

Name: Dr. Sanjib Pramanik

Name of the College: Durga College, Raipur (C.G.), India

Name of the Faculty: Arts

Designation: Assistant Professor, Department of Geography

**Topic: Management of Signal System for Reduce the Traffic
Jam in Raipur City, C.G. (India)**

Date: 12/07/2023

ABSTRACT

The importance of time is increasing with the changing civilization. So, the traffic jam is an enormous problem in our present life. Rapid population growth is a one of the most important factor of traffic jam. The urban population in India has increased significantly from 62 million in 1951 to 285 million in 2001 and is estimated to grow around 540 million by the year 2021 (Census, 2011). According to census of India the population of the study area, Raipur City (C.G.) was 12 lakes in 2011, but at the end of 2015 it has risen to 16 lakes. The traffic flow of the study area, Raipur City has been measured from 10.30 A.M. to 12.30 A.M. and 6.30 P.M. 8.30 P.M. The measurement has been taken twice in every study hour in five working days $\{(5X2) + (5X2)\}$ and also in five holidays. The traffic flow of different direction of a chowk in single time of signal opening has been measured by the average of 40 (20+20) times of measurement.

The paper revealed that the maximum traffic flow is depends on the importance of the side, but the signal system is run on always anti clock wise. In this regard the paper recommended some managemental policy and planning to control the traffic jam in Raipur City.

Key words: Population, Signal System, Traffic Flow, Traffic Jam etc.

I. INTRODUCTION

The urban population in India has increased significantly from 62 million in 1951 to 285 million in 2001 and is estimated to grow around 540 million by the year 2021 (Census, 2011). According to an estimate there is one road accident in every two minutes in India. For every trauma related death, there are many injured and disabled persons. The male age group of 15-40 years is the most affected by trauma (Pande, et al., 2006).

According to census of India the population of Raipur City (C.G.) was 12 lacs in 2011, but at the end of 2015 it has risen to 16 lacs (estimated). If it is rise in this rate than the population of Raipur City (C.G.) will be 40 lacs in the year of 2045. On the other hand in 2009-10 the Raipur district was registered 668353 vehicles but now (November, 2015) it is rise to 1022000 and it will 2200000 in the year of 2045 (Dainikbhaskar, 2015). So, an odd situation on traffic flow will be seen in Raipur City within five to ten years. To control this situation it is need to make several types of planning and management such as; wideness of road, flyover etc. for this purpose PWD, Raipur takes a plan to make three flyovers in the city.

To give an importance on transport and communication development within the development of necessary infra-structure in first five years plan of India and also ninth and tenth plans are more significant in this regard. Former prime minister Sri Atal Bihari Bajpayee's view was quite clear that without proper development of transport network, India cannot achieve its goal of rapid economic development (Singh, 2003).

Highway capacity is very broadly a measure of the effectiveness of various highways in accommodating traffic and its application requires both a general knowledge of traffic behavior and specific knowledge of traffic volume, which can be accommodated under a variety of roadway configurations and operating conditions (Gautam, 1992). It is often stated that lack of a well-developed transport sector has been a hindrance to the region's development (Saikia, 2003).

Many of the causes are responsible for traffic jam, i.e. if width of the road is narrow with respect to growing traffic flow & does not follow the proper traffic rules by the people. This is hampering to time & money also. So we have to take some managerial policy for reducing the traffic jam. In this regard this paper is a deal only the management of signal system.

II. STUDY AREA

Raipur is the capital of Chhattisgarh, which is the 26th number state of India, formed on 1st November, 2000 from Madhya Pradesh. The study area Raipur City (C.G.) is situated in the open series map numbers P44 F11 and P44 F12 lies between 21°13'N to 21°18'N Latitude and 81°31'E to 81°39'E Longitude (Fig.: 1). The river Kharun is situated in the west side of the city.

