International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 05 | May 2021 www.irjet.net p-ISSN: 2395-0072

Analysis of Traffic to Neutralize Congestion at Divided Roadways: Case Study

Sumit Kumbhar[1], Mithilesh Kadam[2], Suraj Pimpale[3], Pravin Kadam[4], Aruna Mitkari[5], Omkar Revankar[6]

[1,2,3,4,5,6]*B. Tech 4th Year, Dept. of Civil Engineering, Annasaheb Dange College of Engineering & Technology, Ashta, Maharashtra, India*

Abstract - *Road transportation is an important mode of transportation in India. The total road network of India is about 62.16 lakh kilometers. According to the recent studies carried out regarding traffic congestion, India ranks second globally. Traffic congestion has a tragic impact on our economy. This cost of congestion can be marked based on fuel burned, loss in working hours of person, opportunity loss, pollution, and other human losses. India faced a loss of a total of 22.29 billion dollars alone from traffic congestion in the year, 2018. As India is a developing country, traffic in India is noisy. In these recent developing years, the infrastructure is booming and the same is the situation of the population in India. This over-increasing population of India is demanding vehicles for transportation. The vehicle demand is so high that old infrastructure is not able to handle this rise in the number of vehicles. There has been a tremendous rise in the number of vehicles on road. In general, a divider is a stationary object intended to distribute the road in two parts, which ultimately distributes the traffic going in the opposite direction. The divider distributes the road in equal parts. As the total space of the previously constructed road and the space required for future construction for the roads is limited, so there is the need for the optimum solution for the utilization of existing resources.*

***Key Words*: Traffic Congestion, Vehicles, Traffic Analysis, Road Barrier, Divider, Traffic Control**

1.INTRODUCTION

In this 21st century, where the traffic is increasing day by day especially in major cities like Mumbai, Delhi, Hyderabad many difficulties are arising while controlling the traffic. There are different situations where different strategies are applied to solve them. A road divider is generally used for dividing the road for ongoing and incoming traffic. This helps to keep the flow of traffic, generally, there is an equal number of lanes for both ongoing and incoming traffic. The problem with the static road divider is that the number of lanes on either side of the road is fixed. Since the resources are limited and population, as well as the number of cars per family, is increasing, there is a significant increase in the number of cars on roads. This calls for better utilization of existing resources like the number of lanes available. For example, in any city, there is an industrial area or shopping area where the traffic generally flows in one direction in the morning and evening, the other side of the road divider is mostly either empty or much underutilized. This is during peak morning and evening hours. This results in loss of time for the people driving cars, traffic jams and the available resources are not used to their fullest capacity. Our aim is to formulate and help reduce traffic congestion. Nowadays usage of private automobiles is making urban traffic more and more rush area as a result traffic congestion has become one of the most important problems which are resulting in vain attempt and pollution in the surrounding area. Hence it has become necessary to find an effective solution for traffic control. A road divider is generally used for dividing the road for ongoing and incoming traffic. The static road divider divides the number of lanes into equal halves where the divider is fixed. Improving the efficiency of the traffic management system (TMS) is still active and challenging research due to the criticality of transportation infrastructure being monitored by such a system.

2. Study Area

Karad is the educational capital of west Maharashtra. daily 1 lakh people traveling on roads of Karad out of that 50 thousand are students. Karad is having a road length of 100km; Karad city faces daily problems of traffic specifically in peak hours. Some important issues to traffic problems in Karad are potholes, irregular parking of vehicles, less space, increase in vehicles, etc. For study purposes, the main road of Karad "Vidyanagar highway" was considered. A survey was conducted on Karad- Masur (Vidyanagar) highway near "GPM" college Karad, India. A four-lane road was taken after observing the congestion area; the Karad-Masur (Vidyanagar) highway was selected to understand the current traffic situation.

The survey was conducted between 7:00AM TO 7:00PM manually. Data was collected from the survey i.e., the vehicular count passing a certain point in both directions. The result was calculated using "PTV VISSIM" software of different classes of vehicles. The output data received from PTV VISSIM software was the speed of the vehicle, the volume of traffic, travel time on selected 4 lane highway at their respective timings in a time span of 1 hour of different class vehicles is put forth. The average speed of different vehicles in their slot of duration i.e., 1 Hour is also shown to understand the real traffic problems, expecting the real problem of traffic, it gives information of the time delays

which happen to be the main concern in thinking the solution for this problem.

