REVISITING THE PROBLEM OF TRAFFIC CONGESTION IN URBAN AREAS

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ABSRACT

This paper examined the problem of traffic congestion in urban areas. It described what traffic congestion is and the types of the traffic congestion which exist in the urban areas. The causes of traffic congestion were highlighted and explained. It thoroughly examined the effects of traffic congestion on: time, psychological well being, economy, environment, human health, accidents and Drivers' behaviours. The paper also discussed the advantages of having traffic calming in our cities. It concluded by recommending the re-designing of urban areas to allow free flow of traffic; provision of alternative routes during road constructions; repairing of bad roads, strict observance of traffic rules and regulations and establishment of commission that will always oversee the problem of the traffic congestion in urban areas. The effort of solving traffic congestion requires all hands to be on deck.

Keywords: Traffic; Congestion; Urban, Motorists: Drivers; Roads.

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1 INTRODUCTION

Traffic congestion is not an amazing social phenomenon in urban areas. It has become part of the life agenda of the people living in urban cities all over the world. The residents and public officials in urban areas around the world are concerned about traffic congestion and air pollution and of the two problems; traffic congestion is the intractable, because improved vehicle technologies are already having dramatic effect on improving air quality (Cox, 2000). Therefore, road traffic congestion is a major urban transport problem (Aftabuzzaman et al, 2010). The problem of traffic congestion is very simple. It has to do with too many people trying to drive on a specific section of road at the same time (RACQ, 2012). Traffic congestion, according to South African Encyclopedia (2012) can be defined as "the Saturation of road network capacity due to increased in traffic volume (recurrent congestion) or interruptions on the road (non- recurrent congestion) that cause an increased in travel times."

Highway networks play a major role in the geographical accessibility within the country and the regions in general. It plays a vital role in the economic well being of communities and countries (Shahili and Abaza,). The best approach to solving the problem would be to take actions to disperse traffic and to make it move faster (Cox, 2000). The economic effects and the social effects of traffic congestion are going to be examined critically, and the policies that can be implemented to curb the problem will be discussed in this paper.

2. TYPES OF TRAFFIC CONGESTION

Traffic congestion has been classified into categories by different writers on the problem. We have recurrent, non-recurrent and pre-congestion (South African Encyclopedia, 2012, Fadare and Ayantoyinbo, 2010). Recurrent congestion is usually the direct result of the culmination of a number of factors such as population size, urban development rate and car ownership to non-car ownership ratios. This is the type of congestion that results in the morning and late afternoon peak hour traffic congestion (see figures 1 and 2). Non- recurrent is classified as the random, unforeseen or unexpected factors that cause lengthy queues. These can be caused by anything like: traffic incidents and accidents, road works that can reduce the number of available lanes, weather conditions that influence visibility and major public events that cause a large volume of

traffic descending upon a specific location for a few hours i.e. political rally, societal wedding, elaborate funeral ceremony, public launching, cultural display, road side company advertisement etc. Other disturbance can be attributed to traffic control measures, such as signage, junctions, traffic light etc. (South African Encyclopedia, 2012). Pre-congestion occurs where free-flow conditions breakdown but full congestion has not yet occurred (Fadare and Ayantoyinbo, 2010).

The types of congestion is described in the table below

Table 1: Type of Congestion

S/N	Congestion Type	Description
1	Recurrent	Occurs at a regular time at a site. It can be anticipated by road users that normally use the route during those times. i.e. morning or evening peak hour congestion or congestion due to constant event like a street market on a particular day each week.
2	Non-recurrent	Occurs at non-regular time. It is unexpected and unpredictable by the driver and is normally due to incidents such as accidents, vehicle breakdowns or other unforeseen loss of carriage way capacity.
3	Pre-congestion (Borderline) Congestion	Occur where free flow conditions breakdown before full congestion. This may occur either side of the time period when congestion occurs upstream or downstream of congestion that is already occurring.

Source: Brownfield (2003) in Fadare and Ayantoyinbo (2010).

Fadare and Ayontoyinbo (2010) argued that the costs, associated with each type of congestion are likely to be different.

3. CAUSES OF TRAFFIC CONGESTION

The vast majority of the factors or sources of traffic congestion are human made.

