Impact of New Public Transportation System in Nagpur City

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Abstract:- Transport in Nagpur is important due to Nagpur's strategic location in a central India. It is a fast growing metrocity and is the third most populous city in Maharashtra after Pune and Mumbai. also one of the country's most industrialized cities**.**

Due to increase in population as well as transportation Nagpur mahanager palica NMPL company formed which gives contract to Vansh Nimay Infraprojects (VNIL) to run city buses but due to increase in transportation and increase in population in Nagpur city it found that there is a numerous problem face by city buses to gave safe and efficient facility to public due to these public in Nagpur city were diverting towards the private transportation. So there is immediately need to improve public transportation which can improve by Bus Rapid Transit (BRT) system which is new transport system provide safety and mobility to road users.

In these projects we show the Impact of public transportation system such as Conjunction, Delay, Incident, Increase traffic condition. For this various data of the existing public transportation (star bus) is collected such as accident data, Problem face by people, traffic data collection for how star bus face the problem and extra time taken to reach destiny

Keyword:- Public transport network, Bus Rapid Transit system, safety, star bus, Conjunction.

Public transportation network, Intelligent Transportation system the timed management, schedule of city bus with withdrawal to taken, discrete waiting and travelling times of city.

I.   INTRODUCTION

Transport in Nagpur is important due to Nagpur's strategic location in central India. It is a rapidly growing metropolis and is the third most populous city in Maharashtra after Mumbai and Pune and also one of the country most industrialized cities**.** Nagpur is one of the 11 administrative districts in the Vidarbha region of Maharashtra state. Nagpur district lies between 20.35 deg – 21.44 deg North latitude and 78.15 deg-79.40 deg East longitude's. It is almost triangular in shape. Nagpur district stretches over an area 9892 sq.kms Area under urban sector 364.66 sq.kms while the area under rural sector 9527.34 sq.kms In terms of area district Nagpur constitutes 3.21% the total area of state of Maharashtra. Population of the district according to 1991 census was 3287139lackh.urban population was 2031000 and rural population was 1256139 which constituted 61.79% and 30.21% respectively of the total population of the district. Whereas the figure of 2001 census reveal that the total population of district has gone up to 4068 thousand persons. The urban population is 2614 and rural population is 1454 thousands which constitutes of 64.35% and 35.64% respectively of the total population of the district. The male-female populations are 2105 and 1962 thousands respective. Due to increase in population as well as transportation NMPL company formed which gives the contract to Vansh Nimay Infraprojects (VNIL) to run city buses but due to increase in transportation and increase in population in Nagpur city it found that there is a numerous problem face by city buses to gave safe and efficient facility to public due to these they were diverting towards the private transportation. So there is immediately need to improve public transportation system need to provide new transportation system provide safety and mobility to road users such as brt metro rail systems**.** In these projects we show the Impact of public transportation system such as Conjunction, Delay, Incident, Increase traffic condition. For this various data of the existing public transportation (star bus) is collected such as accident data, Problem face by people, traffic data collection for how star bus face the problem and extra time taken to reach destiny.

Public Transport is a mass transportation of people from one place to another place through Bus, Rail, and metro, LRT, BRT with efficient speed, frequency, facilitiy, comfort, convenience, and reliability. Public transport or public transit is a shared passenger transport service which is available for use by the local public, as distinct from modes such as hired buses, metro rail, local train which are not shared by strangers without private arrangement. Most public transport runs to a timetable with the most frequent services running to headway. Private vehicle usage and vehicle ownership's are more in the Nagpur. Commuters are habituated to use Para-transit vehicles. To ensure accessibility and live ability of our cities for future generations however, a

substantial quality gap in public transport is necessary. This will provide a desired modal shift from car traffic towards public transportation, which is safer, cleaner and generate less congestion.

Need of study-

The purpose of study is to introduce:-

1) Transport system in cities for sustainable transportation planning. The need of study is to introduce public transport system in Nagpur city for selected at the initial stages of its development.

2) It is a worldwide phenomenon that more and more people are living in cities and towns. Public transportation is often the only available affordable means of transportation for immigrants, especially in their are first few months after arrival. Transit systems in small city struggle to maintain ridership levels high enough to continue receiving local subsidies.

3) The last few decades have shown a substantial increase in personal mobility. Not only in interurban travel but as well in the urban environment traffic and transport volume have been increasing for year.

4) To ensure livability, accessibility of our cities for future generations however, a substantial quality leap in public transport is necessary.

5) Development guidelines need for helping to plan develop and implement effective and efficient public transportation systems in Nagpur City.

