

# Assessment of Seat Belt Usage by Drivers and Front Seat Passengers at DSC Round-About in Effurun Delta State, Nigeria

Farouq A.U.<sup>1</sup>, Adebayo A.B.<sup>2</sup>

<sup>1,2</sup>Industrial Safety and Environmental Technology Department, Petroleum Training Institute, P.M.B., 20 Effurun, Delta State, Nigeria

**Abstract**—Investigation of seat belt usage by Drivers and Front Seat Passengers at Delta Steel Company (DSC) Round-About in Delta State, Nigeria was carried out. Buses and Cars as were the only target vehicles for the observational study. Physical observation of vehicles and occupants was conducted in three shifts: Morning (7.00 am to 8.00 am), afternoon (2.00 pm noon to 3.00 pm) and evening (5.00 pm to 6.00 pm). The information was captured and analysed. Results revealed total of 6039 out of 10, 000 Drivers, 60.39% were in compliance (Belted), 4719 Front Seat Passenger (FSP), 47.19% out of 10, 000, were in compliance (Belted) in Buses and Cars combined. And 40.6% Drivers compliance and 28.50% FSP compliance in Buses, 80.52% Drivers compliance and 66.07% FSP compliance to the use of seat belt in Cars. It was concluded that seat belt usage at DSC Round- About was just above average with Drivers and FSP in cars having higher compliance than Drivers and FSP in Buses. And was a significant relationship between compliance to seat belt use and the vehicle type in both the Drivers and FSP. It is recommended that seat belt survey be undertaken where FRSC personnel will be physically present.

**Keywords**— Seat, Belt, Drivers, Front- Seat, Passengers, Effurun.

## I. INTRODUCTION

Records have shown that even though the African Region holds only 2% of the world's vehicles, it adds 16% to the global accidents fatalities. The Countries with the highest death rates are Nigeria (33.7 deaths per 100000 population) and South Africa (31.9 deaths per 100 000 population) per annum in the region. For every four fatalities recorded in Africa, more than one of these fatalities happened on Nigeria's roads, together with six other countries (Democratic Republic of Congo (DRC), Ethiopia, Kenya, South Africa, Tanzania, and Uganda) are accountable for 64% of all road deaths in the region. Countries like Ethiopia, Kenya, and Tanzania have to some extent, low (for the region) road death rates; this is in contrast to some countries like Nigeria, South Africa, and Uganda because of their large populations and very high fatality rates, which gives rise to high numbers of deaths. As part of steps to reduce these death rates, these seven countries must device a means for curbing road deaths to a large extent (Road safety in the WHO African Region, The facts 2013).

The Nigeria legislation for Seat-belt compliance in front seats and rear seats came into being in 1997; nevertheless, the enforcement of this legislation concerning seat belts usage in front seats only commenced in 2002. The enforcement pertaining seat belts usage in rear seats was to commence in 2015 (ITRAD, 2014).

In the United States, seat belt compliance has indicated increasing tendencies from 1995, side by sides with continuous reduction in the proportion of unrestrained passenger vehicle (PV) occupant fatalities during daytime. Seat belt compliance for occupants in heavy traffic increased considerably from 89% in the year 2012 to 90% in the year 2013. Similarly, seat belt compliance for occupants in the Northeast increased considerably from 80% in 2012 to 84 % in the year 2013. Seat belt compliance continued to be higher in the States in which vehicle occupants can be stopped exclusively for not complying with seat belts usage ("primary law States") as compared with the States with weaker enforcement laws ("secondary law States") or without seat belt laws (Pickrell and Liu, 2014). "Seat belt use is the single most effective means of reducing motor vehicle crash injuries and deaths. According to the Nebraska Office of Highway Safety, in 2014, 189 motor vehicle occupants were killed, 14,531 injured and 57,188 had no injury due to a motor vehicle crash. Of those killed, 70% were not wearing their seat belt. Of those not injured, 83% were wearing their seat belt. Observed seat belt use in Nebraska has remained level from 2012 through 2014" ([www.dhhs.ne.gov](http://www.dhhs.ne.gov)).

