

Factors that contribute to road accidents caused by heavy commercial vehicles: a South African perspective

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Abstract

This article contributes to an understanding of transportation within a South African context. In spite of growing road safety campaigns, the number of heavy commercial vehicles (HCV) on the roads and the associated accidents increases. Within this context, the purpose of this article is to explore and provide insight into factors that contribute to accidents caused by these vehicles and to provide potential solutions to decrease the number of HCV-related accidents.

The article presented is based on a theoretical approach, and reveals that the main factors contributing to the increase in HCV accidents are road conditions, vehicle factors and human factors. An exploratory study was conducted and potential solutions are provided to decrease the number of HCV-related accidents. This could be achieved with support and financial investments from the government and logistics companies.

This article contributes to the limited existing body of research on this topic and provides an understanding of accidents caused by HCVs within a South African context.

Key phrases

heavy commercial vehicles; logistics; road accidents; transportation

1. INTRODUCTION

Transportation is a logistics activity that facilitates the movement of materials and goods from the point of origin to the point of consumption (Bardi, Coyle & Novack 2006:4). The main objective of any transportation function is to deliver the right product to the right place, whilst satisfying customer requirements at the lowest total cost.

Without a well-defined transportation strategy, businesses are not able to achieve the desired outcome of their logistics systems; namely, customer service (Bowersox, Closs, Cooper & Bowersox 2013:30). It is recognised that transport is “the heartbeat of South Africa’s economic growth and social development” (Department of Transport 2012:Internet).

Drawing from this perspective, the mission of the Department of Transport in South Africa is to formulate and lead the integration of efficient transport systems, which it aims to achieve by “creating a framework of sustainable policies, regulations and implementable models to support government strategies for economic, social and international development” (Department of Transport 2012:Internet).

The importance of road transport in South Africa is that it is an essential part of the economy. In the 2011 state logistics survey, it was found that the active vehicle population of heavy commercial vehicles (HCVs) (gross vehicle weight > 3500kg) in South Africa increased from 320 368 in 2009, to 324 303 in 2010, to 333 255 in 2011 (ENaTIS 2012). As a result, major roads have become increasingly congested (Sukhai, Jones, Love & Haynes 2010:421; Vanderschuren 2007:808:55).

The number of fatal accidents involving HCVs in South Africa has also increased. The number of HCVs involved in fatal crashes increased by 800 (109.49%), from 731 in 2009/10 to 1 531 in 2010/11 (Gainewe 2011:64). The trucking sector is plagued by a poor reputation because of the increasing number of accidents and fatalities caused by HCVs. Various sources have attributed these accidents involving HCVs to the need to travel longer distances, the absence of adequate law enforcement in South Africa and human factors (Gainewe 2011:64; Sukhai *et al.* 2010:421; Vanderschuren 2007:808).

The topic of HCV-related road accidents is highly relevant in contemporary South Africa, because of the high number of motor vehicle accidents and the volume of HCVs involved in such accidents. However, the body of research on this topic is limited, and this article aims to contribute by using a theoretical approach to explore the causes of HCV-related accidents and to suggest how such accidents in South Africa could be reduced.

Against this background, two important questions can be formulated, as follows:

1. What are the factors that contribute to road accidents caused by HCVs in South Africa?
2. What are the potential solutions to decrease the number of HCV-related accidents?

Possible answers to these questions are subsequently discussed in this article.

2. RESEARCH METHOD

The topic of HCV-related road accidents is highly relevant in contemporary South Africa, with the high number of motor vehicle accidents and the volume of HCVs involved in such accidents. This article is of an exploratory nature and consists of a theoretical review. This

technique was used in order to address the research questions. Relevant literature, such as academic texts, journal articles, policy documents, Internet sources as well as other research documents relating to the South African transport industry, potential causes of truck accidents, current interventions and potential solutions were reviewed and analysed. In light of the method discussed, the study examines: (1) factors contributing to road accidents involving HCVs; and (2) potential solutions to factors that contribute to road accidents caused by HCVs.

