

PREVENTING WORK-RELATED TRAFFIC ACCIDENTS INVOLVING HEAVY VEHICLES

Solutioning Session on 4 August 2016

Solutioning Session on Preventing Work-Related Traffic Accidents Involving Heavy Vehicles

Published in January 2017 by
Workplace Safety and Health Institute
1500 Bendemeer Road, #04-01
Ministry of Manpower Services Centre
Singapore 339946

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RPT - SS2 - 16

ISBN: 978 981 11 2350 4

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EXECUTIVE SUMMARY

According to statistics from Traffic Police, in 2015, the number of accidents involving heavy vehicles¹ resulting in fatalities or injuries rose by 5% compared to 2014, from 839 cases in 2014 to 877 cases in 2015².

The Workplace Safety and Health Institute (WSHI) in collaboration with the Workplace Safety and Health Council (WSHC) held the WSH Institute Solutioning Session – Preventing Work-related Traffic Accidents (WRTA) involving Heavy Vehicles on 4 August 2016 at Hall 1 of the Employment and Employability Institute (e2i) building.

40 participants from 15 organisations shared their views on the causes of WRTAs involving heavy vehicles and collectively, they explored possible solutions.

During the first session, the participants were divided into 5 discussion groups – 2 groups of heavy vehicle drivers and 3 groups of non-drivers made up of various stakeholders such as fleet supervisors, WSH officers, management executives, vehicle inspectors, and members of associations, etc. The participants were mainly from the Logistics and Transport and Construction sectors.

The participants identified fatigue, incentives relating to the payment structure, inadequate training and lack of awareness among other road users of blind spots due to the design of the heavy vehicles as probable causes for WRTAs.

Word cloud generated from discussion



Summary of possible causes

Areas	Causes	Views
Company Practices	Fatigue	Caused by <ul style="list-style-type: none"> Manpower crunch leading to unrealistic journey planning Long working hours
	Incentives	Pay-per-trip payment model resulting in reckless driving
	Training	Insufficient training
	Business Demands	Overloading vehicles to meet clients' demands
Individual driver characteristics	Culture	Difference in driving culture between local and foreign drivers
	Attitudes and behaviours	<ul style="list-style-type: none"> Not obeying traffic and company rules Distracted driving due to use of mobile devices Not buckling up Tampering with speed limiter
Other road users (3rd party)	Lack of awareness	Blind spots of heavy vehicles
	Attitudes and behaviours	Mind-set that they have right of way

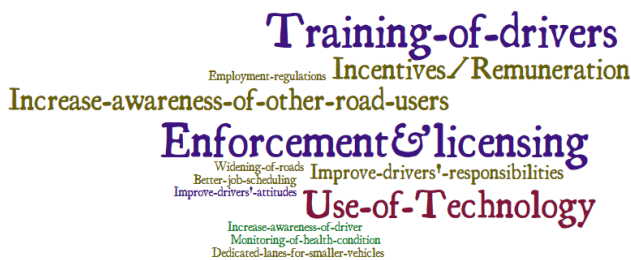
¹ Vehicles with unladen weight above 2,500 kg. Definition accessed from <https://www.wshc.sg/files/wshc/upload/cms/file/RoadSense.pdf>

²Data from Traffic Police via <http://www.channelnewsasia.com/news/singapore/more-accidents-involving/2706190.html>. Accessed on 5 May 2016

Areas	Causes	Views
Vehicle Designs	Blind spots	Multiple blind spots especially heavy vehicles with longer bodies or detached front and back body parts

The participants were then re-organised to brainstorm on possible solutions to lower the WRTA risks. The participants felt the use of technology, training, and linking training and proficiency to license to drive heavy vehicles could improve safety of the heavy vehicles.

