ABSTRACT.
Most of the road networks in the developing countries of Africa are in deplorable conditions. Nigeria being one of these countries is not an exception. The conditions of the roads in Nigeria were examined. The causes of these conditions of the roads in Nigeria were articulated and their effects to the citizen, government and the economy of the country were highlighted and solutions to these problems given in the form of recommendations that will remedy the situation. Some of the identified causes were; poor design and construction, poor maintenance of already built highways, use of low quality materials in construction, poor workmanship and poor supervision of construction work and the plying of heavy traffic that were not meant for the road on the road. Some of the recommendations to remedy the situation are; Use of the appropriate design of the roads, avoiding unnecessary congestion of the roads with traffic especially heavy traffics that were not meant for the roads in the first place, prompt maintenance of the roads, application of suitable construction material in the construction of the roads, applying appropriate tests to the soil in road construction, use of qualified engineering personnel in road construction and the application of sanctions for highway failures.

Key Words; Highway, Failure, Nigerian roads,

INTRODUCTION.
The catalogue on road defects (1992) refers to road defects as the visible evidence of an undesirable condition in the pavement affecting serviceability, structural condition or appearance. The definition of a “road defect” includes any part of a road, highway, or construction site that does not meet the regulations for a safe road. In Nigeria the defects that most often cause injuries to people or damage to vehicles include: inadequate road shoulders, lanes that are uneven, pavement that is uneven, improperly marked signs, malfunctioning stop lights, construction negligence, and municipal negligence. These leads to accidents on Nigeria roads which lead the national emergency agency NEMA to put up a programme that engaged the competent hands from other stake holders such as the Nigerian police, Nigerian army, Nigerian security and civil defense corps, federal road safety commission, National air space management authority, Nigerian red cross, the states ministries of health and environment. For the programme, national and state emergency agencies were to train the volunteers (Onwubiko 2010). NEMA also did a study on the major causes of accidents across the country in collaboration with the federal road safety commission in close partnership with members of some state emergency management agencies in some flash points like Tafa junction, Forest/ Mararaba to Jos in Kaduna state and made recommendations to some state governments on the urgent need to decongest some major federal highways which passed through these states and are now used by heavy duty vehicles drivers as transit camps thereby constituting veritable sources of road disaster. From these studies it indicated that the deplorable conditions of the roads contribute to high level of accident on the roads. Onwubiko (2010) stated that Nigerian roads were death traps. In the developing world which includes Nigeria, road network is the most developed transport mode and the vastest in usage. The Nigerian government over the years has tried to construct and rehabilitated the roads. Considerable interest has been shown by the government to road investment (see table2). The issue has been the extent these interests has been driven to achieve the desired result. According to Oguara(2010), roads represent the major areas of investment in transportation and are the most dominant travel mode accounting for over 90% of passenger and goods transport in Nigeria. One of the main problems of road work in Nigeria is the lack adequate informational data on the Nigerian roads. Some studies have been done on the state of Nigerian roads. Ette (2010) stated that there was a road net work study that was commissioned in 1998/99. This study covered all inter- urban roads which had a traffic of more than 30 vehicles/day and a total length of around 53,000km. Urban roads were not included in this study. The outcome of the study is shown in table 1 below. The problems of the Nigerian roads are looked into in this paper and their causes analysed with the proffering of solutions to these problems.
### TABLE 1: CONDITION OF NATIONAL ROAD NETWORK 1999

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>INTERNATIONAL ROUGHNESS INDEX</th>
<th>PERCENTAGE OF NETWORK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>&lt; 3.5m/km</td>
<td>27%</td>
</tr>
<tr>
<td>Fair</td>
<td>3.5 – 4.5m/km</td>
<td>38%</td>
</tr>
<tr>
<td>Poor</td>
<td>&gt; 4.5m/km</td>
<td>35%</td>
</tr>
</tbody>
</table>