3. FACTORS CONTRIBUTING TO ROAD ACCIDENTS INVOLVING HCVS

Table 1 shows the number of vehicles involved in fatal accidents increased slightly by 220 (1.56%) from 14 119 in 2009/10 to 14 339 in 2010/11. However, the number of HCVs involved in fatal crashes increased by 800 (109.49%) from 731 in 2009/10 to 1 531 in 2010/11. As affirmed by Gainewe (2011:59), on a percentage basis, the biggest increase of fatal crashes was recorded in KwaZulu-Natal with an increase of 316 (220.53%) from 143 in 2009/10 to 459 in 2010/11.

TABLE 1: Number of vehicles involved in fatal crashes

Vehicle type	2009/10	2010/11	Change	% Change
Motorcars	6 872	6 649	-223	-3.25
Minibuses	1 225	1 003	-222	-18.09
Minibus taxis	602	405	-197	-32.79
Buses	392	292	-100	-25.52
Motorcycles	314	309	-5	-1.50
LDVs	2 814	2 803	-12	-0.41
HCVs	731	1 531	800	109.49
Other unknown	1 169	1 348	178	15.24
Total	14 119	14 339	220	1.56

Source: Gainewe 2011:56

Vanderschuren (2007:807) observes that several external factors, such as economic growth, population growth and active vehicle fleet, play a significant role in the growing number of accidents and fatalities on the roads. Gainewe (2011:64) has identified the contributory factors in accidents as human characteristics, vehicle factors and road factors. Figure 1 illustrates the relationship of these factors to the accident experience.

Firstly, there are human characteristics that contribute to the accident experience. These human characteristics can also contribute to the vehicle condition, which ultimately feeds back to the accident experience. Other key factors are the environment and road factors. This can directly contribute to the accident experience, as well as indirectly, as they feed into the vehicle condition and ultimately result in the road accident experience.

Furthermore, there is the periodic motor vehicle inspection variable, which contributes to the condition of the vehicle, and ultimately the road accident experience. It is assumed that these factors are interlinked. The focus should be on assessing the risks at each stage and making sure that the identified risks are properly managed to minimise the rate of accidents that result from human characteristics, environment characteristics, and the vehicle condition.

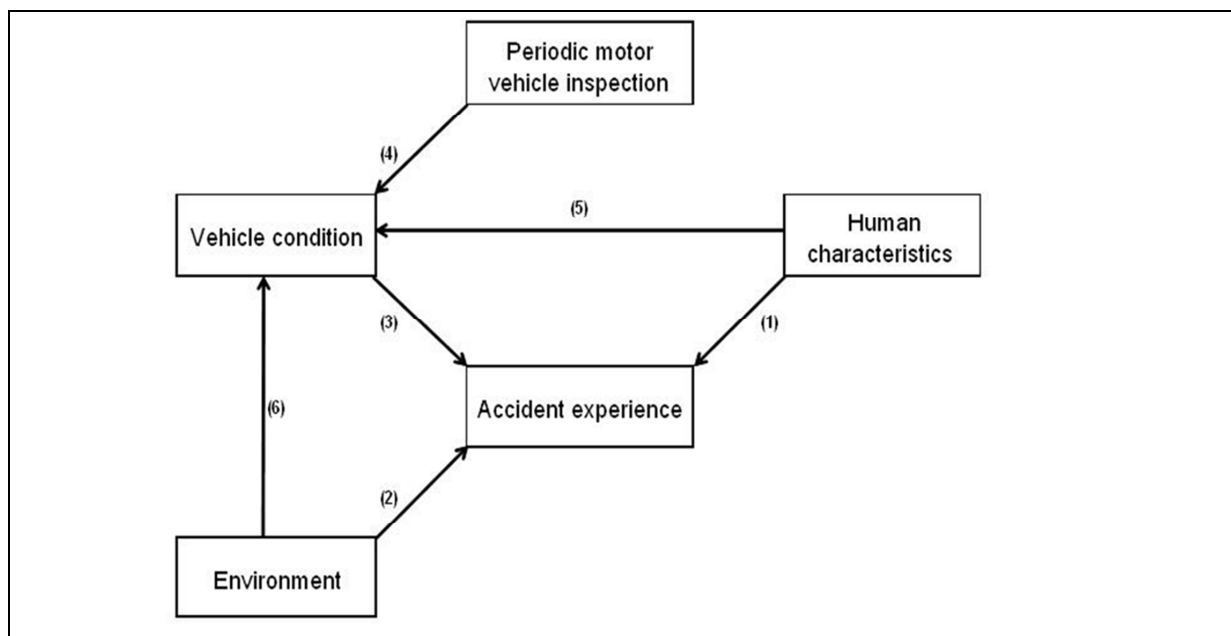


FIGURE 1: Main factors contributing to road accidents

Source: Van Schoor, Van Niekerk & Grobbelaar 2001:713

It is clear from Figure 1 that the main factors contributing to road accidents involving HCVs can be categorised into: (1) human characteristics; (2) environmental characteristics and road conditions; and (3) vehicle condition (Mbanjwa & Govender 2009:Internet). Each of these main factors is dealt with in this article.