United States Department of Transportation (2012) classified the sources of congestion into two:

1. Too much traffic for the available physical capacity to handle: Transportation engineers refer to this as the physical capacity of the high way system. Physical capacity is determine by such things as: how many lanes are available to carry traffic, the curvature of the highway side clearance, and interchange and intersection design.
2. Traffic-influencing events: In addition to the physical capacity, external phenomena can have a major effect on traffic flow as well. These include: crashes and Vehicle breakdown; work zones; bad weather; special events; and poorly timed traffic signals.

However, Aworemi and others (2009) identified five categories of causes of traffic congestion:

1. Social and Economic factors: problem of traffic congestion may be attributed to in adequate planning. For instance, rising in population together with drift from rural areas to the cities, unplanned land use- such as concentration of offices and business centres in a particular place, which makes traffic flow unidirectional during the peak hours, many people now buy cars due to improve standard of living, and finally inadequate public transport in urban areas.
2. Road Factors: The most glaring cause of traffic congestion in some urban areas in developing countries is the conditions of the road. Most roads, particularly, the feeder roads are impassable and in most cases, traffic hold ups build up. Some of these roads are too narrow, making it necessary for vehicles to slow down, considerably, when passing another vehicle from the opposite direction. Moreover, lack of sidewalks often forces pedestrian to use traffic lanes, thereby restricting traffic flow.

Lack of good road construction and maintenance of pavements, result into distress conditions, such as: pot-holes, raveling, scaling and rutting. Poor drainage facilities also cause frequent flooding which obstructs the traffic lanes. Lack of control, most importantly at the grade intersection, is also a major cause of traffic congestion in urban areas. Indiscriminate parking along certain streets creates bottlenecks on the already too narrow roads. Congestion at railway crossing, lack of alternative lanes at road construction sites, and presence of cattle on highway are equally under lack of control which results into traffic congestion.

3. Vehicle Factors: The performance capabilities of motor vehicles, to a large extent, determine the nature of traffic flow and safety. The length, width and height of the vehicles are regulated by the law. Commercial vehicles like trailers and tankers often break the law in this regard and therefore, causing traffic problem. The breakdown of some vehicles can also constitute traffic problem.
4. Human Factors: Human beings (drivers, pedestrians, cyclists etc.) play a prominent role in highway traffic. Individual behaviours in traffic stream are always factors to reckon with in traffic matters. Most of traffic congestions were caused by either pedestrians or vehicle operators. Most of the drivers are not qualified to drive on the roads because they did not pass through the driving test and do not have driver licences. Drivers or road users may not be adequately informed about the contents of the Highway Code as such. Closely related to the above problem is the problem of illiteracy. A substantial number of the drivers are not educated.(Abane, 1994).
5. Accident Factors: Accidents cause traffic congestion. At the scenes of accidents, queues develop in both directions of traffic as a result of lack of immediate settlement by the parties concerned or problem of removing the affected vehicles immediately, especially when the heavy vehicle like tankers and trailers were involved.
6. Natural Factors: Natural factors may also be responsible for traffic congestion. Bad weather like cloud, fogs, snow, rainfall, haramattan etc may slow down the rate of traffic flow, thereby, causing congestion on the roads (U SDepartment of Transportation, 2012; South African Encyclopedia, 2012). Furthermore, natural disasters like flood and earthquake or land slide may damage the roads and consequently lead to traffic hold up or congestion on such affected roads.

4.0 EFFECTS OF TRAFFIC CONGESTION

Morgan (2012) protested that congested traffic can cause a variety of problems for individuals and the entire community. The gridlock can have a tremendous impact on personal life, career, future and even our safety. Congestion, according to RACQ (2012), threatens our local economy, environment and quality of life. Finding a solution to traffic congestion therefore, could mean a vast improvement in the quality of life in our urban areas (Morgan, 2012).

The effects of the traffic congestion are highlighted and explained below.

4.1. EFFECT AS A 'THIEF' OF TIME

The first noticeable effect of traffic congestion is that it 'steals' precious time that could have been used for other productive things. It increases the travel time required for trips. The wasted hours spent on the road during peak hours not only increase frustration levels in drivers, but also take up valuable and productive work hours. It can make people late for work. Congestion means longer travel times as a result of slow driving speeds. Hence, it reduces travel time reliability and increases queuing and delays (Greenwood and Bennett, 2003; Morgan, 2012; Fadare and Ayantoyinbo, 2010 RACQ, 2012; South African Encyclopedia, 2012).

