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Experimental Study of Road Traffic Management in Urban Areas

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ABSTRACT: In this today's world, every person is willing to have their own vehicle. Their willingness led to the gradual growth in the number of vehicles. The place where two or more road network meets, there is a construction of different types of intersections, rotaries/roundabouts. Evaluation of rotary junction capacity is very important. As the evaluation of rotary junction is directly related with several traffic and motorist's parameters such as level of service, travel time, delays, accidents, operation costs, environmental factors, etc. So, there should be proper attention for the evaluation and improvements in the rotary junctions. As at the rotary junction, lots of traffic is diverted to different routes as per the travel of motorists. There should be decrease in the congestion, accidents, etc. So, there must be improvement parameters to be followed for the improvement of rotary junctions. At the mid place of Yavatmal City i.e. Bus Stop Square having very high density of Traffic due to all five roads from Nagpur, Arni, Datta Chowk, Dhamangaon and Darwha meets at a one point. Our Project is based on how to improve traffic Management system and reduce accidents and obstructions on the area. It supply innovative mobility solutions integrate urban transportation carries in an efficient, safe and eco-friendly ways in Yavatmal. By keeping the traffic moving, the system will help reduce fuel consumption and air pollution. In order to have safe traffic operation on roads, it is essential impose adequate traffic regulation and traffic control devices. There is no necessity of traffic police or signal to control the traffic as the traffic rotary could function by itself as traffic controlled intersection and is the simplest of all controls. Traffic congestion is a major problem at an intersection in urban areas. Due to the day by day increase in the growth of vehicular traffic the load on the existing intersections are increasing and causing the Jam condition for movement of vehicles. One way to control the traffic at busy intersections is to construct a roundabout or rotary intersection, which is a special type of at-grade intersection, where all converging Vehicles are forced to move round a central island in particular direction.

KEYWORDS: Intersections, Traffic Survey, Rotary junction, Traffic congestion, Traffic Management.

I. INTRODUCTION

In the light of providing safety, smooth operation and effective traffic management system in urban road intersections the present study is initiated. Urban traffic is increasing day by day and creating several issues related to time management traffic since, understanding of traffic rules and operation. The problem of traffic is conflict one requiring design, planning, engineering and institutional inputs for developing proper solutions. A real time problem of the main multi leg junction of Yavatmal city known as bus stand square has some issues regarding traffic management. It is necessary to survey, analyze and design a traffic system pertaining to engineering. A roundabout is an alternative form of intersection for traffic control. Roundabouts are circular in shape generally and they are characterized by yield on entry and circulation around a central island. Roundabouts are appropriate for many intersections including locations experiencing high number of crashes, long traffic delays, and approaches with relatively balanced traffic flows. Roundabouts have the potential to resolve various traffic flow problems. Traffic volume on one approach is significantly higher than it prevents vehicles at any other approach from entering the roundabout especially at a downstream approach or the next following approach. Rotary intersections or roundabouts are special forms of at-grade intersections laid out for the movement of traffic in one direction around a central traffic island. Essentially all the major conflicts at an intersection namely the collision between through and right-turn movements are converted into milder conflicts namely merging and diverging. The vehicles entering the rotary are gently forced to move in a clockwise direction in orderly fashion. They then weave out of the rotary to the desired direction. Evaluation of junction capacity of roundabout is very important since it is directly related to delay, level of service, accident, operation cost, and environmental issues. The Increase in vehicular traffic is becoming a severe problem. And this problem is arriving due to owning personal motor vehicles. A rotary intersection or Traffic rotary is an enlarged

road intersection where all converging vehicles are forced to move around a large central island in a particular direction before they can weave out of traffic flow into their respective direction radiating from the central island. The main objective of providing a rotary is to eliminate the necessity of stopping vehicle even for cross streams of vehicle and to reduce the area of conflict. Traffic rotaries can handle traffic volume from 500 PCU/hour to 3000 PCU/hour.

Aim and Objective: To design traffic engineering system for smooth operation in multi leg junction considering a case study.

Within this context the objectives of this project were:

- i. To survey and investigate the study area for gathering data for analysis.
- ii. To analysis and design the traffic engineering system applicable for Safety operation.
- iii. If possible implementation of the design with prior permission of concern authorities and identification of its effectiveness.
- iv. To analyze the necessary design improvements of rotary junction.
- v. To decrease the traffic delays and accidents.
- vi. To collect the traffic volume data at the intersection.
- Vii.To collects site details and features of the intersection like width of various roads meeting at the intersection, width and position of medians and obstructions.
- viii. To evaluate design details of the rotary intersection.

