



Fig. 1: RORUNNER system for the London Elizabeth Line consists of two train formations, each with two track vehicles and one transport transport wagon.

There is increasingly less time for rail maintenance in an urban environment. Modular vehicle systems speed up the transport and work processes with the aim of completing maintenance and fault intervention within short possessions.

The faster cities grow, the more complex work on the public transport infrastructure becomes. Operators and passengers rely on the rail and tunnel infrastructure being maintained while the city sleeps. Furthermore, maintenance vehicles are expected to remove faults rapidly whilst normal operation continues and, if possible, without affecting other road users so that long closures can be avoided. An increasing number of network operators convert their fleets to vehicle systems which can be used flexibly for a variety of work tasks due to their modular components. In addition to the technical prerequisites of the vehicles, the total cost of ownership, which is made up of purchase, operation and maintenance in equal parts, is important for the purchase decision. Apart from the effectiveness of the procurement process, maintenance vehicles are, therefore, also assessed on whether they fulfil their tasks economically, are reliable and are capable of being integrated into existing and future areas of work. Using ROBEL transport systems, it is possible for the first time to employ vehicles in various ways for pending work processes.

One system - countless areas of activity

The latest RORUNNER System by ROBEL is tailor-made for the maintenance of the London Elizabeth line and consists of a total of four track vehicles (RORUNNER) and three transport wagons (ROTRAILER) [Fig. 1]:

- 2 RORUNNER with messroom and removable transport module
- 1 RORUNNER with loading area
- 1 RORUNNER with flatbed loading area loading crane and workman basket

- 2 ROTRAILER with twistlock system integrated into the loading area
- 1 ROTRAILER as the basis for the setup of infrastructure measuring systems

Depending on their use, the vehicles can be configured with a total length between 40 and 85 metres with the objective of achieving the best possible work result with as few components as possible in a varying urban environment. For work on the overhead line equipment, the transport wagon carries cable drums and a scissor lift. A closure rail replacement requires a powerful loading crane and modular transport attachments. Drain pipe and tunnel cleaning are realized by a drainage cleaning unit with high-performance pumps which is, like all modules, fitted to the transport wagon using the twistlock system. Furthermore, the RORUNNER systems transport rails, switches, platform screen doors and transformers.

Three case studies highlighting the new process speed

1. Underground switch change in less than 5.5 hours

Vehicle combination:

- 1 track vehicle with modular loading/unloading system and gantries
- 2 transport wagons with switch transport facility
- 1 track vehicle with messroom (max. 10 persons)

The challenge: lack of space when loading and unloading heavy materials, such as switches, crossing frogs and rails. Where cranes and large machines literally hit their limits, ROBEL works with a mobile exchange system specially developed for use in tunnels. 6 gantries portals are mounted on the loading area of the track vehicle on a twistlock frame.



Fig. 2: In the constricted room of a tunnel, the modular loading/unloading system places the gantries over the buffer beam on the track

An automatic loading/unloading system moves the gantries over the buffer beam and places them on the track [Fig. 2]. The large switch components are placed evenly and gently by remote control. The RORUNNER System enables, for example, the replacement of a 5 t switch of 36 m length during one nighttime possession in the underground tunnel.

2. Rail exchange in less than 4 hours

Vehicle combination:

- 1 track vehicle with crew room
- 1 transport wagon with rail transport unit
- 1 track vehicle with loading crane and rail lifter [Fig. 3]

The task: transport and replacement of rail sections in all areas of the urban rail transportation system during closure times. The process includes the time and resources for setting up the work site, to secure it, to carry out the closure rail replacement, dismantling the work site and removal operation. The RORUNNER system replaces 18 m of rails in less than the 4 hours specified.

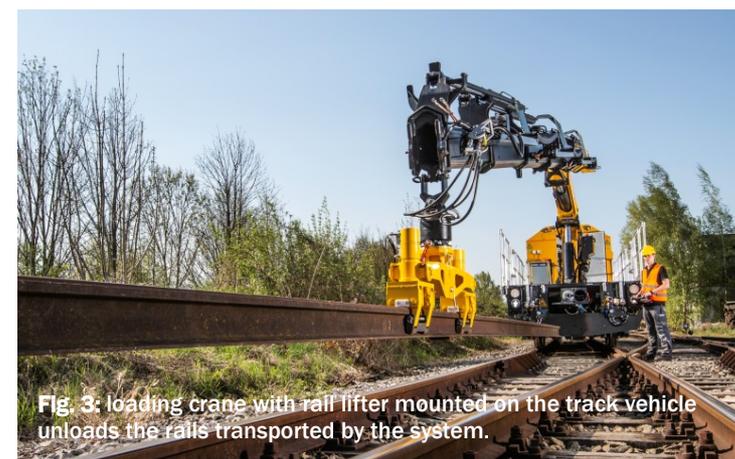


Fig. 3: loading crane with rail lifter mounted on the track vehicle unloads the rails transported by the system.

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3. Replacement of overhead line in a tunnel in less than 4 hours

Vehicle combination:

- 1 track vehicle with crew room
- 1 transport vehicle with cable drum and scissor lift
- 1 track vehicle with loading crane and workman basket

Scope of work: inspection, cleaning and maintenance of overhead line equipment and other high-level infrastructure as well as replacement of overhead lines and fixing rails during closure times. The scissor lift, twistlock mounted on the transport vehicle, has a convenient work area of 25 m², can be moved sideways by up to 1 m and is equipped with a power source and lighting. The cable is transported by means of a cable drum frame with adjustable hydraulic braking for a controlled unwinding speed. The RORUNNER System [Fig. 4] replaces 50 m of overhead line in less than 4 hours.

In addition to the above processes, the system is also equipped for drain pipe cleaning and infrastructure measuring - a modular vehicle concept for fast and productive maintenance in complex urban conditions.

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Fig. 4: RORUNNER system equipped modularly with crew room, scissor lift and loading crane with workman basket for the maintenance of overhead line equipment.