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GEOMETRICAL DESIGN OF HIGHWAY CAPACITY AND LEVEL OF SERVICE

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ABSTRACT: It is essential to find proper solution for traffic congestion. In this document traffic congestion problem in Fursungi, Tal:-Haweli, Dist:-Pune is identified and study to find out the causes and solution of traffic congestion. In the recent years there has been a considerable loss due to the accidents to precious human life and to the vehicles to some extend in Fursungi. Cities and traffic have developed hand-in-hand since the earliest large human settlements. Road traffic congestion poses challenges for all large and growing urban areas. Urban traffic congestion is a significant and growing problem in many path of the world. Traffic jams is major problem transport problem in Pune, due to traffic jams, there is possibility of accidents because of poor traffic management.

KEYWORDS: Level of Service, Passenger Car Unit (PCU),Travel Speed, Methodology

I. INTRODUCTION

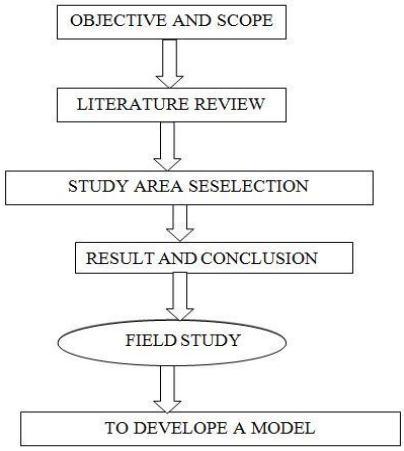
Traffic congestion is major urban transport problem. Due to traffic congestion, there is possibility of accident because of poor traffic management. To eliminate road accidents and to save precious human life. It is essential to find proper solution for traffic congestion. In this document traffic congestion problem in Fursungi, Tal:-Haweli, Dist:-Pune is identified and study to find out the causes and solution of traffic congestion. In the recent years there has been a considerable loss due to the accidents to precious human life and to the vehicles to some extend in Fursungi. Cities and traffic have developed hand-in-hand since the earliest large human settlements. Road traffic congestion poses challenges for all large and growing urban areas. Urban traffic congestion is a significant and growing problem in many path of the world. Traffic jams is major problem transport problem in Pune, due to traffic jams, there is possibility of accidents because of poor traffic management. We all know that Fursungi is developing city and densely populated. But there is some basic traffic problem in fursungi, which need attention and solution as soon as possible so as to maintain the actual growth in terms of basic development.. Whenever we talk about Pune's traffic we hear words like disgusting, chaotic, unsafe, infamous etc. The fatality rate is one person a day or 10 to 15 a week which is very high. Every time we cross the city we find ourselves standing frustrated in traffic jam and criticizing the government. Is it fair to blame government for everything? I agree up to some extent with this but we are also responsible for this situation somehow.

II. NEED OF STUDY

Traffic problem in BhekaraimataNagar occurs due to thousands of cars running through their streets each day so it affecting on highway capacity. Traffic congestion is a big problem for everyone within the city. The main reasons why traffic congestion occurs are more cars, poor road management. Adult population is increasing and therefore more people want their own personal transport to get around with. As the number of vehicles increases the chance of congestion also increases. That's why smaller towns and villages congestion is almost unheard of. This is couples with a lack of proper infrastructure. Councils and national governments fail to act on the looming threat of heavy congestion until it happen. The city doesn't expand along with an increasingly car reliant population. A single street with a lane on each side before might not be sufficient in ten years after the population has increased. Authorities often fail to convert this into a dual carriageway. Alternate routes are also a problem. Cities have limited capacity to expand due to poor funding and planning restriction preventing building on green belt spaces. Road traffic has growing at very rapid rate in urban area from past some decades. About a 10% annum increment in motor vehicle. Effects of urbanization are felt significantly in terms of traffic congestions, delay, road safety, pollution, transport efficiency. Traffic characteristics are changing rapidly in Indian cities because of various reasons.