3.1 Human characteristics

Vanderschuren (2007:808) states that most road accidents in South Africa occur as a result of human error. Human error constitutes 70-89% of all accidents. Human error includes

speeding, dangerous overtaking, alcohol and drug abuse, inadequate driver training and technique, driver distraction and falling asleep at the wheel (Peltzer 2008:32). Table 2 provides a list of the human factors, for all types of vehicles which contribute towards the occurrence of fatal crashes in South Africa.

TABLE 2: Percentage contribution per human factor for all motor vehicle types

Human factors that contribute to fatal accidents	2009/10: % of group	2010/11: % of group
Speed too high for circumstances	36.77	40.11
Pedestrian: jay walking	33.39	30.71
Hit and run	8.58	8.96
Overtook when unlawful / unsafe	7.08	7.14
Turn in front of oncoming traffic	3.67	2.68
Disregard: red traffic light / stop sign / yield sign	3.10	2.66
Followed too closely	2.42	1.98
Intoxicated driver	1.88	1.66
Fatigue /driver fell asleep	1.22	1.24
Illegal / unsafe U-turn	0.73	0.80
Illegal / unsafe reversing	0.52	0.21

Source: Gainewe 2011:64

3.1.1 Speeding

It is clear from Table 2, that speeding is the main cause of road accidents. Statistics reveal that in 2010/2011, speeding was responsible for 40.11% of fatal road accidents in South Africa (Gainewe 2011:64).

To curb speeding, in various countries throughout the world, it is mandatory to fit speed limiters to HCVs, which decreases accidents (AutoKontrol 2011:Internet). It is not mandatory to fit speed limiters to HCVs in South Africa. The Arrive Alive website provides a section on speed limits for particular classes of vehicles only (Arrive Alive 2014a:Internet).

3.1.2 Driver training

The human factors, such as unlawful overtaking, turning in front of oncoming traffic, disregarding traffic lights, following too closely and illegal U-turns and reversing, that contribute to fatal accidents, can be categorised under driver training. South African companies, on

average, spend less than 1% of their turnover on driver training, compared with companies in other countries that spend 3% (State of Logistics 2008:Internet). However, driver training is crucial to ensure safety. For example, a study conducted by the Federal Motor Carrier Safety Administration (FMCSA) reveals that accidents involving HCVs are usually caused by the driver's lack of experience and/or capability (FMCSA 2006:Internet).

A K53 license should not be the only factor that determines whether a person is able to drive an HCV (State of Logistics 2008:Internet). Drivers need training on how to handle heavy loads of cargo on the back of the HCVs, as the braking and handling of the HCV under such circumstances then become more complex (Smith 2012:Internet; State of Logistics 2008:Internet).

3.1.3 Alcohol consumption

Alcohol plays a major role in traffic-related accidents and driving is a complex skill that involves motor and cognitive co-ordination. As explained by Dultz & Frangos (2012:66), alcohol is classified as a depressant that impairs the global cerebral function at escalating levels, causing cognitive and psychomotor impairment.

The consequence of this impairment contributes to the increased risk of motor vehicle accidents (Fields, Wiers, Christiansen, Fillmore & Verster 2010:1347). It is worrying that the 1.6% alcohol-related fatal accidents reported in Table 2, indicates that South African drivers are more likely to consume alcohol in excess whilst they are driving. This demonstrates that alcohol consumption has a role to play in HCV related road accidents.

3.1.4 Fatigue

Fatigue is a problem that results in unsafe driving, and thus increases the probability of an accident. Fatigue is a feeling of disinclination to continue performing a given task because of physical exhaustion or a prolonged experience. For truck drivers fatigue can be described as the "reduced ability of a driver to continue his or her work" (Monaco, Olsson & Hentges 2005:615).

