



Engineering progress  
Enhancing lives

## Underground / Suburban railway systems

Selected references  
[www.rehau.com/railway](http://www.rehau.com/railway)



With the increasing concentration of traffic in major cities and metropolitan areas modern light and heavy railway systems are becoming increasingly important.

REHAU systems made of polymer materials have been occupying a prominent position in the traction current sector with the third rail for over 55 years. The aluminium steel power rail has also been tried and tested over 20 years.







# Load-bearing components for a safe traction current supply



Modern traction power supply with the 3rd rail



GRP support for top contact steel power rail



GRP support for bottom contact power rail



GRP support for bottom contact power rail



GRP support for bottom contact power rail



GRP support for top contact alu composite power rail



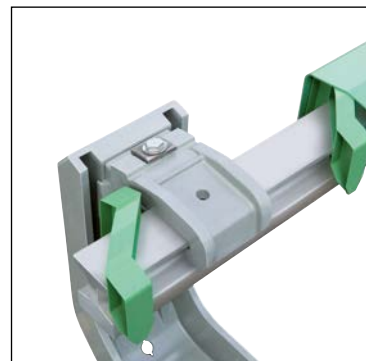
GRP power rail support



Cover System for top contact power rail



Cover system for side contact power rail



Cover system for bottom contact power rail



Aluminium steel composite rail



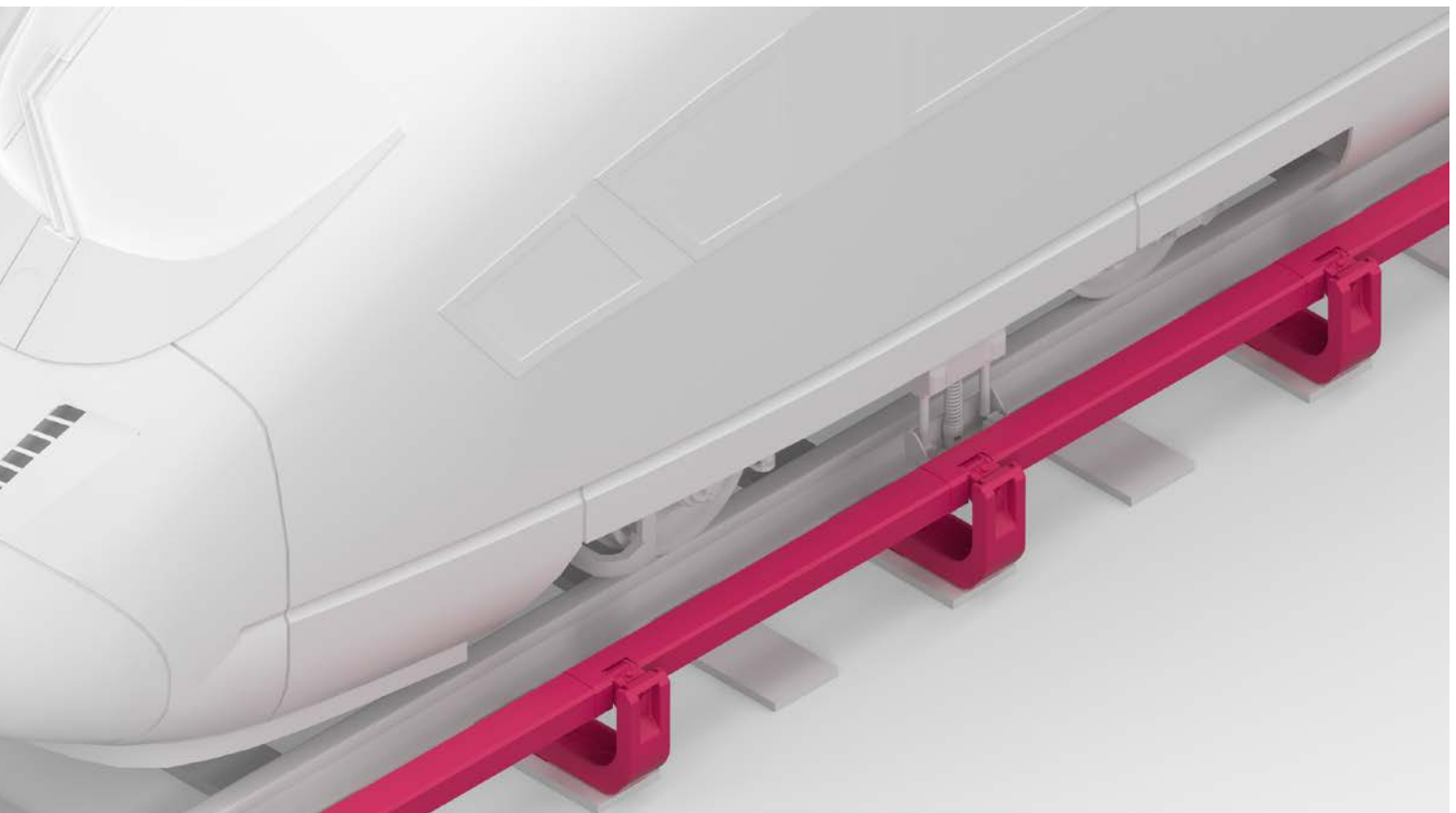
Expansion Joint



3rd rail system technology

# Bottom contact power rail

REHAU underground and suburban railway systems can be used without problems even under difficult climatic conditions irrespective of whether for tunnels or the outdoor area:



Our development expertise and system diversity also enable customer-specific solutions in addition to the development of entire modular construction systems. Components and system solutions for traction current supply are produced with a variety of production processes, materials and cross-sections – of course individually developed according to project need and / or specification.





# Munich – Underground railway

## Bottom contact power rail

### REHAU products

- Since 1969** PVC power rail cover system
- Since 1975** Rigid GRP power rail supports
- Since 1994** Height adjustable GRP power rail supports
- Since 1996** Power rail cover system made of halogen-free thermoplastics

The Munich underground railway in conjunction with the suburban railway form the backbone of the local public transport system of the state capital Munich. It was opened on the 19th October 1971. The Munich underground railway transports approx. 492 million passengers per year (as per 2019). REHAU has supplied approximately 200 km cover systems and 50,000 power rail supports since 1969.





