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A
PROPOSAL
ON
PROPOSE OF GRADE SEPARATE INTERSECTION AT KOTESHWOR
FOR UPGRADING INTERSECTION PERFORMANCE

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Abstract

Kathmandu, being the capital city of Nepal, consists of major traffic flow problems like congestion. The Koteshwor junction is one of the main traffic Y-junction with an enormous traffic congestion. After the Araniko highway expansion by Japan from Koteshwor to Suryabinayak, all the traffic congestion has shifted to this junction as the flow of traffic is pretty much smooth in the section of highway up until the junction. The traffic lights have been non-operational for a long time now and all the work has befallen on to the traffic police. Due to the fact that the junction is the meeting point for traffic from Kathmandu, Bhaktapur and Lalitpur, it is obvious to have congestion. Moreover, due to poor traffic management and implementation of basic traffic rules, it has become uncontrollably difficult to eradicate the traffic jam. An average road user has to spend at least 10 minutes to sometimes half an hour to get past. So underpass and a flyover can be the better solution to get rid of congestion in such enormous traffic area.

Keywords: Underpass, Congestion, Traffic flow management, Intersection, Flyover.

Introduction



At grade intersection is the most common and widely found intersection in Nepal. Only one grade separated intersection is under construction at Kalanki. It is mostly seen that the At Grade intersection is prone to accidents and traffic congestion. Congestion is more than undeniable for an average Nepalese who has to travel through the main intersection. With most of the traffic lights non-functional, the work for traffic management has befallen on to the shoulders of Traffic Police.

As we know that, people often prefer the easiest route and one with the least congestion. So, current congestion problem has lead people to choose other routes such as road connecting Lokanthali and Balkumari or Koteshwor, Pepsicola all around airport. Delay at any congestion has much more effects. For example, apart from losing time, it increases the fuel consumption during queuing or selection of alternate route. The condition of roads around the area is not good. There are a lot of undulation, and this might contribute to increase in vehicle maintenance cost.

Grade separated intersection is answer to the problems of congestion and major conflicts of the intersection. It also ultimately improve the capacity of intersection and as the major conflicts are reduced, accident probability is also reduced.

Literature Review:

Intersection:

General area where two or more highway cross, within which are included the roadway and roadside facilities for traffic movement in that area. (Kadiyali, 2013)

At grade Intersection: an intersection where all roadways join or cross at the same level.

Grade Separated intersection an intersection layout which permits crossings maneuvers at different levels.

Overpass: intersection in which major road or highway passes over all other roadways in the intersection.

Underpass: intersection in which major road or highway passes under all other roadways in the intersection.

Average Daily Traffic Volume: If the traffic flow is measured for a few days, the average flow is called Average daily traffic.

Types of grade separated intersection

1. Grade separated intersections without interchange
2. Grade separated intersections with interchange
 - a. Three leg interchange
 - b. Four leg interchange
 - c. Multi leg interchange

Round-about

A round about is a specialized form of at grade intersection laid out for the movement of traffic in one direction round a central island

Specification as per IRC

Wherever a cross road is proposed to be taken minimum clearances at underpasses shall be as follows:

Lateral Clearance

- Full roadway width at the approaches shall be carried through the underpass. This
- width shall not be less than 12 m (7 m carriageway + 2×2.5 m shoulder width on either side)
- Guardrails/crash barriers shall be provided for protection of vehicles from colliding with the abutments and piers and the deck of the structures.
- The width of cattle and/or pedestrian underpass shall not be less than 5 m.

Vertical Clearance

Vertical clearance at underpasses shall not be less than the values given below:

- Vehicular underpass 5.5 m
- Pedestrian and Cattle underpass : 3.0 m (to be increased to 4.5m, in case certain)
- Wherever existing slab culverts and minor bridges allow a vertical clearance of more than 2 m)

The underpass design on our proposed site basically encompasses:

- Excavation
- Construction method

- i. Precast concrete unit
- ii. Insitu concrete
- iii. Thrust bored unit

- Waterproofing
- Lighting
- Drainage

Types of underpass

- Traffic underpass
- Pedestrian/Cattle underpass

Objective

- To present data collected in survey
- To present grade separated intersection as a solution to current problems in the intersection.
- To prepare model for proposed intersection

