

ISSUES OF CONCERN IN ROAD TRANSPORT SYSTEM IN NIGERIA

By

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ABSTRACT

The road transport system in Nigeria has played a major role in the socio-economic development of the country. The road mode still remains the dominant and most elaborate of all forms of transport in the country today. However, several issues are of concern to both the operators and users of road transport system in Nigeria. These include condition of roads and its funding, road traffic accidents and vehicular air pollution. For example, 54 per cent of the road network in Nigeria is still in poor condition with an annual cost of N133.8 billion (INR = N 2.92) to the Nigerian economy. About N300 billion is needed in the next ten years to bring the total network of roads in the country into fairly good condition. In the same vein, deaths from road traffic accidents have also been staggering. For example, between 1960 and 2001 more than 2,50,000 people have lost their lives in road traffic accidents. The growth in vehicular traffic coupled with rapid urbanization has led to increase in Vehicular Air Pollution (VAP) making Nigeria's air quality one of the worst in the world. Therefore, a range of integrated approach is needed to bring sanity into Nigerian road transport system so as to enhance the effective mobility of people as well as the socio-economic development of the country.

1. INTRODUCTION

Transport plays a fundamental role in the socio-economic development of any nation. It facilitates the movement of goods, people, services and idea from one place to another. Transport also enhances the spatial interaction. In fact, the advantages of transport in economic development have long been recognized.

Presently, road transportation is still the dominant and most elaborate form of all the transport modes in Nigeria. First, its flexibility as well as availability to rural population makes it the most patronized mode of transport. For instance, Bolade and Ogunsanya (1991)³ observed that road carries over 80 per cent of the total freight traffic per annum and more than 9,00,000 persons per day. Secondly, the percentage share of investment on road transport alone accounts for well

over 60 per cent in each of the National Development Plan since 1962⁸.

The heavy reliance of the Nigerian population on road mode implies that the road transport system supposed to be efficient so as to ensure unhindered mobility of the people in the country, but that is not the case. The condition of roads, the funding, safety and environmental implications are issues of concern to many Nigerians. For example, about 50 per cent of the roads in Nigeria are in poor condition, an increase of 54 per cent from the situation in 1985. About N300 billion (INR = N 2.92) is needed in the next ten years to bring this road network into a fairly good condition. This poor state of the roads has contributed to the rising trend of road traffic accidents in Nigeria, which have claimed more than 2,50,000 lives since Nigerian independence in 1960¹⁵. The growth in vehicular transport has made the country's air quality to be one of the worst in the world². It is in the light of this that this Paper is divided into 4 parts including this introduction. Part two looks at road development in Nigeria. Part three examines issues of concern in road transport system in Nigeria. These include the condition of road, funding, road traffic accidents and vehicular air pollution. The final part is the recommendation and conclusion.

2. ROAD DEVELOPMENT IN NIGERIA

The first route for modern road transport system was laid in 1898. This is not unconnected with the British colonialists who got the administration of the country in the Berlin Conference in 1884-1885. The exploitation of the country can only be carried out effectively through a good transport network. Therefore, roads were to serve as feeders to rail system.

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Prior to this period, the dominant mode of overload transportation was by porters and draught animals over bush paths and trails, which were in essence the earliest lines of communication between neighbouring settlements. These roads were more or less national ways. With the advent of colonialism, efforts geared towards the clearing of paths through the bush, often of 6 m in width, to the cutting of drifts (crossings) at bridged rivers or streams and to the construction of bridges where possible³⁰.

The early evidence of road works is the cart for mule and ox carts that started in 1903 and 1904 in Calabar and Zungeru respectively. As a result of the extension of railway Northwards, road motor services opened in 1906 from Ibadan – Osogbo – Ede. By 1914, the length of road over which motor could pass had risen to 3218 km (2000 miles)¹. The process of road development was impaired by the outbreak of First World War, hence the emphasis shifted to the construction of rail line from Portharcourt to Kaduna. However, by 1922, the road efforts were renewed and in 1926 the Road Board was established which later became communication board. The Road Board was charged with responsibility of working out the framework for the development of secondary and feeder roads²⁴. The first bituminous surface road outside the township was laid in 1926 on a section of the Lagos-Abeokuta road. By 1951, official records showed that 44,414 km of roads had been developed out of which 1,782 km were bituminous roads and the rest 42,632 km were earth feeder roads. Table 1 shows that within the period of 50 years (1951-2001), more than fourfold increase was recorded in total length of roads constructed in Nigeria.