# Hamburg – Underground railway

Bottom contact power rail

## REHAU products

- 1989** Height adjustable GRP power rail support
- Since 1989** PVC power rail cover system
- Since 2002** Power rail cover system made of halogen-free thermoplastics

The Hamburg underground railway was opened in 1912 and is the second oldest underground railway in Germany after the Berlin underground railway. In 2017 it transported approximately 242 million passengers in Hamburg. The Hamburg underground railway has the second-largest network in Germany after Berlin, with its network length of approx. 105 km.

REHAU supplied approximately 140 km cover systems over the past 20 years.





# Berlin – Suburban railway

## Bottom contact power rail

### REHAU products

- Since 1991** PVC cover system, GRP cover system
- Since 1992** Height adjustable GRP power rail supports
- 1997** Rigid GRP power rail supports
- Since 2001** Aluminium steel composite power rail in the network
- Since 2005** Halogen-free cover system made of PCAB for tunnels



The cover systems for the suburban railway comprise spacers, "standard" covers, insulator covers, protective covers for ramps in various designs as well as covers for feeding points. In addition to this, the special "bridge guard rail" design exists for the suburban railway for which REHAU supplies the covers, a socket, an insulator cover and an end cover.

The Berlin suburban railway is part of the light and heavy railway system of the city of Berlin. 16 lines are operating on a route network of 340 km, which serves 168 stations. The Berlin suburban railway is the only suburban railway in Germany to operate with a direct current from a laterally attached power rail apart from the suburban railway in Hamburg.

REHAU supplied Germany's largest suburban railway network with approximately 1 million metres cover systems, 100 km aluminium steel composite power rail and 200,000 power rail supports.





© VAG - Claus Felix

# Nuremberg – Underground

Bottom contact power rail

## REHAU products

**Since 1970** PVC power rail cover system

**Since 1998** Power rail cover system made of halogen-free thermoplastics

The latest underground railway in Germany to open was Nuremberg underground railway on 01.03.1972 and was the first railway to open an automated underground railway line in Germany on 15.03.2008. It now forms the backbone of light local public railway systems in Nuremberg and Fürth. Its route network is 38 km long and is served by three permanent lines, which are joined by two support lines. A total of 122 million passengers used the Nuremberg underground railway in 2010 which corresponds to an average of 334,000 passengers per day.





# Vienna – Underground railway

Bottom contact power rail

## REHAU products

**Since 1987** GRP power rail support

**Since 1987** GRP power rail cover system

The Vienna underground railway was officially opened in 1978 following a trial service. The underground network consists of five lines and was partly made up of lines from the Vienna metropolitan railway. The underground railway transports approximately 1.3 million passengers per day i.e. approximately 460 million per year.

Around 100 km cover systems and 25,000 GRP power rail supports from REHAU have been installed into the Vienna underground railway network since 1987.





# Cairo – Underground railway

## Bottom contact power rail

### REHAU products

**Since 1994** Height-adjustable GRP power rail supports, power rail cover system made of GRP.  
The Cairo GRP cover system consists of spacers, "standard" cover profiles, insulator covers, ramp covers, expansion joint covers and cable terminal covers

**Since 2013** Aluminium steel composite power rail

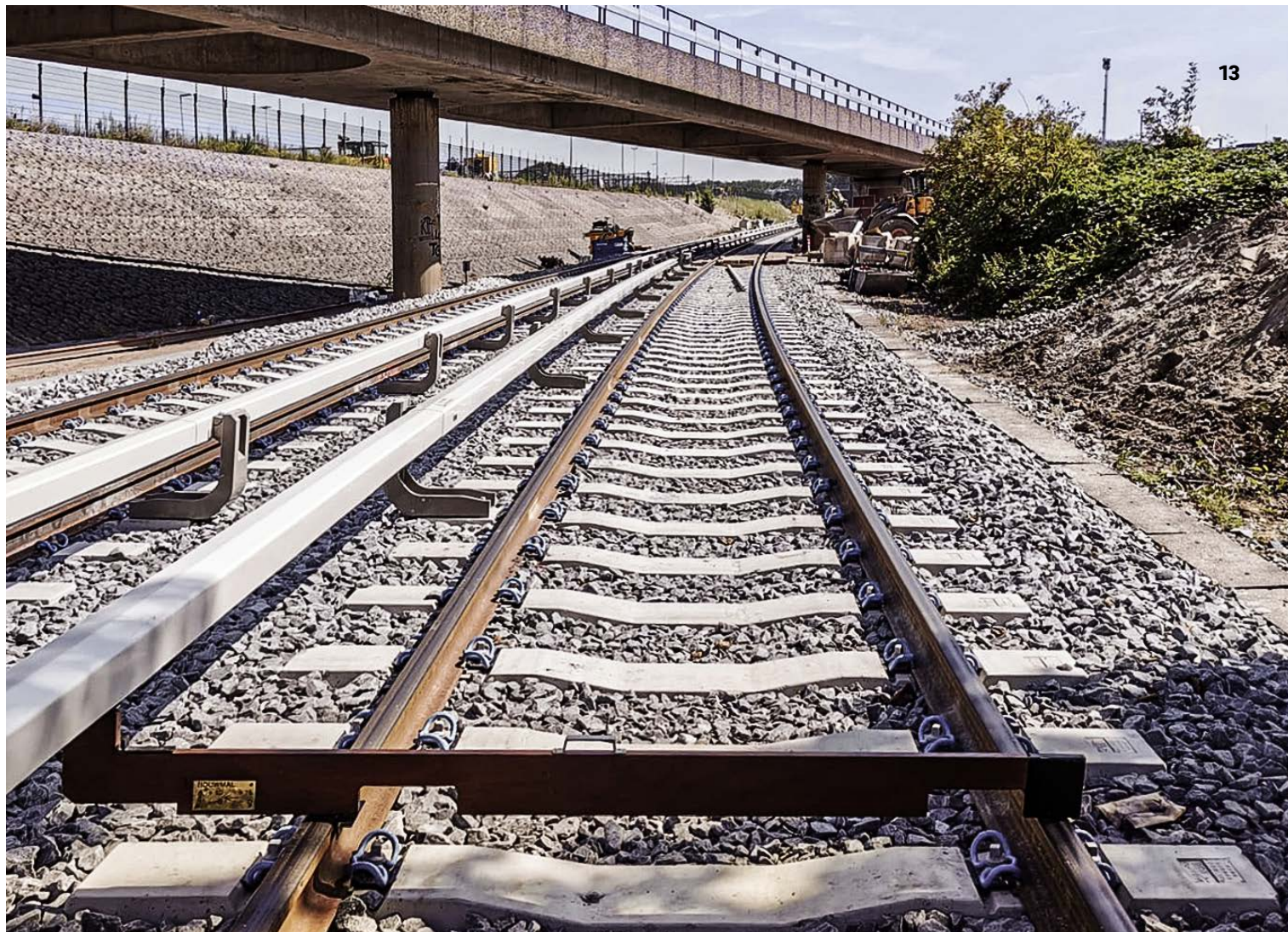
The Cairo metro in Egypt's capital is beside Algier the only fully developed underground system in Africa. Three lines are currently in operation, which are all operated separately. The first section of line 3 started operation on 21.02.2012 with REHAU components.

