International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 05 Issue: 05 | May-2018 www.irjet.net p-ISSN: 2395-0072

Traffic Volume Measurement of Pune University Road to Paud Phata: Case Study

Mr. Abhishek.A.Hirulkar[1], Mr.Tanay.S.Jaiswal[2], Mr. Shankar.B.Kivade[3], Miss. Monica. G. Shewade[4], Miss. Dheeraja.S.Shirke[5], Mr. K. V. Mhetre[6]

[12345]*Student of Anantrao Pawar College of Engineering and Research, Pune-411009.*
[6]*Assistant Prof. Department of civil engineering, Anantrao Pawar College of Engineering and Research, Pune-411009.*

Abstract - Traffic condition in most of the cities are very chaotic and crucial. This is particularly observed in million plus cities. As the urbanization process takes momentum, these prolems crop up due to the lake of commensurate development of infrastructure, particularly roads,

Keywords: Intelligent Transportation Systems (ITS), Traffic flow, optimum green signaling, intersection, Actuated method.

1. INTRODUCTION

Nowadays 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.

Traffic congestion is a global problem. It is a growing matter of concern as it leads to a number of environmental problems. In many developed and developing countries like America, China, India traffic during peak hours is very congested. People lose valuable working hours and costly fuel each and every day. The worst affected are the developing countries like India wherein the sudden rise in use of low budget vehicles in addition to easy installments for purchase of vehicles has increased the number of buyers which has resulted the highway construction. The traffic situation in cities like Delhi, Mumbai, Hyderabad, Bangalore & Pune are getting worst.

The nature of traffic flow is depend on a number of characteristics which includes density, speed and traffic volume and natural factors such as time of day, weekday, weekend, weather conditions. The unpredictable nature of traffic flow makes it difficult to predict the traffic flow. Historical data is crucial in predicting traffic flow. The historical data helps to understand the traffic flow within the city, which is a different at every intersection.

Congestion involves queuing, slower speeds and increased travel times, which impose costs on the economy and generate multiple impacts on urban regions and their inhabitants. Congestion also has a range of indirect impacts including the marginal environmental and resource impacts of congestion, impacts on quality of life, stress, and safety as well as impacts on non-vehicular road space users such as the users of sidewalks and road frontage properties.

1.2 Study area

Location: - Pune university road to paud phata, Pune Maharashtra, India. As shown in fig.1 the route consists of 10 numbers of intersection and having length 2.1 Km. Locality of Pune generally called it as law college road.

It has heavy traffic congestion during peak hours. The problem of traffic congestion is because road consist of number of important places such as film and television institute, law college, prabhat studio (national film archive of India), etc.

Fig. 1: Route Map

1.3 Objectives:

1. To study different traffic studies related to traffic engineering.
2. Traffic congestion problem from Pune university road to paud phata is aimed to be identified.

3. To measure hourly traffic volumes in terms of passenger car unit and note other related traffic characteristics.

4. To compare the results with standard design service volumes and identify remedies.

5. The attempt shall be made to provide the solution.

2. PROBLEM STATEMENT

Now a days, illegal possession on the roads is highly increasing due to which the roads are getting narrow and becoming a reason behind traffic jam. There are some other factors other than the above mentioned factor viz., illegal parking on pedestrian way, movement of heavy weight vehicles on roads etc. Pedestrians use main road for walking as the pedestrian way is occupying illegal parking. Heavy weight vehicles such as trucks, travels, buses are travelling along with two and four wheeler vehicles on same route, which increases traffic volume. City buses also travel on the same route, have to stop on each bus stop to pick up and drop the passengers, which leads to traffic congestion. It affects on the travel time and hence there is a need to find the solution for the above mentioned problems.

3. METHODOLOGY

For measure of various traffic volume we firstly selected site for our project which is from pune university road to paud phata road which is 2.5 km consist of 5 signal then calculating traffic flow and turning moment of vehicle at various intersection during peak hour 5:30 to 7:30 after this we converted the traffic volume into PCU Standard values of PUC are taken from IRC: SP 41-1994[10] which is for intersection design.