Seat belt compliance research revealed "Adults age 18-34 are almost 10% less likely to wear a seat belt than adults 35 years or older, Men are 10% less likely to wear seat belts than women and Adults who live in rural areas are 10% less likely to wear seat belts (78% use) than adults who live in urban and suburban areas (87% use) are some of the factors affecting seat belt use" "Using a seat belt on every trip is the most effective way to prevent injury and death. Seat belt use reduces serious injuries and deaths in crashes by 50%. Air bags provide added protection but are not a substitute for seat belts in a crash. Seat belt use is higher in states that have primary enforcement laws (88%) than in those states that do not have them (79%). In 2009, about 12,000 more injuries would have been prevented and about 450 more lives saved if all states had primary enforcement seat belt laws. In 2010, 19 states—where 1 in 4 adult Americans live—did not have a primary law" ([www.cdc.gov](http://www.cdc.gov)). Ogunnaike and Adewole, (2017), revealed that incidence of road traffic accidents was very high in drivers that rarely use seat belt when compared with the drivers that use seat belt frequently.

Though there was no substantial statistical correlation between seat belt use and fatality of road traffic accidents, there was declining death resulting from injuries sustained in

road traffic accidents in 2009 and 2012. At this period there was a rise in seat belt compliance due to intensified campaigns of enlightenment on the importance of seat belt use by Federal Road Safety Corps of Nigeria (Akinbami, 2013). Seat belt usage in Nigeria is improving over the years, but more needs to be done in the areas of enforcement, particularly in the nights and early mornings (Popoola et al., 2013).

The percentage compliance to seat belt usage in five out of the six geopolitical zones of Nigeria was low ranging from 58 % level of compliance for cars to 60% for buses and trucks. The remaining geopolitical zone, the North East was excluded as a result of the insurgency problems ravaging the area. Their study further, revealed a declining compliance level during the weekend which could be attributed to the fact that the Federal Roads Safety Corps patrols were more on some routes than others (Stephens et al., 2015).

A study of seat belt compliance conducted in University College Hospital Ibadan Nigeria revealed total seat belt use in the whole study area to be 16.5% and that of Drivers alone to be 18.9%. These values were very low, particularly, considering the fact that there is an existing legislation compelling vehicles occupants and drivers to use seatbelts (Sangowawa et al, 2005). A study on the use of seat belt by Nigerian Drivers revealed that there was very low compliance in commercial Drivers to the use of seat belt. Whereas the compliance level to the use of seat belt by private vehicle Drivers was high about 80% (Ismaila and Akanbi, 2010).

Another study of Seat belt usage by Drivers and FSP coming in to and or going out of Petroleum Training Institute Effurun revealed an above average compliance though not up to the compliance in developed Countries range. Drivers have higher compliance level than FSP and the compliance obtained at Access Gate was higher than that of Main Gate (Farouq and Newborn, 2017). This above average compliance results was obtained where there was no law enforcement agents like Federal Road Safety Corps (FRSC).

Considering the above scaring statistics about road deaths, its suffices here to investigate seat belts usage by Drivers and Front Seat Passengers (FSP) on a constant traffic dominated Delta Steel Company (DSC) Round-About in Delta state, Nigeria, using Buses and Cars as only target vehicles for the observational study.

II. METHODOLOGY

A physical observation of vehicles and occupants was done from Monday, 11<sup>th</sup> April 2016 to Monday, 25<sup>th</sup> April 2016 in three shifts: Morning (7.00 am to 8.00 am), afternoon (2.00 pm noon to 3.00 pm) and evening (5.00 pm to 6.00 pm). The information was captured on datasheets specifically designed for the study. Each datasheet was designed to capture the date and time of observation, type of vehicle, usage of seat belt by the drivers and front seat passengers.

III. RESULTS

A total of ten thousands (10,000) of vehicles (both cars and buses) were directly observed for seat belt on or not. Out of the 10,000 vehicles observed, 4975 were private cars and 5025 were commercial buses. Total of 6039 out of 10, 000 Drivers,

were in compliance (Seat belt on), 4719 Front Seat Passenger (FSP) out of 10, 000, were in compliance (Seat Belt on).

TABLE I. Seat belt usage by drivers and front seat passengers.

Vehicles Types	Vehicles Observed	Drivers' Seat belt On	FS Passengers Seat belt On	Drivers Compliance (%)	FS Passengers Compliance (%)
Buses	5025	2033	1432	40.46	28.50
Cars	4975	4006	3287	80.52	66.07
<b>Buses / Cars</b>	<b>10000</b>	<b>6039</b>	<b>4719</b>	<b>60.39</b>	<b>47.19</b>

The results revealed 40.6% Drivers compliance and 28.50% FSP compliance to the use of seat belt in Buses. Furthermore, the results revealed 80.52% Drivers compliance and 66.07% FSP compliance to the use of seat belt in Cars. Compliance was higher in Cars for both the Drivers and FSP than in Buses.

