"ESTIMATION OF LEVEL OF SERVICE THROUGH CONGESTION ON URBAN ROAD-A CASE STUDY OF VRUNDAVAN CROSS ROAD"

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Abstract:A fast emerging component of urban transportation problems in the cities worldwide is the problem of traffic congestion. There is a need for defining traffic congestion on a rational basis and use that for measurement of levels of service on roads. TheObservation show that the fluctuations in speed, which is the most primary effect of congestion, have not yet been utilized for congestion modelling. Present project study will be regarding the relationship of congestion with speed variations and hence to quantify congestion using these speed variations. The congestion model will be developed and assessment of the effect of roadway width on congestion levels and service volumes will be done. While it is possible to assess the realized benefits from an increase in roadway width, the required number of traffic lanes for a desired level of service can also be estimated.

Key Words: Congestion, Level of service

1: INTRODUCTION

1.1 General Introduction:

In urban areas, traffic congestion is a major problem. Heavy traffic flow on National highways with high speed, when mixed up with local traffic at crossings, traffic congestion is likely to occur. This causes many negative effects like pollution, delay, accidents and improper traffic management at crossings. Traffic congestion in urban andSub-urban areas has grown from mere annoyance to a severe problem. Road congestion is spreading,Movements of goods and people are slowing to a crawl and transportation cost escalating.

Most cities in Asian countries are experiencing multi-faceted problems as a result of rapidurbanization. Urban congestion is one such problem afflicting urban agglomerations in Asia and has multiple effects on urban economies. Urban congestion is broadly defined as excess demand for travel over its supply. In fact, the reason why governments are forced to revisit their policies for urban mobility is because of growing demand for travel with limited supply of services. The presence of urban congestion prevents free movement of traffic. For example, according to the International Association of Public Transport (UITP) in 2001, the average speed of vehicles on Bangkok streets was 15 km/h, while that in Manila, Jakarta and Singapore was 18 km/h, 19 km/h and 20 km/h respectively.

In many respects, rapid urbanization is an indicator of economic growth in Asia, and it isexpected to continue. As per an estimate by the Asian Development Bank (ADB), about 44 million people are added to Asia's urban population every year. Asian cities are also characterized by high population density. For instance, Dhaka, Bangladesh, grew rapidly during the last decade and became the most densely populated city in the world, whereas Mumbai stands at number two.

1.2 Situation in India:

Road traffic conditions in India are getting worse day by day. The average number of vehicles in India is growing at the rate 10.16percent annually, since last five years. Spending hours in traffic jam has become part and parcel of metropolitan life style, leading to health and environmental hazards. Traffic congestion is a major problem for the

transportation professionals in India. Most of the cities are suffering from medium to high level of traffic congestion. Although, in some major cities the growth of private vehicle usage has increased at the faster rate, in general car ownership and usage has remained at much lower level in Indian context. The poor roadway condition, non-uniform roadway features in terms of carriageway and shoulder width, encroachment of the road, abutting land use, and resulting pedestrian activities, poor lane discipline, improper bus stop location and design, vehicles of wide ranging characteristics of the technology and operating condition, heterogeneity of traffic, uncontrolled on-street parking etc. indicate that the nature and cause of congestion in India might be substantially different from that in developed countries. As traffic congestion on urban and suburban roads in India is due to only to volume of traffic but also other causal influences, the problem of traffic congestion is more complex in nature and measures for congestion mitigation are also likely to be different from those in developed countries.

India's population and its traffic are concentrated within its cities. The contrast between urban and rural India is far more pronounced than in most Western nations. The migration of rural population to urban areas in search of better job prospects has made cities densely populated. About 27 percent the population live in urban areas. There are 7935 cities and towns in India. The population of India is estimated at 1,267,401,849 as of July 1 2014.India's population is equivalent to 17.5% of the total world population. The ranks number 2 in the list of countries by population.The population density in India is 386 people per Km.32% of the population isUrban(410,404,773 people in 2014)

TRAFFIC FLOW CHARACTERISTIC

Traffic factor which affect the capacity and level of service so the knowledge of traffic flow characteristic is useful to highway engineer in the development of highway and transportation plans, performing economical analysis establishing geometric design criteria , selecting and implementing traffic control measures and evaluating the performance of transportation facilities. The Traffic flow characteristics have been considered following measures of effectiveness are as below:

- Relation between speed-flow-density
- Composition of traffic
- Traffic volume and rate of flow
- Speed and travel time
- Spacing and headways
  - Traffic density or concentration

2: OBJECTIVE

2.1 Objective

Objective of project or study outline of the project.