REHAU supplied approximately 80 km cover systems, 15 km aluminum steel composite power rail and 20,000 power rail supports for this.

Further projects Line 3 have already been delivered since 2016 over 52 km cover systems, over 8,500 supports and over 52 km power rails.







# Rotterdam – Metro

## Bottom contact power rail

### REHAU products

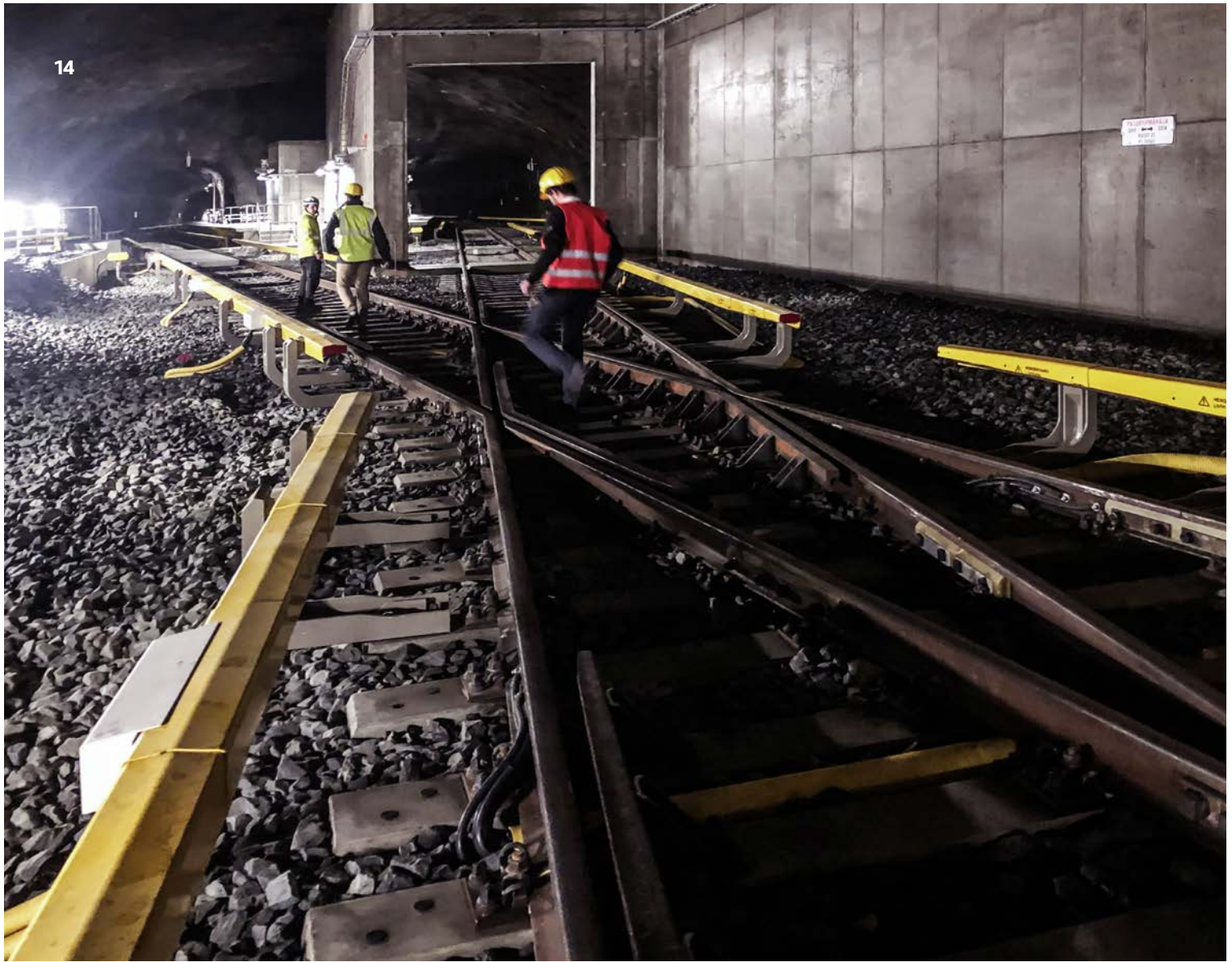
- Since 2000** GRP power rail cover system
- Since 2008** Height adjustable GRP power rail supports
- Since 2014** Aluminium steel composite power rail
- Since 2014** GRP power rail support, height-adjustable for individual installation
- Since 2020** PVC/PCAB cover system



The Rotterdam underground railway is a local public transport system within the second largest Dutch city apart from the metropolitan railway, buses and commuter railways and the oldest underground railway in the Benelux region. The first section was opened in 1968. The metro is used in the urban region Rotterdam whereas the inner city is primarily served by the Rotterdam metropolitan railway. The metro has therefore a large average distance between stations and travels at high speeds compared to other underground railways.

REHAU delivered just more than 120 km cover systems to Rotterdam since 2000 and approximately 8,000 power rail supports and over 21 km power rails since 2008.





# Helsinki – Underground railway

## Bottom contact power rail

### REHAU products

**Since 1991** GRP power rail supports

**Since 1992** PVC power rail cover system

**Since 2021** Complete power rail system including PCAB cover system



The Helsinki underground railway has been in existence since 1982. The network measures approx. 35 km in length of which approx. 55% are underground. There are 17 stations.

REHAU supplied approx. 18 km power rails, 25 km cover system and 5,000 power rail supports.





