:

- use of twin units
- increased double-decker height in size Tpr under GOST 9238–2013 (upper outline along the a–b–b1–a2 line), improving passenger comfort on upper berths of the second deck by increasing the distance between the berth and the ceiling
- refreshed interior and modern design
- bogies with air suspension system (improved smoothness and passenger comfort)
- a next-generation system for detecting potential failures (mechanical parameters monitoring, real-time data transmission to the situation centre, mileage intervals before first maintenance increased to 10,000 km)
- semi-automated customer service technologies with a single service compartment for two carriages (improving train crew productivity).

Features to provide additional comfort for passengers in the carriage:

- A modern design, developed using international best practices and high-quality finishing materials
- Improved soundproofing and vibration insulation
- Wi-Fi hotspot
- Intercoms for communication with a train attendant
- A full-fledged self-service area with vending machines and a purifier
- Convertible tables and personal safes in compartments
- Automated sliding interior doors
- Individual temperature control at each compartment
- A shower cubicle in each carriage

In 2020, prototypes of two compartment carriages and one administrative carriage were developed and underwent preliminary integrated testing.

Yet another R&D focus area is the Carriage-2023 model range project, envisaging the development of single-decker locomotive-hauled carriages in size T and push-pull double-decker electric trains. The project's stage one was the design of the modular open-plan carriage described above.

Availability of carriages equipped with air conditioning units and environmentally friendly toilet facilities

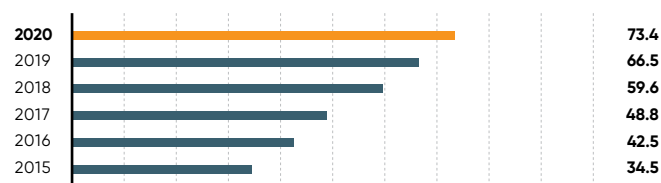
The Company operates 12,552 carriages with power sockets for device charging, with the share of such carriages in the total fleet at 79.9%.

FPC has completed a project to equip its branded trains with high-speed data lines, with a total of 6,373 carriages equipped with this connectivity solution. The data line is used to provide passengers with access to the Poputchik (Fellow Passenger) multimedia portal, as well as for technical purposes – to support the operation of the carriage equipment monitoring and diagnostics system, the CCTV system, and the passenger boarding control system. The Company also plans to use the data line for providing a voice communication service for the train crew and for deploying the software to replace legacy equipment used in the passenger train security and communication monitoring and control system.

Water and air sanitisers are also being installed, with the percentage of carriages already equipped with these solutions already standing at 32% and 42%, respectively.

Sandwich frames made of plastic and aluminium have completely replaced wooden window frames in passenger carriages.

The assigned fleet equipped with bio toilets, %



The assigned fleet equipped with air conditioning, %

