

Traffic Volume Study of Kalaburagi, Karnataka

Shreeshail A Policepatil¹, Vishal², Roopa³, Suresh⁴, Shrishail⁵, Prof. S K Inganakal⁶

^{1,2,3,4,5} B.E Student, Department of Civil Engineering, PDA College of Engineering, Kalaburagi, Karnataka, India 585102.

⁶ Assistant Professor, Department of Civil Engineering, PDA College of Engineering, Kalaburagi, Karnataka, India 585102.

Abstract - 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 depends 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 Kalaburagi at selected priority junctions. In this work emphasis was given on traffic volume and the analysis was carried out through primary traffic flow surveys at the selected junctions in Kalaburagi city. Traffic flow is studied by manual methods. For better understanding of the present status of traffic flow at the junction, 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. Hence the results from the present study are helpful in controlling the traffic at the intersection and also in suggesting some of the remedial measures to improve the traffic safety in the region. [1]

Key Words: Volume, Demand, Road capacity, Average daily traffic (ADT), PCU/PCE

1. INTRODUCTION

Traffic volume studies/surveys are the means of obtaining information about traffic. This data collection is basic requirements for transport planning, designing traffic facilities and determination of priorities of roads for improvement and future expansion. In designing buildings, we need to determine loads coming on the structure to calculate reinforcement to be provided for safe functioning of the structure. Here in the transportation volume serves the same purpose. For various traffic engineering purposes first and foremost requirement is traffic volume. Traffic volume count is defined as counting the number of vehicles passing through a road per unit time. 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 car and expressing the volume in terms of passenger car unit (PCU) per hour. PCU is measured to calculate level of service of the road and related attributes like congestion, carrying capacity, volume/capacity ratio, identification of peak hour or extended peak hour etc. The interaction between moving vehicles under such heterogeneous traffic condition is highly complex. Again, the 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 than the transportation system may fail and the economy of the country may face a great difficulty.

Traffic volume count can be done by various methods depending upon various factors like manpower available, budget, technology/instrument available, magnitude of traffic data required or to be collected. Traffic volume count can be classified or unclassified. There are mainly two methods for collecting the traffic data. They are manual method and automatic method. The most common method of traffic volume count is the manual method which involves a group of people recording number of vehicles passing on a pre-determined location. This method can be expensive in terms of manpower, but it is necessary in most cases where automatic methods can't be used due to lack of infrastructure, necessary authorization etc. In automatic method of volume count various instruments are used for collecting traffic volume data such as pneumatic tubes, inductive loops, weigh-in-motion sensor, micro-millimeter wave radar detectors and video camera. The main advantage of methods of automatic recorders is that they can work throughout the day and night for the desired period, recording the total hourly volume of traffic. Traffic volume is not constant. It varies at each point with time. There are three important cyclic variations.

Hourly Pattern: The traffic flow characteristic varies in Morning, Evening and Night. Maximum hourly volume of traffic said to be peak hourly volume. [3]

Daily Pattern: The day-to-day variation throughout the week. [3]

Monthly and yearly Pattern: The season-to-season variation throughout the year. [3]

2. PURPOSE OF STUDY

The study of traffic volume at particular location is necessary to full fill the following purpose.

1. To determine the magnitudes, classification and time of vehicular flow.
2. To determine the peak hour volume in PCU.
3. Design signal cycles time.
4. Intersection design and improvement purpose.
5. Traffic management purpose.

3. STUDY LOCATION & USED METHOD

The study was conducted at Saradar Vallabhai Patel Circle (SVP Circle) in the Kalaburagi city. The method adopted is manual count method. The reasons for selection of this method are as follows.

1. Simple and direct.
2. Classified vehicle count can be obtained.
3. Data can be used immediately after collection.
4. No special equipments required.
5. Not costly.
6. Easy to collect data.

3.1 SARDAR VALLABHAI PATEL CIRCLE

It is also known as Timmapuri circle, which witness the traffic congestion during the peak hours. The SVP circle is located at the central portion of the Kalaburagi city. The central bus stand road, court road, railway station road, market road & PDA engineering college road merge at the SVP Circle. The study was conducted by manual count method by counting the no. of vehicles entering into junction from all the connecting roads.