Generally, for the whole study area, there was 60.39% overall (Buses and Cars) Drivers compliance and 47.19% FSP compliance (Buses and Cars).

Hypothesis I

The null hypothesis;  $H_0$ = seat belt compliance by Drivers is independent of vehicle type

TABLE II. Contingency table on drivers.

Category	Seatbelt On	Seatbelt Off	Total
Drivers (Bus)	2033	2992	5025
Drivers (Cars)	4006	969	4975
<b>Total</b>	<b>6039</b>	<b>3961</b>	<b>10000</b>

The chi-square statistic is 1677.5962. The  $p$ -value is < .00001. The result is significant at  $p < .05$ . The coefficient of contingency C is 0.379024; Then 0.05 critical value was obtained using Excel to be 0.773864, since the chi-square statistic exceeded the 0.05 critical value, there is a degree of relationship, association or dependence between vehicle types and seat belt compliance. Hence, the null hypothesis;  $H_0$  of independence was rejected and it was concluded that, seat belts compliance by Drivers was contingent upon the type of vehicle.

Hypothesis II

The null hypothesis;  $H_0$ = seat belt compliance by FSP is independent of vehicle type

TABLE III. Contingency table on FSP.

Category	Seatbelt On	Seatbelt Off	Total
FSP (Bus)	1432	3593	5025
FSP (Cars)	3287	1688	4975
<b>Total</b>	<b>4719</b>	<b>5281</b>	<b>10000</b>

The chi-square statistic is 1416.1558. The  $p$ -value is < .00001. The result is significant at  $p < .05$ . The coefficient of contingency C is 0.352205; Then 0.05 critical value was obtained using Excel to be 0.865497, since the chi-square statistic exceeded the 0.05 critical value, there is a degree of relationship, association or dependence between vehicle types and seat belt compliance. Hence, the null hypothesis;  $H_0$  of independence was rejected and it was concluded that, seat

belts compliance by FSP was contingent upon the type of vehicle.

#### IV. DISCUSSION

The high Drivers compliance recorded in Cars (80.52%) was in strong agreement with the results obtained by Ismaila and Akanbi, (2010) of 80% in Abeokuta Ogun State and that obtained by Farouq and Newborn, (2017) of 79.61% in Effurun Delta State. This result suggests slight improvement when compared with the study by of Farouq and Newborn (2017), which could be as a result of this study area (DSC Round-About) being a regular patrol axis for some law enforcement agents. Seat belt compliance continued to be higher in the States in which vehicle occupants can be stopped exclusively for not complying with seat belts usage ("primary law States") as compared with the States with weaker enforcement laws ("secondary law States") or without seat belt laws (Pickrell and Liu, 2014).

The results of compliance in Buses as low as it was, (40.6%), it is still higher than 33.33% compliance recorded (Access Gate) in Buses by Farouq and Newborn (2017), which could be as a result of the perceived presence of law enforcement agents around DSC most of the times.

The Driver overall compliance of 60.39% obtained in this study was higher than the 52.3% Driver compliance obtained in Edo State by Iribhogbe et al, (2008) and the compliance reported by Mohammadi *et al*, (2015) of 58% of the drivers in Iran, but far less than 98% Driver compliance in England and Scotland (Mais, 2015).

Though slightly above average, the overall Driver compliance of 60.39% and FSP Compliance of 47.19% is much higher than that obtained in University College Hospital Ibadan Nigeria, where seat belt use in the whole study area was 16.5% and that of Drivers alone was 18.9% (Sangowawa et al, 2005); and much higher than the 33.4% reported by Densu, (2013) in his study of seat belt use in the Sekondi-Takoradi Metropolis, Ghana, but it fell lower than the range for developed Countries (Bigic et al., 2015).

The Front Seat Passenger compliance Of 47.19% obtained in this study was less than the FSP compliance of 53.92% revealed in the study conducted by Farouq and Suru (2016), but much higher than 10.2% reported by Densu, (2013).

#### V. CONCLUSION

Conclusively, seat belt usage at DSC Round- About was just above average with Drivers in cars having higher compliance than Drivers in Buses. At the time FSP in Cars are more compliant than FSP in Buses. And there is significant relationship between compliance to seat belt use and the vehicle type in both the Drivers and FSP.

#### VI. RECOMMENDATION

It is recommended that survey of this nature be undertaken in conjunction with FRSC where the personnel of FRSC will

be physically present in order to find out the impact of enforcement on compliance levels.