Word cloud generated from the discussion



Summary of Solutions proposed

Party Involved	Solutions	Views
Company	Leverage on technology and labelling	<ul style="list-style-type: none"> Recording cameras on both front and back of the vehicle GPS systems, automated emergency braking system, etc. Blind spot warning stickers
	Review existing company policies and practices	<ul style="list-style-type: none"> Hybrid remuneration scheme with higher basic pay Reward for safe driving Ensure vehicle in good condition and speed limiter not tampered with
	Identify drivers' training needs	<ul style="list-style-type: none"> Defensive driving course Vehicle maintenance courses for drivers

Party Involved	Solutions	Views
Drivers of heavy vehicles	Improve on attitudes and sense of responsibility	<ul style="list-style-type: none"> Drivers themselves being responsible for their own safety and health as well as the safety of other road users Observe traffic rules and regulations Be a role model to other drivers
Other Stakeholders	Safe driving elements in driving tests	<ul style="list-style-type: none"> Relevant authority to incorporate as part of driving tests for issuance of license Refresher training with safety focus for licence renewals
	Better outreach and education for other road users	<ul style="list-style-type: none"> Awareness of blind spots because of vehicle design Educate other road users on how to avoid hazards posed by heavy vehicles
	National policies on heavy vehicle drivers	<ul style="list-style-type: none"> Provide more designated areas for drivers to take breaks Attract more locals to join the profession

It is hoped that these findings will serve to enable the Ministry of Manpower and the Workplace Safety and Health Council to work with partner agencies such as Ministry of Transport, Traffic Police, Singapore Road Safety Council, Land Transport Authority, as well as driving centres, unions and employers and employer associations to reduce WRTAs involving heavy vehicles in Singapore.

Solutioning Session on Preventing Work-Related Traffic Accidents Involving Heavy Vehicles

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INTRODUCTION



According to statistics from Traffic Police, in 2015, there were 877 accidents involving heavy vehicles which resulted in fatalities or injuries, a 5% increase from 839 cases in 2014.

In 2014 and 2015, 56 work-related traffic accident cases involving heavy vehicles were reported to the Ministry of Manpower (MOM).

Based on descriptions in the 56 incident reports^{1,2}, majority (66%) of these cases involved third party road users (i.e. collision with or avoiding collision with other road users or vehicles). 13% were attributed to vehicle faults, 9% were related to human factors such as delayed reflexes, poor judgment, losing control of vehicle and personal protective equipment-related accidents³ and the remaining 6% were from other causes^{4,5}.

Most accidents happened towards the end of the work day between 4 pm to 6 pm. Very few cases happened during night shift hours or during overtime work.

All cases involved male drivers, and 71% were in their first three years of employment with their current employer.

PURPOSE OF SESSION

The session allowed stakeholders from the entire value chain to collectively identify possible causes for WRTAs involving heavy vehicles and to brainstorm for possible solutions to reduce or eliminate these WRTAs.

¹ Text descriptions were coded to convert them to quantifiable data

² There could be more than 1 cause for cases reported

³ Example such as safety boots getting stuck in between the pedals

⁴ Other causes included work arrangements and environment

⁵ Remaining 6% had missing info, thus unable to ascertain the cause for the accident

METHODOLOGY



Fig.1: FGD in session

WSH Institute applied qualitative research methodology, with participants organised in discussion groups. A Participant's Information Sheet was made available in English and Chinese to explain participants' roles and to seek their informed consent for audio recordings during the session.

Three invitations were sent out by WSH Council to their industry committee members. The session was positioned as a WSH Institute Solutioning Session, organised in collaboration with WSH Council. The Solutioning Session was held on 4 August 2016 at the Employment and Employability Institute (e2i) building.

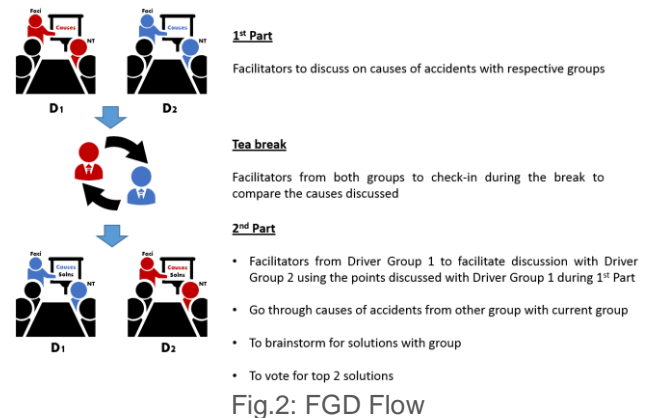
There were two parts to the session. During the first part, participants were organised by the following groups:

