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# STUDY OF HETEROGENEOUS TRAFFIC AT PAKWAN CROSSING

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**Abstract:** The traffic of an urban area increases rapidly due to the growth in population and vehicle ownership. With the advancement in transportation and urbanisation, traffic congestion has become the main socio-economic problem in urban as well as rural areas in developing countries. Careful and balanced management is required for this increased traffic problems. The urban road of India generally carries the heterogeneous traffic which is the combination of various types of vehicles like cars, buses, motor cycles, trucks, auto rickshaws, carts, etc. These all vehicles have different size, speed, load carrying capacities or passenger capacities, etc. which affect the traffic flow. In case of homogeneous traffic the characteristics of traffic does not change abruptly, as the traffic mainly consisting of same type of vehicles. While in case of heterogeneous traffic, there is a combination of different type of vehicles which have a remarkable variation in the traffic stream characteristics. Traffic congestion is managed conventionally by signalisation, widening the roads, interchanges and intersections. Intersections provided sometimes prove the best but growth of population leading to continuous increase in traffic brings with it a deadlock condition. Intersections are the junction (at same level) of two or more roads either meeting or crossing. This study deals with cross intersection provided at Pakwan cross road, connecting Sarkhej-Gandhinagar Highway and Bodakdev-Sindhubhavan Road. The study works for three main parameters: Capacity of Intersection, Study of Heterogeneous traffic flow and suitable measures to be taken for reducing traffic congestion and reconfigure the intersection. The main objective is to survey the study area and to find out the actual reason for the traffic congestion and to give necessary suggestions for solving the problem.

**Keywords:** Urban Roads, Traffic Composition, Heterogeneous Traffic.

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**INTRODUCTION**

Transportation Infrastructure plays a lead role in economic growth and development of the country. The traffic of an urban roads increases rapidly due to the growth in prosperity and vehicle ownership of urban population. The problems occurred due to this increased traffic have also become more and more complex. Intersections are categorized based on the grade and division of movements (at-grade, grade-separated and interchanges). Grade separated intersections may be as simple as bridges and tunnels that separate through traffic streams or as complex as interchanges that incorporate separate dedicated roadways for turning traffic. At-grade intersections are the junction (at same level) of two or more roads either meeting or crossing viz: 3-way (T, Y) intersection, 4-way (Rotary, Regular, Skewed) intersection, 5-way (Roundabouts, Uncommon) intersection, 6-way (having various streets joining more than 5 or 6) intersection.

Rotary intersections or roundabouts are special form of at-grade intersections laid out for the movement of traffic in one direction around a central traffic island. The vehicles entering the rotary are gently forced to move in a clockwise direction in orderly fashion and weave out of the rotary to the desired direction.

**Need of Study**

With the advent in the growth of population causing the boom in the traffic problems has led to the study. Research and development is needed to document the existence situation over the heavy loaded roads and highway networks so as to substantially reduce the fatal and injury crashes. So it is required to reassess the design and traffic flow so as to have a much safer way of travel.

i. Deadlock conditions due to heavy trucks and trailers, light vehicles with local traffic from nearby areas at the Pakwan Crossing.
ii. Improper planning of signals.
iii. Obstruction to the straight moving vehicles of right turning vehicles from opposite direction.
iv. Lack of space for increasing of the width of road network.

**Objectives**

The study involves the assessment of the crossing through traffic volume count and codal provisions. Later to perform the comparative evaluation of the existing situation through simulation analysis in VISSIM. So, the study has brief objectives as follow:

i. Study of traffic composition and various road widths.
ii. Evaluating the capacity of intersection.
iii. To propose the suitable alternatives and recommendations.

**Scope of Study**

Scope of the study includes the following:

i. Data Collection of the existing facility.
ii. Find out the capacity of the intersection.
iii. To propose the suitable alternatives and recommendations.

**Study Area**

This study deals with cross intersection provided at Pakwan cross road, connecting National Highway-8C (Sarkhej-Gandhinagar Highway) and Bodakdev-Sindhubhavan Road. The study works for three main parameters: Capacity of Intersection, Study of Heterogeneous traffic flow and suitable measures to be taken for reducing traffic congestion and reconfigure the intersection.

