

## A STUDY FOR FEASIBILITY OF FLYOVER BRIDGE AT INTERSECTION ON RING ROAD IN METROCITY: A CASE STUDY OF VRUNDAVAN INTERSECTION, VADODARA

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**Abstract** — *Rapid urbanization and industrialization have caused an unprecedented growth of vehicles in the world. The urban traffic congestion has a global phenomenon. Environmental pollution problems are also faced by humanity on these days. Due to fast growing vehicular traffic, old planned cities become congested road links, intersection become saturated, busy and supply service is above its capacity. Therefore, it requires effective controls to regulate the traffic and optimize delay and congestion of the traffic at the intersection. This problem can be eliminated by providing Flyover Bridge at intersection.*

*This research is mainly focused on feasibility of Flyover Bridge at highly congested intersection. This research is consider the traffic survey like classified volume count survey, speed and delay survey and also collect the data like accident data, population and vehicle growth data of study area. Economic evaluation will be carried out for the Vrundavan intersection. From this research it revealed that for better & efficient transportation infrastructure in urban area at highly congested intersection should gave the facilities if Flyover Bridge may be satisfy the needs.*

**Keywords-** *component: transportation problems, traffic congestion at intersections, Flyover Bridge, traffic surveys, economic evaluation*

### I. INTRODUCTION

Transport is an important part of India's economy. The urban population in India has increased significantly India is a developing country and its cities are undergoing rapid urbanization and modernization as a result there is rapid growth in the road traffic. Traffic movement in India is very complex due to the heterogeneous traffic stream sharing the same carriageway. Cities play a vital role in generating economic growth and prosperity. The sustainable development of cities largely depends upon their physical, social and institutional infrastructure. In this context, the importance of transport infrastructure is paramount.

Urban Transport systems in large developing cities face major challenges due to the continuous growth of urban population, private vehicle ownership, congestion, and the fragility of public transportation systems. When the urban transport system experiences major difficulties, consequences are felt by households, by businesses, and by the urban community at large. Transport may become a binding constraint on both economic growth and social development and inclusion, along with increased negative impacts on health and on the environment. The rapid growth of large cities due to the growth in population coupled with increase in urbanization has posed serious challenges in developing adequate infrastructure facilities. Travel demand has risen sharply exceeding the available supply in transportation infrastructure and services. All the Indian cities irrespective of their sizes and forms are suffering from severe traffic and transportation problems.

Due to fluctuation of vehicle population in the city it is not possible to stop traffic and it is very difficult to provide extra land as per traffic demand. At the intersection traffic jam problem may causes delay time and fuel consumption due to frequently stoppage of vehicles at different intersection. Many conflict points at intersections the rate of accident will be increase. Due to fast growing vehicular traffic, cities become congested and road links, intersection become saturated, busy and supply service is above its capacity. Therefore, it requires effective controls to regulate the traffic and optimize delay and congestion of the traffic at the intersection. Space sharing intersection e.g. rotaries and pre timed signals are widely used to control the intersections. Space sharing intersections are intended to give equal priority and permit continuous movement of all intersecting vehicle flows. For higher traffic volumes, space sharing intersections such as rotary is not preferable due to increase in congestion and overall intersection delay and conflicts. In pre timed signal, green times for the phases remain constant for the particular period of the day, although demand fluctuates during that period. This problem can be eliminated by providing flyover at intersection. The flyover construction need very massive amount of investment and it also effect the economy of the country so before construction we have to check feasibility of the flyover so that we can come to know that from this project we can achieving our desire goal or not, and it will overcome the transportation problem and beneficial in future or not.

### 1.1 Objectives of study

- To study the present situation of traffic at Vrundavan intersection.
- To collect data of population growth and vehicle growth.
- To collect the past accident data.
- To carry out the different traffic surveys at study area.
- To find out the benefits of flyover at particular intersection.
- To check construction of flyover at particular location will economically feasible or not.
- To calculate fuel consumption saving, user travel time saving and Vehicle operating cost (VOC) saving due to construction of flyover at intersection.

