European Journal of Business and Social Sciences, Vol. 4, No. 12, **March 2016.** **P.P. 169 - 181**
URL: *http://www.ejbss.com/recent.aspx-/*
ISSN: 2235 -767X

POLICY FRAMEWORK FOR ADOPTION OF SPEED LIMITER IN TRAFFIC SAFETY MANAGEMENT IN NIGERIA

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ABSTRACT

This paper examined the concept of speed limiter as a panacea to reducing carnage and accidents on Nigerian roads. The risks associated with certain driving activities can only be reduced with management commitment and appropriate safety control systems. Descriptive analysis was used to explain upgraded data collected by French Institute for Research in Africa (IFRA-Nigeria) from the records of accidents/crashes extracted from Newspaper and Federal Road Safety Commission's data. The trend of road crashes was analysed using Time Series analytical techniques. The result revealed that, from 2014, there is great reduction in the trend of crashes per annum in Nigeria. Also, the analysis predicted 504 crashes in 2016 as compared to higher figures observed in previous years. However, Lagos, Edo, Ogun and FCT are at the fore front of accident cases in Nigeria. The research concluded that, with the introduction and implementation of speed limiters, there is possibility that crashes will reduce the more if well enforced and adequately implemented but it has to be a gradual process because of the challenges involved.

Keywords: Policy, Speed Limiter, Traffic, Safety, Nigeria.

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1.0 Introduction

Excessive speed has been recognized as the major contributory factor in road crashes. Drivers on high speed on several occasions cannot control the vehicle in case of emergency. This is because the higher the speed of a vehicle, the shorter the time a driver has to stop and avoid a crash. Despite the general acceptance and wide-spread use of speed limits throughout the world, there has been no consensus among practitioners concerning the methods and techniques that should be used to select the most appropriate speed limit for a particular facility. A speed limiter is a governor used to limit the top speed of a vehicle. For some classes of vehicle and in some jurisdictions they are a statutory requirement, for some other vehicles the manufacturer provides a non-statutory system which may be fixed or programmable by the driver (Wikipedia, 2014).

Ogunsanya (2004), Ogwude (2012) identified three categories of factors responsible for road traffic crashes in Nigeria:

- **Human Causes**: Recklessness and negligence of driver, Improper overtaking, Inattention, intoxication, pedestrian fault, overloading,excessive speed, children crossing, inexperience driver e.t.c.
- **Mechanical Causes**: Mechanical defects of the vehicle, Defective lights, dazzling lights.
- **Causes due to road condition**: Skid or road surface defects, Obstruction, other road defects, level of crossing.

Human factors include visual acuteness, driver fatigue, poor knowledge of road signs and regulations, illiteracy, health problems, excessive speeding, drug abuse, and over-confidence while at the steering wheel. Among the mechanical factors that lead to fatal car accidents are poor vehicle maintenance, tyre blowouts, poor lights, un-roadworthy vehicles, and broken-down vehicles on the road without adequate warning. The environmental factors include heavy rainfall, Harmattan winds, sun reflection, heavy wind, potholes, and un-tarred roads. These factors have independently and/or collectively contributed to the high rate of fatal road accidents in Nigeria (Vitus, 2014).The bad roads automatically compel drivers to reduce speed except the driver is careless about aftermath condition of the vehicle. Surprisingly however; findings from other studies indicated that the better the quality of the roads in Nigeria, the higher the level of road traffic accidents in the country because drivers most likely over speed on good roads, leading to more frequent and fatal accidents (Onakomaiya 1988; Filani and Gbadamosi, 2007).
Speed also contributes to the severity of the impact when a collision does occur. For car occupants in a crash with an impact speed of 80km/hr, the likelihood of death is 20 times what it would have been at an impact speed of 30km/hr. Road accidents appear to occur regularly at some flash points such as where there are sharp bends, potholes and at bad sections of the highways. At such points over speeding drivers usually find it difficult to control their vehicles, which then result to fatal traffic accidents, especially at night (Atubi, 2009b). It is difficult for enforcement methods alone to have an effect on over speeding. An added problem is that even motorists who want to obey the speed limits (to keep their life, license or livelihood) have difficulty doing so in modern cars on city roads.

