International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 05 Issue: 03 | Mar-2018 www.irjet.net p-ISSN: 2395-0072

CAPACITY UTILISATION OF KOOTHATTUKULAM-NORTH PALAKKUZHA STRETCH IN KERALA ,INDIA

Nisa Ann Mathew[1],Asha Mathew[2],Bala Murali Krishna[3], Deaphan T Thengumpallil[4],Meera Haridas[5]

[1]Assistant Professor, Viswajyothi College of Engineering and Technology, Kerala, India.
[2,3,4,5]B.Tech Student, Viswajyothi College of Engineering and Technology, Kerala, India.

Abstract: *Traffic volume study plays a crucial role in analyzing the pattern of traffic on the road. It helps to determine the movement, number and classification of vehicles. For a newly reconstructed road, volume studies are significant to determine the suitability of road with traffic conditions. In this study, volume counts were conducted on a selected stretch of road (Koothattukulam-North Palakkuzha) which belongs to State Highway1 of Kerala state, India. The collected data using manual count method was analysed and Volume/Capacity ratio was found. From this, efficiency of the selected stretch was determined. This helps to analyze the performance of the newly reconstructed road regarding the traffic volume.*

Key Words: **Traffic volume, State Highway 1, Volume/capacity ratio, Traffic pattern, Koothattukulam.**

1. INTRODUCTION

Transportation sector is a major contribution to our nation's GDP. Road ways are the dominant mode of transportation due to revolution in automobile industry and economic liberalisation. Thus the number of automobiles has increased drastically and this has caused the problem of increased traffic and accidents. As per the report by Supreme Court Committee on Road Safety, in 2017, the number of people killed on the road is 1,46,225. It means that atleast 400 died every day last year due to road accidents.

Various technical and engineering methods are used in traffic engineering for the safe and fast movement of vehicles. The main two characteristics of study for determining traffic flow are volume and speed.

Traffic volume is the number of vehicles passing a section of road per unit time. Volume of traffic per hour varies considerably depending upon the days in the week or different time period of the day.

Traffic volume data helps us to identify critical flow time periods, influence of large vehicles or pedestrians on vehicular traffic flow, traffic trends etc.

In traffic engineering studies there are many volume such as peak hour volume, hourly volume.Peak hour volume can be defined as the maximum number of vehicles of vehicles passing at a particular point during a time interval of 1 hour. It is normally expressed in passenger car unit (PCU).For calculating the volume of heterogeneous traffic, volume of different class of vehicles are converted into equivalent passenger car unit(PCU). PCU values adopted in this study are given in Table 1.

Table 1: Value of passenger car unit [9]

Sl. No.	Type of vehicle	PCU Value
1	Bus	3
2	Cars	1
3	Pass auto rickshaw	1
4	Truck	3
5	Mini truck/tempo	1.5
6	Goods auto rickshaw	1
7	Two –wheelers	0.5

2. PURPOSE OF STUDY

- To determine the volume of traffic entering and exiting a particular section of road
- To evaluate the efficiency of provided traffic facilities on the newly constructed road
- To find out the deficiencies, regarding the newly provided traffic facilities
- To determine the influence of large vehicles and pedestrians on traffic flow
- To give suggestions to the problems identified, if any

3. DESCRIPTION OF STUDY AREA

The Koothattukulam - North Palakkuzha stretch of road belongs to State Highway 1(MC road) of Kerala State, India. This particular stretch of SH1 was recently reconstructed so the capacity analysis has to be done.It is an arterial road with two lane (two –way) undivided having rolling to mountaineous terrain. The road stretch selected for study connecting the above mentioned locations is of 5 Km length.

4. METHODOLOGY

4.1. ROAD INVENTORY

Road inventory surveys were done to find the required data for volume study. Various parameters like type of carriageway(divided/undivided), width of carriageway, shoulders, kerb height etc. were noted.