### 1.2 Scope of study

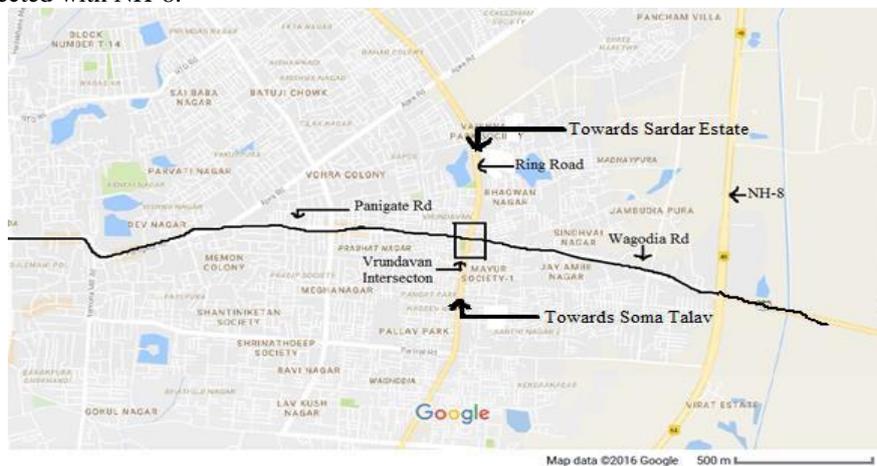
- Various types of field surveys like traffic classified volume count survey, traffic speed and delay survey, occupancy survey will be carried out at particular location.
- Fuel consumption, passenger travel time of the vehicle due to traffic delay will be calculated after traffic data collection.
- User travel time saving, Vehicle operating cost (VOC) saving due to construction of flyover at intersection will be calculated.
- To carry out economic analysis for checking the viability of project.

## II. STUDY AREA

Vadodara is third largest city of Gujarat and eighteenth largest city of India. It is situated on banks of river Vishwamitri. It has an area of 159.95 sq.km and urban population of 1.8 million (Census 2011). It is known as 'cultural city' and the city shows rapid growth in the sectors of Education, Industrial, Infrastructural and Urbanization.

Vadodara city is located at Delhi-Mumbai corridor. Vadodara city is well connected by an expressway, several national and state highways, the broad-gauge and meter-gauge railways and international airport. The city transportation is mainly dependent on roadway system. Vehicle growth has been rapid. The network is expressing heavy congestion. Consequently air pollution has become severe.

Vrundavan intersection is located at 40mt ring road in Vadodara city. It is the outer ring road of the city. Perpendicular to ring road one phase is Panigate road which is connected with CBD area of Vadodara city and another phase is Wagodia road which is connected with NH-8.



**Figure 1:- Location of study area**

## III. IDENTIFYING THE PROBLEM

For Increase in urban traffic congestion has become a serious matter in urban cities. In urban road networks, the intersections are very large and very close to each other. More traffic congestion is observed especially during peak hours. In fact, in urban areas exciting roads or the scope of improvement of intersection at-grade is very limited. So, due to the unavailability of land in urban city improvement is requiring for fast, safe and smooth movement of vehicle. It's achieved by constructing flyover at intersection.

Study area Vrundavan intersection is having poor geometry and poor road surface. Now Vrundavan intersection faced heavy traffic congestion. Efficiency of signal is decrease due to increase in vehicle growth. Due to low efficiency of signal number of Traffic police is required at intersection for managing traffic situation. Autorickshaw is stay on carriageway so decrease the space of carriageway for moving vehicles.

Due to this:-

- Increase travel time.
- Increase air and noise pollution.
- Increase in fuel consumption.
- Increase the chances of accident.



Figure 2:- Traffic at intersection

#### IV. METHODOLOGY

It is required to frame the methodology to be followed before starting the actual research work. For the feasibility study of Flyover Bridge, data works as raw material for analysis, planner and design maker. Without qualitative and detail data, Scientific analysis becomes difficult.

To achieve the objectives a methodology is framed. Complete flowchart of each activity showing various stages involved is shown in fig. For this work study area is identified for collecting data. Main stretches of the study area identify the problems, such as delay in travel time, loss of fuel consumption, air pollution, and noise pollution. Traffic data are collected from the field survey at location and is used for analysis purpose. Economic evaluation is carried out for justification of Flyover Bridge.