According to IBM Corporation (2009), traffic congestion caused urban Americans to travel 4.2 billion hours more in 2007. South African Encyclopedia (2012) argued that in Japan, an estimated 3.8 billion hours are lost each year due to traffic congestion. The first thing many people think of when it comes to congested roadways is the delay. The effect of traffic congestion related to delay is the inability to estimate travel duration. This takes away, from the travellers, leisure time to do other tasks throughout the day (Morgan, 2012)

4.2. STRESS, FRUSTRATION, AGGRESSION

Traffic congestion can alter the psychological moods of the victim drivers. Shope (2006) observed that driver behaviours remain frustrating in the traffic congestion. Aworemi et al (2009) argued that stressed and frustrated motorists in the traffic congestion may be encouraged to involve in road rang. Such stress and frustration affect the health of the victim motorists. IBM Corporation (2009) argued that traffic congestion increased the risk of high blood pressure and equally increased the level of stress hormones. The frustration levels of the drivers can also be increased (South African Encyclopedia, 2012). The more unfortunate thing is that, the high level of anger and frustration experienced by the victim motorists may be transferred (transfer aggression) to the innocent wives and children at homes when such motorists eventually get

home. This may cause future disaffection, Intimate Partner Violence and various abuses at homes.

4.3 ECONOMIC EFFECTS OF TRAFFIC CONGESTION.

Kostiuk and others (1998) argued that traffic congestion resulted into travelers ending up paying more. The economic loses due to traffic congestion, came through increase in prices: people, business and industry and the environment are negatively affected by the daily congestion, as money is lost due to delays, lost opportunities, increased running costs an increased accident rate and pollution. All of these cost individuals (tax payers or otherwise) millions – collectively every year (South African Encyclopedia, 2012).The first area of economic loss is in area of wasted fuel (Aworemi et al, 2009) or the effect on fuel consumption as explained by Bennett (1996).

Ray et al (n.d), argued that industries in India depend on a large number of local and remote vendors and that the times taken by vendors in delivering the needed items are generally long. This, according to them ,was due to traffic congestion and other logistic related problems. Weisbord and Fitzroy (2008) wrote that congestion can affect business productivity through changes in travel time costs and the size of markets areas that can be served from any given business location. Centre for International Economics (2006) announced that there is evidence that business views traffic congestion as causing a serious problem and believes that it causes a significant cost imposition. According to the Centre for International Economics (2006), survey from the United Kingdom found that traffic congestion was perceived as the most important factor likely to affect costs and services. Aworemi and others (2009) argued that traffic congestion leads to more wear and tear of the vehicles as a result of idling in traffic and frequent acceleration and braking, which lead to more frequent repairs and replacements which increase the maintenance costs. Fadare and Ayantoyinbo (2010) argued in the similar direction. According to them, traffic congestion increases the market costs, logistic cost, production costs and productivity costs. These came as a result of vehicle utilization, decreased in fuel efficiency, higher cost of fleet operation, shrink in market coverage, higher cost of shipment and drivers' stress (health). In summary, traffic congestion reduces economic productivity and this influences

people to relocate their business (South African Encyclopedia (2012). Fadare and Ayantoyinbo (2010) were of the opinion that traffic congestion can halt production, hinder sales, and potentially severe business relationships.

4.4 EFFECTS OF TRAFFIC CONGESTION ON ENVIRONMENT AND HUMAN HEALTH

Morgan (2012), argued that stopping and starting in traffic jams contribute to the amount of emission released by the vehicles. These emissions create air pollution and are related to global warming. South African Encyclopedia (2012) was of the same opinion, that only form of pollution that increases with an increase in traffic volume is that of air pollution in the form of carbon emission and noise pollution. Greenwood and Bennett (2003) also believed that traffic congestion increases the volume of emissions from vehicles, and Shaili and Abaza (n.d) also considered traffic congestion as the major source of pollution and a major consumer of world energy sources.