### TABLE 2: INVESTMENT COMMITMENT TO ROAD DEVELOPMENT IN VARIOUS DEVELOPMENT PLANS IN NIGERIA

<table>
<thead>
<tr>
<th>Development plan</th>
<th>Transportation sector as a percentage of total plan (%)</th>
<th>Road transportation as a percentage of transport sector (%)</th>
<th>Road transportation as a percentage of total plan (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962 - 68</td>
<td>19.5</td>
<td>48.7</td>
<td>9.5</td>
</tr>
<tr>
<td>1970 - 74</td>
<td>24.3</td>
<td>72.1</td>
<td>17.5</td>
</tr>
<tr>
<td>1975 - 80</td>
<td>22.3</td>
<td>68.3</td>
<td>15.2</td>
</tr>
<tr>
<td>1980 - 85</td>
<td>15.2</td>
<td>68.2</td>
<td>10.4</td>
</tr>
<tr>
<td>1985 - 90</td>
<td>28.7</td>
<td>68.2</td>
<td>11.0</td>
</tr>
</tbody>
</table>


### CLASSIFICATION OF NIGERIAN ROADS.

Nigeria has about 200,000 km of roads spread all over the country. These roads are made up of over 32,000 km of federal roads spread over the thirty six states and the federal capital, over 30,000 km of state roads and over 130,000 km of local government roads (see table 3). Within the states, the local government roads are further classified into urban and rural roads.

### Table 3: ROAD OWNERSHIP IN NIGERIA SHOWN BY DISTANCE COVERED.

<table>
<thead>
<tr>
<th></th>
<th>Federal (km)</th>
<th>State roads (km)</th>
<th>L.G. roads (km)</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paved main roads</td>
<td>26,500</td>
<td>10,400</td>
<td></td>
<td>36,900</td>
<td>19%</td>
</tr>
<tr>
<td>Unpaved main roads</td>
<td>5,600</td>
<td>20,100</td>
<td></td>
<td>25,700</td>
<td>13%</td>
</tr>
<tr>
<td>Urban roads</td>
<td>21,900</td>
<td></td>
<td>21,900</td>
<td>21,900</td>
<td>11%</td>
</tr>
<tr>
<td>Main rural roads</td>
<td>72,800</td>
<td></td>
<td>72,800</td>
<td>72,800</td>
<td>38%</td>
</tr>
<tr>
<td>Village access roads</td>
<td>35,900</td>
<td></td>
<td>35,900</td>
<td>35,900</td>
<td>19%</td>
</tr>
<tr>
<td>Total</td>
<td>32,100</td>
<td>30,500</td>
<td>130,600</td>
<td>193,200</td>
<td>100%</td>
</tr>
<tr>
<td>Percentage</td>
<td>17%</td>
<td>16%</td>
<td>67%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Source: Central bank of Nigeria.

### FEDERAL ROADS

In one of its publications in June 2011, the federal ministry of works reported that it had over thirty five thousand kilometres of federal roads and bridges in the thirty six states of the federation and the federal capital territory, Abuja (see table 4). These roads are divided into the federal trunk ‘A’ roads and the federal trunk ‘F’ roads. The federal trunk ‘A’ roads are those under the federal government ownership and they are developed and maintained by the federal government while the federal trunk ‘F’ roads are those that were formerly under the state ownership, but were taken over by the federal government, with a view to upgrading them to federal highway standards (Nnanna et al. 2003). The faults on most of the Nigerian federal roads are; depressions on the road surfaces, presence of pot holes and cracks, development of gully due to erosion, washing away of the road shoulders, faulty street lights, faulty drainage systems , faulty traffic signals and wiping off of pavement markings.
Table 4: LENGTH OF FEDERAL ROADS IN THE VARIOUS STATES OF NIGERIA IN KILOMETRES.