1. Heavy vehicle drivers (2 groups) from Logistics and Transport and Construction sectors, and
2. Non-heavy vehicle drivers (3 groups) made up of various stakeholders such as fleet supervisors, WSH officers, management executives, vehicle inspectors, and members of associations, etc.

The first half of the session gathered data on the participants' point of view on what they thought caused WRTAs involving heavy vehicles, focusing on the following areas:

- Company practices, such as job or working conditions
- Driver characteristics
- Heavy vehicle type or design
- Environment or road conditions
- Other road users (3rd party)

For the second half of the discussion, participants were presented with all the causes raised by different groups (see diagram below). They then brainstormed on solutions for these probable causes.



The discussion focused on the following 3 perspectives to glean feasible solutions to reduce WRTAs:

- What the company can do
- What drivers can do
- What other third parties or stakeholders can do

Participants were then asked to individually vote 2 solutions for implementation.

FINDINGS

15 heavy vehicle drivers and 25 non-drivers from 15 organisations participated in the Solutioning Session in response to WSHC’s invitation. The participants were mainly from the Logistics and Transport and Construction sectors.

Probable causes of WRTAs involving Heavy Vehicles

The following table summarises the probable causes leading to WRTAs involving heavy vehicles.

Table 1: Probable causes of WRTAs involving heavy vehicles

Company Practices	
Causes	Views
Fatigue	<ul style="list-style-type: none"> Manpower crunch faced by heavy vehicle companies. This led to unrealistic journey planning by fleet managers. In order to meet orders, the same driver may be asked to make multiple trips often in different areas within short periods of time. Fatigue caused by long working hours. Although drivers spend approximately five to six hours driving on the road, their daily work activities involved long hours of waiting and some even had to be on standby 24/7. This could lead to insufficient rest.
Incentives	<ul style="list-style-type: none"> Pay-per-trip payment model. This was perceived as one key cause for reckless driving as it made drivers rush to make more trips so as to earn more. <p>Despite the potential WRTA risks brought about by pay-per-trip practice, drivers viewed this practice as a motivating factor to continue driving and some shared that their income depended on the pay-per-trip scheme</p>

Training	<ul style="list-style-type: none"> Insufficient training. Training provided by some companies for their drivers may be insufficient. <p>Drivers mentioned that they were not trained in vehicle maintenance and were thus unable to identify any vehicle faults</p> <ul style="list-style-type: none"> Unfamiliarity with vehicle The type of vehicle used during training was different from the actual vehicle used at work.
Business demands	<ul style="list-style-type: none"> Emphasis on meeting clients’ demands. This was cited as a factor, leading to companies overloading their vehicles and compromising on safety measures
Individual driver characteristics	
Causes	Views
Culture	<ul style="list-style-type: none"> Difference in driving culture between local drivers and foreign drivers. Foreign drivers tend to apply their driving cultures back in their home countries while driving on Singapore roads.
Attitudes and behaviours	<ul style="list-style-type: none"> Mind-set that they are indispensable. This was likely due to the shortage of drivers. This mindset could lead to them not obeying traffic and company rules and acting based on what they perceived to be the preferred way of performing the task. Engaged in secondary activities while driving. This included using mobile devices which may reduce driving vigilance. Companies tolerant to overloading of vehicles. If companies pay for the fines incurred from overloading practices, this could lead drivers to be complacent and not report overloading. Not buckling up. Using safety belts was perceived as restrictive and could prevent them from escaping in the event of an accident. Lack of commitment towards training. Tampering with the speed limiter in the vehicles.

