

# Traffic Congestion Minimization Study for Hingna Area of Nagpur City, MS. India

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**Abstract-** Traffic congestion is a major problem in urban transport Areas .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 Nagpur City, MS. India 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 extent in Nagpur City.

## I. INTRODUCTION

In big cities, like Nagpur road traffic congestion is caused by the volume of traffic closely approaching the maximum capacity of the road network like Hingna region. During Peak hours, it gets worse condition and with more people linking the road network every day, the congestion problem will not disappear on its own. Road traffic congestion poses a challenge for all large and growing urban areas. Theoretical frameworks and guidance on some of the practical tools necessary to manage congestion in such a way as to firstly to Avoid second to reduce and last but not the list mitigate the congestion its overall impact on individuals, families, communities and societies in urban areas. Urban traffic congestion is a significant and growing problem in many parts of the Country. Moreover, as congestion continues to increase, the conventional approach of "building more roads" widening of roads doesn't always work for a variety of political, financial, and environmental reasons.

Maharashtra state government and Maharashtra Industrial Development Corporation (MIDC) have drawn up a plan to ensure that the State puts forth a total biotechnology revolution. Since Government wants to establish Pune as a technology hub, MIDC has started acquiring large areas of land it is located 7 Km. from Nagpur city. In this Industrial area, several engineering Industries, Electrical based Industries, food based industries, and etc. is located. Maharashtra state Electricity Boards has established its two sub-station. Telephone Dept. has already its Telephone facilities by way of Electronic Exchange. To facilitate the industrialists and workers amenities like Post office, Banks,

Police station, Petrol Pumps, Canteen, Bus services etc. are available in this area. In this area no land is available for further planning. Audi, Volkswagen Maruti Suzuki Hyundai have already set up their roots.

## II. LITERATURE SURVEY

*Traffic congestion* refers to the incremental delay caused by interactions among vehicles on a roadway, particularly as traffic volumes approach a roadway's capacity. Congestion can be evaluated in various ways that can result in very different estimates of its costs and the benefits of specific congestion reduction strategies. This report describes factors to consider when performing such evaluations.

Conventional congestion indicators, such as roadway Level-Of-Service (LOS), and the Travel Time Index (TTI) reflect congestion *intensity*, the decline in vehicle traffic speeds during peak periods. Such information is useful for making short-term decisions, such as how to travel across town during rush hour, but is unsuited for strategic planning decisions that affect the quality of travel transport options available, or development patterns. Comprehensive evaluation measures congestion *costs*, taking into account congestion *exposure* (the amount people must drive under urban-peak conditions).

Described differently, congestion evaluation is affected by whether the analysis measures *mobility* (travel speed) or *accessibility* (the time and financial costs required to reach services and activities). This is important because planning decisions often involve trade-offs between accessibility factors. For example, roadway expansions tend to reduce motor vehicle delay but reduce pedestrian and cycling access, and therefore transit access since most transit trips include walking links, and often lead to more dispersed development which increases travel distances. Other congestion reduction strategies, such as transit improvements, can improve transport options and land use accessibility, not just mobility. Comprehensive evaluation considers all these impacts.

The work proposed in of IEEE transaction by Shancang Li, Shanshan Zhao, Xinheng Wang, Kewang Zhang, and Ling Li shows that evaluation metric, path vacant ratio, is proposed to evaluate and then find a set of link-disjoint paths from all available paths. A congestion control algorithm that can adaptively adjust the load over multipath is proposed.

### III. CONGESTION

There is no single, broadly accepted definition of traffic congestion. One of the principal reasons for this lack of consensus is that congestion is both:

- A physical phenomenon relating to the manner in which vehicles impede each other's progression as demand for limited road space approaches full capacity.
- A relative phenomenon relating to user expectations *vis-à-vis* road system performance. Both operational and user respective are important in understanding Congestion and its impacts. This report does not seek to select one approach to defining congestion over the other; they clearly both have uses when seeking to develop congestion management strategies. Ideally, urban transport policies should be developed on the basis that congestion is related to both:
  - The behavior of traffic as it nears the physical capacity of the road system.
  - The difference between road user's expectations of the system's performance and how the system actually performs Congestion prevents us from moving freely and it slows and otherwise interrupts the ways of business within urban areas. Conversely, it is important to note that unfettered movement is not the primary benefit we derive from living in urban areas. Cities provide access to a wide range of activities, people, services, goods, markets, opportunities, ideas and networks. These benefits can be delivered either through speed or through greater proximity. Congestion may affect travel speed but in some circumstances, such as dense urban cores, congestion may both be expected and, to some degree, accepted. (Shancang Li et.al., sept 2014)

#### Baseline Speeds

A key congestion analysis factor is the *baseline* speed below which delay of vehicle is calculated. For example, if Vehicles on that road on that particular time were

#### Methods of Counting:

Two methods are available for conducting traffic volume count

- *Manual Method:* These are mainly visual counts carried out by operator. It is time consuming.
- *Automatic Method:* There are various devices and software available, which enables easy and accurate traffic count.

Manual counts are typically used to gather data for determination of vehicle classification, turning movements, direction of travel, pedestrian movements or vehicle occupancy. Automatic counts are typically used to gather data for determination of vehicle hourly patterns, daily or seasonal variation and growth trends or annual traffic estimates.

The selection of study method should be determined

the baseline speed is 60 miles per hour (mph), and actual traffic speeds are 50 mph, the delay is 10 mph. Baseline speeds can be defined in the following ways:

- *Free-flow speeds:* traffic speeds measured during uncongested conditions (LOS A).
- *Speed limits:* maximum legal speeds on a road (LOS A or B).
- *Capacity-maximizing speeds:* maximizes roadway vehicle traffic capacity (LOS C or D).
- *Efficiency-optimizing speeds:* reflects users' willingness-to-pay for faster travel (LOS C or D).

