

**AUTOMATION**  
**Driverless metros**  
Making the most of full automation

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**KUALA LUMPUR**  
**Shahril Mokhtar**  
Expanding to serve the Klang Valley

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# Metro Report

SHOWCASING BEST PRACTICE IN PUBLIC TRANSPORT

## INTERNATIONAL

### Jaipur metro prepares to open



Trams • Light Rail • Metros • Commuter Rail





The SAI 400 EVO de-dusting train was developed from similar machines used in main line tunnels.

tunnels in northern Italy.

The leading car is equipped with a 'brush and suction' device, comprising two hoods each with a rotating brush. These are raised above the tunnel floor when not in use, and are able to move sideways to cover an area up to 4.4 m wide.

As the brushes scrape dust off the tunnel floor, it is sucked into filters fitted in the rear car and collected in bags which are taken to a waste disposal site after de-dusting is completed. The rear car is also equipped with a high-pressure water cannon for degreasing the rails. The 'brush and suction' method can remove up to five times as much dust as the traditional 'blow and suction' method.

The second stage of the cleaning process is 'brush and washing', itself carried out in two phases at different speeds, which requires two separate passes through the tunnel. This is performed by the multifunctional Salt Pony train, also developed from an earlier model in use on main line railway tunnels.

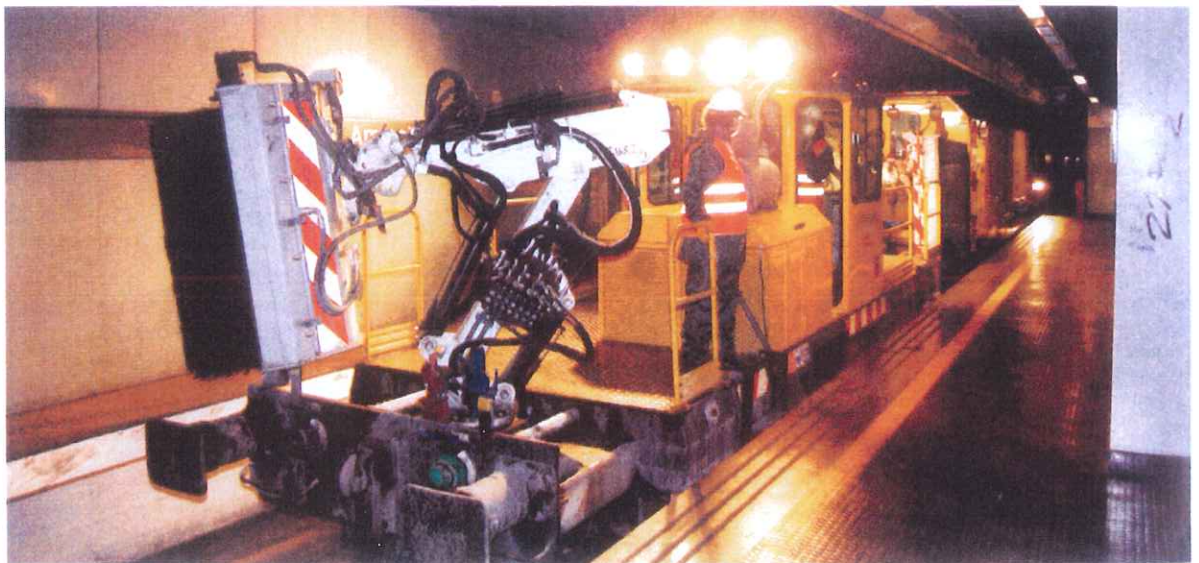
In the brushing phase, dust is removed by hard brushing of the entire tunnel section. It is only through the mechanical action of the brushes that fine dust which has accumulated on the tunnel walls can be effectively removed. Following this, water jetting is carried out using equipment mounted on another vehicle. A large amount of water is needed to ensure that residual dust detached from the walls by the mechanical brushing is removed. ❏

## Evolution of tunnel cleaning

**CLEANING:** As metro technology evolves, so does the technology to clean and maintain tunnels. Mantua-based Tecnofer has been developing tunnel cleaning machines for metros which it now operates in Napoli, Milano and Roma; the company is also in negotiations with other operators. The cleaning trains have been developed from those that Tecnofer operates in main line tunnels, and the

company has designed and is building the next version, to be used on automated metros.

Tecnofer operates two types of tunnel cleaning trains in metro tunnels, each of which is necessary for the two-stage cleaning process. The first stage is de-dusting, carried out by the two-car SAI 400 EVO cleaning train. This has been developed from the SAI 400 train in use on main line railway



The brushing and washing phase is carried out using the Salt Pony train.