<table>
<thead>
<tr>
<th>State</th>
<th>North West</th>
<th>North East</th>
<th>North Central</th>
<th>South West</th>
<th>South East</th>
<th>South South</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jigawa</td>
<td>757</td>
<td>1379</td>
<td>1632</td>
<td>376</td>
<td>638</td>
<td>608</td>
</tr>
<tr>
<td>Kaduna</td>
<td>1730</td>
<td>1335</td>
<td>1173</td>
<td>625</td>
<td>746</td>
<td>168</td>
</tr>
<tr>
<td>Kano</td>
<td>2098</td>
<td>2207</td>
<td>1044</td>
<td>1185</td>
<td>609</td>
<td>1245</td>
</tr>
<tr>
<td>Katsina</td>
<td>842</td>
<td>434</td>
<td>900</td>
<td>900</td>
<td>959</td>
<td>1068</td>
</tr>
<tr>
<td>Kebbi</td>
<td>862</td>
<td>1634</td>
<td>2165</td>
<td>672</td>
<td>680</td>
<td>898</td>
</tr>
<tr>
<td>Sokoto</td>
<td>584</td>
<td>877</td>
<td>936</td>
<td>1157</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zamfara</td>
<td>1040</td>
<td></td>
<td>200</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FCT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source; Federal ministry of works.

STATE ROADS

The state roads are classified as the state trunk ‘B’ roads. These are the roads under the ownership and management of the various state governments.

LOCAL GOVERNMENT ROADS.

These are classified as the local government trunk ‘C’ roads. They are the roads under the ownership and management of the local governments in the country. These roads are divided into the urban, rural and village access roads.

URBAN ROADS.

In Nigeria, these are the roads that are in the urban areas. They account for over twenty one kilometres of Nigerian roads. They include township streets, lanes, cul-de-sac and avenues. Most of these roads are tarred while some are still unattended. In the state capitals the advanced urban roads posses traffic facilities like street lights, drainage facilities, pavement markings and traffic signals. In this country, the main faults on most of our urban roads are almost the same as the ones on the federal and state roads; they are; depressions on the road surfaces, presence of pot holes and cracks, development of gulley due to erosion, washing away of the road shoulders, faulty street lights, faulty drainage systems, faulty traffic signals and wiping off of pavement markings.

RURAL ROADS

In Nigeria, rural roads account for over 72,000 km of roads in the country. These are roads that are found in the remote country parts of the nation. They are mainly earth roads, but with recent developments in the rural areas some of them are now lightly tarred. Here, most of the faults on our urban roads are also available on our rural roads. Faults like the depression of the road surfaces, presence of potholes, cracks, gulley and the wearing away of the road surfaces are rampant.

VILLAGE ACCESS ROADS

In the local governments these are minor roads that provide access within the various villages we have in the country. They are mainly earth roads. The level of under development of these roads reduces them to the level of foot paths. The village access roads account for 35000 km of Nigerian roads (see table3).

ARE NIGERIAN ROADS FUNCTIONING?

With the faults mentioned above that are associated with the roads in Nigeria, the Nigerian roads can be said to be non-functioning. A road that is functioning should be able to possess the following characteristics;

1. The road should be able to give an all-weather support to vehicles. That is, it should bear and distribute wheel loads to within the bearing capacity of the sub grade soil.
2. It should boast of adequate drainage facilities. This means that there should be free flow of water and flood along its drainage system so that water will not flow back on to the pavement to cause one problem or the other.
3. It should provide adequate skid resistance. This implied that it should provide enough frictional adhesion to vehicle tyres especially during acceleration, deceleration and cornering.
4. There should be adequate high way geometrical facilities like good geometric design of road widths, intersections, side slopes, sight distance that make for easy movement and passing with safety at established level of service.
CAUSES OF THE FAILURES OF THE HIGHWAYS

There are many different causes of road defects. Some of the causes on the Nigerian roads are:

1. POOR DESIGN AND CONSTRUCTION.

Failures like cracking in rigid pavement are caused by inadequate curing of concrete, settlement, movement or restraints at joints may also lead to the development of cracks and subsequent failure. Most of the roads in the country are designed in the ministries or by consultants some of who are not within the environment of the road work. This leads to a situation where preliminary studies of the environment that will help the design and construction decisions are not done. This leads to poor understanding of the road environment which subsequently leads to poor road design and construction. Oguara (2010), then said that to save the road network from total collapse, requires good and efficient management which had to be done in a pragmatic and organised framework.