Speed limits differ from one country to another and largely depend on the road safety policies of the country. For instance in United States, all vehicles are to maintain maximum speed within a particular area as follows:

25 mph (40 km/h) in any business district 25 mph (40 km/h) in any residential district

20 mph (30 km/h) at all school zones where 20 mph (30 km/h) regulatory signs are in effect during specific periods
50 mph (80 km/h) on 2-lane roadways
55 mph (90 km/h) on 4-lane roadways and on divided roadways

Speed limit policy formulation is a guide to ensure safety. Hence, if all drivers can understand the post crash effects in terms of how relatives, dependents and friends will suffer or the extent of agony of injuries perhaps; caution will have been taken seriously while on motion. The costs to society such as loss of able bodied men and women who hitherto, would have been involved in productive economic activities, loss of intellectuals in our schools, loss of resources to government and families, to insurance companies and damage to properties, e.t.c. are inestimable. According to Onakomoiya (1992), with injuries, people often suffer physical pain and emotional anguish that is beyond any economic compensation. The repercussions of such accidents have been colossal. Despite the happiness and change of quality of family lives associated with owning a vehicle, its possession has left many families bereft of their breadwinners or loved ones (Umar, 2014).

2.0 Review of Causes of Accidents in Nigeria

In 2006, 644,387 vehicles, including government motor cars and motor cycles, private motor cars and motor cycles, and commercial motor cars and motor cycles, were registered nationwide. The number fell in 2007 to 612, 867 but increased in 2008 to 746,814 and to 777,835 in 2009. In 2010, 712,938 vehicles were registered (NBC, 2009).Over 70% of the total movements of the registered vehicles in the country and about 80% of the freight movements take place on the road (FRSC, 2011).

The Nigeria situation has reached such an alarming proportion even to the point of sheer frustration and near helplessness. Nigeria continues to feature in the bottom half of World Health Organization country rankings of road traffic accidents. The country's 149th ranking in 2009 out of 178 member states indicates the hazards associated with road transportation in a country that is largely dependent on its road network for economic, social and physical activities.Ogwude (2012) also attributed the causes of crashes to the level of aggressiveness of drivers. He reiterated the fact that, lack of spirit of forgiveness of minor or major errors usually results in road crashes. Dosumu (2008) asserted that; crashes can occur as a result of vehicle-vehicle collision, vehicle with unexpected objects, vehicle with pedestrians, vehicle with itself (in case of skidding or surmasult and unnecessary competition among drivers.

According to Sumaila (2013), various measures have been used to tame the level of crashes which has claimed more lives than HIV/AIDS in Nigeria. In fact, WHO and the Global Road Safety Partnership, in its publication, "Speed Management: a Road Safety Manual for Decision Makers and Practitioners" recommended that speed limits be introduced in every country as part of the global strategy to cut down road fatalities.

2.1 Speed Reduction Measures

The enforcement agents; i.e the Police, the Federal Road Safety Corps (FRSC) and the Vehicle Inspection officers (VIO) who are instrumental in crash reduction used Enlightment, Empowerment, Enforcement and Emergency responsive methods to achieve crash reduction objectives. The speed reduction measures have been viewed from different perspectives. Generally, all the perspectives aimed at the followings: to reduce accident/ road crashes, to improve and protect environment, to improve performance and capacity of existing transport facilities and to minimize the costs of implementation.

Reviews of the adopted measures include the followings:

a) Physical Road Designs: this has to do with the configuration of road network to enhance better usage of road. A lot of researchers attributed crashes to the geometric designs and construction of road. The engineering measure involves physical altering of the road layout or appearance to actively or passively retard traffic by increasing the cognitive load of driving. The use of speed humps, chicanes, curb extensions, chokers and narrow lanes have been identified as strategies for effective road designs that limit speed of vehicles. Improvement in road designs also adopts the method of changing the road surface texture to reduce speed by use of bricks. Allowance of parking by road side can also force the drivers to reduce speed.

The following methods have been identified by FHWA, (2012) as **Methods of Setting Speed Limits**within the traffic engineering community:

Engineering approach: A two-step process where a base speed limit is set according to the 85th percentile speed, the design speed for the road, or other criterion. This base speed limit is adjusted according to traffic and infrastructure conditions such as pedestrian use, median presence, etc. Within the engineering approach there are two approaches; 1) Operating Speed Method and (2) Road Risk Method.