# Warsaw – Metro

Bottom contact power rail

## REHAU products

**Since 2003** GRP power rail support

**Since 2003** GRP power rail cover system

The Warsaw metro dominates the underground railway network of the Polish capital Warsaw. The metro in conjunction with the metropolitan railway and buses make up the local public transport system in the city. It was opened in 1995 and currently contains two lines covering a length of 34 km and 31 stations.

REHAU has supplied approximately 16 km cover systems and 4,000 power rail supports since 2002.





# Singapore – Metro

## Bottom contact power rail

### REHAU products

- Since 1985** PVC cover system
- 1994** GRP cover system
- Since 1995** Height-adjustable GRP power rail support for washing system
- 2014** Aluminium steel composite power rail



The Mass Rapid Transit, or MRT, is a rapid transit system forming the major component of the railway system in Singapore, spanning the entire city-state. The initial section of the MRT, between Yio Chu Kang and Toa Payoh, opened on 7 November 1987, making it the second-oldest metro system in Southeast Asia, after LRT System. The network has since grown rapidly in accordance with Singapore's aim of developing a comprehensive rail network as the backbone of the public transport system in Singapore, with an average daily ridership of 3.3 million in 2019 (including the Light Rail Transit (LRT)), approximately 78% of the bus network's 3.891 million in the same period. The MRT network encompasses 203 kilometres of route, with 122 stations in operation, on standard gauge.

REHAU has supplied more than 100 km PVC cover system since 1985.





# Kuala Lumpur – Suburban railway

Bottom contact power rail

## REHAU products

**2015** Complete 3rd rail-system for testing area



RapidKL is the public transport system in Malaysia's capital, Kuala Lumpur, and the surrounding Klang Valley. It consists of two S-Bahn lines, the monorail and a bus network. Two other local KTM Komuter trains run in addition to the rapidKL lines.





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# Sofia – Suburban railway

Bottom contact power rail

## REHAU products

**Since 2012** GRP power rail support

The Sofia Metro was opened on 28 January 1998. The two lines are 52 kilometres long and have a total of 46 stations. The Sofia underground system is used by 450,000 passengers each day.

REHAU supplied approx. 13,000 height-adjustable GRP power rail supports.





# LRT Jakarta – Transit

Bottom contact power rail

## REHAU products

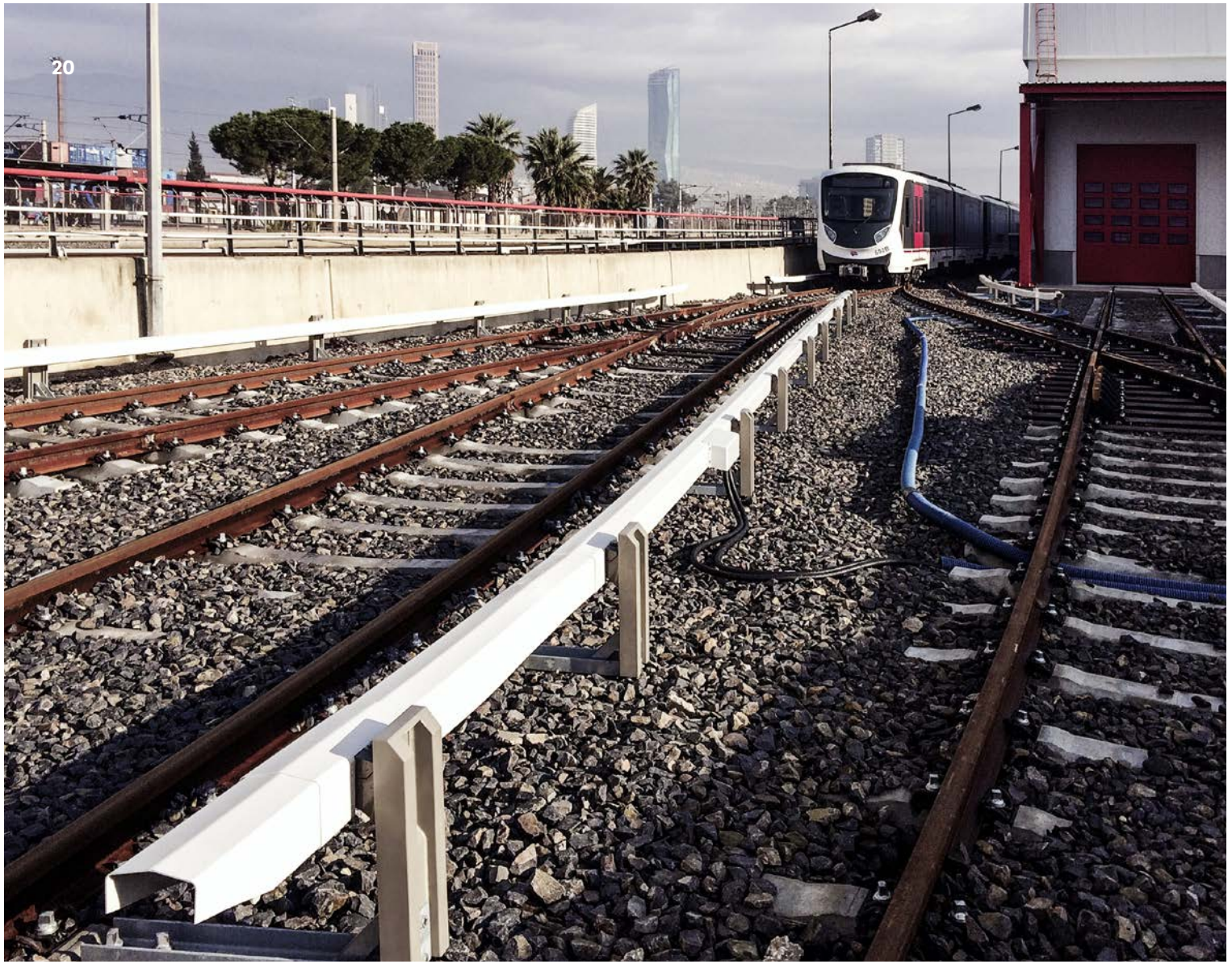
**Since 2017** Gapping Study and Detail Layout Planning  
Complete 3rd Rail system for bottom contact power rail  
Installation tools for 3rd Rail System



The Jakarta Light Rail Transit (Jakarta LRT) is one of the light rail systems in Jakarta, the capital city of Indonesia. It is being implemented by the Jakarta provincial government. The first phase of the LRT, from Velodrome to Pegangsaan Dua, began commercial operations on 1 December 2019.

