

# **Understanding Congestion: First step to winning the fight**

## **A Three Tier Approach to Traffic and Congestion Management**

### **1.1 Introduction**

Traffic congestion has been a serious problem in Lagos for decades. Year on year, successive Lagos state governments have committed very little effort into resolving the problem until now. After many years of neglect it is good to finally see that the Lagos state government under the present leadership of Governor Babatunde Raji Fashola (SAN) is actually now committed to tackling the problem. On my first trip to Lagos from the United Kingdom, I was keen to see for myself what I have only read and heard about since I left Nigeria some years back. Having introduced the Bus Rapid Transit (BRT) scheme, corporate cabs, Lagos State Traffic Management Authority (LASTMA) and other initiatives, the current Lagos state administration and its immediate predecessor have demonstrated a keen interest at tackling one of the key issues affecting the continued growth of Lagos as a major African economic city. In my professional opinion as a Traffic Consultant, I think the government ought to be commended for her efforts. However, there are still immense opportunities to do much more so as to attain a significant reduction in congestion levels within and around Lagos metropolis.

### **1.2 Understanding Congestion**

Traffic congestion occurs as a result of continuous increase in road space utilization by vehicles and it is characterized by lower speeds, longer vehicle queues and increased journey time. In Lagos and in some other major Nigerian cities, traffic jam, which is an extreme case of traffic congestion whereby vehicles are fully stopped for a length of time before moving again, is more common. Traffic congestion or traffic jam as the case may be is a classic demand and supply problem which may be solved by either increasing road capacity (supply) or reducing traffic (demand). Although, both approaches have been successfully used to tackle congestion for decades, there are still ongoing arguments in professional circles on which approach is better. Personally, I am of the opinion that different situations require unique solutions which may include the application of either one of the two approaches or the application of both approaches in varied degrees in order to come up with a solution which optimizes road space utilization at the most economical cost. This, I reckon is the ultimate goal of traffic management duty and it is achievable.

The traditional supply approach of simply building new roads or expanding existing ones in order to reduce congestion have been exposed to be unsustainable in certain situations. This is because it really doesn't eliminate the congestion problem in the long run as traffic level always tends to measure up to available capacity. The inability to control congestion through expensive road construction projects is especially common in growing cities where the persistent congestion experienced during morning and evening travel peaks are caused by ever increasing traffic demand. A key example validating this assertion is the current spate of congestion on Third Mainland Bridge, a project that was instituted to reduce congestion by increasing the road capacity to Lagos Island from the mainland. But now, a few years on, traffic levels to the Island have increased significantly to take advantage of the increased capacity. This is not to say that road construction or expansion should not be used as a mitigation measure but that they should only be resorted to only after having fully considered all other cheaper alternative measures. It should also be noted that when used

as part a range of strategies being applied together to fight congestion, road expansion or construction may offer exceptional benefit.

To win the fight against congestion, the application of a range of measures is inevitable. Using the example of the construction of the Third Mainland Bridge as a congestion mitigation measure, a thorough analysis of the situation prior to the construction of the bridge would have revealed the inherent weakness in the long term effectiveness of the plan. That is, increasing inflow capacity into an already congested district would only be an incentive for increasing traffic inflow to that district even further. And since, the congested district's capacity to accommodate additional traffic did not increase accordingly, the congestion problem has therefore compounded over time to current levels. A better solution might have been to introduce a daily congestion or parking charge for every vehicle entering into the island to complement the effect of the increased capacity through the new bridge. By so doing, the ease brought about by increased entry capacity can then become sustainable since congestion charging would have been in place to stem uncontrolled traffic growth and inflow into the island. This strategy has been applied successfully in London and has been adopted in many parts of Europe as well. I think it's about time similar measures are included in the congestion mitigation arsenal for this part of the world. Resolving congestion on the third mainland bridge is not the subject of this article. It will however be the subject of my next article where a detailed proposal for reducing the congestion levels on the Island and on Third Mainland Bridge in particular will be presented. My goal in this article is to point out that current methods adopted for congestion management is not good enough and that more effective measures are needed.

To apply the most effective congestion mitigation strategies, first, an understanding of the how congestion forms up in the affected area is imperative. By being aware of the physical characteristics of the road layout and location relative to the wider road network as well as the economic importance of connected areas, tailored holistic congestion mitigation measures covering pre-emptive, tactical and strategic options can be developed and applied to achieve the desired results. Pre-emptive measures are required to ensure that anticipated congestion can be prevented from occurring. Tactical measures on the other hand are needed to eliminate the source of congestion once it has occurred while strategic measures include those mitigation or intervention required to get traffic moving once again. This three tier approach to congestion management will certainly produce the most effective solution in any instance and their application is strongly advised. A more detailed description of these measures and their applicable situations follows.