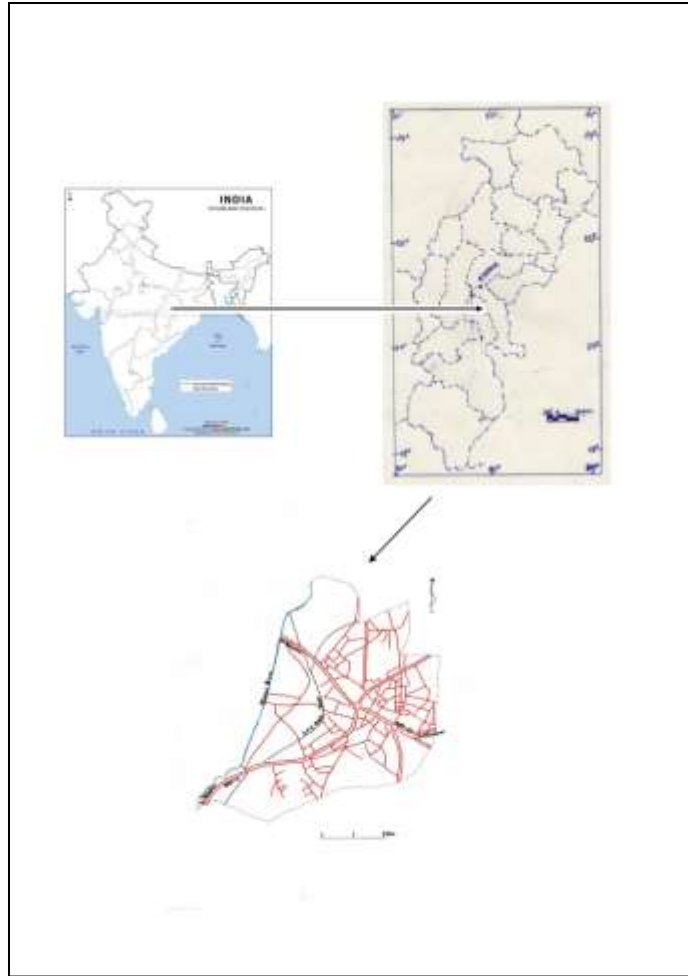


Fig.:1 Location Map of the Study Area.

Raipur is connected by regular S.E.C.R., NH6, NH43 and also flights to major cities of the country, like Kolkata, Mumbai, Delhi, Chennai, Bhopal, Hyderabad, Bangalore, Bhubaneswar etc.

III. OBJECTIVES OF THE STUDY

1. To find out the flowing pattern of vehicles towards different chowk routes from a chowk route at a single signal opening.
2. To the measurement of traffic jam on two different chowks of Raipur City, after signal opening.

IV. METHODOLOGY

The traffic flow of the study area, Raipur City has been measured from 10:30 A.M. to 12:30 P.M. and 6:30 P.M. to 8:30 P.M. The measurement has been taken twice in every study hour in five working days $\{(5 \times 2) + (5 \times 2)\}$ and also in five holidays. The traffic flow of different direction of a chowk in single time of signal opening has been measured by the average of 40 (20+20) times of measurement.

V. RESULTS

Types of Flowing Vehicles

1) Sharda Chowk:

At Sharda Chowk two-wheelers are comparatively high percentage (75.33 %) found than the others vehicles (like auto, four-wheelers & bus etc.) towards Gol Bazar Chowk route from Azad Chowk route. Becomes the route coming from Gol Bazar Chowk is narrower (5.39 m. and this road is single way and the width of the road towards Jayastam Chowk, towards Gurunanak Chowk and towards Azad Chowk routes are 7.3 m., 6.9 m. and 7.01 m. respectively. These three ways are double ways near Sharda Chowk. On the other hand at Fafadhi Chowk, all the four routes i.e. way towards Banjari, towards Rly Station, towards Nahar Chowk and towards Pikadeli Chowk routes are 7.32 m., 7.39 m. 5.8 m. and 9.3 m. respectively and double ways near Fafadhi Chowk.) into the lane and merges into the market, and hence, the big-sized carriage cannot be come of this route.

