

The Awareness of Blind Spot Area in Heavy Goods Vehicle (HGV)



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Abstract: This paper is to demonstrate the awareness of blind spot area in heavy goods vehicles (HGV) towards the road user. A blind spot is an area or zone that cannot be directly observe by the driver. Usually, the weaknesses in the blind spot area resulted in accident between the vehicle as many drivers did not alert or have awareness on the blind spot area especially in heavy goods vehicle. The objective of this paper is to identify the awareness on the blind spot area in heavy goods vehicles to the road users. To achieve the objective, a questionnaire survey has been conducted to the road user. About 100 drivers randomly pick to answer the survey and they are consisting of non-truck drivers that drive a car, van and motorcycle. The results reveal that even the respondents know about the blind spot in heavy good vehicle, but the awareness in the of blind spot area still less where they mistake on the exact location of blind spot. Typically, the only zone that they know as the blind spot for heavy goods vehicle is at the back area. Therefore, it is suggested that the government to improve the awareness of blind spot areas within the drivers through restructure the system inside driving school by give more attention on the blind spot for heavy goods vehicle, make a campaign on the awareness of blind spot in heavy goods vehicle to remind again the road users about the area of blind spots, and establish a standard direct vision in heavy goods vehicle.

Keywords: Blind spot, heavy goods vehicle, drivers, accident

I. INTRODUCTION

Blind spots are the areas around a vehicle that a driver cannot see by looking through the windows or standards mirrors. This can result in a driver failing to notice hidden road users or hazards while maneuvering, which lead to fatal consequences [1]. Blind spot can exist through either in the front, rear and sides view of vehicles.

All vehicles have a blind spot. The larger vehicles are, the much bigger of their blind spot. Every year the automotive industry tries to find an alternative solution to solve blind spot issues for heavy goods vehicle because the percentage of injuries / death people fatality due to blind spot increase.

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As mention by [2], in order to mitigate the blind spot issues, a lot of efforts has been carried out by the automotive industry including cruise control, autonomous emergency braking with pedestrian monitoring, blind lane departure warning and blind spot monitor.

The blind spot issues in heavy goods vehicles in fact is a widespread issue. For example, in Holland (between 2005-2009), on average of nine cyclists die every year in blind spot accident involving heavy goods vehicles during turning right and in Germany (2012), 23 cyclists were killed in right-turn accidents with a heavy goods vehicle [3]. With the urbanization policy to promote cycling and walking in and around city, and continued construction and development, the issues of blind spot will be getting bigger if not handle carefully. Three main zone area as analyze by [3] that frequently happened accident involving heavy goods vehicle at United Kingdom are the front of the truck (when the truck pulls away), the left and the right side.

In 2005, a study conducted by [4] on endangerment of pedestrians and bicyclists at intersections demonstrate that the reason to the fatality or injury between the heavy goods vehicle and pedestrian or cyclist is the insufficient view to the right and front. This show that the awareness of blind spot area in heavy goods vehicle is crucial to prevent fatal accidents.

In Malaysia, data provided by Road Transport Department shows that accident involving heavy goods vehicle increase every year (refer Table 1) and based on the crash configuration, it is noted that most crash that relate with blind spot issues are side collision, sideswipe collision and collision where a vehicle is squeezed by another vehicle (refer figure 1, 2 and 3).

Table. 1 Statistics of accidents involving heavy goods vehicle

| Year | Type of accident | | | | |
|------|------------------|---------|--------|-------------|-------|
| | Fatal | Serious | Slight | Damage only | Total |
| 2009 | 662 | 392 | 500 | 15869 | 17423 |
| 2010 | 650 | 368 | 437 | 17280 | 18735 |
| 2011 | 605 | 222 | 336 | 16005 | 17168 |
| 2012 | 1087 | 485 | 661 | 34743 | 36976 |

Source: Royal Malaysia Police, 2013.

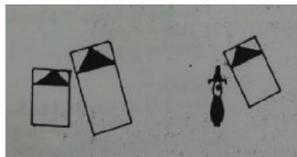


Figure 1 Squeezed

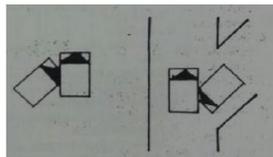


Figure 2 Angular/Side

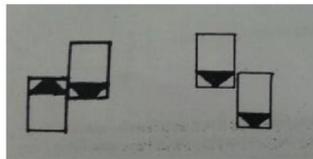


Figure 3 Side swipe

Source: Musa et al., 2017.