2. HEAVY TRAFFIC

All road surfaces wear under the action of traffic, particularly during the very early life of the road. But within a short time the micro texture reaches an equilibrium level and thereafter the low speed skidding resistance remains reasonably constant. However, the action of traffic continues to wear the macro surface texture and thus gradually reduces the high speed skidding resistance. Oguara (2010) stated that with the increase of traffic loads both in terms of numbers and axle loads due to increased economic and developmental activities in the country, the road network was experiencing a systematic deterioration equivalent to an asset loss of about N80 billion due to road deterioration and vehicle operating cost of N53.8 billion per annum. One of the defects caused by heavy traffic on the road is the deformation of the road way which is the change in a road surface from the intended profile. This results due to the application of overload that is beyond what the roadway is designed and constructed for. The Nigerian roads are overloaded with traffics that would have been conveyed through other transport modes than the road. Hence the director general of the Nigerian institute of transport technology Tuesday 16th August 2011 stated that the absence of sound rail transport system, over loaded trucks and general road abuse arising from poor maintenance are the reasons for the poor state of roads in Nigeria. He said that the above factors had to be addressed if roads in Nigeria were to last longer. He stated that the Nigerian roads that were designed to last twenty years experience a reduced longevity because of lack of control over the loading usage and the crumbling of the Nigerian railway system (Okigbo 2012).

3. POOR MAINTENANCE CULTURE.

Even if the roads are well built they need adequate maintenance for sustainability. One of the main problems of highway development in Nigeria is maintenance. The roads are rarely maintained and whenever maintenance is attempted it is done haphazardly. According to Oguara (2010), the financing of the maintenance, rehabilitation and conservation of the roads network in Nigeria had always been left to the government at the federal, state and local government levels who because of their lack of maintenance culture do not release funds for road maintenance at the appropriate time. The road network was therefore left to deteriorate to the extent that portions of the federal trunk A roads became impassable. Igomu (2011) stated that roads world wide were considered critical infrastructure in any nation’s life and were paid premium attention. He said that was not the case with Nigeria, as many of the roads had exceeded their structural life and had become huge slaughter slabs as they had been denied all forms of maintenance. Adequate fund are not budgeted for maintenance in Nigeria. Budgetary process is cumbersome and agencies in charge of maintenance are not well monitored for efficient work. In Lagos, areas like Mushin, Olosa, Ojewoye, Daleko, Moshalashi, Palm avenue and many others have collapsed under the watchful eyes of the local government. Also an area like Kirikiri town in Apapa, mafoluku Oshodi, as well as other places with high commercial concentration are not spared. There is lack of local government presence in these areas in the area of road maintenance. It has become an open truth that roads under the local governments are generally in a state of total disrepair. Checks over the yeas have revealed that on record, billions of naira had been allocated for repair works on the country’s roads only for minor repair works to be effected.

4. POOR HIGHWAY FACILITIES.

Highway facilities like drainages when not in use or lacking in performance result in some of the environmental related defects like roadway deformations and pot holes. As at 2011, virtually all roads in the country have become hubs of intractable snarl-ups and ghastly motor accidents, as unsuspecting motorists speed into deadly craters and monstrous potholes (Igomu 2011). Every part of Nigeria’s main roads is not spared the onslaught of deadly potholes that have inflicted both physical and emotional torture on motorists. The situation degenerates by the day aided by the rains and failed drainages filled with silts.

