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A STUDY ON TRAFFIC CONTROL BY EXTENDING METRO CONNECTIVITY TO URBAN AREAS OF HYDERABAD

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Abstract:

In this paper an attempt has been made to use geographical information system (GIS) to study one of the three high density corridors of Hyderabad Metro Rail. All the issues related to planning, construction and implementation along with its impact on traffic and environment were addressed. GIS techniques/ maps were used to analyze the study area including location of metro stations and also the effects on surrounding environment, heritage and religious structures etc. Rail-based metro system is crucial for supporting a city's expansion and growth. However, urban metro projects being capital intensive with long gestation and pay back periods may not be financially viable but socially desirable. More and more cities in India are announcing metro projects committing huge budgetary resources to these projects at the cost of sectors such as health and education Hyderabad has been under massive urban restructuring. This profile provides an overview of the origins and history of Hyderabad, the changing political economy of the state and resultant urban restructuring and followed by an exploration of emerging urban challenges and socio-spatial complexities of the expanding metro. Urban housing and transport are analyzed in the context of the current phenomenon of urban sprawl witnessed in Hyderabad. The implications of such growth patterns of India are projected and the impacts analyzed. In conclusion, the need for an alternative sustainable urban development pattern is outlined for future metropolitan cities of Hyderabad.

1.0 Introduction

The urban transportation system is the motor of the financial exercises taking all things together urban groups everywhere throughout the world, and thusly maintains work of the general population living in them. Run of the mill urban transportation offices incorporate railroads, conduits, aviation routes and roads. Among these, the huge extent comprises of roads. Coherently, most arranging and research endeavors have

concentrated on the road system. Generally, road transportation system is the significant player in the financial exercises of most urban focuses. As of late, numerous urban communities have seen a huge increment in road activity and transport request, which has subsequently prompt to disintegration in limit and wasteful execution of movement systems. Before, it was felt that keeping in mind the end goal to determine the limit

issue it was essentially to give extra road space. A lesson learnt from this system is that including limit alone is insufficient on the grounds that it prompts travel development that invalidates the advantages of parkway extension.

Highway capacity:

Highway capacity is defined by the Highway Capacity Manual as the maximum hourly rate at which persons or vehicles can be reasonably expected to traverse a point or a uniform segment of a lane or roadway during a given time period under prevailing roadway, traffic and control conditions. The highway capacity depends on certain conditions as listed below;

Traffic conditions: It refers to the traffic composition in the road such as the mix of cars, trucks, buses etc. in the stream. It also includes peaking characteristics, proportions of turning movements at intersections and the like.

Road way characteristics: This points out to the geometric characteristics of the road. These include lane width, shoulder width, lane configuration, horizontal alignment and vertical alignment.

Control conditions: This primarily applies to surface facilities and often refers to the signals at intersections etc. Again capacity can be defined for a point or uniform section. Capacity is estimated for segments having uniform conditions. Points where these conditions change represent the boundaries where separate analysis may be required. Capacity is the maximum rate that a facility can afford. This maximum rate is taken for the worst 15 minutes of the peak hours while finding out the capacity. Capacity is measured as a reasonably

expected value and not the maximum rate ever observed in the facility.

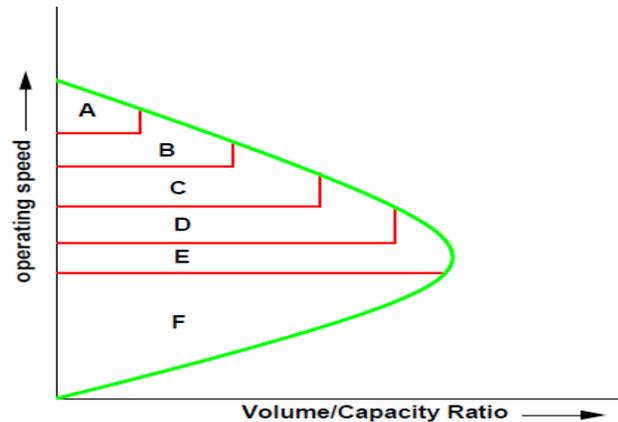


Figure: Level of service A to F

SCOPE & LIMITATIONS:

The scope of the study is to understand the role of Metro rail project and also the issues related to its planning, construction and implementation.

- Its impact on the traffic and environment
- Its influence on the people, business, land use and other factors along the route
- Its impact on the urban infrastructure
- The study is limited to one route of the Hyderabad Metro rail project out of three proposed routes.
- Prototype metro station design to understand the impact on surroundings

OBJECTIVES:

- The need of Metro rail project to solve the traffic issues in Hyderabad
- Impact on the city environment and scope of EIA (Environmental Impact Assessment)
- Impact on the land use patterns.