Truckers often sleep in their trucks in a rest area that is not conducive to proper or restful sleep. Schutte and Maldonado (2003:12) found that drivers were reported to have, on average, 5.4 hours of sleep per night, and even then, that sleep would be interrupted due to the nature of the sleeping conditions that the truckers experience. A report by Marcus (2001:Internet) noted that KwaZulu-Natal truck drivers spend, on average, 16 hours a day on

the road. This is due to the fact that truck drivers are remunerated per kilometre and they want to maximise their income (Maldonado, Mitchell, Taylor & Driver 2002:321).

3.1.5 Other and unknown

Fitness/Diet

A driver should be physically fit in order to react and think quickly when potentially dangerous situations arise (Arrive Alive 2012:Internet). However, poor health, associated particularly with obesity, is common amongst truck drivers as their job requires them to be sedentary for long periods of time, and they have limited access to healthy food along their routes. This lifestyle of minimal exercise and the intake of foods with little or no nutritional value leads to fatigue that will be aggravated when a driver receives less than the average amount of sleep (Moreno, Louzada, Teixeira, Borges & Lorenzi-Filho 2006:1297). The ability of drivers to make better lifestyle choices is limited by the lack of truck-stop facilities that provide nutritious food options and a decent sleeping environment.

Perceptions about Truck Drivers and HIV AIDS

There is a growing concern with truck drivers stopping over at towns and cities and hiring prostitutes (Marcus 2001:Internet). This is cause for concern, especially given the rising rates of HIV and AIDS in South Africa (O'Leary 2007:Internet). It is estimated that almost 70% of KwaZulu-Natal truck drivers spend less than two and a half days a month at home (Maldonado *et al.* 2002:321).

The literature suggests that being away from home for long periods of time, with a lack of recreational activities to engage in during their off time, leads drivers to utilise the readily available sex workers at truck stops (Hollands 2005:Internet; Maldonado *et al.* 2002:321; Marcus 2001:Internet). However, this practice is dependent on the individual cultures of the drivers, but this is a perception that has been shared across the literature. In fact, Roos (2005:Internet) suggests that truck drivers are more physiologically prone to contracting HIV as the physical demands of their job weakens their immune systems, thus also increasing their likelihood of developing AIDS.

Naidu (2006:7) reveals that fatigue, as a dominant cause of truck accidents, is a problem made worse when a truck driver is HIV-positive. Fighting a virus causes fatigue, and increases the likelihood of a driver falling asleep while driving (Naidoo & Martens 2007:Internet).

3.2 Environmental factors

Drawing from van Schoor *et al.* (2001:713), environmental factors include road conditions, congestion, road obstacles, and road maintenance work. Each of these will be discussed in turn.

3.2.1 Road conditions

Another main factor contributing to the high number of HCV accidents is the road conditions that drivers are faced with. Road conditions are responsible for 5 to 15% of accidents (Peltzer 2008:31), and are affected by variables such as congestion, obstacles on the road, road maintenance and weather conditions (Brijs, Karlis & Wets 2008:1181; Gainewe 2011:64). These variables have a negative impact on a driver's skills and concentration, and consequently, result in increased risks of accidents.

Table 3 provides insight into the road factors, for all types of vehicles that contribute towards the occurrence of fatal crashes. It is clear that poor condition of road surface, sharp bends and poor visibility contributed the most towards fatal accidents (64.73% in 2010/2011).

TABLE 3: Percentage contribution per road factor for all motor vehicle types

Road factors that contribute to fatal accidents	2009/10: % of group	2010/11: % of group
Poor condition of road surface	23.03	28.14
Sharp bend	34.14	22.89
Poor visibility (rain, mist, dust, smoke, dawn)	18.99	13.7
Road surface slippery / wet	14.14	9.01
Animals: stray / wild	7.3	8.44
Poor street lighting	6.46	4.69
Road works	3.23	3.56
Blind rise /corner	3.01	3.19
Other and unknown	3.01	3.19
Traffic light / road sign / road marking defective	1.09	2.06
Narrow road lane	1.01	1.13

Source: Gainewe 2011:64

The environmental factors listed in Table 3 are dealt with hereafter and are categorised into road maintenance, road congestion and obstacles on the road.