Scope of Study: The Road Intersections are the critical elements of the Road sections and the function of a designed intersection is to control conflicting and merging streams of traffic, to minimize the delay including pedestrian and bicycle traffic. Intersection design influences the capacity of the corridor and the safe movement of conflicting directions. The pattern of the traffic movements at the intersection and the volume of traffic on each approach, during one peak period of the day determine the lane widths required including the auxiliary lanes, traffic control devices and channelization, wherever necessary. The arrangement of the islands and shape, length of the auxiliary lanes also differs based upon the type of intersection.

The general design principles of intersection design are the approach speeds, restriction on available land, sight distance available and the presence of the larger volume of all the road users in urban areas, although it is necessary for the users of these guidelines that there should be an application of the knowledge about the local conditions while interpreting and arriving at the solution in terms of design. The design details are applicable for the given site, roadway and traffic conditions. However, the design features being of general nature can be applied to other intersections having more or less similar roadway and traffic conditions. Day by day 4 4

increasing the population as well as living standard and institutional and financial situation the traffic volume is going on increasing. The existing road capacity is insufficient to sustain that much quantity of traffic.

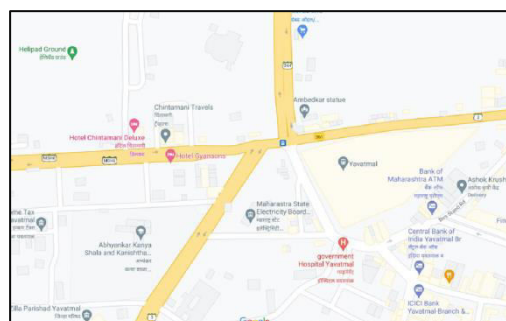


Fig 1. Study Area (Bus Stop Square Yavatmal)

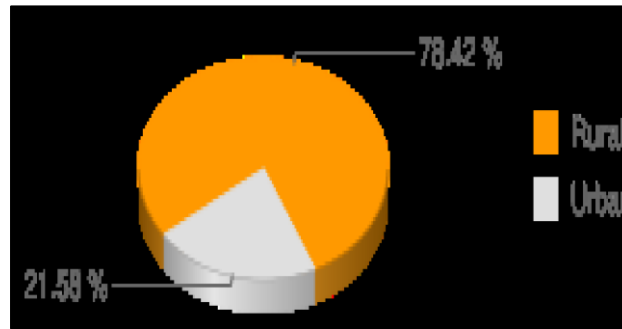


Fig 2. Percentage of Population in Rural and Urban areas in Yavatmal District

II. LITERATURE SURVEY

2.1 Basic design parameters for Intersection & design criteria 101 unsignalized Intersection on NH-10, Sirsa

Highway safety is one of the most important issues in transportation. Intersections are the locations with higher traffic crashes as compared with other highway locations. Pertaining to present mixed traffic situations in domestic cities, along with various intersection types and traffic characteristics, this design includes various basic design parameters, conflict points, solutions to intersection design and safety.

2.2. Statistical Analysis of Traffic of Rotary Intersection

Sitesh Kumar Singh, Karan Prabhakar

As the evaluation of rotary junction is directly related with several traffic and motorist's parameters such as level of service, travel time, delays, accidents, operation costs, environmental factors, etc. So, there should be proper attention for the evaluation and improvements in the rotary junctions. As at the rotary junction, lots of traffic is diverted to different routes as per the travel of motorists.

2.3. Efficiency at Rotary Intersection at Authority Chowk Greater Noida

Ms. Sonalika Mayura, Mr. Abhijeet Singh.

Greater Noida is satellite city for Delhi, capital of India, higher rate of urbanization and decentralization of Delhi are the major reason for fast growing vehicular traffic. Rate of decentralization is very high due to more aesthetic and pollution free environment in Greater Noida.

III. METHODOLOGY

The study aims at minimizing the conflicts and congestion of traffic for the given intersection "Nagpur - Tuljapur (NH-361)" and "Paratwada-Amravati-Chandrapur (MSH-6)". With this objective in view, the traffic data and the site data of the intersection are collected. By adopting the methodology we are designing the traffic rotary on the intersection. We collected the data from Municipal Corporation, Yavatmal & Police Station, Wadgaon.

