International Journal of Engineering Applied Sciences and Teclogy, 2021
Vol. 6, Issue 7, ISSN No. 2455-2143, Pages 307-321
Published Online November 2021 in IJEAST (http://www.ijeast.com)

TRAFFIC VOLUME STUDY AND CONGESTION SOLUTIONS

Nishant Singh,
Department of Civil Engineering
Delhi Technological University

Nitin Chauhan
Department of Civil Engineering
Delhi Technological University of Civil Engineering,

Nishant Pande
Department of Civil Engineering
Delhi Technological University

Narad Muni Prasad
Associate Professor, Department
Delhi Technological University of Civil Engineering,

***Abstract*-Traffic Engineering is used to accomplish secure and time bound commutation of persons and freights on road network which in turn relies on traffic flow. Due to an increase in the standard of living of middle-class families in the last decade, traffic volume has considerably increased. Thus, lack of proper management of roads can result in non-sustainable development. This work analyses traffic properties of Shivaji Marg, Janakpuri district centre, Delhi, India by performing direct manual counting method of survey. Objective of this study is to record traffic volume of the site for the weekdays from 8AM to 2PM, determine the morning peak hour and the morning peak hour factor using the standard passenger car unit (PCU) values. Also, this study attempts to determine the practical PCU values for different automobiles running on the site and calculate the corresponding morning peak hour factor. Lastly, this work comments on the congestion level of the site by comparing the recorded hourly traffic volume with the permissible volume per hour. The study found out that the practical PCU values differ from their corresponding standard values as it depends on the speed and space occupied by the automobiles which can vary from site to site. Also, it was found that the hourly traffic volume is within the permissible limit implying no congestion in the current scenario. There are, however, certain limitations of this work like absence of advanced technology, variation in the PCU values, time constraints. Nevertheless, this study will help the stakeholders in the construction sector to prioritise their resources towards factors which need to be improved to enhance the serviceability of the highway for present as well as for the future generation.**

***Keywords:* Traffic Volume, Standard Passenger Car Unit, Practical Passenger Car Unit, Peak hour factor (PHF).**

I. INTRODUCTION

Since time immemorial, transport system has been sustaining several societies. However, it has also been one of the most burning problems in every corner of the world. Each and every nation has been responding to the situation as per their resources and capabilities. Whenever we design a structure, we calculate the load acting on it to find the amount of reinforcements which is to be provided for its safety. Just like that, volume of traffic is measured to find the capacity of a road network. Volume of traffic is necessary for the planning, styling, secure functioning, and its constant evolution. Traffic engineering is that part of engineering that employs engineering techniques to realize the secure and structured commutation of individuals and freights on road network.

Transportation volume research are specifically performed to work out the count, movement, and classification of road automobiles at a specific point to become conscious of peak time flow period, impact of heavy vehicles or people who walk on foot on vehicle traffic flow. In case of a non-homogeneous traffic flow, it has been a drag to work out the traffic volume as vehicles have different velocities and body measurements. The above problem has been rectified by the use of a quantity known as passenger car unit (PCU). Since volume of traffic isn't steady, endless assessment of traffic volume is of utmost importance otherwise, the transport system may fail, and therefore the financial condition of state may have certain problems.

Some studies have already been conducted on traffic volume analysis of different types of roads. Halder and Alam [2] have conducted the traffic volume analysis at AUST-Flyover junction to Shatrasta junction in Dhaka, Bangladesh. They conducted direct manual counting method and drew the flow fluctuation curve showing number of vehicles at different times in a day. They also suggested few measures to reduce the congestion and improve the efficiency of the highway. Venkatcharyulu and Mallikarjunareddy [1] conducted the traffic volume survey from Miyapur road to Nizampet crossroad, a semi urban road in Hyderabad. They determined the vehicular composition and directional distribution of different vehicles at different times using manual counting method. Yaseen and Swamy [5] conducted traffic volume survey using manual method at Mothi circle, Davangere, Karnataka where they proposed for a signal time optimization for better and efficient flow of the traffic. Singh and Goyal [7] conducted the manual counting and determined the level of serviceability of the road within Punjab University campus. They determined the traffic flow pattern on weekends and weekdays for hourly and daily variations. Objectives of this study are:

- To conduct a survey of volume of traffic of Shivaji Marg, Janakpuri district centre, Delhi using direct manual counting method.
- To determine the practical passenger car unit (PCU) value for different class of automobiles running on the site and then determine the morning peak hour factor (PHF).
- To compare the practical PCU (for the particular site selected) and corresponding PHF values with the standard PCU and corresponding PHF values respectively.
- To comment on the congestion level of the site and provide some measures, if necessary.

