Tunnel boring for Metro-III route to start by Oct, machines to arrive from China in July

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Mumbai: The first Tunnel Boring Machines (TBM) to be used for the Metro-III corridor will reach Mumbai in July, from Guangzhou in China. Mumbai Metro Rail Corporation (MMRC) has set a deadline of September 2019 to complete the tunnelling work.

The TBM will be procured from German major Herrenknecht AG, from its manufacturing facility in China. The machine will deployed for construction of the 6.08-km twin tunnels from Siddhivinayak to Dharavi through TBM launch shafts located at Naya Nagar in Mahim.

MMRC's director (projects) S K Gupta said, "The machine is expected to arrive by ship in July. Overall tunnelling work is on schedule and is expected to begin from October 2017."

The machines will initially have to be assembled after they reach the city, which is a time-consuming process.

The contractors on the seven civil packages of the entire Bandra-Colaba-Seepz alignment of Metro-III plan to deploy a total of 17 TBMs from leading manufacturers such as Robbins, Terratec, Herrenknecht and STEC. Of the 17 TBMs to be used, 10 will be new while seven machines will be refurbished.

A shaft 25m deep into the ground is being built at Naya Nagar. Gupta said, "So far 10m depth has already been achieved."

Tunnelling work, the first for a Metro project in the city, will be completed in two phases. The deadline for Phase-I is April 2019 while for Phase-II it is September 2019.

Work on the project had earlier been held up due to the stay order on cutting of trees. An MMRC official said, "Now that the stay order has been lifted, we have cut the trees which were coming in the way of constructing shaft to build the tunnel. So far 10% of the work has been completed but by next year the we will able to further increase the pace."

MMRC said it hopes to run the first train on the underground corridor by 2020 between Seepz and Bandra-Kurla Complex (BKC). The remainder of the corridor will be opened within a year after that.

"We are not going to wait for the entire construction work of the tunnel to be completed for carrying out other work. Laying of tracks, over head equipment, signalling, etc will also proceed depending on the space created in the tunnel," the official said.

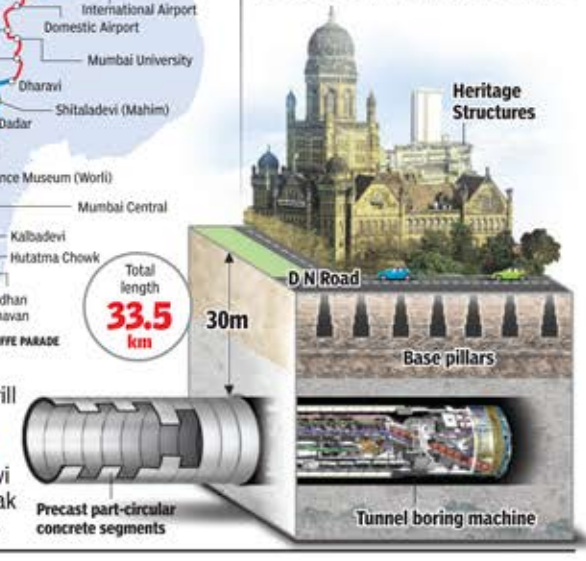
The contractor's engineers are already in Guangzhou to conduct factory acceptance tests on the machines. Dr. John Celentano, TBM expert of General Consultant and MMRC officials are soon expected to reach Guangzhou to conduct a final scrutiny. Subject to the machines passing the tests, approval for their shipment to India will be granted.

FIRST UNDERGROUND METRO WORK

- The first TBM machine will be launched from **Naya Nagar** area in Mahim in October 2017
- The TBM machine is more than **60m long** and 6.3m in diameter
- TBM will be lowered to a **depth of 25m** from ground level. So far 10m of the depth has been reached at Naya Nagar
- The tunnel will be **5.8m** in diameter
- This will accommodate **train coaches** which are 3.2m wide and 4m in height
- Main piece of the TBM, which **weighs 90 ton**, will be lowered in the shaft by a 500-tonne capacity crane
- The TBM will drill a **distance of 8-12m** everyday
- A total of **17 TBMs** will be used
- Cost of each TBM is **₹70-80 crore**
- Tunnelling will be completed by **September 2019**

COLABA-BANDRA-SEEPZ METRO-III ROUTE

The TBMs will drill a stretch of **6.08 km** between Dharavi and Siddhivinayak Metro stations



HERITAGE MONITORING INSTRUMENTS

- A tunnel boring machine (TBM), is used to excavate tunnels with a circular cross-section through a variety of soil and rock strata
- TBMs limit the disturbance to the surrounding ground and produce a smooth tunnel wall, hence they are preferred in heavily urbanised areas
- The TBMs will have various gadgets to monitor vibrations to ensure safety for structures above the ground. Locals fear tunnelling will damage foundations of old buildings and underground utilities
- These gadgets include anchor load cell, borehole extensometer, data logger, inclinometer probe, probe extensometer, tape extensometer, tiltmeter, total pressure cell, vibrating wire station