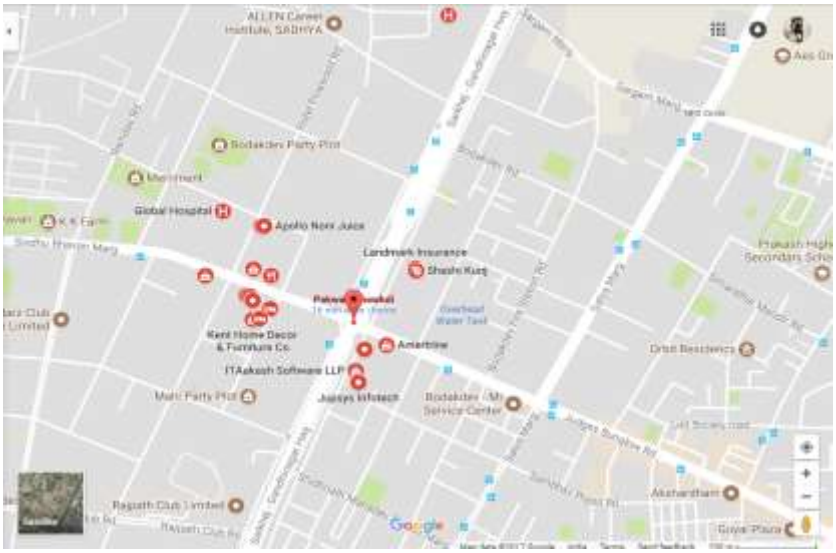
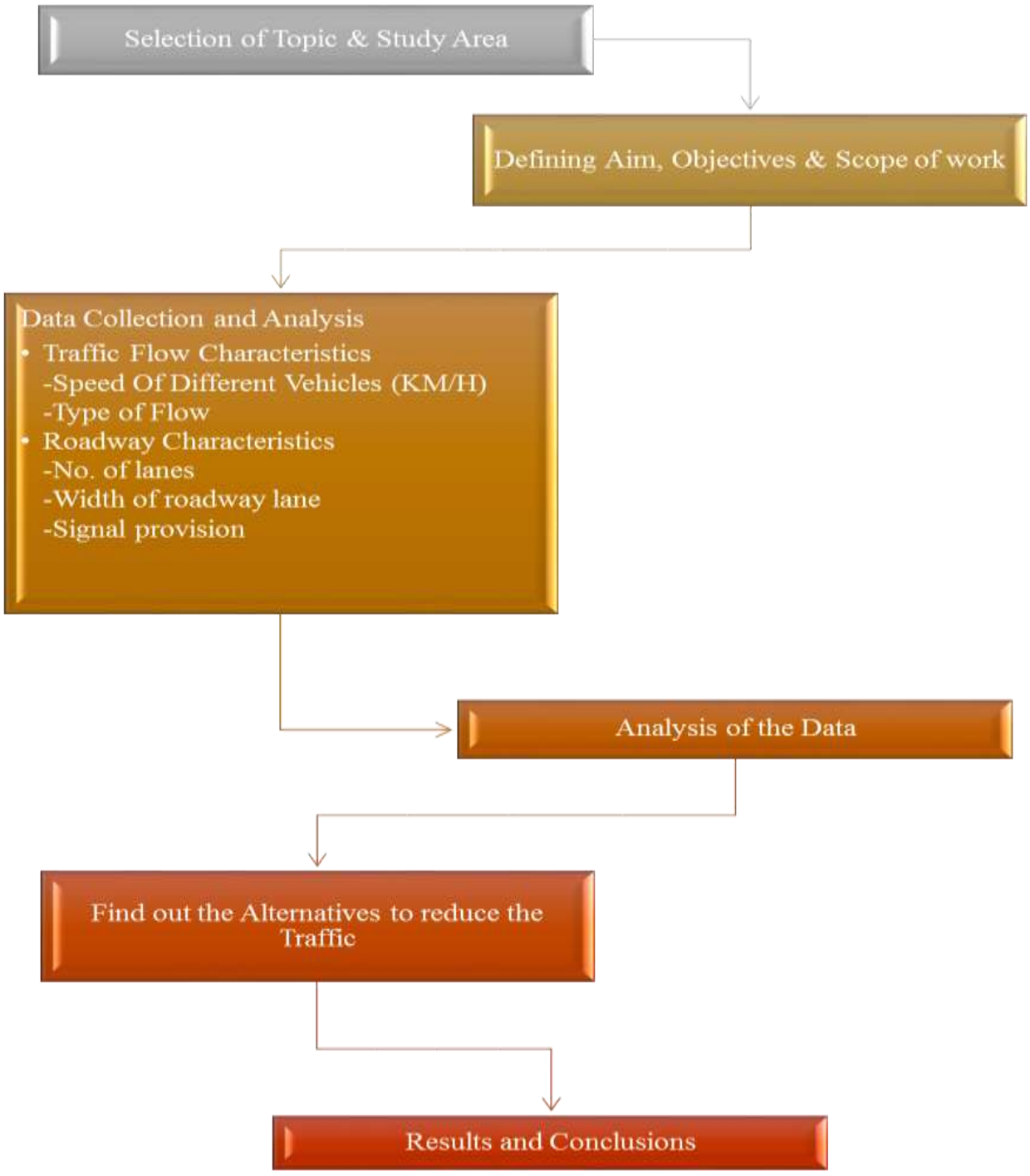



**Fig.1 Map of Pakwan Crossing**

**METHODOLOGY**



**Data Collection**

In the present study, the video graphic method and manual methods were adopted for collection of traffic data and measuring the flow. At the junction, the video camera was placed on the top of the adjacent building (Pakwan Restaurant building). A continuous video graphic survey was carried out for 3 hours in the morning and in the evening. After collecting the data the analysis has been done by replaying the video.

**Fig.2 Data Collection by Videography**

**Table 1: Road Stretches with Lane Details**

| Sr. No. | Name of Stretch | No. of Lanes | Width of Each Lane | Total Width (One Direction) |
|---|---|---|---|---|
| 1 | Pakwan to Sarkhej | 6 | 3.5 | 11 |
| 2 | Pakwan to Gandhinagar | 6 | 3.5 | 11 |
| 3 | Pakwan to Sindhubhavan | 6 | 3 | 11 |
| 4 | Pakwan to Judges Bunglow | 4 | 3 | 7.5 |

The above table gives the details of different stretches including name of the stretch, no. of lanes, width of each lane and total width of road. All the signals provided are fixed time signals, having green interval of **60 seconds** on both directions on S.G.Highway, **30 seconds** on

Sindhubhavan to Judges Bunglow Road and **40 seconds** on Judges Bunglow to Sindhubhavan Road.

## CONCLUSION

In present study, it is found that VISSIM is most suitable software to represent heterogeneous traffic conditions on urban road stretches for the study area. The data collected in these study can be used for the model generation in VISSIM.

We can propose suitable alternatives and recommendations by comparison of manual data collection and model generation in VISSIM to reduce the traffic problems at the junction. These alternatives can be: change in signal cycles, diversio0n of traffic, special restrictions on traffic movements etc.

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