#### REFERENCES

- [1] B. O. Akinbami, "The role of seat belt in the prevention of fatalities and determination of fatality index of road traffic accidents in Rivers State, Nigeria," *The Nigerian Health Journal*, vol. 13, no. 4, pp. 158-165, 2013.
- [2] S. Bilgic, H. B. Barut, M. Karacasu, A. Er, and P. Yaliniz, "The changes in usage of seat belts in Antalya, Turkey," *Procedia Social and Behavioral Sciences*, vol. 20, pp. 588-593, 2011.
- [3] S. N. Densu, "Occupant protection: Observed seatbelt use in Sekondi-Takoradi Metropolis (STM), Ghana," *International Journal of Structural and Civil Engineering Research*, vol. 2, issue 4, pp. 201-212, 2013.
- [4] A. U. Farouq, and C. O. Newborn, "Compliance with seat belt use by drivers and front seat passengers in petroleum training institute, effurun, Delta State, Nigeria," *Scientific Research Journal (SCIRJ)*, vol. V, issue XII, pp. 25-30, 2017.
- [5] A. U. Farouq and H. U. Suru, "Seat belt survey along petroleum training institute road (PTI -Road) effurun, Delta State," *Journal of Multidisciplinary Engineering Science and Technology (JMEST)*, vol. 3 issue 3, pp. 4308-4313, 2016.
- [6] P. E. Iribhogbe, "Compliance with Seat Belt Use in Benin City, Nigeria," *Pre-hospital and Disaster Medicine*, vol. 23, no. 1, pp. 18, 2008.
- [7] S. O. Ismaila and O. G. Akanbi, "Study on the use of seat belt by Nigerian drivers," *Australian Journal of Basic and Applied Sciences*, vol. 4, issue 3, pp. 494-497, 2010.
- [8] ITRAD, (2014): Road Safety Annual Report 2014, International Traffic Safety Data and Analysis Group, pp. 384
- [9] D. Mais, Seat Belt and Mobile Phone Use Surveys: England and Scotland 2014, Department for Transport, Statistical Release, 25 February 2015, pp. 34, Available at: [www.gov.uk](http://www.gov.uk)
- [10] M. Mohammadi, A. A. Moghaddam, M. Rad, R. H. Habybabady, and M. A. Tabasi, "Seatbelt use and related factors among drivers involved in road crashes in Southeast Iran," *Health Scope*, vol. 4, issue 4, pp. 51-55, 2015.
- [11] A. A. Ogunnaike and D. A. Adewole, "Risk factors of road traffic accidents (RTAs) among commercial inter-state drivers in Lagos State, Nigeria," *Global Journal of Medical Research (K) Interdisciplinary*, vol. XVII, issue 5, version 1.0, pp. 21-26, 2017.
- [12] T. M. Pickrell and C. Liu, *Seat Belt Use in 2013 – Overall Results*, 2014, (Traffic Safety Facts Research Note, Report No.DOT HS 811 875), Washington, DC: National Highway Traffic Safety Administration.
- [13] S. O. Popoola, K. S. Oluwadiya, J. N. Kortor, P. Denen-Akaa, and N. O. C. Onyemaechi, "Compliance with seat belt use in Makurdi, Nigeria: An observational study," *Annals of Medical & Health Sciences Research*, vol. 3, issue 3, pp. 427-432, 2013.
- [14] A. O. Sangowawa, S. E. U. Ekanem, B. T. Alagh, I. P. Ebong, B. Faseru, O. Uchendu, B. J. Adekunle, V. H. S. Shaahu, A. Fajola, and G. I. Ogbole, "Use of seatbelts by vehicle occupants in university college hospital, (U.C.H) Ibadan, Nigeria," *Annals of Ibadan Postgraduate Medicine*, vol. 3, no 2, pp. 57-62, 2005.
- [15] M. S. Stephens, I. C. Ogwude, and W. I. Ukpere, "Empirical analysis of road safety policy adherence in Nigeria: Seat belt use," *Risk Governance and Control: Financial Markets and Institutions*, vol. 5, issue 4, pp. 233-242, 2015.
- [16] The Facts (2013): Road Safety in the WHO African Region, Available at [www.who.int/violence\\_injury\\_prevention/road\\_safety.../2013/.../factsheet\\_afro.pdf](http://www.who.int/violence_injury_prevention/road_safety.../2013/.../factsheet_afro.pdf), Pg.3
- [17] [www.dhhs.ne.gov/search/pages/Results.aspx?k=seat belt](http://www.dhhs.ne.gov/search/pages/Results.aspx?k=seat%20belt) Accessed 22<sup>nd</sup> February 2018
- [18] [www.cdc.gov/](http://www.cdc.gov/)