Expert system approach: Speed limits are set by a computer program that uses knowledge and inference procedures that simulate the judgment and behavior of speed limit experts. Typically, this system contains a knowledge base containing accumulated knowledge and experience (knowledge base), and a set of rules for applying the knowledge to each particular situation (the inference procedure).

Optimization: Setting speed limits to minimize the total societal costs of transport. Travel time, vehicle operating costs, road crashes, traffic noise, and air pollution are considered in the determination of optimal speed limits.

Injury minimization or safe system approach: Speed limits are set according to the crash types that are likely to occur, the impact forces that result, and the human body's tolerance to withstand these forces.

b) Speed Breakers (Bump): Speed breakers are colloquially referred to as (Bumps or sleeping policeman). They are low-lying constructed across the road to slow down speed of vehicles approaching mostly intersections (Okoko, 2006). The bumps are used in conjunctions with other road signs. This methods

assumes that motorists will behave rationally, obey traffic regulations and pay due cognizance to the bumps.

c) Zebra Crossing or pelican crossing: This can be referred to the stripes or marks across the road mostly for pedestrians to cross the road. Onakomaiya (2004) describes a pedestrian as someone who is above 6 years old and can presumably aware of traffic to cross a motor way.

d) LASAR: A narrow band of light is transmitted to a targeted vehicle and returned by it and speed of the vehicle is displayed for the officer. These devices are similar to size and weight to police radar. LIDAR (Light Distance and Ranging Device) sends out and retrieve a rapid series of light impulses to and from a targeted vehicle, using a time or distance calculation to measure speed based on the change in consecutive measurements. LASER devices have been in use in the US for speed enforcement since 1990.

e) Speed Cameras: A traffic enforcement camera can be described as a camera which may be mounted beside or over a road or installed in an enforcement vehicle to detect traffic regulation violations, including speeding, vehicles going through a red traffic light, unauthorized use of a bus lane, or for recording vehicles inside a congestion charge area (Robinson,2005).

f) Number Plate Recognition:Automatic number plate recognition can be used for purposes unrelated to enforcement of traffic rules. In principle any agency or person with access to data either from traffic cameras or cameras installed for other purposes can track the movement of vehicles for any purpose.

g) VASCAR: A Vehicle Average Speed Calculator and Recorder uses a portable computer to accurately clock, calculates and display speed based on the time a vehicle takes to travel a known length of road.

h) Variable Speed Limits: This is a type of Intelligent Transport System (ITS) that utilizes traffic speed and volume detective weather information and road surface condition technology to determine appropriate speeds at which drivers should be travelling given the current road way and traffic conditions (Robinson,2000).

i) Road Signs: The road signs are erected along the road. They give signs and warnings to the drivers and ensure that they are aware of what lies ahead especially at nights in a route.

In an attempt to implement a policy, there is need for careful assessment of its merits and demerits. To this end, analyses of the various measures of speed limiters were carried out as follows:

Advantages of speed breakers

- It is a must for drivers to slow own except he is careless about his vehicle
- It has enhanced safer roads for pedestrians as they often target its location before crossing
- Transportation externalities are minimal as the discharge of pollutants are limited by speed reduction in habitable environment

Disadvantages

- It stresses the drivers and can be annoying to impatient drivers it has to do with as change of gears especially for manually operated vehicles
- Can cause misalignment and loss or damage to goods especially low-stable vehicles like trucks and trailers
- It invariably increases fuel consumption as energy requires moving up the bumps is higher compared to when the road is leveled.
- It sometimes causes traffic as a broken-down vehicle can lead to vehicle congestion

Road Signs speed limiters and cameras

Advantages

- Gives direction and necessary information about the road to the users
- Prepares the mind of the users of unpredicted expectations/dangers along the road

Disadvantages

- Cost of erecting road signs/ cameras
- Drivers must be educated to read and understand road signs
- Cost of maintenance of camera

Enforcement

Advantages of Enforcement

- The presence of enforcement officials changes the attitude of drivers. It compels them to obey the traffic rules and regulations
- The erring drivers are or may be arrested by the officials which can serve as deterrent to others
- Road crashes and collision are prevented as officials dictates the right of way

Disadvantages

- Unscrupulous and reckless drivers have injured or killed the traffic warden or safety officials on duty. Unfortunately, once this happens or before that, they do not have any weapon to defend or protect themselves
- The officials can be weary and tired with monotonous traffic control exercise
- Inadequate of facilities and skilled man power is a major challenge for enforcement officials. e.g vehicles, personnel and ability to work round the clock to apprehend offenders.

