

Study of Traffic Volume and Level of Service of Ashram Road, Ahmedabad

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ABSTRACT

A significant effort has been made in order to study the Traffic Volume of Ashram road, Ahmedabad. Ahmedabad itself attracts a lot of vehicular population. Ahmedabad itself becomes a major traffic generator in a way. Ahmedabad is large and contains places to work, learn, socialize and live each with its own trip purpose. In recent years, usage of automobiles on road has increased considerably. In addition to going to class, students also are likely to use vehicles for employment, recreation, shopping and social activities. The objective of the study is to analyze the prevailing traffic conditions on the Ashram road. Traffic Volume study is carried out on Ashram road at Vadaj to Usmanpura and existing level of service is calculated. Due to mixed nature of traffic it gets difficult to accommodate all the kinds of traffic on these roads. The basic problem arises during the peak hours of the day when the traffic volume is highest on the road. The data was analyzed for the peak hour of traffic.

Keywords: Traffic Volume, Level of Service, Capacity, Peak hour

I. INTRODUCTION

A rapidly growing component of urban transportation problems in the cities across the world is problem of traffic congestion. It is believed that identification of congestion is the first step for selecting appropriate mitigation measures. Because of population, economic and vehicle ownership growth, increasing traffic demand exceeds the carrying capacity of the intersection during peak periods, which causes congestion. The congested and hazardous traffic conditions in the city increase fuel consumption of the vehicles, causes noise and air pollution, delay and accidents. In Ahmedabad city, most of arterial roads are congested. An attempt has been made to quantify congestion with delay, speed and volume to capacity ratio. There is a need for defining traffic congestion on rational bases and use that for measurement LOS (Level of Service) of roads.

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Objective of Study

- To carry out various traffic volume on selected section of Ashram road
- To evaluate the capacity and level of service

Study Area

The study is carried out on the important traffic corridor of Ahmedabad city, selected for this study is known as Ashram road in Ahmedabad.

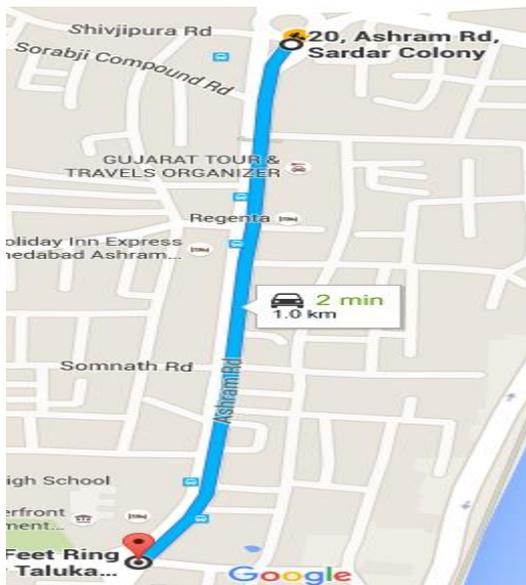


Figure 1: Vadaj to Usmanpura Study Area

II. METHODS AND MATERIAL

Traffic Flow Count and CVC

Traffic flow can be modelled for a wide range of roadway traffic and control conditions. More than eight road stretches were considered under this study. Number of traffic lanes, carriage way width and various data collection techniques are considered in this study. Depending on the prevailing roadway conditions and abutting land use, two different methods were adopted for collection of traffic data for this study. Where the abutting land use patterns were favourable for placing the video camera at the suitable location to cover the traffic movement on selected stretch of road, the video graphic method was used for collection traffic data all the road stretches considered under this study were operating under mixed traffic condition. However, the average composition of traffic varied from one location to the others.

Passenger Car Units

The problem of measuring volume of such heterogeneous traffic has been addressed by converting the different types of vehicles into equivalent passenger cars and expressing the volume in terms of Passenger Car Unit (PCU) per hour. The PCU is the universally adopted unit of measurement of traffic volume, derived by taking the passenger car as the 'standard vehicle'.

The interaction between moving vehicles in a traffic

stream is highly complex and is influenced by a number of roadway and traffic factors. The accurate estimation of the magnitude of vehicular interaction for different roadway and traffic conditions is the prerequisite for better operation and management of roadway facilities in their prevailing conditions.