In the analyses of Currie and Walker (2011), motor vehicles are a major source of air pollution. According to them, they are responsible for over 50 percent of carbon monoxide (Co), 34 percent of nitrogen dioxide (NO2) and over 29 percent of hydrocarbon emission, in addition to as much as 10 percent of fine particulate matter emissions. According to Currie and Walker (2011), in urban areas, vehicles are the dominant source of these emissions.

Currie and Walker (2011) argued that traffic congestion has a delirious effect on fetal health because many studies suggest an association between air pollution from traffic congestion and fetal health.

Levy and colleagues (2010) argued that air pollution from traffic congestion can lead to premature death, particularly from heart attack and strokes: According to them, particulate matter (PM 2.5) from traffic pollution can cause health problems such as asthma attacks, and other respiratory illnesses, hence, they argued that public health impacts of traffic congestion exist. Traffic congestion takes a toll on the health of the motorists involved (IBM Corporation, 2009).

IBM Corporation (2009) argued that traffic congestion can increase the high blood pressure of the victim drivers. Furthermore, the hormonal system of the victim motorists can also be affected.

Mckeown (2007) argued that air pollution health effects are associated with driving a vehicle. Lung cancer is one of the effects. The author argued that lung cancer risk is increased among taxi drivers and truck drivers. Respiratory symptoms and chronic respiratory diseases like throat pain, phlegm, chronic rhinitis and chronic pharyngitis are found to be associated with traffic air pollution which comes as a result of traffic congestion. Mckeown (2007) argued that traffic policemen are exposed to airway inflammation and chronic respiratory symptoms at higher rates than non-exposed groups as a result of traffic pollution that traffic policemen were exposed to. Furthermore, Mckeown (2007) reported that there is a higher rate of cancer incidences among nordic service station workers and other diseases like pharyngeal, laryngeal, lung and nasal cancer, because the group was usually exposed to traffic air pollution from traffic congestion. In addition to this, individuals living close to major roads are at increased risk of exposure to traffic related pollution and related health effects, which ,in turn, have been associated with a high mortality rate.

4.5 EFFECTS ON ACCIDENT AND DELAY OF EMERGENCY VEHICLE

South African Encyclopedia (2012) opined that increased traffic volume will increase the rate of road accidents. IBM Corporation (2009) argued that 100,000 road crashes are caused by driving fatigue each year which resulted from traffic congestion. Furthermore, 54% adult drivers confessed that they had driven while drowsy and young drivers said they are most likely to talk on their cell phones. All these were caused by traffic congestion in the urban areas which may result in road accidents on the highways. Traffic congestion may also cause road range. Morgan (2012) described road range as ‘a senseless reaction to traffic’ that is common in congested traffic areas. Road range often manifests itself as shouting matches on the road, intentional tailgating, retaliatory traffic maneuvers and mostly, a lack of attention being paid to the traffic around the people involved. It is basically a temper tantrum by frustrated drivers in traffic. Traffic congestion may also halt the fast movement of emergency vehicles on the highways.

Police officers' vehicles ambulances, fire trucks and banks' bullion vans may be unable to respond in an appropriate amount of time because of traffic congestion.

4.6 EFFECTS ON DEVIANT BEHAVIOURS AND CRIME

Traffic congestion may serve as an avenue which can prompt some deviant behaviours and criminal occurrences. According to Abame (1994), the following are the deviant behaviours that traffic congestion may prompt:

1. Indiscrimate stopping or parking at unauthorized sections of the road.
2. Fighting or traffic brawls.
3. Abuse of horn.
4. Changing route without signaling.
5. Driving through the red light.
6. Over speeding at restricted areas.
7. Aggressive and untimely overtaking and driving on the shoulder of the road.
8. Refusal to stop for passengers and pedestrians.
9. Use of abusive language on other motorists.

Traffic congestion can also prompt some criminal activities in the urban areas. These are:

1. Stealing from the motorists and passengers by the parading hoodlums.
2. The goods hawkers in the traffic may cheat the motorists and passengers from their payment balance.
3. Hired assassin may use the opportunity of traffic congestion to attack their victims.
4. Bank bullion vans may be attacked by the armed robbers, if such vans are held in traffic congestion.
5. Kidnappers may use the opportunity of traffic congestion to kidnap their victims

5.0 ADVANTAGES OF TRAFFIC CALMING IN BUSINESS URBAN AREAS

Solving the problem of traffic congestion will bring traffic calming to the urban areas. Traffic calming is " the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non motorized street or road users" (Drennen, 2003).