Vehicle Design	
Causes	Views
Blind spots	<ul style="list-style-type: none"> Design of vehicles. Certain types and designs of heavy vehicles, especially those with longer bodies or detached front and back body parts, have bigger blind spots. <p>These blind spots make it difficult for drivers to see vehicles, especially smaller vehicles, if they are in the blind spot zone.</p>
Environment or road conditions	
Causes	Views
Environment or road conditions	<ul style="list-style-type: none"> Uneven and wet roads and pot holes. This affects safety and could potentially contribute to WRTAs. Drivers tend to speed on expressways and roads. This is especially so early in the morning when traffic is usually not heavy.
Other road users (3rd party)	
Causes	Views
Other road users	<ul style="list-style-type: none"> Cyclists and other small vehicles such as cars are unaware of blind spots of heavy vehicles. They would often cut into the heavy vehicles' lanes. Due to the vehicles' size and length, the drivers are not able to see the smaller vehicles and may not be able to react in time. Lack of education on hazards posed by heavy vehicles. Other road users may not be aware of the blind spots and the need for increased braking time in view of its weight. Mind-set that they have the right of way.

The size of the words in the word cloud generated from the discussion notes depicts the frequency the various terms were mentioned in the group discussions. The issue of fatigue, incentives relating to remuneration, training, and other road users' lack of awareness of blind spots due to the design of the heavy vehicles were identified as

probable causes for WRTAs and were areas that participants felt strongly about.



Fig.3: Word Cloud on causes of WRTAs amongst heavy vehicles

Proposed Solutions to reduce or eliminate WRTA risks

The following table summarises the discussion on the possible solutions to reduce WRTAs, from the perspective of the company, driver, and other stakeholders.

Table 2: Solutions to reduce or eliminate WRTA risks

For Company	
Solutions	Views
Leverage on technology	<ul style="list-style-type: none"> Use of recording cameras on both front and back of the vehicle would serve to capture the footage necessary as evidence in the event of any accidents. Companies could also explore installing technology such as GPS tracking system, Fresnel lenses, lane departure, blind spot warning and automated emergency braking systems to reduce WRTAs. Paste warning stickers on the sides of heavy vehicles to warn other road users of blind spots as a quick solution.

<p>Review existing company policies and practices</p>	<ul style="list-style-type: none"> Companies could consider switching to a hybrid remuneration scheme where drivers are given a higher basic pay, over the pay-per-trip component. <p>Companies could also consider rewarding drivers based on no accident records or good behaviour (e.g. not flouting traffic rules, observing safety requirements, not using mobile phones and tablets on the roads, not disabling speed limiters).</p> <ul style="list-style-type: none"> Assign buddy to newer drivers so as to familiarise them with the route and work surroundings. Caution has to be exercised when adopting a buddy system to ensure that proper and safe work methods are passed on to the junior drivers Implement system to ensure that vehicles are in good condition and speed limiters have not been tampered, with checks at appropriate frequency
<p>More involvement in drivers' training needs</p>	<ul style="list-style-type: none"> Groups viewed that sending drivers for frequent defensive driving courses, especially for higher risk drivers, and holding frequent safety workshops with drivers were necessary. They also viewed the need to train drivers in vehicle maintenance to ensure they were able to spot and report any vehicle faults.
<p>For Drivers</p>	
<p>Solutions</p>	<p>Views</p>
<p>Improve on attitudes and sense of responsibility</p>	<p>Most participants viewed that drivers themselves can help reduce WRTAs by being a role model to other drivers (lead by example), by observing traffic rules and regulations, and being responsible for their own health e.g. by not consuming alcohol before or during their working hours, having enough rest and not driving when they are ill.</p>

