

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.

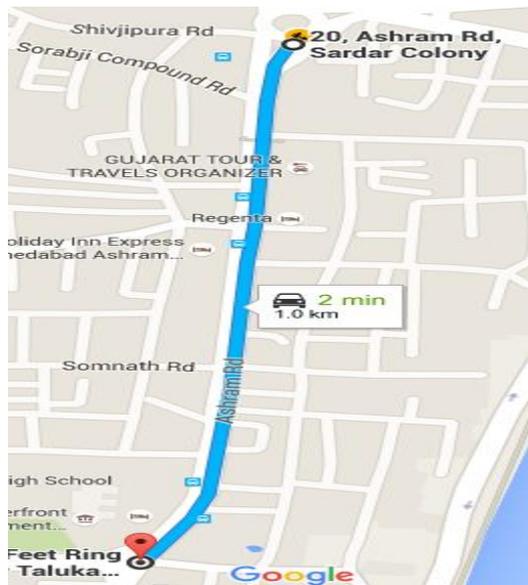


Figure 1: Vadaj to Usmapura Study Area

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.

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