

## Managing Congestion With Public Transport

*B I Singhal*



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Cities in India are faced with growing congestion and declining urban mobility. The consequence is increasing air and noise pollution and lesser road safety. Fossil Fuel, of which a large part is imported, is wasted. GHG emissions are a global concern. There is a general degradation in the quality of life, city efficiency and its economic potential.

All categories of road users are facing problems in commuting. The pedestrians do not get a safe, conflict-free and obstruction free path to walk. The cyclists have to fight for the right of way with fast moving motorized modes of transport, many a times risking their lives. The user of public transport faces long waiting periods, uncertainty in travel time and difficult conditions of travel. Personal motorized modes of transport are slowed down by the slow moving traffic and face significant delays at traffic signals and road junctions. Road users get restless leading to road rage, rash driving and accidents. Worse, urban transport in Indian cities is headed in the wrong direction.

The primary cause of congestion is the prevailing imbalance in the use of road space. The use of high capacity modes of transport i.e. buses and mass rapid transit (MRT) is limited. Instead, use of low capacity modes of transport, both personal and public i.e. cars, 2-wheelers and 3-wheeler tempos is rising. These low capacity modes are uneconomic and socially wasteful in the use of road space and are the primary cause of congestion. Road space in any city is almost fixed and, if at all, can only be marginally improved. Therefore, the available road space must be used in a balanced manner both by low capacity and high capacity modes for efficient urban mobility. Figure-1 shows the road space occupied by cars and a bus to carry the same number of passengers.

### **The Challenge**

Cities face three main challenges. The biggest challenge is the high rate of urbanization; migration from rural to urban areas and from small cities to big cities. The decadal percentage increase of urban population that was 2.26 in 2001 is expected to rise to 4 by 2031 (Ref: The Report of the Working Group

The author is former Director General of the Institute of Urban Transport, India, and the technical advisor to the Ministry of Urban Development, Government of India. He is the former Managing Director of RITES, a large transport consultancy in India. He is also a Member of the Institution of Civil Engineers, London and Chartered Engineer (UK). He has worked on International projects in Metro rail in Hong Kong and Taiwan. During his stay in RITES, he led the team responsible for planning of Delhi Metro rail. Later as Advisor to Delhi Government, he planned the Multi-modal integrated Public transport network for Delhi and led DIMTS Ltd. He has been a consultant and advisor to mega projects like Kolkata metro rail, Ganga Expressway and the Special Economic zone of Reliance of India. He was a visiting Professor of Transportation to France for three months in 1998 and a member of the Urban Transport Strategy review group of the World Bank 2002. He has written nearly 100 papers on technical and management issues. He is the founder member of the Institution of Urban Transport, India and the Patron of the Institute.

Fig-1



on UT for the 12<sup>TH</sup> FYP). By then, the urban population is estimated to double to about 600 million. The challenge is made doubly difficult because there is an existing deficit in urban transport facilities. The High Powered Expert Committee appointed by Ministry of Urban Development, Government of India (March 2011) estimate that the backlog in urban roads ranged from 50 to 80 per cent across all Indian cities. This deficit has to be wiped out before urban transport infrastructure can grow to keep pace with growing demand. Thirdly, there is a need to protect the environment while improving services and infrastructure. All this is not going to be easy because the estimated investment needed is very high.

The report of the 'HPEC' (mentioned earlier), estimates a total expenditure of Rs 39 lac crores on 'Indian urban infrastructure and services' by 2031. The expenditure on urban transport and roads together is more than half the total expenditure at Rs 23 lac crores. Similar estimate is provided by McKinsey Global Institute (MGI). It has estimated a capital outlay of USD 1182 billion (About Rs 53 lac crores) for the next 20 years to build up services in cities to enable them to play their role in the desired economic growth of the country. Urban transport and roads together require half the estimated capex i.e. USD 591 billion (About Rs 26 lac crores).

Apart from the huge funds

requirement, there is an urgent need for an extensive and effective institutional set up to manage such huge expenditure. Unlike other urban services i.e. water, housing and electricity, at present, there is no dedicated agency in most cities to manage urban mobility.