3. Methodology

Traffic volume count is a basic requirement for traffic planning. Traffic volume count is basically counting the number of vehicles passing through on road over a period of time. The purpose of traffic volume count is to provide possible solutions and to suggest improvements for the problem identified. There are two types for counting traffic a) Manual count and b) Automatic count.

For this traffic survey, the manual count method is used. Which involves a group of people recording the number of vehicles passing, on the survey location. Raw data from this survey is then organized and analysed. The vehicles are to be classified in various categories like a motorcycle, car, bus, Truck, etc. The data of vehicles is usually expressed in terms of Passengers Car Unit (PCU). Then this data is represented in the graphical format are as below.

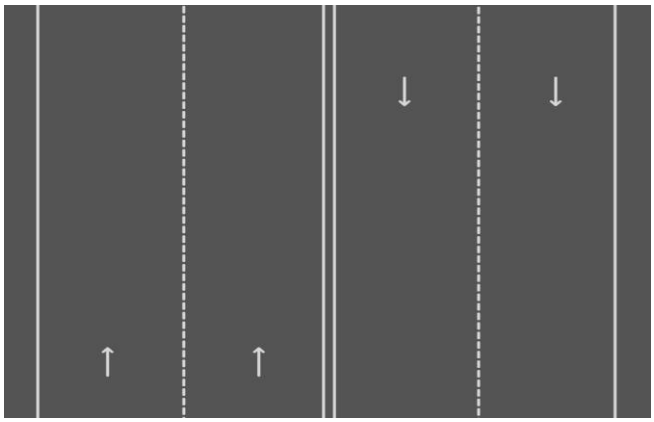

Fig No. 1 Road Layout

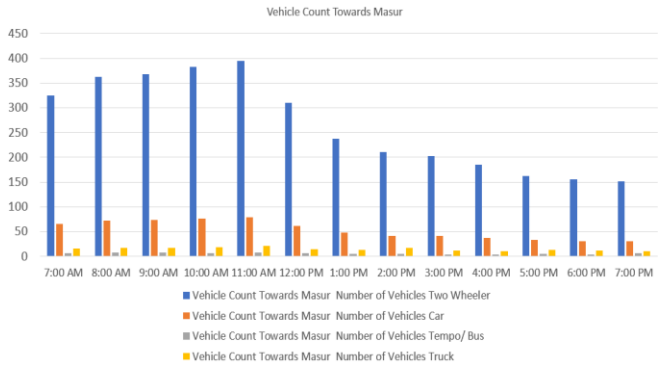

Fig No. 2 Graph of No. of vehicles v/s time towards Masur

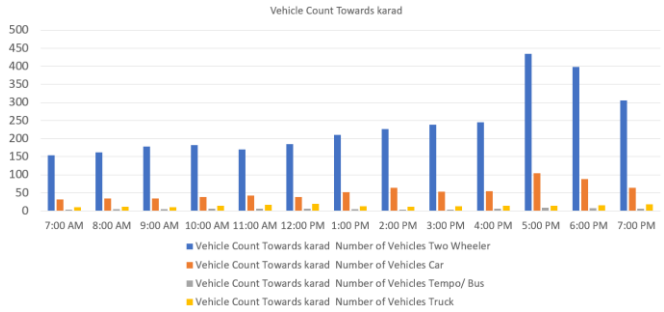

Fig No. 3 Graph of No. of vehicles v/s time towards Karad

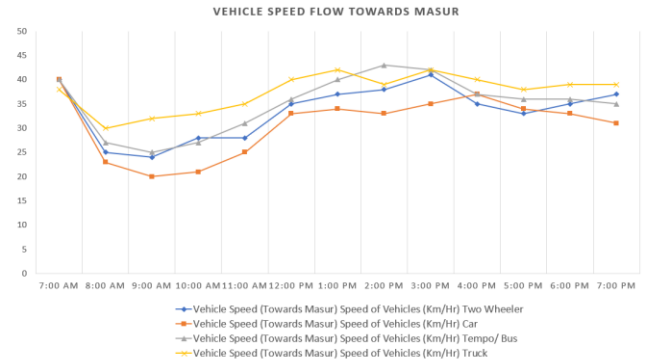

Fig No. 4 Graph of speed of vehicles v/s time towards Masur

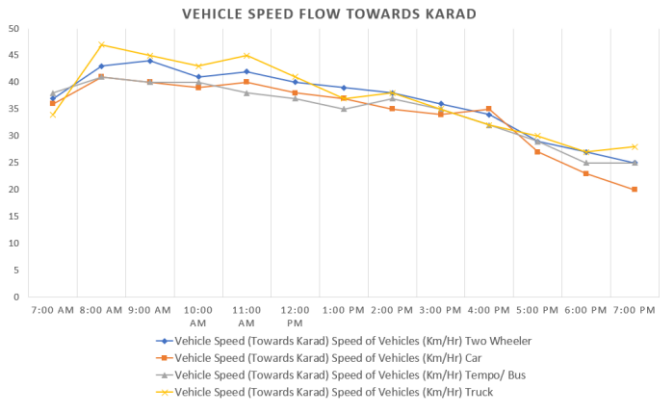

Fig No. 5 Graph of speed of vehicles v/s time towards Karad

4. Result

It can be observed from the Graph that the speed of the vehicle decreases remarkably during the peak hours. The utmost fall in the value is accounted for the remarkable increase in the number of vehicles flowing. It was observed that the count of vehicles heading towards Masur is as high as 380 during the morning peak hours as depicted in Fig. no. 2. Meanwhile on the opposite side at the same time the total count of vehicles heading towards Karad is roughly around 180 as shown in Fig no. 3, which states that the discrepancy is around double. On this ground, the reverse phenomenon is

