

ANALYSIS OF VARIANCE ON ROAD ACCIDENT CASES IN SOKOTO STATE

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***Abstract:** Road traffic accidents contributed a menace in modern times. Nigeria as a developing nation has suffered from varying degree of road accidents which make it one of the countries with the highest rate of accidents. The paper examines road accident cases in Sokoto State. In view of this data was collected from National Bureau of Statistics over a period of sixteen years from 1992 to 2007. Analysis of variance was carried out on the three categories of cases recorded, and the result shows that over the period Fatal accident (accidents resulting to death) have the highest cases followed by Serious (accidents that results in serious injury such as permanent disorder, amputation, fracture etc.) and lastly followed by the Minor cases (accidents that results to only vehicle damage).*

Keywords: Road accident (Fatal, Serious and Minor), Recommendations.

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INTRODUCTION

Road transportation is by far the commonest means of transportation in Nigeria as compared to other means such as air, rail and water. The technology has made life easy than the primitive means of transportation such as animals. Nigeria's Economy, despite its harshness, afforded millions of its populace the means to own cars and motorcycles. Hence, roads were built without dire attention to standard, making road traffic a major problem. Consequently, the roads grew to be a death trap for Nigerian citizens. In Sokoto State, the story is not different as people continue to own cars and motorcycles; people keep on traveling through commercial buses to carry out their businesses and so the roads are getting busy day by day and especially during the festive period. Accident is a sudden occurrence which is beyond human control. Road accident do not simply occur, they are caused. They are basically brought about by human recklessness, carelessness or negligence hence the Federal Road Safety Commission (FRSC) renamed it as Road Traffic Crashes. According to Gungul (2012) "Road traffic accident is an unexpected phenomenon that occurs as a result of the use or operation of vehicles including bicycles and handcarts on the public highways and roads". Emiola and Jimoh (2009) define accident as unforeseen and often disastrous events of chance occurrences usually producing unexpected and unpleasant consequences. Road accidents have taken away so many lives in Nigeria that hardly does any disease matched it mortality rate (Gungul,

2012).Odeleye (2002), point the picture of road traffic environment in Nigeria as an environment dominated by abundant combination of largely illiterate of experienced, drunk, over confident drivers, unconcerned about the lives of other road users, know nothing more than rudiments of moving a vehicle and sounding their horns with reckless abandon, ostensibly to attract passengers, meanwhile operating poorly maintain vehicles on high quality but poorly designed and ill-maintain roads. Anyata (2009) showed that inadequate drainage could render the road a serious accident threat. Owatunmise (2008) affirmed that Road Safety is not a war that any government agency can win alone; it requires objective and transparent collaboration among all stakeholders.

Material and Method:

National Bureau of Statistics has compendium statistics from which the data for this study was collected on the reported cases of road traffic accident in Sokoto State (1992 to 2007). The problem of road traffic accident over the period under study has taken so many lives. It has kept so many on the hospital bed and has caused serious damage to properties. This paper is aimed at determining if there is a significant difference between the casualties (Fatal, Serious, Minor and also between the blocks (years) using analysis of variance (ANOVA)and then offer possible suggestions to minimize cases of road accidents.

CAUSES OF ROAD TRAFFIC CRASHES

The following are the factors leading to road traffic crashes with the Federal Road Safety Commission (FRSC) accepted code.

FACTORS	CODE
Over-Speeding	SPV
Dangerous Driving	DGD
TyreBurst	TBT
Brake Failure	BFL
Fatigue	FTQ
Dangerous Overtaking	DOT
Loss Of Control	LOC
Stationary Vehicle/Obstruction	OBS
Sleeping On Stirring	SOS
Route Violation	RTV
Light Sign Violation	LSV
Night Journey	NTR
Driving under Alcohol/Drug	DAD
Poor Weather	PWR
Mechanical Deficient Vehicle	MDV
Bad Road	BRD
Over Loading	OVL
Traffic Light Violation	TLV
Use of GSM Phones while Driving	UPD