II.   LITERATURE REVIEW

The literature review on a Public Transportation system, with particular emphasis on planning procedure. Today the city is residence to half of the world's population, and in 2030, 60% of the population will live in a city. The urban area have an increasing importance in our society they are continually growing, along with all the issues related to theme. Many metro Politian cities in India are facing problem as the ones related to urban transport, and their interrelated impacts on the environment, economical and society's are always getting bigger as the cities are growing in their size and populations. Roads and rails respective are first and second largest land consumers and cause several negative consequence such as pollution, subsequent health-related problems, traffic congestion or incident. Implementing more sustainable transportation systems within human settlement is principal fundamental in order to limit that issue related to transportation. This can also have positive impact on the city for itself. Determining the level of service of a transit network is difficult task. There are two reasons. First, the number of factors related to service quality, such as a walking distance, in-vehicle travel times, waiting time, number of destination serve and number of transfers needed to reach destinations makes transit connectivity a multidimensional problems. And the transits system consists of many distinct routes. Determining the extent to which the routes are integrated and coordinated so that the transit system is connected. The structure of the public transit network is critical in determining performance, coverage's, and service of the network.

Andreas person, "Public transportation in small towns area with great potential," Lund Institute Of Technology Sweden.

The important aims of the project are to be find the similarities and differences between the condition in small and large towns and to find a suitable planning strategy for the small town's traffic. In Hässleholm and Ängelholm, two small Swedish towns with about 18000 and 22 000 inhabitants respectively, the bus systems were changed in July 2001. The main idea was to provide traffic with higher frequency. In Hässleholm the routes were also changes and the central bus terminal was moved to more attractive location. The number of passenger has increased since the changes and this was studied using time, series analysis. An inquiry was also carried out among the passenger aiming to find attitude about the changes.

Peter King. (1997) "Switching To Public Transport: Results of A UITP Trial" The project aimed to increases public transportation use through personalized marketing directed at people who had little knowledge of the public transportation network and made little use of it.

Margareta Fireman, (2009) "Customer Satisfaction in Public Bus Transport- A study of travelers' perceptions Indonesia, "Karlstad Universities Springs. An increase in population generates increasing in travel demand. An increased road length and new roads generate faster and longer trip, more trip by the car and higher car ownership all of which adds up to more traffic congestion and pollution. Public transportation operator is forced to place emphasis on the monitoring and improvement of the service give in an attempt to address the increasing rate of car ownership. His study focuses public transport used satisfaction.

John Puncher., (2004) "The Crisis of Public Transport in India: Overwhelming needs the rapid growth of India's urban population has put enormous strains on all transport systems. Burgeoning travel demand for overdo the limited supply of transport infrastructure and service. Public transportation, in particular, has been completely overwhelmed. Mostly buses and trains services are overcrowd, in dependable, slow, inconvenient, and risky. Moreover, the public ownership and operation of most public transport services has greatly reduced productivity and inflated cost. India city desperately need improve and expanded public transportation services.

Unfortunately, meager government financials assistance and the complete lack of any assistive policies, such as a traffic priority for buses, place public transport in an almost unsolvable situations.

Maria Attar. (2012) "Reforming the urban public transport bus system in Malt Instead, an organic increases alongside the main route linking new areas to the public transportation network and declining level of services pushed even more the local population to switch to private mobility. This has classified the islands between the countries in the world with the highest levels of motorization.

Jenny Carlson, (2010) "Passengers' Valuation of Quality in Public Transport with Focus on Comfort" Chalmers University Of Technology, Sweden.

In this project, it has been investigated how passenger valuate comfort on board local and regional buses in the region of Gothenburg's. The Gothenburg's region is facing challenge considering how to manage a population increase and at the same time achieve sustainable infrastructure developments. Measure is therefore requiring to attract new passenger as well as to keep the people that already use the public transport system. One factor that car users point out as the main reason for travelling by car instead of with public transport is comfort. Qualitative phone interviews were performed in order to get a deeper understanding about how public transport trips are experienced in a larger perspective. Older respondents consider comfort and more important than younger respondents. Women thinking that the comfort standard on board is better and at the same time more important than men.

III. SURVEYS & DATA COLLECTION

Traffic volume studies are conduct to determine the number, classification, movement of roadway vehicle at given location. These are data can help identifies critical flows time periods, determine influence of large vehicle or pedestrian on vehicular traffic flows, details of traffic volume trends. length of sampling period depend on the type of count being taken and the intended use of data recorded.

