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Assessment of Intermediate Public Transport as A Feeder System to Metro: A Case of Thane City

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Abstract: ***Metro System is been built to provide the service to its people and scale up the facility provided, this would also require the response of people and shift from their mode of transportation. With heavy transportation and day-to-day increase in the traffic on road there is a need to use the Public Transportation. The Detailed Project Report (DPR) for Thane Metro was made in the year 2017, but there is no feeder plan yet, this gives an opportunity to study this respective field. This dissertation aims at getting to know the responses of the commuters of the metro and also of the operators in the catchment area thus providing an efficient last mile connectivity with the Intermediate Public Transport modes available thereof, the catchment area has been selected in accordance with the Metro Policy, 2019. Road Inventory survey of the area gives a detail information about the physical condition present and help to decide the feeder route. In conclusion, this dissertation will provide a convenient way so as to improve the ridership of metro.***
Keywords: Para transit, Integrating, Feeder, Mode Choice, Developing Countries, Public transport, MRT , IPT , LMC.

I. INTRODUCTION

Transport systems and city character are interlinked. Urbanization is a world known phenomena where, in public transport serves a range of population in the city area as well as the fringe area. The overall growth of the area is not only in the term of the land use in the respective area but also the growth of population whether it is a residing population or the floating population in the area. Often these populations either depend on the public transport in the approachable limits or may get irritated by the inconvenience caused by it thus shifting their mode choice from the Public Transport to Personalized transport. The Personalized modes not only adds vehicle to the roads but the greater number of personalized transports often leads to congestion, pollution and at times being highly insecure for the rider or pillion. The traffic load on the major streets on the Indian Metropolitan cities is at alarming situation and is surely going to higher stakes as there is increase in traffic demand day by day. Metro system has been launched by the government in most of the metropolitan cities in India which also manoeuvres through the prominent area in the region. But the problem of lack of ridership is seen in Delhi and Bangalore because of the trouble caused to the users to reach till station, thus having a good supporting infrastructure and supporting strategies for the same would aid to improve the ridership for the metro. Feeder system is one of the Integration Techniques that have been implemented to attract a greater number of commuters from the surrounding radial area so as to increase the revenue of the Mass Rapid Transit (MRT) system and to reduce the traffic problems. So far, the metro projects have been such casually completed in Kolkata, Delhi, Chennai, Bangalore, Hyderabad, Guru gram and Mumbai New technologies have highly increased the ability of administrative bodies to adopt a more scientific- cally validated approach towards the traffic problems of the city and to plan for suitable infrastructure. Micro and Hybrid Simulations are key technologies in this domain, which enables modeling of realistic traffic behavior and group dynamics in order to evaluate and optimize the impact of different changes in traffic infrastructure and demand of users on the performance of the traffic network and also to plan and develop sustainable traffic configurations and facilities.

II. OBJECTIVES

1) To Integrate Intermediate Public Transport (IPT) as a feeder service along Metro route.
2) Arranging Access to Vehicles located at different depots at all demand points and transporting residents from these selected pick-up stops to Transportation hubs.
3) To analyses the immediate area aspects like network and infrastructure.
4) To Prepare Strategy and Policy Guidelines to strengthen Last Mile Connectivity.
5) To identify the potential of IPT with regard to Last Mile Connectivity.

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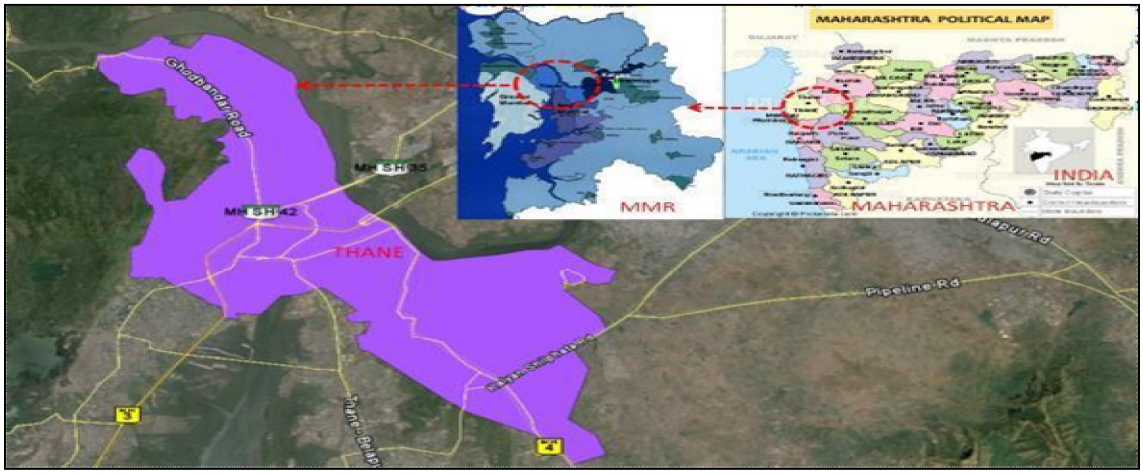
III. SCOPE

1) The study shall to develop an optimum set of feeder routes to provide feeder service to an identified line of thane metro.
2) To determine the scheduling of the feeder buses coordinated with the timetable of the existing thane metro.
3) To determination of feeder bus capacities and stop spacing.
4) To determine performance for feeder bus services network parameter such as travel time from origin to destination on a feeder route by using modeling software vissim.
5) To determine the headways for the routes based on the ridership. The cost function is optimized to determine the optimum headways of the feeder route.

