Effect of Traffic Congestion and Proper Solution for Karad City

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Abstract— This study aimed to analyze traffic congestion and proper solution of road networks. The speed performance index was adopted to evaluate the existing road network conditions of congestion, then road segment and network congestion indexes were introduced to respectively measure the congestion levels of urban road segment and network. . The effect of traffic congestion on the study area are Waste of time, Delay movement, Accident, Inability to forecast travel time, Fuel consumption, Road rage and environmental pollution. Based on these analyses the proposed congestion indexes can well assess the traffic congestion conditions of urban road networks, more importantly, such an assessment study provides traffic control and management agencies an accurate and clear understanding of operation status of traffic networks.

Keywords: Traffic Congestion, Traffic Networks

I. INTRODUCTION

While this is a simple concept, it is not constant for the reason that traffic demand may vary significantly depending on the season of the year, the day of the week and even time of the day. on the other hand, the overall effect of obstruction on Nigeria Highway cannot be truthfully quantify due to uncounted and diversified effects it has on the national capacity but its significant effect can be seen on examination delivery, good delivery, pollution, discomfort, excessive fuel consumption, excessive vehicle maintenance – all these accounted for financial loss. The difficulty of traffic congestion has reached an alarming rate in Nigeria particularly in many cities. However, there is a general feeling that the traffic flow should be free to agree to free movement of goods and service but reverse is the case own to the excess numbers of the road users (vehicles) on the road and this manifest through a number of problems which consist of:

- Delay: this is the time lost while traffic flow is impeded
- Inability to estimate travel time accurately, most important to drivers allocating more time to travel and less time on useful behavior.
- Wastage of fuel and increasing air pollution: releasing of CO (carbon monoxide) and other pollutant by congested car account for environmental and health problem which range from nose organization to international warming.
- Wear and tear on vehicles as a result of idling in transfer and frequent acceleration and braking, leading to more regular repairs and replacements.
- Stressed and frustration: distress that comes from stop and go condition of the traffic congestion cause discomfort and weakness of passengers and motorists. More so, congestion increases the tendency of clash which may lead to cycle of injuries and fatal accident.
- Perishing of some farming produce: Many farming products such as tomatoes, mangoes etc.

While new road construction can temporarily reduce blocking in the longer term it simply encourages further growth in car traffic through improved travel and a switch away from public transport. Beside this, suitable corridor in our cities for major roadwork's is becoming more and more difficult, and many of the recent major projects occupy turrets to decrease environmental disruption and community opposition, thereby raising costs. In the past decade, a new wave of Intelligent Transport Systems (ITS) has emerged around the world to provide additional tools to help solve our transport problems. exceptional Transport Systems can produce major benefits in reducing congestion, accident and environmental impacts, and can make significant improvements to the efficiency of commercial and public transport fleets, and to inter-modal addition. ITS can also reduce the need for expensive new transport road and rail network by maximizing the efficiency of our existing facilities.

II. LITERATURE REVIEW

A. Amudapuram Mohan Rao, Kalaga Ramachandra Rao [2012],

This paper deals with the traffic congestion has been one of major issues that most metropolises are facing. It is believed that identification of congestion is the first step for selecting appropriate mitigation measures. Congestion - both in perception and in reality - impacts the movement of people. Traffic congestion wastes time, energy and causes pollution. There are broadly two factors, which effect the congestion; (a) micro-level factors (b) macro-level factors that relate to overall demand for road use. Congestion is 'triggered' at the 'micro' level (e.g. on the road), and 'driven' at the 'macro' level. The micro level factors are, for example, many people want to move at the same time, too many vehicles for limited road space. On the other side, macro level factors are e.g. land-use patterns, car ownership trends, regional economic dynamics, etc. This paper gives an overview and presents the possible ways to identify and measure metrics for urban arterial congestion. A systematic review is carried out, based on measurement metrics such as speed, travel time/delay and volume and level of service. The review covers distinct aspects like definition; measurement criteria followed by different countries/organizations. The strengths and weaknesses of these measures are discussed. Further, a short critique of measurement criteria is presented.