2.2 Speed Limiter Operational Challenges

The observation of places where the use of speed limiter is effective before its adoption in Nigeria revealed that, system would require detailed digital maps of the area land use and environmental conditions containing every speed limit, to be drawn up. A device in vehicles would use satellite positioning technology to discover the limit in its location and reduce its speed if necessary. Many Intelligent Speed Adaptation (ISA) systems will also provide information about locations where hazards may occur (e.g., in high pedestrian movement areas, railway level crossings or railroad grade crossings, schools, hospitals, etc.) or where enforcement actions is indicated (e.g., speed camera and red light camera locations). The purpose of ISA is to assist the driver in keeping to the lawful speed limit at all times, particularly as they pass through different speed 'zones'. This is particularly useful when drivers are in unfamiliar areas or when they pass through areas where variable speed limits are used (Paine, 1998). In many cases, devices like Radio Beacon, Dead Reckoning system, Global Positioning System (GPS) and Gyroscope are very essential in achieving speed limiter's objectives.

The reports from OECD (2003) stated that Intelligent speed adaptation (ISA) is a co-operative speed control technology. ISA requires accurate information on vehicle locations and speed limits, which can be achieved through a combination of a global positioning system (GPS) and digital road maps. It also requires a link with some or all of the elements of the vehicle's power train: throttle, ignition, fuelling system, gearbox and brakes. A critical aspect of ISA is the level of intervention provided by the system. An active system intervenes directly to affect the speed of the vehicle through a haptic throttle (the resistance to push the accelerator increases) or a speed limiter making it impossible to drive faster than the posted speed limit. Passive systems rely primarily on auditory or visual advisory outputs that alert the driver of the speed difference. ISA can be categorised as:

_ Advisory: the speed limit is displayed for the driver to determine whether or not to comply.
_ Driver select: the driver has the ability to switch ISA on and off, so that compliance is voluntary.
_ Mandatory: the system does not permit the speed limit to be exceeded at any time.

Another dimension of ISA is related to the way that information on speed limits is gathered and processed.

_ Fixed: the vehicle is informed of the posted speed limits.
_ Variable: the vehicle is additionally informed of certain locations in the network where a lower speed limit is implemented at locations such as pedestrian crossings or the approach to sharp curves.
_ Dynamic: additional, temporary lower speed limits are implemented due to network or weather conditions, to slow traffic in fog, on slippery roads, around major incidents, etc. The more dynamic forms of ISA require real-time data on traffic flow and weather.

Various combinations of these approaches have been used in ISA field tests in Denmark, France, the Netherlands, Sweden, and the United Kingdom. The primary advantage of ISA is that it addresses one of the key causal factors of road unsafety, *i.e.* speeding or inappropriate speed.

According to (Gerald et al, 2012), there are two types of statutory speed limits: (a) absolute limits and (b) *prima facie* limits. The principal difference between the two types is whether someone who is charged with driving over the speed limit can defend her/his actions. An absolute speed limit is a limit above which it is unlawful to drive regardless of roadway conditions, the amount of traffic, or other influencing factors. There