Two method available for conducted traffic volume counts

• Manual
• Automatic

Manual counts – are typically used to gather data for determination of vehicle classification, turning movement, pedestrian movement, direction of travel, vehicle occupancy. Most application of manual count required small sample of data at any provide location. Manual count is typically use for periods of less than days. Normal interval for a manual counts are 5, 10, fifteen minutes. Traffic count during a Monday morning rush hour and a Friday evening rush hour may show exceptionally high volume and are not normally used in analysis. Therefore, count is usually conducted on Monday, Wednesday and Thursday.

• Automatic

Automatic counts- are typically use to gather data for determine of vehicle hourly patterns, daily or seasonal variation, macuriationt trends, or annual traffic estimate. The automatic count method gives means for gathering large amount of traffic data. Automatically count usually taken in one hour's interval for each 24 hours of period. The count may enlarge for a week, months, or year. When the count is recorded for each 24 hours time period, the peak flow period can identified. selection of study method should be determined using the counts period. The count period should be shows of the time of days, day of months, and month of years for the study area. The count period should to depart special event or compromising weather conditions Counts period may range from 5 minute to one year. Typical counts period are fifteen minutes or two hours for peak period, four hours for morning and afternoon peak 6 hour for morning, mid-day, and afternoon peak, and twelve hours for daytime period For example, if you were conducting a 2 hour peak period counts, eight 15 minute counts would be required.

IV. MAP ON NAGPUR CITY

LOCATION OF AREA NETWORK

Nagpur is a city and a municipality in Metropolitan Region in the state of Maharashtra, India. Nagpur is one of the primaries Satellite Tow Metropolitan circle. The study area is selected as a Nagpur, Maharashtra India. A network is selected in the city on which four corridors which connects of the city and traffic flow on the city corridors are selected. Nagpur city with population cover an Area of 50 sq.km. The network has been selected and modified to a typical network which is applicable for Indian small scale cities having same demographic and physical features as Nagpur city.

SELECTION OF NETWORK-

Sir no.	Corridor	Distance in(km)
1)	SITABULDI-CHATRAPATI	4.5
2)	SITABULDI-RBI SQ	1.5
3)	SITABULDI-(S.T.STAND)GANESH PETH	3.0
4)	SITABULDI-RAVINAGAR	3.5

CORRIDOR-1 SITABULDI TO CHATRAPATI-

Time	2w	3w	4w	Buses	Bicycle	Lmv	Volume
9.00am-9.15am	267	35	29	12	4	7	354
9.15am-9.30am	218	38	36	11	7	5	315
9.30am-9.45am	234	28	38	9	3	9	321
9.45am-10.00am	256	43	28	13	5	4	349
5.00pm-5.15pm	176	25	46	9	11	10	277
5.15pm-5.30pm	243	34	27	14	9	12	339
5.30pm-5.45pm	321	38	42	15	12	8	436
5.45pm-6.00pm	297	41	38	17	3	13	409

CORRIDOR 2- SITABULDI TO R.B.I .SQ-

Time	2w	3w	4w	Buses	Bicycle	Lmv	Volume
9.00am-9.15am	243	32	36	8	10	12	341
9.15am-9.30am	218	38	36	11	13	9	325
9.30am-9.45am	234	28	38	14	12	7	333
9.45am-10.00am	256	43	28	12	11	6	356
5.00am-5.15pm	176	47	46	9	14	10	302
5.15pm-5.30pm	243	34	27	7	9	5	325
5.30pm-5.45pm	321	38	42	10	15	11	437
5.45pm-6.00pm	297	41	38	13	16	12	417

CORRIDOR-3 SITABULDI TO GANESHPETH-

Time	2w	3w	4w	Buses	Bicycle	Lmv	Volume
9.00am-9.15am	298	35	41	12	14	11	411
9.15am-9.30am	249	38	36	14	10	9	356
9.30am-9.45am	312	32	37	16	13	12	422
9.45am-10.00am	322	43	32	11	16	10	434
5.00pm-5.15pm	176	35	34	13	12	7	277
5.15pm-5.30pm	243	34	27	10	9	11	534
5.30pm-5.45pm	332	38	33	15	17	7	442
5.45pm-6.00pm	345	37	29	12	15	9	447

CORRIDOR- 4 SITABULDI TO RAVINAGAR

Time	2w	3w	4w	Buses	Bicycle	Lmv	Volume
9.00am-9.15am	312	35	32	14	12	7	412
9.15am-9.30am	365	28	39	12	14	11	469
9.30am-9.45am	276	43	28	15	16	9	387
9.45am-10.00am	322	29	33	17	11	12	424
5.00pm-5.15pm	233	34	36	19	10	13	345
5.15pm-5.30pm	323	38	39	16		10	433
5.30pm-5.45pm	297	41	38	12	12	9	409
5.45pm-6.00pm	257	36	34	11	8	14	326

V.   OBJECTIVE

- To conduct surveys.
- Developing possible Network for Public transport corridor.
- Finding out congestion.
- Impact on public.
- Providing New Public Transportation System.
- Providing safety, mobility to road users
- Motivating public to use public buses.