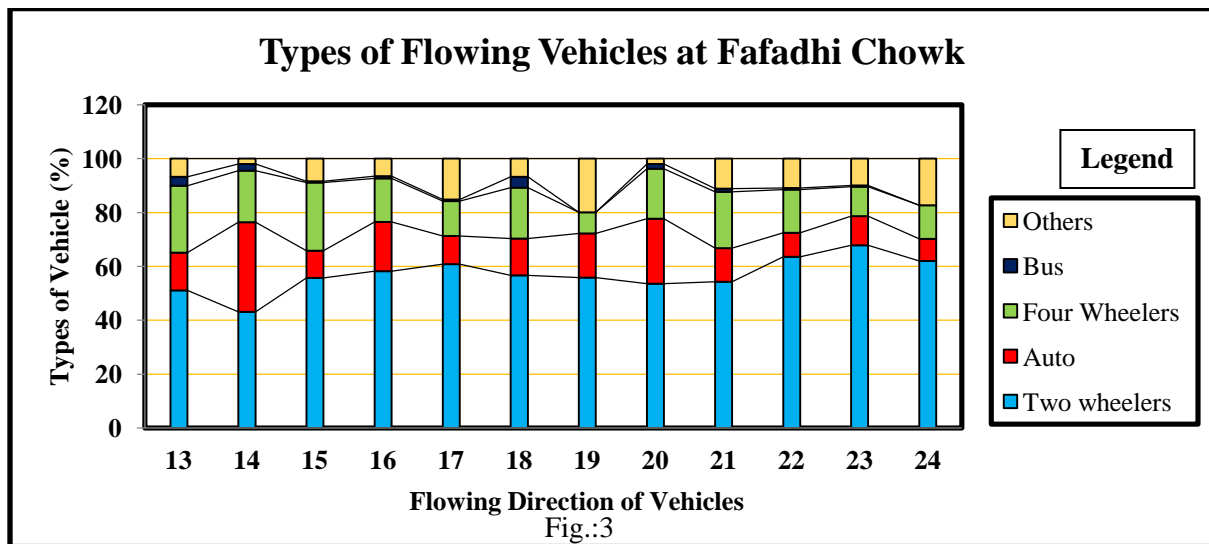
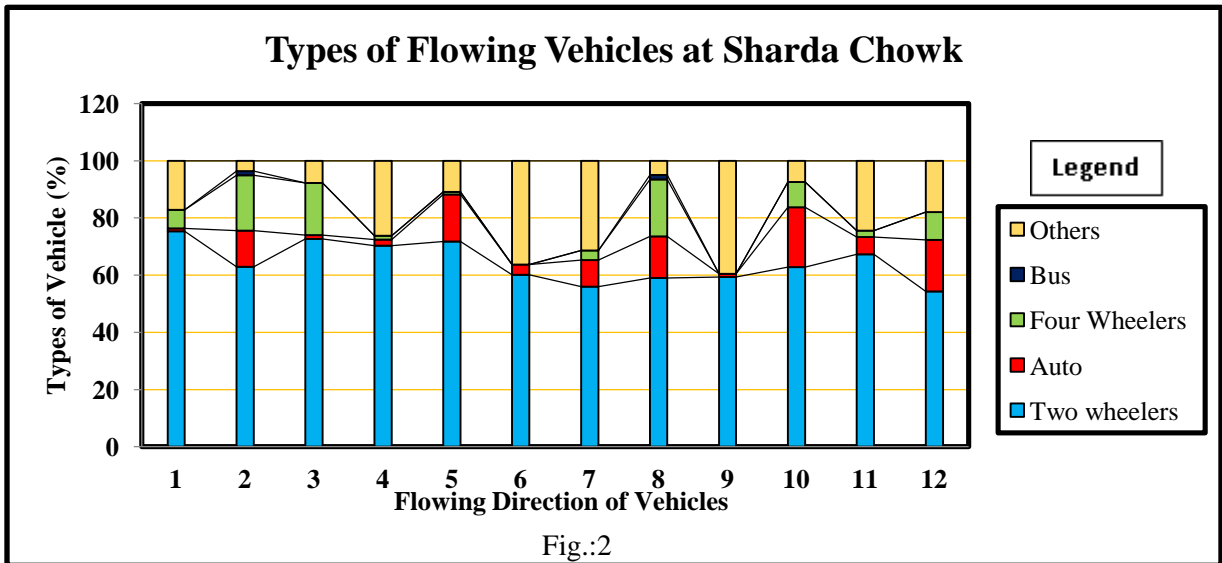
Except sl. no. 7, 8, 9 & 12 (Table: 1) the two-wheelers are found about 60% than the other vehicles (like auto, four-wheelers & bus etc.) at Sharda Chowk. Autos are comparatively high percentage (20.92) found than the other vehicles (like auto, four-wheelers & bus etc.) towards Azad Chowk route from Gurunanak Chowk route. The route towards Gol Bazar from Jayastam Chowk and the route towards Azad Chowk from Gol Bazar Chowk route the four-wheelers and bus are not found but others vehicles (cycle, riksha etc.) are found in high percentage (39.33 % & 36.24 % respectively), because the low communicational importance and narrow lane of Gol Bazar Chowk route (Fig.:2).