#### Role of Public Transport

Way forward clearly lies in developing public transport to restore balance in the use of roads. As a rule, small and medium size cities (population less than a million) should introduce or augment city bus services. Large cities (population more than a million) should introduce and/or augment mass rapid transit modes such as the Metro rail, Light rail transit, Bus rapid transit and the Monorail as per demand.

#### City Bus Service

City Bus service which operates along with other road traffic carries a major share of trips in the city even when rail or other guided transit is provided. Indeed, most small and medium size Indian cities would need only low rise buses and the use of relatively high capacity rail transit if provided would prove to be un-

economic. In large cities, bus services will be a part of the Citywide Public Transport network. Considering the importance of city bus services, Central Government has recently supported the purchase of about 26,000 modern buses in nearly 170 cities to promote public transport. There are, however, two main issues in city bus services that need attention; poor quality of service and financing.

#### Quality of Bus Services

The bus services are overcrowded, unreliable and not user-friendly. The bus bodies built on truck chassis with floor height of about 1 m make it difficult to board and de-board especially for the aged, women and the less-abled and have a poor image. Hence, bus is not a favoured mode of choice. Commuters who have no other option only patronize it.

The severest criticism of bus



services, is its irregularity and lack of information about the schedules. Even when a service schedule is issued, it is more violated than adhered to. The passengers are further rattled if true and complete information about a delayed or disrupted bus service is not made available to them. Passengers are often understanding and accommodating if they are given information about delay or cancellation of a services time.

A commuter survey conducted (By DIMTS Ltd. in 2006) along the BRT corridor in Delhi revealed that the commuter expects a seamless, safe, convenient, comfortable, reliable, on time service with well-behaved drivers and conductors in reasonable time, cost and speed.

Thus, steps to improve quality of bus services are essential. Cleanliness, Punctuality, Reliability, Regularity, Safety, Ability, Behaviour and training of the Crew Members and improved corridor ambience will go a long way in improving the quality of bus service and hence, its image. The quality of bus services should match the quality of service provided by other modern modes of guided transport such as rail transit. Low floor or semi-low floor buses need to be introduced. A total changeover is essential to change the image of the bus and to promote its acceptability. In addition to the general modernization of existing bus services, premium air-conditioned bus services should be introduced both as a stage carriage and as contract carriage services. This will attract the user of personal transport i.e. cars and two wheelers, that is a major cause of the present road congestion to public transport. It will help cross-subsidize normal bus services.

### Financing

Most city bus services operate at a loss and require both capital and revenue subsidy. Many cities introduced bus services in the past, but had to close down mainly because of low financial viability and the need for ongoing subsidy which cities could ill-afford. One of the reasons for these

financial difficulties is the very low fare charged due to low affordability of masses. However, there are examples, though very few, in India where bus services are being operated by the city without any subsidy. In fact, there are some more examples where bus services are being operated on PPP basis and the Government is paid a premium for awarding the lease to the private operator to operate buses in the city. These examples do suggest that a well-planned and well managed bus service can be self-financing.

The Central Government, in its effects to improve financial viability while financing buses for cities, linked it to mandatory reforms as follows:

- Designate a nodal department for urban transport;
- Set up an UMTA to coordinate urban transport activities and for multi-modal integration;
- Set up an SPV to manage bus services;
- Bus prioritization at intersections, dedicated/demarcated lanes for buses;
- Set up an Urban Transport Fund;
- Waive/reimburse state and local taxes on PT;
- Mechanism for periodic revision of PT fares;
- Formulate a policy on advertising and its implementation plan;
- Formulate a policy on Transit Oriented Development;
- Formulate a policy on parking and its implementation plan; and
- Use ITS and Set up a Traffic Information and Management Center;

Some cities brought in private operators to operate bus services. Route permits were issued for a fee and net cost concessions, where the private operators keep all revenue, were awarded. Both failed to provide quality service. Neither were the buses well maintained nor the drivers and conductors, well trained. Since fares cannot be high as a matter of public policy, the fare box revenue can only

sustain a poor quality bus and service. As a result, the ultimate sufferer is the public.

To ensure quality of service, the revenue risk has to be taken by the city and the private service provider should be paid on per kilometre basis (Gross cost model). The model should levy penalties for not achieving the desired key performance indicators and provide incentives for increased ridership. The depots and civil infrastructure facilities in all such cases would have to be provided by the Government as a private operator cannot be expected to pay for the cost of land in urban areas for its 5 to 7 years concession period.