3.2.2 Road maintenance

It is clear from Table 3 that poor conditions of road surfaces in 2010/11 contributed 28.14% of fatal accidents for all motor vehicle types. The Department of Transport (2011:1) affirmed that there are four main factors that have been responsible for the deterioration of South Africa's road network, that is:

- (1) a lack of funding for road maintenance;
- (2) an ineffective enforcement of the controls and laws relating to overloading;
- (3) a significant increase in freight volumes; and
- (4) the road design not taking into account the intensity of the traffic.

The financing of road maintenance and development is a concern for SANRAL, as limited resources are a challenge that could adversely affect the condition of the road network (Perkins, Fedderke & Luiz 2005:217). According to Leathern (2013:Internet), "the budget to maintain our roads should be around R32 billion a year, but is currently only about 25% of this amount". Recent statistics reveal that in 2013, SANRAL received R3.454 billion for current operations and R7.043 billion for capital infrastructure from the Department of Transport. SANRAL provides a critical supporting role in managing 17 000km of South Africa's total road network of 740 000km. The remainder is managed by the Department of Transport (Department of Transport 2013).

Peltzer (2008:31) indicates that many road accidents can be attributed to bad roads. The growing body of research relating to the effect of bad roads on logistics activities highlights the need for appropriate road maintenance (State of Logistics, 8th Annual Survey for South Africa 2011:11). Furthermore, insights from the State of Logistics, 9th Annual Survey for South Africa (2012:iv) reveal that poor road conditions are a major factor of concern amongst stakeholders.

It was acknowledged in Fleetwatch (2009:Internet), that HCVs operating on questionable roads suffered increased operating costs. The State of Logistics, 5th Annual Survey for South Africa (2008:5) refers to a case study that was conducted. The findings of this case study reveal that trucks travelling on roads with average and bad riding conditions suffered increased operating costs of between 684% and 1 560%, respectively. These increased operating costs cause many trucking operators to extend their maintenance schedules to reduce costs. Consequently, this increases the chance of an accident.

For example, a truck could be running with brakes in poor condition and worn tyres. This raises concerns about the vehicle inspection mechanisms in place, and the road worthiness of some vehicles on South African roads.

There are various roadwork zones (construction zones) on major transport routes. Roadwork zones cause congestion and lead to a higher occurrence of accidents and a significant number of annual fatalities (Arrive Alive 2012:Internet). The main causes of accidents in roadwork zones include speeding traffic, inadequate signage notifying drivers of roadworks, drivers ignoring warnings to come to a stop, and drivers distracted by using cellular phones (Arrive Alive 2009a:Internet). As indicated in Table 3, roadworks contributed 3.56% of fatal crashes in 2010/2011 (Gainewe 2011:65). These issues point to the need to manage construction zones properly.

3.2.3 Road congestion

Over the years, congestion on South Africa's roads has increased as the country's economy has grown considerably, and transportation of freight and people has moved from rail to road transport (Sukhai *et al.* 2010:421). In 2003, approximately 80% of goods and passengers were already transported by road (De Beer 2003:1). Over the years, the State of Logistics, 8th Annual Survey for South Africa (2011:6) has indicated that there is a move from rail to road usage, and this shift has significantly increased the number of HCVs on the roads, the result of which has been an increase in accidents involving HCVs. Though more vehicles may not necessarily mean more accidents, the number of road accidents has increased.

The problem of congestion and overloading of HCVs on South Africa's roads has contributed to the deterioration of the state of the roads or road surfaces (Martinez 2001:260), particularly the secondary road network, which was not designed for HCVs (Department of Transport 2011:1). The bad condition of roads is said to be the cause of many accidents, especially those involving HCVs that are heavily laden and take a longer distance to stop. It is estimated that 5% of road accidents are caused by poor signage and bad road conditions (Arrive Alive 2009b:Internet; Lagarde 2007:170). When travelling on poor and uneven roads, HCVs have to lower their speeds and those that fail to do this, as appropriate to the road surfaces, are often involved in accidents (Venter 2009:Internet).

