''Study Of Roundabout For Heterogeneous Traffic Condition''

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ABSTRACT

This thesis addresses the most important element of operational performance of roundabout traffic intersection in Malegaon on capacity analysis. The movements of the vehicles were observed at roundabouts along ring road in Malegaon. Gap acceptance and follow up time were estimated for cars for one hour analysis. The relation between the roundabout performance measure and capacity is expressed in terms of degree of saturation (volume – capacity ratio). The capacity analysis is done based on gap acceptance method that is adopted by Tanner based on HCM 2010. The traffic movement data with vehicle characteristics were collected from roundabouts in Malegaon. These roundabouts are directly related to their approach leg numbers. Approach entry capacity has been analyzed for all roundabouts at their legs. Effectively capacity verses entry flow relationship have been developed in order to find out the causes of their over saturation (v/c ratio greater than 0.8) and the result indicates; number of entry lanes, number of circulatory lanes and high traffic flow are the major causes of their over saturation.
Tanner models use the gap-acceptance theory (or critical headway) to simulate the behavior of entering vehicles and vehicles circulating within the roundabout. Finding a safe gap (or headway) within circulating traffic stream to enter the roundabout is the controlling variable that determines the ability of a approach vehicles to enter the roundabouts. Current research work on roundabout models mostly concentrates on determining the capacity of an approach based on the entering and circulating flows. Approach capacity is calculated as a mathematical function of critical headway and follow up headway.

Also the roundabout are replaced by actuated signal by using SIDRA 5.0 software and give the better results of LOS and decrease the delay and queuing length by comparing other two methods.

IndexTerms-Roundabout, Intersection, Crossing

I.INTRODUCTION

Roundabouts have been widely accepted and used in countries for decades. A roundabout is a form of intersection design and control that accommodates traffic flow in one direction around a central island. Compared to uncontrolled intersection, roundabout can reduce speed as well as number of conflict points because of the geometrical design. The overall delay will probably be less than that for signalized intersection. Therefore, it is necessary to evaluate the feasibility of roundabouts as an intersection control alternative in the city of Malegaon. The objective of this study is to estimate the capacity of roundabout by modeling weaving gap acceptance at the weaving sections. This paper does a careful analysis of the weaving section on capacity of roundabout. Besides, data collection has been conducted at 21 roundabouts of Beijing. Video cameras are used to help to collect data and autoscope device is used to do data reduction. Regression analysis has been made to calculate the relationship between the circulating flow and the entry flow. On the basis of the previous practice, this article obtains experiential formulas from certain reference in which capacity of weaving segment is introduced. Hopefully, this study will provide valuable support for capacity estimation of a roundabout. Significant study has been done to develop methodologies to evaluate the functional performance of roundabouts. The significance of this research is to evaluate the capacity of roundabout as an intersection control alternative in Beijing. Roundabouts can be a good replacement for all-way stop control where traffic volume are high, because priority is assigned to circulating traffic and yield-at-entry control allows vehicles to enter without stopping when gaps are available. Capacity models for the weaving sections using gap acceptance theory and regression analysis techniques are developed in this paper. Capacity is a useful indicators used by most countries to assess roundabout performance.

II METHODOLOGY

The priority stream, or major stream, is defined in this study stream of movement that can pass the roundabout without delay. This is usually assumed to be the circulating stream of movement for roundabouts. The minor stream is the stream of movement that can only enter the conflict area if the next major stream vehicle leaves enough gap for passing. Thus, the capacity of the roundabout depends primarily on the circulating flow and the availability of gaps. Since the entry stream of movement decreases if the circulating flow increases, because there are fewer gaps for vehicles entering roundabout. Therefore, the addition of each entry capacity should not be considered equivalent to the capacity of roundabouts. This paper used the concepts of reserve capacity to create a new method to calculating the capacity of roundabouts. The substance of this concept is that when the stream of vehicles at the weaving section achieves the capacity and becomes the bottleneck of the roundabout, the sum of all flows at weaving sections in all directions is the capacity of roundabouts.