2) Fafadhi Chowk:

At Fafaadhi Chowk two-wheelers are maximum percentages (67.81 %) found than the other vehicles (like auto, four-wheelers & bus etc.) towards Pikadeli Chowk route from Nahar Chowk route. Autos are comparatively higher percentage (33.32 %) than the other vehicles (like auto, four-wheelers & bus etc.) towards Rly. Station route from Devenagar Chowk route.

Due to this way is connected from Rly. Station to hart of the city so, the public who has come by train their maximum numbers are preferred to auto. And four-wheelers are maximum percentage (25.30 %) than the other vehicles (like auto, four-wheelers & bus etc.) towards Nahar Chowk route from Devenagar Chowk route.

Bus is maximum percentage (4.05 %) than the others vehicles is found towards Devenagar Chowk route from Pikadeli Chowk route. Because this way is middle in the Bilaspur road and pandri bus stop. The way towards Nahar Chowk from Rly. Station or vice versa no bus has found. And others vehicles (like cycle, riksha etc.) are maximum percentage (19.9 %) with respect to other route is found towards Nahar Chowk from Rly. Station (Fig. 3).



Flowing Pattern of Vehicles

- 1) **Sharda Chowk:**
 - a) **Towards Three Different Chowk Routes from Azad Chowk Route:**

At a single signal opening at Sharda Chowk, 60 vehicles (maximum) coming from Azad Chowk run towards three different directions. More than 70 % (43 vehicles) out of these 60 vehicles move towards Jayastam Chowk due to its high communicative and commercial importance. Instead of having its high commercial importance, 8 (12.84%) out of these 60 vehicles move towards Gol Bazaar during a signal opening as the route becomes narrower into the lane and merges into the market, and hence, the big-sized carriage cannot be moved towards the route. While 15.98 % (10 Vehicles) out of these 60 vehicles coming from Azad Chowk route move towards Gurunanak chowk route due to its moderate commercial importance (Fig. 4).

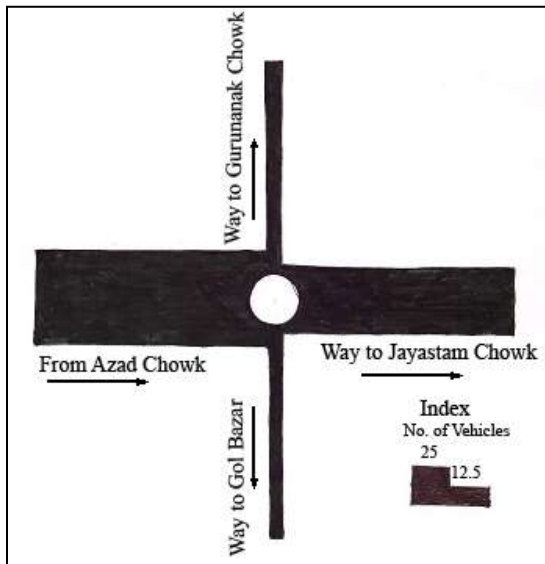


Fig.: 4 Flowing pattern of vehicles from Azad Chowk to three different directions at Sharda Chowk.

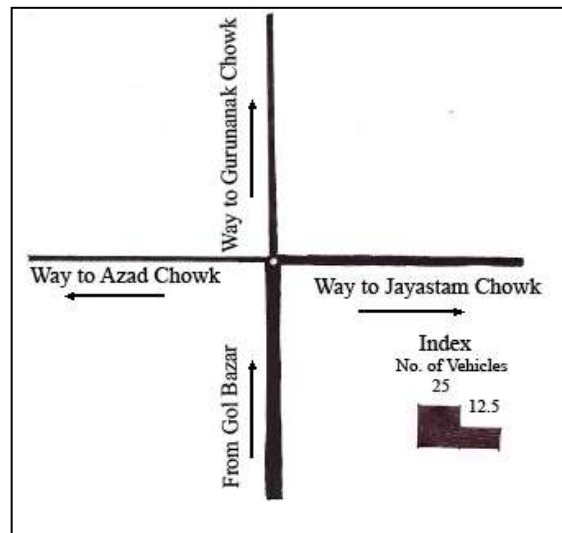


Fig.: 5 Flowing pattern of vehicles from Gol Bazar to three different directions at Sharda Chowk.

