

Traffic Volume Study

Ahjoliya Dhruvi¹, Dholu Smit², Patel Ketu H.³, Tarpara Yash⁴, Patel Yash⁵, Bhavya Solanki⁶, Prof. Bhavna Mistry⁷
^{1,2,3,4,5,6}B.E. Student, Civil Engineering Department, Aditya Silver Oak Institute of Technology, Gujarat Technological University, Gujarat, India

⁷Civil Engineering Department, Aditya Silver Oak Institute of Technology, Gujarat Technological University, Gujarat, India

Abstract: The purpose to make this report is to identify the several problems which is being faced by people and the solution regarding this is being generated. Our project deal with the survey by counting the number of vehicle during the peak hour of the day. This survey will help us to define the path of road and the traffic which is being generated. The heavy vehicle which is being passed during the hr will help us to know the construction or the work load is taking place near the road. Chart or the table is made in order to justify the different type of vehicle passing through the road.

Key words: volume/flow, Rate of flow, volume counts, PCU, LOS.

I. INTRODUCTION

Only now did I recognize the reciprocal relationship which exists between manufacturing power and the national system of transportation, and that the one can never develop to its fullest without the other. - Frie This quote describes almost everything about the importance of transportation. Transportation is carrying civilization to a brighter future. Now a day's transportation is one of the most burning issues in every territory of the world. Every country is approaching differently according to their needs and solving their transportations problems within their capabilities. In designing buildings, we need to determine loads coming to the structure to calculate reinforcement to be provided for safe functioning of the structure. Here in transportation volume serves the same purpose. For planning, designing and operation of transportation system the first and foremost requirement is volume. Volume is simply the number of vehicles passing a section of a roadway. Expressing traffic volume as number of vehicles passing a given section of road or traffic lane per unit time will be inappropriate when several types of vehicles with widely varying static and dynamic characteristics are comprised in the traffic. 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 interaction between moving vehicles under such heterogeneous traffic condition is highly complex. Again volume is not constant. It increases with time. So a continuous method of calculating volume is a matter of great importance for smooth functioning of transportation system. If volume data is not found on a continuous basis then the transportation system may fail and the economy of the country may face a great difficulty.

II. OBJECTIVES & NEED OF STUDY

One of the fundamental measures of traffic on a road is the volume of traffic using the road in a given interval of time. It is also termed as flow and it is expressed in vehicles per hour or vehicle per day. When the traffic is composed of a number of vehicles, it is the normal practice to convert the flow into equivalent Passenger-Car Unit (PCU), by using certain equivalency factors. The flow is then expressed as PCUs per hour or PCUs per day.

Knowing the flow characteristics one can easily determine whether a particular section of the road is handling traffic much above or below its capacity. If a traffic is heavy, the road suffers from congestion with consequent loss in journey speeds. Lower the speeds cause economic loss to the community due to time lost by the occupants of the vehicles and the higher operational cost of vehicles.

There for traffic volume data are require to draw up schemes for improvement of road network and also to allocate the scare economic resources most advantageously. If a traffic flow data are available over the past number of years, the rate at which traffic flow has increased in the past can be easily determined. Extrapolating the past trend into the future, a reasonable indication of the future rate of growth of traffic is made possible. If a average annual flow and the length of the highway are known, the annual vehicle km of travel can easily be computed. Road pavement design pertaining to numbers of commercial vehicles using a road. The maintenance needs of a highway is often based on the traffic using the road. Traffic regulatory and control systems are designed on the basis of accurate vehicle floe data. The design signal and road junction are possible only if, among other things, the vehicle flow data are available.

III. METHODS FOR MECHANICAL COUNTING

- (1) Mechanical counters
- (2) Manual counts

1. Mechanical counters:

These may be either fixed (permanent) type or portable type. The mechanical counter can automatically record the total number of vehicles crossing a section of the road in a desired period.

The working may be by the effect of impulses or stimuli caused by traffic movement on a pneumatic hose placed across the roadway or by using any other of sensor.

Traffic count is recorded by electrically operated counters and recorders capable of recording the impulses.

2. Manual counts:

This method employs a field team to record traffic volume on the prescribed record sheets. By this method it is possible to obtain data which cannot be collected by mechanical counters, such as vehicle classification, turning movements and counts where the loading condition or number of occupants are required.

But it is not practicable to have manual count for all the 24 hours of the day. Hence it is necessary to resort to statically sampling techniques in order to cut down the manual hours involved in talking complete counts, First the fluctuation of traffic volume during the hours of day and the daily variations are observed. Then by selecting typical short count period, the traffic volume study is made by manual counting.

Then by statistical analysis the peak hourly traffic volumes as well as the average daily traffic volumes are calculated. This method is very commonly adopted due to the specific advantages over other methods.

IV. CASE STUDY OF TRAFFIC VOLUME SURVEY

Traffic Volume study was carried out at chanakyapuri bridge. The survey was carried out by Civil Engineering Department of Aditya silver oak institute of technology on 25/02/2018 here we use manual count method. we collect the following data:

- 1) Clear span
- 2) No of piers
- 3) Types of deck provided

Our road is sub arterial road. Our road is two lane one way road. The capacity of sub arterial road is 4200 PCU/hour.

The following steps ware performed for traffic volume study:

- 1) Preparation of site layout

Time	Private Bus	Two Wheeler	Three wheeler	Four Wheeler	L.C.V	H.C.V	AMTS	pedestrian	Total Vehicle.
9 to 9:15	2	450	60	246	43	-	-	2	803
9:15 to 9:30	-	429	52	267	56	-	-	-	803
9:30 to 9:45	1	471	76	288	50	-	2	1	889
9:45 to 10	3	462	63	292	39	-	-	-	859
Total	6	1812	251	1093	188	0	2	3	3354
Total%	0.17	54	7.48	32.58	5.60	0	0.059	0.09	100

- 2) Vehicle Count Survey

- 3) Traffic Volume Survey Analysis

*Analysis of Traffic Volume Composition

*Hourly Variation of Traffic Volume in Vehicle/hr and PCU

*Hourly Variation of Traffic Volume in Vehicle/hr and PCU/hr(DIRECTIONWISE).

