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STUDY OF MIXED TRAFFIC FLOW BEHAVIOR ON ARTERIAL ROAD

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Abstract –

The traffic scenario in developing economies is fundamentally different from that of the developed economies. The latter is predominantly composed of passenger cars and can be aptly termed as ''homogeneous'' traffic, whereas the former is composed of vehicle types with a wide variety of static and dynamic characteristics, which occupy the same right of way, resulting in an unsynchronized movement of the vehicles. Another distinguishing characteristic of this traffic is the absence of lane-discipline, resulting from the wide variation in sizes and maneuvering abilities of the vehicles. These distinctions result in some phenomena like vehicle creeping, which are absent in the homogeneous traffic. Hence, this type of traffic can be referred to as ''heterogeneous disordered'' or ''mixed'' traffic. A review of the literature has shown that most of the studies in such traffic make use of the methods and concepts developed for homogeneous traffic. Very few studies have attempted to capture and understand the distinctive characteristics of the mixed traffic. The primary objective of this paper is to provide a review of the studies on various mixed traffic characteristics in developing economies, identify their limitations and provide guidelines for the future research. Also, a detailed methodology of the simulation process for the mixed traffic is given, reflecting the ''gap-filling'' rather than the conventional ''car-following'' behavior. A comparison of the past modeling approaches is also presented and the accuracy of their implementation is discussed.

Keywords *Heterogeneous Traffic characteristics Modeling PCU Area occupancy*

INTRODUCTION -

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, or document traffic volume trends. The length of the sampling period depends on the type of count being taken and the intended use of the data recorded. For example, an intersection count may be conducted during the peak flow period. If so, manual count with 15-minute intervals could be used to obtain the traffic volume data.

Starting with Greenshields' studies as far back as in 1935, considerable research effort has been spent to under stand the traffic flow characteristics in developed economies. In 1960s, Car following theory was developed, with the background of the experiments conducted by researchers at the General motors' research laboratory. Lighthill and Whitham and Richards proposed a continuum model for vehicular flow based on an analogy with fluid flow and laid the foundation for ''macroscopic traffic flow mod eling''. Later empirical studies have identified various traffic phenomena including stop-and-go waves, hysteresis effect, phantom jams and capacity drop. Analogies with other physical systems are used to describe these phenomena. These studies have resulted in a traffic flow theory with a strong mathematical and empirical basis, which is essential for a thorough understanding of the traffic dynamics.

OBJECTIVES

The present study is undertaken with the following objectives

To measure traffic volumes and note other related traffic characteristics (e.g. flow composition, flow fluctuations etc.).

To determine hourly volume in terms passenger car equivalents (PCE) To determine vehicle composition in traffic stream

To compare the results with standard design service volumes and identify remedies.

Scope of Traffic Volume Studies:

The traffic volume count study is carried out to get following useful informat

1) Magnitudes, classifications and the time and directional split of vehicular flows. Magnitude is represented by volume of traffic. Vehicles are classified into some predefined classes based on vehicle size and capacity. In a two-way road, vehicles moving towards two directions are counted separately to get the proportion. Time and directional split is useful to identify tidal flow.
2) Proportions of vehicles in traffic stream. Proportion of vehicles indicates whether public or private transport dominates the traffic system. It also indicates the choice of road users.
3) Hourly, daily, yearly and seasonal variation of vehicular flows. These variations are needed to establish expansion factors for future use. Using expansion factors, AADT can be calculated from short count.
4) Flow fluctuation on different approaches at a junction or different parts of a road network system.