METHODOLOGY

1. ANALYSIS OF PROBLEM
2. SELECTION OF PARAMETER
3. COLLECTION OF DATA
4. OBSERVATION
5. CALCULATION
6. RESULT
7. CONCLUSION
8. FUTURE WORK

Methodology Phases

The study will be carried out broadly under following

1. **Phase.1-** Survey Investigation of Study area
2. **Phase.2-** Data Collection
3. **Phase.3-** Accidental Analysis
4. **Phase.4-** Design of Rotary

Phase.1: Survey Investigation of Study Area

At the mid place of Yavatmal City i.e. Bus Stop Square having very high density of Traffic due to all five roads like from Nagpur, Arni, Main Bus Stand, Dhamangaon and Darwha roads meets at one point. We investigated the problems from the experience of drivers and the traffic policies etc. and measured the whole area by Measuring Tape and Distometer.

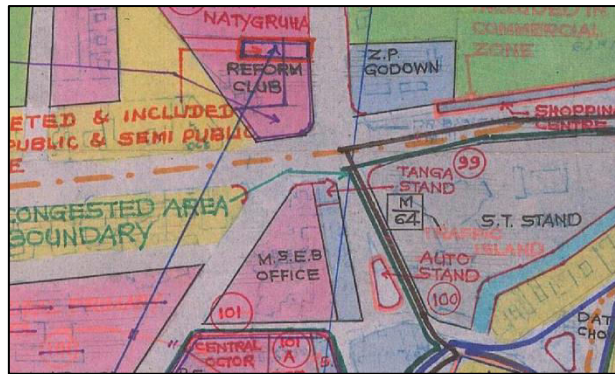


Fig 3. Multi Leg Junction at Bus Stand Square

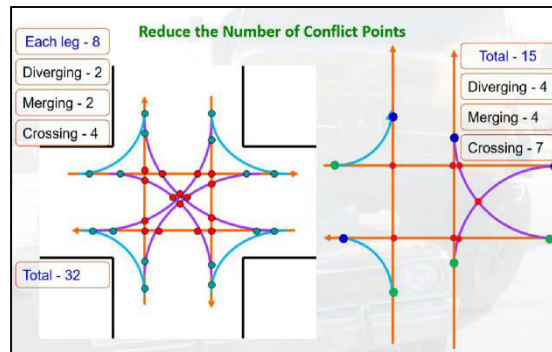


Fig 4. Reduce the Number of Conflict Points Yavatmal

IV. RESULTS AND DISCUSSION

RESULTS

While the study of rotary junction or roundabout we see the lots of parameters were monitored, evaluated and analyzed to understand the traffic improvement necessities to be implemented or adopted. Traffic parameters are the major element for the analysis of the traffic capacity. In this study, we are analyzed the traffic design elements from each of the leg of the rotary junction. After the study of the traffic capacity and volume features for the design rotary junction at Bus Stop Square, Yavatmal following results were observed:

Nagpur- Darwha Road is Major Traffic Road.

Various elements of the rotary have been designed as per relevant IRC code. The design elements are found to be as under.

(i) Design speed of rotary: 30 to 40 km/hr

Fig 5. Rotary Design and Diversions

(ii) Shape of Rotary Island: Circular for both rotary

(iii) Radius of curve at entry: 20m

(iv) Radius of curve at exit: 30m

(v) Radius of Central Island: (i) 6 m (ii) 4 m

(vi) Circulation width:

For 6 m radius Rotary

Nagpur = 15.15m

Datta chowk = 14.79m

Darwha = 14.50m

Dhamangaon = 14.60m

For 4 m radius Rotary

Arni Road = 11.79m

Darwha Road = 14.55m

Nagpur Road = 10.10 m

Height of Central Island: 60 to 70 cm at the edge.

The rotary design with above features is expected to serve the traffic for next more than 15 years.

