IDENTIFICATION OF ALTERNATIVE ROUTES
BY APPLYING THE TRAFFIC MANAGEMENT
APPROACH – A CASE STUDY

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ABSTRACT
Transportation has always been a decisive phase of human civilization. In the recent days the occurrence of traffic congestion has become predominant due to the hasty increase traffic growth rate. Due to traffic congestion, there is risk of accidents because of poor traffic management and administration. To eradicate the congestion and delays, it is significant to find proper solution. In this paper traffic congestion problem in Velachery-Vijayanagar Junction, Chennai is identified and studied to identify the suitable measures for operations of traffic without congestion. Its main aim is to execute a proper management pattern throughout the study area to enhance movement of traffic.

Key words: Traffic Congestion, Growth Rate, Traffic Management.


1. INTRODUCTION
Chennai city’s economic growth has been intimately united to its transport infrastructure and it is measured as the finest infrastructure in India. The city and metropolitan area are served by major arterial roads that run either in an east-west or north-south direction. Due to the enormous growth of traffic in the metropolitan city the result is congestion and pollution. Congestion not only leads to pollution but also it put a stop to us from free movement and interrupts the accomplishment of business within urban areas. Traffic congestion in urban areas indicates the success of urban economic development, employment; housing and culture that make people want to live and work relatively close to each other and magnetize the benefit from the growth in productivity. In order to achieve the hassle free lifestyle a proper management system is required in the locality. Hence, the traffic management pattern is introduced in the selected area undergoing various traffic surveys. Based on the result analysis the suitable solution is recommended.
2. RELATED STUDY
Chandra and Sikdar (2000) in their study made an empirical study and found that for a given road width, an increase in volume level of heterogeneous traffic causes more density on the road resulting in reduced uniform speed of vehicles. The lower speed difference between cars and subject vehicles yield smaller PCU value for the vehicle type. Chandra and Kumar (2003) studied the effect of road width on PCU of vehicles on two-lane highways and found that the PCU value increased with increase in width of roadway. Franklyn et al. (2005) discussed and assessed that there are few components related to transportation and traffic in the city. Current traffic conditions in the city were characterized and pertinent information regarding traffic management, public transportation, traffic circulation, road capacity and traffic accidents were provided and evaluated. In the preceding section, recommendations were made to enhance traffic management. Justo and Tuladhar (1984) urbanized statistical models to derive PCU values for vehicles on metropolitan roads based on empirical data under mixed traffic flow. Ramanaya (1988) estimated the PCU factors for different vehicle types at different levels of services taking the Western car as the Design Vehicle Unit DVU. Sandhya (2015) explains that the Intelligent Traffic Management System is a broad field which covers many technologies and they play a significant role in the technology era. Intelligent Traffic Management System deployments offer the following benefits like improved safety, efficiency, mobility, accessibility, intermodal connections. Zhang et al. (2006) adopted the vehicle moving space (VMS) as the measure to originate passenger car equivalents for vehicles of different classes for Chinese roadway and traffic conditions. The related study on the issue exposes the studies which are conducted predominantly associated to consistent traffic conditions, and the few studies conducted under heterogeneous traffic conditions are not completely enough to reproduce the field conditions accurately. Hence, it was decided to make an attempt to study the vehicular interaction in heterogeneous traffic in a inclusive approach using the alternate road networks connecting the main link roads and derive a solution to traffic congestion at the intersection in the selected study area.

3. STUDY AREA
The study area selected to the analysis is Velachery-Vijayanagar Junction. It is located in a residential cum commercial area in southern part of Chennai metropolitan city in Tamilnadu, India. The intensification of Velachery during the last few decades can be mentioned due to the growth of the IT sector in southern Chennai. It acts as an important core connecting the rapidly growing business corridor, well connected with the Great Southern Trunk road and the Central Business Districts of the city.

Figure 1 Study Area Velachery

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Figure 1 represents the existing developing areas nearby Velachery. Due to the radical growth of population, business and all other commercial facts it resulted in highly congested area. The worse case of traffic congestion may lead to a degraded use of the available facilities, thus contributing to a hastened congestion increase, which leads to further infrastructure degradation.

4. NEED FOR THE STUDY
The number of motor vehicles has been growing at a rate around 10 percent per annum. The growth rate of various vehicle classes has been as given for Cars as 7.5 %, Buses as 5.3 %, Trucks as 6.2 % and Two-wheelers 17.2 %. As a result of the abrupt growth of motor vehicle populace, the interchange on the roads has been escalating, both in terms of capacity and intensity. The Figure 2 and Figure 3 shows the traffic density during the morning peak hour and evening peak hour.