- To collect traffic volume data.
- To collect spot speed study data.
- To provide recommendations to reduced congestion and improve level of service of stretch

3: LITERATURE REVIEW

3.1 "MODELLING CONGESTION ON URBAN ROADS AND ASSESSING LEVEL OF SERVICE"

Congestion has been quantified based on operational and volume characteristic. The level of congestion has been modelled to relate to the casual influences of traffic movement. The contribution of each vehicle type to the total congestion in mixed traffic operation has been captured through the parameter of the congestion model. Based on quantified congestion, LOS boundaries have redefine with nine LOS in a stable flow zone and one LOS for unstable flow zone. Using congestion models developed on three road sections, the limiting service volume for different level of service have been estimated and related to the variation in carriageway width. It has been shown that the quantified congestion can be used as a tool for assessing the efficiency and estimating the benefits from additional traffic lane(s) or the level of demand management required for a desired LOS.

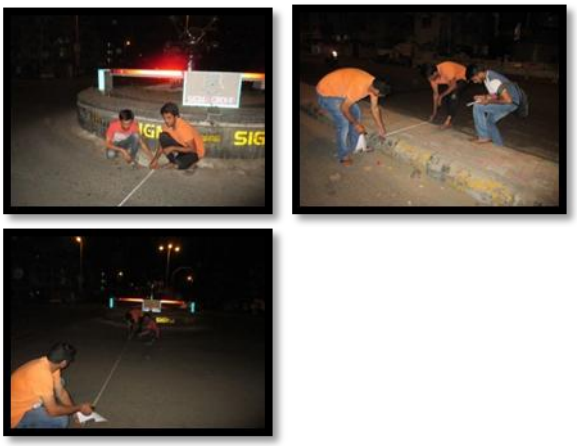
3.2 "MEASURING URBAN TRAFFIC CONGESTION"

Traffic congestion has been one of major issues that most metropolises are facing. It is believed that identification of congestion is the first step for selecting appropriate mitigation measures. Congestion - both in perception and in reality - impacts the movement of

people. Traffic congestion wastes time, energy and causes pollution. There are broadly two factors, which effect the congestion; (a) micro-level factors (b) macro-level factors that relate to overall demand for road use. Congestion is 'triggered' at the 'micro' level (e.g. on the road),and 'driven' at the 'macro' level. The micro level factors are, for example, many people want to move at the same time, too many vehicles for limited road space. On the other side, macro level factors are e.g. land-use patterns, car ownership trends, regional economic dynamics, etc. This study gives an overview and presents the possible ways to identify and measure metrics for urban arterial congestion. A systematic review is carried out, based on measurement metrics such as speed, travel time/delay and volume and level of service. The review covers distinct aspects like definition, measurement criteria followed by different countries/organizations. The strengths and weaknesses of these measures are discussed. Further, a short critique of measurement criteria is presented.

4 Methodology

4.1 Survey Images :



GENERAL CONCLUSIONS:

Traffic congestion is a major urban transportation problem. Different researchers have provided alternative definitions of traffic congestion. The rapid growth of travel demand and preferences for private modes have caused the vehicular traffic to grow at a fast rate, while the augmentation of the roadway infrastructure has not kept pace mainly due to shortage of funds. The growing congestion levels and resulting tremendous economic loss in terms of additional delay, user cost and increase in pollution have made the congestion to be the biggest challenge for the traffic engineers.

The present study is focused on the modelling of recurring congestion in mixed traffic operation on urban mid blocks. Before attempting to model congestion, it is essential to have an acceptable definition of the congestion and its quantification technique. The IRC and HCM define six different level of service taking only the operating speed level as a measure of effectiveness. In this study, the congestion level is used as measure of effectiveness to account for the definition of LOS. Using the Maitra's model the deterioration in the quality of traffic operation due to various roadway and control conditions has been estimated in terms of congestion level at different traffic volumes and speed levels at different level of service. Modelled congestion has been used for evolving the policy of congestion mitigation on urban roads. The congestion modelled developed under different roadway and control conditions have been used to assess the benefits from augmentation of supply by adding additional lane or lane width.

CONCLUSION:

- A new methodology has been developed using the speed variations as the basis for quantifying congestion in the form of loss in freedom of movement under prevailing roadway, traffic, and control conditions.
- Congestion can be quantified based on both the operational and volume characteristics by observed speed-flow variation.
- Based on traffic volume count and spot speed study, the average speed on this stretch 40 to 45kmph for two wheelers, for four wheelers it is 25 to 30kmph. 6 different LOS has suggested

according to congestion level have been proposed with 5 in a stable flow zone (presently designated as *A*–*E*), and 1 representing an unstable operation (presently designated as *F*). The LOS for arterial roads is 60kmph. Here we are getting less speed as compare to LOS criteria.

- The variation of congestion due to change in traffic and control conditions can be captured through Modelling. The calibrated coefficients of model are capable in capturing the contribution of different vehicles in the traffic stream.
- The effect of encroachments and on-street parking on congestion level has been quantified. In present study, on Vrundavan road the intensity of on-street parking and encroachment is high at evening time as compare to morning time so, it can be say that the congestion level at evening time is higher than after noon time on that road.
- Modelling congestion can be used as a tool for embraced Technique of Travel Demand Management. Promoting the usage of public transport while discouraging private modes and Para transit modes is an effective way of congestion mitigation on urban roads.

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