

A STUDY OF TRANSPORT PLANNING AND TRAFFIC ROUTING ANALYSIS THROUGH CLOVERLEAF ROAD PLAN: A SPECIAL REFERENCE TO SHASTRI PARK JUNCTION (DELHI)

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Abstract: A road stretch is incomplete without junctions. If traffic isn't flowing smoothly, they're a common place for accidents to occur. In both rural and urban regions, the fundamental principles of design remain the same. Differences in design speeds, available land restrictions, sight distance, and the huge number of pedestrians and cyclists in metropolitan settings all contribute to the final result being either faster or slower. Grade separation is a technique of intersection in which one or more crossing roadways or distinct means of transportation are separated in space at different heights from each other (grades). As a result, an interchange is the pinnacle of junction design. Shastri park junction (Delhi) justifies an interchange since the cumulative traffic of all the intersection's axes exceeds 10,000 pcu/hour, according to a traffic study. North East Delhi, India, has a key intersection connecting important connection routes and city streets. There is also a famous Akshardham temple located about 7 kilometres away from this intersection, which connects to the Shastri Park metro station and Delhi's Inter State Bus Terminal (ISBT). The design of this grade-separated structure contains inventory information, traffic surveys, traffic analysis, and the suggested design of a grade separated structure. In light of the present traffic patterns at Shastri Park Junction, it is recommended to use a partial/half clover leaf. At the intersection, complete cloverleaf proposals may also be used, although as can be found from the result, the region is highly inhabited and home to several high-rise structures. Although it is possible to remove all traffic conflicts and associated concerns by presenting a complete cloverleaf road plan, it is also possible that extensive demolition of built-up areas, both in terms of compensation and construction costs. This thesis presents the current Transport planning and Traffic Engineering problem in respect to traffic of Delhi.

Keywords: Transport planning, Traffic Routing Analysis, road stretch, Inter State Bus Terminal

I. INTRODUCTION

Grade separation is a technique of intersection in which one or more crossing roadways or distinct means of transportation are separated in space at different heights from each other (grades). As a result, an interchange is the pinnacle of junction design. Shastri park junction (Delhi) justifies an interchange since the cumulative traffic of all the intersection's axes exceeds 10,000 pcu/hour, according to a traffic study. North East Delhi, India, has a key intersection connecting important connection routes and city streets. There is also a famous

Akshardham temple located about 7 kilometres away from this intersection, which connects to the Shastri Park metro station and Delhi's Inter State Bus Terminal (ISBT). The design of this grade-separated structure contains inventory information, traffic surveys, traffic analysis, and the suggested design of a grade separated structure.

The following are examples of interchanges that may be grouped into one of four categories:

- The diamond interchange is an example of this.
- Directional inter change
- Interchange Cloverleaf
- Interchange between the trumpet and the oboe

II. SITE SELECTION, DATA COLLECTION & METHODOLOGY

Research Methodology (Data collection methodology)

1. A wide variety of methodologies and data collecting were used by researchers to accomplish their goals. Traffic data collection and analysis play a significant part in junction improvement traffic studies. As a consequence, the following procedures have been followed in order to arrive at the following conclusion:
 2. Site selection
The Shastri park intersection at Pushta Road, a four-arm junction currently controlled by a traffic signal, is the focus of the current investigation. Traffic congestion is expected as a result of the lack of traffic signal enforcement. Figure 1.1 depicts the junction's key map.
 3. Reconnaissance
Reconnaissance was conducted in the study region in order to get first-hand knowledge of the project road status, analyse traffic characteristics along the project road, and examine possibilities and restrictions for traffic diversion along this project road. The Project Influence Area (PIA) was established.
 4. Secondary Data collection
Secondary data has been gathered from a variety of sources, including the Internet.
 - a) Maps of Major District Roads, Interstate Highways, and State Highways
 - b) State, District, and Project Economic Database
 - c) The selling of fuel Information from the Petroleum Planning and Analysis Cell on a sampling basis (PPAC)

5. Primary Survey
Different types of traffic surveys are included in this study, such as the Traffic Volume Count, the Origin-Destination Survey, and the Turning Movement Count.
6. Traffic study and Analysis of data
To acquire the output and to know traffic flow characteristics, data processing and traffic analysis were performed after the gathering of data from the site.

Types of surveys and their locations

The Mid-Block site has a classified traffic figure. Many highway and intersection construction projects involve a basic traffic study, which includes counting traffic. Over the course of seven days at two sites, as well as three days at two additional locations on and near the project route, the volume of classified traffic was counted for 24 hours each day. Directional traffic on the road is monitored for statistics. Table No.3.2 and Figure 3.1 show the survey sites, which are shown below.

PCU Factor

Table 1 shows the traffic count unit factor that was used in the analysis:

Table 1: The Traffic count unit factor

Vehicular Modes	PCU VALUE
Car/ Van/ Jeep/ Taxi	1.0
2-Wheeler	0.5
3-Wheeler	1.0
Bus	3.0
Mini Bus	1.5
LCV	1.5
2-Axle Truck	3.0
3-Axle Truck	3.0
Multi Axle Vehicles (MAV)	4.5
Agricultural Tractor - Without Trailer	1.5
Agricultural Tractor- With Trailer	4.5
Cycle	0.5
Cycle-Rickshaw	2.0
Hand Cart	3.0
Bullock Cart	6.0

III. ANALYSIS AND DATA COMPUTATION

General

The importance of traffic engineering in the development of traffic operations in major cities like Delhi, Mumbai, Bangalore, Kolkata, etc. has finally been acknowledged. The most critical pre-requisite for any enhancement to traffic infrastructure is a thorough examination of traffic characteristics. Many people utilise the road for a variety of diverse reasons, and the traffic patterns are highly complicated as a result. Apart from these different studies on traffic flow, origin-destination studies, accidents, and other aspects of traffic, the research of vehicle characteristics is crucial. As a consequence, the information gathered from the site has been examined and analysed further.

