

METRO RAIL TUNELLING MACHINES ALL SET TO TAKE ON BANGALORE'S UNDERGROUND CHALLENGES

# Boring can be interesting too

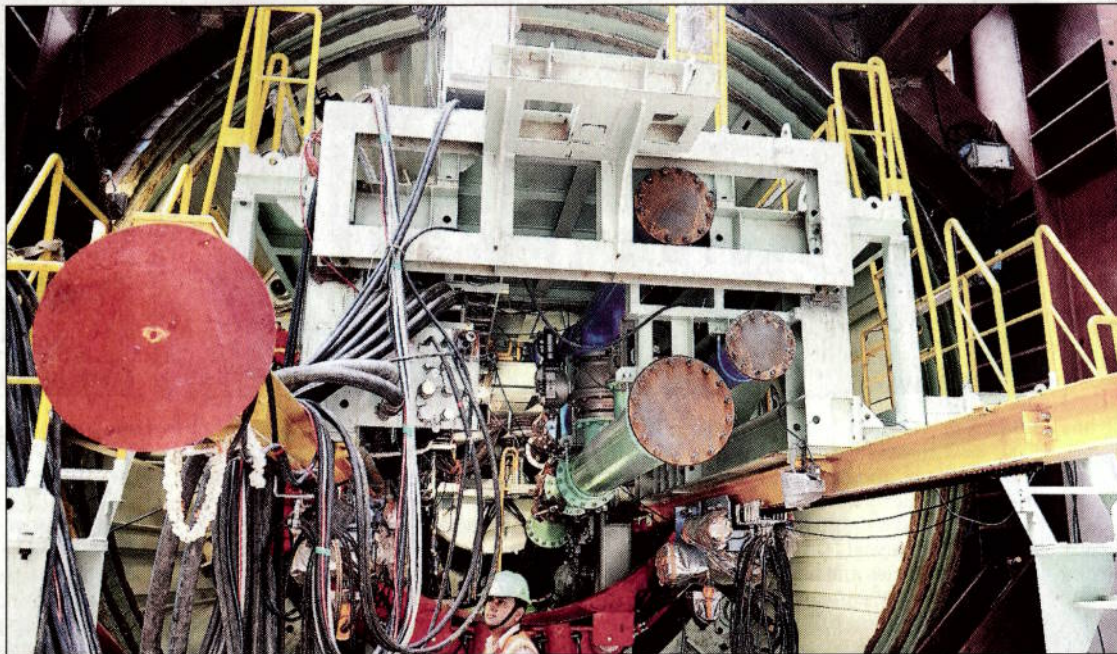
TIMES NEWS NETWORK

**Bangalore:** There's excitement in the air as Bangalore Metro finally gears up to tunnel underground with its two imported slurry tunnel boring machines (TBM), Helen and Margarita. But it's a challenging time.

The symposium on Saturday organized by the Bangalore Metro Rail Corporation (BMRC) and its consortium partners for the underground network discussed these issues and lessons from international experience. "The biggest challenge with underground work is planning. Bangalore Metro must plan it well as any delay henceforth is likely to cost it Rs 50 lakh a day," explained managing director of Delhi Metro Rail Corporation E Sreedharan, also a consultant for Bangalore Metro.

There's tunnelling under the General Post Office (GPO) and a building on KG Road. The rugged terrain and mixed soil conditions are other challenges. Experts say the UG-2 stretch from City railway station to Minsk Square will see 10,000 cubic metres of hard rock excavated in Majestic area alone. The stretch towards Central College has 28m of hard rock from surface to ground level. Beyond Central College, the mixed soil conditions begin, and these require frequent changing of cutter wheels attached to the tunnelling shield.

Other challenges include transporting the soil removed to the dumping yard at MS Palya only between 10pm and 6am every night. The total quantity of excavation from rock blasting alone is expected to be 6.5 lakh cubic metres.



**READY TO GO UNDER:** Tunelling work for the Bangalore Metro is set to begin. However, the rugged terrain and soil conditions in the city are likely to pose difficulties

## Metro Man Sreedharan says all's well

TIMES NEWS NETWORK

**Bangalore:** Even as the city's Metro project has failed to meet one deadline after another, the common man's wait continues. Bangalore first track — Reach-1 (Byappanahalli to M G Road) — is yet to receive crucial safety clearances in order to begin operations.

Is there an end to this long wait? When can Bangaloreans hope to board the Metro? STOI sought answers from E Sreedharan, who is among the chief architects for Bangalore Metro. Excerpts from an interview:

**What's the problem with Bangalore Metro Reach-1?**

A: There's no problem as I see it. Bangalore Metro Rail Corporation



E Sreedharan

**Clearances for Delhi Metro came faster.**

A: This happens with every Metro. But we are getting closer to Reach-1. Unfortunately, in Bangalore there was a peculiar problem where the commissioner for railway safety (CRS) retired during the process. So, it will naturally take some time for

(BMRC) has applied for all the necessary clearances and they are getting these one by one.

**Then why is the safety certification process being delayed?**

the next person in charge to catch up. **Why did Bangalore Metro need a separate Metro act? We are told the certification is waiting for some rules to be gazetted by the Centre.**

A: I don't know. There is no difference in law. It's the same for both Delhi and Bangalore.

**Is it time we have a separate authority to certify the Metro projects in India to avoid such unforeseen delays in the future?**

A: It's difficult to comment. Safety is a major concern for the Metro and must be handled by a knowledgeable organisation. Railways is good enough as it's among the oldest systems in the country and has good track experience. I am confident that the certification for Reach-1 will come through shortly.

### Lessons from Delhi

**Underground Metro between INA and Jor Bagh**

- **Sept. 8, 2008:** Herrenknecht TBM S-411 'Napaporn' struck an unforeseen obstruction at ring no. 589 which stalled cutter wheel
- **Sept. 10:** TBM was restarted after preliminary investigation and removal of rock fragments. It advanced with some difficulty for one more ring. The drive was stopped for investigation as there was some obstruction
- Encountering a strong rock severely damaged some cutting tools
- Problem was resolved by replacing rock cutter wheel and excavation proceeded through mixed soil without further incident
- Two TBMs for Bangalore have both rock and soft ground cutting wheels

### Quote hanger

We have taken all the necessary precautions for properties along the underground stretches and are using the best technology. Detailed building surveys along UG-2 have been done. The survey for UG-1 has begun.

N Sivasailam | MD, BMRC

### Challenges beneath

- **City station area:** Laying a section of the pocket track section (Metro track) below the railway track
- **Majestic to Central College (954.3m):** Sharp curves beneath K G Road; hard rock terrain and congestion on road
- **Central College to Vidhana Soudha (727.13m):** Long section of hard rock and mixed soil conditions; heritage buildings
- **Vidhana Soudha to Chinnaswamy cricket stadium (478.91m):** Heritage buildings; tunneling under GPO
- **Cricket stadium to Minsk Square:** Cut-and-cover section