Traffic Forecasting and Traffic Congestion in Vidisha (M.P), My Solutions

Surendra Singh Dangi[1] C.P. Yadav[2] Pankaj Jain[3] Dr. Pramod Sharma[4]
[1]M.E. Student [2,3]Lecturer [4]Associate Professor
[1,2,3,4]Department of Civil Engineering
[1,2,3,4]SATI Vidisha (M.P)

Abstract— Traffic congestion is one major problem that most people suffer everyday in a city like Vidisha (M.P). I drive 30 min a day commuting and this takes a large toll on body both physically as will as mentally. Staying near the workplace (my name to SATI engineering collage Vidisha) is a very costly option visually for the middle class as the property Rates keep going up more faster than salary ever the main purpose of this study is aimed to reducing urban traffic congestion generally de find as increase of demand for road user or road travel many organizations and professional have defined congestion in other ways based on variety of criteria. In the recent past, traffic congestion has extended as one of major challenge for traffic engineer, policy makers and planners in urban area Economic structures and modern social, shaped by car oriented urban development and rapid growth in vehicle ownership, have established congestion as on inescapable reality of urban life. Traffic forecasting is a process to estimate of future traffic such as number of vehicles or people that will use a specific traffic forecasting is used a specific in design highway facilities, planning and geometric design, engineering to calculate the capacity of infrastructure that is design rotary Intersection, Traffic sign, Traffic signal, how many lanes a road and bridge should have to estimate the financial and cast benefit ratio and calculate social impact assessment calculate environmental impacts that is noise and air pollution.

Key words: Traffic Congestion, Webster's Method, Forecasting Methods, Impact of Traffic Congestion, Traffic Cycle Time

I. INTRODUCTION

Traffic congestion is a condition on road network that occurs as use extreme and is characterized by slower speeds, increased vehicular queuing and longer trip time.

The traffic congestion occurs in space and time i.e., it is a spatiotemporal process. One of India's major problems regarding transport is the congestion that millions of commuters face each day on the road. Vidisha (M.P) is one of the rapid growing cities in the Madhya Pradesh but in the Top is list in (M.P) of cities with the traffic jam causes of traffic jam include factors such as the cities mass transport infrastructure, which is failing to keep up with the rapidly growing developments in the cities that require people to travel in and out on a daily basis there is on calculated 5 thousand of vehicles travelling on Vidisha road per day, this includes mixed traffic such as trucks, cars, two-wheelers, animal, pedestrians and driven carts.

A. Traffic Forecasting

Investments in the transport sector constitute a significant part of the total investment. This is especially true in the case of developing nations, where transport is the catalyst for all-round development and is one of the basic infrastructures. When the capital available is search and has competing demands, the investments in a transport project have to be planned carefully, keeping in view not only the present demand but also the requirements for a reasonable period in future. This underlines the need for calculation the future traffic accurately. Whither the plan be for the construction of a new facility or the improvement of existing facilities. To a great extent the accurate calculate of future traffic will influence the engineering design of the facility and the economic decision whether to take up the project or not.

II. SOME OF THE MAJOR CAUSES OF TRAFFIC CONGESTION IN VIDISHA(M.P.)

- Substantial Increase in the number of vehicles on Vidisha (M.P) roads in recent years. In fact, studies have shown more than a vehicle is plying almost every day on most of the important corridors in Vidisha.
- The read length in Vidisha has increased at the rate of very low present (%) per year, which of course is not in pace with the growing population. It is reported that the road density in Vidisha is very small and about 25 vehicles per km.
- Other major cause is that Vidisha roads are characterized by mixed traffic, which include personal vehicles, trucks, buses, two whaler, three-whalers, including animal-driven carts and pedestrians. This creates problem for traffic management and leads to delays in movement of the traffic.
- There has been inadequate pubic transport system in Vidisha. In spite of bus services, the transport system is not being able to keep pace with the growing. Population as a result of which, mare and mare people use their private vehicles, leading to increased congestion on the roads.
- Increase in the growth rate of the population in Vidisha, which include the growing number of work force, is another important cause.
- Damaged roads, repairing roads all contribute to several traffic congestion in the Vidisha city.

III. NEGATIVE IMPACTS OF TRAFFIC CONGESTION

Wasting time of passengers and motorists as a non-productive activity for most people, congestion reduces regional economic health.

- Wasted full increasing air pollution and carbon dioxide (Co_2) emissions owing to increased idling, braking and acceleration.
- Frustrated motorists and stressed, encouraging road rage and reduced health of motorists.
- Higher chance of collision due to constant stopping, going and tight spacing.

Fig. 1: Negative Impacts of Traffic Congestion

- Emergencies jam traffic may interfere with the passage of emergency vehicles traveling to their destinations where they are urgently needed.
- Tear and wear on vehicles as a result of idling in traffic, braking and frequent acceleration, replacements and leading to mare frequent repairs.
- Inability to forecast travel time accurately, leading to drivers allocating more time to travel "Just in case" and less time on productive activities.