This paper is organised into 5 sections. Section 2 deals with the different methods of counting the number of vehicles, different parameters used to determine the average annual daily traffic and peak hour factor. Section 3 presents the methodology adopted in the study. Section 4 gives the result and discussions. Lastly, section 5 concludes the study.

II. TRAFFIC SURVEY

Information on traffic is a prerequisite for the highway engineers in order to design the road network and also to manage the traffic system. In order to design various traffic facilities, select the standards of geometry, and assess from the economic angle, the knowledge about traffic is required. They make use of such information to install control devices like traffic signs, traffic signals, marking of pavements, and also to assess the effectiveness of various programs and schemes. Such an information about the volume of traffic must be regularly updated as it is an ever-changing system. There are certain ways to perform the survey of volume of traffic which have been discussed in the following section.

2.1 Methods of Volume Survey

a) Manual Counting Method: - in the considered category, counting of automobiles is performed using one's hands. It is further categorised into 2 methods: -

- **Direct Method: -** A hand tally and devices like manual counters and enumerators are used in such a method. The reason why such a method is considered is that such a data can be used immediately after the conduction of the survey and also vehicle classification can be done easily. But such a method cannot be practicably used for a survey of long duration and also when the flow of traffic is quite high as there is a fear of error like missing the vehicles or forgetting the count or double counting the same automobile. Also, such a method cannot be used in oppressive weather conditions. [2]
- **Indirect Method: -** A video camera is used for recording the footage in such a method. Here, data is collected later by

replaying the footage of the recorded video. Apart from volume of traffic, we can also find various other parameters. Whenever the flow of automobiles is large and the operation is non-lane based, this method can be handy. One of the constraints is that for better recording of the footage, a raised place or platform is needed. Other thing is that the data cannot be used immediately after conducting the survey. It has to be transcripted from the video first. Moreover, the capacity of the film of the recorder is finite, so it is not applicable for a long time period of counting of vehicles. Furthermore, the sky has to be clear, and sun needs to be shining brightly for better quality of the video recording. [2]

b) Automatic counting method: - In such a method, counting of automobiles is performed using devices which do not require any interference by human beings. Such a method is further categorised into two broad classifications, first being the one in which contact takes place between the device and vehicles which includes pneumatic tubes and the other being the one in which no contact is required which includes ultrasound or infrared radar. Such a method can easily be used in cases of long time period count. Moreover, it does not need many personnel and is free from any error and also it does not get affected by oppressive weather conditions. Some of the constraints are that it cannot classify the automobiles into various categories and sometimes it may happen that two vehicles cross the point at same time, but the machine counts them as one. Thus, it can be deduced that the accuracy of this method is not as high as the previous methods. Moreover, the cost of installation of the machines is quite high. [2]

a) 2.2 Peak hour factor (PHF)

It is defined as the average volume during the peak 60 minutes period divided by 4 times the average volume during the peak 15 minutes period. It is descriptive of trip generation patterns and may apply to an area or portion of a street and highway system. One can also use 5,10- or 20-minutes interval for the calculation of PHF. However, in that case, the multiplying factor in the denominator would change. [10]

$$PHF = V_{av}^{60} / (4 * V_{av}^{15}) \qquad \text{--------(1)}$$

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III. METHODOLOGY

Direct manual counting method has been selected to conduct the survey. Traffic volume survey was conducted at the mid-section of the road for the time interval 8AM-2PM, for five days in a week starting from Monday (25/10/2021) to Friday (29/10/2021). A map of the site has been depicted below this section. Data was collected for every 15 minutes in order to calculate the morning peak hour factor for every day. The count of different class of vehicles was then multiplied by standard passenger car unit values to get the total number of vehicles crossing the section. The corresponding standard morning peak hour factor was determined for every day using equation (1) and then averaged to get the mean value.

Now, since PCU depends upon the speed and space occupied by automobiles, the practical PCU value may differ from road to road. Thus, in order to calculate the practical PCU value for different vehicles, a formula suggested in Chandra and Kumar (2003) was used.

$$PCU = \left(\frac{Vc}{Vi}\right)/\left(\frac{Ac}{Ai}\right) \quad \text{-------------------(2)}$$

where, Vc - speed of car
V_i - speed of ith vehicle
A_c - projected rectangular area of a car
A_i - projected rectangular area of ith vehicle
V_c/V_i - speed ratio of the car to the ith vehicle
A_c/A_i - space ratio of the car to the ith vehicle

Projected rectangular area was calculated by measuring the length and breadth of the vehicles and then multiplying them together. Speed of the vehicle was determined by dividing distance by time. Distance of the stretch was found to be 500 metres. Time to traverse this distance was found using stopwatch and video recording. Speed of a number of automobiles were calculated and then averaged to get the mean speed of a particular class of automobile. Once the practical PCU value was calculated, it was used to calculate the corresponding practical morning peak hour factor for every day of the survey.

