

An Evaluation of Rotary Intersection: A Case Study of Habibganj Naka Bhopal

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Abstract— The developing cities are having lots of traffic problems with increasing rate of vehicle I today’s. Bhopal is in this time high population city in Madhya Pradesh. Traffic problem are due to private vehicles running in this city these increase rates of vehicles require space for movement with safety having enough capacity of rotary intersection. So capacity evaluation needs to be done on rotary intersection for easy operation of traffic. There are rotary intersection on Habibganj Naka in Bhopal where the evaluation of capacity is done. During the past decade major cities have under gone hazard growth of Industrialization, urbanization of country.

Key words: Rotary Intersection, Habibganj Naka Bhopal

I. INTRODUCTION

Population in the India is increasing tremendously and this is leading of traffic problem as, the all people nowadays have started purchasing their own vehicles. This has led the city to be congested on road and on intersection. Bhopal city is the traffic congested cities in India which is having transit systems like BMC (Bhopal Municipal Corporation) and BRTS (Bus Rapid Transit System). These are the basic public transport system and the third is Auto rickshaws. Habibganj Naka rotary intersection is type of vehicles are move like that colleges bus ,car , two wheeler and tempo etc. Habibganj Naka is very heavy traffic flow in this road because this road is keep for link road. Mandideep is a industrial area is one road, and second road Habibganj station and ISBT bus station and third one is BSS college and BHEL roadand next one is Railway Fatak and this road is MP nager area and type of market in this road. Habibganj Naka Rotary intersection is selection for evaluation of capacity which is having four routes connected to the Habibganj station, BSS College, Hosangabad Road and Railway Fatak. The manual survey is done in morning to night morning time 6am to night 12am.The peak house of evening time at 6 p.m. to 7 p.m. for data collection to know flow of traffic on lanes

A. Objectives

- Find out the study about the capacity analysis of Rotary intersection.
- To be evaluation capacity of Habibganj Naka rotary intersection.
- To be suggest the modification for rotary intersection if required.

II. TRAFFIC SURVEY AND DATA COLLECTION

A. Manual Method:

Manual method use filed personal to count and classify traffic flowing past a fixed point. Automatic devices enable a count of traffic to be taken at any given location and a record to be kept of the count. A combination of manual and mechanical methods involves the services of field personal who operate mechanical devices to count and record the arrival of vehicles at any given point across a road. The moving observer methods is a special traffic engineering technique which result in the collection of data on the flow speed of traffic, travel time, delay at junction and parking and has been considered in detail in chapter Photographic method for measurement flow and other traffic characteristics are becoming powerful tools in the hands. Study area selection is Habibganj Naka intersection which is surrounded by industrial areas and flow of traffic varies during peak and off peak hours in Bhopal city. It is now being connected by BRTS(Bus Rapid Transit System). The flow of traffic includes two wheeler, car, bus, and auto rickshaws. Habibganj Naka intersection rotary has proved to be a safer for operation of vehicles. Traffic data collection from manual count method. Which are then converted into PCU/hour. It was found that maximum number of vehicles passing through Habibganj station in straight direction The data collection for traffic flow in an (Habibganj Naka) urban section.

Approach	Left turning	Straight ahead	Right turning
Habibganj station PCU	189.6	897.4	176.96
Bss college PCU	125.28	151.6	52.75
Hoshangabad road PCU	234.6	746.5	85.3
Railway Fatak PCU	187.24	151.4	59.76

Table 1: Traffic flow in Hibibganj Naka average maximum PCUs/hour





Fig. 1: Traffic Snaps

III. ANALYSIS AND DESIGN OF ROTARY INTERSECTION

A. Solution:

The rotary is located in an urban road section and a design speed of 30K.P.H. Since the intersection legs almost equal traffic, a round-shaped central island. radius of 20 meter at entry and 40 meter at exit. The values conform to current Indian standards discussed earlier. Radius of island is 12m

Traffic flow in an urban section (habibganj naka) at the intersection PCUs/hour

In a maximum average PCUs/hour

Approach	Left turning	Straight ahead	Right turning
Habibganj station(N) PCU	189.6	897.4	176.96
B.S.S. college(E) PCU	125.28	151.6	52.75
Hoshangabad Road(S) PCU	234.6	746.5	85.3
Railway Fatak (W) PCU	187.24	151.4	59.76