Traffic signals:- traffic signals are one of the more familiar types of intersection control. Using either a fixed or adaptive schedule, traffic signals allow certain parts of the intersection to move while forcing other parts to wait, delivering instructions to drivers through a set of colorful lights (generally, of the standard red-yellow (amber)-green format). Some purposes of traffic signal is to (1) improve overall safety (2) decrease average travel time through an intersection, and (3) equalize the quality of services for all or most traffic streams. Traffic signals provide orderly movement of intersection traffic, have the ability to be flexible for changes in traffic flow, and can assign priority treatment to certain movements or vehicles, such as emergency services. At intersection where there are a large number of crossings and right turn traffic, there is possibility of several accidents as there cannot be orderly movement. The earlier practice has been to control the traffic by means of traffic police by showing stop signs alternately at the cross roads so that one of the traffic streams may be allowed to move while the cross traffic is stopped. Thus the crossing streams of traffic flow are separated by time, segregation. Traffic signals are control devices which could alternately direct the traffic to stop and proceed at intersection using red and green traffic light signals automatically. The main requirement of traffic signals are to draw attention, provide meaning and time respond and to have minimum waste of time. Traffic signal characteristics:- modern traffic signals allocate time in a variety of ways, from the simplest two-phase pretimed mode to the most complex multiphase actuated mode. There are three types of traffic signal controllerschange and clearance interval that are repeated in each cycle to produce a constant cycle length. Fully actuated, in which the timing on all of the approaches to an intersection is influenced by vehicle detectors. Each phase is subject to a minimum and maximum green time, and some phases may be skipped if no demand is detected. The cycle length for fully actuated control varies from cycle to cycle. Semi actuated, in which some approaches (typically on the minor street) have detectors and some of the approaches (typically on the major street) have no detectors. While these equipment-based definitions have persisted in traffic engineering terminology, the evolution of traffic control technology has complicated their function from the analyst's perspective. For purposes of capacity and level-ofservice analysis.

It is no longer sufficient to use the controller type as a global descriptor of the intersection operation. Instead, an expanded set of these definitions must be applied individually to each lane group. Each traffic movement may be served by a phase that is either actuated or nonactuated. Signal phases may be coordinated with neighboring signals on the same route, or they may function in an isolated mode without influence from other signals. Nonactuated phases generally operate with fixed minimum green times, which may be extended by reassigning unused green time from actuated phases with low demand, if such phases exist. Actuated phases are subject to being shortened on cycles with low demand. On cycles with no demand, they may be skipped entirely, or they may be displayed for their minimum duration. With systems in which the non actuated phases are coordinated, the actuated phases are also subject to early termination (force off) to accommodate the progression design for the system. Not only the allocation of green time but also the manner in which turning movements are accommodated within the phase sequence significantly affects capacity and operations at a signalized intersection. Signal phasing can provide for protected, permitted, or not opposed turning movements. A permitted turning movement is made through a conflicting pedestrian or bicycle flow or opposing vehicle flow. Thus, a left-turn movement concurrent with the opposing through movement is considered to be permitted, as is a right-turn movement concurrent with pedestrian crossings in a conflicting crosswalk. Protected turns are those made without these conflicts, such as turns made during an exclusive left-turn phase or a right- turn phase during which conflicting pedestrian movements are prohibited. Permitted turns experience the friction of selecting and passing through gaps in a conflicting vehicle or pedestrian flow. Thus, a single permitted turn often consumes more of the available green time than a single protected turn. Either permitted or protected turning phases may be more efficient in a given situation, depending on the turning and opposing volumes, intersection geometry, and other factors. Turning movements that are not opposed do not receive a dedicated left-turn phase (i.e., a green arrow), but because of the nature of the intersection, they are never in conflict with through traffic. This condition occurs on one-way streets, at T-intersections, and with signal phasing plans that provide complete separation between all movements in opposite directions (i.e., split-phase operation). Such movements must be treated differently in some cases because they can be accommodated in shared lanes without impeding the through traffic. Left turns that are not opposed at any time should be

IIICONCLUSION

We have find out that our proposed method is able to provide a most efficient traffic signaling method till now. We can definitely conclude that design of traffic signal will help in advancing transportation network to provide ease & safety to the using it. They will provide easy & efficient control over the movement of vehicles at Intersections. It will lead to minimum time delay resulting in saving in fuel & hence the cost of travelling will minimize achieving economy. Also there will be less pollution as vehicles have to wait for no such longer time than before. Traffic signals will also reduced the conflict points at intersections will minimize the accident. Thus resulting in overall efficiency & economy will assist the road user for better experienced. We have given a brief ideology for the different aspects of signal methodology and provide our proposed method to resolve the three most important issues related with traffic i.e cost, time and fuel saving of vehicle .We can achieve a better prospect by using the proposed method. As future work we can proceed towards the vehicle automation of vehicle especially heavy vehicle by using the wireless sensor network and internet protocol

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