Figure 1: Different views of site taken for Traffic study

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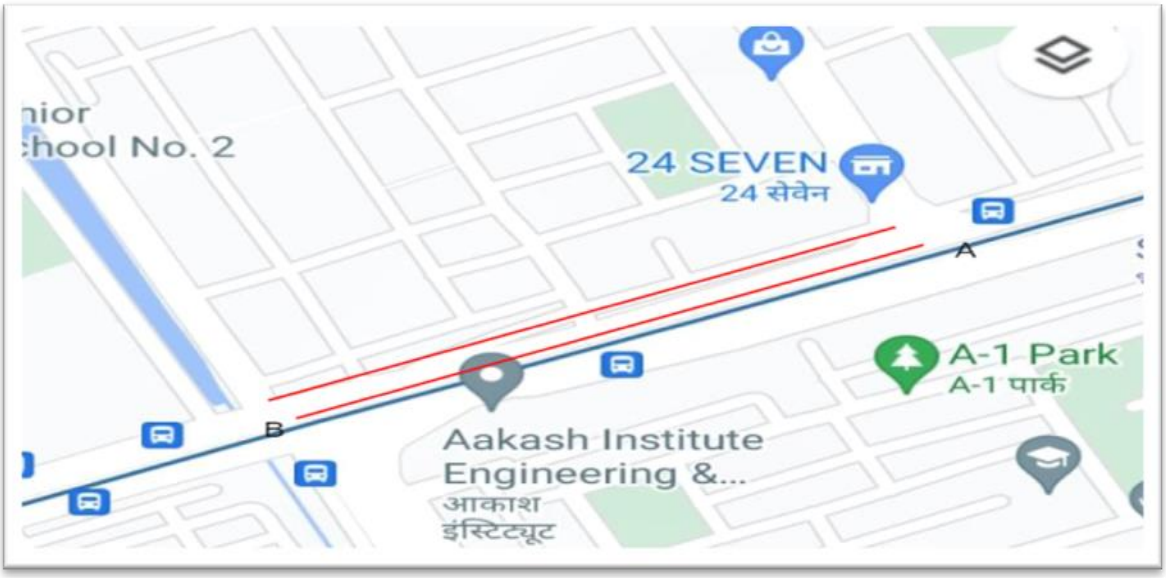
Figure 2: Map View of Site taken for Traffic Study



IV. OBSERVATIONS AND CALCULATIONS

Table 1(a). Speed of vehicles on Monday

Monday

Vehicle Type	Number of vehicles considered	Average Speed in kmph
2-Wheelers	60	33.7
3-Wheelers	25	28.5
Car	60	37.78
Bus/Truck	10	30.25
LCV	20	29.45

Table 1(b). Speed of vehicles on Tuesday

Tuesday

Vehicle Type	Number of vehicles considered	Average Speed in kmph
2-Wheelers	60	32.9
3-Wheelers	25	29.15
Car	60	37.1
Bus/Truck	10	29.55
LCV	20	30.5

Table 1(c). Speed of vehicles on Wednesday

Wednesday

Vehicle Type	Number of vehicles considered	Average Speed in kmph
2-Wheelers	60	34.4

Table 1(d). Speed of vehicles on Thursday

Thursday

Vehicle Type	Number of vehicles considered	Average Speed in kmph
2-Wheelers	60	33.55

3-Wheelers	25	29.05
Car	60	37.45
Bus/Truck	10	31.95
LCV	20	30

3-Wheelers	25	29.6
Car	60	38.95
Bus/Truck	10	31.5
LCV	20	32.05

Table 1(e). Speed of vehicles on Friday **Friday**

Vehicle Type	Number of vehicles considered	Average Speed in kmph
2-Wheelers	60	34.05
3-Wheelers	25	28
Car	60	36.55
Bus/Truck	10	32.5
LCV	20	30.92

Average Speed of every class of vehicle

2-Wheeler = (33.7+ 32.9 +34.4 + 33.55+ 34.05)/5
= 33.72

Similarly average speed for each class is calculated

Table 2. Average Speed of vehicles considering all the five days of survey

Vehicle Type	Mean Average Speed in kmph
2-Wheelers	33.72
3-Wheelers	28.86
Car	37.57
Bus/Truck	31.15
LCV	30.58

