

Afcons Infrastructure records longest tunnel breakthrough for Delhi Metro Phase 4 Project

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New Delhi, India (Metro Rail Today): The Afcons Infrastructure team has reached a significant construction milestone in the Delhi Metro Phase 4 expansion, with the successful completion of the longest underground tunnel on the Tughlakabad - Aerocity corridor. The breakthrough, which occurred on November 30, 2024, marks a crucial step forward in the development of the 40.109-kilometre underground section of Delhi Metro Phase 4.

The breakthrough was achieved when the Tunnel Boring Machine (TBM) AMRIT successfully completed a 2.65-kilometre-long tunnel between the Tughlakabad Air Force Launching Shaft and Maa Anandmayee Marg, located in the heart of South Delhi. This achievement was celebrated in the presence of DMRC's Director (Projects & Planning), Rajiv Dhankher, and other senior officials.



Tunneling Breakthrough at Maa Anandmayee Marg

The TBM (nicknamed AMRIT), a colossal 105-metre-long machine, bored through the hard rock and complex soil conditions to complete this crucial section of the tunnel. The tunneling work involved the construction of two parallel circular tunnels, one for upward and one for downward movement, which are essential for the safe operation of the metro trains. The breakthrough for the second parallel tunnel is expected to be completed by January 2025.

This newly completed tunnel runs at an average depth of 16 meters and is a vital part of the 19.343-kilometre underground section of the Aerocity-Tughlakabad corridor, which is the longest underground stretch in the entire Phase 4 project.

Technological and Construction Challenges Overcome

The construction of this tunnel presented several technical challenges, including the relocation of existing sewer lines and navigating through hard rock strata. However, with the use of advanced technology and careful planning, DMRC successfully completed the tunnel with minimal disruption to the surrounding infrastructure.

The Earth Pressure Balancing Method (EPBM), a state-of-the-art tunneling technique, was employed to excavate the tunnel. This method, which is widely used for tunneling in congested urban areas, ensures that the surrounding soil and structures remain stable while tunneling progresses. The concrete tunnel lining, consisting of precast tunnel rings, was cast at a fully mechanized yard in Mundka. The concrete segments were then cured using a steam curing system to ensure early strength, which is critical for the tunnel's structural integrity.

DMRC took all necessary precautions to ensure the safety of workers and the surrounding environment during the construction process. Ground movements were closely monitored with highly sensitive instruments installed on nearby buildings and structures, ensuring that no settlement occurred during tunneling operations. These safety measures were particularly important as the tunnel passed under existing urban structures.

Phase 4 Expansion: A Vision for the Future of Delhi Metro

The completion of the Maa Anandmayee Marg tunnel is a significant achievement in the ongoing Phase 4 expansion of the Delhi Metro. With a total of 40.109 kilometres of underground metro lines under construction, Phase 4 will significantly enhance Delhi's metro connectivity, making it faster, more efficient, and more sustainable.

The Aerocity-Tughlakabad corridor, which is part of the Phase 4 plan, is one of the most challenging and critical sections due to its complex urban setting. Once complete, it will serve as a major transit route, alleviating congestion and improving transportation accessibility for residents and commuters in South Delhi.

About Tunnel Boring Machines (TBMs)

TBMs are specialized machines designed to excavate tunnels through various soil and rock types, including hard rock and loose sand. These machines are particularly advantageous for underground construction in densely populated urban areas as they minimize surface disruption. DMRC has used TBMs since the first phase of Delhi Metro's construction and continues to rely on them for complex tunneling projects in the city.

During Phase 3 of the Delhi Metro project, approximately 50 kilometres of underground sections were constructed using 30 TBMs, underscoring the importance of this technology in the ongoing expansion of the metro network.

Looking Ahead

With the breakthrough at Maa Anandmayee Marg and continued progress on the other underground sections, DMRC is on track to complete Phase 4 in the coming years, further solidifying Delhi's position as a leader in sustainable urban transport. The completion of the tunnels and their integration into the larger metro network will provide a crucial boost to the city's infrastructure, helping to reduce congestion and improve the daily commute for millions of Delhi residents.