- (1) Preparation of site layout:

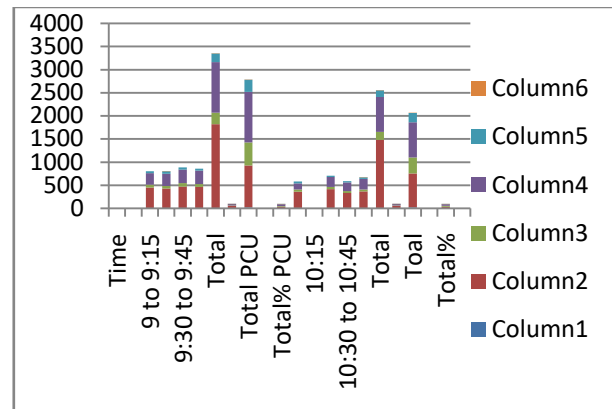


Figure 1

- (2) Vehicle Count Survey:

Volume Count data is as following:

Hourly Variation of Traffic Volume in Vehicle/hr (Mode wise) on Date: 25/02/2018 at chanakyapuri bridge.



Total PCU	18	906	502	1093	263.2	0	6	0.6	2788.8
Total% PCU	0.65	32.49	18	39.19	9.44	0	0.21	0.02	100
10 to 10:15	-	359	48	130	47	-	-	-	584
10:15 to 10:30	2	416	44	213	33	-	-	-	708
10:30 to 10:45	4	330	39	189	28	-	2	-	592
10:45 to 11	1	366	42	228	36	-	-	-	674
Total	7	1471	173	760	144	0	2	-	2557
Total%	0.27	57.5	6.76	29.72	5.63	0	0.078	-	100
Toal PCU	21	735.5	346	760	201.6	0	6	-	2073
Total% PCU	1.01	35.48	16.69	36.66	9.72	0	0.289	-	100

Table 1

3) Traffic Volume Survey Analysis:

<u>Sr.no</u>	<u>Type of vehicle</u>	<u>%of total vehicle</u>		<u>%of total volume in PCU</u>	
		<u>9 to 10AM</u>	<u>10 to 11AM</u>	<u>9 to 10AM</u>	<u>10 to 11AM</u>
<u>1)</u>	<u>Private bus</u>	0.17	0.27	0.64	1.01
<u>2)</u>	<u>Two Wheeler</u>	54	57.5	32.45	35.48
<u>3)</u>	<u>Three Wheeler</u>	7.48	6.76	17.98	16.69
<u>4)</u>	<u>Four Wheeler</u>	32.58	29.71	39.15	36.66
<u>5)</u>	<u>L.C.V.</u>	5.60	5.63	9.42	9.72
<u>6)</u>	<u>H.C.V.</u>	0.0	0.0	0.0	0.0
<u>7)</u>	<u>AMTS</u>	0.059	0.078	0.21	0.289
<u>8)</u>	<u>Pedestrian</u>	0.09	-	0.02	-

Table 2

Level of service (LOS): Our road is sub arterial road. Our road is two lanes one way road. The capacity of sub arterial road is 4200 PCU/ hour.

Type of road	Type of road lane	PCU	capacity	V/C ratio	LOS
Sub arterial road	Two lane one way road	2791.8	4200	0.66	Class-C

Table 3

IV. CONCLUSION

Valuable information are obtained from the statistical analysis of survey data regarding respondents perception on over bridge.

At level of service C, the presence of other vehicles begins to restrict the manoeuvrability within the traffic stream. Average speeds remain at or near the free flow

speed level, but significant increase in driver vigilance is required at this level. Minimum average spacing between the vehicles is in the range of 67 m. Queues may be expected to form behind any significant blockage.

ACKNOWLEDGEMENT

We would like to extend our hearty thanks with a deep sense of gratitude and respect to all those who provides us immense help and guidance during our project. We would like to thank our Head of Department for providing a vision about the system. We have been greatly benefited from their regular critical reviews and inspiration throughout my work. We would like to express our sincere thanks to our internal guide , who gave us an opportunity to undertake such a challenging and great innovative work. We are grateful to them for their guidance, encouragement, understanding and insightful support in the development process

REFERENCES

- [1]. Ahmed Al.Kaishy, Younghan Jung and Hesham Rakha. (2005), "Developing Passenger Car Equivalency Factors for Heavy Vehicles during Congestion". *Journal of Transportation Engineering, ASCE*, Vol. 131, No. 7, pp. 514-523.
- [2]. Central Road Research Institute, (1988), "Capacity of Roads in Urban Areas", Project Sponsored by Ministry of Surface Transport, Sept, 1988.
- [3]. Chandra, S. and Sikdar, P.K. (2000), "Factors Affecting PCU in Mixed Traffic Situations in Urban Roads", *Road Transport Research*, Vol. 9, No. 3, Australian Road Research Board, pp. 40-50.
- [4]. Marwah, B. R. and Singh, B. (2000). "Level of service classification for urban heterogeneous traffic: A case study of Kanpur metropolis." *Transportation Research. Circular E- C018: 4th International Symposium on Highway Capacity*, Maui, Hawaii, 271-286.
- [5]. IRC-106-1990-guidelines-for-capacity-of-urban-roads.
- [6]. L.R KADIYALI (traffic engineering)