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Experimental Study of Traffic Management Using Rotary at Yavatmal City

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ABSTRACT: 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. Main 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. 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: Traffic management, Intersection, Rotary junction, Traffic survey, Traffic congestion.

I. INTRODUCTION

The traffic is create 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 Main 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.

Recent rapid urban development in India has resulted in transport problems, such as traffic congestion and an increase in traffic accidents. Although the national and state governments have made substantial efforts to improve urban transport, problems have been exacerbated by the rapidly increasing number of private vehicles. The rapid increase in the volume of traffic in most of the countries containing the heterogeneous traffic demands a more efficient and intelligent system to be dealt with. A heterogeneous traffic stream consists of vehicles that have different speeds, sizes, operating characteristics and vehicle spacing. Existing local government capacity for urban transport planning for Yavatmal city is still insufficient because of day by day increase in traffic volumes. One of the main planning issues is that most of the cities do not have a longterm comprehensive transport and traffic strategy.

Aim and Objective: To the design traffic engineering system for smooth operation and traffic movement 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 design of rotary or roundabout junction.

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. 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.

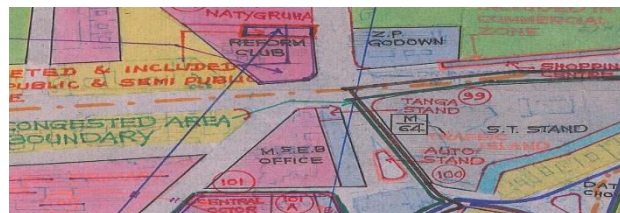


Fig No.1 Multi Leg Junction at Main Bus Stand Square, Yavatmal.

II. LITERATURE SURVEY

2.1 Efficiency of Rotary Intersection at Authority Chowk Greater NOIDA

Azeem Ashraf, MD Gayasuddin, Meraj Hussian Khan

Greater Noida is an urban town and most of intersections are designed as Rotary intersection as per previous medium traffic flow in past years as per economic consideration. Rotary intersection became inefficient in peak hour traffic and resulted as a major point of traffic congestion near intersection area and increase travel time, discomfort as well as noise and air pollution. First step in my research work is to collect traffic volume study in different approaches by manual method in PCU per hour and with help of other field data such as existing weaving length, width, angle, road width etc., evaluate the present capacity of weaving section. The practical capacity of rotary intersection is depended on the minimum capacity of the individual weaving section.

2.2. Efficiency Analysis of Roundabout with Traffic Signals

Nikolay Nikitin , Victor Patskan , Iulia Savina

Roundabouts begin to be used more often instead of crossroads with traffic signals. A simulated model was applied for the performance assessment of a roundabout. The modeling of a roundabout confirmed the existence of big transport delays at this site of the street and road network. To prevent congestion at roundabouts it is necessary to know that crosswalks located in direct proximity to driveways/exit roads of a roundabout seriously reduce its traffic capacity.



2.3. Solving Congestion Problem at 3-Legged Junction-Case Study of Pantha Chowk Intersection in Kashmir

Muqsit Masood Chishti, Dr Mohammad Shafi Mir, Peerzada Umer Haris

Pantha Chowk, a crucial road link to South Kashmir and to Jammu or in other words the throat of Srinagar City is undoubtedly the busiest intersection of the valley considering its strategic position and the importance of roads which it forms link to. It has been witnessing harrowing traffic jams for years while state government despite embarrassments at the highest levels has done nothing. At peak hours-the mornings and afternoons, the traffic on the busy road remains badly affected as vehicles are seen stranded. The queues at times last for hours & extend up to distances in kilometers resulting in serious worry for commuters.

III.METHODOLOGY

The Aim of project is to minimizing the conflicts and congestion points in traffic for the given intersection located "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. The designing the traffic rotary on the intersection. Collected the data from Municipal Corporation, Yavatmal & Police Station, Wadgaon.

Methodology Phases

The study will be carried out broadly under following

Phase.1- Survey Investigation of Study area

Phase.2- Data Collection

Phase.3- Accidental Analysis

Phase.4- Design of Rotary

IV. RESULTS

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- Darwaha 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

(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

Darwaha = 14.50m

Dhamangaon = 14.60m

For 4 m radius Rotary

Arni Road = 11.79m

Darwaha 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.



V. CONCLUSION

It analyzes the need of the improvements for the better movement of vehicles and safety of motorists and pedestrians. Traffic knowledge should be incurred in people. As per the literature reviewed, the rotary intersection is feasible only for heavy and low traffic congestion. It is required to reassess the design and traffic flow to have a much safer way of travel. So from analysis we can conclude that the existing rotary is able to handle the traffic.

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