Source: FRSC

EFFECT OF ROAD TRAFFIC ACCIDENTS

The effect of road traffic accidents cut across the family, the society and nation at large. The family of the accident victims may suddenly have to grapple with the loss of their breadwinner or be forced to take care of the victim who has suddenly become crippled for life. In some cases family may also have to contend with the huge medical bills to pay as a result of hospital care given to their love ones. Also variable manpower is cost because of the accident, the company where the vehicle is employed is forced to find a replacement through the period the victim is hospitalized some companies are also required to pay part, if not all of their employees medical bills. This constitutes a financial burden on company. It is therefore important that road traffic accidents are brought to a barest minimum. Road accidents have taken away so many lives in Nigeria today that hardly does any single disease match its mortality rate. This is only one of many adverse consequences of road accidents which also cause a lot of injuries as well as economic losses in all its ramifications. Before we can adopt a course of actions to reduce the number of severity of roads accidents we need a large amount of data which have to be analyzed and interpreted. Some of these obtained for this purpose include data on number and severity of accidents in years and the contributory factors. Corps Marshal of the Federal Road Safety Corps (FRSC), Mr. Osita Chidola disclosed at the 2012 special marshals Sectoral Workshop, Sokoto State Command that fifty persons died in road traffic accidents in Sokoto, Kebbi and Zamfara in the space of two months. He reaffirms *that no* disease is killing people in the country like road traffic accidents and this is a source of concern to stakeholders.

HYPOTHESIS

Null hypothesis $H_{0(1)}$: There is no significant difference between the casualties

Alternative hypothesis $H_{0(1)}$: There is a difference between the casualties (treatments)

$H_{0(2)}$: There is no significant difference between the blocks (years)

$H_a(2)$: There is a difference between the blocks (years)

Level of significance: $\alpha = 0.05$

Test statistic: F statistic

DECISION CRITERION

Reject H_0 if $F_{cal} > F_{\alpha,0.05}$, otherwise accept the alternative hypothesis.

ANALYSIS

To test for the differences between the road accident cases (fatal, Serious and minor), two way analysis of variance was carried out using MINITAB (statistical software). The following is the extracted data and output of the analysis.

DATA ON ROAD TRAFFIC ACCIDENTS IN SOKOTO STATE

S/N	YEAR	FATAL	SERIOUS	MINOR
1.	1992	172	157	110
2.	1993	109	95	38
3.	1994	128	123	63
4.	1995	26	23	7
5.	1996	46	88	33
6.	1997	122	28	23
7.	1998	83	55	66
8.	1999	78	67	10
9.	2000	50	46	6
10.	2001	21	13	5
11.	2002	117	63	22
12.	2003	5	4	0
13.	2004	20	17	14
14.	2005	94	53	228
15.	2006	108	24	1
16.	2007	128	1	0

Source: National Bureau of Statistics.

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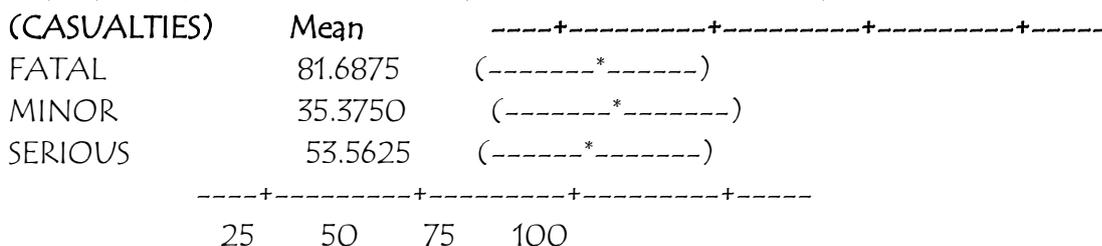
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Two-way ANOVA: COUNTS versus TREATMENTS (CASUALTIES), BLOCKS (YEARS)