B. Mr. Udit Batra, Mr. Mandar V. Sarode [2013],

In this paper studied the Rapid industrialization and the consequent urbanization has brought about an unprecedented revolution in the growth of motor vehicles all over the world and India is no exception. Such growing urbanization, combined with rising number of vehicle ownership, has led in recent years to an increased demand of traffic survey and analysis, for both long term and short term period. Traffic analysis is basically the process of intercepting and examining the number of vehicles on the road and deducing the pattern of traffic movement. A Traffic survey on specific

road sections of Nagpur city has been carried out which included Calculation of present traffic density and comparison with previous year data, Average velocity of traffic. Manual method of counting was used with the help of video recording.

– Width of the Residency Road 7.4 meters Traffic density per hour for Residency Road is 5002 vehicles
– Width of the WHC Road is 8.85 meters & Traffic density per hour for West High Court Road is 1697 vehicles
– The traffic density from liberty square to Smruti Theatre square is 5000 vehicles per hour which is substantially more than Wardha Road where flyover has been constructed hence there is an urgent need to distribute heavy traffic density at Residency Road
– The width of the Residency Road is 7.4 meters which is comparatively less than that of Wardha Road hence frequent traffic congestions are observed
– There are schools on the Residency road & during school timing more traffic flow is observed.
– Possibilities of restricting four wheelers during peak traffic hours need to be examined.
– On street parking of vehicles should be prohibited.
– Taking into account development taking place in western Nagpur, WHC road with limited width will not be able absorb increase in vehicular traffic. Hence, traffic distribution through alternative routes or construction of flyover may be envisaged.
– Two wheelers, particularly motorcycles is the most preferred mode of transport.
– Public transport system needs to be strengthened so that use of individual vehicles is restricted, thereby reducing traffic density.

C. *Shekhar K. Rahane, Prof. U. R. Saharkar [2014],*

This paper deals with the traffic congestion is a major urban transport problem. Due to traffic congestion, there is possibility of accidents because of poor traffic management. To eliminate road accidents and to save precious human life it is essential to find proper solution for traffic congestion. In this paper traffic congestion problem in Talegaon Dabhade, Tal-Maval. Dist-Pune is identified and studied for finding out the causes and proposed solution of it. In the recent years there has been a considerable loss due to the accidents to the precious human life and to the vehicles to some extend in Talegaon Dabhade.

Traffic congestion is a global as well as local problem. All over the world, the prime cause of traffic congestion is on street parking. In Talegaon, traffic congestion is a common issue like Mumbai. Different infrastructural and managerial projects are granted for reducing traffic jam. However in Talegaon this type of policy is not addressed yet. Traffic congestion constraints can be ameliorated by embarking on various strategies such as road capacity expansion, improved road infrastructures, restricting routes for Rickshaw, financial penalty to the traffic law breakers and application of Fly over. Most importantly, proper traffic management system along with appropriate implementation of traffic rules is necessary to mitigate the problems of traffic congestion in Talegaon Dabhade.

III. THEORETICAL CONTENT

A. *Reasons behind Traffic Congestion*

1) *Inadequacy of Traffic Police*
Traffic police in vijay chowk karad is inadequate in numbers compared to other cities in Maharashtra. All the cross roads need at least four traffic police at a time whereas in vijay chowk it is seen that the number of traffic police are always short and due to the lacking of proper instruction the vehicles are getting trapped in traffic. Only two traffic police are working in the city which is inadequate.

2) *Narrow Roads*
Streets of vijay chowk are not that wide spread, due to illegal possession on the road they are getting narrow and becoming a reason behind traffic jam. So every possibility is there to expand the road as per their right of way to reduce traffic congestion. Moreover this will be less expensive and less time consuming due to land acquisition won't be required in this process.

3) *Increasing Number of Population*
All the areas under karad city are facing an increasing number of population which is a bad indicator for the traffic management and this could be a vital reason behind traffic.

4) *Improper Planning of City Development*
Development Plan has its long term city development planning. But that planning is not proper. Most of the time it is seen that some illegally ceased roadside land, but due to the vague development plan these kinds of movements are going in vain.

5) *Improper Lane Management*
Lane management is an important fact in managing the traffic in vijay chowk. Many types of the vehicles try to overtake the vehicles even in the single undivided road. This is the main reason that the city roads are unequipped with the lane dividers which divide the lane into incoming and outing traffic.