LITERATURE REVIEW

Chandra, S., and Sikdar, P. K, (2000)the significance of comprehension the relationship between flow, speed and thickness is irrefutable. From the point of view of plan, information of high flow rate attributes is required for the expectation of thruway limit. From the point of view of activity operations, understanding the whole scope of connections is vital to give satisfactory level of administration. Undertakings, for example, improvement of flow control and incline metering strategies must be founded on these useful interrelationships under high-thickness conditions

Arasan V.T, Koshy (2004)Firstly, roads were selected based on the presence of a wide range of traffic flow conditions such as flow intensity (volume/capacity ratio), directional distribution, traffic mix, percentage of heavy vehicles, and levels of side friction. At least places nearby intersections, which are prone to congestion, were avoided because the idea was to observe uninterrupted flow. Secondly, roads were selected based on their physical and geometric quality that could support this kind of study

Advani M and Tiwari G (2005)the land acquisition was expected to be very low for this project. Metro route was proposed along the road (mostly elevated) and hence required higher land acquisition. MMTS required coordination among Indian Railway officials, Andhra Pradesh State Road Transport Corporation, MCH, private bus operators, city traffic policy, and the concessionaire. It was expected to be the most difficult part.

TrajulaAdinarayana Dr. N.C. Anil (2005),the result of traffic counting is subject to sampling error and observational uncertainty. Sampling error in traffic counting is error emanating from collected traffic data while observational error relates to vehicle classification by vehicle types resulting in some vehicles being wrongly classified. In this context, vehicle classification cannot be defined without ambiguity and therefore is a subject of enumerators' interpretation of the passing traffic stream.

METHODOLOGY

Hyderabad is the second largest metropolitan region in India. The advent of globalization in India has opened the door for Hyderabad to brand itself as the popular destination for high-tech industries. In 1999, the entrepreneurial state government initiated Andhra Pradesh Vision 2020, a strategic document to develop the state by attracting foreign direct investments and developing specific growth engines in order to leapfrog toward the information society. Hyderabad was chosen to be the spine of the state governments' visioning strategies and efforts have been made to brand it as the 'world-class' high-tech hub of India. Since then, Hyderabad has been under massive urban restructuring. This profile provides an overview of the origins and history of Hyderabad, the changing political economy of the state and resultant urban restructuring and followed by an exploration of emerging urban challenges and socio-spatial complexities of the expanding metro.

Urban restructuring of Hyderabad:

Manuel Castells have noted that a city is 'not a place but a process' Cities today are

being increasingly shaped and re-shaped by the processes of globalization in both Global North and South. Economic, political and social changes are happening in a more intense way through cities, shaped by cities and often shaped cities. That said, it is noteworthy what Jane Jacobs said nearly four decades earlier – ‘a city seems always to have implied a group of cities, in trade with one another’ Cities are very much distinguishable due to their ‘complicated and diverse’ economies. With proliferation of globalization and services sector development, especially due to Information Technology (IT), cities have become the agents of change for their nations – an engine of growth.



Figure: Traffic congestion in a major traffic node in Hyderabad

The Environmental impact study:

The environmental impact study is prepared based on the prevailing status of environmental, ecological resources and socioeconomic conditions of the population in and around the project area. The observations and survey results were analyzed and were used as main tools for planning the project. The planning

essentially envisages the following stages of the Metro Rail Project:

Reduction in Air Pollution: This is the single most important factor for promoting a better and healthy city and ensuring a better quality of community’s health. From the estimates made, the Metro operation can bring down air pollution loads by an average of 30% from the existing situation with an overall improvement in city’s air quality. In operation, it is a non-polluting and environmental friendly system

Traffic Decongestion and Road Safety: While ensuring a rapid, user friendly mode of transportation, the Metro Rail would effectively bring down the congestion problems on city roads to an extent of nearly 30%. While achieving substantial decongestion of the roads, this will also ensure that the accidents on the roads will be brought down by the same. Additionally, as significant traffic load will be taken over by the Metro Rail, the vehicle density on the roads will be less thus leading to reduced stress on the road with consequent lease of longer life to the existing road network

4.0 Results

Traffic Data Collection and projections thereof of traffic volumes are basic requirements for planning of road development and management schemes. Traffic Data forms an integral part in the science of descriptive national economics and such knowledge is essential in drawing up a rational transport policy for movement of passengers and goods by both government and the private sectors. This Guideline considers the fact that traffic flow

data is important in planning of a particular section of the road network and for its subsequent maintenance. Traffic flow pattern appears to be random in distribution, as it reflects people’s motivation in terms of different composition of vehicles on different types of roads under varying environmental conditions.

General Specifications:

General specification provides guidance for the allocation and distribution of traffic counting points along the national road network. This is done in order to maintain consistency and attainment of appropriate comparisons of data between counting stations.

