International Journal of Advance Research in Science and Engineering
Vol. No.6, Issue No. 07, July 2017
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

Traffic Congestion and Possible Solutions in Urban Transportation System

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ABSTRACT

In rapidly growing cities of country like India, the increasing private transport and high movement of the population toward urban cities leads to problem of congestion, which further leads to complications and hazard on the cities roads. Indian cities already suffering with huge deficiencies in term of infrastructures as well as in operational efficiencies. Considering the policy gaps on country roads this paper first describes the factor causing the congestion and after that presents some recommended measures to reduce the congestion on the city roads.

Keywords: Urban transportation system, congestion, traffic, vehicles, public transport, infrastructures

I. INTRODUCTION

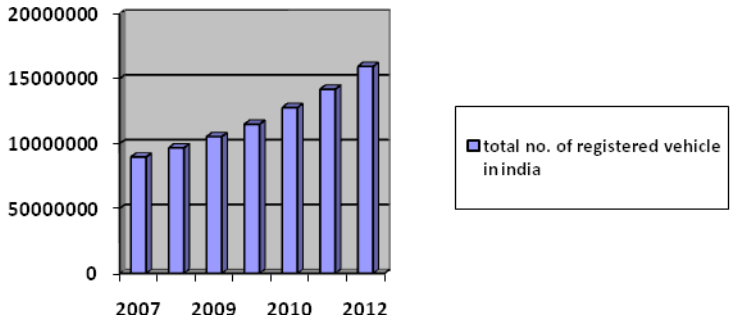
Most of the cities in Country like India are undergoing multi-faceted problems because of the rapid urbanization and sudden increment in the private transport. Congestion on the urban roads are afflicting vehicle stockpile in India, and effects the urban economies in different ways. Congestion may be defined as excess demand for travel over its supply. In fact, the reason why governments are forced to revisit their policies like in Delhi for urban transport just because of increasing demand of travel with in limited available services like public transports. The occurrence of congestion on the city roads prevents the movement of traffic and leading to the intolerable increase in the trip delay.

Constructing new road or the widening of an existing road is a temporary relief to the congestion, but in future perspective it simply encourages the growth of the new vehicle through increased level and it may also switch away the use of public transport. Building new road does not always hold good for variety of financial, environmental and political reasons, in fact by introducing greater demand of vehicle to travel smoothly and save time it compounds congestion on that road also.

Against the serious problem of growing and existing congestion problems in the Indian cities, smart traffic control and information techniques are required that can subsequently reduce the traffic congestion and increase demand of public transport

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

Fig. source: transport research wing, ministry of surface transport



II. IMPACTS OF CONGESTION

Congestion involves slower speeds, queuing and increased trip times, which impose higher costs on the economy and also generate impacts on urban regions and their inhabitants. Congestion also has a range of indirect impacts including the marginal environmental and resource impacts of congestion, impacts on quality of life, stress, safety as well as impacts on non-vehicular road space users such as the users of sidewalks and road frontage properties. there are some more serious social effects of congestion on the environment are listed here

1) Congestion means just waste of valuable time and health. The time wasted in congestion could effectively be used in doing some productive work
2) The sudden stop and go driving pattern in the congestion leads to the more fuel consumption in the city and thereby increasing the pollution level in the city by emitting more carbon into the environment.
3) The slow speed of vehicles in the traffic jams also leads to the emission of the oxides of nitrogen and some hydrocarbons which is maor culprit of a term known as photo chemical smog.
4) Traffic congestion causes noise of high level (more than 90 dB) which causes environment unpleasant.

III. REASONS OF CONGESTION

Increasing movement of population towards urban cities

Rapidly growing Indian cities are facing an increasing and unexpected number of population which is a bad indicator for the traffic management and this could be a vital reason behind traffic. Continues movement of large population toward urban cites for better employment, education, medical treatments etc., causing an unexpected growth of traffic on city roads.

Improper planning of city development

Most of the Indian cities are not well pre planned, Development Plan has its long term role in the development of the city. But in Indian cities the lack of planning appears in result of that the cities roads experiencing congestion have not much space to widening its roads and to introduce extra roads.

Illegal Parking

Illegal and unauthorized parking on the city roads has been creating congestion every day. On-road parking of the vehicles near markets and area business district is one of main reasons behind serious traffic congestion.

IJARSE
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Lack of urban public transport facilities.

The lack of good and rapid public transport in the minor and also some of the major cities necessitate the use of personal cars and vehicles by individuals

Higher Purchasing power of the public

Due to the higher purchasing power of the citizen the popularity of private transportation is increasing and but existing roads and highway are not supportive or changing according to the increasing number of vehicle. As a result, vehicle congestion is increasing at an alarming rate.