Table 2: In a maximum average PCUs/hour

The traffic in terms of PCUs from each leg each is depicted

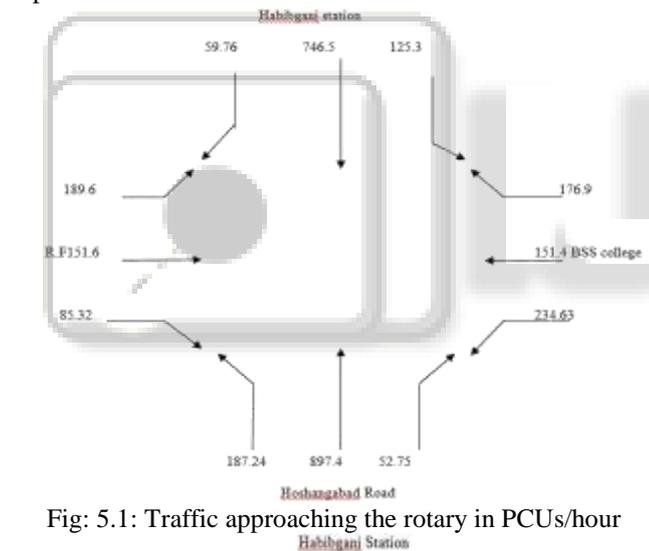


Fig: 5.1: Traffic approaching the rotary in PCUs/hour

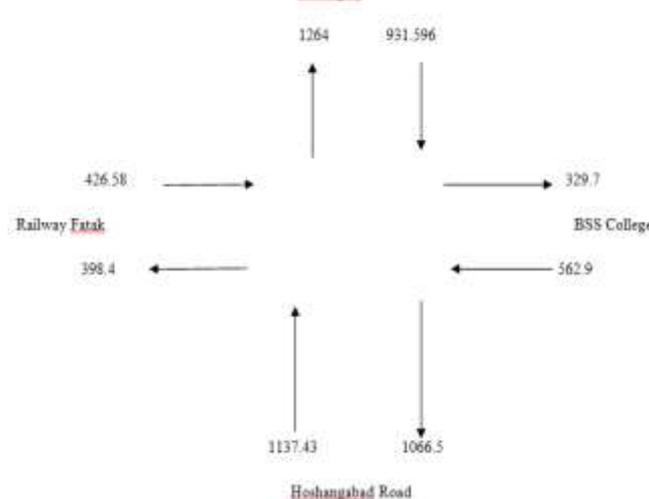


Fig: 5.2: traffic in PCUS/hour at habibganj rotary intersection

The maximum flow in the intersection leg (south) is 2204 PCUs/hour and the maximum in one direction is 1264 PCUs/hour a 4 lane road with moderate interference from cross traffic has a capacity 1400-1800 PCUs/hour in one direction

The width of carriageway at entry and exit may be taken from table for a 4 lane road, with of 10.0 m the width of the non-weaving section is kept 10.0m. The width of the weaving section is:

$$W = (e_1 + e_2 / 2) + 3.5 = 13.5$$

The minimum length of weaving section should be 30m from table this fails the requirement that the ratio l/w should be 4. So adopt 30m, which given a l/w ratio slightly greater than 4

The maximum weaving occurs in railway fatak to Habibganj station section

$$P = 1311.38 / (52.75 + 897.44 + 176.96 + 151.66 + 85.32 + 189.6) = 0.84$$

$$P = 0.84$$

Thus the proportion of weaving traffic c to non-weaving traffic is highest in the W-N

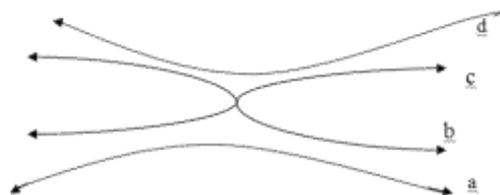


Fig: 5.3 weaving traffic

The capacity of a rotary intersection is directly represent and determined by the S-N section

$$Q_p = \frac{280 * 13.5 (1 + 10 / 13.5) (1 - 0.84 / 3)}{1 + (13.5 / 30)} = 3072.7 \text{ PCUs/hour}$$

This is very much higher than the traffic flow 3768.3 PCUs/hour

And the design is acceptable.

Weaving traffic form BSS college to Hoshangabad road

$$a = 59.76$$

$$b = 831.32$$

$$c = 328.36$$

$$d = 234.63$$

$$p = (831.32 + 328.36) / (59.76 + 831.32 + 328.63 + 234.63)$$

$$p = 0.79$$

Late the capacity of a rotary intersection is directly represent and determined by the BSS College to Hoshangabad road section

$$Q_P = 3341.52 \text{ PCUs per hour}$$

Weaving traffic from Hoshangabad road to Railway fatak

$$a = 176.96$$

$$b = 211.16$$

$$c = 950.19$$

$$d = 187.24$$

$$p = 0.76$$

Late the capacity of a rotary intersection is directly represent and determined by the Hoshangabad road to Railway fatak section

$$Q_P = 3386.9 \text{ PCUs per hour}$$

- Weaving traffic from Habibganj station to BSS College

a = 85.32
b = 204.41
c = 806.3
d = 125.3
p = 0.83

Late the capacity of a rotary intersection is directly represent and determined by the Habibganj station to BSS College section

$$QP = 3281.04 \text{ PCUs per hour}$$

IV. RESULT

The capacity of weaving section using given the value habibganj station to BSS College comes out 3281.04 PCUs per hour similarly BSS College to Hoshangabad Road comes out 3341.52 PCUs hour and Hoshangabad Road to Railway Fatak comes out 3386.9 PCUs per hour and Railway Fatak to habibganj station 3072.7 PCUs per hour.

It is seen from the results that all weaving section of the rotary are having more 3000 vehicles per hour.

V. CONCLUSION

Total vehicles entering into each of weaving section are more than 3000 PCUs per hour and IRC suggests that the maximum volume of traffic that a rotary can efficiently is 3000 vehicles per hour entering from the all weaving section intersection. Hence rotary cannot accommodate the traffic safely. We need to adopt other alternative to accommodate the traffic.

- 1) Bus stops must be provided at location to 50 to 70 meter length from the intersection. The busses should not be allowed to stop with in this 70 m length. Also the location of the bus stop should be kept the farther side of the junction.
- 2) The following traffic control devices are helpful in reducing accident and improving flow conditions at intersection

Necessary traffic signs and pavement markings need to be provided at the intersection. Also, ought to be used so as meet the requirement of night traffic.

Road marking, object marking, road sings and signals

- Centre line markings
 - Edge markings
 - Turn markings
 - Direction markings
 - Lane markings
 - Kerb markings
 - Median markings
 - Channelizing Island markings
 - Pedestrian Cross Walk markings
- 3) The vehicles passing through rotary intersection are more than 3000 VPH hence signal design should be done to overcome traffic of rotary intersection. High vehicles legs to habibganj and hoshangabad road.
 - 4) It should be need lighting in Central Island.

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