



Evaluation and Reconfiguration of Multifarious Traffic at Rotary Intersection

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Abstract — 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. Traffic congestion is managed conventionally by signalisation, widening the roads, interchanges and intersections. Intersections provided sometimes proves the best but growth of population leading to continuous increase in traffic brings with it a deadlock condition. It is necessary to design the intersection that present as few impediments to efficient travel as possible and thereby making a number of countermeasures to be implemented to lessen the adverse effects of intersection hazards. This study deals with Rotary Intersection (Roundabouts) connecting National Highway-147 (Himmatnagar-Ahmedabad) and Gandhinagar - Dahegam road. Multi- modal traffic augments the congestion at this intersection. The study works for three main parameters: Capacity of Rotary Intersection, Heterogeneous traffic flow and suitable measures to be taken for reducing Traffic congestion and reconfigure the intersection. The framework will comprise of collection of accident data, measurements of geometric elements and its comparison with the standards of IRC: 65-1976 guidelines, also the public survey to have the idea of prevailing conditions. Further setting forth possible alternatives and come up with best gratifying solution which will analyse and optimise the traffic flow.

KEYWORDS: Intersection, Evaluation, traffic congestion, Reconfiguration

I. INTRODUCTION

The Inhabitants congregated in large urban areas lead to sometimes intolerable levels of traffic congestion on urban streets and thoroughfares. Modern traffic management depends highly on the efficiency of mechanisms, such as the controlled intersection and multi-lane roundabouts. Rotary intersections or roundabouts are special form of at-grade intersections laid out for the movement of traffic in onedirection around a central traffic island. Research and development is needed to document the existence of the rotaries over the heavy loaded roads and highway networks to substantially reduce the fatal and injury crashes. For heterogeneous traffic on National Highway it is necessary to study efficiency of Rotary. Design of Rotary must satisfy the standards of IRC.

II. DATA COLLECTION & METHOD

Rotary is designed for day and night travel and it should ensure smooth movement of traffic and pedestrian safety. It's Design and Redesign is carried by following IRC: 65 guidelines for which data are collected.

(a) Study Area

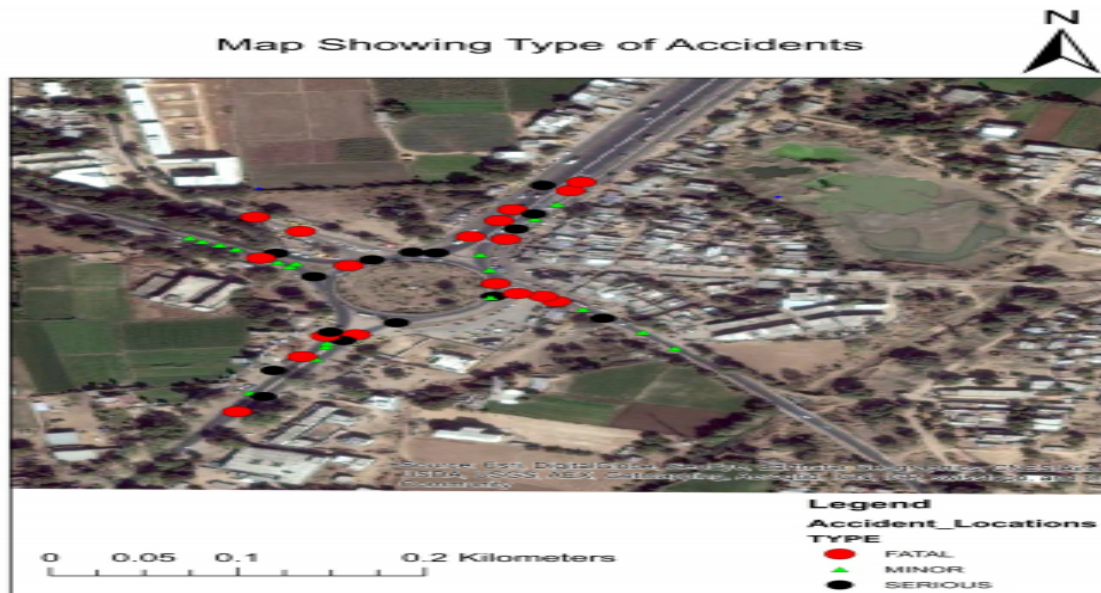
Chiloda Circle- Rotary Intersection, connecting National Highway of Himmatnagar (N)-Ahmedabad (S) and Gandhinagar (W)-Dahegam (E) Road undergoes multifarious traffic.

(b) Collected Data

The general public opinion were marked down and willingness survey was conducted in a paper format with some general questions so as to understand the necessary changes needed for existing conditions
Blackspots identification by collecting Accident Data of four years and plotting the points of crashes on Chiloda circle map using GIS.

Geometric elements (lane width, weaving length, radius of Central Island, width of weaving and non-weaving section) were measured and manual Traffic Volume Count taken at morning and evening peak hours for seven days. Practical Capacity of rotary is found using formula given below:

$$Q_p = \frac{280 * w(1 + e/w)(1 - p/3)}{1 + (w/l)}$$

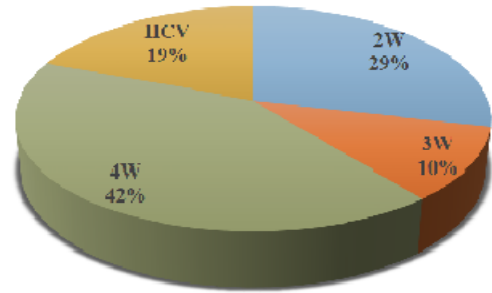


III. RESULT AND DISCUSSION

Chiloda Circle was designed around ten years back for the smooth manoeuvring of heavy commercial vehicles. The pedestrians and commuters find difficulty in crossing road due to lack of segregated lanes and zebra-crossing. Vehicles directly strike to the circle as there's complete absence of bumps and lighting posts.

The existing conditions contradicts the standards of IRC: 65 guidelines because sight distance is obstructed from Dahegam to Ahmedabad along with inadequate weaving length and central island having excessive vegetation over it. Practical capacity of Rotary exceeds the limit mentioned in IRC: 65 guidelines. Maximum traffic is generated between Ahmedabad and Gandhinagar. It was found that there is no specific peak hours for traffic as it gets max at any time in a day.

Deadlock condition occurs due to insufficient width of weaving and non-weaving section occupied by heavy and light commercial vehicles every single minute, also cars, two wheelers and pedestrians. Congestion also takes place due to conversion of four lanes of Himmatnagar highway into two lanes of Ahmedabad highway.



Percentage of Multifarious Traffic

IV. CONCLUSION

Traffic knowledge should be incurred in people.

As per the literature reviewed the rotary intersection are feasible only for heavy traffic congestion. It is required to reassess the design and traffic flow to have a much safer way of travel.

The following recommendations can be worked out:

- 1) Redesigning the geometric elements.
- 2) Removing the Rotary Intersection.
- 3) Proposing Efficient Signal system.
- 4) Provision of Dedicated lanes.

The impacts of traffic congestion can be compensated by implementing above mentioned alternatives.

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