A Complete Survey on Traffic Volume at Tirupati City, Andhra Pradesh, India

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A B S T R A C T

The scope of this work is to survey traffic volume at Tirupati City. Traffic engineering uses engineering methods and techniques to achieve the safe and time efficient movement of people and goods on roadway. The safe and time efficient movement of the people and goods is depending on traffic flow, which is directly connected to the traffic characteristics. The three main parameters of a traffic flow are volume, speed and density. In the absence of effective planning and traffic management of the city, the current road infrastructure cannot cater the future needs of city. Pedestrian and vehicle volumes have increased significantly in the last decade due to the change of the economics of the middle-class families. The current work studies traffic characteristics in the city of Tirupati at selected stretch of road. In this work emphasis was given on traffic volume and the analysis was carried out through primary traffic flow surveys at Tirupati city. Traffic flow is studied by manual methods. For better understanding of the present status of traffic flow, traffic survey is conducted. Traffic volume is usually expressed in terms of PCU. With the help of the data collection, an attempt had been made to understand the traffic patterns during different time periods. Traffic control at that junction is also dependent on the traffic flow characteristics.

1. Introduction

Traffic engineering uses engineering methods and techniques to achieve the safe and time efficient movement of people and goods on roadways. The safe and efficient movement of the people and goods is dependent on traffic flow, which is directly connected to the traffic characteristics. The three main parameters of a

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traffic flow are volume, speed and density. In the absence of effective planning and traffic management of the city, the current road infrastructure cannot cater the future needs of the city. Effective planning and traffic management can be achieved by proper analysis of site condition, traffic flow patterns, population of vehicles flowing in that particular route etc. In this study we have conducted traffic volume studies to know the peak hour flow and traffic flow patterns on week days and week end 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 2 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.

Traffic Data Collection is basic requirements for transport planning. Traffic Data forms an integral part of national economics and such knowledge is essential in drawing up a rational transport policy for movement of passengers and goods by both government and the private sectors. Traffic Volume Count is counting of number of vehicles passing through a road over a period of time. Traffic volume can be conducted in any of the two locations

1) Mid-Block Volume

2) Inter-Section Volume

The difference between these two surveys will defined as the place which the observer select. If the place selected is in the intersection then it is called as inter-section volume, if the place is in a certain specified length then it is mid-block. Method of Traffic Counting The method of traffic counting has a bearing on the quality of data obtained. Manual counting of vehicles passing a point at specific intervals (15 minutes, 30 minutes, 45 minutes, 1 hour, etc.) is one method of traffic counting, whereby the total vehicular traffic is required. If from the past traffic counts it is required that a proportion of heavy vehicles is to be determined as a percentage of the total traffic, then such a percentage is applied to the counted volume to get the effective traffic flow. On this basis, the method of traffic counting should be decided before hand and that traffic counting forms and training should be conducted. Location of Counting Sites Counting in the open country and in build-up areas is different in nature and in execution. Traffic counting in an open country (rural environment) has a high potential to yield the much-needed concentration by enumerators, while that in the build-up areas is prone to disturbances

The type of disturbances envisaged include movement by enumerators between the counting sites and the built-up environment, such as shops, thus resulting in high error margins in data so collected. It is, therefore, critical that supervision and close monitoring are undertaken at the respective sites falling within the built-up environment for the duration of the counts. Where traffic counting is to be conducted for an intersection, the number of enumerators required is mainly a function of the type of intersection, the composition of traffic flow, the number of lanes and the anticipated traffic volume. It is, therefore, essential that a proper and detailed site inspection is conducted prior to start of any traffic survey.

2. Objectives of Study

The main objectives of traffic study are as follows:

➢ To find out the traffic volume on selected section of the road at Tirupati

➢ To find out the traffic flow pattern on week days and weekend for 15 minutes interval variation

➢ To determine the percentage of two wheelers, three wheelers, car, jeep, taxi, bus, travelling in that selected section of road

➢ To convert obtained survey data into PCU

➢ To find the peak hour flow on each day

3. Methodology

The traffic analysis can be done in automatic and manual survey. Now we have done manual survey in a midblock section

3.1. Automatic Method

➢ Portable counters, permanent counters, and videotape are the methods by which automatic counts are recorded. Explanation: When demand exceeds the capacity of approach, the volume is counted as the vehicle enters the intersection. This is done so because these are a more precise reflection of demand.