Table 3. Projected area for each class of vehicles

Vehicle Type	Dimensions (meter)		Projected Area (meter squares)
	Length	Width	
2-Wheelers	2.28	0.98	2.2344
3-Wheelers	2.58	1.32	3.4056

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Car	4.5	1.8	8.1
Bus/Truck	9.5	2.45	23.275
LCV	4.85	1.9	9.215

PCU value for each class of vehicle for the given segment (Practical PCU)

PCU= (Speed of Car/Speed Of vehicle class considered) / Area of Car/Area of vehicle class considered)

2-wheelers PCU = (37.57/33.72) / (8.1/2.23)
= 0.31

Table 4. Practical PCU

Vehicle Type	**PCU Value**
2-Wheelers	0.31
3-Wheelers	0.55
Car	1.00
Bus/Truck	3.47
LCV	1.40

Table 5. Standard PCU as per IRC

Vehicle	**PCU Value**
2-Wheeler	0.4
3-Wheeler	0.5
Car	1
Bus/Truck	2.2
LCV	1

Standard PCU values considered for study of any Road are:-

Table6(a). Vehicular composition for Day 1 –Monday (25/10/2021)

Time	**2-Wheelers**	**3-Wheelers**	**Car**	**Bus/Truck**	**Pick-up (LCV)**
8- 8:15	102	12	49	5	8
8:15- 8:30	93	11	52	5	10
8:30- 8:45	98	13	68	7	6

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8:45- 9:00	109	16	55	9	3
9:00- 9:15	**115**	**19**	**71**	**13**	**4**
9:15- 9:30	**111**	**18**	**87**	**17**	**6**
9:30- 9:45	**133**	**21**	**109**	**14**	**8**
9:45- 10:00	**121**	**24**	**96**	**21**	**10**
10:00- 10:15	107	22	89	19	12
10:15- 10:30	115	26	78	10	15
10:30- 10:45	120	19	87	11	7
10:45- 11:00	118	23	80	8	8
11:00- 11:15	95	22	75	12	15
11:15- 11:30	103	19	79	14	3
11:30- 11:45	111	15	81	11	4
11:45- 12:00	88	11	75	10	6
12:00- 12:15	92	13	80	17	8
12:15- 12:30	100	17	81	13	2
12:30- 12:45	99	21	78	8	4
12:45- 1:00	94	13	79	11	5
1:00- 1:15	90	9	60	11	16
1:15- 1:30	86	13	58	10	8
1:30- 1:45	82	10	52	17	6
1:45- 2:00	85	15	55	13	9

Table 6(b). Hourly Traffic as per Practical PCU

Monday

Vehicle Type	8- 9 AM	9- 10 AM	10- 11 AM	11- 12 PM	12- 1 PM	1- 2 PM
2-Wheelers	402	480	460	397	385	343
3-Wheelers	52	82	90	67	64	47
Car	224	363	334	310	318	225
Bus/Truck	26	65	48	47	49	51
Pick-up	27	28	25	28	19	39
Total	**731**	**1018**	**957**	**849**	**835**	**705**
Total Volume (total*PCU)	**505.24**	**821.65**	**727.66**	**672.21**	**669.18**	**588.75**

Table 6(c). Hourly Traffic as per standard PCU

Vehicle Type	8- 9 AM	9- 10 AM	10- 11 AM	11- 12 PM	12- 1 PM	1- 2 PM
2-Wheelers	402	480	460	397	385	343
3-Wheelers	52	82	90	67	64	47
Car	224	363	334	310	318	225
Bus/Truck	26	65	48	47	49	51
Pick-up	27	28	25	28	19	39
Total	**731**	**1018**	**957**	**849**	**835**	**705**
Total Volume (total*PCU)	**495**	**767**	**693.6**	**633.7**	**630.8**	**536.9**

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Table 6(d). Peak Hour traffic

Vehicle Type	9:00-9:15 AM	9:15-9:30 AM	9:30-9:45 AM	9:45-10:00 AM
2-Wheelers	115	111	133	121
3-Wheelers	19	18	21	24
Car	71	87	109	96
Bus/Truck	13	17	14	21
Pick-up	4	6	8	10

Figure 3: Pie chart representing vehicular composition percentage for Day 1(Monday)