Conclusion and result:-

Finding out the Level of service with the HCS 2000 Software:

➢ Level of service with the HCS 2000 software requires the traffic data of peak hour of selected route network.
➢ Selecting route network.
➢ Input the peak hour traffic data of 7 days selected route network in HCS 2000 software.
➢ HCS 2000 software find out thre result level of service as output.
➢ HCS Software gives the level of service by which we can exactly know the congestion. So we can know is there really need for implementing Bus rapid transit system.

Inputting the above peak hour traffic data of selected route network in HCS the 2000 software:

A. Input Traffic Data of Sitabuldi inetersection-
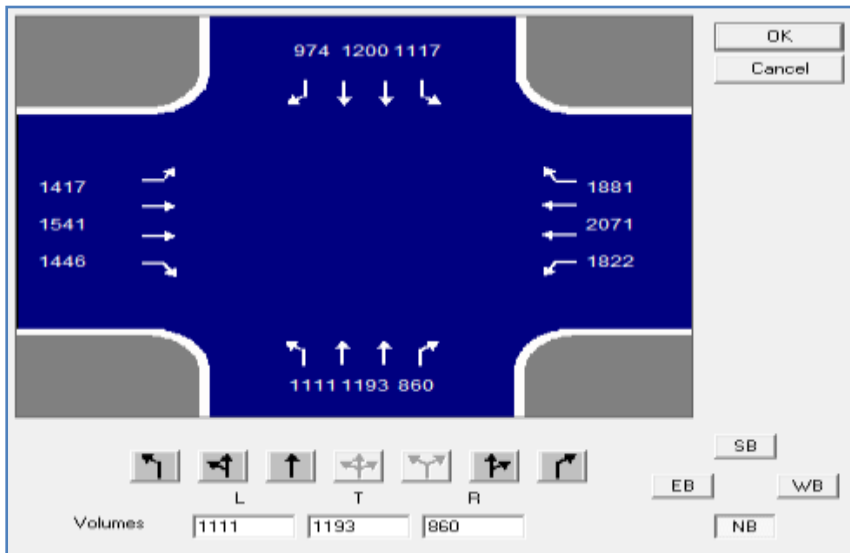
Figure 6.1.

Output for sitabuldi Intersection:

Figure 6.2.

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B. Input Traffic Data for Chatrapati Intersection
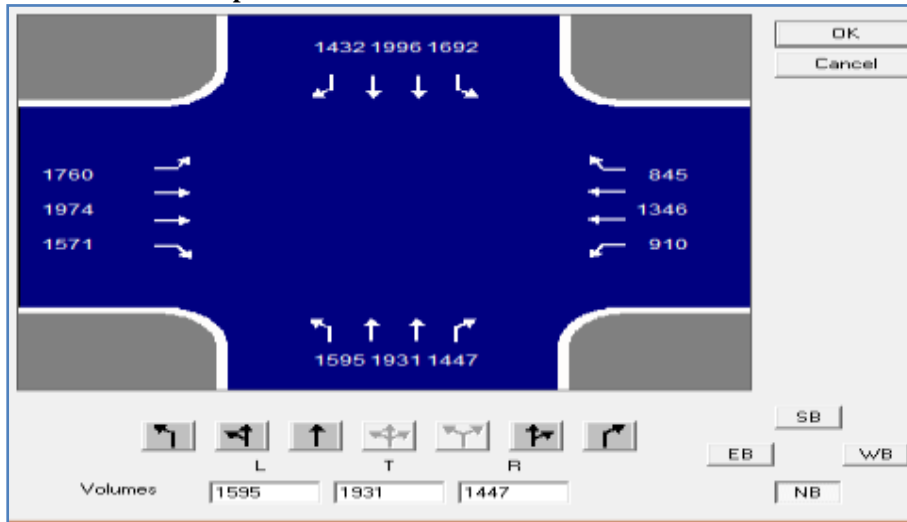
Figure 6.3.

Output for Chatrapati Intersection:

Figure 6.4.