Specifically, by December 2001 the length of roads in Nigeria was 1,93,637 km with the Federal Government responsible for 17 per cent (32,100 km), State Governments 16 per cent (30,500 km) and Local Government 67 per cent (130,600 km)⁴. This shows in essence that the Nigeria road network is vast and that the government is the sole provider and manager of roads in Nigeria. However, the inability of the government to ensure regular maintenance of this vast road network due to limited resources and competing needs has led to road deterioration in Nigeria over the years.

TABLE 1. LENGTH OF ROADS (KM) DEVELOPED IN NIGERIA: 1951-2001

Year	Bituminous	Earth /Feeder	Total
1951	1,782	42,632	44,414
1962	11,052	60,818	71,870
1968	15,200	73,280	88,480
1969	15,758	75,000	90,958
1971	16,122	75,088	91,210
1972	18,109	77,266	95,374
1976	28,242	85,696	1,13,938
1980	28,632	86,136	1,14,768
1989*	-	-	1,89,675
2001*	-	-	1,93,637

Source: Federal Republic of Nigeria, 1981

* CBN (2002)

3. ISSUES OF CONCERN IN ROAD TRANSPORT SYSTEM IN NIGERIA

3.1 Road Deterioration in Nigeria

Road deterioration means the progressive worsening in the quality or condition of road. It involves a gradual reduction in the utility of road overtime. Road deterioration results from failure to ensure regular maintenance of roads and is tantamount to an act of disinvestments because it implies the sacrifice of past investment on roads³¹. Bad roads seldom deter users or curb the volume of traffic. Instead they raise the cost of road transport. Road users bear the brunt of these additional costs.

World Bank has categorized the condition of roads into good, fair or poor. A road in good condition requires only routine maintenance to remain that way. A road in fair condition needs resurfacing while a road in poor condition has deteriorated to the point that it requires either partial or full reconstruction.¹⁶ Faiz, et. al. observed that the cost of restoring any deteriorating roads is between 3-5 times greater than the bill would have been for timely and effective maintenance. Vehicle operating costs rapidly outpace the costs of road repairs as the condition of roads passes from good to poor. These avoidable costs together form a formidable obstacle to economic development.

Road deterioration in Nigeria has been on the increase. Presently, the country has a total of 1,93,200 km of roads made up of 34,123 km of Federal roads, 30,500 km of States roads and 130,600 km of Local Government roads⁴. In 1985, about 23 per cent of Nigerian road networks were in poor state. This rose to 30 per cent in 1991 and 50 per cent in 2001²¹. A further breakdown of the analysis by Oyesiku (2002)²⁶ showed that 30 per cent, 40 per cent and 75 per cent of the Federal, State and Local Government roads are in poor state. Even in the metropolitan cities of Lagos and Ibadan, the situation is not different. About 30 per cent of the roads in these cities are in poor condition²⁶. This poor state of the Nigerian roads does not only affect mobility but also has great effect on Nigerian economy.

CBN (2002)⁴ estimated the total loss of road deterioration to the Nigerian economy to be N133.8 billion per annum. This figure represents about 5.5 per cent of the Nigerian Gross Domestic Product (GDP) and is more than 10 per cent of the year 2004 budget. The figure does not take into account losses in traffic due to bad roads and other emotional or physical trauma people go through plying bad roads and the consequent loss of productivity. In the same vein, Ogunsanya (2004)²¹ noted that about N300 billion is needed over a period of 10 years to bring the road network into a fairly good condition. After recovery N24 billion would be required each year for subsequent maintenance and N32 billion per year for road rehabilitation. Where will the government get this enormous amount of money for road infrastructure alone? Can government continue to fund road infrastructure alone in the face of dwindling resources and competing needs? No. Therefore, all and sundry must wake up to the challenge of how to fund road infrastructure in Nigeria. In a nutshell, users must pay for the road they use.