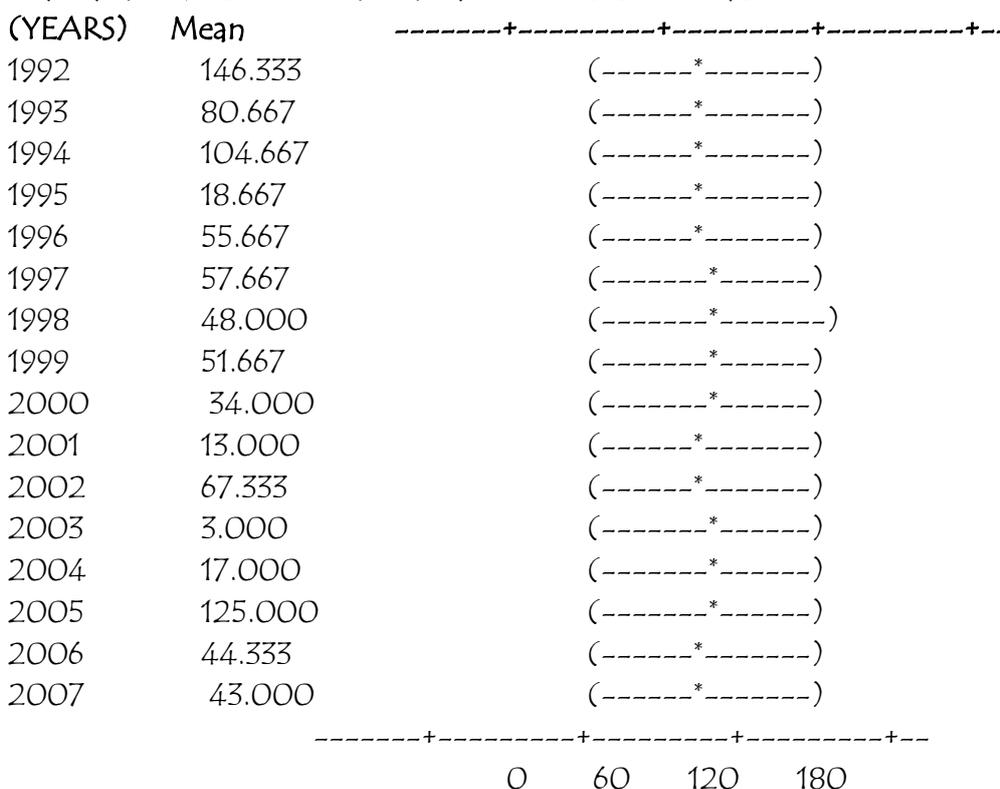
Source	DF	SS	MS	F	P
TREATMENTS (CASU	2	17422	8711.06	5.98	0.007
BLOCKS (YEARS)	15	73385	4892.35	3.36	0.002
Error	30	43722	1457.40		
Total	47	134529			

S = 38.18 R-Sq = 67.50% R-Sq (adj) = 49.08%

Individual 95% CIs For Mean Based on TREATMENTS Pooled StDev



Individual 95% CIs for Mean Based on BLOCKS Pooled StDev



DISCUSSION OF RESULTS

From the analysis, we could observe that the

$F_{cal} > F_{\alpha 0.05}$, i.e.

For the treatment $F_{cal} = 5.98 > F_{\alpha 0.05, 2, 30} = 3.32$

For the block $F_{cal} = 3.36 > F_{\alpha 0.05, 15, 30} = 2.01$

Therefore, we reject the null hypothesis and conclude that there is a significant difference between the casualties and between the years. Hence further tests are carried out to find out where the difference lies. From the multiple comparison test carried out, it was observed that out of the three levels of casualties, FATAL was found to be highly significant as it falls between the ranges of 75 to 100 at 81. SERIOUS cases were found to be significant as it falls on 53 between the ranges of 50 to 75. MINOR was the lowest as it falls at 35 between the ranges of 25 to 50. For the block, result shows that 1992 had the

highest road traffic crashes which is highly significant. 2005 follows with about 125 crashes in the year which is also significant. And lastly 1994 recorded 104 crashes in the year. From the analysis, It was also found that a significant difference exist between the casualties (treatments) and between the years (blocks) which lead to the rejection of null hypothesis and the acceptance of the alternative hypothesis. A multiple comparison test was at the same time carried out, and the result showed us the exact position of the mean of the various levels of the treatments and the blocks on 95% confidence interval scale. Fatal is the highest, with a mean of 81.6875. Serious is the second highest with a mean of 53.5625 and lastly is the minor with a mean of 35.3750 on the scale. For the years (blocks), 1992 recorded the highest on the scale with 146.3 cases followed by 2005 and 1994.

CONCLUSION

In conclusion, it is important to note that road accidents some times occur unexpectedly, but in most cases they are caused by human recklessness, carelessness or negligence, it can be prevented or reduce if all road users decides to obey road safety conditions and make proper use of the road signs.

RECOMMENDATIONS

- Private owned mass transit operators should, as a matter of urgency, introduce and operate comprehensive maintenance and repair programme for their vehicles.
- The FRSC official must ensure that only licensed Driver's operate and those without license must be forced to obtain it.
- Any person found driving dangerously must be fine accordingly, whatever his personality. .
- There is need for the government at various levels to pay sufficient attention to the maintenance of roads in the federation.
- Traffic laws must be enforced by various law enforcement agencies fairly and justly for cases such as driver under drug influence or alcohol, inexperience, ignorance of road traffic signs, etc. because experience has shown that in countries where enforcement has been adequately provided, road traffic accidents have been well reduced.
- FRSC staff should ensure that motorist in the state avoids over -loading , over speeding and route violation as it constitute a major factors to road traffic crashes in Sokoto state and Nigeria at large.
- The FRSC should continue to organize enlightenment campaign on issues relating to road safety in motor parks, public places, media etc. from time to time.

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