IV. FORECASTING METHODS

The different methods which are generally used for calculating future traffic by engineers are described below. Some of these methods and used when the design period is small and some are used when the design period is large. The particular method to be used particular case or particular city depends largely upon the factors discussed in these methods and the selection is left to the discretion and intelligence of the designer.

1) Arithmetical Increase method.
2) Geometrical Increase method.
3) Graphical extension method.
4) Growth composition analysis method.
5) Ratio and correlation method.
6) Graphical comparison method.
7) Incremental increase method.
8) Decreased rate of growth method.
9) Zoning method or master plan method.

A. Geometrical increase method or uniform Percentage growth method or geometrical progression method

- This method the percentage increase in population from decade to decade is assumed to be remain constant.
- This method gives higher values and hence should be applied for a new industrial town at the beginning of development for only few decade.

$$A = P(1 + r)^n$$

where
A = Traffic Population after n^{th} decade
p = Present Population
r = Annual growth of traffic is generally taken as 7 to 8% Here we assume 8%

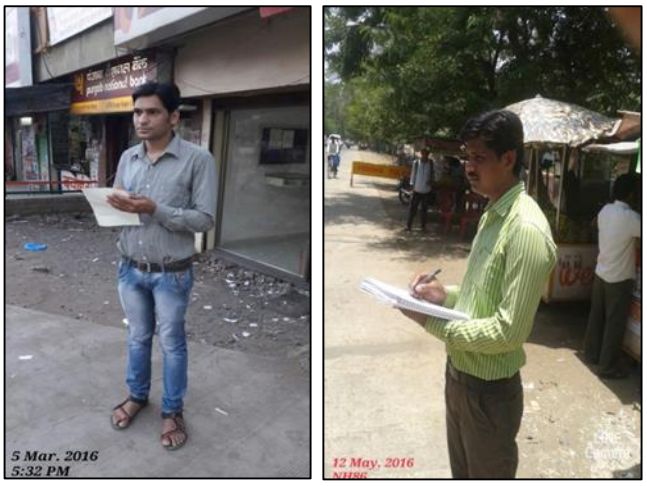


Fig. 2: Traffic Observation

1) Example

At Duraganagar square Vidisha (M.P.) The normal flow of traffic on crass roads

- (NH 86 Sagar to Bhopla) and
- (Station to Durganagar)

During design period are 946 and 641 PCU per hour the saturation flow values are assumed according to IRC 93-1985 the all red time for pedestrian is 12 sec. design two phase traffic signal by Webster's method after 5 year.

Approach road with (kerb to medium or centre line)In miter	3	3.5	4	4.5	5	5.5
PCU per hour	1850	1890	1950	2250	2550	2990

Table 1: Design two phase traffic signal by Webster's method after 5 year

Normal flow on road 1

$$q1 = 947\ (1 + 0.08)^{\ 5}$$

Let assume annual growth rate r = 8%

$$q1 = 1389.98\ say\ 1390\ PCU/hr$$

Normal flow on road 2

$$q2 = 641(1 + 0.08)^5$$

$$q2 = 941.8\ say\ 942\ PCU/\ hr$$

2) From IRC: 93 – 1985:

The total lost time per cycle is equal to total amber time per cycle I.E 8 sec. plus 4 sec. reaction time for first vehicle in phase 1 plush 4 sec. reaction time for first vehicle in phase 2 that is equal to total 16 sec.

Saturation flow = 525 * W PCU per hour

W = width of the approach measured from kerb to the inside of the central medium or mentioned canter line of the approach.

The width form 5.5m for lane width the value may be obtained from the table given blow

Normal flow on road 1 (q1) = 1390 PCU/hr
Normal flow on road 2 (q2) = 942 PCU/hr
Width of road 1 (W1) = 10m
Width of road 2 (W2) = 5.5m
Saturation flow for critical approach for road 1 (S1) = 525*10 = 5250 PCU/hr
Saturation flow for critical approach for road 2 (S2) = 2990 PCU /hr

3) From IRC 93:1985

All red time required for Pedestrian crossing 12 sec. and provide amber or yellow time of 2 sec. each for clearances.

According to Webster method

$$Y1 = \frac{q1}{s1} = \frac{1390}{5250} = 0.264$$

$$Y2 = \frac{q2}{s2} = \frac{942}{2990} = 0.315$$

$$Y = Y1 + Y2 = 0.264 + 0.315 = 0.579$$

$$L = 2n + R$$

n =is the number of phase

R=is the all red time

L = Total lost time per cycle

$L = 2 * 2 + 12 = 16$ sec.