III. METHODOLOGY

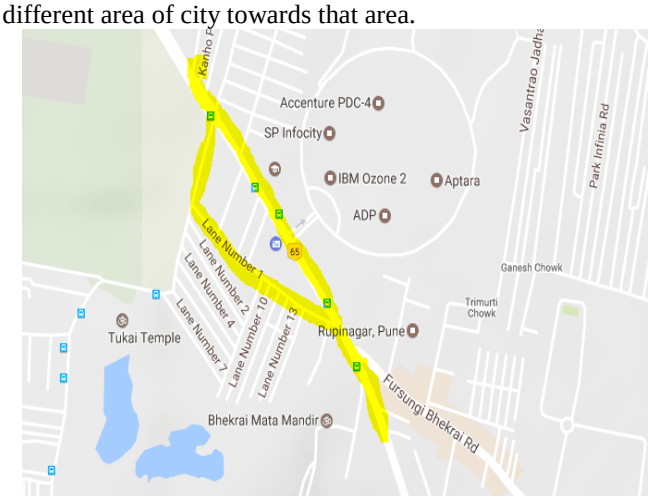
Methodology to be design on the basis of studied by literature is reported in previous chapter. The following methodology is to be adopted for traffic problem at Bhekaraimata Nagar.



IV. STUDY AREA AND PROFILE

Name	Bhekarai Mata Nagar
Country	India
State	Maharashtra
District	Pune
Closest address	Fursungi, Pune
Hadapsar latitude	17.9000˚N
Hadapsar longitude	74.0830˚E

The National Highway-65 (Pune to solapur) passes through Bhekaraimatanagar. It carries sizable amount of inter-state traffic. To avoid junction and subsequent congestion, flyover over road or bridge were designed which have partial solved problem of congestion and accident. Traffic is not only problem of big mega cities but also of small developing cities also. That is the reason planning done for fulfilment of future requirements of small city before creation of any drastic traffic problem. For example if a developing cities have residential area dividing in different small part and if some part of city is generating employment, providing business and education facilities for people of about 1/2 population of city than it can create traffic problem due trip generation from different area of city towards that area.



V. TRAFFIC DATA COLLECTION METHODS

Point 1- Day 1

TIME	HADAPSAR TO SASWAD		SASWAD TO HADAPSAR	
	VOLUME	PCU VALUE	VOLUME	PCU VALUE
9-10 AM	2698	2220	4904	3526
10-11AM	2935	2388.1	3808	2990.1
11-12AM	2992	2520.8	3359	2694.8
1-2PM	2777	2284.6	2732	2228.6
2-3PM	2455	2027	2612	2132.5
5-6PM	2848	2301.9	4530	3171.8
6-7PM	**3231**	**2654.1**	**5060**	**3568.3**
7-8PM	3141	2568.3	4610	3282.1

Table no 4.1 Volume and PCU for point 1-day1

Point 1- Day 2

TIME	HADAPSAR TO SASWAD		SASWAD TO HADAPSAR	
	VOLUME	PCU VALUE	VOLUME	PCU VALUE
9-10 AM	2847	2340.6	**5021**	**3490.1**
10-11AM	2832	2266.9	4502	3213.2
11-12AM	2803	2293.6	4198	2953.5
1-2PM	2491	2060.4	2782	2236.2
2-3PM	2328	1916.2	2715	2141.9
5-6PM	2852	2203	4456	3127.5
6-7PM	3185	2526.8	4481	3188.1
7-8PM	**3520**	**2682.4**	4350	3271.3

Table no 4.2 Volume and PCU for point1-day 2

Point 2- Day 1

TIME	HADAPSAR TO SASWAD		SASWAD TO HADAPSAR	
	VOLUME	PCU VALUE	VOLUME	PCU VALUE
9-10 AM	**1857**	**2255.5**	2140	2270.9
10-11AM	1662	1917.6	1946	2191.6
11-12AM	1717	1890.2	1986	2046.8
1-2PM	1545	1776.1	1452	1779.1
2-3PM	1557	1886.4	1428	1643.1
5-6PM	1659	1938	2199	2310.5
6-7PM	1695	1964.3	**2226**	**2396**
7-8PM	1695	2134.7	2129	2310.1

Table no 4.3 Volume and PCU for point 2-day1

Point 2- Day 2

TIME	HADAPSAR TO SASWAD		SASWAD TO HADAPSAR	
	VOLUME	PCU VALUE	VOLUME	PCU VALUE
9-10 AM	1744	2076.1	2170	2164.7
10-11AM	1740	2050.9	2180	2063.3
11-12AM	1690	1997.4	**2186**	**2216.6**
1-2PM	1529	1814.7	1506	1887.2
2-3PM	1509	1703.2	1445	1594.5
5-6PM	1619	1778	2073	1893.1
6-7PM	1709	2018.6	2119	1955.9
7-8PM	**1847**	**2230.1**	2273	2154.6

Table no 4.4 Volume and PCU for point 2-day 2

VI. RESULT

As observed from the various surveys conducted and their results we came to a solution that a new routes should be used as an alternative to this particular single route, and some other solutions is as follows.

