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Alleviating Traffic Signal Design at Kacherippadi Junction

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Abstract: ***Improved traffic management and control systems are widely reported to be cost effective investments. As vehicular traffic began to increase, the congestion on the street to begin to hamper thus safe and efficient movement of traffic. The problem of traffic accidents and congestion in urban roads is being viewed with grave concern in the recent years. The main cause for this problem improper planning of road network and other roadway facilities and poor traffic planning. Simply retiming signals can provide significant benefits by reducing vehicle stops, travel times, and fuel consumption. The installation of advanced traffic management systems (ATMS) can provide even greater savings. However, many hardware and software obstacles are impeded the actual implementation of advanced traffic management systems. For this project we have chosen an intersection at Kacherippadi, where traffic congestion is more and we are planning to do a traffic signal, for that we counted traffic in that area, after analyzing and examining the speed data, average vehicle at a peak time, number of vehicles per day. Pedestrian movements, to reduce the congestion problems.***

Keywords: vehicular traffic planning, ATMS, traffic management, traffic congestion

I. INTRODUCTION

The study consists of conducting various types traffic survey for collecting data for the preparation of development plan. The traffic survey include road inventory survey, traffic volume survey, speed and delay survey, parking surveys and pedestrian surveys. The data collected are being analyzed. The total station survey is also conducted for understanding the geometrical features of accident spots identified in accident survey. The application of GIS is also used to represent the traffic features of study area.

The basic object of traffic engineering is to achieve efficient free and rapid flow of traffic, with least number of traffic accidents

The objectives identified for the study are as follows:

- To obtain current traffic volume and characteristics of road.
- To reduce accidents.
- To identify the traffic conflicts in major & minor streams in a particular intersection/junction.
- To estimate the basic traffic stream parameters for the selected road.
- To estimate the condition of study road.
- Reduce the frequency of accidents and delays.
- To evaluate the condition of study road.
- To better categorize and orderly traffic movement.
- To design and provide the signal timings at “Kacherippadi junction”.

1) *Cycle:* A signal cycle is one complete rotation through all of the indication provided
2) *Cycle Time:* Cycle length is the time in seconds that it takes a signal to complete one full cycle of indications. It indicates the time interval between the starting of green for one approach till the next time the green start. It is denoted by C_0.

$$Co = \frac{1.5\,L + 5}{1 - y}$$

L= Total lost time per cycle

This value is used in estimating the overall capacity of the intersection by deducting the sum of the lost times for each of the critical movements from the overall cycle length.

$$L=2N+R$$

N= No. of phase in cycle

R= Total red time

Y= Constant

$Y= y_1+y_2+y_3+\ldots\ldots\ldots+y_n$

$Y =q_1/s_1+q_2/s_2+q_3/s_3+\ldots\ldots\ldots+q_n/s_n$

q = Normal Flow

s = Saturation Flow

3) *Normal Flow:* The normal flow of the traffic is also determined on the approach roads from the field studies for the design period (during the peak or off-peak hours as the case may be).

4) *Saturation Flow:* The maximum number of vehicles that can move past the stop bar in one lane group per unit of time, usually per hour (veh/h).

S=525w PCU/hour

S= saturation flow

w= width of approach road in meters measured kerb to inside of pedestrian refuge or centre line, whichever is nearer, or to the inside of centre reserves in case of dual carriage way.The above formula for saturation flow is valid for width of from 5.5 to 18 m. When the approaches are in a gradient, the saturation flow needs some adjustment. Approximately this can be done by decreasing the saturation flow by 3 per cent for each 1 per cent uphill gradient and increasing the saturation flow by 3 per cent for each 1 per cent of downhill gradient.

5) *Passenger Car Unit (PCU):* The PCU may be considered as a measure of the relative space required of a vehicle class in compared to that of passenger car under a specific set of road way traffic and other conditions. If the addition of one vehicle of a particular class in the traffic stream produced the same effect as that due to the addition of one passenger then the PCU of that vehicle equal to 1.0. The PCU value of a vehicle class may be considered as the ratio of the capacity of a roadway when there are passengers' cars only to the capacity of the same road way when there are vehicles of that class only.

6) *Effective Green Time:* It is the green indication for a particular movement or set of movements and is denoted by $_G$. This is the actual duration the green light of a traffic signal is turned on.

7) *Red Time:* It is the red indication for a particular movement or a set of movements and is denoted by $_{Ri.}$ This is the actual duration the red light of a traffic signal is turned on.

8) *Amber Time:* The transition interval between the termination of a related green signal and exhibition of a red signal. The amber period is generally 2 seconds, but may last up to 4 seconds, depending upon the traffic and pedestrian movements.

