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To Study a Need of Metro Line Work and Its Safe Implementation in Mumbai

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ABSTRACT: A metro city Mumbai is the financial capital of India, has seen tremendous growth in population and employment. The economy in Island City is growing rapidly and is growing faster than Island City in terms of area, population distribution and recreation places. The key challenge is to promote development through adequate investment in infrastructure that will improve residents' quality of life. Mumbai Metropolitan Area (MMR) is one of the largest urban areas in India. Metro Line 4 is a fully elevated metro line.

The proposed corridors will be implemented with track on Standard Gauge (SG) 1435mm. Planning for any higher speed is not desirable as the average inter-station distance is kept close to one km and trains will not be able to achieve higher speed. The elevated tracks will be carried on twin-U girders supported on single circular piers, generally spaced at 28m centres and located on the median or on the space available between main carriage way and service road to the extent possible.

The horizontal alignment and vertical alignment are therefore, dictated to a large extent by the geometry of the road and ground levels followed by the alignment. The design parameters related to the Metro system described here with have been worked out based on a detailed evaluation, experience and internationally accepted practices.

Various alternatives were considered for most of these parameters but the best-suited ones have been adopted for the system as a whole. As regards the type of alignment i.e. At-grade, Elevated and Underground depends upon the ROW. If ROW is 20 m or more, Elevated alignment is preferred over Under ground as the cost of Underground alignment is 2 to 2½ times of Elevated alignment.

KEYWORDS: Metro Line, Economy, Growth of Population, Future Planning and safe Implementation.

I. INTRODUCTION

The main challenge today is to provide connectivity and better transport system. The metro line transport comes under a road way system but due to its vertically height and location it's a part of airways. The metro line construction in a metro city is a challenging task for every engineer, architectures, structural engineer etc, because of population explosion in a metro city like Mumbai. So it is essential to study a safe implementation of metro line by considering a growth of Population with Future Planning.

Study of this paper indicates that how to implement a safe construction of metro line with future expansion planning. Mumbai may have a very good transportation system but has not been able to handle future growth. The load carrying capacity of the bus and rail system has increased considerably but has been always on the lower side than what is needed. Though the metro for Mumbai had been talked for last 50-60 years, but something concrete did not come up till MMRDA got prepared the Master Plan of the Mumbai Metro network considering 337 km comprising the under-mentioned corridors.

II. RELATED WORK

The proposed corridors will be implemented with track on Standard Gauge (SG) 1435mm. Planning for any higher speed is not desirable as the average inter-station distance is kept close to one km and trains will not be able to achieve higher speed. The elevated tracks will be carried on twin-U girders supported on single circular piers, generally spaced at 28-m centres and located on the median or on the space available between main carriageway and service road to the extent possible.



The horizontal alignment and vertical alignment are therefore dictated to a large extent by the geometry of the road and ground levels followed by the alignment. The design parameters related to the Metro system described herewith have been worked out based on a detailed evaluation, experience and internationally accepted practices. Various alternatives were considered for most of these parameters but the best-suited ones have been adopted for the system as a whole.

As regards the type of alignment i.e. At-grade, Elevated and Underground depends upon the ROW. If ROW is 20 m or more, Elevated alignment is preferred over Underground as the cost of Underground alignment is 2 to 2½ times of Elevated alignment. Metro Line 4 is fully elevated metro line.

Design Speed: The maximum Design speed has been proposed as 90 kmph and maximum sectional speed 80 kmph. The booked speed has been taken as 35kmph.

Alignment: First station on Wadala – Ghatkopar – Mulund – Thane – Kasar vadavali Corridor is named as Bhakti Park Metro and last station is Kasarvadavali. Chainage of Bhakti Park proposed station is taken as 0.0 for reference and dead-end chainage of this station as (-) 450 m. Total length of the corridor from dead end to dead end is 32.322 km. The entire corridor proposed is elevated.

Station Locations: Stations have been located so as to serve major passenger destinations and to enable convenient integration with other modes of transport such as Railway Stations, Bus Terminals, etc. However, effort has also been made to propose station locations, such that inter station distances are as uniform as possible. The average spacing of stations is close to one km. All stations will be two level stations. The concourse comprising of passenger facilities and station facilities will be at lower level and the platforms on the higher level. All the stations have been planned cantilever leaving 10.5m road width either side of the median.

Terminals:

Bhakti Park Metro Terminal- This Station is proposed off the road just parallel to Mono Rail Station. Scissors cross overs are proposed at the rear end of station.

Kasarvadavali Terminal-This Station is proposed on median of the road just before depot location. Scissors cross overs are proposed at the rear end of station and depot entry also has been planned at rear end of the station.

Metro Line is Important because of

Overcrowding, comfort and safety compromised.

- Daily rider ship in local train in Mumbai is 75 to 80 lakhs.
- Western railway and Central railway respectively run 1375 no. and 1810 no. local services each day.
- Average 10 death per day on railway tracks due to overcrowding and trespassing.
- Rise in pollution
- Road rage, irritation and discomfort
- Health and safety issues

Objectives

- To study the construction activities of Mumbai Metro.
- To connect the main points of the Mumbai region namely Wadala, Ghatkopar, Mulund and Thane.
- To reduce traffic flow along the corridor of Mumbai.
- Eco-friendly causes no air pollution, much less sound pollution. Low energy consumption
- The key advantages of this project will be saving in travel time, reduction in pollution, decongestion of roads, comfortable journey, no road stresses and saving of energy.
- Very low ground space occupation 2-meter width only for elevated rail.
- High-capacity carriers very high volumes of peak hour peak direction trips

III. METHODOLOGY

1. Survey
2. Geotechnical Survey
3. Utility Identification or Utility Trenching
4. Planning and Design Execution

5. Pile Foundation
6. Crash barrier
7. Pile cap construction
8. Pier construction
9. Casting of Pier cap
10. I/U Girder casting
11. Construction of station activities

IV. EXPERIMENTAL RESULTS

Metro Projects are highly capital intensive on account of the high costs involved. Due to the need to maintain a fare structure within the affordable reach of ordinary citizens, metro projects are ordinarily not financially viable. However considering the economic gain to the society and the fact that city with a population of more than ten million cannot survive without an efficient Metro System, implementation of Metro System and this particular corridor is strongly recommended.

All figures show the construction of metro line.



V. CONCLUSION

The main aim of writing this paper is to carry metro line work with economy by considering future planning. Safe implementation of metro line work is also an important parameter. Study shows that the construction of metro line is much more essential rather than other construction work.

Due to increasing population in the trains and overcrowding, initiatives have been taken up by the government in terms of the major developments in transport sector for the city of Mumbai which includes the construction of metro. The Mumbai metro will provide much needed stability and higher efficiency and safety to the commuters. By the use of modern day construction techniques and equipment's the construction of the metro is possible at a faster rate and also speeds up the overall development in the city. The Equipment's ease out the activity of construction and hence reduce manual labour too and hence it is possible to work at a rapid pace.

It is going to be one the best technological marvel and will be serving economic capital of India. It will have minimum environmental impacts as it uses all possible associated techniques. Metro Projects are highly capital intensive on account of the high costs involved. Due to the need to maintain a fare structure within the affordable reach of ordinary citizens, metro projects are ordinarily not financially viable. However considering the economic gain to the society and the fact that city with a population of more than ten million cannot survive without an efficient Metro System, implementation of Metro System and this particular corridor is strongly recommended.



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