Table 2 meanwhile shows the statistics of accident between heavy goods vehicle and motorcyclist based on collision type and heavy goods vehicle type. From the statistics, it can be noted that most of the accidents were happened from the type of rigid lorry, while the frequent location of accident for heavy goods vehicle are at the straight road followed by T/Y junction and curvyroads (refer Table 3). These two results thus indicate why the study on the awareness of blind spot area is needed to conduct; to reduce the numbers of accident related with blind spot area in heavy good vehicle and to educate road users on the area of blind spot in heavy good vehicle.

Table. 2 statistics od accident between heavy goods vehicle and motorcyclist based on collision type and heavy goods vehicle type

| Collision type | Year 2009 | | | Year 2010 | | | Year 2011 | | |
|----------------|-----------|-------------|-------------|-----------|-------------|-------------|-----------|-------------|-------------|
| | Trailer | Rigid lorry | Small lorry | Trailer | Rigid lorry | Small lorry | Trailer | Rigid lorry | Small lorry |
| Angular/Side | 185 | 572 | 579 | 210 | 589 | 584 | 190 | 521 | 476 |
| Side swipe | 188 | 347 | 299 | 181 | 367 | 306 | 170 | 340 | 263 |
| Squeezed | 17 | 19 | 7 | 9 | 18 | 6 | 6 | 23 | 10 |
| Total | 390 | 938 | 885 | 400 | 974 | 896 | 366 | 884 | 749 |

Table. 3 Numbers of accident based on road design

| | Fatal | Serious | Slight | Damage only | Total |
|-----------------------|-------|---------|--------|-------------|-------|
| Straight | 285 | 130 | 167 | 910 | 1492 |
| Curve | 64 | 22 | 29 | 115 | 230 |
| Roundabout | 0 | 1 | 2 | 15 | 18 |
| Cross-junction | 39 | 10 | 23 | 131 | 203 |
| Junction T/Y | 77 | 46 | 66 | 478 | 667 |
| Staggered junction | 1 | 0 | 1 | 5 | 7 |
| Gradient intersection | 0 | 0 | 1 | 4 | 5 |
| Unknown | 5 | 3 | 3 | 6 | 17 |
| Total | 471 | 212 | 292 | 1664 | 2639 |

II. LITERATURE REVIEW

Over the last decades, researchers have focused on how to improving in the safety of indirect vision of heavy goods vehicle - the zone around the heavy goods vehicle that is visible through mirrors. The outcome from the research lead to implementing six mirror around the heavy goods vehicle cab [5]. Theoretically, the function of six mirrors are to eliminate a large part of blind spot area but unfortunately, too much mirror around the heavy goods vehicle provide a distorted image. Other than that, the truck drivers also need to check more than one mirror which often are not correctly adjusted. This is agreed by Loughborough Design School (LDS) that mention even the multiple mirrors implement, the blind spots zone issues still remain because the driver unable to see cyclists or pedestrians[6]. This conclude that the fitting of extra mirrors has not created the safety improvements as initilly expected.

According to [7], the shape of window apertures and the driver's view location in relation to these window apertures can reduce the size of the identified blind spots. For example, two different truck designs with the same cab height can have different results for blind spot size area due to window shape and driver seat location. Therefore, his study suggested the need for a new standard of window design and shape which defines what should be visible through direct vision from the vehicle.

[8] mean while conduct a research on the lorry-bicycle safety. In their findings, they identified several risk factors that lead to accident between the lorry and bicycle. Their findings state that the reason to the accidents are wrong assumptions about the lorry driver’s ability to observe the cyclist during manoeuvres, improper setting and usage of blind spot mirrors by lorry drivers and ignorance regarding blind spot zone by both cyclists and lorry drivers.

[9] in his study of analysis of sensor placement for vehicle’s blind spot detection suggested to use a device that will warn the truck driver about the incoming vehicles in the blind spot zone by blinking LED. The result from the study shows that the instalment of sensor above the rear truck tire give a good performance in term of truck driver alerts of the presence of vehicle at the blind spot zone.

[10] conducted a study to eliminate blind spot on heavy goods vehicles. The study shows that the catadioptric cameras – a integrated of mirrors and standard cameras can provide truck drivers with an image that allowing to observe the whole area of large goods vehicles and thus reduce fatal accidents, and helps drivers onmanoeuvring tasks.

III. METHODOLOGY

The objective of this study is to identify the awareness of road users towards the blind spot area in heavy goods vehicle. To achieve the objective, this study use self-administered survey among the road users that use Pasir Gudang Highway.

Around 100 respondents randomly pick to join this survey. From 100, 20 were who use motorcycle, 74 for those who use car and 6 were who use van.