b) Towards Three Different Chowk Routes from Gol Bazar Route:

Only 8 vehicles (minimum) move towards three different directions at a single signal opening from the route of Gol Bazar as the big-sized carriage cannot be moved out due to its narrow width. Out of which, more than 45% (4 vehicles) vehicles run towards Jayastam Chowk route due to its high commercial and communicative importance. While less than 20% (1 vehicle/ 16.26%) move towards Azad Chowk route laying at the left-side of the route from Gol Bazar. And 37.16% (3 vehicles) of vehicles run towards Gurunanak Chowk (Fig. 5).

c) Towards Three Different Chowk Routes from Jayastam Chowk Route:

From the route from Jayastam Chowk, 40 vehicles move at a single signal opening towards three different routes. Maximum numbers of vehicles (32 vehicles/ 80.38%) out of these 40 move towards Azad Chowk as this route connects with the south-western urban residence of

the city and also it connect with NH-6; while, 5 vehicles (13.38%) move towards Gurunanak Chowk. During a signal opening only 3 vehicles (6.24%) run towards Gol Bazar remarkably for the causes that the route lays at the left-side of the route coming from Jayastam Chowk and the route becomes narrower into the lane and merges into the market, and hence, the big-sized carriage cannot be moved towards the route (Fig. 6).

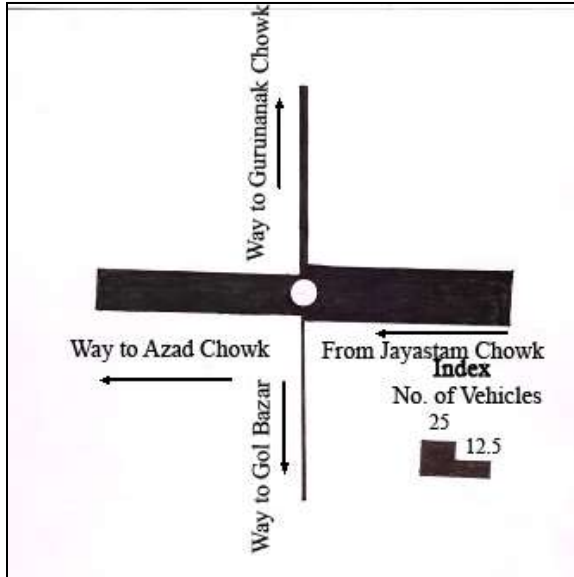


Fig.: 6 Flowing pattern of vehicles from Jayastam Chowk to three different directions at Sharda Chowk.

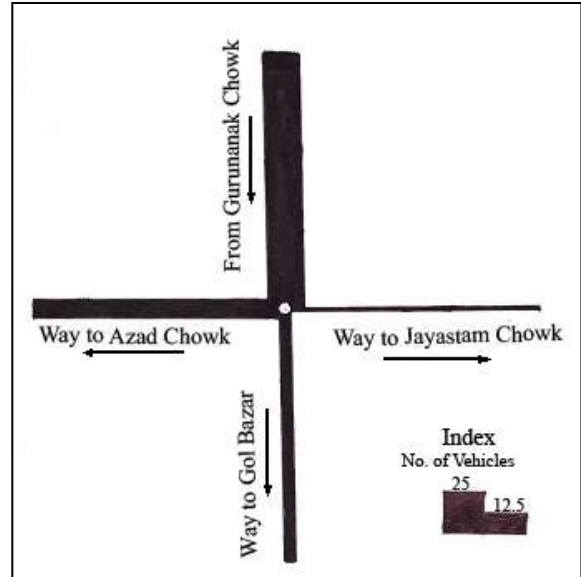


Fig.: 7 Flowing pattern of vehicles from Gurunanak Chowk to three different directions at Sharda Chowk.

d) Towards Three Different Chowk Routes from Gurunanak Chowk Route:

24 vehicles from Gurunanak Chowk route pass on at a single signal opening towards three different routes, out of which more than 55% (14 vehicles) run towards Azad chawk as this route connects with the south-western urban residence of the city and also it connect with NH-6; while, a very least number of vehicles (2 vehicles/ 7.81%) run towards Jayastam Chowk as many bypass facilities are available there and also it lays at the left-side of the route from Gurunanak Chowk. And 8 vehicles (34.73%) move towards Gol Bazar (Fig. 7).