➢ The automatic count method provides a means for gathering large amounts of traffic data. Automatic counts are usually taken in 1-hour interval for each 24-hour period. The counts extend for a week, month, or year. When the counts are recorded for each 24-hour time period, the peak flow period can be identified. Automatic counts are recorded using one of three methods: portable counters, permanent counters, and videotape.

3.2 Manual Method

➢ Manual counts are typically used to gather data for determination of vehicle classification. Manual counts are used when the effort and expense of automated equipment are not justified. Manual counts are necessary when automatic equipment is not available.

➢ Volume Study Traffic volume is defined as the number of vehicles crossing a section of road per unit time at any selected period. Traffic volume studies are conducted to collect data on the number of vehicles that pass a point during a specified time period

Most applications of manual counts require small samples of data at any given location. Manual counts are rarely used when the effort and expense of automated equipment are not justified. Manual counts are necessary when automated equipment is not available. Manual counts are typically used for period of less than a day. Normal intervals for a manual count are 5, 10, or 15 minutes.

3.3 Vehicle Classification

Traffic volumes vary over time on all roads. Traffic volumes also vary dramatically from one road to another. These variations in traffic volume are even more apparent when volumes for specific vehicle types (classification) are analysed. Consequently, the vehicle classification data collection program must gather sufficient data on traffic patterns of important vehicle types to accurately quantify the truck traffic stream to meet the needs of users. These include; time of day, day of week, time of year, direction. Vehicle classification counts are used in establishing structural and geometric design criteria, computing expected highway user revenue, and computing capacity. If a high percentage of heavy trucks exist or if the vehicle mix at the crash site is suspected as contributing to the crash problem, then classification counts should be conducted.

4. Traffic Survey Results

Traffic volume survey was conducted for both directions in the selected stretch of road DIRECTION- 1, In front of srinivasam towards bus stand

4.1 DAY: MONDAY

Type of Vehicles	Total Vehicles	% Composition
Bikes	10689	51.48
Auto	1290	20.66
Car	5076	21.45
Bus	628	3.02
tractor	79	0.38

Table 1: Traffic survey Data on Monday

4.2 DAY: TUESDAY

Type of Vehicles	Total Vehicles	% Composition
Bikes	10344	48.48
Auto	5713	26.78
Car	4884	22.89
Bus	338	1.58
tractor	57	0.27

Table 2: Traffic survey Data on Tuesday

4.3 DAY: WEDNESDAY

Type of Vehicles	Total Vehicles	% Composition
Bikes	19110	62.51
Auto	5344	17.48
Car	5577	18.24
Bus	468	1.53
tractor	72	0.24

Table 3: Traffic survey Data on Wednesday

4.4 DAY: THURSDAY

Type of Vehicles	Total Vehicles	% Composition
Bikes	15373	57.10
Auto	4677	17.37
Car	6270	23.29
Bus	531	1.79
tractor	74	0.27

Table 4: Traffic survey Data on Thursday

4.5 DAY: FRIDAY

Type of Vehicles	Total Vehicles	% Composition
Bikes	17001	59.07
Auto	5474	19.02
Car	5682	19.74
Bus	552	1.29
tractor	74	0.26

Table 5: Traffic survey Data on Friday

4.6 DAY: SATURDAY

Type of Vehicles	Total Vehicles	% Composition
Bikes	15921	64.04
Auto	4925	18.57
Car	5020	19.05
Bus	547	2.06
tractor	73	0.28

Table 6: Traffic survey Data on Saturday

4.7 DAY: SUNDAY

Type of Vehicles	Total Vehicles	% Composition
Bikes	16176	56.19
Auto	5687	19.75
Car	6298	21.88
Bus	551	1.91
tractor	77	0.27