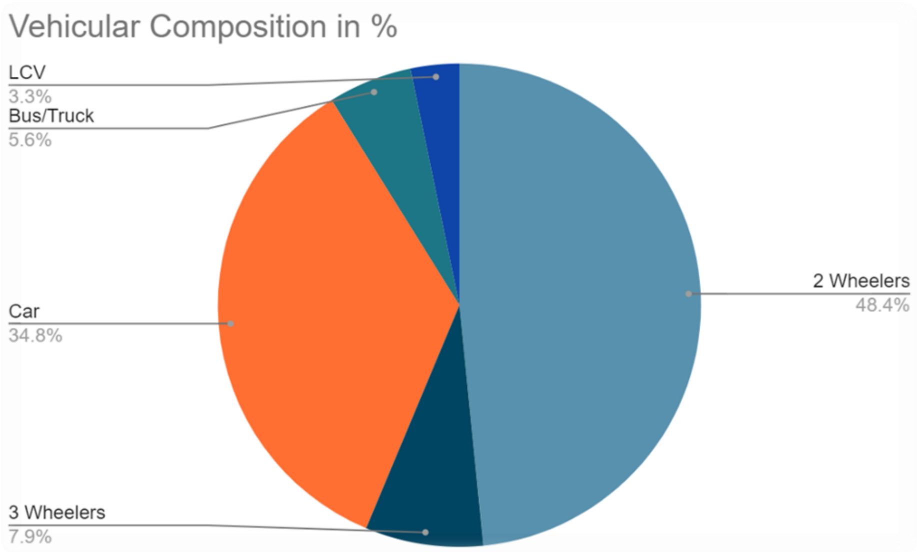

Table 7(a). Day 2- Tuesday (26/10/2021)

Vehicle Type	8- 9 AM	9- 10 AM	10- 11 AM	11- 12 PM	12- 1 PM	1- 2 PM
2-Wheelers	412	492	466	451	395	350
3-Wheelers	45	57	57	63	62	50
Car	212	363	334	310	318	225
Bus/Truck	17	31	50	34	39	34
Pick-up	27	29	25	34	22	27
Total	**713**	**972**	**932**	**892**	**836**	**686**
Total Volume (Practical PCU)	**461.26**	**695.04**	**<u>718.31</u>**	**650.04**	**640.68**	**516.78**
Total Volume (Standard PCU)	**463.7**	**<u>685.5</u>**	**683.9**	**630.7**	**614.8**	**491.8**

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Table 7(b). Peak Hour traffic as per standard PCU

Vehicle Type	9:00 – 9:15 AM	9:15 – 9:30 AM	9:30 – 9:45 AM	9:45 – 10:00 AM
2-Wheelers	120	123	117	132
3-Wheelers	14	14	14	15
Car	91	89	86	97
Bus/Truck	8	8	7	8
Pick-up	7	7	7	8

Table 7(c). Peak Hour Traffic as per practical PCU

Vehicle Type	10:00 – 10:15 AM	10:15 – 10:30 AM	10:30 – 10:45 AM	10:45 – 11:00 AM
2-Wheelers	112	106	118	130
3-Wheelers	14	17	15	11
Car	81	86	84	83
Bus/Truck	12	16	11	11
Pick-up	5	6	6	8

Figure 4: Pie chart representing vehicular composition percentage for Day 2(Tuesday)

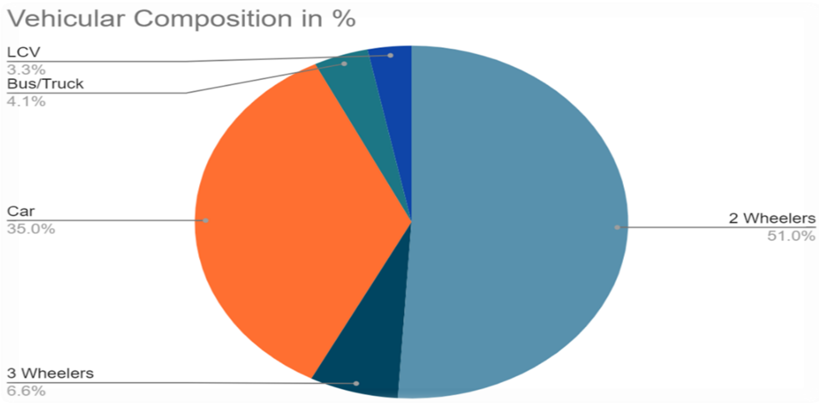

Table 8(a). Day 3 – Wednesday (27/10/2021)