The system length for the first phase has around 8.5 km. Further projects with about 48 km system are planned.





# Izmir – Metro

## Bottom contact power rail

### REHAU products

**Since 2017** Complete 3rd rail system for bottom contact

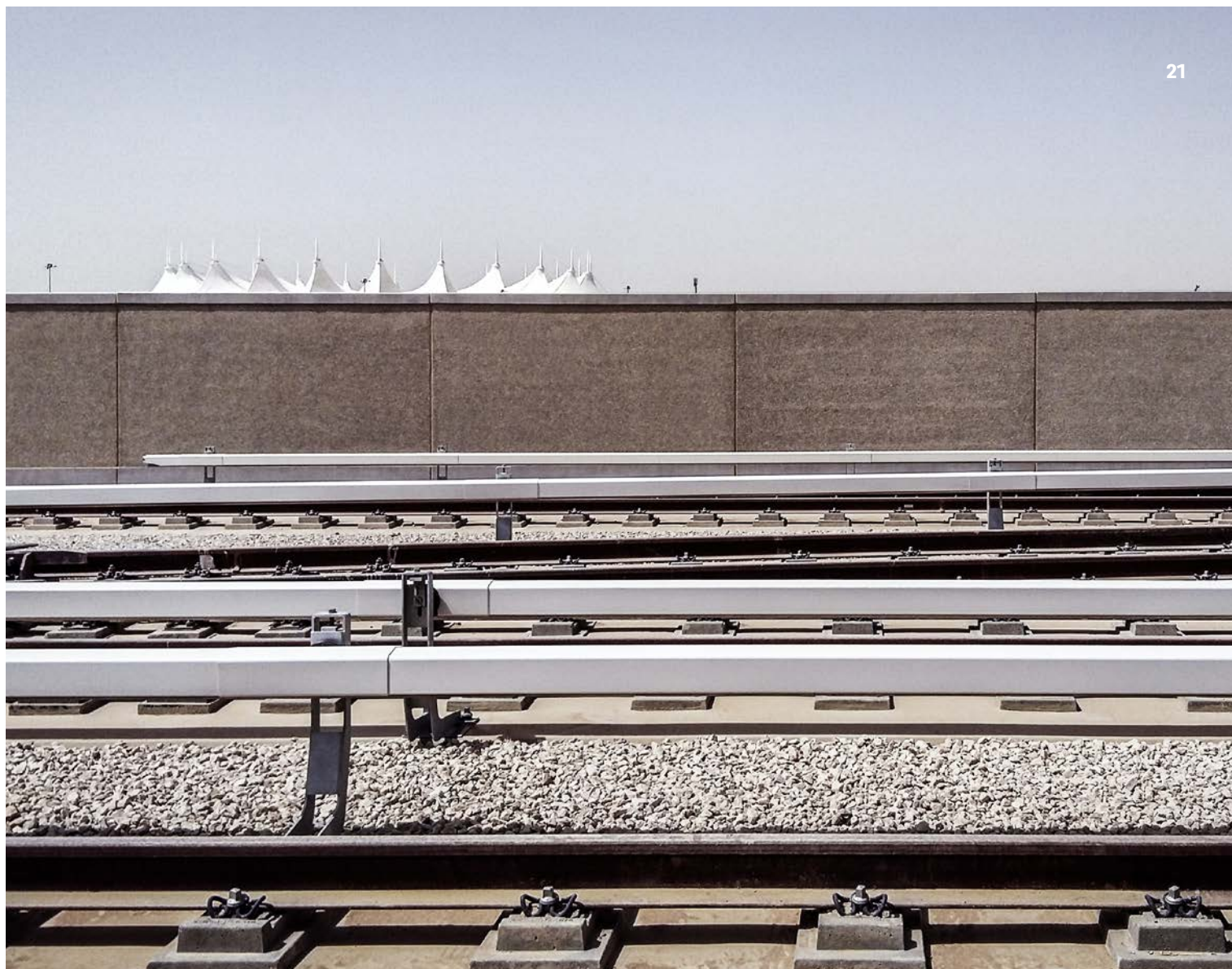


There are five different metro systems in Turkey.

The Izmir Metro Line started operation in May 2000. Up to now there is one line with 17 stations. About 100 Mio passengers (daily more than 300,000 passengers) with about 160,000 rides per year in this net of about 20 km.

There are total 182 metro vehicles from different companies like ABB, CSR, CRRC.