- Provision of Alternative Route
  The vehicles which are coming from Saswad are very less in numbers, so the 2 wheelers can be diverted to this alternative route by taking a left turn which is of about 350m from the opposite end of the

road length. This would help to reduce the traffic heading towards Hadapsar.

- Providing parking facilities.
  As we could notice there is a insufficient space for parking which leaves no other option for the passengers to park the vehicles on the main road which leads to reduction of road width. The space which is required for parking is available at below the flyover which is to be constructed and it is also one of our other solutions.
- Increase in road width
  The width of the approaching road is 15m, which is a two way road of 7.5m width on each side. The road width which is available on the selected site is 8m wide. So there is a decrease in road width which leads to traffic congestion on the selected site. If we could try to increase the road width this could help to reduce the traffic conditions, as increase in road width makes more space for the vehicles for their movement.
- Provision of Pedestrian.
  Guidelines for pedestrian facilities were under the consideration of the Traffic Control. Its basic importance should be to reduce pedestrian conflict with vehicular traffic to the minimum. Absence of footpath and guide rails are the main reason that the pedestrian are forced to use the highway and the service road of vehicle which makes it inconvenient for the drivers to drive on such a busy road with pedestrian.
- Provision of separate bus and auto stand.
  The bus stand and auto rickshaw stand are currently situated at a same point. This creates a huge rush at the these stands as the passengers are crowded at a same particular point. This crowd is so huge that sometimes people keep waiting for bus or rickshaw on the street.
- Provision of Flyovers
  A flyover of length approximately of 1.2 km should be provided at Bhekaraimata Nagar. Provision of this flyover will be helpful to reduce the traffic congestion. The vehicles which are heading towards saswad can take the flyover which would help to cover the distance within a short period of time.

VII. CONCLUSION

During the case study we understand that the reason behind the provision of flyover at Hadapsaris , the area has witnessed an exponential growth in population and consequently vehicular traffic in the last decade which makes this one of the busiest corridor in the city along with the Pune – Solapur road, and the main purpose of development at pimpri chinchwad area is to improve the public transportation system. This will also improve the network of existing roads in order to provide good quality of service to commuters has also been proposed. The proposed solution to control the traffic which would help us to improve the level of service by proper management of the traffic and also because of proper route for transportation. Level of service will definitely be improved by provision of the flyover and an alternative route for transportation of vehicles. We observed that the present critics related to traffic and infrastructural developed at fursungi is similar to hadapsar.

REFERENCES

[1] Prof. U.J. Phatak, Miss NiveditaKaushik, Mr. LintuAbhraham "Intelligent Transport System: A Sustainable future Prospect", Volume 3 ,April 4 2014. ISSN No 2277-8179

[2] Wayne K. KittelsonAndKittelson Association, "Highway capacity and Level Of Service".

[3] Manraj Singh Bains, BalajiPonnou, Shrinivas S. Arkatkar, "Modelling Of Traffic Flow on Indian Expressway using simulation Technique"

[4] ShreyPahuja, " Capacity Estimation of Four Lane divded inter urban hill road using videography technique. Development of Indian Highway Capacity Manual

[5] Satish Chandra, "Capacity Estimation Procedure for 2 lane Roads Under mix traffic conditions".

[6] Hashim and Abdel-Wahed (2012), "Effect of Highway Geometric Characteristics on Capacity Loss", journal of Transportation system Engineering And Information Technology (2012).

[7] Nakamura M. "Research and Application of Highway Capacity in Japan", Second International Symposium on Highway Capacity, 19941 Sydney, Australia, 103-112

[8] A.R. Khanorkar, S.D.Godmare, Dr. B.V. Khode "Impact of Lane Width of road on PCU Capacity under mix traffic condition in cities on congested highways".

[9] Arasan V.T. , K. krishnamurthi (2008), "Study of Effect of traffic volume and Road width on PCU values of vehicles on microscopic simulation.