observed during the evening peak hours where the traffic flow is seen to increase towards Karad to around 430 and that towards Masur is 160, the difference being 270. This variation in the count is working as a signifying factor for the vehicular delay, reduced speed, increased pollution, inefficiency in optimum utilization of the available space. Having a closer look at the graph depicts the drop and rise in the average speed of the vehicles but in a fixed pattern. Apparently, left lane [fig no. 1] is considered, the average vehicular speed is high at around 7.00 AM and as the time passes, the number of vehicles passing also increases significantly showing a drop in their average vehicular speed but this pattern is detected only for some time. As the day progresses the reduction in the vehicular count is noticed with the successive rise in the velocity of the vehicles. But as the peak hours in the evening time are observed, the drain velocity is again observed. Although the decrease in speed is noted, it is not as substantial as that in the morning peak hours. Thus, a cautious analysis with the appropriate study of the data is done to provide a feasible solution biding on the guidelines and the limitations have to be incorporated.

5. Possible Solutions to Reduce Traffic Congestion

As observed from the above results some of the solution will definitely work and solve the problem of traffic congestion faced by people using this road. Solution A is the Provision of manually movable Road Barriers so that during peak hours when the vehicles on one side of lane moving in one direction increases these road barriers can be used to include less used lane form the other side of road to minimize the traffic congestion. Solution B is Automated Movable Barriers that can also be used to shift heavy volume of traffic to adjacent lane.