is no recourse to contend a charge. A *prima facie* speed limit is one above which drivers are presumed to be driving unlawfully but, if charged with a violation, they may contend that their speed was safe for conditions existing on the roadway at that time. And, therefore, that they are not guilty of a speed limit violation. *Prima facie* limits provide greater flexibility to drivers to determine an appropriate speed for conditions and place a greater burden of proof on the enforcement community that a violation has occurred. The challenge of speed limiter has been described as 'driving at speed limit rather than to the conditions. Obviously, many roads have features such as curves and gradients where the appropriate speed for a road segment with these features is less than the posted maximum speed limit. Some car manufacturers have expressed concern that some types of speed limiters "take control away from the driver". In Nigeria, a challenge is the issue of escort and authorities who disobey traffic laws with unnecessary speed. Another aspect that is most challenging is how the drivers are being licensed. By law, the FRSC is empowered to produce while the VIOs are to issue driver license in the country. The operational procedure is that VIOs carry out driver testing and recommend successful candidates to FRSC for production of their license. The produced license would be forwarded to the VIO for issuance. This legal arrangement makes the management of driver license rather untidy. The result is that the Nigerian driving population is faced with many forged and invalid driver licenses, multiple issuance from different states of the country and underage and sometimes aged licensed drivers. The fact that the issuing authorities are agencies of state governments, it is not surprising that emphasis is on revenue generation casting doubts on the credibility of the process and the competence of the recipients. It is also worthy of note that Road Worthiness of vehicles are currently tied to revenue in Nigeria. This just requires drivers to show revenue receipts. They are then left off the hook even though the vehicle is driven with worn out tires, broken chassis, bad center bolts with vehicle body tilting at a dangerous angle. This is simply a crash waiting to happen (Oyedokun, 2015).

3.0 Methodology

The country is located in West Africa and shares land borders with the Republic of Benin in the west, Chad and Cameroon in the east, and Niger in the north. Its Coast in the south lies on the Gulf of Guinea on the Atlantic Ocean. This paper used the data collected by French Institute for Research in Africa (IFRA-Nigeria) from the records of accidents/crashes extracted from Newspaper and Federal Road Safety Commission's data. In order to determine the impact of speed limiter policy initiation, accident/ crashes data from 2006 to October 2015were collected across the Nigerian States of the federation. The collected data is only linked to the reported accidents cases in all the states of the federation.