LITERATURE REVIEW

Van Aired, (1995) studied that Green shields, and Van Aerde Car-Following and Traffic Stream Models. In this investigation, the author, has relates steady-state car-following behavior to macroscopic traffic stream models has concluded that the results clearly show that Traffic move models through shooting both macroscopic and microscopic constant-state visitors behavior for a large range of roadway features and traffic requirements. Satyanarayana, (2012) studied the effect of traffic volume, its composition and stream speed on passenger car equivalents. In this investigation, the author, has relates the safe and efficient movement of the people and goods is dependent on traffic flow, which is directly connected to the traffic characteristics. The volume, speed and density are the three important things in public transportation. V.T Hamizh Arasan and Krishnamurthy, (2008) studied the complexity of the vehicular interaction in heterogeneous traffic. In this investigation, the author, has relates the PCU estimate, made via microscopic of simulation, for the exceptional varieties of cars of heterogeneous traffic, and has concluded that the results clearly show that the PCU price of an automobile tremendously alterations with trade in traffic quantity and width of roadway. Ahmed Al-Kaisy, (2005) studied that developing PCE factors for heavy vehicles on freeways and multilane highways during congestion. In this investigation, the author relates to the mechanism of heavy vehicles' behavior during congestion and has concluded that the results clearly show that the effect of heavy vehicles on traffic stream behavior under free-flow condition. Marwah and Bhuvanesh, (2000) studied that level of service classification for urban heterogeneous traffic. In this investigation, the author has related the traffic simulation model, model has been successfully calibrated and validated for the urban heterogeneous traffic flow conditions on the Kanpur roads and has concluded that the classification level for the urban areas especially which re heterogenous. Chandra. S, (2004) studied that Different sections of urban roads. In this investigation, the author has related the development of simpler techniques for evolving capacity norms, based on observed data and has concluded that the results clearly show that minimizing kerbside parking, controlling pedestrian movements and cross traffic, and separating up and down traffic by barriers. Prasad N.V, (2009) studied that Central Road Research Institute (CRRI), New Delhi to determine the PCU value for different types of vehicles. In this investigation the author has relates the (speed, density, vehicle-hours etc.) reported based on which PCE values are calculated for different types of vehicles. Present study reviews the various methods have been used to calculate PCE. and has concluded that the results clearly show that Out of the various methods discussed, headway ratio method is currently the most commonly used method for PCE estimation.

METHODOLOGY

Traffic Volume Counts

#Prepare

1. Communicate with other staff/departments
2. Review historical data trends
3. Review citizen input
4. Request traffic control

#Select Location

1. Select the proper location
2. Plan the data collection preparations
3. Complete the pre-study documentation

#Complete Study

1. Collect the data
2. Evaluate the data
3. Calculate the traffic volume trends

#Document

1. Finalize the report
2. File the report
3. Communicate the results

USING COUNT PERIOD TO DETERMINE STUDY METHOD Two methods are available for conducting traffic volume counts: (1) manual and (2) automatic. Manual counts are typically used to gather data for determination of vehicle classification, turning movements, direction of travel, pedestrian movements, or vehicle occupancy. Automatic counts are typically used to gather data for determination of vehicle hourly patterns, daily or seasonal variations and growth trends, or annual traffic estimates.

(1) MANUAL COUNT METHOD- Most applications of manual counts require small samples of data at any given location. Manual counts are sometimes used when the effort and expense of automated equipment are not justified. Manual counts are necessary when automatic equipment is not available.

(2) AUTOMATIC COUNT METHOD- The automatic count method provides a means for gathering large amounts of traffic data. Automatic counts are usually taken in 1-hour intervals for each 24-hour period. The counts may extend for a week, month, or year. When the counts are recorded for each 24-hour time period, the peak flow period can be identified.

CONCLUSION

Understanding of traffic stream flow characteristics and their inter-relationships is per-requisite for an efficient design of traffic facilities and realistic assessment of the quality of service provided to the road users. The study is carried out to analyse the traffic and flow characteristics of Indian Arterial road.The traffic volume data can identify critical flow time periods, determine the influence of large vehicles or pedestrians on vehicular traffic flow, or document traffic volume trends.The length of the sampling period depends on the type of count being taken and the intended use of the data recorded.Example: An intersection count may be conducted during the peak flow period. If so, manual count with 15-minutes intervals could be used to obtain the traffic volume data.

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