C. Input Traffic Data for Ravi agar Intersection:
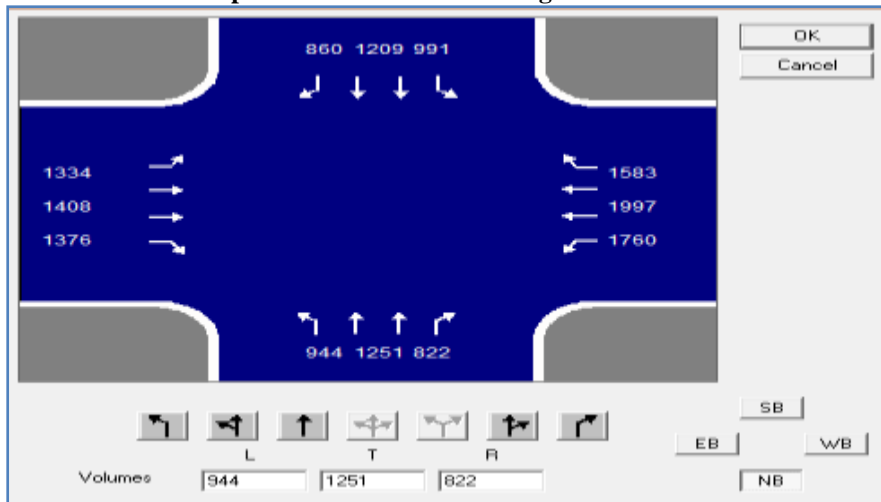
Figure 6.5. Input Traffic Data for Ravinagar Intersection

Output for Ravi agar Intersection:

	Eastbound			**Westbound**			**Northbound**			**Southbound**	
L	T	R	L	T	R	L	T	R	L	T	R
Lane Group Adjusted Volume, (vph)											
1482	1564	1529	1956	2219	1759	1049	1390	913	1101	1343	956
Lane Group Capacity, (vph)											
60	573	256	60	573	256	60	573	256	60	573	256
Lane Group v/c Ratio											
	2.73	5.97		3.87	6.87		2.43	3.57		2.34	3.73
Critical Lane Group											
			#						#		
Lane Group Delay, (sec/veh)											
	836.2						699.9			663.1	
Lane Group Level of Service											
	F	F		F	F		F	F		F	F

Figure 6.6

A. Results of Level Of service for selected Route network
➢   Sitabuldi sq
➢   Chatrapati sq
➢   Ravi agar sq

Is found to be F for Existing Condition of Public Transportation: This describes a forced-flow operation at low speeds, where volumes are below capacity. In the extreme, both speed and volume can drop to zero. These conditions usually result from queues of vehicles backing up for a restricted downstream. section under study will be serving as a storage area during parts or all of the peak hour. Speeds are reduces substantially and stoppages may occur for short or long periods of time because of the downstream congestion. So there is urgent need to improve the running star bus condition.

B. By increasing the number of buses .the total number of buses are 220 only (the data collected from NMPL Department)

C. The existing condition can be improve by time management process .the existing time facility provide from stop to destination point is 16 to 20 min.

D. From Accident Analysis of Three year it seem that due to improper driving of road users and mistakes of driver while driving in a heterogeneous traffic the accidents rates from 2011 to 2013 increased due to Heterogeneous Traffic.

E. Public opinion for existing public transportation system
According to driver and public point of view due to heterogeneous traffic they face many problems due to improper driving of the vehicle user they suffer from accident. Drivers and public face the congestion problem due to this the time required to reach the respective destination point is more. Drivers are mentally harass by improper behavior of road user's they do not fill safe while driving the star bus in heterogeneous traffic.

VI.   FUTURE SCOPE OF WORK
The present study dealt with the only Impact of public transportation system for Nagpur city. The future should be directed at developing

1.   By seeing the impact of public transportation system the existing condition are not good. The system can be improved by implementing BRT system a new ITS technology.

BRT:-
In past decade, BRT systems are an innovative lower cost,, higher capacity public transit result. There is no delicate definition of BRT. Wright defines it as a "bus-based mass transit system which provide fast, cost effective, flexible urban mobility".Levinson et al it is defined as a flexible, fast transit mode which combines vehicles, stations services, running ways, and Intelligent Transportation System (ITS) elements into an integrated system with a strong positive identity that raise a idiomatic image". Lloyd Wright ITDP (2002), "It is a high quality public transport system, Oriented to the user that provide fast, comfortable and low cost urban mobility".

Diaz et al.(2004) "BRT has the potential to provide a Higher quality experience than possible with traditional bus operations due to reduce travel and waiting time, increase service reliability and improved usability". Wright and Hook (2007) "BRTS is a Rubber-tired mode of public Transport that enables efficient travel". PNUMA (2010) "BRTS is also capable of improving local and Global Environmental conditions. BRT is a public transit mode that uses bus to provide a light rail quality of service. BRT merge the flexibility and low cost of bus service with the efficiency, flexible, cost effectiveness.

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