

PLANNING OF SIGNAL FREE JUNCTION

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Abstract:

Underground structures have been widely adopted and used in construction of infrastructure in urban area in India for the last 5-10 year. Traffic congestion is a severe problem in India. To provide more freely flow of traffic at major road or highway intersection having high traffic volume a solution of grade separation or interchange is, generally executed by the responsible authority. For economical reason, overpass is usually the first option although it gives more visual and obstruction impact to the people over an underpass option. In some particular cases, underpass with 7-8 m excavation depth would be designated as the alternative because of its more environmental friendly option and tends to be preferable in the near future for urban area. Whilst deep bored tunnel is considered not feasible for this case due to size, more land occupancy, long approaching section and cost. This subway is provided in baba petrol pump to API corner. The main purpose of this subway is to achieve the signal free junction in this area as this area is more important area of the city. It provides the better approach to the passenger. The subway has friendly nature to the atmosphere. Easy to construct as it includes the excavation, retaining wall, slab etc. The 1:15 slope has been provided to the road which is suitable for all type of traffic. And the slab has 20ft height due to that the containers, trucks can easily pass through it. This subway is constructed by understanding the need of all type of vehicles. The proper ventilation is provided if any accidental case occurred in the subway.



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INTRODUCTION

A well known and co-ordinate system of transport plays an important role in the sustained economic growth of a country. The present transport system of India comprises several nodes of transport including rail, road, coastal shipping, air transport, etc. Transportation in India has recorded a substantial growth over the years both in spread of network and in output of the system. Subway means In Foreign countries the term subway normally refers to a specially constructed underpass for pedestrians and/or cyclists beneath a road or railway, allowing them to reach the other side in safety. Subways may also be constructed for the benefit of wildlife. The term is also used in the United States, for example, by the California Department of Transportation, for a road undercrossing which is depressed. The term is also used in parts of Pennsylvania in the United States, such as Harrisburg, Duncannon and Wyoming County. Underground pedestrian passageways are less common in North American cities than in European cities of comparable size. They are constructed when it is necessary for pedestrians to cross a railroad or a limited-access highway such as an interstate highway, and of course they appear at the exits from underground rapid transit systems, but one would be rarely built just to enable people to cross an ordinary city street. When they are built, the term pedestrian subway is more likely to be used, since the word "subway" is usually used there to refer to rail-based rapid transit systems such as New York Subway in the United States

LITURATURE SURVEY

1. M. Abdel-Meguid, et al. (2002), 3D effects of surface construction over existing subway tunnels, the study of surface construction over existing tunnels has been analyzed by 3D elasto-plastic finite element model. The 2D strain analysis also conducted to investigate the importance of 3D analysis in this case. It was observed by field measurements that the predicted results using 3D numerical simulation are moreover similar.
2. Leopold Scheuble & Karlsruhe (2004), Trenchless technologies in pipeline construction,: This literature describes trenchless technology in pipeline structure for various types of carriers. Various types of machines, their implementation and impact on environment aspects are explained in this literature. Technique of various types of installation in open trench or pipe pushing by ramp or pull method has been explained in this paper.
3. Hideki Shimada, Saeid Khazaei & Kikuo Matsui, (2004), Small diameter tunnel excavation method using slurry pipe-jacking: The study of a small diameter pipe pushing construction, design and various aspects studied in this paper. The mud slurry is formed around the pipe in order to stabilize the concerned soil. This paper also discusses the effect, shape on the stability of concerned soil by means of numerical analysis.
4. Douglas Allenby & John W.T. Ropkins, (2006), Creating underground space at shallow depth beneath our cities using jacked box tunneling: This paper describes the jack box tunnel method with example, its use and detailed about the sensitivity. Jack box tunnel is a method of construction that enables Engineers to create underground space at shallow depth in a manner that avoids disruption of valuable infrastructure and reduces impact on environment.
5. Dalgobind Mahto & Anjani Kumar, (2008), Application of root cause analysis in improvement of product quality and productivity: In this paper, root-cause identification methodology has been adopted to eliminate the defects in cutting operation in a machine and a rejection has been drastically reduced. The theory is that after asking “why” five times one is likely to arrive at the root cause.
6. A Mouratidis, (2008), The “Cut-and-Cover” and “Cover and-Cut” Techniques in Highway Engineering: The use of “Cut & Cover” and “Cover and Cut” methods are studied in this paper for construction of underground tunnels or subways. In this paper, the overview of both the methods is presented which includes describing main features, advantages and field applications.
7. B.N. Sinha & R.P. Sharma, (2009), RCC Box Culvert - Methodology and Designs including Computer Method: This paper describes the design and construction of RCC culvert without cushion. The IRC code used for the design of RCC Box and provides full discussion on the provision in the code considerations and justifications of all the aspects of design.
8. Geoff Casburn & Brian Cumming, (2009), Underpasses for moving livestock under expressways: Case study of under pass construction under expressway is described in this paper. RCC Box culvert tunnel constructed for crossing of live stock under the expressways and motorways are used.
9. S. S. Basarkar et al., (2009), Emerging Trend in Deep Basement Construction: Top-Down Technique: In this paper, the details of Top & Down construction technology and its important component is explained in detail. The paper concludes the usefulness of such technology for early commissioning of the structures.