3.2 Funding of Road Infrastructure in Nigeria

Traditionally, government at each level (Federal, State and Local) has been responsible for the cost of road infrastructure in the country. For example, the Federal government is responsible for the cost of construction, rehabilitation and maintenance of all Trunk 'A' roads in Nigeria. The same responsibility is placed on the shoulders of State governments for all

Trunk 'B' roads and local government for all Trunk 'C' roads⁴. The government expenditure on roads has been tremendous over the years. In the Ten-Year pre-independence Development Plan (1946–1955), investment on roads was ranked second in the list of sectoral allocation, gulping N14 million (E7 million) or 12.7 per cent of the total estimates²⁴. In the same vein, the share of road investment in transport allocation rose from 58 per cent in the first Development Plan (1962–68) to over 70 per cent in the Third National Development Plan (1975 – 1980) (FRN 1981). A detailed analysis by Ojabo (2004)²² showed that between 1975 and 1985, the Federal Government spent the equivalent of N924 billion at 1985 prices on road development. This represented an average expenditure of about N90 billion per annum between the period of analysis. However, between 1986 and 1994 the yearly federal government expenditure fell to only about N1 billion.

The analysis further showed that in the last four years, the federal government has committed over N362 billion to the road sub sector. Specifically, government has rehabilitated 2,476 km of roads at the cost of N57, 791 billion. Currently, there are 94 on-going projects covering a total length of 5,397 km at the cost of N302.31 billion. In the 2004 budget, the Ministry of Works was allocated about N30 billion which is not enough to pay the Ministry's debts to the contractors, which stood at N48.2 billion in 2004. The sources of revenue to the Ministry are from budgetary allocation, vehicles registration, fines and proceeds from toll plazas across the country. The amount realized from these sources are not only meager but also irregular making them unsustainable sources of road financing in the country. For example, the total revenue from toll plazas across the country before they were demolished in early 2004 stood at N65 million per month or N780 million per annum²³. This represents about 2½ per cent of the funds needed to maintain road network in the country. Since the flow of funds from the sources are both meager and irregular, it is therefore imperative that other sources of funding are needed to ensure sustainable flow of funds for road infrastructure in the country. The reintroduction of Fuel levy could be the answer.

Fuel levy is a certain amount of tax imposed on fuel to be paid by a consumer or road user. It was

recently introduced in Nigeria but was declared illegal by court of Appeal because the government refused to follow lay down procedures in its implementation. In addition, the fuel levy was vehemently resisted by the public because of lack of proper awareness and inadequate enlightenment that preceded its introduction. It must be noted therefore, that one way of ensuring sustainable financing of road infrastructure in Nigeria is to return to fuel levy.

Gwillian and Kumar (2003)¹⁰ in a review of some African countries that have introduced fuel levy and also established Road Funds for financing road infrastructure showed that the share of fuel levy in the Road fund differs from one country to another. For example, it ranges from over 90 per cent in Malawi, Tanzania, Zambia and Kenya to about 80 per cent in Benin and Ghana. Road funds in these countries are managed by Road Boards whose number and composition also differ from one country to another. For example, 5 out of 9 members in Republic of Benin are from private sector, while in Ghana it is 8 out of 13 and in Malawi 9 out of 12. In principle, all the African Road Boards are responsible for generating and allocating resources for road maintenance but in practice the boards' powers are restricted. For example, none of the boards is able to set the fuel levy. In the same vein, one or more government ministries must approve the spending programme of the Board resulting in the delays and leakages.

Gwillian and Kumar (2003)¹⁰ observed that in Kenya payments are made from the customs departments to the Ministry of Public Works and Highways, and then to the Road Fund. In Benin and Zambia, the fuel levy is channeled to the Road Fund from the Petroleum Commission through the Ministry of Finance, creating a delay of four and two months respectively. They noted further that in 1999 in Zambia only 2/3 of the fuel levy found its way to the Road Fund. While in Tanzania between 1996 and 1999 such complicated mechanisms caused a two-month delay and 25 per cent leakages in the original levy¹³.

In spite of these predicaments, the Boards have used Road Funds in these countries to substantially improve their quality of road network. For example, in Ethiopia the share of main roads in good condition

increased from 15 per cent in 1996 to 25 per cent in 1999, whereas in Ghana the proportion of good roads increased from 21 per cent in 1997 to 30 per cent in 1999¹⁰. Nigeria can learn from these countries while avoiding their pitfalls.

