

ANALYSIS OF TRAFFIC FEATURES IN VEHICLE ACCESS ROADS TO LARGE PUBLIC BUILDINGS IN THE URBAN AREA

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ABSTRACT

Millions of hours and associated costs are wasted each year through traffic congestion. Congestion characterizes most of the urban road transportation systems around the world. The problem concerns the whole spectrum of the community as evident from the dominance in technical papers on the issue presented at transportation professional conferences and the articles appearing in the media and other forums. Congestion dates back as far as the time of increased and preferential use of private automobiles by the mass population.

More worrying is that the situation appears to worsen with time despite the strenuous and combined efforts by transport sector stakeholders to alleviate the congestion problem. This is attributed to the fact that causes of congestion transcend the technical issues and more often than not, the techniques and strategies that are used to alleviate the problems require large funding, changes in institutional structure, persuasive use of the government power over land use decisions and change in individual travel behaviours (Meyer et al, 1989). Banks (2002) notes that in most cases obvious solutions to congestion are not available or else are considered politically infeasible.

Thus, this paper discusses on the role of transport policy and public participation in traffic congestion management on the road network in South Africa, and in this particular case, with reference to N1 –Ben Schoeman road between Johannesburg and Pretoria.

1. BACKGROUND

Congestion

Congestion is common characteristic of urban road transportation systems in many metropolitan cities including Guateng. Congestion simply means that the demand exceeds the capacity of the transportation system. It is a major challenge to the transportation system and transportation engineering profession because it undermines the effectiveness and efficiency of the system (Banks, 2002). More importantly, traffic congestion results in higher operating costs, loss of productive user time, higher road accidents, more fuel consumption, more air pollution, more noise pollution, discomfort and inconvenience to pedestrians, and wear and tear of drivers' nerves.

Traffic congestion can be categorized into either recurring or non-recurring (Figure 1). Recurring congestion is caused by too many vehicles trying to use too little roadway. Such congestion occurs at approximately the same location and time of the day. The problem of peak period travel demand exceeding capacity is the major cause of traffic congestion in urban areas. Non-recurring congestion occurs due to temporary loss of capacity of an otherwise un-congested roadway by an incident. Wadhawa (1993) summarizes the

incidents as to include accidents, disabled vehicles, debris on the roadway pavement failures, landslides, adverse weather conditions and other random events –environmental or roadway conditions that reduce capacity.

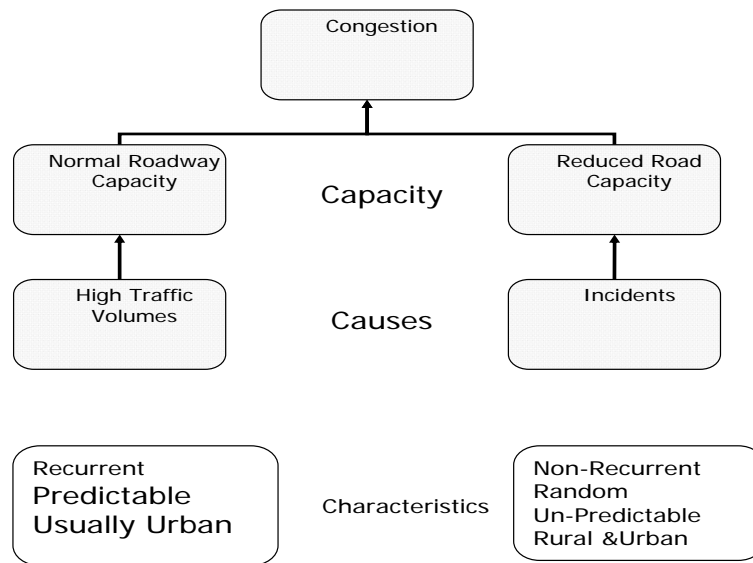


Figure 1: Types and Characteristics of Congestion

Many of the congestion reduction actions, especially those that attempt to influence demand, require more time for their effects to occur. For example, a major purpose of preferential lanes for high occupancy vehicles on major freeway is to encourage the increased use of transit and rider-sharing. However, this takes time to happen in any significant way because it is a result of land use and travel behaviour changes that could take several years. In the mean time, inconvenience to the existing users of the freeway could result in political pressure to remove the lane. Meyer (1993) concludes that officials must have a strong commitment to the implementation of these types of techniques if they are ever to be effective.