To overcome all the problems and to meet out the convenient way the traffic engineering measures provide a helpful means to recognize the issues and evolve suitable measure to prevail over the deficiencies. It has some dignified functions such as collection, analysis and interpretation of data pertaining to traffic, traffic and transportation planning, traffic design, measures for operations of traffic and administration.

5. OBJECTIVE OF THE STUDY
The main objective for the study requires identifying the issues regarding traffic congestion in the study area. To achieve main objective the traffic volume survey at Vijayanagar junction has to be executed. The traffic data has to be analyzed with a suitable traffic management measures by reducing the conflict points in the Vijayanagar junction has to be identified and therefore to check the possibility of introducing new alternate routes in and around Vijayanagar junction.

6. TRAFFIC FLOW DATA COLLECTION AND ANALYSIS
Traffic volume studies are conducted to determine the number, movements, and classifications of roadway vehicles at a given location. These data can help identify critical flow time periods, determine the influence of large vehicles or pedestrians on vehicular traffic flow. The manual count method was adopted for conducting the survey. From the collected data and analysis the peak hour was identified as 09:00 a.m to 10:00 a.m. The Figure 4 represents the distribution of heavy traffic during the peak hour.
Problem Identification and Prevention

From the survey data analysis it is clear that the traffic congestion is increasing day by day. This will lead to queue, leisure speeds and amplified travel times, which enforce costs on the economy and engender several impacts on urban regions and their residents. Congestion also has an array of meandering impacts counting the insignificant environmental and resource impacts of congestion, impacts on eminence of life, safety as well as impacts on non-vehicular pedestrian such as the users of sidewalks. Figure 5 shows the view of Velachery junction which has to be avoided during peak hours in order to escape from traffic congestion. The legendary box shows the high traffic zone, the road stretch to be avoided during peak hour and the side roads to choose to get rid of traffic.

Summary and Outlook

The junction needs to be redesigned based on the traffic survey and also take the surrounding land-use into account. The corporation will need to work with an iron hand when giving...
building permissions and ensuring that parking norms are followed. The buses parked opposite the Vijayanagar bus stand will also need to park away from the junction. The frenzied traffic movement at Vijayanagar intersection in Velachery may soon be a thing of the past with the state highways department planning to build a multi-level flyover at the busy junction. The flyover will cater to the huge vehicular population coming in from the suburbs. The Vijayanagar intersection is at the confluence of Velachery Bypass, Taramani Link Road, Velachery Main Road and the Velachery-Tambaram High Road. Figure 6 shows the existing features of the alternate routes in and around the intersection where the “Tidal flow” can be adopted during peak hours. The availability of cross roads can be utilized for the vehicular movement in order to void congestion at the intersection.

![Figure 6 Existing alternate road network near intersection](image)

7. CONCLUSIONS

![Figure 7 Alternate routes for diversion](image)
The escalation of Velachery in recent years can be mentioned due to the growth of the IT sector, commercial infrastructures like Phoenix mall, Grand mall and other residential apartments. Nowadays this place acts as a central spotlight connecting the rapidly growing business class Information Technology and mercantile activities. Thus, keeping all the keynotes in mind, it is not possible to acquire the commercial area for the development of road infrastructure. Hence the existing cross roads are utilised as alternate routes during peak hours. The possibility of movement of vehicles is given in Figure 7 which shows the proper connectivity for the traffic to get connected with the main link roads. The conclusion is to provide congestion less traffic movement. This is done by removing the signals and by diverting the routes and by closing the side roads. This provides us less journey time with more satisfaction. This ensures safety and reduces accidents. This provides a uniform flow of traffic with no chaos and congestion.

8. RECOMMENDATIONS
The traffic pattern on the existing streets should be reoriented so that the conflict between vehicles and pedestrians will get reduced. The essential approach is to retain possible existing pattern of streets but to alter the pattern of traffic movement on these, so that the most efficient use is made of the system. Hence prohibition of right turn movement is known to increase the saturation flow and the capacity of the junction. But prohibition of right turn will not altogether make the problems disappear. Traffic intersections are problem spots on any highway, which contribute to a large share of accidents. For safe operation, these locations should be kept under some level of control depending upon the traffic quantity and behaviour. Based on this criterion the intersections and interchanges can be designed and constructed at Velachery Vijayanagar intersection.

REFERENCES