

Review Study and Analysis of Rotary Intersection at LIC Square, Yavatmal

Prof. H. D. Mishra¹, Sagar Parise², Dhawal Patil³, Suraksha B. Sonone⁴,
Sarthak Deshmukh⁵, Komal Patil⁶

Assistant Professor, Department of Civil Engineering¹

Students, Department of Civil Engineering^{2,3,4,5,6}

Jagadambha College of Engineering & Technology, Yavatmal, India

mishrahitesh53@gmail.com, sagarparise01@gmail.com, sarthakdeshmukh495@gmail.com, kp47826@gmail.com,
sbs162001@gmail.com, dhawalpatil285@gmail.com

Abstract: *This project involves Study and Analysis of Rotary Intersection at LIC Square Yavatmal for smooth flow of traffic and also to avoid conflicts at the intersection. In recent years, the intense growth of vehicles has caused heavier traffic congestions on the roads and intersections, which are even worse during the peak traffic time. At that intersection which increases the travel time of the vehicles cause delays and also cause more traffic accidents or conflicts. Traffic volume is incrementing at an alarming rate, so it becomes extremely difficult for traffic police to control the traffic manually at the intersections. For proper management of traffic stream at the LIC Square intersection and to reduce the accidents head of collision between vehicles on road. The situation become more intense during the peak hours when increase of traffic volume by 50% than normal traffic. The traffic flow characteristics at rotary intersections are studied to observe the performance of intersection. The capacity of the roadway rotary depends on the flow at different legs approaching the rotary. Aim of project is that to Study and Analysis of Rotary Intersection at LIC square which include site investigation, measurement present geometry of intersection, traffic volume count.*

Keywords: Rotary intersection, Peak hour, Congestion, Traffic volume, Mixed traffic, PCU

I. INTRODUCTION

A rotary is an alternative form of intersection traffic control. Rotaries are generally circular in shape, characterized by yield on entry and circulation around a central island. Rotaries are appropriate for many intersections including locations experiencing high number of crashes, long traffic delays, and approaches with relatively balanced traffic flows. Rotary have the potential to resolve various traffic flow problems. Traffic volume on one approach is significantly higher that it prevents vehicles at any other approach from entering the rotary especially at a downstream approach or the next following approach. Evaluation of junction capacity of rotary is very important since it is directly related to delay, level of service, accident, operation cost, and environmental issues. There are three legs, four legs, five legs and six legs rotaries in India and most of them have served more than 15 years. Since little attention has been paid to the design and capacity evaluation of the roundabouts, no one knows their capacities of level of services. In India especially in urban areas the mixed traffic condition is present. Higher traffic volume is the main reason for traffic congestion in city roads and at intersections. The increase in traffic volume will reduce the performance of urban roads and at intersections. The traffic must be regulated effectively to overcome these problems and to provide better service for the road users. Rotary is an enlarged road intersection where all converging vehicles are forced to move around a large central island in one direction (clockwise) before they can weave out of traffic flow into their respective directions. Rotaries are suitable when the traffic entering from three or more approaches are relatively equal. IRC suggests that the maximum volume of traffic that a rotary can efficiently handle is 3000 vehicles per hour entering from all legs of the intersection and volume of 500 vehicles per hour is the lower limit. Traffic rotaries may be provided where the intersecting traffic is about 50 percent or more of the total traffic of all intersecting roads or where the fast traffic turning right is at least as 30 percent of the total traffic. With the increase in population private owned vehicles have seen a sharp increase which leads to congestion. The less use of public transport also adds up to the trouble. Significantly after interests in street association and plans for transport progress,

clients face the issue of clog, mishaps and clamor contamination. Mishap is a fundamental issue, particularly at the convergence of national interstate and different streets. National roadway traffic delay and unseemly association just as helpless authority over the progression of traffic increments quickly.