Co = is optimum cycle length

Road	Green time In sec.	Amber time in sec.	Red time in sec.	Total cycle length
Road 1	25	2	38	65
Road 2	24	2	39	65

Table 2: Road & timings

$$Co = \frac{1.5L + 5}{1 - Y} = \frac{1.5 \times 16 + 5}{1 - 0.579}$$

$$Co = \frac{24 + 5}{0.421}$$

$$Co = 68.88\ sec$$

Green time on road 1

$$G1 = \frac{y1}{y}(Co - L)$$

$$G1 = \frac{0.264}{0.579}(68.88 - 16)$$

$$G1 = 24.11 \text{ sec.} say\ 25\ sec.$$

Green time on road 2

$$G2 = \frac{y2}{y}(Co - L)$$

$$G2 = \frac{0.315}{0.579}(68.88 - 16)$$

$$G2 = 24\ sec.$$

All red time for pedestrian crossing = 12 sec.

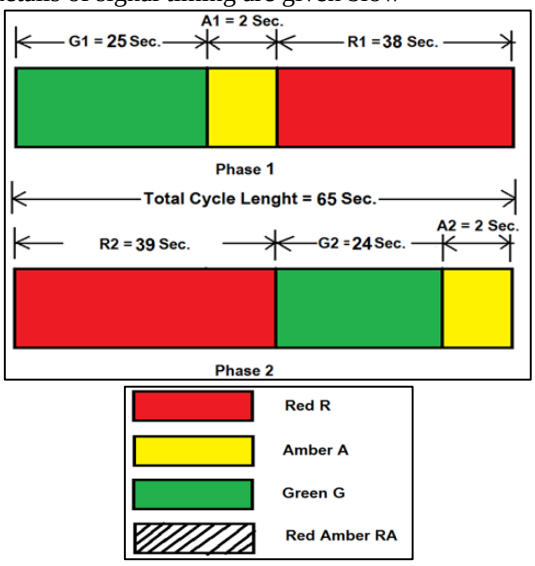
Providing Amber time of 2 sec. each for clearance

Total cycle length

$$= G1 + G2 + all\ Red\ time + amber$$

$$= 25 + 24 + 12 + 4 = 65\ sec.$$

The details of signal timing are given blow



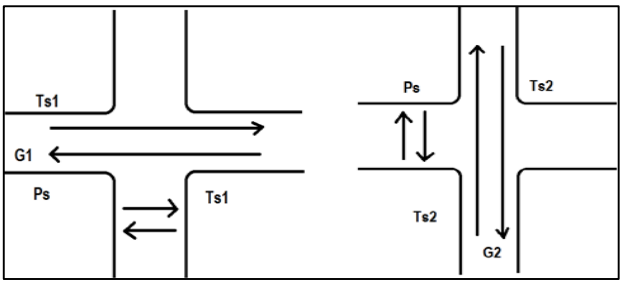


Fig. 3: Traffic Signal

Ts1-Traffic signal on road 1

Ts2-traffic signal on road 2

Ps-Podstriem signal

B. Phase Diagram and Details of Signal Setting

Fig. 4: Phase Diagram and Details of Signal Setting

V. MY SOLUTION

A. Road Widening

Road widening is often advocated as ways to reduce traffic jam. Road of the Vidisha city are narrow in various places for example Madhavganj Vidisha to Tilak Chowk Vidisha there are several reason like Hawkers on the footpath and some portion of the and illegal possession on the road or illegal structures. This kind of unlawful activity has to be prevented by imposing proper law and city development plan. Several step of road widening have been undertaken. However some research reductions in urban traffic jam or traffic congestion.

- Restricting routes for Rickshaw: Rickshaw should not be allowed in all the routes of the city. RTO should take some responsibility to imposing registration fee and legal documentation.
- Developing and increasing the manpower (traffic police): As the city is running with inadequate amount of traffic police then required. So it is the need of the hour for the authority to increase the number of traffic police
- Strict lane management: Different lane for various types of vehicles should be marked be imposed to make the drivers maintain the lone discipline
- Supply and demand: Jam com be reduced by either increasing road capacity (supply) or by reducing traffic (demand) revealed that road capacity can be increased

in a number of way such as adding more capacity over the whale of q route or at bottlenecks, creating new routes and improvements for traffic management. Reduction of demand con include, park and ride, parking restriction, congestion pricing road space rationing, incentives to use public transport and introducing of e-education, e-shopping and name based working options will reduce the number of people traveling.

VI. CONCLUSION

Traffic congestion is a local as will as global problem. All over the world, the prime cause of traffic congestion is an street parking. In Vidisha traffic congestion is common issue like Bhopal different infrastructural and managerial projects are granted for reducing traffic congestion. However in Vidisha this types of policy is not addressed yet. Traffic congestion constraints con be ameliorated by embarking on different strategies such as road capacity expansion, improved road infrastructures, restricting routes for rickshaw, financial penalty to the traffic law breakers and application of flyover. Most importantly, proper traffic management system along with appropriate implementation of traffic rules is necessary to mitigate the problems of traffic congestion in Vidisha city.

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