4.2. VOLUME COUNT

There are mainly two methods for counting traffic volume. The two methods are volume count using mechanical counters and manual count. In this study, manual count method is adopted. This method involves counting the number of vehicles which entered and exited North Palakkuzha and Koothattukulam. A team was employed for this purpose in the field and thus volume of vehicles according to various classification, turning movements etc. can be obtained. Tally sheets were used for recording manual count records. The volume count was taken for 12 hours from 8 am to 8 pm on the same day and the collected data was analyzed .

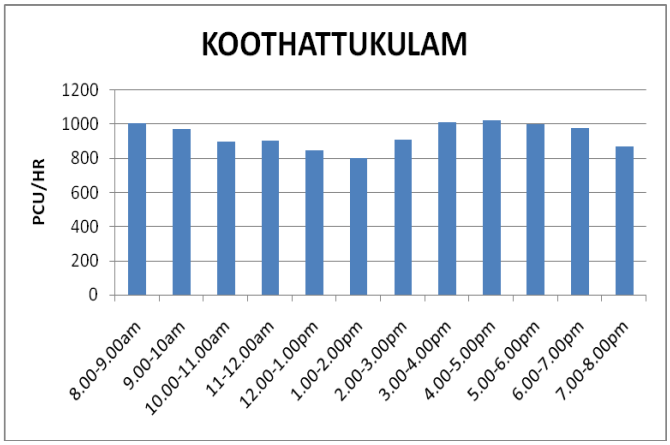

Chart -1: PCU/Hour in Koothattukulam

Chart 1 shows the variation in traffic flow through Koothattukulam with a time interval of 1 hour. The highest hourly value of volume in PCUs was obtained during 4pm to 5pm as 1023.5. This peak hour is due to the fact this is the time when most of the working population and day scholars pursuing education travel back to the places of stay. The morning peak hour is between 8.00-9.00am.

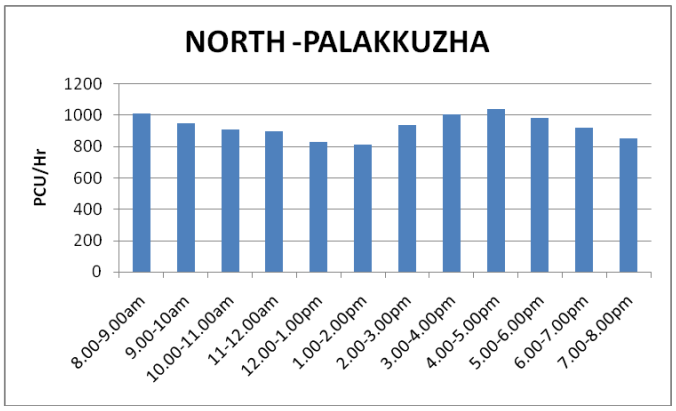

Chart -2: PCU/Hour in North-Palakkuzha

At North –Palakkuzha , the peak hour was between 4.00 - 5.00pm with a peak value of 1040.5 PCUs.

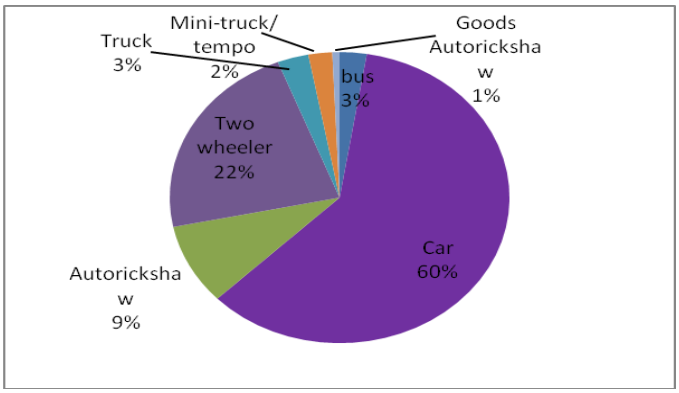

Chart 3: Composition of vehicles during peak hours in Koothattukulam (4-5pm)

Chart 3 and 4 shows the composition of the different classes of vehicles at Koothattukulam and North-Palakkuzha respectively during the peak hours.

