

A Preliminary Study on Possible Alternate Roadways to Reduce Traffic Hazards at Velachery Township in Chennai Traffic Flow Minimization- a Preliminary Study

Deepak R, Gangha G

Department of Civil Engineering, SRM University, Chennai, India

Department of Civil Engineering, SRM University, Chennai, India

ABSTRACT: The present study investigates the traffic characteristics such as road geometric design, conflict points and the traffic flow of the vehicles. This study helps to understand the geographical pattern of the specified location. Further, this study also suggests a few alternate route and methods for avoiding traffic flow that suits to the geographical condition of the site without any hindrances. This study can be examined by two methods: (i) volume count and (ii) geometric study of the location of the traffic flow. The collected data is analyzed and the possible alternate route of the traffic flow is suggested. It is the hope that this study minimizes the traffic flow and delay of vehicles.

KEYWORDS: traffic congestion; delay analysis; alternated route;

I. INTRODUCTION

Transport networks are vital infrastructure of human society. Many networks are overloaded and often choked with traffic. One of the major predicament faced by Chennai people is "TRAFFIC CONGESTION". Traffic congestion is becoming a serious problem on urban roads in all over the world due to the uncontrolled increase in vehicle population and this result in severe environmental problems and economic losses. The traditional way of creating more infrastructures is not a feasible solution due to the intensive capital requirement and unavailability of space and recently, transportation engineers and planners are constructing more on proposing solutions for better management of existing infrastructure through operational means and this can be achieved through the advance technologies such as Intelligent Transportation systems etc. Traffic flow characteristic shows dynamical change at different time periods of the day. Many traffic incidents such as accidents, disabled cars, construction activities, high demands on traffic, and other unusual events cause this change and traffic management is the major aspects which involving, inspecting, regulating and control the overall rate of traffic flow and study of the major causes of delay helps in identifying the alternate routes during those occurrence.

An alternate route provides additional capacity to service primary route traffic. Alternate routes begin from one point on the primary route and terminate at another point on the primary route. The terminal point of an alternate route must be downstream of the congested area. The congestion may result from some event that causes either a significant or total roadway capacity reduction or excessive, sustained traffic demand. These events may include a traffic incident, natural disaster, or emergency. These events may render a roadway facility impassable. Diverting traffic to a parallel roadway specified in a carefully planned alternate route plan provides an effective, temporary response to facilitating increased mobility and improved travel time reliability in the corridor.

The objectives of this study are manifold and they are as follows:

- To identify the traffic density of a location and detailed survey of the existing road condition.
- To study the existing road conditions and geographical features of the area.
- To analyses the collected data to obtain the speed pattern and traffic pattern along the selected network.

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- To conduct survey to study the causes of delay by moving observer method.
- To study the vehicle flow and its characteristics based on the survey reports.
- To collect speed data, accident history data, and geometric features of the selected road network
- To reduce the number of conflict points occurring at the concentrated junction.
- To suggest the possible alternate routes for the delay section.

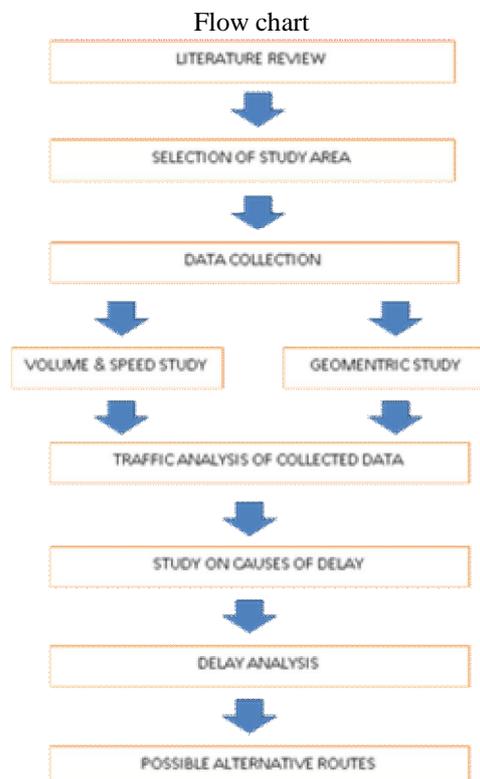
II. SITE DETAILS

The site chosen to carried out for this study is Velachery Main road near Phoenix Market city located in Chennai city in Tamilnadu. The sole purpose of making our study here is to provide an effective solution for the traffic congestion by easing it for commuters entering Phoenix Market city and who travel to Taramani IT by any means of mode by maintaining the integrity of the specifications. The site chosen to explore and examine in our paper is Velachery Main road near Phoenix Market city. The Directions of flow of vehicle are measured and the site directions as follows.

- From Guindy Race course to Taramani and Velachery via Velachery Main Road.
- From Taramani and Velachery to via Guindy and race course via Velachery main Road.
- From Guindy and race course to Vijayanagar Bus terminal via 100ft road.
- From Vijayanagar Bus terminal to Guindy and Race course via 100ft road.