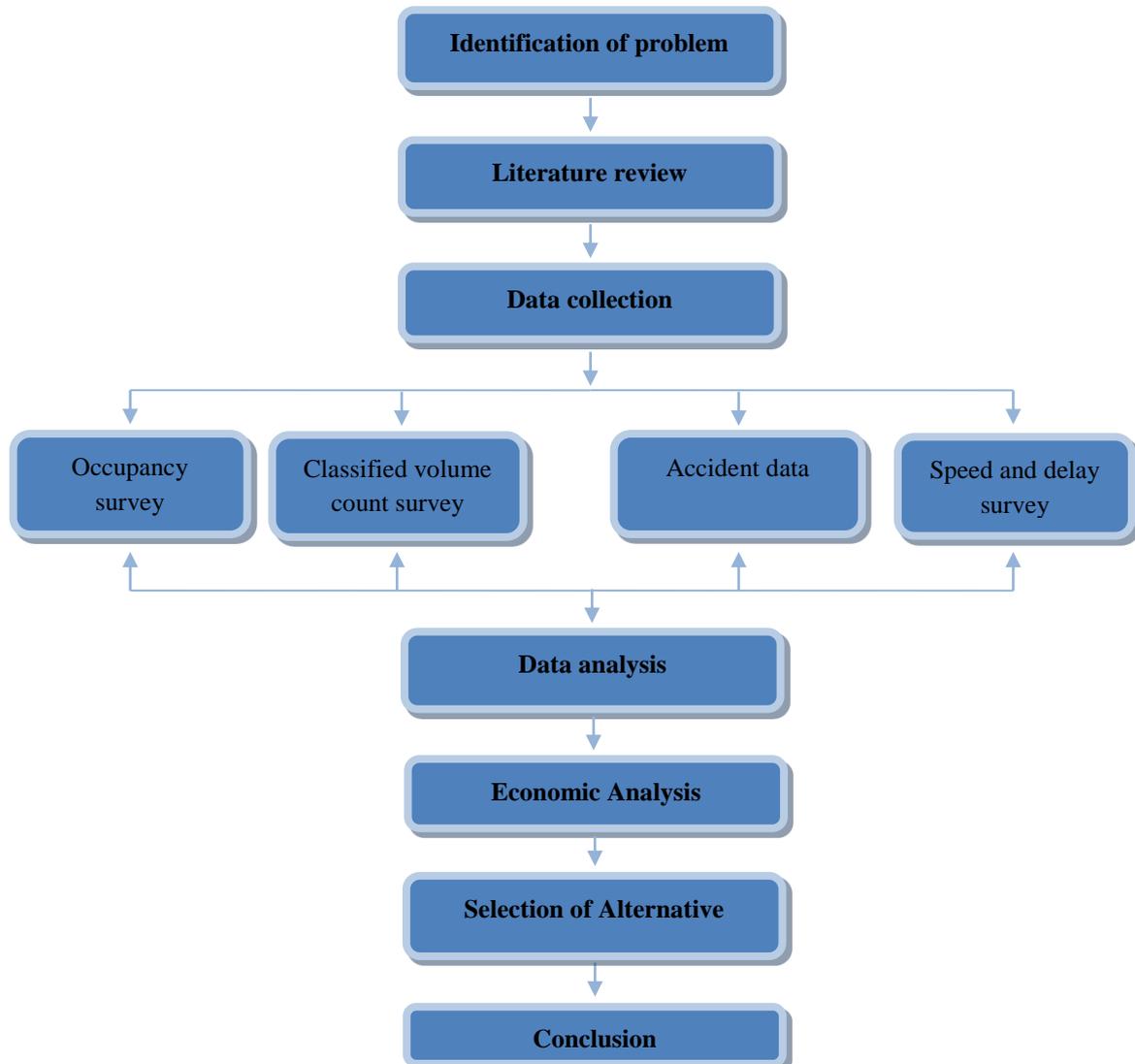


Figure 3:- Methodology flow chart

#### IV. CONCLUSION

In this research paper study was taken into account for the fast, smooth and efficient infrastructure in the metro city. Ring road is made for the smooth flow of traffic it reduces the travel time for local traffic and helps driver to avoid city's most congested areas. Due to intersection on ring road it increases the travel time, delay, risk of safety for pedestrians, increases the chances of accident and ring road traffic flow is obstructed by the alternative road. So the flyover bridge at intersection is beneficial for the fast, smooth and convenient flow of traffic.

Its benefits like:

- Reduce the congestion on ring road
- Travel time saving
- Fuel saving
- Reduce the accident
- Increase the pedestrian safety
- Reduce the noise and air pollution
- Reduce alternative road traffic obstruction on ring road

In this research economical analysis is used for justification of the project. Economic evaluation methods like benefits cost ratio and NPV will be used for project justification.

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