

Shanghai Tunnel Engineering Co. Ltd.

New Delhi

Complex challenges during mining for RRTS Delhi-Merrut corridor from Khichdipur to Vaishali, by M/s. STEC

STEC has completed its tunneling of 10 kms with 4 TBMs, 12 cross passages and 2 ramps from Khichadipur to Vaishali within the stipulated time in spite of several complex challenges from Khichdipur to Vaishali.

The inner diameter of the tunnels is 6.5m (Outer Dia 7.25m) which is highly optimized as compared to global benchmarks of tunnels for a similar design speed of 180 Kmph with wider and higher rolling stock.

Challenges faced to Khichadipur from Anand Vihar,

- I. TBM was passing very close to the existing DMRC line 4 & 7 with a distance of 2-meters from metro piling structures.
- II. NCRTC Anand Vihar cut & cover station was constructed underneath the existing DMRC metro station.
- III. NH4 expressway piling structures nearby.
- IV. Non-engineered buildings in Khichadipur.
- V. Industrial buildings.
- VI. Passing below big drain at Khichadipur passed below shallow over burden area ranging from 4m-6m;

Similar challenges were faced in the mining towards Vaishali,

- I. Road over bridge pining structure.
- II. Passing below a few high-tension electric cables with an overburden of only 0.5m.
- III. Industrial buildings.

All these challenges were overcome successfully by executing strategic planning and innovative methods.

Precautions & several technologies to ensure safest mining with a low over burden also.

1917 building's survey has been conducted by our geotechnical & survey team, among them 300+ buildings has been repaired before TBM progression, almost 100+ has been propped & 100+ buildings has been evacuated from the TBM progression path.

Mockdrill with public has been conducted in such area to check the evacuation time for any untoward incidents.

Continue monitoring done by a competent team with the help of Building Settlement Points, Ground & pavement Settlement markers, Mini Prism targets, Bi-Reflex targets.

A system of ground parameter's monitoring has been done by our competent geotechnical team with the help of monitoring instruments such as, Strain Gauges, Crack meters, Tilt meters, Vibrating Wire & Standpipe Piezometers, Extensometers, Inclometers, Vibrographs & Ground Penetrating Radars.

30 new small houses have been reconstructed which were effected during the mining at low overburden.

Mining has been completed for all 4 TBMs safely with competent engineers & a dedicated round-the clock medical team.