Vehicle Type	8- 9 AM	9- 10 AM	10- 11 AM	11- 12 PM	12- 1 PM	1- 2 PM
2-Wheelers	320	356	345	325	300	305
3-Wheelers	31	57	85	75	65	52
Car	200	232	190	201	170	155
Bus/Truck	18	39	55	26	30	41
Pick-up	21	24	37	42	28	19

Total	**590**	**708**	**712**	**669**	**593**	**572**
Total Volume (Practical PCU)	**408.11**	**542.64**	**586.35**	**492.02**	**442.05**	**447.02**
Total Volume (Standard PCU)	**404.1**	**512.7**	**514.9**	**467.7**	**416.5**	**412.2**

Table 8(b). Peak hour traffic

Vehicle Type	**10:00 – 10:15 AM**	**10:15 – 10:30 AM**	**10:30 – 10:45 AM**	**10:45 – 11:00 AM**
2-Wheelers	85	86	82	92
3-Wheelers	21	19	23	22
Car	68	69	65	72
Bus/Truck	14	16	13	12
Pick-up	6	6	6	6

Figure 5: Pie chart representing vehicular composition percentage for Day 3(Wednesday)

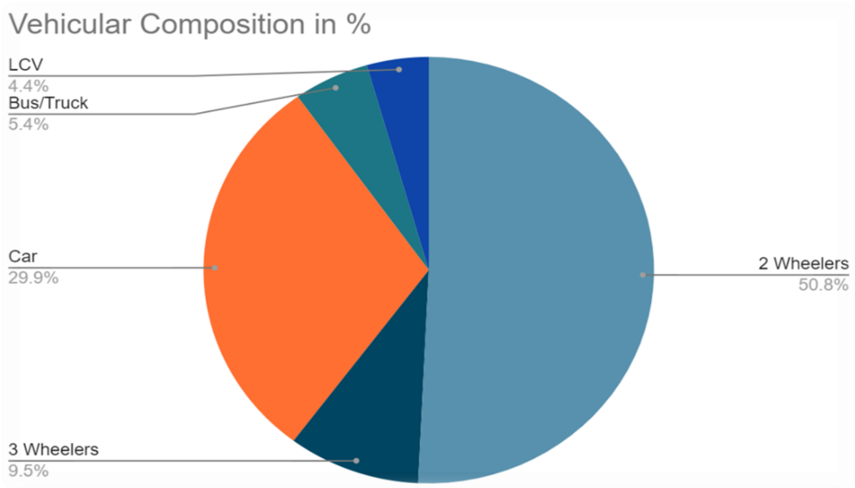

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Table 9(a). Day 4 – Thursday (28/10/2021)

Vehicle Type	**8- 9 AM**	**9- 10 AM**	**10- 11 AM**	**11- 12 PM**	**12- 1 PM**	**1- 2 PM**
2-Wheelers	322	391	360	312	308	297
3-Wheelers	36	50	65	71	62	47
Car	165	208	185	185	195	132
Bus/Truck	12	27	22	17	23	27
Pick-up	18	26	40	48	20	11
Total	**553**	**702**	**672**	**633**	**608**	**514**
Total Volume (Practical PCU)	**351.46**	**486.8**	**464.69**	**446.96**	**432.39**	**359.01**
Total Volume (Standard PCU)	**356.2**	**474.8**	**449.9**	**430.7**	**419.8**	**344.7**

Table 9(b). Peak hour Traffic

Vehicle Type	**9:00 – 9:15 AM**	**9:15 – 9:30 AM**	**9:30 – 9:45 AM**	**9:45 – 10:00 AM**
2-Wheelers	95	98	93	105
3-Wheelers	13	12	12	13
Car	52	51	50	56
Bus/Truck	5	9	6	7
Pick-up	7	6	6	7

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Figure 6: Pie chart representing vehicular composition percentage for Day 4(Thursday)