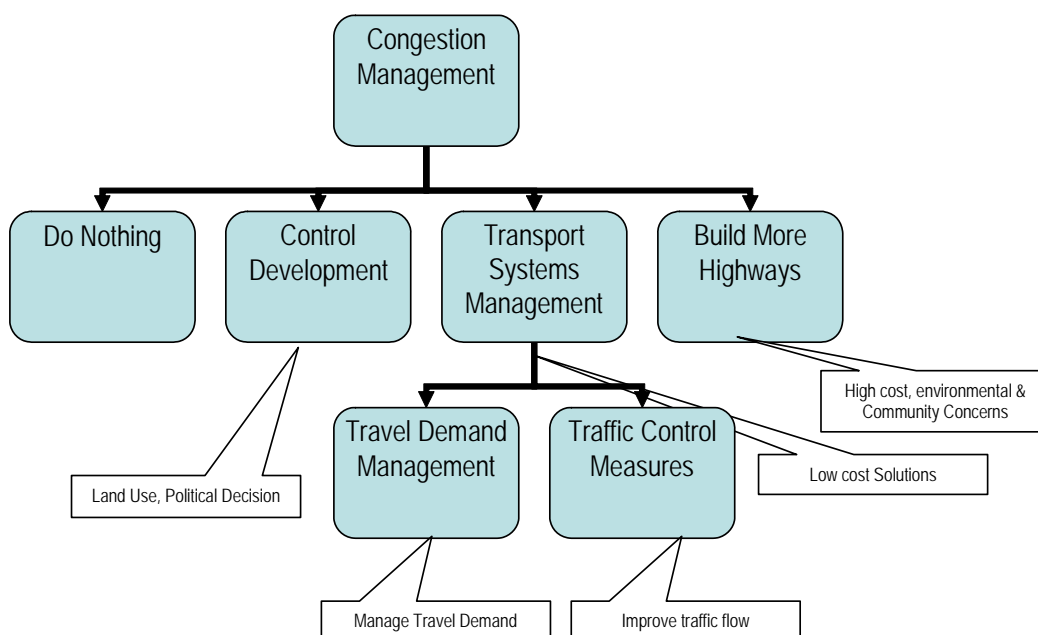


Figure 2: Congestion Management Strategies

The linkage between congestion management strategies is shown in Figure 2. Experience has shown that success in traffic congestion management requires an integrated and systematic approach. Louw (2003) presents five core steps essential in integrated transport planning, namely: initiate planning, analyze transport system, analyze options, develop preferred options and implement options. However, iterative processes involving review of the ITP process and the transport system, engaging and building partnership with key stakeholders and the community are considered as key catalyst to achieving good transport system outcomes.

2. TRANSPORT POLICY

Transport Policy is defined in general terms as a statement or framework adopted for action needed to overcome identified problems and achieve the stated objectives or goals in the transport system. The process of developing policy and legislation generally follows stages including the following;

- **Mobilisation** of grassroots support and support of key persons / organisations.
- **Formulation**, public opinion and enactment.
- **Implementation**, enforcement and monitoring.

In the case of South Africa, the transport policy enacted through legislation of the NLLTA (2000) and amended in 2006 forms the first-ever comprehensive transportation planning legislation. The act deals with amongst other issues institutional restructuring, transport planning, formalization of the taxi industry, regulation of road based services, regulated completion new vehicle sizes and enforcement. This reflects the political will of the government to improve the road system, which is essential to the effective implementations of the strategies outlined in several other White papers.