3.3 Road Traffic Accident Problem in Nigeria

The news of road traffic accident in Nigeria does not stir surprise any longer. What may be shocking however, is the magnitude of the fatality. Every day, Nigerian newspapers carry shocking headlines of road traffic accidents. Examples of these headlines include, 30 lives lost in bus disaster; 72 people killed in ghastly bus crash, 16 perish in Akure auto crash and so on. In fact, from North to South, East to West the common sight on our highways is carnage upon carnage. The Sunday Monitor Newspaper of March, 2002 puts it this way "every hour the bodies of helpless Nigerians who are unfortunate victims of road traffic accidents litter our roads. The hospitals are congested with the wounded ones who must have suffered various degree of injuries ranging from broken skulls, bruised faces, strained joints to fractured limbs and dislocated bones (The Monitor on Sunday, March 2002). This indicates that we live in accident every day. It has been a calamity surpassed probably only by AIDS. Unfortunately, it has existed uncontrolled over the decades in this form. It is, therefore, imperative to look at the trend.

Since the first road accident that occurred in Lagos in 1906, the number of deaths and injuries caused by road traffic accidents have been staggering. For example, Oyeyemi (2002)²⁷ showed that between January 1960 and December 2001, a total number of 926,66 cases of road crashes were reported. This led to the death of 2,55,874 persons while 7,96,538 persons were seriously injured. A decade analysis shows that in the first decade (1960 – 1969), 1,51,237 cases of road crashes were reported, killing 18,748 persons with 1,04,825 people seriously injured. Reported cases of road crashes jumped to 2,76,700 in the second decade (1970 – 1979) leading to the death of 57,136 persons while 2,09,088 people sustained serious injury. The upward casualty trend continued in the third decade (1980–1989). The death tolls increased to 78,783 persons while 2,08,600 people were seriously injured. However, in the fourth decade (1990–1999),

the casualty trend witnessed a slight reduction. Persons killed in road accidents came down to 72,806 while those who sustained injury stood at 19,22,802. This reduction might not be unconnected with the activities of Road Safety Commission and under reporting of road accident cases in Nigeria. NITT (2004)¹⁵ observed that because accidents are seldom reported in Nigeria, only about 1/3 of road crashes are reported in the country.

Despite this decline, which of course is not supported by Newspaper publications and people's outcry, the overall number of accident per year is still appalling. Quite sadly too there seems to have been another gradual rise since the abrupt plummeting of road casualties in 1997 as shown in Table 2. This high level of road accident casualty in Nigeria is caused by the interplay of various factors, which include human, vehicle, road and the environment.

TABLE 2. TREND OF ROAD TRAFFIC ACCIDENT CASUALTIES IN NIGERIA BETWEEN 1990-2002

Year	No. of Accidents Recorded	No. of persons killed	No. of persons injured
1990	22,018	8,244	22,884
1991	22,632	9,221	24,644
1992	22,909	9,620	26,279
1993	21,610	9,707	24,373
1994	17,633	7,296	18,289
1995	17,003	6,771	14,668
1996	16,793	6,364	15,290
1997	9034	3,616	10,786
1998	16,046	6,538	17,341
1999	12,427	5,429	17,728
2000	12,705	6,521	20,677
2001	12,954	8,012	23,249
2002*	14,267	7,407	22,112

Source: Oyeyemi (2002)
 * The Punch April 16, 2003 pg 10

The human factor is concerned with the skill of the driver with particular reference to his competence in vehicle control, his level of information intake and his age, which is a determinant of his maturity. These and other general characteristics of the driver are

important causes of road accident considering that about 85 per cent of the road traffic accidents in Nigeria are caused by human errors²². Even within the country, human errors accounted for 80 per cent of road accidents in Kaduna State in 1985¹⁴, 91.06 per cent in Ogun State between 1980-1985¹⁹ and 76 per cent in Oyo State between 1980-84¹². A recent study by²⁷ showed that out of the total of 248 roads mishaps that occurred in the Federal Capital Territory (FCT) in 2001, over speeding alone caused 47 per cent of them. Dangerous driving accounted for 37 per cent and dangerous overtaking 2 per cent. Tyre burst, brake failure and route obstruction shared the remaining percentage. This implies that human error accounted for 86 per cent of the road crashes in FCT in 2001. This confirms earlier studies that human factor is the chief cause of road crashes in Nigeria.