<p>For Other Stakeholders</p>	
<p>Solutions</p>	<p>Views</p>
<p>Improve license issuance for driver</p>	<ul style="list-style-type: none"> Safety awareness of drivers be assessed by incorporating safety components in the tests before the issuance of licenses to heavy vehicle drivers. Incorporate regular refresher trainings in safety and a requirement to renew heavy vehicle driving licence every two years, contingent on passing a refresher driving test.
<p>Better outreach and education for other road users on heavy vehicles</p>	<ul style="list-style-type: none"> Working with relevant organisations such as the Singapore Road Safety Council to design better outreach and education programmes for other road users on road safety. Increase awareness on hazards posed by heavy vehicles and how to avoid them.
<p>Improve national policies on heavy vehicle drivers</p>	<ul style="list-style-type: none"> Provide more designated areas for drivers to take breaks as there is limited parking spots for heavy vehicles. This would improve the heavy vehicle driver's work conditions. Work with relevant parties to improve the image of heavy vehicle transportation sector so as to attract more Singaporeans to join the sector. <p>This will help to alleviate the current manpower shortage which in turn would lead to driver fatigue.</p>

The word cloud generated from the notes of FGD shown below depicts the discussion on the possible solutions to prevent WRTAs amongst heavy vehicles. It showed that the use of technology, training, and linking safety training and driving proficiency to the licence to drive heavy vehicles are areas to focus on to improve safety of heavy vehicles.

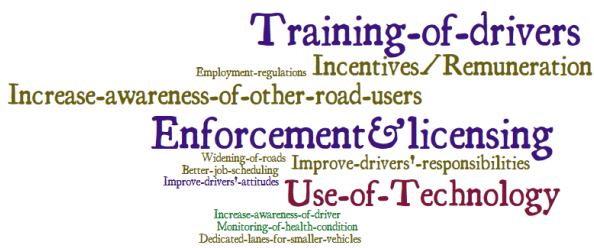


Fig.4: Word Cloud on solutions to prevent WRTAs amongst heavy vehicles

DISCUSSION AND CONCLUSION

From the discussion, participants felt strongly that fatigue was a significant cause of WRTAs, contributed by manpower crunch in the sector. This led to unrealistic journey planning for drivers by companies.

Pay-per-trip remuneration was also brought up as a key WRTA risk factor. However, drivers viewed it as a motivating factor given that more trips translated to higher income. Some of the driver participants shared that they moved on to driving for companies that remunerate on a fixed pay having recognised the risks from pay-per-trip. They felt that a hybrid remuneration scheme comprising a higher basic pay coupled with a smaller pay-per-trip component would help to engender greater safety on the road.

As part of the discussion, the participants were asked to individually vote for 2 solutions. The top

two solutions collectively voted by participants were:

- Use of technology; and
- Training.

To prevent WRTAs, companies could use technologies such as deploying recording cameras or GPS tracking systems, and other relevant technologies e.g. lane departure and blind spot warning. Simple solutions such as placing blind spot warning stickers on the sides of the heavy vehicles would also help raise awareness among other road users.

Participants also mooted for incorporating safety components into the driving tests required for issuance of licenses to heavy vehicle drivers. The participants also felt that a driving license renewal every two years which was contingent on passing a refresher driving test which focused on safety elements would make drivers drive more carefully.

These findings serve to inform the Ministry of Manpower and the Workplace Safety and Health Council on areas for collaboration with partner agencies such as Ministry of Transport, Traffic Police, Singapore Road Safety Council, Land Transport Authority, as well as driving centres, unions, employers and employer associations, to reduce WRTAs involving heavy vehicles in Singapore.

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ACKNOWLEDGEMENTS

WSH Institute would like to thank the following organisations and persons for their contributions to this Solutioning Session..

Participating Organisations

1. Association Of Singapore Marine Industries (ASMI)
2. CHC Express Pte Ltd
3. CWTI
4. Goldstream CTNRS Pte Ltd
5. Hua Tiong Asia Pte Ltd
6. Kim Ee Logistics Pte Ltd
7. KKL Enterprise Pte Ltd
8. Land Transport Authority
9. PSA Corporation
10. Samwoh Corporation Pte Ltd
11. SH Cogent Logistics Pte Ltd
12. Singapore Contractors Association Ltd (SCAL)
13. Singapore Safety Driving Centre Ltd
14. ST Kinetics/KTS & STAI
15. Tiong Seng Contractors Pte Ltd

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ISBN: 978-981-11-2350-4