Traffic Volume Count and Analysis for Ambedkar Circle, Bidar

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Abstract- ***In this today's world, every person is willing to have their own vehicle. Their willingness led to the gradual growth in the number of vehicles. As per the considerations for the movement of the vehicles, lots of roadways have been constructed with several reinforcement parameters. The place where two or more road network meets, there is a construction of different types of intersections, rotaries/roundabouts. Rotary junction has efficiency to manage the various traffic congestion. Evaluation of rotary junction capacity is very important. As the evaluation of rotary junction is directly related with several traffic and motorist's parameters such as level of service, travel time, delays, accidents, operation costs, environmental factors, etc. So, there should be proper attention for the evaluation and improvements in the rotary junctions. As at the rotary junction, lots of traffic are diverted to different routes as per the travel of motorists. There should be decrease in the congestion, improvement of rotary junctions. Improvement of rotary junction justification have been considering by evaluation of the rotary junction. Traffic volume study is the major study for the evaluation of the traffic condition of the rotary junction. To analyse the traffic volume, traffic survey has been considering in the peak hours on the rotary junction.***

Indexed Terms- ***Traffic Rotaries, PCU (Passenger Car Unit), Traffic Studies, Traffic Volume***

I. INTRODUCTION

1.1 Traffic Volume Study is the number of vehicles crossing a section of road per unit time at any selected period. It is used as a quantity measure of flow. The commonly units are vehicles/day or vehicles/hour. It is used in planning, traffic operation and control of existing facilities and also for planning the new facilities. It is used in the analysis of traffic patterns and trends. Rotary intersections or roundabout are special form of at-grade intersections laid out for the movement of traffic in one direction around a central traffic island. Essentially all the major conflicts at an intersection namely the collision between through and right-turn movements are converted into milder conflicts namely merging and diverging. The vehicles entering the rotary are gently forced to move in a clockwise direction in orderly fashion. They then weave out of the rotary to the desired direction. The traffic operations at a rotary are three; diverging, merging and weaving. All the other conflicts are converted into these three less severe conflicts.

1. Diverging: It is a traffic operation when the vehicles moving in one direction is separated into different streams according to their destinations.
2. Merging: Merging is the opposite of diverging. Merging is referred to as the process of joining the traffic coming from different approaches and going to a common destination into a single stream.
3. Weaving: Weaving is the combined movement of both merging and diverging movements in the same direction.

1.2 Design elements

The design elements include design speed, radius at entry, exit and the central island, weaving length and width, entry and exit widths. In addition, the capacity of the rotary can also be determined by using some empirical formula

1.2.1 Design speed

All the vehicles are required to reduce their speed at a rotary. Therefore, the design speed of a rotary will be much lower than the roads leading to it. Although it is possible to design roundabout without much speed reduction, the geometry may lead to very large size incurring huge cost of construction. The normal practice is to keep the design speed as 30 and 40 kmph for urban and rural areas respectively.

1.2.2 Entry, exit and island radius

The radius at the entry depends on various factors like design speed, super-elevation, and coefficient of friction. The entry to the rotary is not straight, but a small curvature is introduced. This will force the driver to reduce the speed. The entry radius of about 20 and 25 meters is ideal for an urban and rural design respectively.

The exit radius should be higher than the entry radius and the radius of the rotary island so that the vehicles will discharge from the rotary at a higher rate. A general practice is to keep the exit radius as 1.5 to 2 times the entry radius. However, if pedestrian movement is higher at the exit approach, then the exit radius could be set as same as that of the entry radius. The radius of the central island is governed by the design speed, and the radius of the entry curve. The radius of the central island, in practice, is given a slightly higher radius so that the movement of the traffic already in the rotary will have priority. The radius of the central island which is about 1.3 times that of the entry curve is adequate for all practical purposes.

1.2.3 Width of the rotary

The entry width and exit width of the rotary is governed by the traffic entering and leaving the intersection and the width of the approaching road. The width of the carriageway at entry and exit will be lower than the width of the carriageway at the approaches to enable reduction of speed. IRC suggests that a two-lane road of 7 m width should be kept as 7 m for urban roads and 6.5 m for rural roads. Further, a three-lane road of 10.5 m is to be reduced to 7 m and 7.5 m respectively for urban and rural roads.

The width of the weaving section should be higher than the width at entry and exit. Normally this will be one lane more than the average entry and exit width. Thus, weaving width is given as,

$$W = \left(\frac{e1+e2}{2}\right) + 3.5$$

where e_1 is the width of the carriageway at the entry and e_2 is the carriageway width at exit.

Weaving length determines how smoothly the traffic can merge and diverge. It is decided based on many factors such as weaving width, proportion of weaving traffic to the non-weaving traffic etc. This can be best achieved by making the ratio of weaving length to the weaving width very high. A ratio of 4 is the minimum value suggested by IRC. Very large weaving length is also dangerous, as it may encourage over-speeding.

