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TITLE: EXPERIMENTAL STUDY OF ROAD TRAFFIC MANAGEMENT IN URBAN AREAS

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Abstract

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,Main Bus Stop, Dhamangaon and Darvha meets at a one point .Our project is Based on how to improve traffic Management and reduce Accidents and Obstructions on that road. It supply innovative mobility solutions integrates 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 a traffic controlled intersection and is the simplest of all controls. At that place there is no proper traffic management system except signals but this signals are not working properly. The people are not follow the traffic rules. In present situation the design is not properly so that to create problems like traffic jams, collision of vehicles, time consuming. Because of this problems are created we decided to design effective traffic management system.

Index Terms: *Traffic Management, Accident, traffic rotary, efficient, safe.*

1.SURVEY INVESTIGATION AND DATA COLLECTION

Identify the data of multi leg junction at bus stop square with respect to plans which is collected from Municipal Corporation Yavatmal. This area having very high density of traffic. We investigate the problems from the experience of drivers and the traffic polices etc. The five main roads are intersect at a mid point.

The following Obstructions and improper designs are arises after the Completion of Surveys:

- 1)Obstructions are created due to improper arrangement of Temporary Dividers.
- 2)Lack of Space for Parking Facilities.

3) Road Margins are not Provided.

4)Traffic Operations Signs Are not Provided.

5)Improper System for Pedestrian Crossing.

2.ANALYSIS AND DESIGN

1.1 Accident Analysis

The problem of accident is very acute in multi leg Junction due to complex flow pattern of vehicular traffic presence of mixed traffic and pedestrians. Traffic accidents may involved property of damages personal injuries or even casualties. The statically analysis of accidents carried out periodically at intersection road stretches or zone will help to arrive at suitable measure to effectively decrease the accident rates.

1.2 Causes Of Accident

There are four basis element in a traffic accidents.

The road users

The vehicles

The roads and it's conditions

Environment factors traffic weather

1.3 Design Of Traffic Rotary

1.3.1. Intersection Of Multi Leg Junction

Intersection is an area shared by two or more roads. This area is Design for the Vehicles to turns to different directions to reach there desire destinations. The Road Intersection 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 arrangement of the islands and shape, length of the auxiliary lanes also differs based upon the type of intersection. The traffic conflict is a case which involves two or more vehicles approaching each other in a traffic flow situation, in such a way that traffic collision would ensure unless atleast one of vehicles performs an emergency manuer. Traffic conflict are define by there time to collision postencrouchment time and angle of conflict parameters are as well as the vehicles position in time and space. In that multi legged junction the point of conflict are more but we have design the rotary island and then minimize the conflict points on that multi leg junction.

1.4 Traffic Rotary

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. 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.

1.4.1 Guidelines for selection of rotary

There are few guidelines that help in deciding the suitability of a rotary. They are listed below.

1. Rotaries are suitable when the traffic entering from all the four approaches are relatively equal.
2. A total volume of about 3000 vehicles per hour can be considered as the upper limiting case and a volume of 500 vehicles per hour is the lower limit.
3. A rotary is very beneficial when the proportion of the right-turn traffic is very high; typically if it is more than 30 percent.
4. Rotaries are preferable when there are more than four approaches or if there is no separate lanes available for

right-turn traffic. Rotaries are best suited if the intersection geometry is found to be complex.

1.4.2 Traffic Operation In rotary

As noted earlier, The traffic operation at a rotary are three, diverging merging and waving all the other conflicts are converted into these less serve conflicts. There are three parts of Traffic Operations:-

Diverging: It is a traffic operation when the vehicles moving in one direction is separated into different streams according to their destination.

Merging: Merging is the opposite diverging merging is refered to as the process of joining the traffic coming from different approaches and going to a common destination into a single stream. **Weaving:** Weaving is combine moment of both merging and diverging moment in the same direction.

1.4.3 Design elements

The design elements include design speed, radius at entry, exit and the central island, weaving length and width, entry and exit widths. In addition the capacity of the rotary can also be determined by using some empirical formula

1.4.4 Design speed

All the vehicles are required to reduce their speed at a rotary. Therefore, the original design speed of a rotary will be much lower than the roads leading to it. Although it seems to be possible to design roundabout without much speed reduction, the geometry may lead to very large size in curing huge cost of construction. The normal practice is to keep the design speed as 30 and 40 kmph for urban and rural areas respectively.