Another important factor responsible for road accidents is the conditions of the vehicle. This has to do with defects in the vehicle with reference to the braking system, the elasticity of the tyres, defects in the steering and inadequate maintenance. Ovuworie et. al. (1989)²⁵ observed that tyres, engines, brakes and lights are examples of vehicle parts, the malfunction of which can cause accidents. For example, in 1999 in Nigeria, out of the total 6239 accidents examined, brake failure was responsible for 948 cases, representing about 15 per cent of the total accidents recorded for that year¹⁵. Even within the Federal capital territory, vehicle condition (brake failure and tyre burst) was responsible for about 14 per cent of the road accidents between 2001 and 2002¹⁵.

Furthermore, road condition is another factor in road accident causation. The curvature, alignment and geometry of the road have a great influence on road accidents. Akinyemi (1986) found that rural roads in Nigeria have poor geometric design such as insufficient space for stopping, parking and overtaking which sometimes result in road accidents. In 1999 in Nigeria, road defect was responsible for 12 per cent of the total road accidents recorded for that year¹⁵. Urgent steps are, therefore, needed to arrest the rising trend of road accident casualties in Nigeria. Such solution must be targeted specifically at human factor that is the major culprit in road traffic accident causation in the country.

3.4 Vehicular Air Pollution: (VAP)

Vehicular Air Pollution (VAP) is one of the consequences of transport usage. It refers to a situation in which the outer ambient atmosphere contains materials in concentrations emitted by motor vehicles, which are harmful to man and his environment (Arosayin 1999)². The major pollutants from motor vehicles include carbon monoxide, nitrogen oxides, hydrocarbons, and other toxic substances, such as, fire particles and lead. For example, in large urban centers, road traffic may account for as much as 90–95 per cent of lead and carbon monoxide, 60–70 per cent of nitrogen oxide and hydrocarbons, and a major share of particulate matter³². The health and environmental effects of these emissions are grievous^{7,9,18}. It has been observed that high particulate levels contribute to an estimated 12,500 deaths a year in Mexico²⁸. While in Egypt, the lead content in the blood of children in Cairo is 3–5 times as high as that of children in rural Egypt (Stickland, 1993). High lead concentration in human system has been linked with behavioural problems in children such as low IQ and decreased concentration. There are also evidences that there is an association between diesel particulate and cancer, mortality and morbidity from respiratory diseases (Clavel and Walsh 1984)⁵. The effect of vehicular air pollution is not limited to health issue, it also contributes to global warming and stratospheric ozone depletion as well as causing acid rain. The emissions of hydrocarbons, nitrogen oxides and carbon monoxide are as well harmful to both terrestrial and aquatic ecosystems and contribute to crop damage and other welfare losses.

In spite of the air quality hazards associated with road transport, research into vehicular air pollution in Nigeria is not only isolated but also uncoordinated despite the fact that motor vehicles are fast becoming a major source of air pollution in developing countries⁷. The growth in vehicle and vehicle-use, rapid urbanization and motorization, rising trip rates as well as increase importation of used (tokunbo) vehicles among others are the major factors responsible for increasing level of vehicular air pollution in Nigeria.

In Nigeria, the number of vehicles on roads has grown over time with improved economic condition.

For instance, in 1995, 51,000 vehicles were added to the existing fleet in the country. This decreased to 10,947 in 1997 but rose to 83,406 in 2000 and 2,11,026 in 2001²⁶. Almost 90 per cent of these vehicles are used in Nigerian cities. In the same vein, about 90 per cent of these imported vehicles are fairly used vehicles called "Tokunbo". Most vehicles in Nigeria have an average turnover year of between 12–17 years and are poorly maintained due to high cost of maintenance. The average vehicle per kilometer traveled has also increased due to rapid rate of urbanization. The implications of the above are weak engines with its attendant high rate of emission per vehicle kilometer because older vehicles pollute more.

Obioh (1994)¹⁷ observed in his study in Nigeria that the transport sector accounts for 40.81, 82.80, 58.60, 97.74, 21.97, 77.06, 77.02 and 97.79 per cent of carbon dioxide (CO₂), carbon monoxide (CO), Nitrogen oxide (NO_x), Sulphur oxide (SO₂), Volatile organic compounds (VOC), Nitrous oxide (N₂O) particulate matter and lead (Pb) respectively. Since the dominant transport mode emitter is road transport, it implies that the bulk of these emissions are from road vehicles. Isimu et al (1998)¹¹ observed that a single car in Nigeria emits about 29,600 kg. of different carbonated gases.

