International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 01 | Jan 2020 www.irjet.net p-ISSN: 2395-0072

REVIEW PAPER ON ESTIMATE TRAFFIC VOLUME AND GEOMETRIC DESIGN ON SELECTED STRETCH OF ROAD

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Abstract - *The Socio-economic growth of India caused an intense rise of vehicle usage and comprised road traffic, which is highly heterogeneous in nature. This heterogeneous traffic of variable speed increased continuously, but there is no improvising in bedrock capacities of roads and transportation system have not created in an identical manner to viably adapt to the quantity of vehicles travelling on them. Due to this, traffic congestion, accidental conditions and traffic correlated pollution problem rise which affect adversely on society. To minimize this problem and encounter the requirement of safe and time efficient movement of traffic from improvised road pavement and able to cater future need of city effective planning and traffic management is important. Traffic flow characteristics give essential information required for planning, analysis, and operation of highway for effective traffic management. In this work emphasis traffic volume is estimated manually through traffic flow survey at Gaddigodam stretch of Sadar road in Nagpur city. With the help of data collection, an attempt was made to understand traffic patterns during different time periods. Traffic Control at the Junction is additionally reliant on traffic flow characteristics. Hence, the outcomes from the current study help in controlling traffic at the Stretch and also help to suggest some measures to improve traffic safety in this region which meet the future requirement.*

***Keywords:-*Average Annual Daily Traffic (AADT), Passenger Car Unit (PCU)**

1. INTRODUCTION

Transportation engineering plays a dynamic role for planning of effective cities which permit future expansion of existing roadways and various infrastructure facilities using wide application. Nowadays, Increasing Urbanisation raises transportation system problem like traffic congestion and traffic correlated pollution across every country in the world. Every country is approaching as per their wants and try to resolve transportation issues as per the abilities, requirements and assets they owe. To reduce traffic congestion and transportation problem arises mainly because of heterogeneous traffic flow in developing country like India having knowledge of traffic volume study is important. In Transportation engineering, traffic engineer and planners required information about traffic volume which is obtained from systematic traffic survey. The traffic Volume study helps in analysing, planning and designing new transportation facilities including pavement design, selecting geometric design standards and improvement of existing road facilities by economic analysis and determining priorities. Traffic volume study also help to manage and control transportation system by installing and modifying traffic control devices including traffic signal, sign and pavement marking, traffic light for safe and time efficient movement of traffic on road and providing road geometry, sidewalk and crosswalk.

Traffic volume is the number of vehicles passing a given stretch of road or traffic lane in per unit time. Traffic volume studies are executed to determine the count, movement and classification of roadway vehicles at a given site so as to become attentive of the peak hours of the day when the traffic volume is highest on the road. India's traffic is heterogeneous in nature and varies continuously during 24 hour of duration in a day. This tends to raise problem like congestion of traffic responsible for increase accidental condition during peak hours so it is necessary to study the junction between the moving vehicles over an extensive array of roadway and traffic conditions. Traffic volume study also considers traffic safety by examining sites of roadways with high accidental rate and developing countermeasure to reduce crashes and accidents. In Traffic volume study Heterogeneous traffic has been addressed by exchanging the different types of vehicles into equivalent passenger cars and expressing the volume in terms of Passenger Car Unit (PCU) per hour. The PCU is the universally adopted unit for measurement of traffic volume, derived by taking the passenger car as the standard vehicle. Traffic volume study which include traffic stream, flow rate, direction distribution, peak hour flow and annual average daily traffic (AADT) provide input for planning, design and operation of highway in maximum of the industrialised countries. If traffic volume isn't measured continuously transportation system may miscarry to manage and additionally face a difficulty of traffic jam and accidental proven conditions. As per report of world health organisation report 2018 number of yearly road traffic death reached to 1.35. Road traffic injuries are now the leading killer of people aged 5-30 years. As per media statistics, in India one person dies in a road accident every four minutes. The main reasons for India's high percentage of on- road defect are bad road conditions, careless user behaviour, defective road planning and designing, poor control of traffic rules and emergency services. The study of traffic volume will contribute us for finding various locations where the congestion is

dominant leading to unsafe travel experience. Traffic volume studies are accompanied to examine the number, movements and classifications of roadway vehicles at a certain location so as to detect critical flow time periods, the influence of large vehicles or pedestrians on vehicular traffic flow or document traffic volume trends. The Junction of Gaddidodam on Sadar road of Nagpur is highly complex to study traffic volume and influenced by number of roadways and traffic factor is observed and recorded data manually at identified peak hours. After all the surveys and observations solution and suggestions are provided for better traffic condition and safeguard of users for smooth functioning of transportation system and conquer future requirement.