As traffic speed of a vehicle increase the space required between vehicles for a given level of driver effort and safety effort. For example, a highway lane can efficiently carry more than 1,500 vehicles per hour at 45-54 mph, about twice the 600 vehicles that can operate comfortably at 60+ mph. Urban arterial capacity tends to peak at 35-45 mph. Maintaining free flow speeds under urban-peak hour conditions is more costly than most car owner are willing to pay and efficiently useless.

(Rijurekha Sen et.al.,)

### IV. METHODOLOGY

#### Study Magnitude

1. *Time of the day:* The traffic flow was seen varying during the peak hours and the non-peak hours. The peak hours (9:00 AM to 10:30 AM and 5:00 PM to 6:00 PM) were taken into consideration for the recording of the maximum traffic movements. The peak hours are defined by the buses, office going people, shopkeepers, school and college going people majorly. This is the time a t which traffic movement is maximum and therefore the actual capacity of the road under consideration is measured.
2. *Morning / Evening:* The recordings at a single place were taken that is once in the morning. The morning data was directly compared to the evening, giving better estimate for the study.
3. *Inflow / Outflow:* The inflow as well as the outflow of the same road was recorded so that the total no of

recorded accordingly.

using the count period. The count period should be representative of the time of day, day of month, month of year for the study area. For example counts at a summer resort would not be taken in January. The count period should avoid special event or compromising weather conditions. Count period may range from 5 minutes to 1 year.

#### Routes of Study:

Subhash Nagar sq. To YCCE:

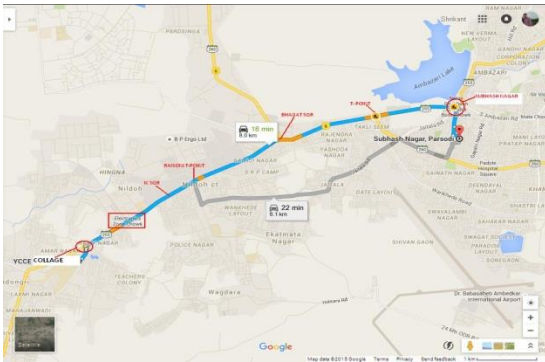


Fig.1.Site map of Subhash Nagar sq. To YCCE

Data Collected on several intersections

Table 1.Subhash Nagar sq. To YCCE

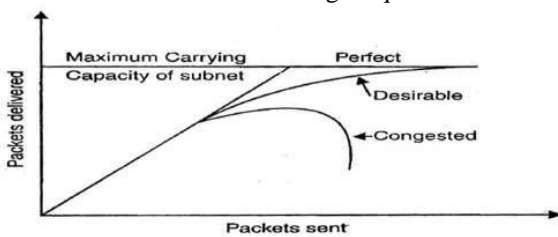


Fig.2.Concept of congestion

V. REASONS OF TRAFFIC CONGESTION

A. Narrow roads

Streets of Hingna Road are not that much wide so that the number of vehicle traveling from the street get disrupts, due to illegal work 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 (ROW) to reduce traffic congestion. Moreover this will be less expensive and less time consuming due to land acquirement won't be required in this process.

B. Irregular Parking

Irregular parking on the road has been creating congestion every day from Subhash Nagar to YCC College Hingna, a distance of around eight kilometer patch. On-road parking of vehicles is one of the main reasons behind serious traffic congestion on different parts of the Hingna city parking of the buses on the several intersections so that the other vehicle get affected of congestion.

C. Improper lane management

Lane management is an important fact in managing for proper transportation in Hingna road Nagpur. 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 (William ZHANG et.al.,).

VI. SUGESTION FOR TRAFFIC CONGESTION

A. Road widening

Road widening is often supported as ways to overcome traffic congestion. Roads of the city are narrow in different places, for example road square near vadi naka petrol pump street and in front of CRPF gate there are several reasons

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 steps of road widening have been undertaken. However some research indicates that road widening provides only slight reductions in urban traffic congestion.

( Vipin Jain et.al.,)

B. Restricting routes for Rickshaw

Rickshaw should not be allowed in all the routes of the city.as the Rickshaw they stands anywhere of the road they even don't see any vehicle only they get the passenger to halt and take the money due to this the other vehicle have to stop or reduce their speed of vehicle .RTO should take some responsibility to control the increasing number of

Side	Time	Moto r cycle s	Car s	Buse s/ truck s	cycle s/ Auto s	Anima ls	Pedestria ns	Wron g Sides
Up	9-10 am	468	98	70	66	10	22	5
Dow n	9-10 am	459	55	63	62	15	26	7

rickshaws by imposing registration fee and legal documentation.

C. Financial penalty to the traffic law breakers

Government can take such strict step like imposing financial penalty on the law breaking drivers. They should be made to dissuade the drivers from certain Congestion-causing habit such as wrong overtaking, one way driving. Mobile court should be introduced to fine the truck drivers for disobeying traffic law and driving unfit truck.istant challan online should be forward to the signal disobeying drivers. This kind of implication of law can mitigate the traffic jam in short run, but in long run all the people should be involved to create awareness and responsible to the city. Otherwise traffic jam solution is impossible(Alexander Th et.al.,).

VII. CONCLUSION

Traffic congestion is a global as well as local problem. All over the world, the major cause of traffic congestion is on street parking of the buses or any other vehicles. In Hingna Road, traffic congestion is a common issue like Nagpur city. Different infrastructural and managerial projects are granted for reducing traffic jam. However in Hingna Road this type of policy is not adopted yet. Traffic congestion limitations can be upgraded 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, in future metro.

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