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SLAB DESIGN OF SUBWAY FOR THE PEDESTRIANS

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Abstract— Street mishaps are a main source of death of youngsters between the ages of 10 – 24 during the street crossing. This paper presents the results of design of subway for the pedestrians who is crossing the considered stretch from Attapur to tolichowki main road towards mehdipatnam. As the time passed well defined divider as well as traffic signals are came to existence but somewhere alternative is required to overcome these problems so we planned to develop subway at mehdipatnam zone for pedestrian crossing .we used manual survey to generate traffic analysis at mehdipatnam in both directions (i.e towards Gachibowli and koti.) For designing the subway we used "CUT AND COVER METHOD" to develop the project. The design of subway is done by considering present pedestrian traffic and also the future trend in increase of pedestrian volume count in this regard we recommend this as the present existing provisions for pedestrians cannot be expanded or developed due to the increase vehicular traffic in the considered area of study

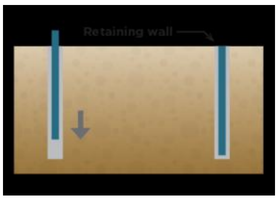
Keywords—pedestrians traffic analysis, vehicular traffic analysis, slab design

I. INTRODUCTION

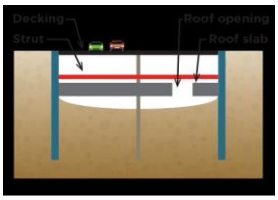
Mehdipatnam is one of the central zone occupied in central zone of Hyderabad .We can say mehdipatnam is junction for passengers to generate trips to their destination .The problems comes to cross pedestrians from one side to other side .In previous days there was no such safe and secure facility to passengers to cross the roads. At present a zebra crossing and signals are laid for the pedestrian to move across the road and at the major traffic period the traffic police officers are also imposed at that point to control the traffic.
The major issue that is created is that for the emergency vehicles and the normal traffic has to stop at the signal, therefore it is necessary to built a subway at that point. There were two options to built the crossway for pedestrians there are overhead foot bridge and underground pedestrian subway ,the experts have suggested to built the underground subway because there is a flyover that road .
Requirement: The Indian road congress guide line for pedestrian facilities (2012) underline different pedestrian crossing facilities with specifications and capacity consideration grades separated pedestrian crossing are to be built only after the local conditions are meet Certain warrants specified in the IRC 203-2012.
FOB or pedestrians subway should be considered only in very exceptional cases as a last option when all attempts to provide safe at grade crossing have failed. Final decision about grade separated crossing shall be based strictly on the finding of necessary scientific surveys and on satisfying stipulated warrants as per applicable codes and standards.
Subways lengthen the journey on foot rather that making it convenient. There are, therefore, not intuitive to a pedestrian's obvious walking route and desire lines. Speed calming measure-since the site where subway is recommended is closed to a signalled junction when implemented speed calming measure can vary effectively mitigate conflict points.

II. METHODOLOGY

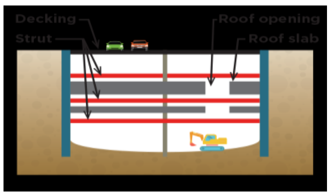
Cut and Cover Method is one of the methods that will be used to build the pedestrian subway tunnel. As the name suggests, cut and cover construction involves using excavation equipment to dig a large trench or rectangular hole in the ground which is then covered by a concrete deck. Once the deck is in place, surface activity can largely resume as construction works continue below. During construction of the stations, poured concrete or pre-cast panels are used to form the various levels and internal structures. Cut and cover construction technique. The construction site (enclosed in an acoustic shed) may be located next to a diverted road as the proposed station box is built below.



Installation of retaining wall



Installation of decking of roof slab

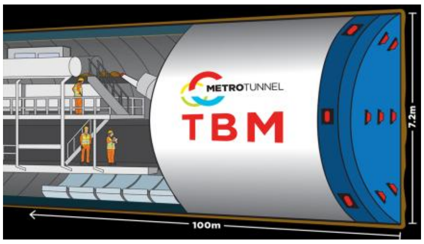


construction of station box

Tunnel Boring Machine: Tunnel Boring Machines (TBMs) are needed to dig the tunnel.
TBMs perform two main tasks:

- Excavating rock and soil with a rotating cutter head at the front of the machine before it is transported via pipes running through and behind the TBM.
- Progressively installing curved concrete segments to create a watertight lining inside the tunnels.

BIG AND BEAUTIFUL
At 120m long, the TBMs are as long as 3 E-Class trams end-to-end. They weigh a whopping 1,100 tonnes, equal to the weight of around 150 elephants.
SILVER LINING: The TBM not only digs the tunnels but it also seals them. Concrete segments are delivered to the TBM and installed to line the tunnel walls *MAKING HEADWAY*: At the front of the TBM is the 'cutter head', which acts as a drill that can tunnel through rock six times harder than concrete. The face of the cutter head is 7.2m in diameter and each of the cutter head's front discs weigh 200kg.