2. LITERATURE REVIEW

Birva B. Shah, Prof. N. G. Raval (2016) [1]

Concluded that Estimation of traffic volume is fundamental to planning, design and operation of the roads. It helps in improving new and existing transportation facilities for safe and time efficient movement of vehicle on roads. In their studies, they found out the suggested traffic volume capacity by Indian road congress (IRC) is nearly 16% less that the observed at C.G. Road of Ahmadabad city. Due to urbanization and increased population traffic is increased rapidly in the urban area which is highly dynamic in composition .They suggest, design service volumes are required to update in the highly congested cities which At this level, will be around 0.7 times the maximum traffic volume required for design of road.

Hall & Pendleton (1990) [2]

Examined the connection between hourly crash rates and also the ratio of traffic volume to capacity on rural highways. They found that the speed of traffic crashes on roadway sections increases with increasing traffic volume. However, data which was needed in order to support this relationship were highly scattered. According to the authors, the idea of a relationship between traffic crash rates and traffic volume is valid but the exact nature of the connection is unknown.

Ashish Dhamaniya & S. Chandra (2013) [3]

Mixed traffic flow is transformed to equivalent flow in passenger car units (PCUs). These PCU values are utilized to convert highly dynamic traffic volume to homogeneous volume in PCU per hour. New concept of stream equivalency factor (SEF) is presented in this study and denoted by K. It is the ratio of traffic volume in PCU to volume in vehicles per hour which related to traffic composition and volume on a road and study through the regression analysis method. A micro simulation program is used to generate the traffic flow data for various categories of vehicles in the traffic stream used to present a generalized solution for defining the value of K for any combination of traffic composition and volume on a road.

Nabanita Roy, Rupali Roy, Hitesh Talukdar & Pritam Saha (2017) [4]

These research focus on how heterogeneity in traffic mix affect on two-lane road traffic . It examine the effects of such traffic on capacity , traffic -flow characteristic and factors affecting it. Here, traffic flow characteristics equation developed using green shield modal which show capacity and free-flow speed changes with the traffic composition and largely affected by the presence of low performance vehicles including non-motorized ones. It clarifies the requirement of announcing the concept of dynamic passenger car unit which would lighten the current implication on capacity standards of two-lane roads under heterogeneous mixed traffic.

Pothula sanyasi Naidu, Gundu Navya, Chukka Deepika, Mahesh Yamala [5]

This research presents important features of capacity evaluation for road designing by using PCE In place of PCU. Utilization of Mathematical model is done by using IRC specifications and regression analysis is performed for obtaining capacity values of traffic flow on road. Relations between traffic volume and geometric cross section of road are identified, which derives the capacity effecting zones. This relation helps in studying variation in capacity with respect to various widths of road elements. Impact of geometrics and road elements on capacity is measured and capacity is derived on the basis of PCE and road geometric factors, which results in accurate prevailing road capacities.

[6] Sai Kiran M.1 & Ashish Verma[1]

The primary objective of this research is to review on various mixed traffic characteristics in developing economies, identify their limitations and supply guidelines for the long run research. Also, a detailed methodology of the simulation process for the mixed traffic is given, reflecting the ‘‘gap- filling’’ instead of the traditional ‘‘car-following’’ behaviour. A comparison of the past modelling approaches is additionally presented and therefore the accuracy of their implementation is discussed

3. CONCLUSION

Recent Research on traffic volume study help to enhance knowledge about how traffic volume study is helpful of design new transportation facility and enhance the existing one according to present and future requirement for safe and time efficient movement of traffic on road. Traffic volume study also help to manage and controlling the heterogeneous traffic of dynamic speed which is calculated in terms of Passenger Car Unit (PCU).

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