

MANAGING TRAFFIC CONGESTION IN GABORONE: Prophylactic treatment or an application of palliative measures?

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ABSTRACT

For many countries around the globe, economic development seems to have contributed to increases in levels of private car ownership. This has induced traffic-related problems such as road congestion particularly in developing countries. This paper discusses the current problems and measures aimed at mitigating the effects of traffic congestion such as road expansion and improvement in public transport services in Gaborone, and their associated constraints and opportunities. The daily traffic congestion, mainly in Botswana's capital of Gaborone, is perhaps a harbinger of chaos to come, unless robust measures are undertaken. The paper is primarily based on the review and analysis of secondary information. It recommends that Transportation Management System measures such as aggressive promotion of public transport, road pricing, paid parking across the city and the overhaul of associated infrastructure be considered in order to mitigate the congestion problem.

1 INTRODUCTION

Botswana has over the years registered a steady economic growth and has seen a tremendous development in the transport sector, particularly road transport resulting in significant traffic growth as shown by the national fleet which increased from 34, 698 in 1981 to 362,599 vehicles by 2009, affecting automobility in the process (see **Figure 1.0**). From 2000 to 2006, the country's vehicle population grew by about 9.5% per annum. On average, 18, 853 and 34217 vehicles were registered during 2008 and 2009 respectively (Dept. of Road Transport & Safety, Botswana, 2010). A new contribution to this growth in the past 10 years has largely been due to relatively affordable cars imported from the Far East.

The increase in the number of vehicles has effectively reduced the country's average car occupancy ratio from 12 persons per car in 1996 to 6 in 2006. Considering the limitations of Botswana's road infrastructure, such levels of growth are somewhat inimical, most especially in major urban centres. In this regard, the need to control traffic with the aim of reducing road congestion and other transport externalities, and improving safety, has never been more relevant and urgent.

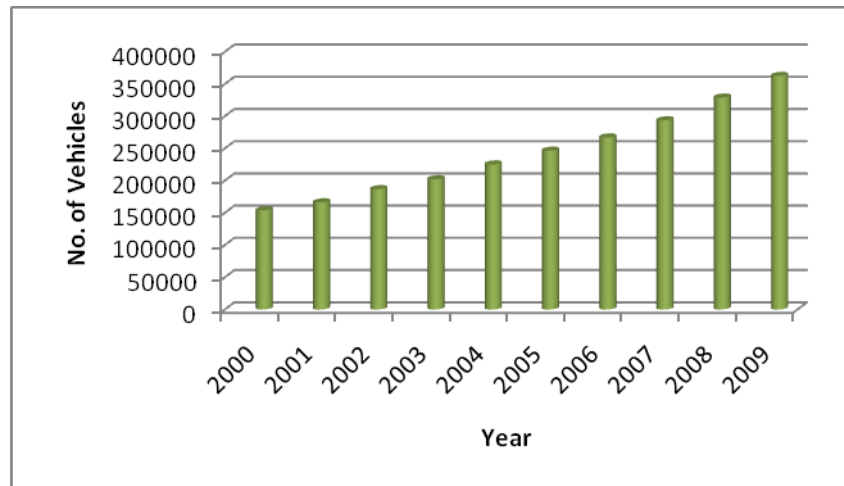


Figure 1.0 – Growth of National Vehicle Fleet (2000-2009)

2 TRAFFIC CONGESTION

Traffic congestion is relatively simple to recognize as it is characterized by roads filled to capacity with vehicles, and side walks teeming with pedestrians. However, in the transportation parlance, congestion refers to *“an excess of vehicles on a portion of roadway at a particular time resulting in speeds that are slower-sometimes much slower-than normal”* (FHWA, USA, 2006) or *“a physical phenomenon relating to the manner in which vehicles impede each other’s progression as demand for limited road space approaches full capacity”* (OECD/ECMT Report, 2007). The daily traffic jams on Botswana’s urban roads, Gaborone in particular, are common to all car users. Gridlocks on the Wellie Seboni Road which intersects with Nelson Mandela Drive in the east and connects to the so-called Btv traffic circle in the west, right through part of Mogoditshane; Gaborone/Molepolole road and the Gaborone/Kanye road at both morning and afternoon rush hours, are typical examples of congested roads. **Figure 2.0** shows typical road traffic congestion along Wellie Seboni Road.



Figure 2.0: Traffic at the so-called Btv Circle, Gaborone.