Table 7: Traffic survey Data on Sunday

Bikes	Car	Auto	Bus	Tractor	Total
56.41 %	19.95 %	21.40 %	2.00 %	0.24 %	100 %

Table 8: The average percentage of all vehicles in the week

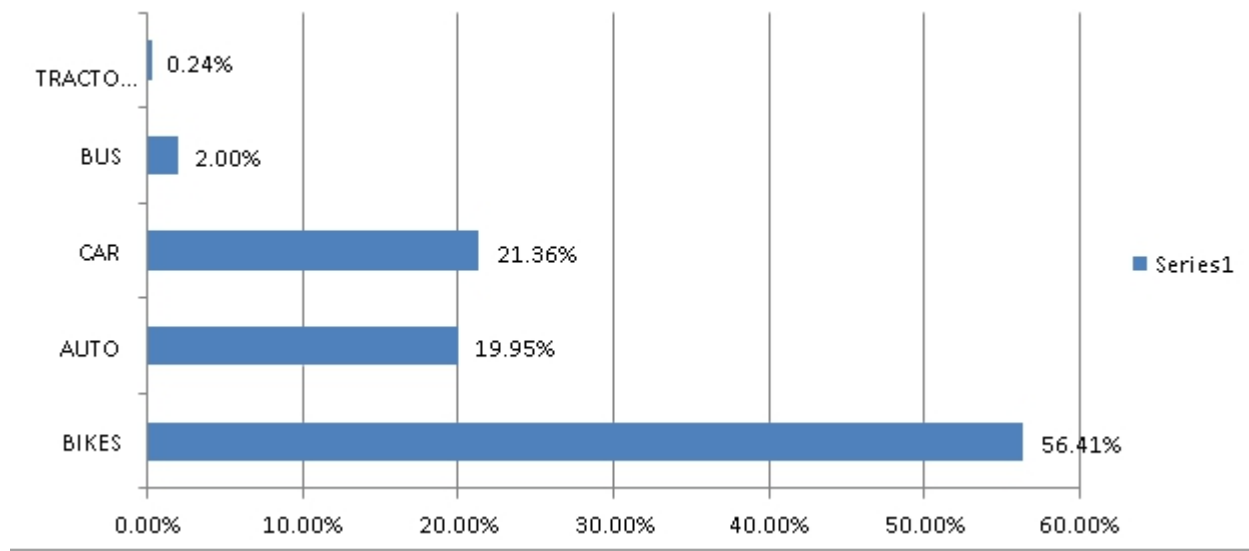

Figure 1: percentage of all vehicles

5. Traffic Survey Results Discussion

- The percentage of bikes is more when compared to other vehicles per week andpercentage of buses is very less

- The maximum traffic flow is on Wednesday

- Percentage of public transport i.e Buses is less and need to be strengthened

6. Conclusion

The following conclusion were drawn from the current study

- On Monday between 9:45-10am the number of vehicles passed and PCU are 2961,3167, on Tuesday between 10-10:15am the number of vehicles passed and PCU are 2629, 2805

- On Thursday between 8:45-9am the number of vehicles passed and respective PCU are 3120, 3374, on Friday between 8:45-9am vehicles passed

and PCU are 3213,3439

➤ On Saturday between 9:15-9:30am the number vehicles passed and PUC are 3151, 3403

➤ On Sunday between 10-10:15am   the number of vehicles passed and PUC are 3351, 3496

➤ It is observed that Wednesday the traffic flow was very high comparing all other days, between 8:45 to 9:00 am 3148 vehicles have passed through direction 1 with passenger car unit value 3428

➤ Volume of bikes (56.41%) was high comparing volume of car (19.95%) , volume of auto's (21.4%), volume of buses 2% and volume of tractors is 0.24%

7. Scope for Future Study

➤ Percentage of public transport need to be improved by maximizing the volume of buses

➤ In this study we had conducted traffic volume study for only one week, for further studies can be done by conducting the survey for one month continuously or for longer period of time to get to know the traffic flow precisely

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