PRESENT STATUS OF URBAN TRANSPORT SYSTEM IN HYDERABAD:

Hyderabad having a chequered history of 420 years has virtually adopted every modern mode of transportation that emerged on par with the time. Nizam Road Corporation and Nizam State Rail ways have had transport operations way back in the end of 19th century itself. The twin cities of Hyderabad and Secundrabad witnessed very wide road network and railway track within the municipal limits and continued to be developed by the modern state administrators in the erstwhile Andhra Pradesh and in the present state of Telangana. The following table provides a vivid view on Hyderabad transport system

Vehicles	Status (lakhs)	Percentage
BUSES	11.5	28.9
MMTS	3	07.60
METRO	1.3	03.27
AUTOS	16	40.20
CABS	8	20.10

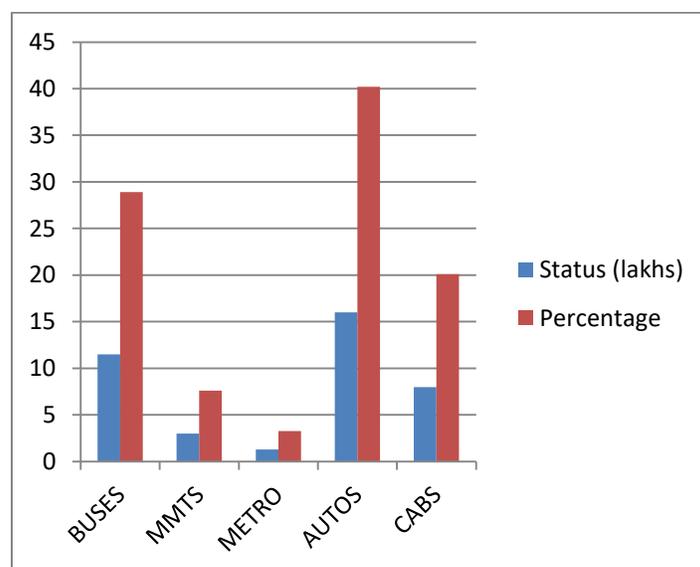


Figure: Vehicle transportation system

It is evident from the table that 40.2% of urban commuters in the city of Hyderabad traditionally depend on autos and 20.1% on cabs that is Para transport system alone contribute 60.3% of urban commutation in Hyderabad. The state owned RTC carries 28.9% of the fleet and stands in the second position. However the state owned carrier is not a profit making entity and does not impact the livelihood of employees working in it.

Table: Before metro connectivity to urban areas

Variable	Before metro connectivity to urban areas				
	A	%	B%	C	%
Income	6	12	36	66	14
Trips	14	28	28	54	12
Hours	5	10	33	64	16
Traffic	9	18	30	54	14

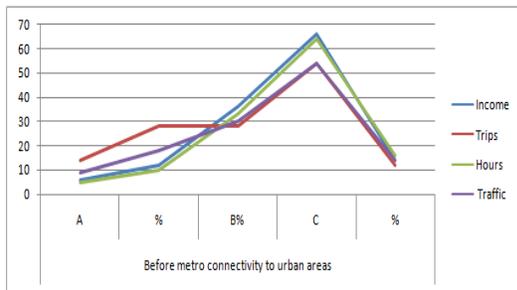
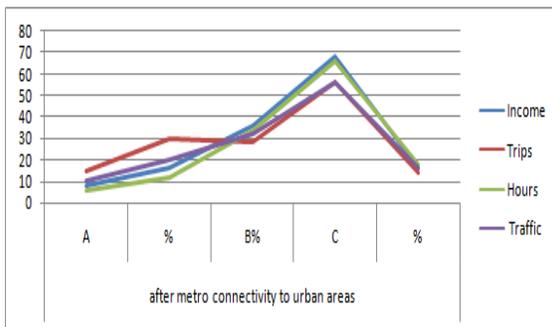


Table: aftermetro connectivity to urban areas

Variable	aftermetro connectivity to urban areas				
	A	%	B%	C	%
Income	8	16	36	68	16
Trips	15	30	28	56	14
Hours	6	12	34	66	18
Traffic	10	20	32	56	16



Graph: aftermetro connectivity to urban areas

It is found from the primary data that, only two members out of 50 i.e. 4% in the high earning group of > 1000 per day are effected due to metro, another 4% i.e. 2 members out of 50 in the mid earning group of Rs. 500/-

to 1000 per day are effected due to metro. 4 members out of 50 i.e. 8% of lower earning group i.e. less than Rs 500/- per day are affected. It means those who were earning less from autos have had a direct impact after the commencement of metro operations but this primary interpretation does not generate any conclusion due to statistical irregularities which are tested with Sign test at 5 % significance

CONCLUSIONS

The impact of "FRIC" on speed-flow bends was broke down. The outcomes demonstrated huge effect on speed for both road sorts. Effect on limit was recognized on two- path two-way roads while field information on four- path two-way roads did not permit this. In the microanalysis approach, impact of individual side friction factors on speed was broke down. This is proposed in the knowledge that at present, there are no simulation models developed to take account of friction factors. Application of simulation will be regarded as a breakthrough in this field. Implementation of GIS in combination with other advanced communication computer technologies to traveler information systems enables the conspicuous dissemination of information pertaining to fixed route facilities, such as offices, educational institutions, health facilities, places of tourist interest, etc.; route planning and spatial and attribute information on other transportation facilities within the cities, including highways, airports, marine ports, and passenger rail systems

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