Vehicle kilometers travelled (vkt) are often used as a measurement of average increase or decrease in car travel patterns. However, there is a paucity of this information in Botswana; consequently, fuel usage was used as a measure to determine increase in car travel. Davey (1996:30) employed the same mechanism in his Road Safety Evaluation Study to determine the average increase in car travel in the country. **Table 1.0** shows fuel

usage between 2000 and 2009. Overall, fuel usage has increased by about 9% during the same period with fluctuations probably caused by tumultuous oil markets (Dept. of Energy Affairs, Botswana, 2010). While we may not directly link the increase in fuel usage with congestion, such increase somewhat indicate an increase in motorbility.

Table 1.0: Fuel usage in Botswana (2000-2009)

Year	Petrol	Diesel	Paraffin
2000	343,587,401.00	294,567,753.00	24,494,415.00
2001	350,646,439.00	305,598,963.00	20,339,260.00
2002	382,226,671.00	313,583,225.00	17,154,852.00
2003	411,644,736.00	324,373,632.00	17,068,890.00
2004	408,339,592.00	335,706,339.00	17,701,478.00
2005	414,021,363.00	338,307,410.00	17,032,382.00
2006	403,848,380.00	364,097,585.00	17,108,751.00
2007	431,753,057.00	391,981,819.00	15,113,181.00
2008	415,100,752.00	409,070,343.00	9,169,080.00
2009	451,193,572.00	368,682,232.00	13,856,403.00

2.1 Causes of traffic congestion in Gaborone

The causes of traffic congestion are multiple and varied. Among the major ones are road improvement projects as the picture in **Figure 3.0** shows, an inefficient public transport system, the inability of the road system to cope with an excess of vehicles and urban sprawl. In particular, urban sprawl often results in high car dependence. While Gaborone has not experienced leap-frog developments per se, except for privately developed suburban areas of Phakalane, Gaborone North, Mokolodi, etc. which contribute a significant amount of traffic as they are located away from the city centre, it is sandwiched between high density dormitory villages/towns of Tlokweng, Ramotswa, Mogoditshane, Metsimotlhabe, Gabane, Kumakwane and Mmopane.

During the morning rush hour period, these settlements disgorge unprecedented volumes of vehicles into the city's roads choking off the free flow of traffic. Some of the traffic emanate from as far as Molepolole, Kanye, Mochudi and Lobatse. In the late afternoon, the same cycle repeats itself in outward movement. The trajectory of consequences resulting from such trips is not hard to fathom. Traffic circles and junctions without traffic lights are the hardest hit, causing a great deal of anguish to public transport commuters and motorists. This calls for systematic measures, including the elimination of traffic circles, which are effective in the road safety context, but not efficient in managing traffic flows.



Figure 3.0- Traffic congestion during construction of Molapo Crossing/Metsimotlhabe Road.

2.2.1 *The effects of traffic congestion*

Information regarding the actual cost of traffic congestion in Botswana is conspicuously scanty, but it can not be denied that traffic congestion affects all of us since transport externalities affect owners and non-car owners alike and the penalty paid by the nation is recurrently multiplying. Some of the adverse effects of traffic congestion are: increases in the average travel or commute time for both private motorists and consumers of public transport services; delays which result in late arrival for work and meetings (resulting in unfavorable effects such as, disciplinary actions, loss of business etc.), road traffic accidents, noise pollution, fuel wastage due to increased idling and; stress and frustration which may culminate in reduced health and cases of road rage (FHWA, 2006).

3 ROAD BUILDING AS A TRAFFIC CONGESTION MEASURE

Road building seems to have been persistently adopted as a predominant counter-measure for traffic congestion woes. Despite research evidence indicating that it has a short term effect (Raynault, 2006) since expanded roads tend to be an incentive for more people to use their cars, which inevitably results in road congestion, it seems to have formed part of a congestion alleviation strategy even in Gaborone. However, some studies have further revealed that the majority of cities fail to add roadway commensurate to growth in traffic congestion (TTI, 2005). To confirm this contention, between 2000 and 2009, the City of Gaborone built and expanded about 79.3 kilometres of road in various parts of the city most of which, except for Nyerere Drive, were in Self-Help Housing Areas (SHHA). On the other hand, the Department of Roads expanded the 13.6 kilometre Molapo crossing/Metsimotlhabe road from two lanes to six lanes. It is also upgrading the Tlokweng/Gaborone road and Mobuto Drive from two to four lanes. Whether these developments will, when fully completed, adequately address the current congestion problem remains to be established.

