

**Evaluation And Reconfiguration of Heterogeneous Traffic at Rotary
Intersection: Chiloda Circle**Binny N. Pandya¹, Abhinav Yadav², Prof. Kumkum Bhattacharya³¹Infrastructure Engineering, LDRP-ITR, Gandhinagar²Structure Engineering and Design, CEPT University, Ahmedabad³Civil Engineering, LDRP-ITR, Gandhinagar

Abstract — With the advancement in transportation and urbanization, traffic congestion has become the main socio-economic problem in urban as well as rural areas in developing countries. Careful balance between benefits of agglomeration and dis-benefits of excessive congestion is required. 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. The study here deals with necessary reconfiguration required at Chiloda circle which is the rotary intersection (Himmatnagar – Ahmedabad NH-8 and Gandhinagar Dahegam NH-147). The work is focused on assessment of existing conditions and suitable recommendations followed by calculating capacity of Rotary.

Keywords: Traffic congestion, Rotary Intersection, Assessment, Heterogeneous Traffic

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 one direction 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

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.

2.1 Study Area

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

2.2 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:

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

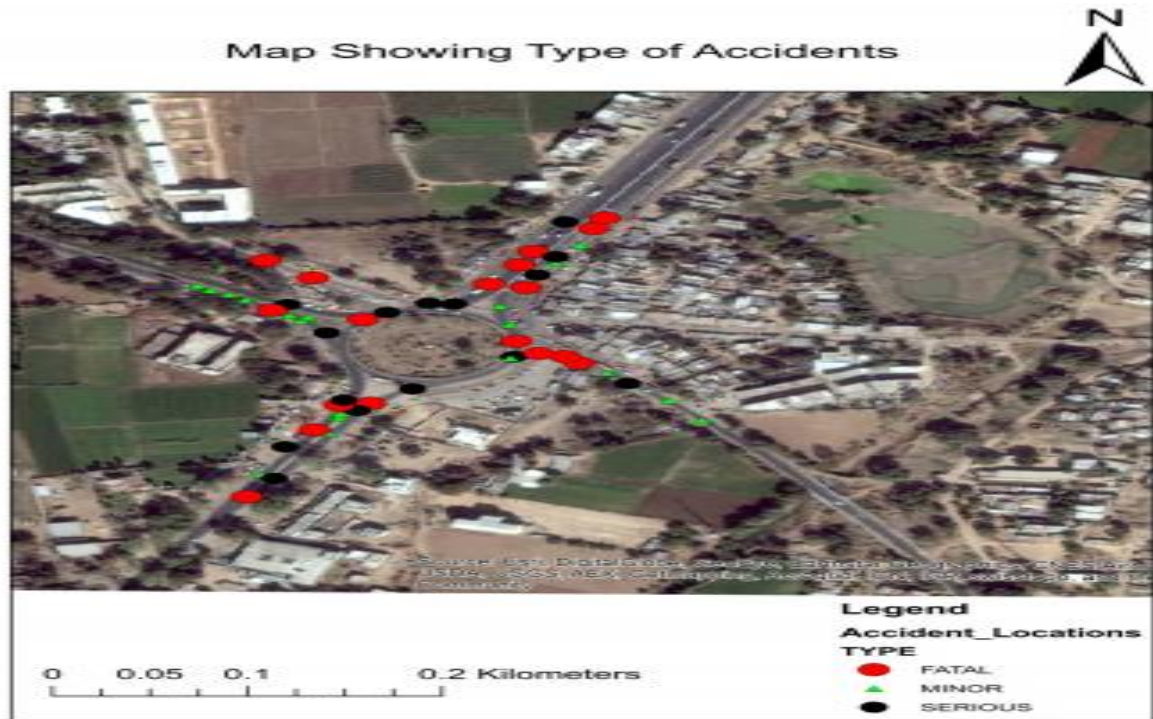


Figure 1. Accident Type

III. RESULTS AND DISCUSSIONS

Chiloda Circle was designed around ten years back for the smooth maneuvering 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.

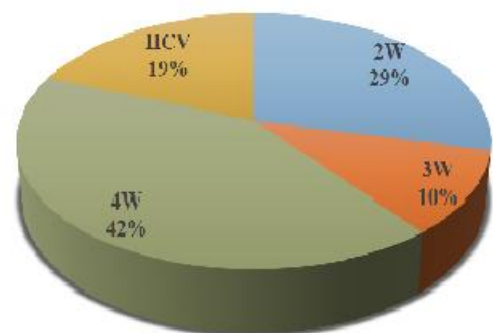


Figure 2. Percentage of Multifarious Traffic

IV. CONCLUSIONS

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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