III. METHODOLOGY

The methodology adopted for this study is as follows. A detailed survey is carried out to analyze the problem and the literatures can be seen in the references of the current paper.



In case of study area when we make a detail study on the traffic flow, volume counts and geometric pattern we should have the correct and precise data of the study area on which the study is going to be done. So a detailed study and

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data's are being collected practically to understand the geographical pattern of the particular location from which we can find out the ways or method through which the results can be obtained, which also suits the geographical condition of the site without any hindrances. However, after the collection of data we mainly focus on the main problem to find an alternate. This is obtained by two ways mainly Volume count and Geometric study of the location for the traffic flow analysis and alternate route. With the help of these two ways, we can collect the traffic flow data and the delay in traffic flow of the particular location on which the study is being done. After the collected data's are analyzed and manipulated and the results are obtained for the possible alternate route from which the traffic flow, delay of vehicles and the environment can be sustained.

The geometric of the location is carried out on the basis of the geometric design of roadway which deals with the dimensions and layout of visible features of the roadway such as alignment, sight distances and intersections.

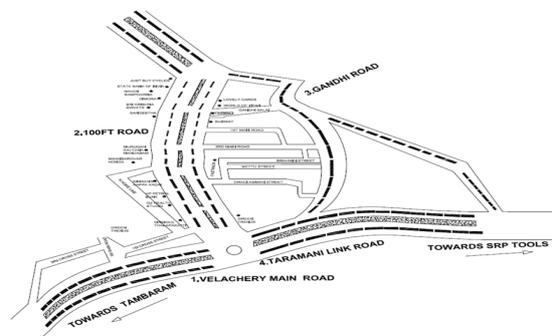


Fig 1. Location of the study

IV. RESULTS AND DISCUSSION

In Order to comprehensively appreciate the traffic and travel characteristics on the surrounding areas of the proposed location, the type of survey, location and duration's is formulated with respect to the scope of the study, with the view of the detailed traffic characteristics a pilot survey has been done to understand the traffic pattern, dispersal characteristics and its temporal variations. According to the observation in the pilot survey and the scope of the study the detailed survey has been segmented and the essential locations for the traffic survey have been assessed for understand the present traffic characteristics for various vehicles. Volume flow rate

Knowing the flow characteristics one can easily determine whether a particular section of the road is handling traffic much above or below its capacity. If the traffic is heave the road suffers from congestion with consequent loss of journey speed. Lower speeds because economic loss to the community due to time lost the occupants of the vehicle and the higher operational cost of vehicles. Congestion also leads to traffic hazards. Volume counts are therefore, indicators of the need to improve the transport facilities and are an invaluable tool in hands of transport planners. They enable to draw up schemes for improvement of roads based on a system of relative priorities and to allocate the scarce economic resources most advantageously. They provide an equitable basis for the selection of pavement, shoulders and bridge widths.

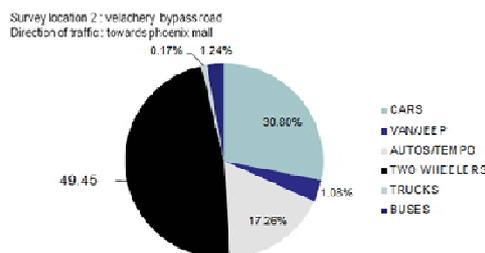


Fig. 2 Pie chart for traffic census per hour (Towards Pheonix mall)

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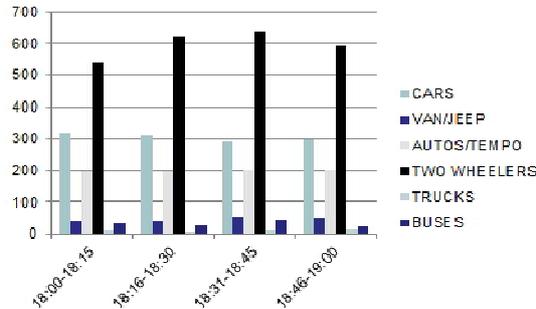


Fig. 3 Bar chart for traffic census per hour (Towards Phoenix mall)

From the above figure, it was observed that the peak traffic analysis taken between 18 to 19 and peak traffic is 18.30 to 18.45. In addition, it is to be noted that the traffic prevailing at the location is dominated by private vehicles like cars and two wheelers in large numbers and public transport. The roles of two wheelers are found to be approximately 50 percent, which occupies the maximum role in transport congestion in the study conducted. The second most is founded to be vehicles such as auto and tempo travellers. The public transport (buses) has least impact is found in this study, since most of the buses follows the other route to reach the same destination. The significant amount of share is occupied by cars. It is found that the almost 95 percent of the cars reach the Vijayanagar from the Phoenix mall prefers to take this route unlike the public buses. The reason could be as follows. (i) The roads are much better than the other and (ii) the route is almost straight which doesn't have turns or diverted route.