5. POOR LABORATORY AND INSITU TESTS ON SOIL.

There is the need for the adequate test of the soil and the materials used for road construction. Unfortunately this is not always done. This is due to lack adequate laboratory facilities and trained laboratory manpower for the
job. Since most of the construction companies in the country could not afford adequate laboratory facilities they should make use of the laboratories in the universities and polytechnics that have better facilities in the country for the test of their construction materials. Even the road research institute in Ogun state can help if the facilities are adequate.

6. USE OF LOW QUALITY MATERIALS.

Use of low quality aggregate adversely affects the quality of the roads in Nigeria. This sometimes occurs in the form of the improper grading of aggregates for sub base and poor sub grade soil. The use of extreme cohesive and expansive soil as sub grade soil results in prolonged consolidation and unnecessary settlement of the roadway. The use of soil of low bearing capacity leads to the failure of the sub grade soil.

7. POOR WORKMANSHIP.

Most of the workmen in construction sites in Nigeria are not well trained. This is especially among the artisans and the craftsmen. Sometimes the technicians, the technologists and even the engineers are not given adequate practical training. Inappropriate application of materials by the workmen is mostly due to low knowledge of the works by the workmen. Operations like soil compaction and stabilisation are inadequately done due to low knowledge of the workers.

8. POOR SUPERVISION.

In Nigeria most of the supervisions of construction work are done by the engineers and other middle level supervisors like the foremen. Some of these supervisors who have low knowledge of the work find it difficult to deliver adequate supervision at the site. Some of the faults on the roadway like depressions, cracks and even pothole can occur due to improper workmanship that resulted from wrong supervision. Wrong supervision could result to improper application of the material and operation of the works. Operations like the application of bituminous material, compaction of the soil etc could be messed up because of improper supervision.

9. LOW KNOWLEDGE BASE.

Lack of modern method of road construction on the part of the old engineers and low curriculum standards on the part of the young engineers are some of the problem of road construction in the country. Even the multi national construction companies in the country their workers display inadequate knowledge of the process of road construction. There are modern methods and standards of road design and construction available today. Our road contractors have to avail themselves of the used of these available new and modern methods of road construction and maintenance.

10. NO LOCAL STANDARD OF PRACTICE.

There is the need for adequate monitoring and control in the local construction process. This can be done by the provision of a standard method of practice which will be strictly followed, monitored and maintained. The professional bodies in the country will play a very important role at this stage. They should be able to provide a local standard of practice for the country, maintain it and monitor compliance to the use of the standard. This is because a local standard will take cognisance of the local peculiarities that will affect the environment where road works are located.

11. INADEQUATE SANCTIONS FOR HIGHWAY FAILURES.

There have been records of failures on Nigerian highways. No body or agency has ever been held responsible. Even the roads constructed by the multi national companies some of them start failing before the construction work are completed. Even when accident occurs it is generally blamed on the behaviour of the driver without looking at the effects of the nature of the road. The main factors that contribute to the cause of accident are driver behaviour, nature of vehicle and the nature of the road. In this country whenever accident occur we emphasise the first factor while deemphasising the effects of the other two factors which make tremendous contribution to the cause of accidents.

12. NOT CO-OPTING LOCAL PROFESSIONAL BODIES IN HIGHWAY DESIGN, CONSTRUCTION AND MAINTENANCE.

As earlier mentioned, the professional bodies have a lot of contribution to make to the construction of highways in this country. At present in the Nigeria the professional bodies have not been given adequate chance to contribute to road construction and maintenance in the country. The whole work of road construction and maintenance in the country is left at the mercy of expatriate companies that need to understand the local terrain and situation of our roads to enable them construct appropriately. These information can be provided by the local professional bodies that have more knowledge of the local environment. The professional bodies can even act as checks and monitors to the construction firm on road work in the country.
EFFECTS OF THE FAILURES OF THE HIGHWAYS

Deformation affects the safety and riding quality on the pavement as it may lead to water ponding thus increasing the chance of aquaplaning and is a traffic hazard. Cracking just like inadequate joint sealant allow water to penetrate into the sub base and the sub grade and tends to soften the sub base and the sub grade. The water most of the time tends to weaken the soil and in rigid pavement tend to rust the reinforcement. Some of the main effects are enumerated below