Table no.1: PCU equivalency for intersection design

Type	PCU equivalency
Two wheeler	0.5
Three wheeler	1
Car	1
LCV	1.5
HCV	3
Mini bus	1.5
Bus	3
Bicycle	.5

From this PCU we calculated the design service volume which will be compared with standard design service volume. From this calculation an attempt is to be made to provide solution to solve traffic congestion problem.

4. CALCLULATION AND RESULT

Traffic volume survey is carried out for each intersection of selected route which is converted into PCU by multiply by PCU equivalent factor as shown in table no.1. one of intersection is

Table no.2: PCU for intersection design

Time	PCU
5:30-5:45	114
5:45-6:00	113
6:00-6:15	775.5
6:15-6:30	770
6:30-6:45	973
6:45-7:00	1023.5
7:00-7:15	457.5
7-15-7:30	460
7:30-7:45	1139
7:45-8:00	1198.5

Table no.3:design service volume compared with standard.

Intersections	Category of Road	Calculated design service volume [PCU/hr]	Standard service volume [PCU/hr]
Pune university chowk	Arterial	4798.70	1500
Vaikhunthbhai Mehta chowk	Arterial	2731.5	1500
Vetalbaba chowk	Sub-Arterial	2912	1200
Vithalrao tukaram chowk	Sub-Arterial	3727.5	1200
Maharshi dadhichi chowk	Sub-Arterial	4282.13	1200
V.S. khandekar chowk	Sub-Arterial	2293.41	1200
Bhandarkar institute chowk	Sub-Arterial	2030.94	1200
Athawale choce	Sub-Arterial	1618.47	1200
Abhinav chowk	Arterial	3132.04	1500
Paud phata chowk	Arterial	3220.73	1500

The peak hour volume is just the sum of the volumes of four 15 minute interval within peak hour (1198.5+1139+1023.5+973=4334 PCU). the peak 15 minute volume is 1198.5 PCU in this case. The peak hour factor(PHF) is found by dividing the peak hour volume by four times peak 15 minute volume. PHF=4334/4*1198.5=0.904

The actual design (flow rate) is calculated by dividing peak hour volume by the PHF,

FLOW RATE (design service volume)=4334/0.904=4794.24 PCU/hr or by multiplying the peak 15 minute by 4 4*1198.5=4794 PCU/hr

REFERENCES

[1] Ahmed Al.Kaishy, Younghan Jung and HeshamRakha. "Developing Passenger Car Equivalency Factors for Heavy Vehicles during Congestion". Journal of Transportation Engineering, ASCE, (2005), Vol. 131, No. 7, pp. 514-523

[2] Ammu Gopalkrishnanl, Dr. Sewa Ram, Dr. P.K. Sarkar, "Analysis of Estimating Saturation Flow under Heterogenous Traffic Conditions Against Conve ntional Techniques", Vol. 4, Issue. 09, 2016, ISSN (online): 2321-0613, pp. 706-709.

[3] Andrew P. Tarko, Rafael I. Perez –Cartagena, "Variability of a Peak Hour Factor at Intersections", Submitted for presentation at the 84 nd Annual Meeting of the Transportation Research Board, January 9- 13, (2005), Washington D.C.

[4] Arkatkar, S.S. "Effect of Intercity Road Geometry on Capacity under Heterogeneous Traffic Conditions Using Microscopic Simulation Technique", International Journal of Earth Sciences and Engineering, (2011),ISSN 0974-5904, Volume 04, No 06 SPL, October 2011, pp. 375-380.

[5] Basu, D., Maitra, S.R. and Maitra, B. "Modelling passenger car equivalency at an urban midblock using stream speed as measure of equivalence", European Transport, (2006), Vol. 34, pp. 75-87.

[6] Central Road Research Institute, "Capacity of Roads in Urban Areas", Project Sponsored by Ministry of Surface Transport, Sept(1988).

[7] Chandra S., Kumar, V., and Sikdar, P.K. "Dynamic PCU and Estimation of Capacity of Urban Roads", Indian Highways, Indian Road Congress, (1995), Vol. 23, No. 4, pp.17–28.

[8] Chandra, S. and Prasad, N.V. "Capacity of Multilane Urban Roads under Mixed Traffic Conditions", Highway Research Bulletin, Traffic Engg, Indian Road Congress, (2004), pp.97-103.