Effectiveness of Seatbelt Law in Ghana; A Case Study on its Implementation in Tarkwa Nsuaem Municipality

Anthony Simons and Isaac Edunyah
University of Mines and Technology

Author Note
Anthony Simons, Department of Mechanical Engineering, University of Mines and Technology. Isaac Edunyah, Department of Mechanical Engineering, Takoradi Polytechnic. Correspondence concerning this article should be addressed Anthony Simons, Department of Mechanical Engineering, University of Mines and Technology, P.O. Box 237, Tarkwa, Ghana. E-mail: remasd@yahoo.com / asimons@umat.edu.gh

Abstract
The use of seatbelt as a passive safety measure has the tendency to reduce accident injury severity during collision; as such several countries including Ghana have laws governing the use of seatbelt. In this work the effectiveness of seatbelt law in Ghana as a whole and Tarkwa Nsueam Municipality in particular was used as a case study. A survey was carried on 3676 vehicles. It was observed that seatbelt wearing rate in the Tarkwa Nsueam Municipality is approximately 46%. In conclusion it was noted that bus drivers and their front seat passengers are the categories of vehicles that have higher seatbelt rate in the municipality, this was because of the in-service training provided by the employers of these drivers and the strict seatbelt use law on the premises of the mining companies. Finally this research recommends that any measure to encourage seatbelt use in the country should be based on Engineering, Enforcement and Education.

Keywords: road traffic accident, injury severity, seatbelt, injury, municipal and collision.
Effectiveness of Seatbelt Law in Ghana; A Case Study on its Implementation in Tarkwa Nsuaem Municipality

The introduction of seat belts in cars and car derivations (light commercial vehicles) are part of passive safety measures aimed to reduce occupancy injuries during road traffic accident (Marphetia, 2006). Also seatbelts are used to prevent the body from being hurled forward when the vehicle is stopped suddenly. The force involved in hurling a body when a vehicle is stop suddenly may be as high as 10000 Newton at impact speed of 30 mph (49.5 km/h) [6].

In most advance countries the use of seatbelt has been proven to reduce between about 80-90% of occupancy injuries (Abdulla, 2013). According the National Highway Traffic Safety Administration NHTSA, USA, (Anon. 2001), in 2001 alone, 13,274 lives were saved in crashed through the use of seat belts and an estimated 7,334 lives could have been saved during the same time period, had all occupants used seatbelt.

In the United Kingdom, the Department of Transport (DoT) estimates that since the wearing of seat belt in front seats became a legal requirement in 1983, about 200 deaths and 7000 serious injuries have been avoided each year [4]. According to the UK Department of Transport figures, in a collision at 30 mph (49.5 km/h), an adult back seat passenger is thrown forward with a force of three and half tons-equal to the weight of an elephant.

According to Alaa, Ashraf, and Fikri, (2011), there are three types of ‘collision’ that occur during a road traffic accident where occupants are not restrained, and these have been categories as; type 1, type 2 and type 3 collusion.

Type 1: this type of collision occurs when a vehicle and other object collide, example vehicle colliding with another vehicle, or stationary object like tree, signpost, human being or animal.

Type 2: the collusion under this category occurs when unbelted occupant collide with the interior of the vehicle. Example, a driver hitting his chest with the steering wheel or his uppertorso with a window.

Type 3: this occurs when the impact of the accident affect the internal organs of the occupants.

In Ghana, the road traffic act was enacted in 2004 and article 683 section 13 a and b of this law states “that a person of age 18 years or above who drives a motor vehicle on road or sit on the front or rear seat of a motor vehicle being driven on a road without wearing seatbelt commit an offence liable on a summary conviction to a fine not exceeding 100 penalty points or imprisonment for a term not exceeding 6 month or both” [7]. The law also makes it a mandatory for all persons between the ages of five and eighteen who sit on the front seat of a vehicle to wear a seatbelt. This work therefore seeks to evaluate the effectiveness of the seat belt law in Tarkwa Nsuaem municipality ten years after the enactment of the law in Ghana.

A survey was carried out in the Tarkwa Nsueam to ascertain the effective use of seatbelt. Methods adopted for data collection were; roadside count, questionnaires and interviews. Two research assistants were positioned at vantage points for the road side count.

In all 3675 vehicle were counted along the road, about 150 questionnaires were sent out and one hundred and fifty (150) people including law enforcement agencies interviewed.

Data Collection and Analysis of Result

A total of about 3675 vehicles were counted during the roadside counting, majority of the vehicles were counted during the morning and evening rush hours. Most of the cars counted were, taxis, pickups/private, mini-buses, buses, cargos and articulator trucks. Table 1, shows the categories of cars counted during the exercise and the corresponding number of people wearing seatbelt in each category.
It could be seen from figure 1, that the worst offenders of the law are the occupants of articulator trucks, follow by cargo, taxi drivers and pickup/private drivers. 73 and 67% of this drivers are bus and minibus drivers. This is as a result of the fact that most of these buses counted belong to third party Transport Company working for some of the mining companies in the municipality, these companies have strict policy governing the use seatbelt on their premises and this could reflect in the increase wearing rate in bus drivers and their front seat passengers, also the mini-buses (trotro) that ply long distances put on their seatbelt for the fear of the police on the road.