Table 3. 1: Accident Data from 2006-2015

		ACCIDENT DATA FROM 2006-2015										
States	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**TOTAL**	Rank
Abia	**28**	**28**	**12**	**3**	**1**	**5**	**57**	**42**	**5**	**18**	**199**	**25**
Adamawa	**0**	**0**	**54**	**10**	**39**	**13**	**30**	**12**	**2**	**9**	**169**	**30**
AkwaIbom	**3**	**17**	**0**	**3**	**5**	**8**	**26**	**22**	**7**	**6**	**97**	**35**
Anambra	**36**	**22**	**30**	**78**	**98**	**35**	**69**	**96**	**28**	**17**	**509**	**11**
Bauchi	**23**	**17**	**69**	**24**	**65**	**124**	**88**	**76**	**19**	**23**	**528**	**9**
Bayelsa	**1**	**30**	**19**	**4**	**0**	**3**	**3**	**34**	**10**	**8**	**112**	**34**
Benue	**19**	**51**	**12**	**66**	**18**	**68**	**40**	**48**	**4**	**15**	**341**	**17**
Borno	**0**	**21**	**13**	**45**	**17**	**12**	**18**	**18**	**11**	**13**	**168**	**31**
Cross river	**34**	**21**	**54**	**10**	**10**	**10**	**6**	**26**	**18**	**11**	**200**	**24**
Delta	**44**	**82**	**181**	**39**	**184**	**44**	**62**	**112**	**50**	**14**	**812**	**6**
Ebonyi	**2**	**3**	**5**	**4**	**5**	**1**	**3**	**21**	**11**	**6**	**61**	**37**
Edo	**47**	**88**	**164**	**196**	**11**	**208**	**85**	**210**	**120**	**18**	**1147**	**2**
Ekiti	**0**	**20**	**11**	**4**	**8**	**8**	**24**	**21**	**11**	**5**	**112**	**33**
Enugu	**0**	**5**	**2**	**40**	**61**	**44**	**27**	**35**	**30**	**7**	**251**	**23**
FCT	**48**	**80**	**159**	**120**	**198**	**134**	**87**	**162**	**58**	**55**	**1101**	**4**
Gombe	**20**	**15**	**19**	**24**	**40**	**27**	**5**	**23**	**0**	**13**	**186**	**27**
Imo	**26**	**21**	**71**	**33**	**73**	**14**	**20**	**30**	**7**	**14**	**309**	**20**
Jigawa	**1**	**24**	**23**	**14**	**16**	**10**	**13**	**32**	**37**	**9**	**179**	**28**
Kaduna	**43**	**186**	**24**	**32**	**28**	**17**	**48**	**50**	**18**	**21**	**467**	**13**
Kano	**36**	**16**	**31**	**102**	**49**	**48**	**13**	**50**	**28**	**17**	**390**	**16**
Kastina	**36**	**80**	**8**	**64**	**52**	**121**	**50**	**83**	**10**	**14**	**518**	**10**
Kebbi	**11**	**0**	**1**	**10**	**36**	**38**	**3**	**43**	**7**	**5**	**154**	**32**
Kogi	**33**	**70**	**58**	**208**	**172**	**89**	**86**	**64**	**56**	**28**	**864**	**5**
Kwara	**39**	**29**	**34**	**50**	**34**	**21**	**47**	**43**	**22**	**16**	**335**	**18**
Lagos	**212**	**260**	**306**	**148**	**236**	**156**	**68**	**119**	**74**	**71**	**1650**	**1**
Nasarawa	**4**	**64**	**12**	**29**	**2**	**7**	**10**	**19**	**20**	**9**	**176**	**29**
Niger	**21**	**18**	**40**	**37**	**94**	**70**	**13**	**51**	**48**	**12**	**404**	**15**
Ogun	**82**	**95**	**87**	**105**	**92**	**86**	**227**	**182**	**28**	**29**	**1013**	**3**
Ondo	**67**	**81**	**59**	**34**	**148**	**106**	**53**	**20**	**15**	**13**	**596**	**8**
Osun	**13**	**88**	**75**	**14**	**9**	**27**	**29**	**28**	**27**	**18**	**328**	**19**
Oyo	**177**	**23**	**41**	**77**	**59**	**114**	**67**	**107**	**53**	**21**	**739**	**7**
Plateau	**4**	**9**	**31**	**33**	**18**	**32**	**10**	**40**	**0**	**19**	**196**	**26**
Rivers	**43**	**97**	**51**	**11**	**55**	**15**	**174**	**30**	**0**	**21**	**497**	**12**
Sokoto	**8**	**44**	**38**	**12**	**46**	**8**	**28**	**19**	**32**	**17**	**252**	**21**
Taraba	**5**	**9**	**20**	**11**	**5**	**1**	**5**	**6**	**6**	**4**	**72**	**36**
Yobe	**6**	**36**	**38**	**13**	**62**	**88**	**40**	**50**	**78**	**17**	**428**	**14**
Zamfara	**17**	**52**	**25**	**22**	**24**	**27**	**18**	**37**	**18**	**12**	**252**	**21**
Total/yr	**1189**	**1802**	**1877**	**1729**	**2070**	**1839**	**1652**	**2061**	**968**	**625**	**15812**	

Source: Authors' Computation (2015)

4.0 Results and Discussions

Time series analysis using linear trend can be used to determine the value of constants "a" and "b" by solving the two normal equations simultaneously.

The linear trend analysis =Y= a +bx

i.e $\sum Y = aN + b\sum x$……..1

$\sum XY = a\sum X + b\sum x^2$…….2

In time series however, the Xs often refer to years,months or weeks. Hence we can simplify these formulas for calculating the constants "a and b" by changing the scale of Xs so their sum will be equal to zero.

Then we solve for 'a' and 'b' as follows:

$a=\sum Y/N = Y$ and 'b'$=\sum XY/\sum X^2$

Table 4.1: Time series analysis

Years	Crash/yr	x	xy	x2
2006	1189	-9	-10701	81
2007	1802	-7	-12614	49
2008	1877	-5	-9385	25
2009	1729	-3	5187	9
2010	2070	-1	-2070	1
2011	1839	1	1839	1
2012	1652	3	4956	9
2013	2061	5	10305	25
2014	968	7	6776	49
2015	625	9	5625	81
	15812	0	-82	330

Source: Output result based on field survey (2015)

$a= \sum Y/N = 15812/10 = 1581.2$

$b=\sum XY/\sum X^2 = -82/330 = -0.25$

Therefore the trend line of accident =Y=1581.2-0.25x

To predict year 2016 accident data, we therefore have Y=1581.2-0.25(2016)=Y=504

The analysis of the above figure revealed that, Lagos, Edo, Ogun and FCT have the highest rate followed by

Kogi State.