3.2.4 Obstacles

Many accidents involving HCVs are as a result of drivers having to contend with obstacles such as pedestrians crossing and/or stray or wild animals that have wandered into the road

(8.44% as indicated in Table 3), especially on smaller rural roads. It is extremely difficult for drivers to see pedestrians crossing roads at night, or those crossing where there is no clear view by the oncoming traffic, such as on a tight corner or blind rise. In these cases the driver is often unable to avoid hitting the pedestrian (Peltzer 2008:31; Rypstra 2011:Internet; Vanderschuren 2007:807). On rural roads in particular, animals such as cows and goats are common. More effective measures need to be taken to prevent animals from being on the roads, such as better law enforcement or more effective fencing.

3.3 Vehicle condition

When investigating and identifying the possible reasons why so many of the road accidents are caused by HCVs, it is easy simply to place the blame on the driver. However, driving an unworthy vehicle is common (Davis 2013:Internet). Vehicle factors include smooth and damaged tyres, inadequate lights, damaged brakes, overloading, poor load balancing and poor maintenance. As can be seen from Table 4, burst tyres and faulty brakes contributed the most towards fatal accidents (69.05% in 2010/2011).

TABLE 4: Percentage contribution per human factor for all motor vehicle types

Vehicle factors that contribute to fatal accidents	2009/10: % of group	2010/11: % of group
Burst tyres	45.85	54.07
Faulty brakes	23.75	14.98
Overloading: cargo / passengers	4.14	7.82
Bicycle: no head lamp	5.15	6.19
Bicycle: no rear reflectors	2.49	5.54
Other and unknown	3.76	4.89
Smooth vehicle tyres	2.53	2.93
Dirty / no reflective stripes	0.59	0.33

Source: Gainewe 2011:64

3.3.1 Maintenance

Technical problems such as tyres bursting, rims cracking and brakes failing can also be a direct result of poor maintenance of the vehicle. In an effort to keep running costs as low as possible, many truck owners run their vehicles past the service dates advised. When the

time does come for repairs to be done, they are done as quickly as possible in order to get the vehicle back on the road and earning money (Arrive Alive 2009c:Internet).

Running vehicles past the service dates will ultimately result in unroadworthy vehicles being on the roads, and problems such as accidents. For example, vehicle maintenance can lead to early detection of faults in the braking system, vehicle efficiency, and so forth. Delaying vehicle maintenance resembles a reactive approach where the transport operator will attend to the vehicle problem when accidents and fatalities have occurred.

3.3.2 Overloading

In 2001, Martinez (2001:206) had already asserted that a combination of overloading and load imbalances on axles contributes significantly to the deterioration of roads. The South African National Roads Agency (SANRAL) reported in 2001, that overloading causes 600 million rand's worth of annual damage to South Africa's paved roads (Martinez 2001:206).

Even though there are pockets of excellence, for example the overload control practices in KwaZulu-Natal and the Eastern Cape (Department of Transport 2011:i), the issue of overloading is an ongoing challenge and contributes 7.82% to fatal road accidents, as shown in Table 4. Even though South Africa has strict laws in place to deal with the weight restrictions and loading of HCVs, the consistent failure of law enforcement to act appropriately has resulted in some logistics operators overloading their vehicles (Nordengen 2007:Internet).

South Africa already has a high weight allowance in terms of HCVs (56 tons) and exceeding this allowance increases the likelihood of accidents. One in every eight HCV that is weighed along the N3 Toll Route is overloaded (Arrive Alive 2009c:Internet). Overloading is a safety and cost concern as it can lead to fatal accidents, road deterioration, increased road maintenance and higher transportation costs. However, transport operators appear to be of the view that overloading is commercial self-interest (Arrive Alive 2009c:Internet), as they see this as making sense in the short-run, where the available capacity is fully utilised

4. POTENTIAL SOLUTIONS

In 2008, the Road Transport Management System (RTMS) recommended a voluntary, self-regulation scheme that encourages logistics companies to implement the recommended practice that contributes to the preservation of roads infrastructure, improves road safety and increases the productivity of the logistics strategy. The requirements of the practice – ARP

067-3:2008 – were developed to ensure that all participating logistics companies achieve the same standard of compliance (Standards South Africa 2008:3)

A significant number of transport companies already have ARP 067-3-2008 accreditation and have their fleet management practices and procedures independently audited on a voluntary basis through RTMS certification (Standards South Africa 2008:3). It is envisaged that this should make a major contribution to road safety. However, the HCV active vehicle population in South Africa and the number of accidents involving HCVs has increased significantly. The suggested potential solutions to decrease the number of HCV-related accidents are categorised into: (1) human characteristics; (2) environmental characteristics – road conditions; and (3) vehicle condition.