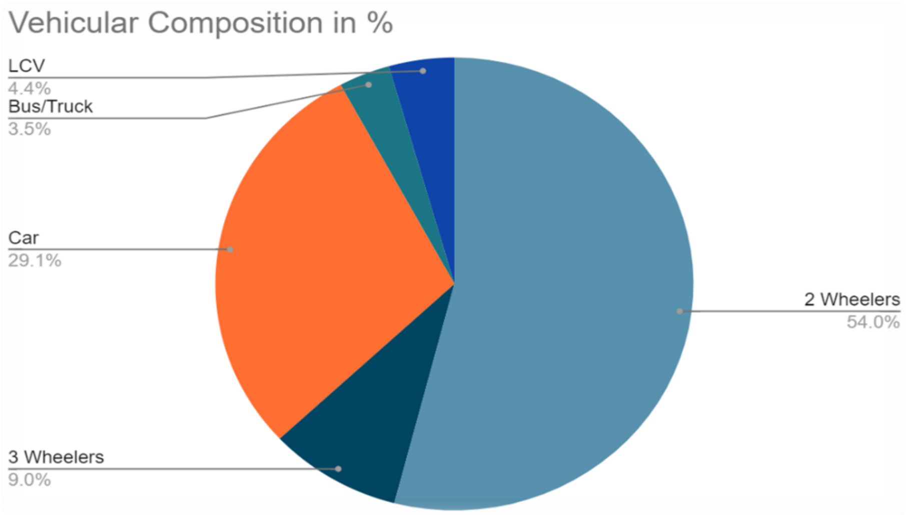

Table 10(a). Day 5 – Friday (29/10/2021)

Vehicle Type	**8- 9 AM**	**9- 10 AM**	**10- 11 AM**	**11- 12 PM**	**12- 1 PM**	**1- 2 PM**
2-Wheelers	304	365	340	308	295	306
3-Wheelers	21	50	81	68	75	55
Car	170	185	165	186	171	152
Bus/Truck	12	30	18	19	25	20
Pick-up	18	31	55	33	19	15
Total	**525**	**661**	**659**	**614**	**585**	**548**
Total Volume (Practical PCU)	**342.63**	**473.15**	**454.41**	**431.01**	**417.05**	**367.51**
Total Volume (Standard PCU)	**346.5**	**453**	**436.1**	**418**	**400.5**	**360.9**

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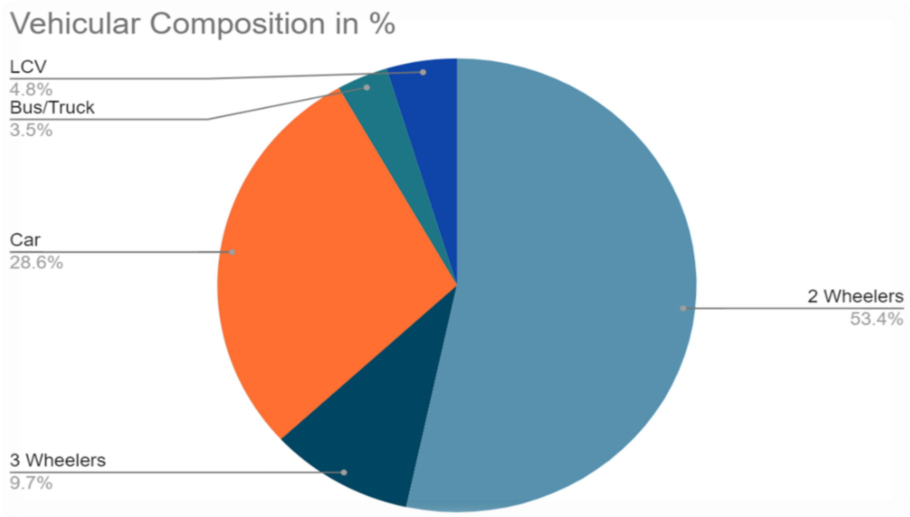
Table 10(b). Peak hour Traffic

Vehicle Type	9:00 – 9:15 AM	9:15 – 9:30 AM	9:30 – 9:45 AM	9:45 – 10:00 AM
2-Wheelers	89	91	87	98
3-Wheelers	13	12	12	13
Car	46	45	44	50
Bus/Truck	9	6	5	10
Pick-up	8	8	7	8

Figure 7: Pie chart representing vehicular composition percentage for Day 5(Friday)



<u>Calculations (Shown for Monday)</u>
Standard PCU calculations (9-10 AM)

2 wheelers = 480*0.4 = 192
3 wheelers = 82*0.5 = 41
Car = 363*1 = 363
Bus/Truck = 65*2.2 = 143
Pick-up= 28*1 = 28
Total Volume = 192+41+363+143+28
= 767 per hour

PHF Calculation

PHF for Monday (9-10am) = 767/ (4*212) [using equation 1]
= 0.902

<u>Practical PCU Calculation (9-10 AM)</u>

2 wheelers= 480*0.31= 148.8
3 wheelers= 82*0.55= 45.1
Cars= 363*1= 363

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Bus/Truck= 65*3.47= 225.55
pick-up= 28*1.4= 39.2

Total Volume = 148.8+45.1+363+225.55+39.2=821.65

PHF Calculation
PHF for Monday (9-10am) = 821.65/(4*233.58)
0.879

Similarly:-

Table 11(a). Standard morning PHF

Day	PHF (Standard)
Monday	0.902
Tuesday	0.937
Wednesday	0.858
Thursday	0.936
Friday	0.935
Average	**0.913**