3.2 DURATION OF COUNTING

The study was conducted from 12 to 17 Feb. 2018 & time chosen in the study was 7am to 9pm which includes morning peak hours, afternoon peak hours and evening peak hours flow. The traffic data collected in the study was by continuous method of manual counting, because the data obtained by this method is more reliable then short term manual counting method.

4. TRAFFIC CHARACTERISTICS

There are different types of vehicles present in the heterogeneous traffic, for the purpose of this study, were grouped into eight different categories as follows.

1. Motorized two-wheelers (M.T.W), which include motor cycles, scooters
2. Motorized three- wheelers (M. Th. W), which include Auto-rickshaws –three wheeled motorized paratransit vehicles to carry a maximum of three passengers and tempos –three wheeled motorized vehicles to carry small quantities of goods
3. Cars include jeeps and small vans

4. Light commercial vehicles (LCV) comprising large passenger vans and small four wheeled goods vehicles
5. Bus
6. Truck
7. Bicycle and
8. Tricycle which includes cycle-rickshaw-three wheeled pedal type paratransit vehicles to carry a maximum of two passengers and three wheeled pedal type vehicles to carry small amount of goods over short distances. [2]

RESULTS

From the applied Manual Count Method, these are the following results were observed , the data mentioned in the following tables are average of seven days traffic volume data.

Table -1: Number of Vehicle (Bus Stand Road to SVP Circle)

Time	Two wheelers	Three wheelers	Car Jeep Taxi	Bus Lorry	Total
7-8 am	681	472	121	49	1323
8-9 am	989	689	207	62	1947
9-10 am	1653	853	512	60	3078
10-11 am	1380	708	312	39	2439
11-12 am	1029	582	308	41	1960
12-1 am	982	508	182	25	1697
1-2 am	1153	618	268	58	2097
2-3 am	1081	503	317	43	1944
3-4 am	1180	616	284	74	2154
4- 5 am	1048	643	101	68	1860
5-6 am	1164	677	246	61	2148
6-7 am	1112	617	234	51	2014
7-8 am	1492	753	282	38	2565
8-9 am	1096	508	315	4	1923
Total	16040	8747	3689	673	-

Table -2: Converted no. of Vehicle (Bus Stand Road to SVP Circle)

Type of vehicle	No. of vehicle	PCE	PCU = (No. Of vehicles * PCE)	% PCU
Two wheelers	16040	0.5	8020	35.68
Three wheelers	8747	1	8747	38.91
Cars jeep taxi	3689	1	3689	16.41
Bus lorries	673	3	2019	8.98

Table -3: Number of Vehicle (Station Road to SVP Circle)

Time	Two wheelers	Three wheelers	Car Jeep Taxi	Bus Lorry	Total
7-8 am	260	243	32	2	537
8-9 am	419	381	40	4	844
9-10 am	582	316	74	3	975
10-11 am	317	310	35	2	664
11-12 am	296	235	30	2	563
12-1 am	315	296	27	1	639
1-2 am	412	363	21	2	798
2-3 am	518	312	69	4	903
3-4 am	312	292	49	3	656
4-5 am	418	291	75	4	788
5-6 am	413	416	85	4	918
6-7 am	577	375	77	5	1034
7-8 am	512	323	51	1	887
8-9 am	613	315	47	1	976
Total	5964	4468	712	38	-

Table -4: Converted no. of Vehicle (Station Road to SVP Circle)

Type of vehicle	No. of vehicle	PCE	PCU = (No. Of vehicles * PCE)	% PCU
Two wheelers	5964	0.5	2982	36.03

Three wheelers	4468	1	4468	53.98
Cars jeep taxi	712	1	712	8.60
Bus lorries	38	3	114	1.37

Table -5: Number of Vehicle (PDA College Road to SVP Circle)

Time	Two wheelers	Three wheelers	Car Jeep Taxi	Bus Lorry	Total
7-8 am	250	7	9	2	268
8-9 am	361	9	12	0	382
9-10 am	1152	40	30	3	1225
10-11 am	613	30	15	0	658
11-12 am	315	9	12	0	336
12-1 am	263	12	3	0	278
1-2 am	670	23	20	2	715
2-3 am	543	19	11	0	573
3-4 am	601	38	45	0	684
4-5 am	432	25	39	3	499
5-6 am	455	18	13	2	488
6-7 am	253	10	6	3	272
7-8 am	282	14	3	0	299
8-9 am	196	7	5	0	208
Total	6386	261	223	15	-