2) Fafadhi Chowk:

e) Towards Three Different Chowk Routes from Devenagar Chowk Route:

At a single signal opening at Fafadhi Chowk, 84 vehicles (maximum) coming from Devenagar Chowk run towards three different directions. More than 50% (50 vehicles) out of these 84 vehicles move towards the Rly Station due to its high communicative and commercial importance. As the route towards Nahar Chowk having its less communicative and commercial

importance than other sides lays at the left-side of the route coming from Devenagar Chowk route, so the most of the vehicles from Devenagar Chowk bound towards Nahar Chowk have not to wait for any signal opening, and hence, less than 12% (10 vehicles) out of the 84 vehicles move towards Nahar Chowk during a signal opening.

29.53% (25 Vehicles) out of the 84 vehicles coming from Devenagar Chowk move towards Pikadeli Chowk due its moderate communicative and commercial importance (Fig. 8).

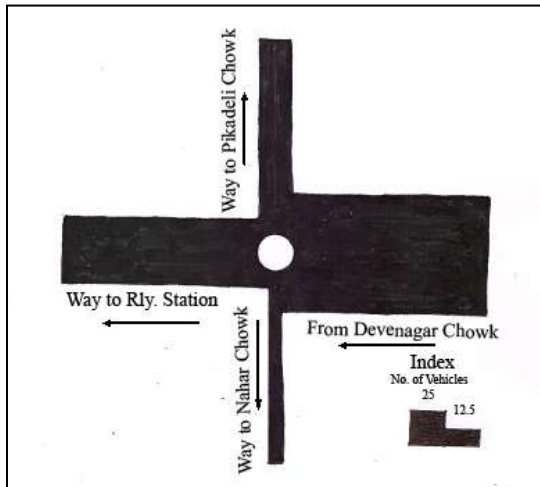


Fig.: 8 Flowing pattern of vehicles from Devenagar Chowk to three different directions at Fafadhi Chowk.

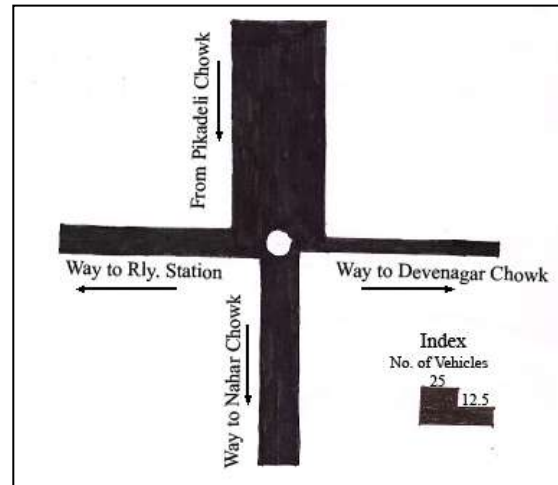


Fig.: 9 Flowing pattern of vehicles from Pikadeli Chowk to three different directions at Fafadhi Chowk.

Table: 2 Flowing Pattern of Vehicles at Single Signal Opening from one Route to Different way at a Chowk