# Riyadh – Metro

## Bottom contact power rail

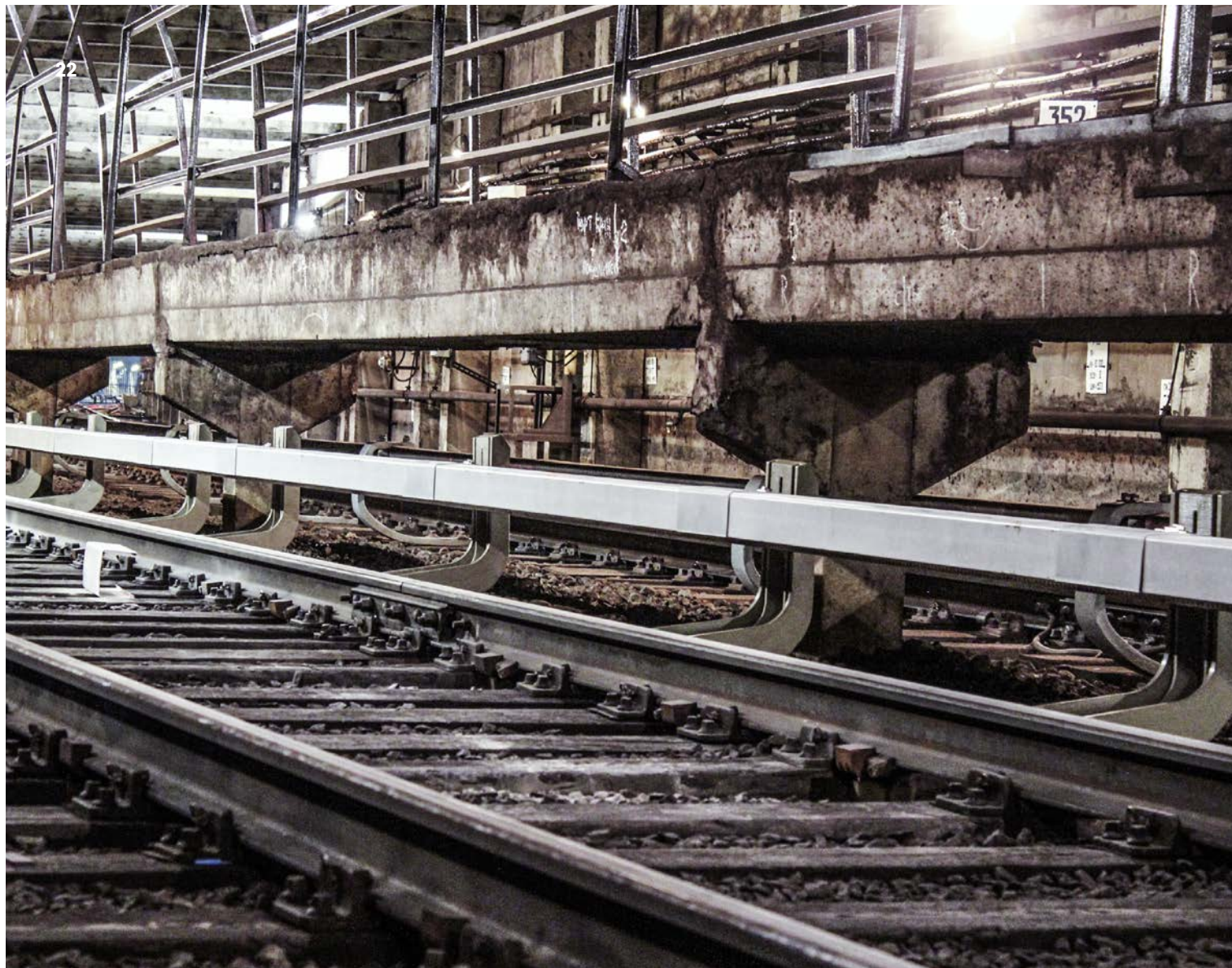
### REHAU products

**Since 2016** PVC power rail cover system outside  
PCAB power rail cover system for tunnel

The subway is a system under construction in Riyadh, the capital of Saudi Arabia. Planning started in April 2013. First Groundbreaking celebrated April 2014. The complete completion is planned for 2021.

Different vehicles will then drive on 6 lines with total 176 km track length.





# Saint Petersburg – Metro

## Bottom contact power rail

### REHAU products

**Since 2016** Height-adjustable GRP power rail support  
**2018** Complete 3rd rail-system for testing area



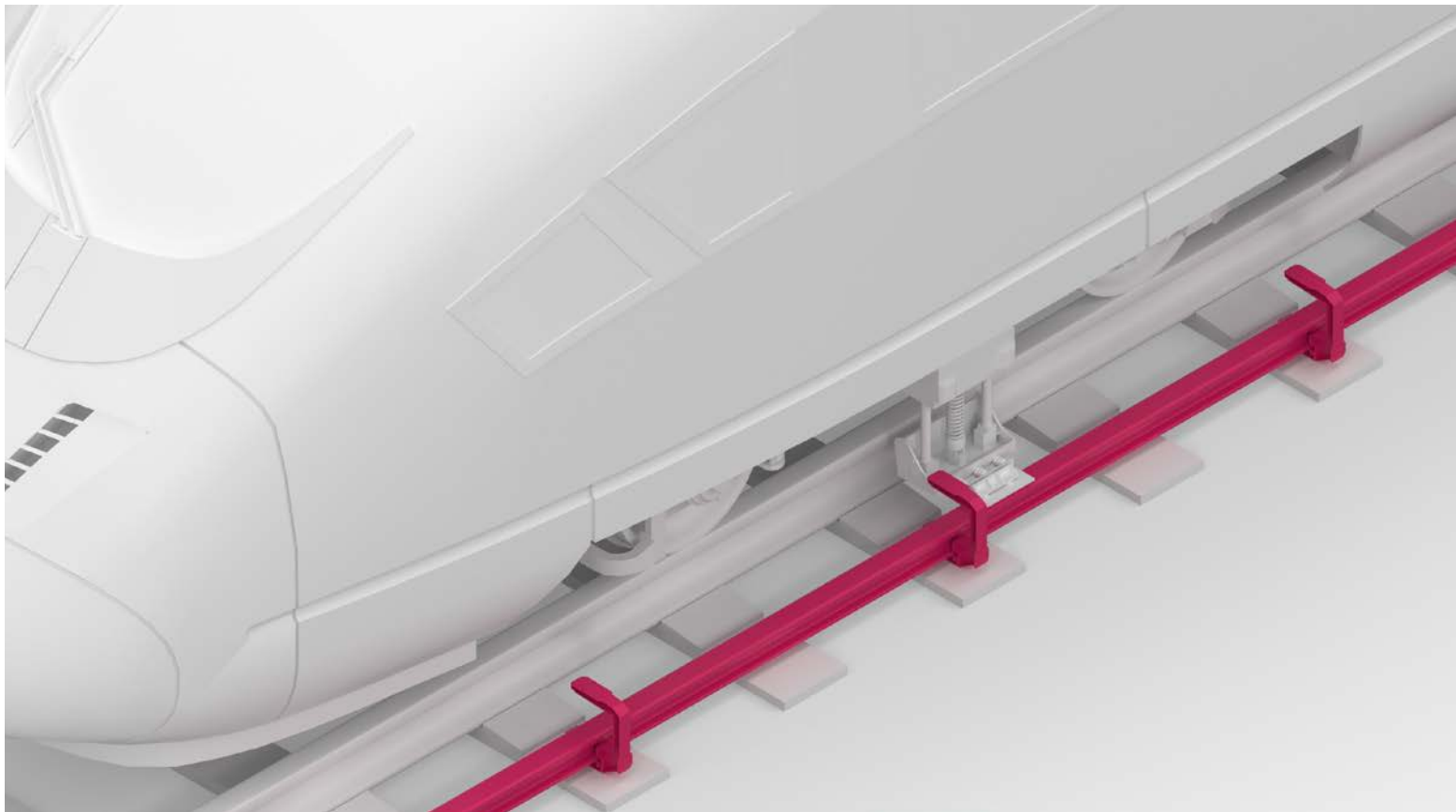
Metro Sankt Petersburg was opened in November 1955 and is one of the deepest subways in the world. The system has about 124 km track length with 72 stations.