The White Paper on National Transport Policy provides the South Africa's formal transport policy document. The paper sets out the vision for South African transport as:

*“To be a system that will provide **safe, reliable, effective, efficient**, and fully integrated transport operations and infrastructure which will **best meet the needs of freight and passenger customers** at improving levels of service and cost in a fashion which supports government strategies for economic and social development whilst being environmentally and economically sustainable.”*

The Land Transport policy places high priority on Public Transport and strongly advocates a move away from supply (operator) driven to demand driven system of plans. Stanway (2001) underscores the significance of the law of the land in stating that public transport must be given a higher priority than the private transport.

Intent of legislation of the transport policy

The Transport policy articulates its main objectives as improved mobility and accessibility, efficient institutional structures, support for economic and social goals, enhanced role for public transport, improved functioning of cities, enhance affordability of transport, improved safety and security, efficient and effective transport system. In the context of this paper, emphasis is on Section 1 part (a) of Clause 4 of NLLTA that explicitly states that;

“For the purpose of land transport planning and the provision of land transport infrastructure and facilities, public transport must be given priority than private transport.”

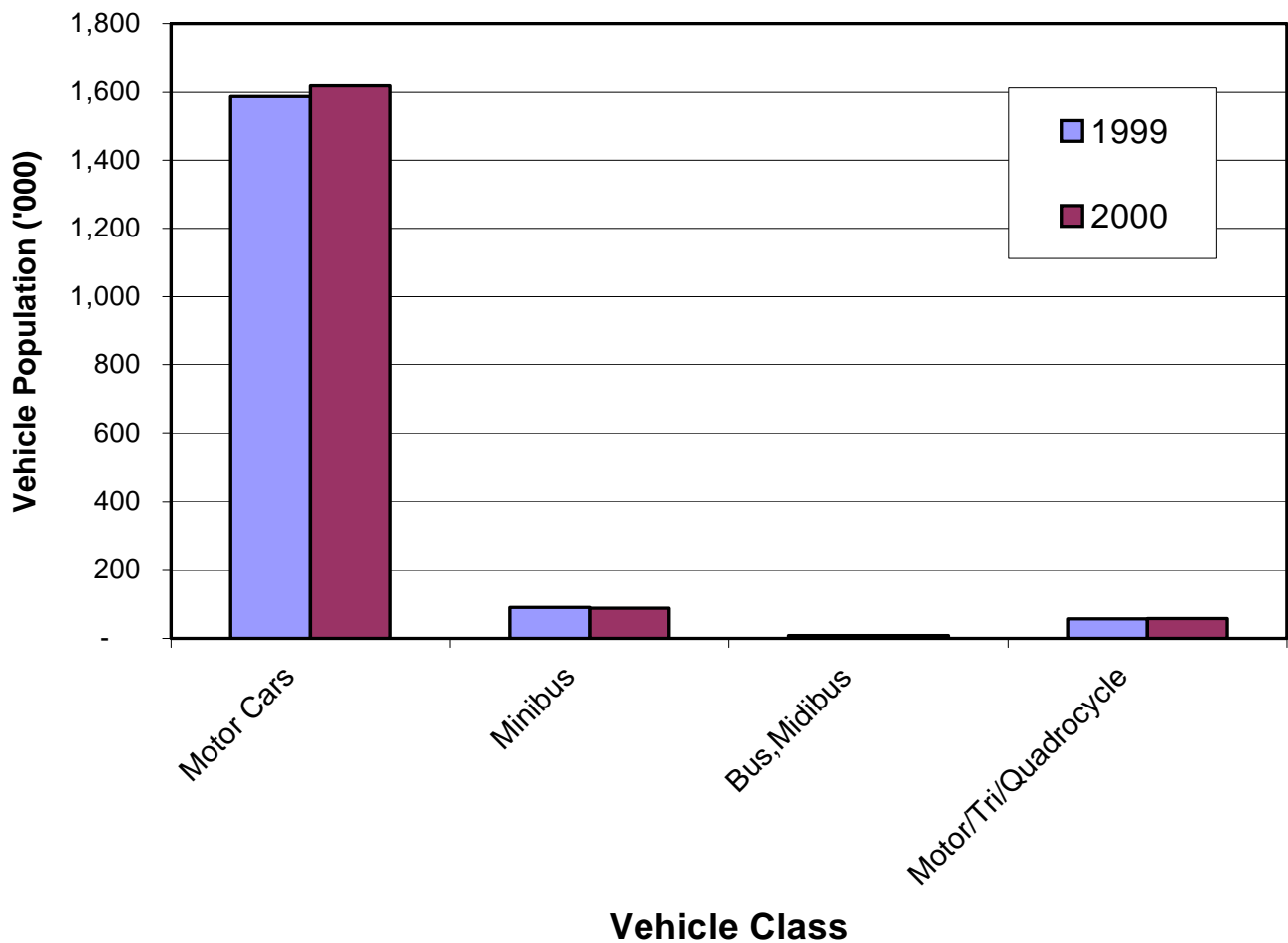


Fig 3: "Live" Vehicle Population in Gauteng

Thus, the policy sets out a clear impetus in transport planning to systematically target public transport as a priority over the private automobile that dominates the freeway traffic volumes (Figure 3). However, implementation of the contents in the policies developed so far has proved to be a challenge to surmount. Meyer (1989) notes that in many countries implementation of individual congestion reduction actions or combinations of the actions are often constrained by institutional problems associated with the coordination of many groups in both the public and private sectors. The authority for transportation decision making is dispersed among several levels of government and often between several agencies within each government level.

3. COMMUNITY PARTICIPATION

Community participation is a process of information exchange to inform the citizens fully and continually about plans for and activities in the planning process. Comments questions and criticisms are solicited from the citizens and considered as part of the planning activity. One of the keys to successful community participation process is feedback where in planning staff responds to citizens indicating how all specific community comments questions and criticisms were considered. The process also includes well-organized and publicized community meetings, considerable media participation and a continuous flow of information (Shunk, 1992).