6) *Low Road Space*
Due to unplanned parking and construction materials that are place beside the road, the usable road space becomes low. So, with the low road space it is common that very few vehicles will get the chance to pass through them. It causes traffic jam.

7) *Unplanned Stoppage/ Parking*
We do not have any planned parking facility over vijay chowk Karad City. That is why vehicle operators stop their vehicles in any place, where they need. And it cause traffic jam.

8) *Different Speed Vehicle*
Slow and fast moving vehicles are running through the same road. As a result, slow moving vehicles are making the fast moving vehicles slow. This is also one of the important reasons of traffic jam.

9) *Rickshaw*
Some people think rickshaw is the main cause of traffic jam. Their structure and moving capability is also responsible for traffic jam.

10) *Insufficient Road*
Due to inadequate space in the vijay chowk Karad City according to its population, we have very low road space to offer for this huge population as buildings, offices are consuming a huge portion of lands.

11) Lack of Law Implementation

One important complain against traffic is lack of proper law implementation is also encouraging illegal parking. So, law enforcement should be strict.

IV. RESULT AND DISCUSSION

ays		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Traffic Classification		Traffic						
1 - A to C	2 Wheelers	1240	1160	1160	1220	1116	1012	972
	Cars	352	304	324	360	276	248	220
	Truck	16	4	16	8	8	12	8
2 - C to A	2 Wheelers	720	684	672	712	716	812	800
	Cars	372	392	348	352	344	380	352
	Truck	8	12	4	8	8	0	4
3 - B to A	2 Wheelers	916	876	916	928	976	720	700
	Cars	140	176	128	172	80	120	152
	Truck	4	0	8	20	4	12	4
4 - A to B	2 Wheelers	280	368	304	332	304	360	368
	Cars	48	24	40	32	16	32	40
	Truck	4	0	8	12	16	0	8
5 - D to B	2 Wheelers	712	712	688	660	712	568	576
	Cars	56	44	32	56	36	40	56
	Truck	8	12	4	8	12	8	4
6 - B to D	2 Wheelers	780	680	752	732	756	592	568
	Cars	244	224	172	216	208	200	204
	Truck	4	12	0	8	4	12	16
7 - D to C	2 Wheelers	1712	1688	1464	1752	1664	1552	1488
	Cars	472	412	464	484	432	412	416
	Truck	8	20	8	4	8	4	12
8 - C to D	2 Wheelers	1300	1368	1452	1424	1348	1300	1280
	Cars	408	488	436	520	472	460	472
	Truck	8	0	4	0	12	16	16
9 - D to A	2 Wheelers	5528	5928	4916	5892	5796	4500	4824
	Cars	1420	2000	2072	2132	2044	1968	1860
	Truck	56	48	48	52	64	32	44
10 - A to D	2 Wheelers	6196	6672	6504	6244	6600	6416	5912
	Cars	2528	2532	2336	2736	2540	2512	2504
	Truck	96	116	148	84	104	148	224
11 - C to B	2 Wheelers	644	664	580	616	612	568	580
	Cars	28	24	52	12	0	48	48
	Truck	8	12	0	16	16	8	8
12 - B to C	2 Wheelers	608	664	716	656	692	776	744
	Cars	8	16	32	40	0	28	32
	Truck	4	0	12	8	12	12	12

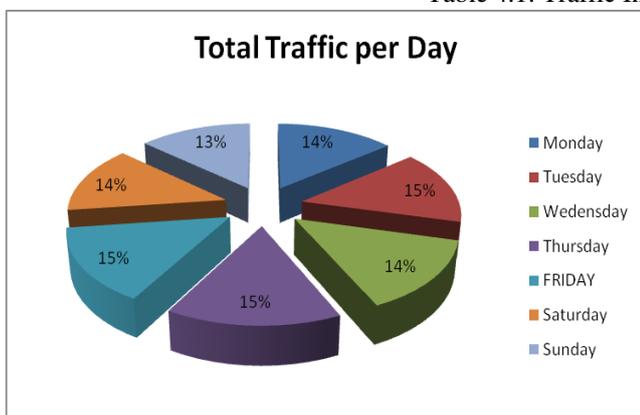Table 4.1: Traffic Intensity per Day of 1 Week