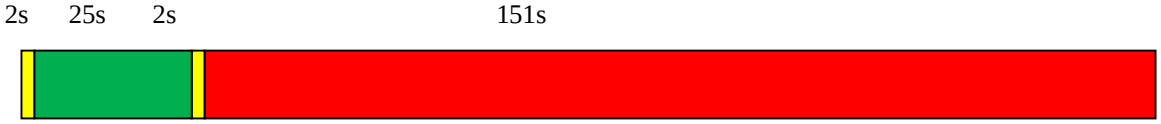

Figure 1.1 :from manjeri

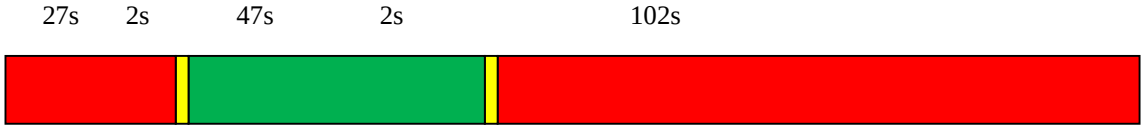

Figure 1.2: From thurakkal

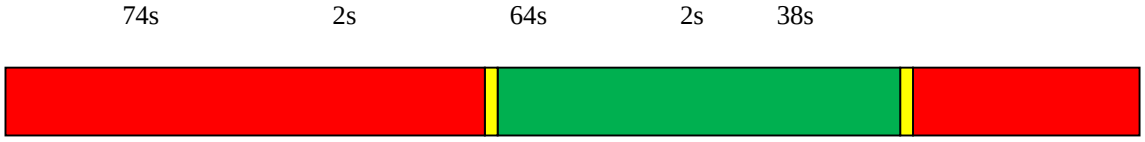

Figure 1.3: from malappuram

Figure 1.4:from payyanad

II. CONCLUSIONS

In our locality many people shifting to use public transport and carpooling also helps to reduce the traffic congestion, in our project site Kacherippadi we were planned to do some traffic signals, for that we have analyzed the traffic congestion on the particular area, for that we identified. The peak hours are 9:45-10:45 in the morning and 4:00-5;00 in the evening. Based on the calculations done on the PCU values obtained from the traffic survey. The optimum cycle length was found to be 180s. The signal is designed as per IRC guidelines IRC: SP-106, IRC: SP-41 so that the signal can justify the proper movement of traffic. Here we found that the kacherippadi junction was suffering heavy traffic and we are provided the effective traffic signal timing. By providing the signals, there will be reduction in the conflicts. And also, there will be an orderly movement of traffic in the cross-section for the roads.

III.ACKNOWLEDGMENT

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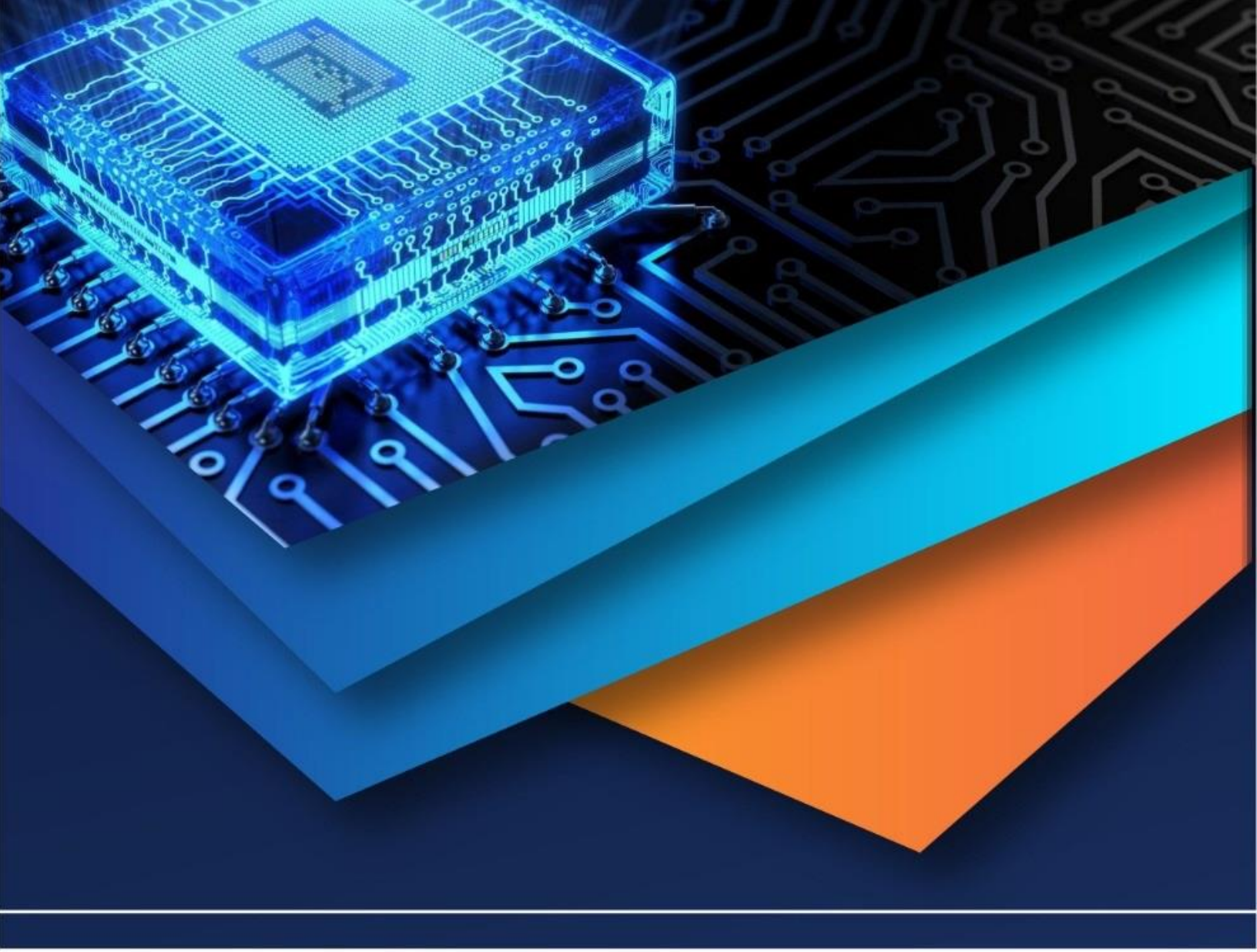

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