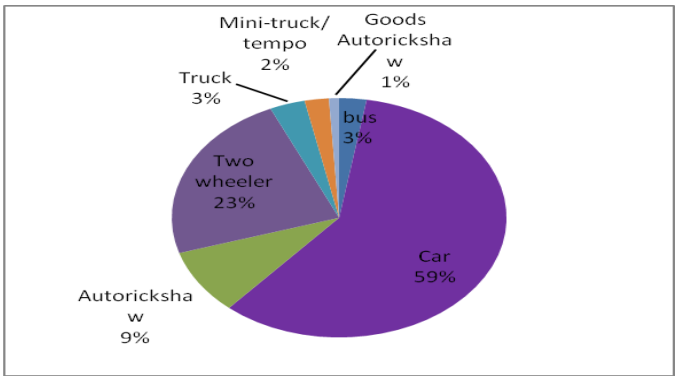

Chart 4: Composition of vehicles at peak hours in North-palakkuzha(4-5pm)

It is evident from these charts that major portion of traffic are passenger cars. The reason for the high proportion of cars and two-wheelers may be due to proximity of the location to residential areas. Only 3% of vehicular composition were buses; which could be another reason why people used their own personal vehicles.

5. CAPACITY UTILISATION

Capacity utilisation of the stretch of road is analysed through Volume-Capcity ratio. Volume-capacity ratio (V/C) is the measure which indicates the primary performance of the road section, where V represents the total number of vehicles in one hour passing through a section and C is the capacity of that section or the maximum number of vehicles that can pass in a reasonable traffic. It is the most common parameter used to analyze the traffic status. The threshold value of V/C is 1.For finding out the capacity of a particular road, the data collected for road inventory was compared capacities given in IRC: 106-1990.This stretch of road is classified as arterial two lane two -way undivided road.

Volume capacity ratio results from the study conducted is as shown in table 2

Table 2 : Volume –Capacity ratio

Sl no.	Location	Volume (PCU/Hr) (V)	Capacity (C) (PCU/ HOUR)	V/C
1	NORTH-PALAKKUZHA	1040.5	1500	0.69
2	KOOTHATTUKULAM	1023.5	1500	0.68

The peak V/C value was obtained for North-Palakkuzha as 0.69.

6. CONCLUSIONS

- The highest traffic volume in PCU was obtained at 4.00-5.00 pm
- The major composition of the vehicle were cars (59% at North Palakkuzha and 60% at Koothattukulam).
- Traffic measures should be taken up to avoid capacity augmentation in the near future.
- Increasing the frequency of the public transport facility, for eg. Increasing the number of buses could improve efficiency of the road and also encourage people to use the same.

7. REFERENCES

[1] Himanshu Bharadwaj, "Traffic volume study of sitapura,jaipur",International journal of civil engineering,vol.3,No.7,2016

[2] IRC:SP:73-2007

[3] Chandra, S. and Prasad, N.V., "Capacity of Multilane Urban Roads under Mixed TraffiC Conditions", Highway Research Bulletin, Traffic Engg., Indian Road Congress, 2004

[4] Ramanayya, T.V. (1988), "Highway Capacity under Mixed Traffic Conditions",Engineering and Control, Vol. 29, No. 5

[5] Tanaboriboon, Y. and Aryal Roshan, "Effect of Vehicle Size On Highway Capacity In Thailand", Journal of Transportation Engineering, ASCE, Vol.116, No.5,1990

[6] Ahmed Al. Kaishy, Younghan Jung and Hesham Rakha. , "Developing Passenger Car Equivalency Factors for Heavy Vehicles during Congestion". Journal of Transportation Engineering, ASCE, Vol. 131, No. 7,2005

[7] IRC:SP 106 -1990

[8] IRC :SP88-2010

[9] IRC:SP 64-1990

[10] Chetan.R.Mankar, "Road Safety and Audit:An Accident studies of Selected stretch road",IJIRD, volume 3,may 2014