1. ACCIDENTS

The rate of accident on Nigerian roads due to the nature of the road is alarming. Obi (2010) puts it this way ‘As the land becomes increasing restive because of the constant spillage of blood on Lagos roads, residence of the city are rising up to say, enough is enough.’ He stated that driving on Lagos roads, especially on the express roads, was becoming increasingly dangerous. Hardly did a day pass without a truck induced accident. It was either a petrol tanker collided with a car, exploded and hundred were burnt or a car runs into a parked trailer and lives were lost.

The world health organisation said that Nigeria had the world’s third-highest number of road traffic deaths, behind China and India. It noted that traffic fatalities kill nearly 50,000 people a year in Nigeria (Igomu 2011). The corps marshal of the federal road safety commission said a total of 4,372 people were killed in road accident in Nigeria in 2011 (see table 5 below). The Ogun state command of the federal road safety commission, in a report released in 2011, disclosed a chilling data on accidents on the busy Lagos-Ibadan expressway. According to the statistics, between January 2009 and July 2011, over 833 people died on the road while 6,103 had been injured in 2,264 accidents on that road. On the same road, between January and July 2011 alone, 217 travellers lost their lives in 559 accidents, while 1,434 were injured. The federal road safety corps marshal on 9th March 2012 at the FRSC public lecture in Abuja said that a total of 6,012 road accidents involving trailers and tankers in which 5,531 people died were recorded between 2007 and 2010 (Bashir 2012). The frequent accidents on the road are due largely to the neglect of the road by the federal government.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>NUMBER OF ACCIDENTS</th>
<th>NUMBER OF DEATHS</th>
<th>NUMBER OF INJURED</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>8,875</td>
<td>5,654</td>
<td>25,056</td>
</tr>
<tr>
<td>2010</td>
<td>5,330</td>
<td>4,065</td>
<td>17,690</td>
</tr>
<tr>
<td>2011</td>
<td>4,765</td>
<td>4,372</td>
<td>16,855</td>
</tr>
</tbody>
</table>

Source; Weekly trust of 10th March 2012.

2. INCREASE IN FAULTY VEHICLES.

One of the main causes of many racy vehicly on the Nigerian roads is because of the nature of the roads. It has been shown that vehicles wear down faster in less developed countries of Africa like Nigeria than is obtainable in civilised economies. This is evident in second handed vehicles that are shipped from developed economies to Africa which are in most cases here considered as new vehicles. One of the reasons for this is the situation of our roads. This brings a lot of hardship to road users hence Igomu (2011) stated that the hard times faced on the disintegrating roads have continued to raise pertinent questions that had remained unanswered. He said that the extent of damage done to cars due to their morbid state was also enormous, not to mention the loss of productive man-hour.

3. WASTE OF JOURNEY TIME.

Useful time is wasted in plying faulty roads. The nature of roads in Nigeria is one of the main causes of excessive traffic congestion on our roads. Some of the times opposite coming vehicles will have to share the same lane. Some of them do this to avoid pot holes, pavement gulley and other defected parts of the road way. This makes movement on the roads very slow and as such causes the waste of precious time. When the motorist decides to be on his own lane that is littered with cracks and potholes he must have to unduly slow down in order to save the vehicle from avoidable damages.

4. TRAFFIC CONGESTION.

As earlier said faulty nature of Nigerian roads is one of the main causes of traffic congestion on our roads. The N.T.A. news 24 on 1st November 2011 at 6pm news reported that on the Lagos – Ibadan expressway 1000 vehicles ply the road every hour. Among this 40% are heavily loaded trucks. These vehicles are forced into congestion on this road because of the bad nature of the road. This road is one of the worst roads in the country and with such level of traffic on that road and the nature of the road there is no way traffic congestion will not take place.
5. AID TO CRIME (ROBBERY)

In 2010, the author was confronted by armed bandits on a road between Bida and Lambata in Niger state of Nigeria. This was made possible by the nature of the road. The robbers had to hide in the bush at the point where the road was quit bad so that the drivers must make a temporary stop at that point to save their vehicle from unnecessary damage. At that point in time the robbers will jump out from the bush and attack the vehicle. Bad roads are another contributor to the incessant armed robbery and kidnapping that has been taking place in Nigeria. It encourages the robbers to hide at bad spots of the road and waylay motorists on the road. It will be very difficult if not impossible to stop the motorists against their wishes if the roads were in motorable condition.