IV. STUDY AREA

The city of Thane is located on the Northeast of the Salsette Island and on the Northern extremity of Greater Mumbai. In fact, boundaries of Greater Mumbai and Thane are contiguous. The city falls on latitude 720 .50' North with longitude 190 -10' East. The Central railways main and local lines pass through the city, which connect the city to north-north east and south-south east parts of the India. Recently the Thane-Turbhe local line has connected the city to Navi-Mumbai & Panvel node through the rail network. The Mumbai Agra road and the old Mumbai-Bangalore road, the two important national highways pass through the city, which connects the city to all parts of India through road network. Because of this rail & road network, Thane city is well connected to Greater Mumbai. The important national port of Mumbai and Navi Mumbai are at about 25-30 km from the city. The domestic as well as International airports are at the distance of about 15-20 km from Thane.



V. PHYSICAL GROWTH AND LAND USE PATTERN

Major land use Major land use category in TMC is under forest and green zone. They together occupy 52% of the total are within the administrative boundaries. This distribution is as proposed in City Development Plan for Thane. The percentage distribution of land use across the town is out- lined in the table below along with a graphical representation.

Land Uses	Area inHa.
Residential Area	2665.61
Industrial Area	1254
Reservation Area	1267.65
Roads	742.97
Defense Area	122
Forest Area	3560
Green Zone Area	3211.77
Total	12824

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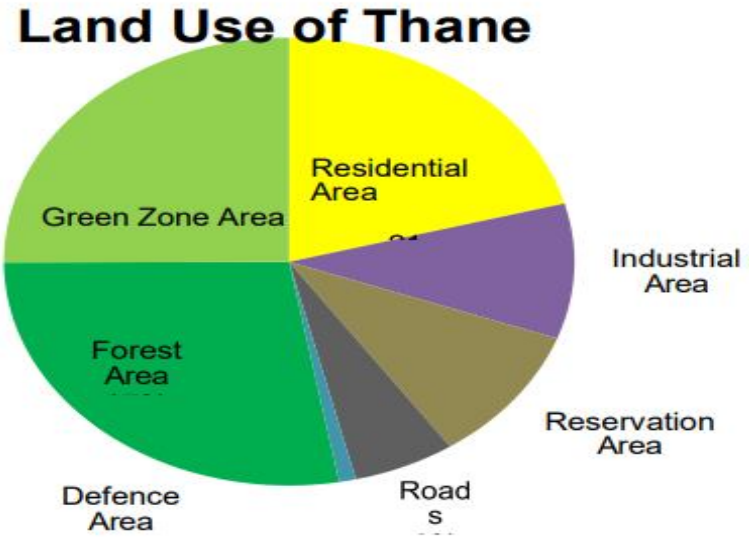

The present development is analyzed in the development plan from the point of view of availability of land, followed by issues and concerns.

1) Present sanctioned development plan shows 3682 Ha of land which falls under forest and defense area and is not available for development.

2) The area under green zone and water bodies is 3211.77 Ha and as per the present sanctioned DP and development control regulations, this land is also not available for development.

VI. SALIENT FEATURES

A. Feeder bus facilities are provided for some metro stations to increase the metro rider ship.

B. Entries to these stations will be through subways provided at different locations.

C. Feeder buses are environmentally friendly with CNG engine bharat stage 3 buses. Aesthetics and safety are the important features.

D. All metro stations are having good interchanges facilities with other modes of transport.

E. All metro stations are provided with automatic fare collection system and will be access controlled.

F. Feeder buses have global positioning system (GPS) equipment for real time tracking and online alerts.

G. Control centers are set up to monitor the movement of vehicles and will have the traffic inspectors, traffic managers and control room operators.

H. Every feeder bus is accompanied with the public address system

I. Minimum fare is Rs 10 and maximum fare is Rs 15 in the feeder buses

J. The buses can have a seating capacity 20 people with standing capacity of 10 people.

VII. METHODOLOGY

A. Generation of feeder routes

At first select the metro station for which routes to be generated. Details of that individual station are marked and used for feeder route generation. Then same procedure can applied to other stations of the metro corridor, and it can be extended for whole thane metro network.