Improvement in quality of city bus service will attract ridership and help to improve the financial viability of the city bus services as well.

### Mass Rapid Transit

#### Policy

The report of the working group on UT for the 12<sup>TH</sup> FYP lays down guidelines to augment mass rapid transit with part funding from Government of India as follows:

- a) Introduce organized city bus service as per Urban Bus Specifications issued by MOUD in all 2 lac+ cities and State capitals;
- b) Add BRT @ 20 km/1 million population in 51 cities, population > 1 million;
- c) Add rail transit @ 10 km/ million population, start planning rail transit projects in cities with population in excess of 2 million, and start construction in cities with population in excess of 3 million. The estimated financial progress during the 12<sup>th</sup> plan period is envisaged at 25 per cent of total cost;
- d) Expand rail transit in existing mega cities (4 million +), @ 10 km per/ yr.
- e) Provide suburban rail in urban agglomerations with population > 4 million.

Many cities have/are taking steps to improve mass rapid transit- both road and rail based. At least 19 cities are at different stages of implementation and operation of Metro rail. A monorail project has recently been commissioned in Mumbai. Cities like Kozhikode, Chennai and Delhi are considering the use of Monorail. More than 500 km 'Bus Rapid Transit' is currently under construction and some even operational. Regional connectivity is being improved.

### Planning Issues

In order to derive full benefit from the huge projected investment in mass rapid transit, it is incumbent on the city to provide full support to these services. This includes provision of a comprehensive road network, traffic engineering and management, education of road users, enforcement of rules, training of drivers and other road users, removal of encroachments, licensing, vehicle inspection and testing facilities and transport demand management. Of prime importance are road network and traffic engineering and management.

### Road Network, Traffic Engineering and Management

Basic infrastructure for city transport is the roads network and associated features such as street furniture, intersections, traffic signals,

round-about, grade-separators, bridges on rivers, drains and railway tracks, road bye-passes, terminals, inter-modal transfer points, parking, pedestrians, bicycles and bus priority schemes. All modes use the road network and each mode has its own operating requirements. Movement of goods vehicles is of special significance as there are a variety of vehicles performing varied tasks related to goods movement. Even though rail transit has its own dedicated tracks and terminals, commuter entry and exit uses road infrastructure. Hence the movement of all other modes of transport should be simultaneously planned. Traffic engineering and management, both area-wise and corridor-wise maintains mobility on the road network and hence should be in sync with the mass rapid transit network.

### Future Technology

Technology is advancing very fast. Planning should have flexibility to adopt future technology updates along with special fuelling, operation and maintenance facilities and appropriate regulatory measures. Such technologies will enter the country through joint ventures and collaboration agreements between Indian companies. However, new technologies always find it difficult to

enter an established market. They will need to be offered suitable concessions and benefits that would enable them to compete with established technologies. It is expected that such competition will also encourage established technologies to improve their performance characteristics and compete with the emerging choices.

### Promoting Public Transport

Providing a mass rapid transit network is only the first step; it has to be promoted. In this context, the two most important steps are multimodal integration and first and last mile connectivity.

### Multimodal Integration

PT is inherently multi-modal. The city has several corridors with demand ranging from a few hundred trips to several thousand trips per hour. Similarly, starting with a mini bus to midi and maxi buses and finally guided and rail transit modes, the capacity of each mode increases. All corridors in a city do not need a high cost, high capacity Metro rail. Similarly, a bus may not necessarily be able to meet the demand on all corridors. For an economic transport network, it is necessary that capacity of the chosen mode matches the demand level in a corridor. Over-provision in a corridor will be uneconomic. Such a multi-modal network will be least costly with best possible financial viability and hence affordable and sustainable.

A multi-modal network means that the commuter has to change mode at the interchange points. A commuter, however, does not like to change modes. It is inconvenient and has a time penalty. While it may not be possible to eliminate the need for interchange completely, it can be made convenient by designing efficient interchange points that impose minimum time penalty. Single ticket for all modes, integrated service schedules and easily available passenger information about connecting services will save commuter time. Indeed, the need to change can be limited to one interchange for most commuters by



Ahmedabad BRT



Delhi Metro rail



Mumbai suburban rail



Mumbai Monorail

introducing the PT network in a grid pattern that covers the entire city. All modes, private, NMT and PT should be integrated into a seamless network.