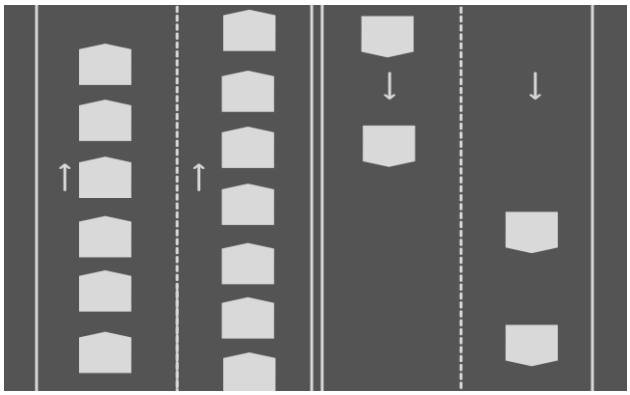

Fig No. 6 Morning Peak Hours

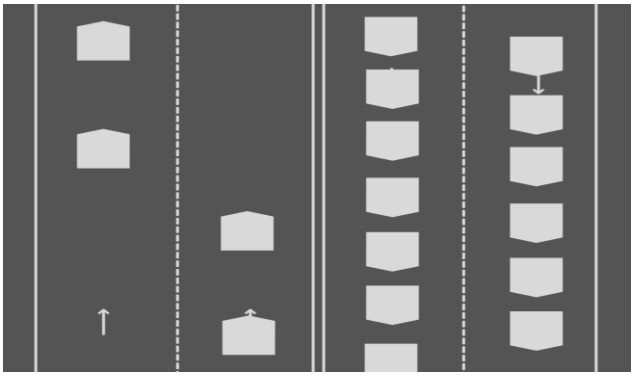

Fig No. 7 Evening Peak Hours

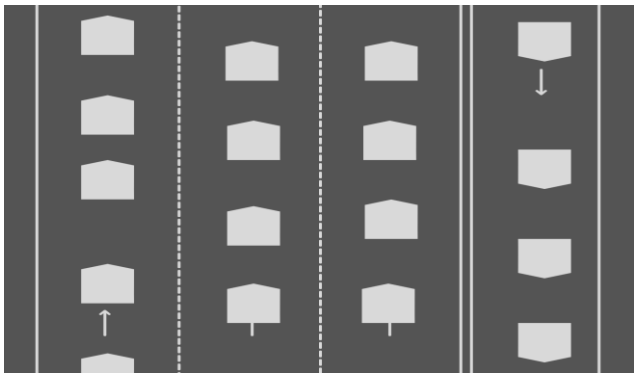

Fig No. 8 Morning Peak Hours after solution A

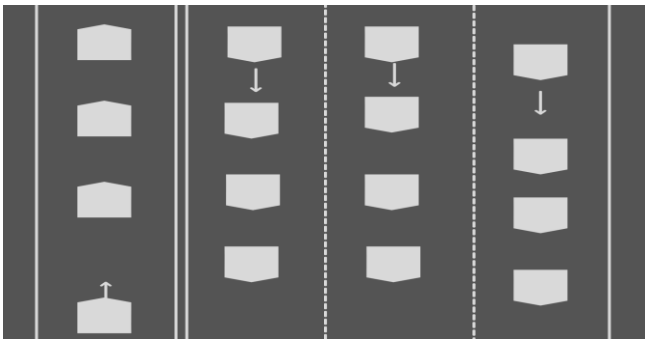

Fig No. 9 Evening Peak Hours after solution A

6. CONCLUSIONS

The proposed solutions will help to reduce the chances of traffic jams and to provide clearance of road for the emergency vehicles to an extent. In these proposed works we are aimed to clear the traffic in accordance to priority. Many emerging countries all over the world are facing a poor traffic network. Many metropolitans cite have poor traffic networking management with most of the population and automobiles. These solutions are incredibly helpful compared with the existing system which could be able to facilitate the general public to travel quickly in significant traffic in time.

REFERENCES

[1] Dr.Ch. Pamuleti, Abhiram Kurre, Niharika Sunke, Nikhitha Rudraramu, "Traffic Detection Using Automated Movable Road Divider And Transmitting Data to IOT", IRJET.

[2] Advait Kawle, Dhruv Shah, Kavin Doshi, Manish Bakhtiani, Yash Gajja, Pratibha Singh "Movable Traffic Divider: A Congestion Release Strategy"

[3] Indian Road Congress "Manual For Specifications And Standards For Lanes On Highways"; Irc: Sp: 84; 2014

[4] Dr. Tom V. Mathew, IIT Bombay; Transportation Systems Engineering, Measurement At A Point. February 19, 2014

[5] Shabbir Bhusari, "Traffic system mistreatment Raspberry-pi", world Journal of Advanced Engineering Technologies ISSN (Online), Volume 4, Issue 4- 2015, pp 413-415.

BIOGRAPHIES

Sumit Kumbhar
B. Tech 4th Year, Dept. of Civil Engineering, Annasaheb Dange College of Engineering & Technology, Ashta, Maharashtra, India

Mithilesh Kadam
B. Tech 4th Year, Dept. of Civil Engineering, Annasaheb Dange College of Engineering & Technology, Ashta, Maharashtra, India

Suraj Pimpale
B. Tech 4th Year, Dept. of Civil Engineering, Annasaheb Dange College of Engineering & Technology, Ashta, Maharashtra, India

Pravin Kadam
B. Tech 4th Year, Dept. of Civil Engineering, Annasaheb Dange College of Engineering & Technology, Ashta, Maharashtra, India

Aruna Mitkari
B. Tech 4th Year, Dept. of Civil Engineering, Annasaheb Dange College of Engineering & Technology, Ashta, Maharashtra, India

Omkar Revankar
B. Tech 4th Year, Dept. of Civil Engineering, Annasaheb Dange College of Engineering & Technology, Ashta, Maharashtra, India