ROCK AND ROLL: TBMs bore through a variety of ground conditions, from hard rock to sand, travelling around 10m a day. The amount of excavated material removed would fill the MCG 1.2 times!
HEAVE-HO: Up to 14 people work in each TBM at any one time. Workers in the TBM include the operator, who drives the TBM, as well as tunnel and electrical engineers.
HOME SWEET HOME: Each TBM is manned and monitored 24 hours a day, 7 days a week. It is fully equipped with facilities for staff, including an office, kitchen and toilets.

III. CARRIAGEWAY

The width of single lane or village roads may be decreased to 3.0 m. On urban roads without kerbs the single lane width may be decreased to 3.5 m and in access roads to residential areas to 3.0 m. The minimum width recommended for kerbed urban road is 5.5 m to make allowance for a stalled vehicle.
A.Road side objects: While moving towards the GACHIBOWLI there is Raithu bazaar and bus bays on the left hand side. And while moving towards koti there is a bus bay on the left hand side and behind the bus bay there is military area wall.
B.Water proofing: Water proofing underpasses is commonly achieved by applying one of the following:-
Mastic asphalt, Bituminous or neoprene sheeting, Painted membrane.
C.Lighting and drainage: To try avoiding vandalism occurring, underpass lighting should be made using toughened glass and recessed into the walls or roof units. The locality and use of the underpass will determine the finishes. Urban underpasses are often painted in bright colours or to suit the finish of its immediate surroundings, using mosaics, tiling and rendering. For underpasses where aesthetics are not as important, a plain concrete finish will often be chosen.
Drainage comprises normal falls, screed floor and gullies or continuous side channels which will flow into a storm sewer as and when required.

III DESIGN PARAMETERS

A.DESIGN OF SUBWAY SLAB

1. Depth of slab:

Length of slab= 1.264m

2. Self weight of structure:-

Self weight of slab=31.6kn/m2

Weight due to carriage way =1.071kn/m2

Tendon axel load=8.13kn/m2

Total load=40.801kn/m2

Factored load=61.201kn/m2

Bending moment on structure =7639.10 kn-m

Note:* Assuming HYSD bars of Fe 550 grade. *Assuming M25 grade of concrete

3. Main reinforcement:

$Mu=0.87 \times fy \times Ast \times d(1-\frac{fy \times Ast}{fck \times b \times d})$

Ast_{req} =10328.017mm^2

Assuming 16mm ϕ bars

No.of bars=52

Provide 52 bars of 16mm ϕ bars

4. Spacing:

[Spacing of reinforcement as per clause 26.3.3 IS 456:2000]

=288.46mm

Hence provide 16mm ϕ @ 280mm c/c along the shorter span

5. Distribution reinforcement:

Ast =1516.8mm^2 [As per IS 456-2000, clause: 26.5.2.1]

Assuming 10 mm ϕ bar

= 78.53

No.of bars = 19.31 $\simeq$20 no's

6. Spacing:

=681.81mm c/c [Spacing as per IS 456-2000 clause 26.3.3]

Hence provide 10 mm ϕ of bars @450mm c/c

III SUMMARY

A. *PEDESTRIAN PROBLEMS*

1. *Accidents Circumstances* – pedestrian accidents occur in a variety of ways; the most common type involves pedestrian crossing or entering the street at or between intersections.
2. *Factors affecting pedestrian demand:* The demand for pedestrian facilities is influenced by a number of factors of which some of the most important are

- The nature of the local community- Walking is more likely to occur in a community that has a high proportion of young people.
- Car ownership- The availability of the private car reduces the amount of walking, even for short journey.
- Land use activities- Walking is primarily used for short distance trips. Consequently the distance between local origins and destinations (e.g. homes and schools, homes and shops) is an important factor influencing the level of demand, particularly for the young and elderly.
- Quality of provision-If good quality pedestrian facilities are provided, then demand will tend to increase.
- Safety and security- It is important that pedestrians perceive the facilities to be safe and secure. For pedestrians this means freedom from conflict with motor vehicles, as well as a minimal threat from personal attack and tripping on uneven surface.

IV CONCULUSION

The qualitative results then suggest the type of interventions that would reduce fear of crime, such as improving lighting and cleanliness. The quantitative study also showed that the aversion towards footbridges and underpasses is also explained by their lack of accessibility, a solder people and people with disabilities gave low relative rankings to those facilities, and lack of accessibility was the main reason given by participants to reject footbridges in the stated preference exercise. Again, the qualitative results suggest specific interventions that can improve accessibility, such as adding or improving ramps .It should be noted that the choice set available for a pedestrian in this survey contained only the use of designated crossing facilities and the option of not crossing the road. In most cases, the pedestrian also has the option of crossing the road in places without any facilities.

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