However, the most important feature to minimize time penalty and most difficult to achieve is physical integration of modes at stations/stops. This requires integrated planning at concept level of alignment and station locations of all modes that will form the multimodal PT network. If various components of the network are planned independently and physical integration is an afterthought, it will neither be effective, nor user friendly. This brings in the importance of institutional integration for effective coordination. The present practice of rail transit and bus services being planned by separate agencies and operation without any mechanism for integration of services is not conducive to making the use of PT convenient.

In recent years, an increasing emphasis has been placed on designing interchange facilities that make such transfers easy and seamless. An intermodal station may service air, rail, and road transport, both urban and inter-city, for example. To encourage car users to make much of their journey by public transport, parking places are provided in the suburbs near

major highways where commuters can leave their cars for the day and take a train or bus into the city.

#### **PT to be Citywide with First and Last Mile Connectivity**

For PT to be attractive and effective, it should be citywide so that the commuter is assured that he can complete his journey all the way by PT. One or two corridors of PT in a city will not make a dent into the urban mobility problem. MRT modes, whether road based or rail based, cannot provide door to door service. Other modes i.e. walk, cycle, personal vehicles- cars and 2-wheelers- and para-transit- tempos and autos- have to provide first and last mile connectivity for easy and safe access to public transport. The worry of the 'first and last mile connectivity' compels commuters to use their own vehicle and discourages the use of PT. It will make the network city-wide with door to door service. This is essential for PT to be the favoured choice of the commuter. This will improve ridership and hence financial viability of the PT network.

#### **Setting up an SPV**

Planning, operating and financing of quality city bus and MRT service requires the dedicated attention of a team with appropriate skills in route planning, infrastructure planning,

operation and maintenance, use of intelligent transport system, fare fixation, financing and cost benefit analysis. Operation should provide reliable on time service and user friendly service that meets with the aspirations of the commuter which will attract users. The service should be alive to the changing needs of the commuter. Not all cities are equipped with these skills. There is extensive experience in the country in inter-city transport services, both road and rail based. However, city transport services have special requirements and are different from inter-city services. Speed is low, frequency of service is high and passengers can be standing. A special purpose vehicle set up to provide PT services will pay rich dividends in terms of quality of service and financial viability.

#### **Concluding Remarks**

Congestion cannot be reduced by increasing the capacity of the road network. Experience shows that congestion returns within a few years. Congestion has to be managed. An efficient citywide public transport network that provides reliable on time service will promote its use and help reduce road congestion. A walkable city, however, is a necessary adjunct to manage congestion. □

*(E-mail: bisingal@yahoo.com)*

### **Indian Railway Knowledge Portal**

The Indian Railway Knowledge Portal namely [www.kportal.indianrailways.gov.in](http://www.kportal.indianrailways.gov.in) was launched recently. The portal has aggregated most of the available knowledge about Indian Railways at one location and has also tried to encompass as much knowledge as possible, by linking websites, documents etc. for dissemination of knowledge on Indian Railways. This portal is an initiative of the National Academy of Indian Railways (NAIR), Vadodara.

This Knowledge Portal features all subjects of Indian Railways, Railway Research and Development, use of ICT in Indian Railways, listing of major International Railway Journals, linking of existing Indian Railway Libraries and also World Railways in one web page. It has e-access to existing libraries of Railways, and all the libraries are being clustered to have a single interface through e-Granthalaya by NIC. The Knowledge Portal Home Page also gives a brief of all the social media activities of the Indian Railway sites. It has web pages on fan clubs, heritage, and rail museums across the world. In short, it is a 'one stop' arrangement for people who are interested in Indian Railways both from a strictly technical point of view as well as enthusiasts. It is envisaged that it shall be a virtual learning point where people will be able to login to the website and go for off-line or online learning. The website has a modern design, with a very clean and simple layout. It is mobile and tablet friendly and is easily navigable. It has been an in house effort of IT Faculty of the Academy with bare minimum cost for website development, about Rs 70,000.