4.1 Human characteristics

Most road accidents can be attributed to human error related to fatigue, fitness/diet, habit, speeding and lack of driver training (Vanderschuren 2007:808).

4.1.1 Fatigue

Suggestions on how fatigue during driving can be minimised in order to decrease the number of truck accidents are provided as follows:

- Country-wide legislation is needed, regulating the working hours of all truck drivers and thus preventing them from working more than, for example, 11 hours per day. This will increase the 5.4 hours (Schutte & Maldonado 2003:12) that truck drivers sleep on average in 24 hours and enable them to structure their day in such a way that they will be able to sleep for seven hours.
- A greater number of safer and cleaner truck stops could be created. These areas would need to be well lit and have the required security, as currently truck drivers currently state that they do not want to rest because it is unsafe – particularly along the N3 (Arrive Alive 2014b:Internet).

4.1.2 Fitness/diet

As obesity is common amongst truck drivers, it is suggested that companies educate their drivers on the benefits and necessities of a healthy, balanced diet.

An improved diet will help in decreasing obesity amongst truck drivers. For example, companies could encourage their drivers to: eat meals with reduced fat; eat meals that

include low-fat meats, vegetables and fruit; increase fibre into their diets; eat three to four smaller meals a day; and exercise regularly.

4.1.3 Speeding

Speeding is responsible for 40.11% of fatal road accidents (Gainewe 2011:64). It is suggested that speed limiters be fitted onto vehicles. Speed limiters not only make the vehicles safer, but they also reduce fuel consumption, have lower liability costs and increase the life span of the truck's equipment, such as its tyres and brakes (AutoKontrol, 2011: Internet).

It is also suggested that the maximum speed limit for HCVs be reduced to 90km/h. The maximum speed limit in the United Kingdom was reduced to 90km/h and this reduced the accident rate by 26% (AutoKontrol 2011: Internet).

4.1.4 Driver training

Due to the fact that not all logistics companies can afford in-house training programmes, it is suggested, that in order to improve truck drivers' skills a government-funded "Truck Driver Academy" be introduced. It is envisaged that this academy would serve to:

- reinforce the rules of the road to truck drivers, as well as the penalties for violating them;
- improve truck drivers' skills;
- provide tips on how to prevent and avoid accidents; and
- educate truck drivers about speed management, fatigue management, health, diet and exercise, and the effect of drugs, alcohol and medication (Cousins, 2009:59).

4.1.5 Alcohol

Dultz and Frangos (2012:66) note that results from a study involving 178 countries, revealed that only 10% of participating countries had "adequate" drink-driving laws and enforcement of such laws. Within this context, it is suggested that sobriety checkpoints be implemented and enforced. It is also suggested that blood alcohol concentration legal levels be lowered as this may potentially lower the rate of drunk-driving and road accidents.

4.2 Environmental characteristics

4.2.1 Congestion

The dependence on road transport has resulted in a large number of HCVs utilising the country's main and secondary roads to access the ports and economic hubs. It is suggested that many commodities that are transported by road could be more efficiently transported by

rail, which would reduce the number of HCVs on the roads and ease congestion. If there was a major shift back to rail it would “ultimately address costs and reduce congestion on the roads, while removing HCVs from the road, [and would] enhance road safety and reduce road damage” (Railway Technology 2012:Internet).

However, given the limited rail network, road transport has become the only available alternative to transport goods. Two significant disadvantages thereof are an increase in the number HCVs on the roads. Traffic congestion affects all road users. In order to alleviate congestion in the main transport corridors, it is suggested that additional lanes could be dedicated to freight only (Department of Transport 2011:11).

4.2.2 Road maintenance

One of the factors that have contributed to the deterioration of South Africa's road network is a lack of funding to invest in road maintenance. In this instance, consultants suggested, in a report to the Department of Transport (2011:15), that as government does not have spare funds to place into a new road fund, monies could be obtained as follows: (1) the Treasury could motivate for a provision of funds; (2) a certain percentage of monies collected from the fuel tax, HCV licensing fees, and toll fees could be earmarked; and (3) overloading penalties received could be utilised to maintain and improve the road infrastructure (75%), and to enforce overload controls (25%) (Department of Transport 2011:16).