The power here has 825 V DC.



# Top contact power rail

Covers with or without roof, whether for steel or aluminium composite power rail: Together with our customers, we develop a solution that is application-specific and the best economically.







# London – Network rail and Underground UK

## Top contact power rail

### REHAU products

**Since 2001** Height adjustable GRP power rail supports

**Since 2001** PVC power rail cover systems

**Since 2007** GRP power rail supports for tunnels (LSF - LU)

The London Underground is the world's oldest metro system, and the longest in Europe in terms of total line length. It covers the City of London, Greater London and some adjacent parts of the surrounding counties. The first section of the Metropolitan Railway (today's Metropolitan line) was opened on 10 January 1863 as an underground line with steam locomotives.

The London Underground currently has 272 stations, 262 of which it manages itself. The network's lines have a total length of 402 kilometres. Outside the city centre, most of the lines run above ground; in fact, just 45 percent of the system is actually based in tunnels. Only the Victoria line and the Waterloo & City line run completely underground. The London Underground is used by some 3.2 million people each day. On weekdays, the number of passengers can reach 3.7 million.

A total of 1.171 billion journeys were made in the 2011/2012 financial year, representing a new record.

REHAU has delivered more than 80 km cover system and 600,000 power rail supports to the UK since 2001.





# Berlin – Underground railway

Top contact power rail

## REHAU products

**Since 1965** PVC power rail cover systems

**Since 2014** PCAB power rail cover systems

The Berlin underground railway in conjunction with the suburban railway forms the core of the urban transport in Berlin. It was opened in 1902 and now consists of 175 stations of which 139 are located underground. The Berlin underground railway network comprises 9 lines across a total length of 155 kilometres.

REHAU supplies up to 5 km cover system every year.





# Tianjin – Metro

## Top contact power rail

### REHAU products

**Since 2004** approx. 88 km aluminium steel composite power rails



The Tianjin Metro is the current rapid transit system in the city of Tianjin, which was the second city (after Beijing) in China to operate a subway system. Opened in 1984, the system now has 8 operating lines and 164 stations spanning over a total of 265 km. The lines are jointly operated by two rapid transit companies, namely the Tianjin Metro Group Co. Ltd and the Binhai Mass Transit Development Co. Ltd. The former mainly operates lines in the downtown, while the latter operates lines that serve the Binhai New Area and TEDA.





# Ankara – Suburban railway

Top contact power rail

## REHAU products

**Since 2013** Complete 3rd rail-system



The Sincan-Kayaş commuter line or the Ankara suburban railway is the name of the commuter service between Sincan and Kayaş in Ankara. The line has 26 stations and is owned and operated by the Turkish State Railways.





# Kolkata – Metro

## Top contact power rail

### REHAU products

- Since 2016** Gapping study and Detail layout planning  
Complete 3rd rail system for top contact  
Installation tools for 3rd rail system (KMRCL)
- Since 2020** Complete 3rd rail system for top contact (RVNL)

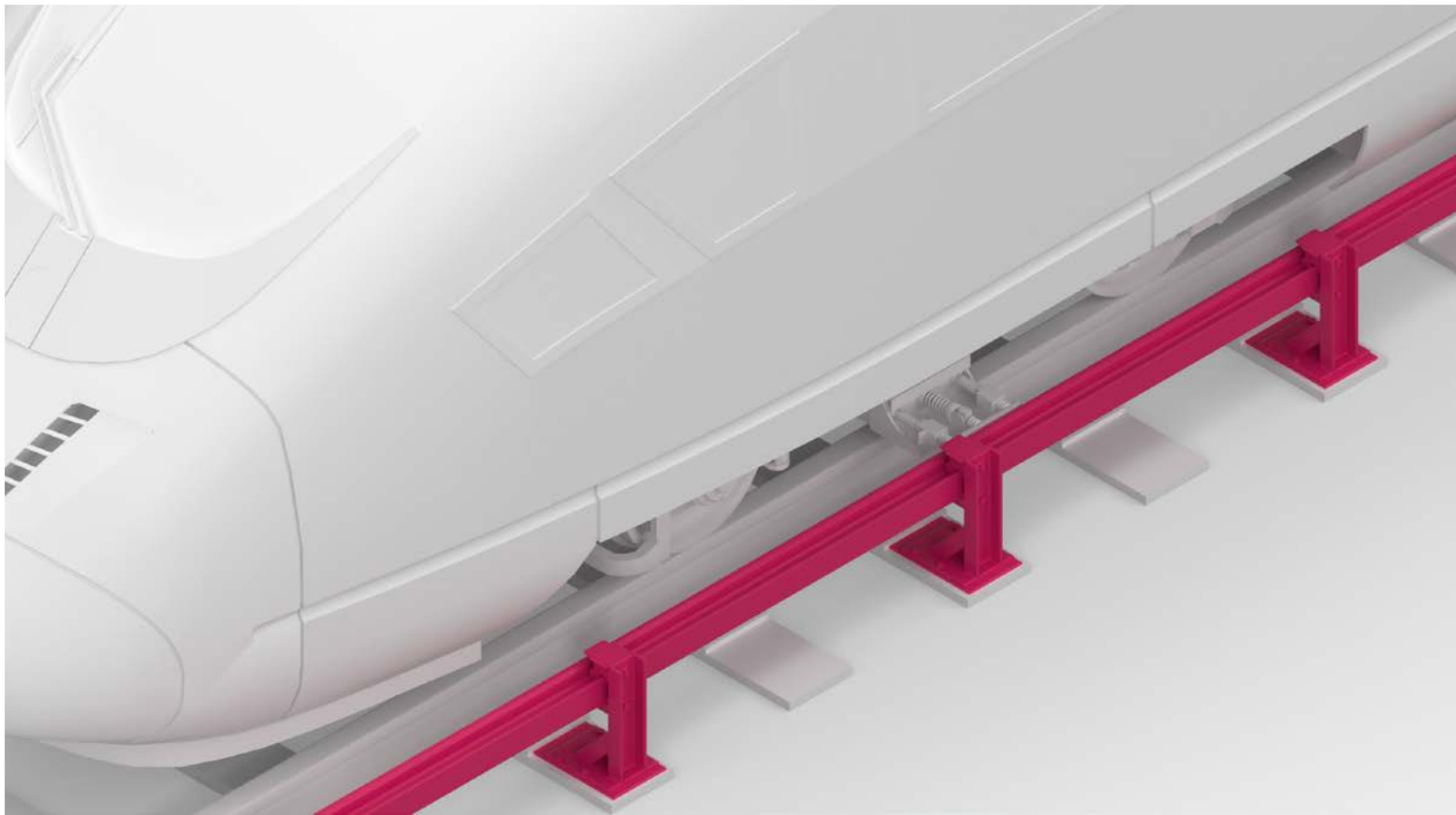


Metro Kolkata was the first subway in India. The opening was in 1984. The total length of the existing line 1 is about 31 km with two lines, it uses steel power rail. The new line 2 (East West metro) is ongoing and uses an aluminum steel power rail.



