REHAU UNDERGROUND/SUBURBAN RAILWAY SYSTEMS

Selected references
REHAU CONDUCTOR RAIL SYSTEMS
In order that operating currents can flow safely

Safety first
Modern traction power supply with the 3rd rail

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 45 years. The aluminium steel conductor rail has also been tried and tested over 15 years.
REHAU CONDUCTOR RAIL SYSTEMS
Load-bearing components for a safe traction current supply

- GRP support for top pick-up conductor rail
- Support for bottom pick-up conductor rail
- GFK support for bottom pick-up conductor rail
- GFK support for bottom pick-up conductor rail
- GFK support for top pick-up conductor rail
- GRP conductor rail support
- Cover system for top pick-up conductor rail
- Cover system for side pick-up conductor rail
- Cover system for bottom pick-up conductor rail
- Aluminium steel composite rail
- Expansion Joint
- 3rd rail system technology

Products for light railway systems
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, all are from one source and specific to the system.
REHAU products
Since 1969: PVC conductor rail cover system
Since 1975: Rigid GRP conductor rail supports
Since 1994: Height adjustable GRP conductor rail supports
Since 1996: Conductor 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. 390 million passengers per year (as per 2014). REHAU has supplied approximately 200 km cover systems and 50,000 conductor rail supports since 1969.
REHAU products  Since 1989: Height adjustable GRP conductor rail support
PVC conductor rail cover system
Since 2002: Conductor 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 2013, it transported approximately 218 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 45 km cover systems over the past 7 years.
REHAU products
Since 1991: PVC cover system, GRP cover system
Since 1992: Height adjustable GRP conductor rail supports
Since 1997: Rigid conductor rail supports
Since 2001: Aluminium steel composite conductor 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 boxes for point leading ramps in various designs as well as covers for feeding points. In addition to this, the special “bridge guard rail” design exits 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. 15 lines are operating on a route network of 331.5 km, which serves 166 stations. The Berlin suburban railway is the only suburban railway in Germany to operate with a direct current from a laterally attached conductor rail apart from the suburban railway in Hamburg. REHAU supplied Germany’s largest suburban railway network with approximately 1 million metres cover systems, 50 km aluminium steel composite conductor rail and 150,000 conductor rail supports.
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 36 km long and is served by three permanent lines, which are joined by two support lines. A total of 117.54 million passengers used the Nuremberg underground railway in 2010 which corresponds to an average of 322,000 passengers per day.
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 1.2 million passengers per day i.e. approximately 439.8 million per year. Around 100 km cover systems and 25,000 GRP conductor rail supports from REHAU have been installed into the Vienna underground railway network since 1987.
Since 1994: Height-adjustable GRP conductor rail supports, conductor rail cover systems made of GRP. The Cairo GRP cover system consists of spacers, “standard” cover profiles, insulator covers, protective boxes for point leading ramps, cover for cable terminals in various dimensions.

Since 2013: Aluminium steel composite conductor 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 conductor rail and 20,000 conductor rail supports for this.

Further projects Line 3 Phase 4A and 4B have been delivered since 2016 (34km) also with 2 different aluminium dimensions.
REHAU products

Since 2000: GRP conductor rail cover system
Since 2008: Height adjustable GRP conductor rail supports
Since 2014: Aluminium steel composite conductor rail
Since 2014: GRP conductor rail support, height-adjustable for individual installation

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 40 km cover systems to Rotterdam since 2000 and approximately 4,000 conductor rail supports since 2008.
HELSINKI UNDERGROUND RAILWAY
Bottom pick-up conductor rail

REHAU products
Since 1991: GRP conductor rail supports
Since 1992: GRP conductor rail cover system

The Helsinki underground railway has been in existence since 1982. The network measures approx. 21 km in length of which approx. 30% are underground. There are 17 stations. REHAU supplied approx. 25 km cover system and 5,000 conductor rail supports.
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 29.2 km and 28 stations. REHAU has supplied approximately 16 km cover systems and 4,000 conductor rail supports since 2002.
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 3.031 million in 2015 (including the Light Rail Transit (LRT)), approximately 78% of the bus network's 3.891 million in the same period.

The MRT network encompasses 170.7 kilometres (106.1 mi) of route, with 102 stations in operation, on standard gauge. REHAU has supplied more than 100 km PVC cover system since 1985.
**KUALA LUMPUR SUBURBAN RAILWAY**

Bottom pick-up conductor rail

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**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.

**REHAU products** Since 2015: Complete 3rd rail-system for testing area
The Sofia Metro was opened on 28 January 1998. The two lines are 40 kilometres long and have a total of 34 stations. The Sofia underground system is used by 450,000 passengers each day. REHAU supplied approx. 5,000 height-adjustable GRP conductor rail supports.
LRT JAKARTA
Bottom pick-up conductor rail

In Jakarta the first metro with power rail is under construction. Until 2017 only catenary was used. The first new trains with 3rd rail will run in 2018. The system length for the first phase will have around 8.5 km. Further projects with about 48 km system are planned.

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
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 passenger) 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.
The subway is a system under construction in Riadh, 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 176km track length.
METRO SAINT PETERSBURG
Bottom pick-up conductor rail

REHAU products
Since 2016: Height-adjustable GRP conductor rail support
Since 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 114 km track length with 67 stations.

The power here has 825 V DC.
Covers with or without roof, whether for steel or aluminium composite conductor rail:
Together with our customers, we develop a solution that is application-specific and the best economically.
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 270 stations, 260 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 conductor rail supports to the UK since 2001.
BERLIN UNDERGROUND RAILWAY
Top pick-up conductor rail

REHAU products
Since 1965: PVC conductor rail cover systems
Since 2014: PCAB conductor 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 173 stations of which 139 are located underground. The Berlin underground railway network comprises 10 lines across a total length of 146 kilometres. REHAU supplies up to 5 km cover system every year.
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 5 operating lines and 95 stations spanning over a total of 132.4 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 pick-up conductor 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.
METRO KOLKATA
Top pick-up conductor rail

REHAU products
Since 2016: Gapping study and Detail layout planning
Complete 3rd rail system for top contact
Installation tools for 3rd rail system

Metro Kolkata was the first subway in India. The opening was in 1984.
The total length of the existing line 1 is about 22 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.
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 100 km protection for side pick-up conductor rails.
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.
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