Everyone in a community is a transportation expert and has an opinion about how to solve the transportation problems. The community use or see the system perform every day, usually at the times of its worst performance which is the peak periods. These people pay for the solutions so they must be given an opportunity to voice their opinions about what the possible solutions should be. The key word is opportunity. Public information program about the transportation planning process must reach as many people as reasonably as feasible and to provide them with opportunities to express their opinions.

The principal goal of the community participation program is to ensure that residents have a part in the planning program, thereby making the results of the planning process credible and instil ownership by the electorate. To do this, the community participation program must demonstrate that the planning process is open, accessible and responsive to citizens' concerns.

One way of gaining support for these actions is to involve the public in the discussions and debate that precedes adoption of the actions. Some of the most successful efforts at adopting congestion reduction programs have exhibited the following characteristics;

- Waging an aggressive campaign to inform the public of the what is likely to occur if something is not done
- Clearly stating what the average citizen will gain from these actions
- Providing opportunities for concerned citizens and interest groups to participate in the planning and decision making process
- Actively pursuing business support for the proposed actions
- Seeking media support in editorials and news reporting
- Developing a cost effective program that appeals to as broad a political base as possible

Experience has shown that in some cases good ideas and projects have languished for years because of officials ignoring or paying minimal attention to public involvement during planning and the process of implementing congestion reduction actions (Meyer et al, 1989).

4. TRAFFIC CONGESTION IN GAUTENG

Gauteng's population has been growing at a staggering annual growth rate of 4.1 % since 1996. This rapid urbanization patterned in sprawl has characterized Gauteng's development since the automobile epoch in the 1920s. The problems associated with automobile congestion in Gauteng in particular the Johannesburg CBD became acute as early as 1950 when the city council and various interest groups anxious to protect investment in the CBD devised a system of freeways to alleviate the situation (Hart, 1984). However, this encouraged urban sprawl and further growth of car ownership as distances of residential developments from the working places increased.