1.4.5 Entry, Exit, And Island Radius

The radius at the entry depends on various factors like design speed, super elevation, and coefficient of friction. The rotary doesn't allow straight entry, but a small curvature is introduced. This will insist the driver to reduce the speed. The entry radius for urban and rural design is of about 20 and 25 metres respectively. The exit radius needs to be higher than the entry radius and the radius of the rotary island so as to discharge the vehicles from the rotary at a higher rate. A general method is to keep the exit radius 1.5 to 2 times the entry radius. Moreover, if pedestrian movement is denser at the exit approach, then the exit radius could be set as same as that of the entry radius. The radius of the central island is descided depending upon design speed, and the radius of the entry curve. The radius of the central island, in practice, is given a slightly higher radius so that the movement of the traffic already in the rotary will have priority.

1.4.6 Advantages Of Rotary

1. Rotary regulates the traffic flow to only one direction of movement, thus eliminating severe conflicts between crossing movements.
2. All the vehicles which get introduced to the rotary and are insisted to reduce the speed and continue to move at slower speed. Thus, the vehicles will not be forced to stopped, unlike in a signalized intersection.
3. Because of lower speed of negotiation and elimination of severe conflicts, accidents and their severity are much less in rotaries.
4. Rotaries are self monitoring and do not need practically any control by police or traffic signals.
5. They are ideally introduced for moderate traffic, especially with irregular geometry, or intersections with more than three or four approaches.

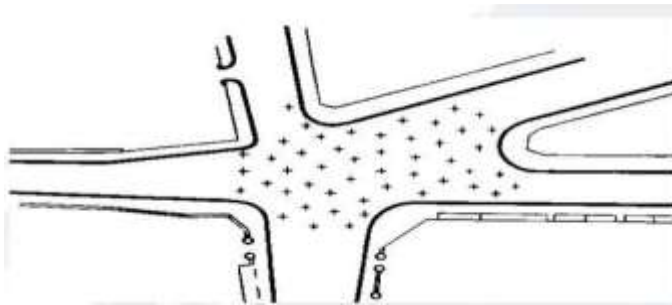


Fig-1: Conflict Points Without Island

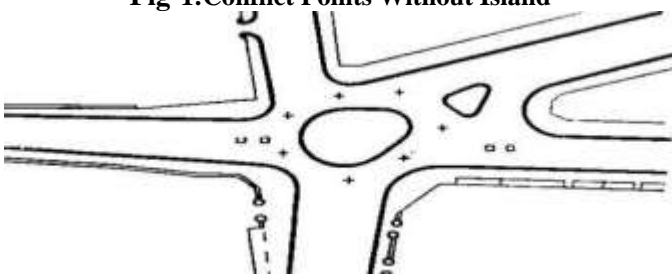


Fig-2: Conflict Points With Island

REFERENCES

- [1]. IRC Code: IRC: 93-1985. "Guidelines on Design and Installation of Road Traffic Signals".
- [2]. Jat S., Goliya S. S., Nagayach S., Gurjar R., (2015). "Controlling Traffic by Designing Signal at Intersection of Vidisha", *International Journal*

for Scientific Research & Development, ISSN: 2321-0613.

- [3]. Manjunath N., Nikschal V. M., Mohta S., Sindhuja N., (2016). "Design Of Automated Traffic control system for emergency Vehicle Clearance", *IJERMT*. ISSN:2278-9359.
- [4]. Rathore R., Sinha L., Kumar A., Raghuwanshi A. K., (2016). "A Case Study of Radisson Square Indore for Design of Signalised Roundabout", *International Journal of Engineering Research and General Science*, ISSN: 2091-2730
- [5]. Reddy B. S., Reddy N. V. H., (2016). "Signal Design for T-Intersection by using Webster's Method in Nandyal Town, Kurnool District of Andhra Pradesh", *International Research Journal of Engineering and Technology*, e-ISSN: 2395-0056
- [6]. Sayyed S., Date P., Gautam R., Bhandari G., (2014). "Design of Dynamic Traffic Signal control system", *IJERT* - ISSN:2278-0181