Traffic studies

Average Daily Traffic

Project road ADT ranges from 18,215 to 1,04,609 PCUs per day, according to the study's data. Table 2 provides the specifics.

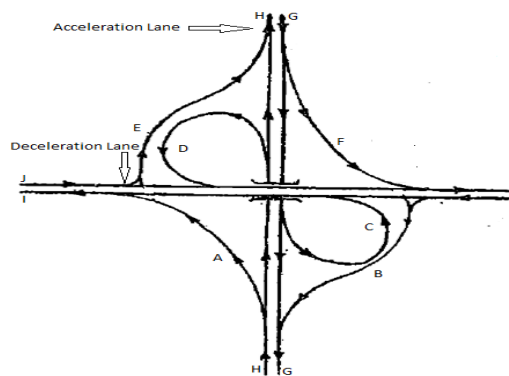
Table 2: Traffic Characteristics at mid-block location

Mode		TVC-01 (Mandaula)	TVC-02 (Vijay Vihar)	TVC-03 (Singhu Border)	TVC-04 (Badarpur Border)
Heavy Fast Passenger Vehicles	Standard Bus	121	89	534	203
	Mini Bus	46	16	69	54
Light Fast Passenger Vehicles	Car/ Van/ Jeep/ Taxi	7743	11026	39377	17780
	3-Wheeler	414	2265	1498	7186
	2-Wheeler	4071	3528	9570	14295
	LCV Passenger	3444	1276	35251	8957
Goods Commercial Vehicles	LCV Freight	422	131	2003	1072
	2-Axle Truck	608	84	2426	1145
	3-Axle Truck	223	76	539	828
	MAV	59	28	2001	1111
Agricultural Vehicles	Tractor	109	313	96	774
	Tractor Trailer	11	18	134	541
Slow Vehicles	Cycle	1077	254	692	621
	Cycle Rickshaw	0	0	0	2

IV. RESULT/DISCUSSION

In light of the present traffic patterns at Shastrri Park Junction, it is recommended to use a partial/half clover leaf. At the intersection, complete cloverleaf proposals may also be used, although as can be seen in Fig. no. 1.1, the region is highly inhabited and home to several high-rise structures. Although it is possible to remove all traffic conflicts and associated concerns by presenting a complete cloverleaf road plan, it is also possible that extensive demolition of built-up areas, both in terms of compensation and construction costs, is required. Half-cloverleaf intersections will lessen traffic congestion, but they won't completely eliminate it. The following is a list of the components and design requirements for a partial/half cloverleaf: -

1. It is a form of interchange designed to remove just the most crucial conflicting turning directions.
2. A typical depiction of a partial/half clover leaf.



Figures 1: Traffic Congestion

This figure's components are described as follows: -

3. The ramps A, B, E, and F serve as a diagonal connector that allows a free turn to the left. The term

"free left" is sometimes used. Traffic entering from the G direction and wanting to go toward I is served by C, a right-hand loop on the road's right side. Another left-hand turn on the route, D, serves vehicles entering from the H direction and wishing to go in that direction.

Result and Design components adopted-

There will be a half-clover leaf suggested, with a ramp from Kashmiri gate to Seelampur consisting of two elevated loops: Loop-1 to service right turns from Khajurikhas to ISB/Kashmiri gate and Loop-2 to serve right turns from Gandhi nagar to Seelampur. Table 3 shows the design components for ramps and loops, and Fig. 3 shows the design concept with traffic flow.

Table 3 Design Standards considered

S.No.	Description	Details
1.	Design speed	80-100Kmph
2.	Width of ramp	21m
3.	Width of loop	8.0m
4.	Camber (Pavement and Paved shoulder)	2.5%
5.	Max ^m superelevation	7%
6.	Radius for loop-1	53m
7.	Radius of loop-2	73m
8.	Min ^m vertical clearance for Ramp	5.5m
9.	Carriageway width	3.5m

V. CONCLUSION & RECOMMENDATIONS

CONCLUSION

The following conclusions may be reached from various traffic surveys done at a particular intersection:

1. INT-01 (Shakarpur Police Station) had a traffic volume of 52023 PCUs, whereas INT-02 had a traffic volume of 155450 PCUs (Mohan Nagar Chawk).
2. The Singhu border and the Badarpur border see the most inflow and outflow of traffic.
3. Traffic from Mohan Nagar and the ISBT may easily travel down this planned ramp.
4. The proposed Loop-1 will service a right turn from Khajurikhas to the ISBT through Loop-1.
5. Right turn from Gandhi nagar to Seelampur would be served by the proposed Loop-2.

Recommendation

To alleviate traffic congestion at Delhi's Shahstri Park intersection, this research recommends installing a proposed half-clover leaf interchange.

Further scope of work

By doing a thorough analysis, it can be concluded that this junction is located on a major thoroughfare that is widely used by both the public and businesses in the surrounding areas. There may be an opportunity to build a second-level flyover from Seelampur to Khajurikhas in the future.

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