Fig. 4.1: Traffic Volume of Vijay Chowk per Day for One Week

Sr. No	Ring No	Distance in m	$R_i \, l_i$	Congestion Index Of Particular Road
1	P1-P2	70.12	30.8528	0.0431
2	P2-P3	147.49	64.8956	0.0906
3	P3-P4	195.06	85.8264	0.1199
4	P4-P5	192.19	84.5636	0.1181
5	P5-P1	111.58	49.0952	0.0686

Table 4.2: Intermediate Road Network Congestion Index of Ring 1

190

Fig. 4.2: Intermediate Road Network Congestion Index of Ring 1

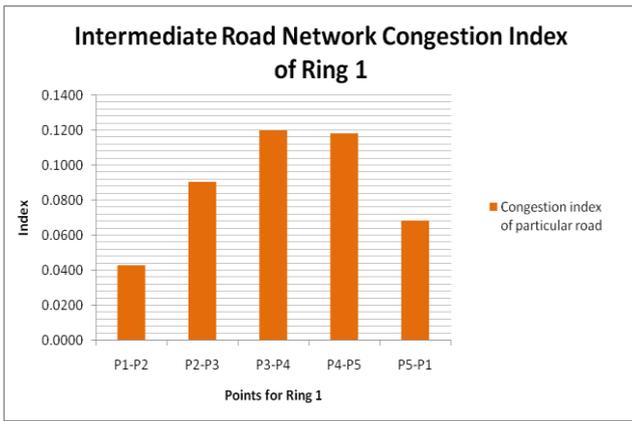Table 4.3: Road Network Congestion Index of Ring 1

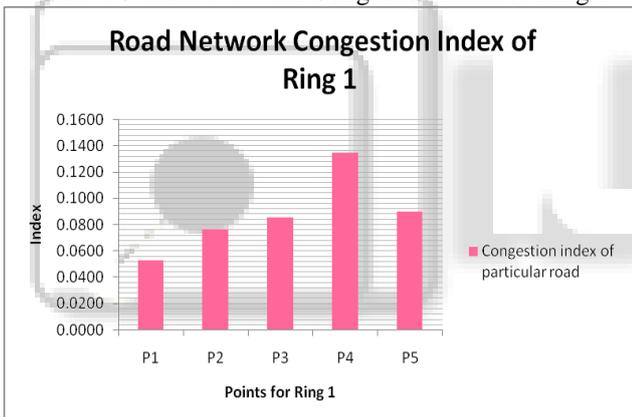| Sr. No.	Points	Distance From Vijay Chowk	$R_i L_i$	Congestion Index Of Particular Road
1	P1	69.29	30.4876	0.0529
2	P2	100.4	44.176	0.0767
3	P3	112	49.28	0.0856
4	P4	176.57	77.6908	0.1349
5	P5	118.33	52.0652	0.0904

Fig. 4.3: Road Network Congestion Index of Ring 1

V. CONCLUSION

Traffic congestion is a global as well as local problem. Most importantly, proper traffic management system along with appropriate implementation of traffic rules is necessary to mitigate the problems of traffic congestion in Vijay Chowk, Karad.

The following conclusions were drawn:
1) In Vijay Chowk, Karad city traffic volume of seven days 16 hour is 190024.
2) Average congestion index of road;
− The average intermediate road network congestion index is 0.0393.
− The average road network congestion index is 0.0367.
3) Maximum & minimum congestion index;
− It is observed that the maximum congestion index of intermediate road network is 0.1199 at ring 1 point P3-P4 & minimum congestion index of intermediate road network is 0.0089 at ring 5 point P55-P56.

− It is observed that the maximum congestion index of road network is 0.1349 at ring 1 point P4 & minimum congestion index of intermediate road network is 0.0073 at ring 4 point P413.
4) The total shortest distance of alternate route 1 to avoid the congestion in Vijay Chowk is seen to be 632.23m long & specification regarding time is around 3.2min.
5) The total shortest distance of alternate route 2 to avoid the congestion in Vijay Chowk is seen to be 937.02m long & specification regarding time is around 4.5min.
6) On Comparison of alternate routes 1 & 2 it is observed that alternate route 1 is 304.79m shorter than alternate route 2. The alternate route 1 takes 1.3 min minimum time to reach as compare of alternate route 2. Hence alternate route 1 is preferred for travelling, in view of time & cost.

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