Table 4.2: States crashes ranking

States	Rank
Lagos	**1**
Edo	**2**
Ogun	**3**
FCT	**4**
Kogi	**5**
Delta	**6**
Oyo	**7**
Ondo	**8**
Bauchi	**9**
Kastina	**10**
Anambra	**11**
Rivers	**12**
Kaduna	**13**
Yobe	**14**
Niger	**15**
Kano	**16**
Benue	**17**
Kwara	**18**
Osun	**19**
Imo	**20**
Sokoto	**21**
Zamfara	**21**
Enugu	**23**
Cross river	**24**
Abia	**25**
Plateau	**26**
Gombe	**27**
Jigawa	**28**
Nasarawa	**29**
Adamawa	**30**
Borno	**31**
Kebbi	**32**
Ekiti	**33**
Bayelsa	**34**
AkwaIbom	**35**
Taraba	**36**
Ebonyi	**37**

Table 4.3:Crashes per annum ranking

years	Crash/yr	rank/yr
2010	2070	1
2013	2061	2
2008	1877	3
2011	1839	4
2007	1802	5
2009	1729	6
2012	1652	7
2006	1189	8
2014	968	9
2015	625	10

Source: Output result based on field survey (2015)

There is no perfect trend in accident rate reduction from the observed years; the causes of the crashes has been attributed to falling of tankers, trailers, trucks, robbery, speed, political violence and motorcycle accidents. The recorded accidents mostly occur happened towards the end of the year (Ember months) and the beginning of the year. Perhaps, the more reason the FRSC and other safety agents are more concerned about these (Ember) months is predicated on the fact that these months used to witness fatal crashes occurrence. The efforts of the road transport enforcement agencies to reduce carnage on Nigerian roads have been justified. It has been observed from the analysis that, there will be reduction in accident rates as the year increases.

Sequel to this, the implementation of speed limiter will also reduce to the barest minimum if absolute eradication is not possible regarding the issue of road mishaps and accidents. From the table 3.1 above, accidents occurred mostly in 2010, 2013 and 2008 according to the number of occurrence per year. There were reduction in the rate of accident occurrence in less densely populated States as indicated by Ebonyi, Taraba, Bayelsa, AkwaIbom and Ekiti States. From all indication, although; accident data for both November and December 2015 were not included in the collected data, with the Time series analysis prediction for 2016 and consequently for subsequent years, there is every tendency that there will be reduction in cases of crashes in Nigeria. With the implementation and introduction of speed limiters however, there is possibility that crashes will reduce the more if well enforced and adequately implemented.

5.0 Conclusion and Recommendation

The researcher concluded that, the policy framework should carefully look into the advantages and disadvantage of speed limiter. It implementation will further reduce road accidents and instill the good driving behavior on drivers. However, Government should initiate the enforcement of speed limiter cameras so as to cover and monitor drivers when the safety officials are absent. Of course, the enormous cost of putting required infrastructure is a major challenge; the policy frame work can be carried out with segmentation of roads. All tiers of government and private companies should be made to actively participate in the implementation of the speed limit policy. More importantly, Nigerians should be well informed and the cost of installing the devices should be affordable. Again, there is need for government to provide funds to the Ministry of Works in rehabilitating some of road transport infrastructures. More importantly, Local government ministries of works and/or transport should be made functional for proper rehabilitations of some routes before they get out of hand as a result of constant damage by erosion. There should be modalities by which government vehicles on motion should reduce speed in an attempt to allow other vehicles to give way. The issue of issuance of driver's license should not be carried out with lip service; rather there should be stringent measures and proper regulations for adequate compliance.

Monitoring system for speed limiters

Monitoring procedures should be put in place for checking that the speed limiter is functioning correctly at all times, as otherwise road safety may be compromised. The system should check: the installation date; the position of the speed limiter plate and the accuracy of its details; any speed limiter malfunction and a record of any checks that have been carried out, for example check size of tyres fitted against details on plate; evidence from tachograph records that the vehicle has not exceeded the regulated speed limits; and records of all defect reports submitted by drivers concerning malfunctioning speed limiters and the actions taken to

solve the problems (including relevant dates)(RSA, 2009).

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