**Analysis from the Questionnaire.**

One hundred and fifty questionnaires were administered and the figure 2. Gives clear presentation of the usage of seatbelt from the survey.

**Analysis from the Interview**

About 150 people were interviewed at random and these include drivers, passengers and other road users, the following were the reasons given for not wearing seatbelt. Discomfort, intermittent stoppage, irrelevant of seatbelts, dirty seatbelts, restriction of movement by the belt, unavailability of seatbelt, pain and forgetfulness and lack of education on usage. Figure 3, gives the percentage of the interviewees and their responses to the reasons for not wearing seatbelt. Furthermore, respondents were asked of their opinion on the importance of wearing seatbelt and their views are depicted in table 2.

It could be seen from Table 2 that whilst only 3.33% of the respondents disagreed to the importance of wearing of seatbelt, 73.33% and 83.33% agreed to injury severity reduction and compulsory usage of seatbelts respectively.

**Discussion**

The results from this study reveal that seatbelts wearing rate in Tarkwa Nsuaem Metropolitan is 46 percent. It was observed that most of the bus drivers in the metropolitan are employees of third party transport companies working for some of the mining companies in the catchment area. These mining companies have stringent rules governing the use of seatbelts on their premises for all their workers including those on contract, and that failure of any driver to wear seatbelt could result in the transport company losing its contract with the mining company.

Also the mining companies provide in-service training for all drivers including the third party drivers, all these factors motivate the drivers of buses to the use of their seatbelt. It was also detected that the drivers of mini-buses (trotro) who ply their trade outside the metropolitan and their front seat passengers are challenged to use the seatbelts because of the presence of the police on the road.

**CONCLUSIONS AND RECOMMENDATION**

**Conclusions**

This study shows that overall seatbelt usage in the Tarkwa Nsueam municipality was 46%.

The belt usage rate is in the descending order; buses 73%, mini-buses 67%, pick-up/private cars 45%, taxis 44%, cargo 29% and articulators 17%.

The research also revealed that 96% of all the reasons given for non-usage of seatbelt were human related which could be tackled by a behavioral change.

**Recommendations**

The authorities responsible for testing all vehicles in the country, the Driver Vehicle and Licensing Authority (DVLA) should ensure that before vehicle pass its road worthiness
examination, especially all vehicles that had undergone a body works, should have all the seatbelt fixed, to merit the issuance of road worthiness certificate.

The police and also the street warders should be empowered to enforce the road traffic law 2004 as enshrine in the constitution concerning the penalty point system, (GHs: 12.00 per penalty) by allowing them to give on the spot fine to all drivers and passengers found not wearing their seatbelt.

Finally, any measure to encourage seatbelt use in the country should be based on Engineering, Enforcement and Education.

**Limitation**

The study did not take rear seat passengers into consideration in the sense that most cars in the country did not have rear seatbelt installed in them. There are so many reasons why some cars in the country do not have seatbelt in them. It was also difficult to have any statistic in the country that shows the correlation between non seatbelt usage and injury severity. It is recommended that another research could look into this phenomenon.

**REFERENCES**


http://www.medicalnewstoday.com/articles/41499.php
Table 1
*Category/ type of vehicle and the usage rate of seatbelt by front occupants*

<table>
<thead>
<tr>
<th>Vehicle type</th>
<th>Number counted</th>
<th>Seatbelt worn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taxis</td>
<td>1650</td>
<td>715</td>
</tr>
<tr>
<td>Pick-up/private</td>
<td>720</td>
<td>325</td>
</tr>
<tr>
<td>Buses</td>
<td>550</td>
<td>400</td>
</tr>
<tr>
<td>Mini-bus</td>
<td>210</td>
<td>140</td>
</tr>
<tr>
<td>Cargo</td>
<td>225</td>
<td>65</td>
</tr>
<tr>
<td>Articulators</td>
<td>320</td>
<td>52</td>
</tr>
<tr>
<td>Total</td>
<td>3675</td>
<td>1670</td>
</tr>
</tbody>
</table>

Table 2
*Respondents Views on Importance of Wearing Seatbelt*

<table>
<thead>
<tr>
<th>ViewQuestion</th>
<th>Agree</th>
<th>Indifferent</th>
<th>Disagree</th>
<th>Total Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>wearing of seatbelt is important</td>
<td>65</td>
<td>10</td>
<td>5</td>
<td>150</td>
</tr>
<tr>
<td>seatbelt can reduce injury severity</td>
<td>30</td>
<td>22</td>
<td>18</td>
<td>150</td>
</tr>
<tr>
<td>use of seatbelt should be made compulsory</td>
<td>15</td>
<td>10</td>
<td>15</td>
<td>150</td>
</tr>
</tbody>
</table>

*Figure 1*. Percentage of Seatbelt Usage in the Various Vehicles
Figure 2. The Rate at Which Passengers Use Seatbelt.
Figure 3. Reasons for not Wearing Seatbelt