II. OBJECTIVES

- To minimize the potential conflicts between different stream of traffic.
- To provide smooth flow of traffic across the intersection.
- To improve the traffic condition and reduces the head of collision between Vehicles so that reduces the chances of accident.
- Provide ease/ control of access consistent with the function of intersecting roadways
- To increased efficiency of traffic handling.
- To give the attractive view to the city.

III. LITERATURE REVIEW

The work by Sandeep B. Rajurkar, Mithil S. Soni, Mohan M. Dusane, Kunal A. Mahale, Amar S. Gorule on “STUDY AND DESIGN OF ROUNDABOUT AT CHARKOP MARKET, KANDIVALI (WEST).” gives an idea about traffic congestion which is a major problem at an intersection in urban areas. The location of survey volume while other two were appointed to count left and right turning traffic. They carried out six surveys at peak hour on working three days at morning and evening. They got maximum traffic volume at morning peak hour and selected that volume for a design of rotary. After that they calculated weaving length, entry, exit radius. They decided to construct rotary in Charkop market, since the result will full fill the IRC 65 requirement.

The paper on “TRAFFIC VOLUME AND CONGESTION ANALYSIS AT GOLF COURSE ROTARY INTERSECTION” by Akshat Upadhyay, Bharat Tyagi & Vaishnavivansal. Golf course rotary intersection is taken up for capacity analysis. The capacity studies on the rotary are done from all four directions and which is calculated based on the established norms of Indian road congress (IRC:65, 1976). The performance analysis of rotaries is based on various parameters such as total entry & exit traffic volume, weaving lengths & width. The resulting performance leads to a new modal development and its validation based on calculated traffic volume density by collected data of traffic volume at the particular location. There are two methods of traffic volume measurement -1. Manual method 2. Automatic method. Considering the cost factor and available facilities they used manual method for calculating traffic volume count. Readings were taken at entry and exit points to the roads going in all four directions using tally method of counting for which a measuring tape was used to measure dimensions like radius of rotary, entry and exit width, weaving width, weaving length etc. Capacity of rotary is determined by the capacity of each weaving section. The various components are thus calculated.

The paper on “CASE STUDY ON PERFORMANCE ANALYSIS OF ROTARY INTERSECTION” by Debasish Das, Prof. Mokaddesh Ali Ahmed, Saikat Deb (2014) gives an idea about increasing trends of traffic in urban area which is a major concern in all cities in India. The heterogeneous traffic is more diverge in nature due to lane changing and lack of lane discipline characteristics of drivers in India. The situation becomes more intense during the peak hour when increase of traffic volume by 50% than normal traffic. The traffic flow characteristics at rotary intersection were studied to observe the performance of intersection. In this study Silchar city has been selected as a case study area. Ambika Patti is considered for evaluation of performance. Ambika Patti is one of the major uncontrolled intersections in Silchar city. The performance of this intersection is investigated based on critical gap acceptance criteria. The data were recorded for each 15 min/ hr of our survey duration i.e., from 9:30 hours to 19:30 hours on a typical week day. They recorded the number of arrival and departure of different type of class of vehicles. for both off-peak and peak hour the cumulative arrival rate and cumulative departure rate has been recorded.

The work on “DESIGN AND ANALYSIS OF INTERSECTIONS FOR IMPROVED TRAFFIC FLOW AT BHOPAL-CASE STUDIES OF JYOTI SQUARE AND VALLABH BHAWAN ROUNDABOUT.” by Veentika Gomasta, Mohit Malviya, Abhishek Singh, Salim Akhtar (2015) gives an idea that signalised intersection are critical element of an urban road transportation system and maintaining this control system at their optimal performance for different demand condition has been primary concern of the traffic engineer. Round about is a five-legged intersection situated near DB



city mall, MP Nagar, Bhopal. In which study traffic volume is done by manual method. In there work they have gathered the data by calculating the traffic volume at four phases of intersection. Survey is done throughout the day at 2-hour interval -10 am to 12 pm, 1pm to 3pm, and 5pm to 7pm. Thus, survey is carried out in a consecutive day in a week. Classified traffic volume data are collected for 12 min duration. The classified traffic volume is converted to a common unit called passenger car unit.