In the same vein, Obajimi (1998)¹⁶ observed that air pollution including those from mobile sources in Nigeria is a threat to healthy living. Though he failed to provide any empirical evidence to support his claim because his work was based on theoretical reasoning. Arosanyin (1999)² however provided a baseline estimate of the environmental costs of the Nigeria road system between 1980 and 1995 to be about N329billion (US\$2.5 billion). The estimate showed that about 67 per cent of these costs are attributed to vehicular air pollution. In spite of the largely uncoordinated research into vehicular air pollution in Nigeria, it is accepted that VAP is a problem especially in urban centers of Nigeria where a substantial number of people suffer undocumented vehicle pollution induced ailments. Though the Federal government established the Federal Environmental Protection Agency (FEPA) to regulate the level of environmental pollution in Nigeria. However, little has been done in the area of vehicular air pollution. In fact, Nigeria has no national emission standards

unlike other developing countries such as Thailand, Argentina, Brazil, Mexico etc. it is imperative for more coordinated and articulated researches are to be conducted in order to know the nature and magnitude of vehicular air pollution in Nigeria and the cost effectiveness of certain measures in the country.

4. CONCLUSION

The condition of roads in Nigeria is very poor. A huge amount of money is required to maintain the roads regularly. For example, over 50 per cent of the road network in the country is in poor condition. The bad state of the roads has contributed in no small way to the rising trends of road traffic accidents in the country. For instance, just 40 years after independence the country has lost over 2,50,000 lives in road traffic accidents. Human error was responsible for more than 85 per cent of the cases. In the same vein, the level of vehicular air pollution in Nigeria is a very serious issue that requires urgent attention because of its implications on the health of individuals. The increase in the number of imported fairly used vehicle called "Tokunbo" as well as traffic congestion in the cities due partly to poor road condition has made Nigeria air quality to be one of the worst in the world.

Therefore, appropriate measures are needed to address these issues. Since the government can no longer fund the road sub-sector single handedly, therefore, there is the need to involve the private sector. Fuel tax should be re-introduced with some moderations. With respect to road traffic accidents, more effort should be directed to post-crash management practices by strengthening the health institutions and introduction of Highway Safety Patrol. Furthermore, the traffic agencies need to be overhauled and well funded to enable them to carry out their duties effectively. Time has come for the promotion of environment-friendly modes of transport, such as, walking and the use of bicycles in Nigerian cities. The use of bicycles will work better in intermediate cities where transport crisis is yet to peak. This will require the construction of cycle lanes that should terminate some distances away from the Central Business District (CBD). Finally, political will on the part of the government is very paramount to the success of any transport policies in the country.