6. CAUSE OF SOIL EROSION

The nature of the road is a veritable source of the erosion of the soil on the road way. The nature of the roads result to the deformation of the road way like potholes, cracks and in some cases complete scraping of the road way. These lead to the penetration of the soil by water which in most cases enable water to wash away the surface of the road way. In JUNE 2011, on the Oshodi- Apapa expressway, hell was literally unleashed on commuters by flood which virtually took over the length of the expressway. Initially, when the rain started as a light shower and turned into a torrential downpour that submerged the city (Igoumi 2011). The high level of devastation of this flood was mainly due to inadequate drainage by the road sides. For days while the flood ravaged, road users were practically sacked from the expressway while the number of broken down vehicles outnumbered those that were able to wade through the deluge. This effect is not only limited to the Apapa-Oshodi expressway. A detailed check through Lagos and other parts of Nigeria reveals stretches of roads that have degenerated into death trap, with most requiring total reconstruction.

7. ADVERSE TO ECONOMIC DEVELOPMENT

The deteriorating nature of the Nigerian roads adversely affects the country’s economy. The nature of the roads adversely affects the transportation system in Nigeria and consequently intercepts commercial activities in the country. It leads to the breakdown of vehicles and other transport systems which consequently affect the movement of goods and personnel within the economy.

REMEDIES AND RECOMMENDATIONS TO HIGHWAY FAILURES.

There are remedies to the causes of highway failures in Nigeria. These remedies are enumerated and recommendations made on how to solve the road failures as follows;

1. PROVISION OF ADEQUATE AND APPROPRIATE DESIGNS

The construction of a road starts from conception, planning and design. Without a good design of the road the functionality of the road may not be achieved. Even when the construction and supervision is adequate without the design process well done the end product in the form of a road project will not be functional. The agencies in charge of road work in the country like the ministry of works and the professional bodies whose works relate to road constructions in country will be made to be more proactive in the activities leading to the design and construction of roads in the country. They should be able to give appropriate supervision, direction and control to road design consultants and road construction companies in the country.

2. DECONGESTION OF THE ROADS

The roads need the decongestion of traffic on them. Obstacles like cracks, potholes and abandoned vehicles on the roads lead to slow movement of vehicles on the road which leads to the congestion of traffic on the roads. There fore one way of decongesting the roads of traffic is by removing those obstacles like cracks, potholes and abandoned vehicles from the road. Decongestion can also be achieved by the diversion of traffic to other traffic modes like the railways, waterways and air transport.

3. MAINTENANCE OF THE ROADS

For a sustainable road development in Nigeria there is the need for adequate maintenance of the roads in the country.

Highway maintenance ensures that the road way, the road sides, traffic structures and facilities are kept in a condition of performance same or nearly as operational as when the road was newly built (Okigbo 2012).

This is done by constant checking for faults or faulty locations on highway and where such faults occur, adequate repairs are applied. This detection of faults can be done using experience and equipment that can locate or detect potential weaknesses on the pavement before they visibly occur.

Depending on the type and location of the road, these operations include; grading of the road way, paving, resurfacing, mulching, planting of grasses and trees where necessary, replacing of damaged traffic facilities, patching of road way surfaces, drainage maintenance, sweeping of road surfaces and side walks and the disposal of the refuse that are littered on the road. In some of the state capitals in Nigeria street sweeping and the disposal
of rubbish is gradually being taken serious by some of the state governments. A lot of money, materials and labour go into the maintenance of the nation’s highways, but with appropriate planning and execution of maintenance operation in this country money will be saved.