Paper on “AN EVALUATION OF ROTARY INTERSECTION” by Rakesh Kumar Chhalotre & Dr. Y. P. Joshi (2016) According to this paper, it is observed that there is increasing trends of traffic in urban area is a major concern in all cities in India. The Traffic in Bhopal City which is Increasing day by day and the condition is now reached to upgrade the intersection. N attempt is made to solve the problem of traffic congestion and unusual delay to the traffic movement at Prabhat Square Raisan road Bhopal by suggesting the design of Fix time signal in Places of the rotary intersection. In this paper the data is collected by manual method by counting the number of different types of vehicles approaching to the intersection from all direction.

This paper on “A STUDY ON ROTARY INTERSECTION AT MANGLURV” the authors Ishanya P, Shriram Marathe & Y. R. Suresh in 2017 from international journal of current engineering & scientific research. they classified traffic volume count was performed at Nanthur intersection in the peak hours (7:30 – 10:00 AM, 12:30 – 2:30 PM & 4:30 – 8:00 PM). The survey was done by video photography method which gives permanent record of volume count. The same empirical formula is used to calculate traffic volume at weaving section which is proposed by Transportation Road research lab (TRL). On the basis of their study, they concluded that, the rotary intersection at Nanthur junction is not functioning adequately due to a reduced capacity and a brupt growth of traffic in scenario. The attempt made to design signal was failed therefore it is essential to redesign the rotary intersection.

The work on “DESIGN OF ROTARY FOR AN UNCONTROLLED MULTI-LEG INTERSECTION” by S Vasantha Kumar, Himanshu Gulati, Shivam Arora (2017) gives an idea about the capacity study on the rotary are done from all direction and was calculated based on established norms of Indian road congress (IRC 65, 1976& 2017). The video graphic data collection was carried out to obtain the current traffic volumes, which is main input in design of a rotary. The hourly traffic volumes from 7:30 am to 11:30 am and 2:30 pm to 6:30 pm was calculated. It was found that, from 9 am to 10 am, the traffic volume was 4500 PCUs, which is maximum when compared to the other morning hour. This values clearly show the heavy amount of traffic which enter the rotary leading to long traffic jams.

The work on “EFFICIENCY OF ROTARY INTERSECTION AT AUTHORITY CHOWK GREATER NOIDA.” By Ms. Sonalika Maurya, Mr. Ajeet Singh (2018) analysed present data of authority rotary Intersection. Then by calculating traffic volume and converting into PCU, they calculate practical capacity of rotary. Analysis was done by using Direct manual methods, as per IRC-65 1976 Guidelines. Data is collected in evening peak hours from 5pm to 6pm. After studying traffic volume at authority rotary intersection they found that, minimum capacity of rotary is 3306pcu/hr. And the total traffic entering the intersection is 5230 PCU/hour. Hence, they suggested that, signalized Rotary can be provided.

Paper on “TRAFFIC CONGESTION OVERCOME BY ROTARY DESIGN AT VALSAD” by Krutika M. Gamit, Aney K. Patel & Ankit S. Vasava (April 2019) where they determined the capacity of rotary of each weaving section. Transportation road research lab (TRL) proposed the empirical formula to find the capacity of the weaving section. The width of weaving section should be higher than the width at entry and exit. Normally this will be one lane more than the average entry and exit width. IRC suggest the entry radius of about 20m and 25m is ideal for urban and rural design respectively. It was found that, traffic volume at there designs acceptable.

IV. CONCLUSION

After surveying area, we noticed that here traffic is more in peak hour so we are decided to study on that area for the complete information so we are selected LIC Square, Yavatmal for the project which is study and analysis of Rotary intersection at LIC Square, Yavatmal

After the studying all the review papers we get information for completing this project when we study all thing of rotary, we get idea about that for redesign we are assumed that when complete this project that is beneficial for city, reduce chances of collision and also reduce traffic congestion

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