# Side contact power rail

Our systems are characterised by the highest manufacturing quality and precision. Thanks to engineering expertise, research and development partnerships as well as novel polymer compositions, custom-fit solutions are created for every requirement, no matter how complex.







# Hamburg – Suburban railway

Side contact power rail

## REHAU products

**Since 1993** PVC power rail cover system

**Since 2008** Power rail cover system made of halogen-free thermoplastics

The Hamburg S-Bahn is a local passenger railway in the Hamburg Metropolitan Region. Together with the U-Bahn, the AKN and the Regionalbahn, it forms the backbone of the passenger rail services in the Hanseatic city and its surrounding areas. It has been operated as an electric rapid transit system by the state railway since 1907 and transported around 271 million passengers in 2015. The Hamburg S-Bahn is the only rapid transit railway in Germany to use both direct current (1,200 V) and alternating current (15 kV/16.7 Hz).

REHAU supplied approximately 171 km protection for side pick-up power rails.





# LRT Kuala Lumpur – Bandar Utama to Johan Setia

Side contact power rail

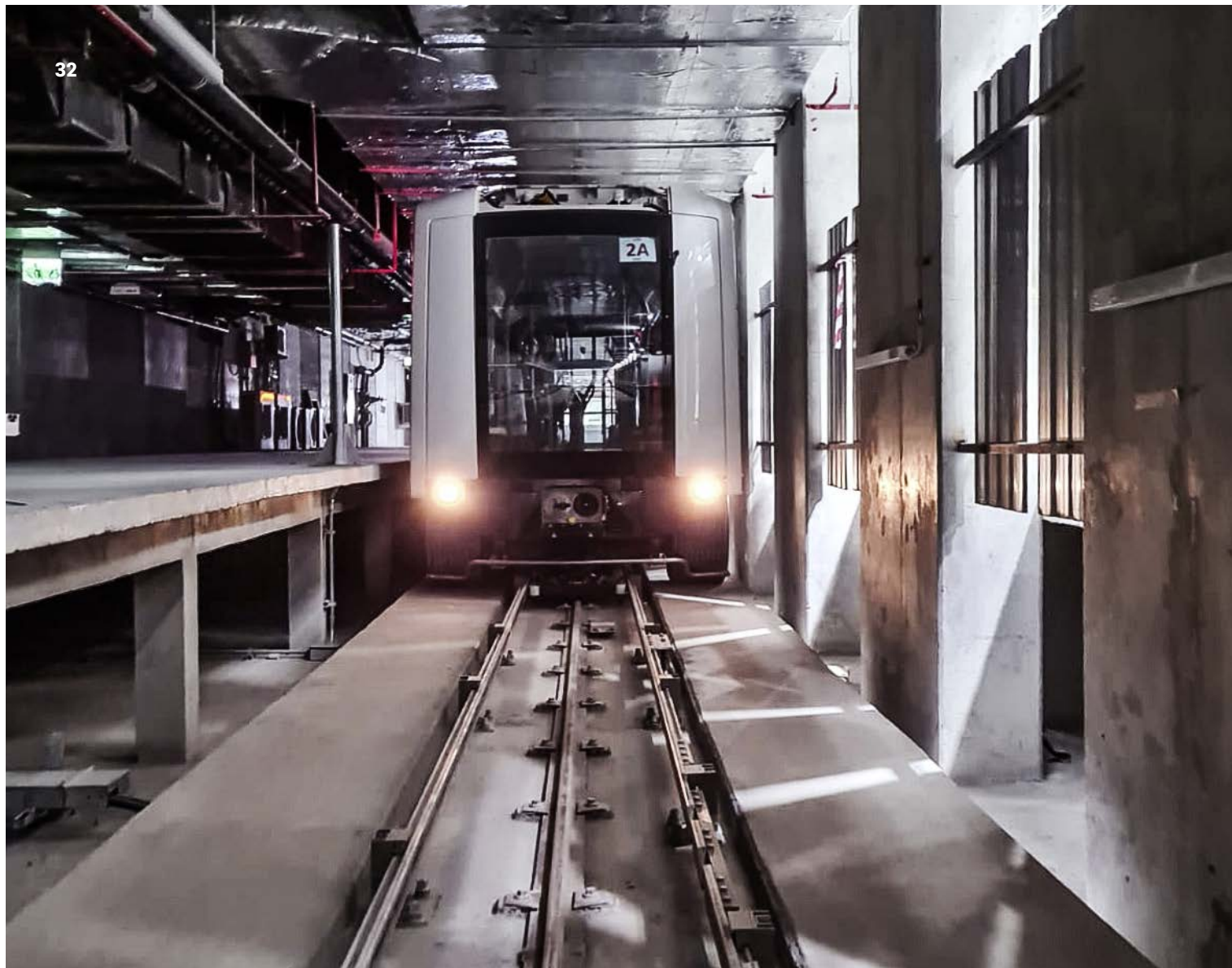
## REHAU products

**Since 2020** Gapping Study and Detail Layout Planning  
Complete power rail system with 3rd and 4th rail  
Installation tools for 3rd and 4th rail system



Different commuter rail systems exist in Kuala Lumpur (catenary, monorail, 3rd rail systems and 3rd and 4th rail systems). Kuala Lumpur has a modern, complex and well connected transport system. All systems together have a length of more than 100 km. One of them is LRT with 3rd and 4th rail power system.





# Bangkok Automated People Mover Airport Suvarnabhumi

Side contact Power Rail

## REHAU products

**Since 2021** Complete power rail system with 3rd and 4th rail



The Automated People Mover (APM) Bangkok is located at the Suvarnabhumi airport. It connects the main terminal building with different terminals within the distance of 10 km.



## Notes

This image shows a single page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



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