4 CURRENT INADEQUACIES AND ALTERNATIVES

4.1 Cycling and walking

Traffic congestion erodes the general level of safety for pedestrians and has the effect of stunting walkability. In Gaborone, there is a general inadequacy of traffic calming measures near schools, and 'home zones'. This discourages many people from walking for fear of being involved in vehicular/pedestrian accidents. Presently, cycling and walking represent only 0.20% and 30.30% of trips in Gaborone respectively (Greater Gaborone Multimodal Transport Study Report, 2008). In addition, it is apparent that cycle paths and pedestrian side walks in Gaborone are inadequate in various respects and to some extent, sporadic. What is available in Broadhurst or Gaborone West is not necessarily available in Bontleng or White City areas and the dissimilarities in **Figures 4.0** and **5.0** below are apparent.



Figure 4.0- North Ring Rd, Gaborone (note NMT facilities)



Figure 5.0- A road in Phase II area, Gaborone (note the disparities)

The current setting does not provide a consistent picture of a harmonized approach to provide these facilities across the breadth of the city, and the scenario is rather of a divergence between land use planning and transport planning. For instance, open storm

water trenches running alongside main roads as illustrated in **Figure 7.0** render it impossible for the City Council to provide facilities for cycling and walking. Open trenches can also aggravate the severity of injuries in event of a road traffic accident; therefore, covered pipes could be more ideal as the land above can be conserved and utilized for facilities mentioned earlier.



Figure 6.0: An open trench along Wellie Seboni Road, Gaborone

For example, some cities such as Curitiba in Brazil, have taken steps to pedestrianize certain busy centres of their towns. The Gaborone City Council (GCC) can also do the same with some streets and major centres of the city including the new Central Business District (CBD) to promote pedestrian safety and green methods of transport such as cycling and walking. In addition to traffic calming measures, the GCC could provide sufficient infrastructure to support non-motorised transport. This infrastructure could include cycle paths/tracks, cycle parking racks and pedestrian walkways. Most importantly, the promotion of these modes of transport should also be backed by improvement in the general level of road safety as its absence can be inhibitive (Modukanele, 2008).

4.2 Public transport

Promoting the use of public transport has been known to reduce congestion and improve public mobility. Its neglect normally proves to be detrimental because *“the dominance of the private car and resultant traffic congestion works against providing a quality transport system, and is ultimately unsustainable”* (Norfolk County Council Passenger Transport Policies, Final Draft, 2000). Presently, 15-seater mini-buses, commonly called “combis” are the mainstay of public transportation within the city of Gaborone as shown in **Figure 8.0**.



Figure 8.0 – Mini buses at the old Gaborone rank

The deficiency of these low capacity vehicles as mass passenger transporters is apparent. For example, they carry number of commuters they carry per kilometre of travel is limited. On the other hand, acts of careless driving and wanton disregard for traffic laws by some mini-bus drivers exacerbates traffic congestion problems and impact negatively on road safety. Public transport infrastructure is inadequate and unattractive as can be seen in **Figure 9.0**



Figure 9.0: A typical bus shelter in Gaborone

Gaborone City Council has in the past conducted studies to map the way for developing public transport. One such study is the 1995 City Traffic Planning and Management (1995), the Final Draft of which recommended at page 18, that *“25-seater vehicles should be introduced in new areas of Gaborone which had no existing transport services.”* This proposal, which could have further reduced the number of vehicles on the road, was never implemented primarily because of lack of political support and resistance by the baseline or existing transport operators.

4.3 Park n’ Ride bus services

There is no one panacea for reducing road traffic congestion and it is only through proper husbandry of various action-based measures that positive result can be attained. Therefore, radical and perhaps too futuristic as it may seem, the time is ripe for the Department of Road Transport & Safety (DRTS) and the GCC to explore the feasibility of Park N’ Ride schemes and Bus-based Rapid transit system (BRT), most particularly on

corridors carrying high volumes of traffic into Gaborone from the side of Molepolole, Mochudi, Lobatse and Kanye through the 'bedroom' villages/towns mentioned earlier at **paragraph 2.1** above.

Secure parking facilities with attendant amenities should be built on the periphery or outskirts of the city. The disused dumping site in **Figure 10.0** below is situated next to the Gaborone/Kanye road and can be rehabilitated for park n' ride services into the conurbation of Gaborone. To further enhance patronage of these services, planners should ensure that future designs for new roads include dedicated lanes for the so-called high occupancy vehicles (HOVs) as this measure is bound to improve average bus journey times.



Figure 10.0- A disused dumping site just outside Mogoditshane.

4.4 Light Rail Transport (LRT)

Rail transport is inherently a mass transportation system and its high capacity can be used more efficiently to move not only people in urban areas, but also freight through out the country. In addition, relatively small space is needed to build rail infrastructure than it is the case for roads. Most importantly, it can also reduce traffic congestion within Gaborone if it is competitive enough to induce the majority of motorists abandon their cars in favour of rail transport. Botswana Railways (BR) terminated rail passenger transport services between Gaborone and Francistown sometimes in 2009 probably because of declining fortunes in terms of users. This is however, a universal phenomenon in the rail passenger transport industry which is not necessarily isolated to any one country, and history is replete with similar examples (Bell *et al*, 1983:15).