1.2.4 Capacity

The capacity of rotary is determined by the capacity of each weaving section. Transportation road research lab (TRL) proposed the following empirical formula to find the capacity of the weaving section.

$$Q_w = \frac{280w[1+\frac{e}{w}][1-\frac{p}{3}]}{1+\frac{w}{l}}$$

where *e* is the average entry and exit width, i.e., $\frac{(e_1+e_2)}{2}$, $w$is the weaving width, *l* is the length of weaving, and *p* is the proportion of weaving traffic to the non-weaving traffic. Figure 40:3 shows four types of movements at a weaving section, *a* and *d* are the non-weaving traffic and *b* and *c* are the weaving traffic. Therefore,

$$p = \frac{b+c}{a+b+c+d}$$

II. METHODOLOGY

The methodology of the project includes analysis of rotary junction traffic at peak hours, problem definition and goals related to selected rotary, data collection through count of volume capacity and traffic survey and data analysis of the different rotaries.

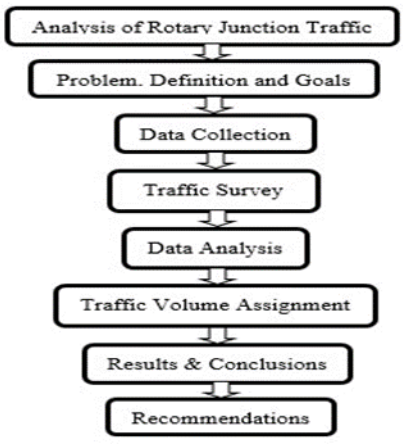

Fig .2.1. Approach and Methodology

III. RESULTS AND DISCUSSION

3.1 Traffic volume count for the Ambedkar Circle

Table 3.1. Traffic volume Count (No. of vehicles hourly) at Ambedkar Circle

NO. OF VEHICLES …… HOURS OF DAY	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday
07:00 AM – 08:00 AM	3438	3380	3391	3331	2965	3381	3389
08:00 AM – 09:00 AM	3568	3481	3512	3685	2890	3119	3580
09:00 AM – 10:00 AM	3783	3689	3811	3912	2990	3896	3611
10:00 AM – 11:00 AM	4192	4200	3991	4100	3885	3791	3889
11:00 AM – 12:00 PM	4138	4340	4100	4119	3197	3008	4002
12:00 PM – 01:00 PM	4346	4410	4468	4321	4009	4321	4512
01:00 PM – 02:00 PM	3848	3698	3890	3900	4189	4009	4581
02:00 PM – 03:00 PM	3993	3112	3689	3812	4005	4867	4689
03:00 PM – 04:00 PM	3698	3567	4106	3900	3972	4000	4123
04:00 PM – 05:00 PM	4019	4123	4231	4000	4008	3900	4228
05:00 PM – 06:00 PM	4980	4500	4333	4115	4610	4168	4800
06:00 PM – 07:00 PM	4598	4399	4612	4300	4287	4599	4776
07:00 PM – 08:00 PM	4271	4008	4008	4680	4779	4380	4398
Total	52872	51379	52142	52175	49786	51439	54578

TYPES OF VEHICLES PER WEEK	
Truck	1462
Bus	9498
Car	73074
Auto Rickshaw	91342
Motor Cycle	188168
Bicycle	1827
	365371

Table 3.1 Traffic volume Count (Types of vehicles per week) at Ambedkar Circle

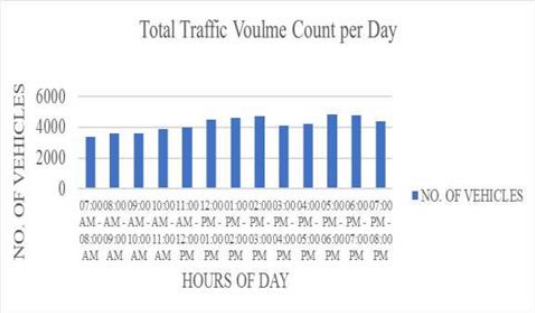

Fig.3.1 Total volume count per day at Ambedkar circle

Type of vehicle/week	PCU value/week
Truck	5117
Bus	33243
Car	73074
Auto Rickshaw	73073.6
Motor Cycle	94084
Bicycle	365.4
	278957

Table 3.2 PCU Value/Week of vehicles at Ambedkar circle

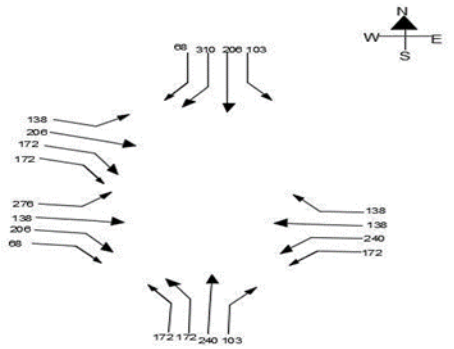

Fig.5.6 The traffic in terms of PCUs from each leg is depicted at Ambedkar circle

p	ES	S W	W-NW	NW-N	NE
a	172	172	276	138	103
b	516	515	412	550	584
c	446	620	378	446	481
d	550	206	481	241	480

Table 3.3 Proportion of weaving Traffic at each leg at Ambedkar circle

CONCLUSION

The study of Traffic volume count and analysis for Ambedkar circle, Bidar conclude that

1. Motorcycles, cars, buses and trucks occupied 52%,20%,8% and 1% respectively per week
2. Very small percentage of congestion is occurring and need to provide separate auto stand.
3. The Percentage of public transport is less and need to be strengthened.

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