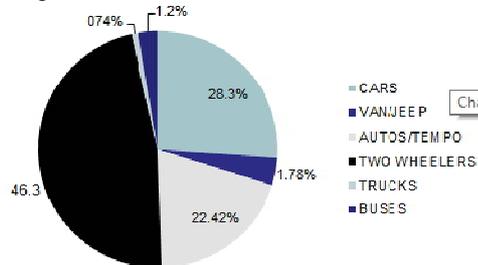


Fig. 4. Pie chart for traffic census per hour (Vijayanagar bus stand)

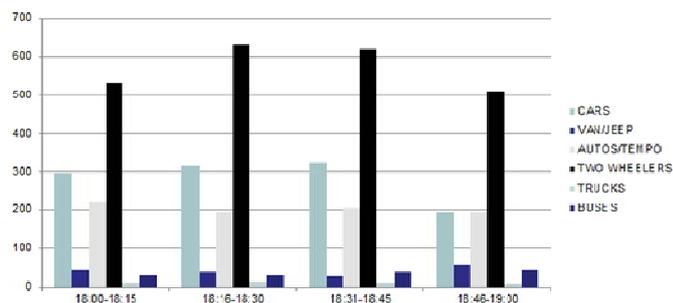


Fig. 5. Bar chart for traffic census per hour (Vijayanagar bus stand)

Form the figure 4 and 5, it is evident that the peak traffic analysis taken between 18 to 19 and peak traffic is 18.15 - 18.30. It is also noticed that the traffic prevailing at the location is dominated by private vehicles like cars and two wheelers in large numbers and public transport. The same reason we stated for the earlier case also holds valid for this case.

The geometric of the location is carried out on the basis of the geometric design of roadway which deals with the dimensions and layout of visible features of the roadway such as alignment, sight distances and intersections (see Table. 1)

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Table. 1 Geometric details of study

S.No	Name of road	Type of road	Number of lanes	Direction	Width of the road	Length of the road(Km)
1	Velachery main road	State highway	four	Madipakkam-velahery	23.7 meter	1.35
2	Velachery by-pass road	State highway	four	Veachery-pheonix mall	23.1 meter	1.90
3	Gandhi road	Artillery road	two	Vijayanagar-gandhiroad	8.94 meter	0.99
4	Taramani link road	State highway	four	Vijayanagar-taramani	23.7 meter	1.45
5	Gandhi salai	Artillery road	two	Alternate route 1	6.15 meter	0.45
6	3 rd main road	Artillery road	two	Alternate route 2	6.90 meter	0.50
7	1 st main road	Artillery road	single	Alternate route 3	4.11 meter	0.50

However, after the collection of data, the issue of finding alternate route was focused. This is obtained by two ways and they are (i) volume count and (ii) Geometric study of the location for the traffic flow analysis and alternate route. With the help of these two ways, one can collect the traffic flow data and the delay in traffic flow of the particular location on which the project is being done. After collecting the sufficient data, it is analyzed using proper tools. Later the data is processed and the results are obtained for the possible alternate route from which the traffic flow, delay of vehicles and the environment can be sustained (See figure 6).

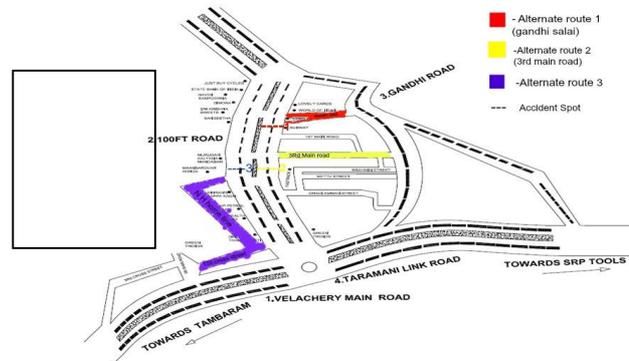


Fig.6 Delay spots and proposed alternate route

V. SUMMARY AND CONCLUSION

The present study has been investigated the traffic characteristics such as road geometric design, conflict points and the traffic flow of the vehicles. It is found that this study can help to understand the geographical pattern of the specified location. From this study, the traffic density of the location has been identified in existing road condition on a day. The scenario of the existing road conditions and its geographical features is discussed in detail though the figure. A survey is conducted and the flow of all sorts of vehicles is collected. A volumetric flow rate of traffic flow from one location to the other has been recorded. This data showed the need of the allocation of alternate route to minimize the traffic congestion. However, it is to be noted that this study is a very preliminary study and in order to completely minimize the traffic congestion on the real time situation (such as attempted in the study) demand more and more data on various hours on the day, various days on the week and so on. Nevertheless, this study is more helpful to choose whether the traffic on the certain route really need alternate route. In addition, this study sets a platform to explore the other insights involved.

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