Name of the Chowk	Sl. No.	Flowing Direction of Vehicals		Vehicles		Total No. of Vehicles
		<i>From</i>	<i>To</i>	<i>Number</i>	<i>Percentage</i>	
Sharda Chowk	1	Azad Chowk	Gol Bazar	7.74	12.84	60.26
	2	Azad Chowk	Jayastam Chowk	42.89	71.18	
	3	Azad Chowk	Gurunanak Chowk	9.63	15.98	
	4	Gol Bazar	Jayastam Chowk	3.81	46.58	8.18
	5	Gol Bazar	Gurunanak Chowk	3.04	37.16	
	6	Gol Bazar	Azad Chowk	1.33	16.26	
	7	Jayastam Chowk	Gurunanak Chowk	5.36	13.38	40.06
	8	Jayastam Chowk	Azad Chowk	32.2	80.38	
	9	Jayastam Chowk	Gol Bazar	2.53	6.24	
	10	Gurunanak Chowk	Azad Chowk	13.53	57.46	23.55
	11	Gurunanak Chowk	Gol Bazar	8.18	34.73	
	12	Gurunanak Chowk	Jayastam Chowk	1.84	7.81	
Fafadhi Chowk	13	Devennagar Chowk	Pikadeli Chowk	24.89	29.53	84.3
	14	Devennagar Chowk	Rly. Station	49.53	58.75	
	15	Devennagar Chowk	Nahar Chowk	9.88	11.72	
	16	Pikadeli Chowk	Rly. Station	22.89	35.89	63.77
	17	Pikadeli Chowk	Nahar Chowk	28.52	44.73	
	18	Pikadeli Chowk	Devennagar Chowk	12.36	19.38	
	19	Rly. Station	Nahar Chowk	4.17	5.58	74.69
	20	Rly. Station	Devennagar Chowk	58.54	78.38	
	21	Rly. Station	Pikadeli Chowk	11.98	16.04	
	22	Nahar Chowk	Devennagar Chowk	16.81	34.67	48.49
	23	Nahar Chowk	Pikadeli Chowk	27.65	57.02	
	24	Nahar Chowk	Rly. Station	4.03	8.31	

f) Towards Three Different Chowk Routes from Pikadeli Chowk Route:

From the route from Pikadeli Chowk, 64 vehicles move at a single signal opening towards three different routes. Maximum numbers of vehicles (29 vehicles/ 44.73%) out of these 64 move towards Nahar Chowk as the route connects with G. E. Road as a shortcut; while, 23 vehicles (35.89%) move towards Rly. Station. During a signal opening 12 vehicles (19.38%) run towards Devenagar Chowk remarkably for the cause that the route lays at the left-side of the route coming from pikadeli Chowk (Fig. 9).

g) Towards Three Different Chowk Routes from Rly. Station Route:

75 vehicles from Rly. Station route pass on at a single signal opening towards three different lines, out of which more than 75% (59 vehicles) run towards devenagar Chowk as it connects with the heart of the city; while, a very least number of vehicles (4 vehicles/ 5.58%) run towards Nahar Chowk as many bypass facilities are available there. Although the route towards pikadeli Chowk lays at the left-side of the route from rly station but a more number of vehicles (12 vehicles /16.04%) than Nahar Chowk route move towards pikadeli Chowk during a signal opening as there is no other short-cut to connect the area (Fig. 10).

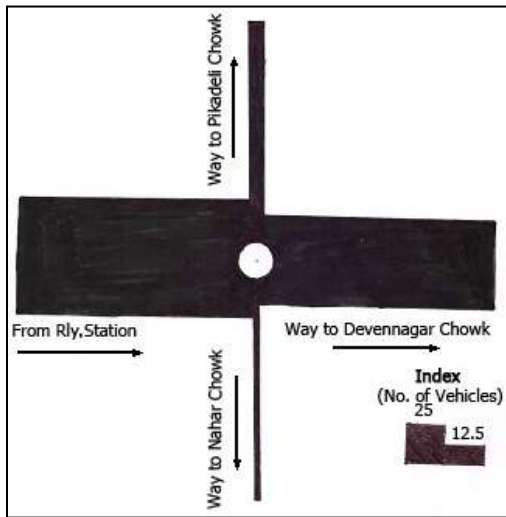


Fig.: 10 Flowing pattern of vehicles from Rly. Station to three different directions at Fafadhi Chowk.

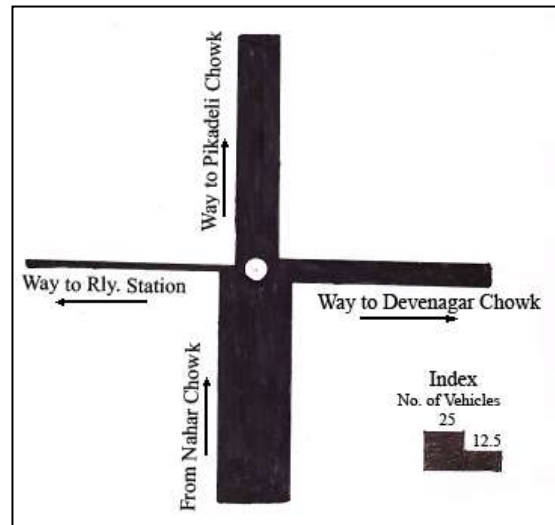


Fig.: 11 Flowing pattern of vehicles from Nahar Chowk to three different directions at Fafadhi Chowk.