Methodology

- Data collection
 - Traffic volume analysis
 - Topographic survey
 - Google map study
 - Research paper study
- Data Presentation
 - Presentation of structure in model
 - Traffic volume data interpretation using simulation in VISSIM
 - Presentation of current scenario of intersection capacity

Study area

Koteshwor Intersection

This intersection is often considered as congestion prone intersection. With the daily traffic volume increasing due to the fact that it serves as a gateway between Kathmandu to all the eastern parts of the country. The continuation of Araniko Highway and B.P. Highway, to the east is mostly accessed using this intersection, there being no alternatives. The topographic feature of the area is favorable for an Underpass, in addition to the area being buffer zone of one and only International airport of Nepal, TIA. Currently it is at grade intersection with three major conflicts and six minor conflicts. This arises delay during the crossings and reduce capacity of

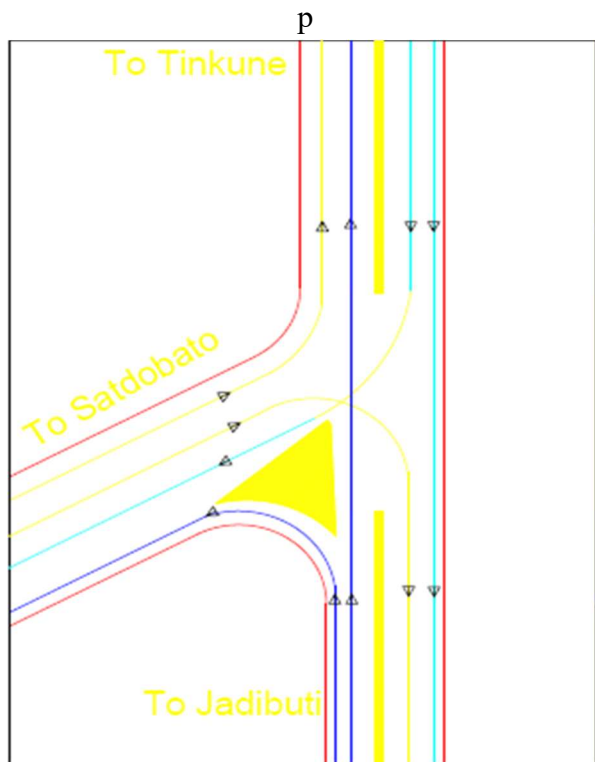
the respective roadways. Since the area has uniform altitude on all directions, an Overpass is proposed in the intersection so as to improve the condition of intersection. Furthermore, currently it is a four lane highway in the section, we propose an eight lane two way roads to manage flow.

Suitability of Underpass

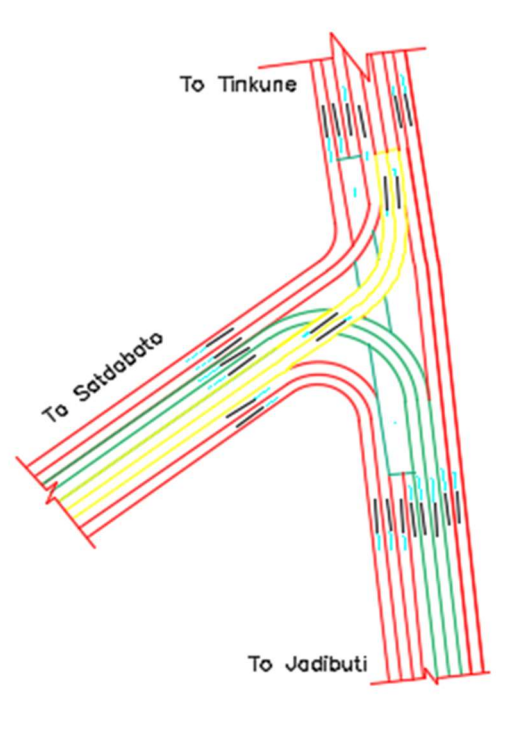
- Buffer zone for TIA, so overpass cannot be constructed.
- Junction is at higher elevation compared to Jadibuti and Tinkune.
- Congestion is mostly due to vehicles moving from Jadibuti to Tinkune.

In order to properly regulate the flow with zero major conflicts, we introduce a flyover for two lanes one way from Tinkune to Satdobato route. This way the flyover will not conflict over the approach of aeroplanes to the airport.

Flow diagram



Current flow diagram



Design flow diagram

Output

Model Preparation for overpass in Koteswor Intersection.