REFERENCES

1. Arosanyin G.T. (2004), "An Overview of Road Transportation in Nigeria" Papers presented at the one-day Seminar on "Road Transportation in Urban Centre of Nigeria: A Case Study of Abuja" Organized by NEIC. The Presidency, Abuja.
2. Arosanyin, G.T. (1999), "Vehicular Air Pollution: Research Needs and Reduction Options for Nigeria" The Trainer: Vol. 1, No 5, p. 1 -11.
3. Bolade, T. and Ogunsanya A.A. (1991) (ed), "Accident Control and Safety Measures in Mass Transit operations in Nigeria", Ibadan: University Press pg.1-10.
4. Central Bank of Nigeria (CBN) (2002), "Highway Maintenance in Nigeria: Lessons from Other Countries". Report 2002.
5. Clavel and M. Walsh (1984), "Environmental Guidelines on the Diesel Vehicle", United Nations Environmental Programme: Paris.
6. Faiz A and Esru B. (1988), "Road Deterioration in Developing Countries: The Financial and Institutional Challenge", Paper No. 265, 14th conference of the Australian Road Research Board Canberra, August 28- September 2, 1988.
7. Faiz A.K, Sunha, M. Walsh and A. Varne (1990), "Automotive Air Pollution: Issues and Options for Developing Countries", WPS 492. Washington DC: The World Bank.
8. Federal Republic of Nigeria (1981) Fourth National Development Plan, 1981-85, Lagos: National Planning Office.
9. French, H.F. (1990), "You Are What You Breathe", Worldwatch Vol. 3, No. 3, Washington DC: The World Bank.
10. Gwilian, K. and Kumar A. (2003), "How Effective are Second Generation Road funds? A Preliminary Appraisal", The World Bank Observer, Vol. 18, No 1, 2003. Washington DC: The World Bank.
11. Isimu C. (1998), "Urban Transportation: The Mass Transit Imperative: National Concord (Lagos)", September 21, 13-14.
12. Jegede, J F (1987), "Spatio-temporal Analysis of Road Accidents in Oyo State", Accident Analysis and Prevention vol 20 (3) 227-243
13. Kumar A. (2002), "A Review of Road Sector Reforms in Tanzania", Sub-Sahara African Transport Policy Programme Discussion Paper 2. World Bank, African Region, Washington DC: The World Bank.
14. Mukoro A.V. (1986), "Road Transport Accident in Kaduna State 1975 -1985: Interpretation and Analysis", in J. Asabor et. al. Road Traffic Accidents in Developing Countries Ikeja: Juju ERP p.37-44.
15. Nigeria Institute of Transport technology (NITT) (2004) Strategies for Minimising Road Traffic Accident in Nigeria - Case Study of Abuja.
16. Obajimi M.O. (1998), "Air Pollution : A Threat to Health Living in Nigeria Rural Towns: A Clinico-Radiological Perspective", in Osuntokun, A. Current Issues in Nigerian Environment Ibadan: Davidson press pg 49-59.

TECHNICAL PAPERS

17. Obioh, I.B (1994), Inventory and Emissions Projections in Relation to Transport Modes in Nigeria (Mimeo).
18. OECD (1988), Transport and Environment OECD: Paris.
19. Oduola S.D. (ND), Road Transport Administration Ibadan: NISER.
20. Jegede J.F (1983), "Spatio -Temporal Analysis Road Accidents in Oyo State" Accident Analysis and Prevention: Vol. 20 (3), 227-243.
21. Ogunsanya A.A (2004), Challenges for an Efficient Urban Transportation System in Nigeria - Best Practices. Papers presented at the one-day Seminar on "Road Transportation in Urban Centre of Nigeria: A Case Study of Abuja", Organized by NEIC. The Presidency, Abuja.
22. Ogunsanya A.A. and Waziri (1991), "Case Study of Accident and Safety Control of Selected State Mass Transit Agencies", Paper Presented at the FUMPT/NITT Workshop on Accident and Safety Control of Mass Transport Vehicle Benin City, 19-22 March, 1990.
23. Ojabo L (2004), "Road Financing: Petroleum Levy to the Rescue?", The Punch, Monday January 5, 2004 pg 30-31.
24. Onakomaiya S.O. (1981), "Highway Development in Nigeria. A Review of Policies and Programmes. 1900-1980", NISER Monography Series No.5. Ibadan.: NISER.
25. Ovuworie, G C , Asalor, J.O. and Onibere E. A (1989), "An Overview of the Road Accident Problem in Nigeria", Paper presented at the 2nd International Conference on Road Traffic Accidents in Developing Countries, 23-26 July, 1989, Benin City.
26. Oyesiku O.O. (2002), "from Womb to Tomb" 24th Inaugural Lecture, AT Olabisi Onabanjo University, Ago-Iwoye, Ogun State 24th August 2002.
27. Oyeyemi B.O. (2002), "Highway Casualty Incident and Rescue Operations in Nigeria: Issues Problems and Protections", Paper presented at Trauma Inter EMS forum and Exhibition, Abuja, 5-6 March, 2002.
28. Serageldin, (1993), "Environmentally Sustainable Urban Transport: Defunding a Global Policy Paper Presented at the 50th International Congress of the Union International des transports", Sydney, Australia.
29. The Monitor on Sunday March, 2002.
30. Walker, G (1959), "Traffic and Transport in Nigeria: The Example of an Underdeveloped Tropical Country", Colonial Research Studies 29 London: Colonial Office.
31. Road Deterioration in Developing Countries: Causes and Remedies. A World Bank Policy Study. Washington DC: The World Bank 1988.
32. Sustainable Transport: Priorities for Policy Reform, Washington DC: The World Bank 1996.



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