IV. RESULT AND DISCUSSION

Table 5 shows the demographic details of the participants. A total of 100 respondents participated in the survey. The participants were overwhelmingly (82%) less than 50 years’ old with the majority of them were Malays (88%). Most of them (64%) also a male respondent.

Table. 5 respondent’s demographic

| Details | Percentage |
|-------------|------------|
| Age (years) | |
| 21-30 | 57 |
| 31-40 | 14 |
| 41-50 | 11 |
| Above 50 | 18 |
| Ethnicity | |
| Malay | 88 |
| Indian | 5 |
| Chinese | 5 |
| Others | 2 |
| Gender | |
| Male | 64 |
| Female | 36 |

The respondent then was asked about the awareness of the blind spot in heavy goods vehicle. From the survey, 84% of the respondent state that they know about the blind spot in

heavy goods vehicle and only 16% state that they don’t know. The respondent then was asked to identify which area that they think is the blind spot for heavy goods vehicle (refer figure 4).

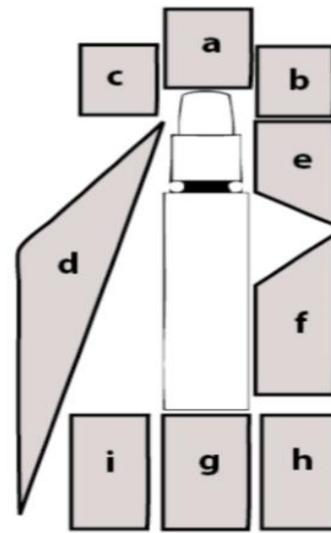


Fig. 4 Area of blind spot shown to respondent
Source: MIROS, 2017

The blind spot in figure 4 are the area of A D E G. From the answer (refer Table 6), all the respondent can acknowledge that G is the blind spot for heavy goods vehicles but the others area is mistaken. This can be concluded that even the awareness about the blind spot is there, but the knowledge on the area of blind spot is actually still less.

Table. 6 Result for blinds spot area

| Blind spot area | Percentage (%) |
|-----------------|----------------|
| A | 30 |
| B | 30 |
| C | 20 |
| D | 40 |
| E | 20 |
| F | 70 |
| G | 100 |
| H | 20 |
| I | 50 |

Another question that being ask is does the driving school did teach the respondent about the blind spot in heavy goods vehicle. This question being ask because driving school is the formal education before someone can get their vehicle license. Therefore, it is expected that such information is being delivered during the training session. From the answer (refer Table 7), 31% respondent state that they did learn about blind spot during driving school while 69% state that they did not discuss much/never discussed about this issue. This is something that need to be alert by government if the awareness about blind spot wants to be increased.

ACKNOWLEDGMENT

Table. 7 Result of driving school did teach the blind spot issue in heavy goods vehicle

| | Percentage (%) |
|---|----------------|
| Driving school did teach about blind spot in heavy goods vehicle. | 31 |
| Driving school did not focus a lot about blind spot heavy goods vehicle | 39 |
| Driving school never teach this issue during driving school. | 30 |

The last question is about the awareness on blind spot campaign (refer Table 8). The respondent was asked either they have heard about the campaign before or never heard about it. The results demonstrate that only 27% of the respondent have heard about the blind spot campaign while 73% either never/sometimes/not take any attention about this issue. The result thus justifies about the knowledge on the area of blind spot.

Table. 8 Awareness on blind spot campaign

| | Percentage (%) |
|--|----------------|
| Yes, I do hear about the blind spot campaign | 27 |
| I never hear about the blind spot campaign | 14 |
| I sometimes hear about the blind spot campaign | 51 |
| I think I do hear about blind spot campaign but I did not take any attention about it. | 8 |

V. CONCLUSION

From the survey conducted, it was found that there is a lack of awareness about the blind spot zone in heavy goods vehicle. The majority of the respondents only able to identify the back of a heavy goods vehicles as a blind spot zone whilst forget about others three critical area. This finding indicates a worrying level of blind spot related knowledge. Thus, this study recommends that the government to reconstruct back the system inside driving school by give more attention on the blind spot area in heavy goods vehicle. This step can help road user to aware and know a lot about blind spot area for heavy goods vehicle when drive near to heavy goods vehicle. Other than that, the campaign on the awareness of blind spot in heavy goods vehicle also need to be done to remind again the road users about the area of blind spot. Lastly, it is recommended that the government can introduce direct vision standard for heavy goods vehicle as currently there are no minimum requirements on how much of field of vision a heavy goods vehicle must be able to see by truck drivers.

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