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# Ahmedabad (Gujarat) AHMEDABAD METRO RAIL NETWORK

THE FIRST STRETCHES HAVE BEEN COMPLETED OF THIS NEW TRANSPORT SYSTEM WHICH WILL RUN FOR 69 KM

The city of Ahmedabad goes way back in time: founded in the XV century by Sultan Ahmed Shah, it became the capital city of the State of Gujarat and is still the most populated city in the state. The last few decades have also seen the city develop into an important economic, industrial and educational hub. As a result, the population has grown steadily, and is about to reach a total of 6 million. This growth meant the capacity of the road and rail networks needed to be increased, which led the Gujarat authorities to taking the decision to invest heavily in an infrastructure project for a metropolitan transport system to connect the city to nearby Gandhinagar, the capital of the district of the same name.

Construction of the network is being developed by Gujarat Metro Rail Corporation (GMRC) Limited and will be carried out in two phases: phase 1, which is already underway and is scheduled to be completed in 2023, and phase 2, for which the tender process is currently ongoing. Phase 1 includes the construction of two metropolitan railway lines: the north-south line and the east-west line. The lines will have a combined total length of 40 km (6 of which running underground) and will connect the four cardinal points of the city, including outlying residential and industrial zones. There will be 32 stations (15 along the north-south line and 17 on the east-west line), 13 of which will be located underground. Phase 2 will lead to the construction of a further 28 km of track and 24 stations. Once the Ahmedabad Metro network is completed, it will have 69 km

of track and a daily capacity of 1.5 million passengers.

## Products and technologies in Phase 1

Even though the first phase of the work has yet to be completed, several sections of the network have been finished, including a 6 km section of the east-west line which was inaugurated on 4<sup>th</sup> March, 2019 by the Hon'ble Prime Minister Narendra Modi and then opened to the public two days later. Part of the work was carried out using innovative technology and construction methods to excavate underground sections using EPBM-type (Earth Pressure Balancing Method) TBM (Tunnel Boring Machine) equipment.

Right from the very start Mapei India, which has worked for a number of years with several of the construction companies taking part in the project, was also involved through the supply of concrete admixtures, waterproofing products and other solutions for underground work. Going into detail, the Indian subsidiary supplied products used in the excavation of a twin-bore tunnel, such as POLYFOAMER FP and POLYFOAMER FLS high-performance, liquid foaming agents for ground conditioning, MAPE-DISP FLS, liquid dispersing agent for mechanised tunnelling and drilling, and MAPEBLOX T tail sealant, which is used in the excavation of tunnels with shielded TBMs.

To construct a diaphragm wall, the modified acrylic-based super-plasticising admixture DYMANON SX404 (which is manufactured and distributed on the Indian market by Mapei India) was used to manufacture con-

crete with high mechanical properties, excellent workability and durability. The same admixture was used to formulate the concrete used to build several structures in the metro stations.

The product chosen to waterproof the tunnels excavated using NATM (North Austrian tunnelling method) technology was MAPEPLAN TU S, a single-layer, synthetic membrane with an in-built signal layer. The same product was used for waterproofing operations at the intersection between the two lines of the metro.

The access ramps to the stations and various areas of the station buildings were waterproofed with PURTOP 1000, a two-component, solvent-free, polyurea membrane applied by spray using a high-pressure, bi-mixer type pump, after treating the substrates with PRIMER SN.



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## MAPEPLAN TU S

PVC-P single-layer, synthetic waterproofing membrane with signal layer; it can be applied as a fluid barrier in tunnel and underground structures waterproofing works. It is manufactured by Polyglass, a subsidiary of the Mapei Group.

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1. Internal view of one of the tunnels excavated using Mapei underground tunnelling solutions, such as POLYFOAMER FP, POLYFOAMER FLS, MAPEDISP FLS, and MAPEBLOX T.  
2. An image of the TBM-EPBM tunnelling machine used to excavate the twin-bore tunnels.

### TECHNICAL DATA

**Ahmedabad metro, Phase 1**, Ahmedabad, Gujarat (India)  
**Period of construction:** 2018-ongoing  
**Period of the Mapei intervention:** 2018-2020  
**Owner:** State of Gujarat  
**Project developer:** Gujarat Metro Rail

Corporation (GMRC) Limited  
**Contractors:** Larsen & Toubro, Afcons Infrastructure Limited  
**Project manager:** YVN Sharma (Larsen & Toubro) and Arvindan Anand (Afcons)  
**Mapei coordinators:** Bhavesh Jethava, Mapei India

### MAPEI PRODUCTS

**Excavating tunnels:** Polyfoamer FP, Polyfoamer FLS, Mapedisp FLS, Mapeblox T  
**Building diaphragm walls:** Dynamon SX 404\*  
**Waterproofing tunnels:** Mapeplan TU S  
**Waterproofing ramps and stations:** Purtop 1000,

Primer SN

\*This product is manufactured and distributed on the Indian market by Mapei India.

For further information on products see [mapei.com](http://mapei.com) and [mapei.com.in](http://mapei.com.in)