With regard to N1 Ben Schoeman, traffic volumes have been growing at a growth rate of 7% per annum for the past two decades (Jacobs, 2005). This rapid growth in traffic volume has resulted in congestion on the existing freeway. Thus, the Gauteng province, in cooperation with SANRAL, has embarked on a traffic congestion management program on Ben Schoeman freeway which focuses on the following:

- Developing an effective public transport system
- Identify and implement financial measures that will provide incentives to public transport

- Travel Demand Management (TDM); and
- Use of cutting-edge technology- intelligent Transport Systems

The above measures are in line with the transport policy which provides a shift from primarily responding to congestion by the construction of additional road capacity to rather prioritisation of public transport and promotes solutions which include managing and reducing the demand for travel and deriving greater use from the existing system capacities. However, Behrens (2006) notes that travel demand management (TDM) and other low cost solutions such as High Occupancy Vehicle (HOV) lanes require change in travel behaviour of the public which can only be achieved over time when they become habitual. In fact behaviour change could initially be stimulated during the public participation meetings where the population would build up the basis for need to change.

Congestion Management on N1-Ben Schoeman

The primary objectives of congestion management are to minimize the magnitude and duration of congestion, reduce accident rate and promote travel demand management through HOV and other measures. Based on these benefits, the Gauteng provincial Transport Authority set out during the month of October 2006 to try the use of HOV lanes besides the use of ITS implemented by the SANRAL, on the N1-Ben Schoeman road to alleviate the congestion.

A snap shot of pessimistic comments in the media articles reveal that the plans lacked support from the media and the public was inadequately informed about the new concept. This resulted in chaotic performance of the HOV lanes as the automobile drivers were losing patience and more confusion surfaced. The woes on the N1 flooded into the feeder roads as evident from the long queues as far away as Kempton Park and congestion on the Allandale and Kyalami roads.

Based on this confusion on the N1, Botha (2006) purports that there is need to get rid of our professional engineering proclamation that 'I am right and alone , and don't you dare criticize me, because I know it all, and I will decide for the people and I can decide, and I have seen and studied it '. The confusion on the freeway and comments in the media just highlighted the importance of public involvement for an undertaking such as HOV lanes.

There have been reports that lane conversion has been tried in some areas of the world but the conversion projects reportedly failed due to tremendous negative support from the general public. However, with the ever-rising cost of new highway construction as well as environmental concerns lane conversion has strongly emerged as a way of providing HOV facilities in the today's climate. Converting a general purpose lane to an HOV lane can work, however, but a thorough traffic and environmental analyses should be performed to ensure that negative impacts are discovered and an extensive public information process must be conducted to solicit input and ensure a complete understanding of the project by the general public.

5. CONCLUDING REMARKS

Prioritisation of public transport by the transport policy in the country provides a good base and political environment for utilizing low cost solutions such as HOV lanes in alleviating congestion on the road networks. The policy also provides the basis for selling the options to the community and later enforcement during implementation. HOV lanes have worked in many, if not most, cities in the world. However, experience has shown that solutions like HOV lanes require good participation of all stakeholders in order to stimulate travel behaviour changes and instil responsibility over the success of the option by the

stakeholders. HOV lanes are feasible and workable on our roads if only a systems approach and Integrated Transport Planning (ITP) principles are practiced and not only nicely documented and talked about.

In the context of South Africa, which has high law and regulation violations, it is even more important to encourage public participation and conduct extensive awareness campaigns prior to implementation of HOV lanes. Even more challenging in relation to the HOV lanes is the implementation of the car pooling, and park and ride (P+R) components which require change in perception and social values of individuals, bearing in mind the history of the country. Behavioural change could be induced and enhanced by close participation of the public in identification of the options, selection of the actions to be taken and more so, implementation of options.

In light of what has been stated above, it can be concluded that major effort in marketing and promotions of the HOV lane options should be made prior to launching the projects whilst on the other hand innovative incentives for people to form carpools and P+R to utilize the express buses are considered.

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