According to Drennen (2003), the following are the advantages of traffic calming:

1. Economic Revitalization and property values: Traffic calming can improve the residential and commercial property value, which attracts wealthier residents to the area. This will improve the retail sales and bring economic revitalization to a commercial corridor.
2. Attractiveness and safety: Traffic calming will create more attractive environments, reduce auto speed, and increase safety for pedestrians, bicyclists, drivers and other road users, which is good for business.
3. Sales and Attracting customers. Traffic calming attracts customers due to reduced travel time, hassle, and cost.
4. Parking: Most businesses are concerned about the quality and quantity of customer parking and access for delivery truck. Traffic calming would ensure adequate quality and quantity of parking.
5. Impact on employees: Traffic congestion can cause loss of workers' productivity. Conversely, improved traffic can provide more convenience for employees which improve their productivity.
6. Construction and cost. Traffic congestion decreases road surface lifetime (South African Encyclopedia, 2012) .However, according to Drennen (20030) traffic calming requires minimal 'downtime' for construction and improve the quality of road surface life time.

6.0 CONCLUSION

Abane (1994) argued that research on the problem of city traffic is becoming increasingly extensive in the developing parts of the world. The upsurge of interest in city traffic is attributed to a variety of socio-economic development, not least, a rise in the demand for motorized transport and the need to expand existing infrastructure to cope with increasing volume of traffic.

Traffic congestion, as it has been explained in this paper, wasted the precious times of the individual urban dweller. It has serious negative impacts on the individual business, organizational productivities and the economic environment at large. Traffic congestion creates psychological problems in form of stress, anger and aggression for the urban dwellers. It damages our pure natural environments through air and noise pollution which consequently affects the health of the urban dwellers. Various respiratory diseases have been attributed to air pollution from the traffic congestion. Traffic congestion increases the rate of accident through the road range and other related factors. Finally, traffic congestion may lead to exhibition of some deviant behaviours and create an avenue for the commission of some criminal activities. Hence, there is an urgent need for the governments to see to the problem of the traffic congestion, and come up with strategies to overcome the problem. The principal among these is the road network capacity improvements (Hokao and Mahamed, 1999).

7. RECOMMENDATIONS

Traffic congestion is a serious urban problem that needs to be addressed. It requires the efforts of the individuals and the government to solve the problem of traffic congestion. The following are the proposed recommendations to solve the problem of traffic congestion in urban areas:

In the first place, urban areas must be redesigned in a way to allow the free flow of traffic. There must be adequate land-use planning measure and land –use growth management for the urban areas. Re planning urban areas will alleviate the problem of traffic congestion.

Secondly, there must be alternative provision for means of transportation other than road highways. Water transportation and rail transportation must be developed and be made attractive for use by the urban dwellers.

Thirdly, traffic lights must be made to function always. Such traffic lights must not be over timed. Traffic police officers must be stationed at strategic road intersections where traffic congestion usually occurs. The government must provide alternative routes for the motorists during road constructions and repairs.

Fourthly, roads that are bad must be repaired. Bad roads can aggravate the problem of traffic congestion. Repairing the bad roads will alleviate the problem of traffic congestion.

The fifth is that, traffic laws and regulations must be made to function very well. People must undergo and pass driving test before they were given driver licenses.

Motorists must be encouraged to be well versed in observance of traffic laws and regulations. Deviant behaviours must be discouraged among the urban motorists through different measures i.e. media advertisement, workshops, seminars and public talks.

Another way of ensuring free traffic flow is through provision of help hand for the motorists who have their vehicles broken down or involved in accidents. Government must create an agency which shall oversee this provision.

Finally, government must have a commission that will always see to the problem of traffic congestion and how to solve it. Such commission must be saddled with the responsibility of alleviating the problem of traffic congestion in urban areas. Commission must be given adequate fund and logistic assistace by the government, in the process of carrying out its responsibilities.

Traffic management and control must be taken seriously in all the urban areas where the problem of traffic congestion is prominent. Overcoming the problem of traffic congestion will improve the personal life of the people and improve the conditions of the entire community of the urban areas. However, overcoming the problem of traffic congestion is a task that must be embarked on by all and sundry, living in the urban areas.

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