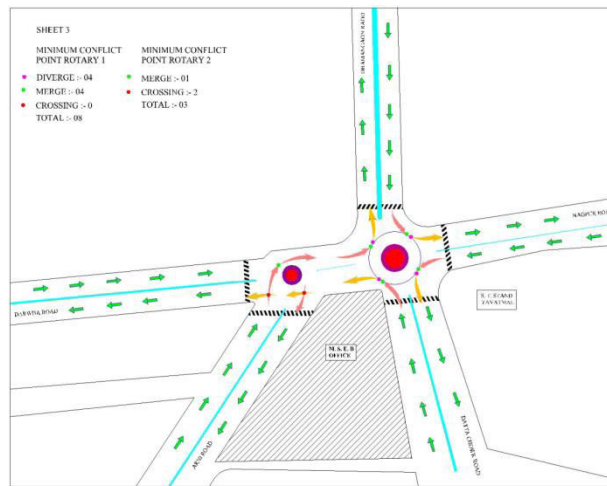
Recommendations: On the basis of the result obtained for the study of rotary junction and its a. Remove the temporary dividers from the roads and give the proper arrangement.

b. Drainage system should be improved for the better movement of vehicles and pedestrians in the rainy season.

c. Road margins are provided on the intersection.

d. Provide effective parking facilities.

e. Give the provisions about markings, signs etc.



V. CONCLUSION AND SCOPE FOR FUTURE STUDY

CONCLUSION

We had successfully designed a rotary for an intersection based on Bus Stop Square. As per our studies lastly we concluded that, effective transportation system is required in all aspects of the traffic system for Yavatmal city. We analyze the problems and collected the data

• **The Compatible System with administrative procedure for design of traffic rotary** is developed.

• The problems faced by vehicular are overcome by this system and reduced the conflict points on the intersection.



VI. SCOPE FOR FUTURE STUDY

As we are moving towards for the improvement of traffic facilities in Yavatmal city our research is little contribution towards the removing the traffic problems and congestion on the Bus Stop Square. This project is useful for Public Work Department and Municipal Council in the future if proper implemented. It is also useful in traffic calming. Confidently it can be used where traffic flow is more and congestion is high. Still the effort initiated in this project we facilitate the vehicular or motorist and government agencies to minimize the traffic problems.

REFERENCES

- 1 Deepak Darda, Best Practices for Traffic Signal Operations in India, Shakti Sustainable Energy Foundation, April 2016.
2. Dr S. N. Sachdeva Professor Civil Engineering Department National Institute of Technology Kurukshetra Jan., 2012.
3. F Khanna, S.K., and Justo, C.E.G., "Highway Engineering", New Chand and Bros, 9th Edition, New Delhi (2011).
4. IRC Code: IRC: 93-1985. "Guidelines on Design and Installation of Road Traffic Signals".
5. Jat S., Goliya S. S., Nagayach S., Gurjar R., "Controlling Traffic by Designing *Signal at Intersection of Vidisha*", *International Journal for Scientific Research & Development*, ISSN : 2321-0613 (2015).
6. Kadyali L.R. And Lal N.B.: Principles and Practices of Highway Engineering, Delhi, India, 2004.
7. Letchworth Garden City Heritage Foundation. "Sign of the Times". Archived from the original on 16 October 2006. Retrieved 14 December 2006.
8. Manjunath N., Nikschal V. M., Mohta S., Sindhuja N., "Design of an Automated *Traffic Control System for Emergency Vehicle Clearance*", *International Journal of Emerging Research in Management & Technology*, ISSN: 2278-9359(2016).
9. Mr Azeem ur Rehman, Mr Arjun Kant Jha, Ms Varsha Rathore, Dr. Christer Hyden, Dr Ase Svensson, Dr Dinesh Mohan, Dr Geetam Tiwari, Traffic Calming in India[Report on theory of Traffic Calming and Empirical Trials in the city of Jaipur].
10. Ms. Sonalika Maurya, Mr. Ajeet Singh , Efficiency of Rotary Intersection at Authority Chowk Greater Noida, May 2018
11. Polus, A., Shmueli, S. (1997). Analysis and Evaluation of the Capacity of Roundabouts. TRB Annual Meeting, Jan. 1997, Washington, Preprint 970115.
12. P.S.Gawande "Study and Improvement of Exiting Transport System" JCOET Yavatmal
13. Prof. V.B. Shrirame and Prof. S.R. Nagoshe, "Design and analysis of Rotary Tsection at arvinaka, wardha" *International Journal of Research in Science & engineering* Volume: 3 Issue: 2 March-April 2017.



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