

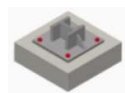
REF-A11

**BASEPLATE CONNECTION FOR ROCS CONNECTION-TUNNELS**

<b>PROJECT</b>	Mumbai metro project line 3 Underground stations
<b>LOCATION</b>	Mumbai, India
<b>CLIENT</b>	MMRC
<b>DESIGNER</b>	Maple
<b>INSTALLATION</b>	2023



<b>Application</b>	ROCS baseplate fixing
<b>Design std.</b>	EN 1992-4 (post-installed anchors)
<b>Hardware</b>	HST3, HY 200-R V3, TE-CX, TE-2 A22
<b>Software</b>	PROFIS Engineering (anchor to concrete)
<b>Services</b>	Demonstration, training at jobsite


**LOAD/ CONDITIONS**

Static / underground stations

**CHALLENGES**

- Underground application
- Huge quantity
- Limited budget
- NATM guideline
- Signature project, reputed manufacturer required

**HILTI TOTAL SOLUTION**

- ✓ Different anchors for different application
- ✓ Optimised design in PROFIS
- ✓ Post-installed chemical anchors for NATM
- ✓ Premium product with required approvals

**PROJECT HIGHLIGHT**


Efficient design as per special guidelines and delivery of huge quantity on time

## APPLICATION AND REQUIREMENT



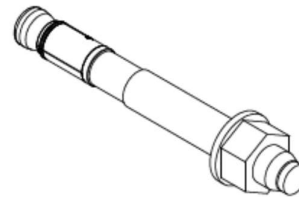
### Application Details: ROCS

Application of underground Rigid Overhead Conductor system (ROCS) fixing for which baseplate needed to be fixed on concrete. Requirement was given for underground 27 stations (stretch of 33 km) and depot level.

### Special NATM guidelines

In some locations New Austrian Tunneling method (NATM) was applicable. Post-installed chemical anchors were the suitable solution which can satisfy the requirement as per NATM guidelines. There was another criteria that the anchor rod used for chemical anchors to meet the corrosion resistance criteria.

## APPROACH TOWARDS SOLUTION



**HST3-R M16x170**  
(ISOMETRIC VIEW FOR UNDERSTANDING PURPOSE)

#### NOTES:-

1. TYPE OF ANCHOR BOLTS TO BE USED ARE HILTI HST3-R WEDGE(MECHANICAL) ANCHOR WITH 115mm DRILL HOLE DEPTH, STAINLESS STEEL A4. INSTALLATION AS PER ETA-98/0001.
2. VERTICAL LOAD AND BENDING MOMENT ARE THE WORKING LOADS ACTING ON THE BASE PLATE.
3. FACTOR OF SAFETY = 4.

### Huge quantity; cost effective solution

Since the number of post-installed anchors was more than 30000, designer wanted some optimized cost-effective solution. Again, the product needs to be popular in category with necessary approvals. The multiple designs done using PROFIS helped the team to decide the optimized solution.

### Post-installed anchors and other tools

- Post-installed mechanical anchors- **HST3** of size **M16x170mm** -35000 nos
- Post-installed chemical anchors- **HIT-HY 200-R V3** with **HAS-U A4 rod** of size **M16x260mm** -1200 nos
- Installation was done with cordless drilling using Hilti drilling tool **TE 2A22** with drill bit **TE CX 16X27**

## THE FINAL OUTCOME



### Ongoing anchor installation and finished post-installed connection