Table 11(b). Practical morning PHF

Day	PHF (Practical)
Monday	0.879
Tuesday	0.928
Wednesday	0.862
Thursday	0.937
Friday	0.886
Average	**0.898**

Table 12. Permissible Capacity in PCU per hour for different traffic conditions

No. of Traffic Lanes and Width	Traffic Flow	Capacity in PCU per hour for traffic condition	
		Roads with no frontage access, no standing vehicles, little cross traffic	Roads with frontage access, no standing vehicles and high-capacity intersection
Two lane (7.0- 7.5m)	One way	2400	**1500**
Two lane (7.0- 7.5m)	Two way	1500	1200
Three lane (10.5m)	One way	3600	2500
Four lane (14.0m)	One way	4800	3000
Four lane (14.0m)	Two way	4000	2500
Six lane (21.0m)	Two way	6000	4200

(Referred from “Highway Engineering” book by Justo and Khanna)

Table 1(a) to 1(e) depict the calculation of speed of different automobiles on different weekdays. In table 2, speed in different weekdays has been averaged to get a mean speed. Table 3 shows the dimensions and the corresponding projected area of the automobiles. Table 4 presents the practical PCU values calculated using Chandra and Kumar method. Table 5 represents the standard PCU value of an automobile.

Table 6(a) gives a detailed description of the first day of the survey. Data for an interval of every 15 minutes has been shown. In table 6(b), the data has been multiplied by the practical PCU values to get the total PCU per hour. Similarly, in table 6(c), the data has been multiplied by standard PCU values. Table 6(d) depicts the peak hour traffic for Monday. Similarly, tables from 7 to 10 represent the total PCU per hour for the remaining days of the survey.

Table 11(a) and 11(b) present the standard and practical morning PHF calculated using (1).
Table 12 has been referred from Justo and Khanna (2011) which depicts the maximum PCU per hour for different traffic conditions. The condition under which our site falls has been kept in bold.
The pie charts depict the proportion of different classes of vehicles on each day of the survey. It represents the dependency of people on different classes of vehicles.

V. CONCLUSION

In this study, traffic volume survey was conducted for Shivaji Marg, Janakpuri west, Delhi for five continuous days of a week from 25/10/2021 to 29/10/2021 from 8AM to 2PM. The morning peak hour factor was also calculated for every day of the survey and then averaged to get the mean value.
First of all, coming to the PCU values, it can be observed that the practical PCU value of 3-wheelers, bus/truck and LCV have come out to be greater than the standard value. For 2-wheelers, the practical value is less than the standard. Thus, we can say that the PCU value cannot be generalised (standardised) as it depends on a number of factors like condition of road, type of road, nature of traffic and even on the time chosen for conducting the survey.
Moving further, as per the practical PCU, the morning peak hour for three days of the survey was 9AM-10AM which is correct as per IRC as people tend to move out to go to their offices or schools or any other place of work. However, for two days, i.e., Tuesday and Wednesday, morning peak hour was 10AM-11AM . This might be because of the varying timetable of the various coaching institutes set up in the area. As per the standard PCU, morning peak hour was 9-10AM for all days except Wednesday when it was 10-11AM. As time passes, volume of traffic tends to decrease gently which is also correct as per IRC. Slight variation in the result is expected due to some difference in the PCU values.
The site selected is a one-way two-lane urban road and its permissible volume as per table 12 is 1500 PCU per hour. As per the practical PCU, the maximum PCU per hour is on Monday from 9-10AM (821.65 PCU/hour) and as per the standard PCU also, it is on Monday from 9-10AM (767 PCU/hour). Thus, it can be inferred that the site is well below the level of congestion.
Average morning PHF was found to be 0.898 and 0.913 corresponding to practical and standard PCU respectively . A higher PHF value indicates that the traffic volume in every 15-minute interval is almost the same and thus consistent throughout the hour. This results in less variable traffic flows and free flows of traffic.
From the pie-charts, it can be concluded that people are heavily dependent on two-wheelers, followed by four-wheelers. Public transport system like bus is less favoured by the commoners especially because of the pandemic situation. As a result, people move out in their private vehicles which could result in heavy traffic in coming few years because with the increase in standard of living, people tend to buy private vehicles to show their stature in the society. As a result, the road transport authorities should be vigilante to regularly assess the traffic volume of the site and undertake necessary improvements for the betterment of the efficiency of the road and its level of service.

VI. REFERENCES

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