Table 1 Vadaj to Usmanpura at 9 to 10 AM

Time(M)	2W	3W	Car	LCV	Bus	CR	C	Total
15	450	141	122	23	17	0	31	
30	477	139	134	19	21	4	26	
45	537	190	139	14	23	2	33	
60	528	154	161	17	20	3	24	
Total(veh)	1992	624	556	73	81	9	114	3449
PCU factor	0.75	2.0	1.0	1.4	2.20	1.5	0.4	
PCU/h	1494	1248	556	102.2	178.2	13.5	45.6	3637.5

Table 2 Vadaj to Usmanpura at 9 to 10 AM opposite side

Time(M)	2W	3W	Car	LCV	Bus	CR	C	Total
15	411	192	117	10	33	7	52	
30	482	176	151	12	29	3	53	
45	444	158	137	10	27	1	47	
60	496	185	131	21	31	4	35	
Total(veh)	1833	711	536	53	120	15	187	3455
PCU factor	0.75	2.0	1.0	1.4	2.2	1.5	0.4	
PCU/h	1374.75	1422	536	74.2	264	22.5	74.8	3767.95

Table 3 Vadaj to Usmanpura at 6 to 7 PM

Time(M)	2W	3W	Car	LCV	Bus	CR	C	Total
15	503	185	144	22	29	5	31	
30	490	168	151	14	19	1	26	
45	457	193	148	19	31	1	20	
60	485	174	164	10	23	3	15	
Total(veh)	1935	720	607	65	102	10	92	3531
PCU factor	0.75	2.0	1.0	1.4	2.2	1.5	0.4	
PCU/h	1451.25	1440	607	91	224.4	22.5	74.8	3910.95

Table 4 Vadaj to Usmanpura at 6 to 7 PM opposite side

Time(M)	2W	3W	Car	LCV	Bus	CR	C	Total
15	478	151	138	18	30	0	25	
30	512	159	153	23	24	2	31	
45	533	164	146	16	20	1	23	
60	497	195	167	15	33	1	27	
Total(veh)	2020	669	604	72	107	4	106	3582
PCU factor	0.75	2.0	1.0	1.4	2.2	1.5	0.4	
PCU/h	1515	1338	604	100.8	235.4	6	42.4	3841.6

Vehicle Composition

Table 5 Vehicle Composition

Type of vehicle	Morning		Evening	
	This side (%)	Opposite side (%)	This side (%)	Opposite side (%)
2W	57.75	53.05	54.80	56.39
3W	18.09	20.57	20.39	18.67
Car	16.12	15.51	17.19	16.86
LCV	2.11	1.53	1.84	2.01
Bus	2.34	3.47	2.88	2.98
CR	0.26	0.43	0.28	0.11
C	3.30	5.41	2.60	2.92

III. RESULTS AND DISCUSSION

PCU per Hour and Level of Service

Table 6 No. of vehicles and PCU/h

No.	Peak	Stretches	No. of Vehicles	PCU/h(V)
1	Morning	Vadaj to Usmanpura	3449	3637.5
		Vadaj to Usmanpura opp.	3455	3767.95
	Evening	Vadaj to Usmanpura	3531	3910.95
		Vadaj to Usmanpura opp.	3582	3841.6

Table 7 Level of Service

No.	Peak	Stretches	PCU/h(V)	V/C	LOS
1	Morning	Vadaj to Usmanpura	3637.5	0.84	E
		Vadaj to Usmanpura opp.	3767.95	0.87	E
	Evening	Vadaj to Usmanpura	3910.95	0.90	E
		Vadaj to Usmanpura opp.	3841.6	0.89	E

Level of service is determined as per IRC: 106-1990. The level of service is evaluated as 4300 PCU/h for sub-arterial roads.

IV. CONCLUSION

The present study has been conducted to analyse the traffic characteristics of Ashram road, Ahmedabad. The following main conclusions are drawn from the work:

- As per the data collected from the traffic volume study, it was found that the maximum number of vehicles which arrives at evening peak hours at

Vadaj to Usmanpura opposite side of road 3582 vehicles.

- The traffic composition of the vehicles which arrives and leaves the road constitutes of 15-16 per cent of 4-wheelers, 18-20 per cent of 3-wheelers and 53-57 per cent 2-wheelers.
- The level of service as calculated for both the roads opposite to Vadaj and Usmanpura were found to be of E level of service against all the peak hour traffic.

V. REFERENCES

- Hiren V. Patel, V. R. Gor – “Capacity Determination of an Arterial Road - A Case study of Modasa Town (Bus station to Malpur cross road)” (2013) 2013 IJSRD/ISSN: 2321-0613
- Chetan R. Patel, G. J. Joshi- “Capacity and LOS for Urban Arterial Road in Indian Mixed Traffic Condition” (2012) Transport research Arena-Europe 2012:527-534
- Bhavneet Singh, Tripta Goyal- “Study of Traffic Volume and Level of Service of Panjab University, Chandigarh” (2015) IEJRA/ISSN: 2248-9622 July 2015, pp.09-14
- Ebin Nirmal Joseph, M.S.Nagakumar- “Evaluation Of Capacity And Level Of Service Of Urban Roads” (2014) IJETE/ISSN:2348-8050 30th-31st August 2014
- Dipak K. Thakor, Dr. L B Zala, Prof. A A Amin- “Traffic Flow Characteristics For Heterogeneous Traffic On Urban Road-a Case Study of Selected Stretch Of Anand City” (2014) INSS:2320-5083, May 2014
- Dr. L.R. Kadiyali-Traffic Engineering and Transport Planning
- IRC: 106-1990 –Guideline for Capacity of Urban Roads in Plain Areas