Table 1 Source: Open Government Data, platform India

Cities with No. of car ownership	
City	**No. of Cars**
Delhi	2172069
Bengaluru	800866
Chennai	653270
Greater Mumbai	617556
Hyderabad	558081
Pune	332293
Chandigarh	286584

IV. POSSIBLE SOLUTIONS FOR TRAFFIC CONGESTION

4.1 Better Integrated Urban Planning

Currently, urban transport policies are regulated by city municipalities in the country. At the national level, the Government of India's Jawaharlal Nehru National Urban Renewal Mission (JNNURM) mandated to transform urban areas, particularly urban transport. To get funds under this programme, states and municipalities are required to adopt specific reforms in urban development policies, which relate to the management of funds and adoption of new regulations pertaining to urban land ceiling and public discourse law, etc.

4.2 Promotion and integration of Public Transport

The Working Group on Urban Transport for 12th Plan period recognizes the important of public transport. In India, metro rail transport is already in operation in cities like New Delhi and Bangalore. The same facilities are also underway in other major cities like Mumbai, Chennai, Hyderabad, Jaipur and Kolkata.

4.3 Intelligent signalization system

instead of using conventional old signalization we must go for automated signalization in the mega cities. Intersection are the major sources of the congestion and this system could relief a much amount of congestion.

4.4 Strict lane management

Different lanes for different types of vehicles should be marked on the roads and law i.e. financial penalty should be imposed to make the drivers maintain the lane discipline.

4.5 Supply and demand

Congestion can be reduced by either increasing road capacity (supply) or by reducing traffic (demand) revealed that road capacity can be increased in a number of ways such as adding more capacity over the whole of a route

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

or at bottlenecks, creating new routes, and improvements for traffic management. Reduction of demand can include, parking restriction, park and ride, congestion pricing, road space rationing, incentives to use public transport and

introduction of e-education, e-shopping and homebased working options will reduce the number of people travelling.

4.6 Effective Traffic Policies

With a huge increase in urban traffic population, there has been sudden increase in need for mobility, and also with it, there is an increase in personal motorised vehicle. Instead widening and constructing new roads which further generate or attract more traffic, government should adopt intelligent urban transport policies to tackle the increasing congestion problems in the city roads

1) **Street usage capacity:** This scheme may be used to improve the road network capacity and to reduce the road conflicts on the selected routes in the city. Bus lanes can also be used successfully that will lead to improve in level of service and will reduce the congestion.
2) **Area licensing system:** this scheme first introduces in Singapore in 1975.in this scheme while entering to a designated area fess is mandatory by the users who not have four or more occupants in the vehicle during the peak hours this scheme hold good in highly populated central business district like Delhi in India where there is much employed population.
3) **Electronic road pricing(ERP):** Introduces in Singapore in 1995. In this scheme use charged to use the road with private vehicles during peak hours. Congestion is reduced under this scheme by imposing road using charges.
4) **Quota for new car registration**: this scheme is first introduced in Shanghai in 1998. Under this scheme congestion is brought down by setting monthly quota or new cars in the city. Registration is given to only few vehicles monthly or yearly.
5) **Week end car system:** The objective of this system was to allow Singaporeans, especially the lower income groups, to own cars without contributing to traffic congestion. Car buyers who opted for this scheme were given tax rebates and a discount on their road taxes. Weekend car buyers have six categories to bid for a licence or Certificate of Entitlement (COE).

V. CONCLUSIONS

In Indian Transportation system there is deficiencies both in term of operational efficiencies and infrastructure. By considering some policy gaps in Indian transportation system the measures are recommended above to reduce traffic congestion in the urban cities. There is requirement of integrated urban transport policies to reduce the congestion on urban roads. Continuous vehicle purchasing due to high income in the mega cities also should be addressed and there should be birth of new rules and regulations for registering a new vehicle the major urban congested cities like Delhi. Mumbai etc. State and city public transport undertaking need to be strengthened to attract the public to use the public transport. Introducing a rapid and efficient public transport and promoting it to a national levels leads to some relief in the major congestion problems in the urban cities.in the mega cities there is a need of strict rules of parking and uniform charges of vehicles so that no one can park their vehicles on the busy roads. Intelligent signalization and strict lane management should be adopted to get

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

some relief against congestion. Government should adopt hit and trials congestion relieving policies like odd and even in Delhi and analysis of them should be kept in mind while imposing these schemes to other mega cities.

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