B. Identification of Influence Area

Influence area is the zone which can be served the metro station. For thane metro corridor influence area for each station is taken as circular area around the station with radius 5 km. in this work it is assumed that all industrial area, residential areas, shopping malls, markets schools etc with in this influence area are chosen on basis of non-overlapping criteria.

C. Identification of Potential Destination

For selection of destinations or potential stops it should be taken carefully that stops must be distributed properly all around the metro station within its influence area. Well distribution of the stops will provide good door to door service over the area. Influence area of each destination stops is assumed as 150m radius circular area around node, as per convenient walking distance.

D. Identification of Route Set

Route set for zone can be identified applying different criteria. One of the most popular ways to identify the routes sets is to determine shortest paths to each extreme stop. The routes covering maximum number of stops are adapted here. With help of route cost evaluation model route cost for both the path are determined.

VIII. CONCLUSION

Routes are selected that covers maximum number of stops.

The benefits of the selections are:

1) Saving of travel time
2) Minimizing the operator and user cost
3) Serving the maximum area-well accessible

IX. ACKNOWLEDGEMENT

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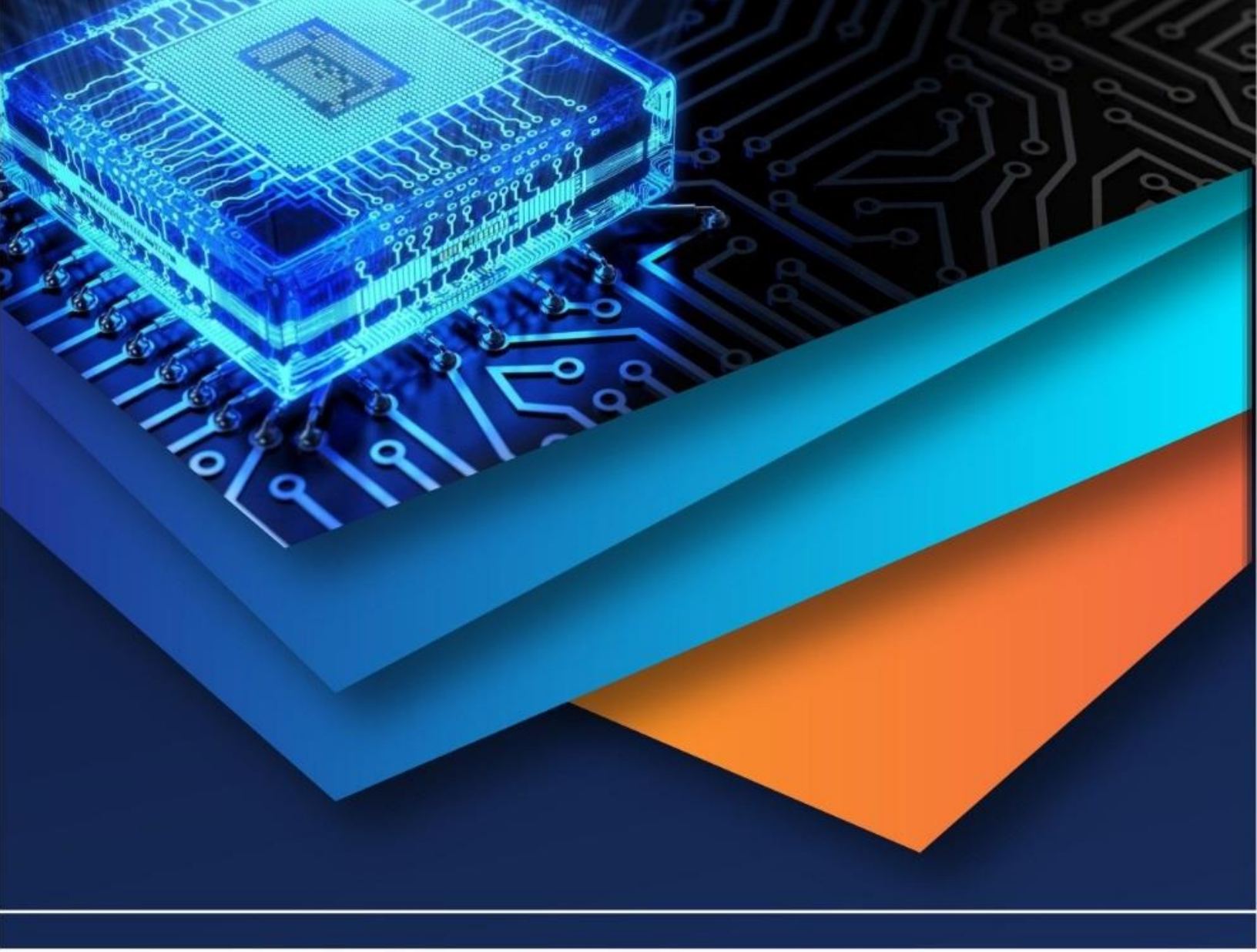

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