h) Towards Three Different Chowk Routes from Nahar Chowk Route:

At a single signal opening, from Nahar Chowk route 48 vehicles (minimum) move towards three different directions, out of which more than 50% (28 vehicles/ 57.02%) run towards Pikadeli Chowk as the route connects with the Bilaspur highway. Instead of its high communicative importance of the route towards

devenagar Chowk, comparatively less numbers (17 vehicles/ 34.67%) of vehicles than pikadeli Chowk route move from Nahar Chowk route as the area is connected by other short-cut way. During a signal opening a very least number (4 vehicles/ 8.31%) of vehicles move towards Rly. Station route considerably as the route lays at the left-side of the route coming from Nahar Chowk as shown in Table 2 & Fig. 11.

VI. DISCUSSION & CONCLUSION

In this present study it is surprisingly found that at the both Chowk two-wheelers move more in number than the other vehicles like auto, car, bus etc. At Sharda Chowk more than 50% of vehicles are two-wheelers while at Fafadih Chowk more than 40% of vehicles are two-wheelers move towards any directions. At Sharda Chowk big-sized carriage like auto, car, bus etc. move towards Jayastam Chowk from Azad Chowk or vice versa more in number than the other directions. On the other hand at Fafadhi Chowk big-sized carriage like auto, car, bus etc. move towards Rly. Station route from Devenagar Chowk route or vice versa more in number than the other directions, and also towards Pikadeli Chowk route from Devenagar Chowk route or vice versa.

At the both Chowk the signal openings are run anti-clock wise. At Fafadih Chowk, it is found that at each opening, maximum number of vehicles move towards its straight direction than the other two directions, so the traffic jam is occurred for a short span of time or very less.

But at Sharda Chowk it is also found that at each opening, maximum number of vehicles move towards its straight direction except from the route of Gurunanak Chowk (maximum movement towards its right side, Azad Chowk route). For its anti-clock wise operation, the signal is opened from the Jayastam Chowk route before the Gurunanak Chowk route and the maximum number (14 vehicles/ 57.46 %) of vehicles moves towards straight (Azad Chowk) from Jayastam Chowk. For this reason, traffic jam is occurred at Azad Chowk route for long duration.

At this type of Chowk, if the signal is operated crisscross rather than clock wise or anti-clock wise movement, then this type of traffic jam can be minimized.

ACKNOWLEDGMENT I am thankful and profound gratitude to my Sir Dr. D. P. Kuity, Professor (Retd.), School of studies in Geology and WRM, Pt. R. S. U., Raipur for careful supervision, helpful suggestions and sole inspiration. Also I would like to thanks my junior Atanu Das and Anup Kumar Pandit for their constant co-operation.

REFERENCES:

Census of India, Provisional Population Totals, Paper 1: Madhya Pradesh, Cited in, Sen, A. and Sanyal, S., Urban Transport System: Issues and Challenges in Bhopal City, "National Geographical Journal of India" (NGSI-BHU, ISSN: 0027-9374/2013/1506), vol. 59 (4), Dec. 2011, pp. 421-434.

Dainikbhaskar, City Front Page, Raipur, Monday, Dec. 2015, 14, p. 2.

Gautam, P.S., Transport Geography of India, Mittal Pub., New Delhi, 1992, 124 p.

Pande, R. K., Pande, R. and Sing, A. K., Road Accidents in Uttarakhand (India): Some Observations, "National Geographer", Vol. XLI, No. 1+2 (Jan.-June, July-Dec.), 2006, pp. 103-109, ISSN: 0470-0929.

Saikia, A., Transport Development in the North Eastern Region of India, Ed. Vaidya, B. C. "Geography of Transport Development in India, Concept Pub. Comp., New Delhi, 2003, pp. 283-293.

Singh, R. C., Urban Transportation Development Issues: A Case Study of Bhilai Industrial Complex, "National Geographer", Vol. XXXVIII, No. 1, (Jan. – June), 2003, p. 69-79, ISSN: 0470-0929.

.....