## **1.3 A Three Tier Approach to Congestion Management**

### **1.3.1 *Tactical Measures***

From a tactical perspective, it is important to put measures in place to ensure that incidents on the motorway can be actively detected as soon as they occur. This can be achieved by installing traffic sensors on the road to automatically detect abnormal traffic flow and alert the relevant authorities on congestion related incidents on the motorway. In many developed countries, traffic detectors have been buried beneath the road surface for this purpose during their construction. We can also follow this approach for new construction works on roads where it is still feasible to do so. However, there are a myriad of above ground detectors that can be used to achieve the same purpose. Yet another solution is to

use CCTV cameras positioned to focus on the road network while operators monitor the footage for signs of congestion. By detecting road incidents more quickly, it is possible to significantly speed up response time by relevant authorities to remove the cause of the incident. For example if the abnormal flow detected is due to a road accident then LASTMA, police and the emergency services can be on hand to clear the scene as soon as possible.

### **1.3.2 Strategic Measures**

Strategic solutions look at actions to take once congestion arises. This involves taking into account the effect of link congestion on the wider road network. Experience has shown that drivers often add to a problem of congestion by trying to avoid a congested route even when it is clearly too late to do so. In addition, a population of drivers avoiding a congested zone often dramatically increases the traffic demand on alternative routes causing those routes to become congested as well. Therefore, any strategic solutions should consider drivers' behaviour and the effect of the congested route on the wider road network. So, in addition to adequate response in clearing the congested bottlenecks, drivers coming enroute needs to be issued early warning about the situation. This can be achieved through a variety of media including live traffic update on radio and dynamic route guidance systems, live traffic information websites, variable message signs on the road, and location based instant messaging. Informed drivers are then able to judge whether diverting from current route is the best thing to do at any point in time based on the information available.

### **1.3.3 Pre-emptive Measures**

As explained earlier pre-emptive solutions look at ways of avoiding congestion altogether. The first step to applying preventive measure is to undertake some studies to understand the problem better. Studies may be commissioned into congestion causes and the analysis of the effectiveness of previous mitigation strategies applied on specific routes. Result of such research activities may suggest more effective solutions that will ensure sound mitigation strategies can be put in place to prevent future congestion on such routes. Another useful approach will be to start collecting traffic data on the road network. These can then be used for traffic flow trend analysis. Specifically, trend analysis may reveal a growing or a temporary surge in traffic levels on certain routes. A growing traffic trend may be as a result of a variety of reasons including having a newly built shopping complex or a new estate development around the area. A temporary surge on the other hand may be as a result a large public event, a concert or religious gathering around an area. It may also be as a result of a major traffic incident on connected routes. Such situations have to be anticipated and adequate measures designed and put in place to ensure that these congestion causing activities do not constitute congestion. More so, with an archive of historic traffic count data that have been collected consistently over many months, it will be possible to make intelligent forecast about when a route will likely experience congestion. With this advance knowledge, it would be possible to do something now to prevent the problem before it becomes obvious. Such intervention may be technological and or policy motivated to achieve the required objective. However, on the most congested route with no obvious alternative routes, road user charging may be considered as a short term pre-emptive solution.

## **1.4 Conclusion**

The present Lagos State government administration has shown that things can be done differently and we ought to support all positive effort by this government to make Lagos state a shining example to the rest of the world. Congestion, though seen as a sign of economic advancement is one key problem that can prevent Lagos from sustaining the economic growth it has experienced for so long. This is because, more and more people and businesses are already finding Lagos unbearable to live and conduct business in. Spending countless unproductive hours on the motorway has not helped the economy and lifestyle of the citizenry. So, some have opted for relocation to other parts of the country while a few others have left the country in order to enjoy a better lifestyle. This is not to say that congestion is the major reason for the exodus out of the country. There are many issues responsible for this and all these need to be addressed. However, I contend that eliminating congestion will lead to a better work-life balance, increase the productivity of the average Lagosian and help the economy. From a personal perspective, I have found this to be true.

For example, it takes me 28 minutes to drive a distance of 18 Kilometres to get to my office in UK every day during the busy hour. This ensures that I am able to leave my house at 7.30am and be in the office in time for an 8:00am start. At the same time, when I finish from work at 4:00pm then barring any unforeseen circumstances, I should be in my house 30 minutes later even on the most congested days. This gives me ample hours every day to devote to my other interests such that my productivity is increased. Conversely, I spent almost two hours travelling the 12km length of Third Mainland Bridge during the morning travel peak on my way to Victoria Island during my last visit to Nigeria. This journey, I reckon could have been made in less than 15 minutes at a safe speed of 60km/hr. The other one and a half hours spent waiting in traffic could have been used for something far more productive. Now imagine if everyone that had to commute daily on third mainland bridge during both morning and evening peak period had that extra 3 hours every day devoted to something they love. Well, the good news is that this can be the story of an average Lagos worker in a few years time if ongoing effort to significantly reduce congestion in Lagos is intensified and the congestion fight won. I have decided to do my part to ensure that this will be a reality, will you do yours?

Going forward, I will be presenting detailed practical measures that can be applied to reduce congestion in Lagos most notorious congested areas. So, please look forward to my next article on this space. Thank you for the time invested to read this work.

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