4. PROVISION OF HIGHWAY FACILITIES

Highway facilities like drainages, shoulders, highway signs and markings are needed for the good functionality of the roads in Nigeria. Such facilities that will provide adequate functionality for the highway. The problems of the roads arise from faulty design, lack of the facilities like the drainages, and very thin coatings that are easily washed away by floods and hardly withstand heavy traffic.

5. ADEQUATE SOIL TESTS IN ROAD CONSTRUCTION

One of the main reasons why highways in the country fail is that adequate knowledge of the soil situation is not obtained before the commencement of the road work. Knowledge of the soil situation helps both at the design and construction stage of the road. The subgrade should be tested and found to be adequate before usage. The soil for sub base and base course even the material for the wearing course and the pavement must be found to meet the standard before they will be accepted for usage in road construction work.

6. APPROPRIATE ROAD CONSTRUCTION MATERIALS

The problems of road functionality in Nigeria arise from faulty design, lack of drainages, and lack of appropriate construction materials. The materials for road construction and maintenance must be tested and confirm adequate by competent examiners before being used for road construction. Those materials that are of standard quality are what are needed for good road construction. The use of this type of material will enable us realise the governments aim in the provision of appropriate road network in the country.

7. USE OF WELL TRAINED ROAD ENGINEERS

Those who will be able to realise the problems of the Nigerian roads, their causes and proffer solutions should be sought. The problems arise from faulty design, lack of drainages, and very thin coatings that are easily washed away by floods and hardly withstand heavy traffic (Okigbo 2012). These faults could be easily detected and dealt with if well trained and qualified engineers are enlisted for road work in the country.

Engineering professional bodies like COREN should be involved in both the training and the supervision of highway engineers both in the school stage and in the direct construction work on our roads. This will also extend to collaboration between the professional bodies and government agencies that are in charge of road maintenance (Okigbo2012). This manifested in august 2011 when the minister for works received the members of the Nigerian society of engineers in Abuja. The minister declared his willingness to collaborate with the Nigerian society of engineers on road sector transformations. He described the bad state of the Nigerian roads as contributing to the low productivity and poor economic development of the country (Onuoha and Oriakhi 2011).

8. APPROPRIATE SANCTIONS FOR HIGHWAY FAILURES.

The Nigerian president said on 11th September 2011 that all contractors that could not live up to expectation in their project would be sanctioned. If this threat is well carried out it will go a long way in accelerating job completion in Nigeria (Okigbo 2012). One of the main problems of road construction in Nigeria is delays and a display of incompetence by the contactors. Such development need to be condemned and sanctions applied as a deterrent to future occurrence of such show of incompetence.

9. ENHANCED USE OF OTHER MODES OF TRANSPORTATION

Other modes of transportation like the rail lines and waterways should be developed to reduce the pressure on the road transportation mode in the country. The director general of the Nigerian institute of transport technology Tuesday 16th August 2011 stated that the absence of sound rail transport system, over loaded trucks and general road abuse arising from poor maintenance are the reasons for the poor state of roads in Nigeria. He said that the above factors had to be addressed if roads in Nigeria were to last longer. He stated that the Nigerian roads that were designed to last twenty years experience a reduced longevity because of lack of control over the loading usage and the crumbling of the Nigerian railway system. It was reported that 95% of the movements today in Nigeria were done by road, while the remaining 5% percent of movements in the country are done by air, rail and sea. If the other transport modes in the country are activated fully this trend will be changed and our roads saved from undue deterioration.

CONCLUSIONS

Having looked at the causes, effect and remedies of improper road construction practice recommendations have been given on how to avoid such occurrence in the future. If the Nigerian authorities will carefully carry out the recommendations given in this paper it will go a long way alleviating the country’s road transportation problems.
REFERENCES