Gaborone City Council should therefore, engage BR on resuscitating rail passenger transport services by studying the feasibility of Light Rail Transport (LRT) along suitable corridors within the city to restrain the current road gridlock. Rail services can also be used to connect the city to the Sir Seretse Khama Airport terminal to provide the connectivity between other modes with air transport, thereby enabling the travelling public easy access to banking, health and other related facilities in the city centre.

4.5 Paid parking

Free parking serves as an incentive for motorists to use their cars for short trips to the City. This culminates in congested streets in busy portions of Gaborone such as the main Mall.

Presently, parking is free in all areas of the city for use by the public except where some organizations have provided restricted parking for the sole use by their employees. Introducing paid parking, most especially in the up-coming Central Business District, is not necessarily a wild card and can reduce road traffic congestion in some parts of the city. Aside from generating income for the city, it can ensure that only people with imperative errands to perform in such areas gain access, thereby decreasing traffic congestion.

4.6 Electronic Road Pricing (ERP)

Electronic Road Pricing (ERP) is another congestion counter-measure worth pioneering to control entry into the city centre during traffic peak times. Road pricing is a rubric for all mechanisms of collecting a levy from motorists for using a particular restricted segment of the road in a bid to reduce traffic congestion. Opportunities abound for the introduction of ERP in both the CBD and the Gaborone main Mall.

5 INTEGRATED TRANSPORT SYSTEM

The initiatives discussed above could assist the government to promote an integrated transport system which is characterized by the availability of infrastructure for most, if not all modes of transport. An Integrated Transport System recognizes not only the provision or expansion of infrastructure such as roads, to accommodate the persistently increasing number of cars, but also an improved rail network, paths for cycle tracks, as well as facilities for pedestrians to use the streets conveniently and safely. On the other hand, the provision of the necessary infrastructure such as, interchanges which facilitates road to rail transfers is necessary to widen or increase the choices available to transport users, and above all, increase the process of integration.

The most important aspect of integrated transport services is that it eliminates the duplication of services and wastage of resources such as land and energy, thereby allowing the efficient use of the same. The on-going Greater Gaborone Multi-Modal Transportation Study (GMMTS) is aimed, among other things, at creating more integration of the city and proximate localities' transport systems. This project is expected to alleviate some of the problems identified as afflicting the system in general.

6 CONCLUSION

Traffic growth and subsequent automotive congestion negatively impacts on the lives of inhabitants of Gaborone and demands urgent and targeted solutions. Road congestion problems bedeviling the city are not bound to fade away in the near future unless robust and anticipative measures are introduced across the spectrum of the transport system.

The most compelling reason is that, despite being intrinsic to economic development, transport development and ensuing congestion, can drastically affect economic growth. The economy of Gaborone as the capital city can be threatened by wayward traffic congestion. This calls for transport demand and traffic growth forecasts to develop and provide facilities for transport, based on hard facts. This will assist the authorities to provide transport facilities based on real-time data and avoid the pitfalls of doing so on 'predict and provide' basis as correcting past infrastructural blunders can be costly. Public passenger transport must form an elemental part of congestion alleviation initiatives in the city and should be aggressively promoted. An efficient public transport can provide an alternative to private car users and enable city authorities to enforce parking restrictions.

The current regime where the Department of Road Transport & Safety (DRTS) plans, promotes and regulates road passenger transport services throughout the country including urban areas should probably be re-assessed.

It may ideal for the DRTS to devolve the authority and responsibility for the planning and management of intra-urban passenger transportation operations to Local Authorities. DRTS could assist in the drafting of Local Transport Plans (LTPs) which addresses the mobility needs of urban populations in an effort to mitigate road traffic congestion. Similarly, road building has been shown to be an unsustainable method of addressing traffic congestion, particularly when it is the main counter-measure relied upon. As the country's capital and major economic centre, the city of Gaborone absorbs a large percentage of vehicles registered in urban areas, and traffic congestion affects people, the economy and environment in more ways than one. The GCC should explore other strategies such as providing infrastructure to promote cycling and walking as green modes of transport with abundant health benefits.

In the absence of the implementation of targeted measures, some of which are mentioned in this paper, or a show of direction towards the same, the approach to deal with road traffic congestion in the city of Gaborone may appear to be more of palliative measures meant to make a worse situation seem better, rather than a prophylaxis. We must however, hasten to accept that traffic congestion solutions are complex and therefore; demand a combination of extensive and change-effecting strategies.

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