Table -6: Converted no. of Vehicle (PDA College Road to SVP Circle)

Type of vehicle	No. of vehicle	PCE	PCU = (No. Of vehicles * PCE)	% PCU
Two wheelers	6386	0.5	3193	85.78
Three wheelers	261	1	261	7.01
Cars jeep taxi	223	1	223	5.99
Bus Lorries	15	3	45	1.20

Table -7: Number of Vehicle (Court Road to SVP Circle)

Time	Two wheelers	Three wheelers	Car Jeep Taxi	Bus Lorry	Total
7-8 am	368	119	38	2	527
8-9 am	652	127	58	3	840
9-10 am	721	351	60	5	1137
10-11 am	534	282	52	4	872
11-12 am	492	147	32	2	673
12-1 am	382	127	28	2	539
1-2 am	672	232	35	4	943
2-3 am	563	181	31	7	782
3-4 am	485	162	62	3	712
4-5 am	608	203	74	6	891
5-6 am	518	172	35	8	733
6-7 am	572	169	53	6	800
7-8 am	597	156	68	1	822
8-9 am	673	169	98	1	941
Total	7837	2597	724	54	-

Table -8: Converted no. of Vehicle (Court Road to SVP Circle)

Type of vehicle	No. of vehicle	PCE	PCU = (No. Of vehicles * PCE)	% PCU
Two wheelers	7837	0.5	3918.5	52.94
Three wheelers	2597	1	2597	35.08
Cars jeep taxi	724	1	724	9.78
Bus lorries	54	3	162	2.18

Table -9: Number of Vehicle (Market Road to SVP Circle)

Time	Two wheelers	Three wheelers	Car Jeep Taxi	Bus Lorry	Total
7-8 am	495	356	227	47	1125
8-9 am	704	458	156	28	1346
9-10 am	1629	817	340	62	2848

10-11 am	1213	627	289	59	2188
11-12 am	1129	583	267	52	2031
12-1 am	1029	541	258	50	1878
1-2 am	1217	582	247	41	2087
2-3 am	1123	496	252	49	1920
3-4 am	1073	753	270	57	2153
4-5 am	924	547	237	46	1754
5-6 am	1149	520	286	48	2003
6-7 am	1193	550	190	50	1983
7-8 am	1426	532	272	39	2269
8-9 am	1436	448	258	30	2172
Total	15740	7810	3549	658	-

Table -10: Converted no. of Vehicle (Market Road to SVP Circle)

Type of vehicle	No. of vehicle	PCE	PCU = (No. Of vehicles * PCE)	% PCU
Two wheelers	15740	0.5	7870	37.11
Three wheelers	7810	1	7810	36.83
Cars jeep taxi	3549	1	3549	16.73
Bus Lorries	658	3	1974	9.31

3. CONCLUSIONS

The following are the important conclusions drawn based on this study:

1. Light vehicles (car, Jeep, etc) occupied 35-37 % of the total vehicle on central bus stand road, station road & market road
2. The percentage of three wheelers is relatively high about 54 % of the total vehicle on the station road
3. The percentage of two wheelers is very high about 86 % on PDA engineering college road and 53% on court road
4. The Percentage of public transport is very less need to be strengthened
5. PCU value of a vehicle significantly changes with change in traffic volume.

ACKNOWLEDGEMENT

We are very thankful to our guide, Asst. Prof. S K Inganakal for his constant encouragement, guidance and for the continuous support in making this work complete.

REFERENCES

- [1] "Traffic volume study" report submitted to A.K.M. Abir & Md. Sami Hasnaine, Department of Civil Engineering, Ahsanullah University of Science and Technology.
- [2] Himanshu Bharadwaj "Traffic Volume Study of Sitapura, Jaipur" SSRG International Journal of Civil Engineering (SSRG_IJCE) – volume 3 Issue 7 – July 2016
- [3] Botswana Guideline 9 – "Traffic Data Collection and Analysis" Feb (2004).