10. Thamer Ahmad Mohammad et al., (2010), Assessment of Using Tunneling and Trenchless Technology for Constricting Twin Box Culvert: This paper is a case study of construction of a twin box culvert for flood mitigation project Negeri, Sembilan of Malaysia.

11. Mohankar.R.H. & Ronghe.G.N, (2010), Analysis and Design of Underpass RCC Bridge: The analysis under pass RCC Bridge is presented in this paper by considering fixed end condition. The analysis is done by FEM method and compared with 2D & 3D models for fixed end support condition.

12. Kamaladdin Edalat & Mohammad Javad Vahdatirad, (2010), Choosing TBM for Tabriz subway using multi criteria method: Case study of Tabriz Urban Railway Line is presented in this paper. The TBM model is used for construction of tunnel. Two kinds of TBM model suggested. EPH (Earth Pressure Balance), SS (Slurry Shield) are used and compared for various parametric, environments, technical, and economical effect on the project.

13. Michael Peter et al., (2011), Railway Foundation Design Principles: This study describes sub grade failure under the Railway track and methods to design safe thickness of safe track bed. This paper describes various procedures and compares the thickness of track bed layers proposed by each for a number of hypothetical situations.

OBJECTIVES

- Subway required minimum size as compared to flyover.
- Subway is economical as compared to flyover
- Maintains cost is less as compare to flyover
- Rate of accident is less as compared to flyover
- Construction method is simple compare to flyover
- Less number of special machinery required as compare to flyover
- Duration of construction, period is less as compare to flyover

NECESSITY OF PROVIDING SUBWAY

- Making junction traffic free
- Reducing the fuel consumption
- Minimizing the waste of time due to slow traffic and Signals
- Minimizing the accident
- To separate the heavy vehicles from regular traffic
- To minimize the cost of construction as compared to bridge
- Safe and secure travel route for pedestrians and vehicles when crossing major roads
- To making junction signal free
- To reducing man power To maintaining easy flow of traffic

PHOTO GALLERY



VENTILATIONS

Subways may require ventilation for a variety of reasons - for example to ensure an adequate air quality, to control the spread of smoke in case of fire, or to reduce temperatures to acceptable limits. The function of the ventilation relates to the type of subway in question vehicular subways (road, rail and metro) generally require high air quality during normal operation and smoke control in case of fire, while cable subways require cooling, smoke control and a certain amount of air exchange. For Ventilation Purpose we specially provided a Circular duct in the traffic island the diameter of that duct is 14M AIM of providing Ventilation duct To use the natural sun light in subway at the day time Maintaining air continuous flowing and fresh in subway Ventilation duct at the centre of traffic island (from actual model) Purpose of providing duct For lightning the underground subway passage at day time For getting fresh air into the subway For making subway passage pollution free

CONCLUSION

As Nanded city is developing and subway projects such as Delhi-Mumbai industrial corridor is coming to MIDC Nanded, we requires good transportation system for sustainable growth and such a type of traffic system will help to reduce the stress on vehicles at junction of the Nanded road. As topography of Vazirabad Chowk Nanded road is very suitable for subways it will very efficiently work subways on the Nanded road. The growth in vehicular traffic and industrial activity in Whitefield area and associated activities necessitates

the improvement of the project road to a good riding quality and of adequate width which enhances the level of service, driving comfort and safety. The road inventory and traffic survey of the existing road section has been carried out. Some part of the existing road is in very poor condition, due to playing large number of vehicles at many locations the road is severely distressed with severe raveling and deep potholes. The saturation flow model is developed based on the field data of saturation flow and width of the approach roads of the all the junctions. The underpass and redesign of signal has been proposed in Hope farm junction, Graphite India junction, Hudi junction and Kundala halli junction. The design of signal has been proposed in Varthur Kodi junction, the design of signal is done by using Webster's method.

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5. Guidelines For Highway Landscaping- IRC Manual
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