4.3 Vehicle condition

As indicated by Davis (2013:9), accidents caused by HCVs are attributed to vehicle factors and mainly involve the overloading and poor maintenance of these vehicles.

4.3.1 Overloading

The recovery of overloading fines is low and needs to be improved. It is suggested that in order to eliminate overloading, a zero-tolerance approach should be adopted by law enforcement. Provinces must employ strict regulations and fine offenders heavily. A percentage of the funds generated from fines could be used to improve the enforcement of overload-control laws.

Another way to eliminate overloading could be to expose and embarrass the offending companies publicly. The assumption is made that companies do not want their reputation to be negatively affected, so this may dissuade them from overloading their vehicles.

4.3.2 Poor maintenance

Eliminating unroadworthy HCVs from the road may reduce the number of accidents caused by these vehicles. It is suggested that stricter policing is needed to enforce current legislation. Further, the weighbridges along the major routes of South Africa should be maintained timeously, and used effectively in order to detect any incidents of overloading.

To sum up, Table 5 presents the causes of truck accidents, potential solutions and the potential benefits thereof.

TABLE 5: Causes of truck accidents, potential solutions

Causes of accidents	Potential solutions	Potential benefits
Human characteristics that include: fatigue; fitness/ poor diet; habits; speeding; drinking and driving; and inadequate driver training.	Introducing country-wide legislation preventing drivers from working for example more than 11 hours per day, 5 days a week.	Minimising fatigue during driving could result in a decrease in the volume of truck Accidents.
	Fitting speed limiters on vehicles (if not already done so) Reduce speed limit to 90km/h	Not only makes the vehicle safer, but reduces fuel consumption, reduces liability costs and increases the life span of the truck's equipment.
	Implementation and enforcement of sobriety checkpoints and the lowering of acceptable blood alcohol concentration legal levels	This may potentially lower the rate of drunk-driving and road accidents.
	Introducing a Government funded "Truck Driver Academy".	Reinforce the rules of the road and the penalties for violating them to truck drivers Educating truck drivers about speed management, fatigue management, health, diet and exercise and the effect of drugs, alcohol and medication.
Environmental characteristics such as: congestion; obstacles on the road; and road maintenance	Establishing a road maintenance fund.	Maintain and improve infrastructure of roads.
Vehicle factors which include: overloading; and poor maintenance of the vehicle	Strict penalties for offenders - adopting a zero tolerance law enforcement approach	Percentage of funds generated from fines could be used towards improving overload control law enforcement.

Source: Researchers' own construction

It is important to note, that the ability of Government to reduce the road accident toll depends also on building up local partnership networks, ensuring quality planning and implementation of road safety interventions, including monitoring and evaluation of implemented strategies.

5. CONCLUSION

This study has shown that there are many factors leading to the increase in HCV accidents. There is evidence that the reasons for the increase cannot be narrowed down to one factor, but involve a combination of many factors, such as road conditions, truck conditions and driver capabilities. More effort and resources, from both the government and the private sector, need to be invested in correctly training and educating truck drivers to equip them with the skills they need to drive HCVs safely and efficiently. Many accidents could be avoided if drivers were correctly trained.

The development of safe and secure truck stops along the major roads in the country would considerably improve the working conditions of truck drivers, as they would be able to rest and recover in a safe environment, thus reducing the dangerous lack of sleep that affects their driving capabilities. This would also help to reduce the fear of being hijacked when stopping.

The lack of certain rules and regulations in the trucking industry and the lack of enforcement of the existing regulations, can also be seen to play a role in the number of truck accidents. Stricter penalties and enforcement of laws on overloading and speeding would force drivers to adhere to laws and thus greatly enhance road safety. Legal controls that limit the number of hours a driver is permitted to drive need to be implemented by the Department of Transport.

This research was conducted within certain limits. No empirical research was undertaken, and only secondary sources were reviewed. It is suggested, as a way forward, that a survey be conducted to test these identified causes in the industry. This article does not claim to have presented an exhaustive list of the causes of HCV accidents, but the ones identified here are the main causes emerging from the literature review. In addition, the proposed solutions have not been priced, as in-depth analyses and technical studies need to be carried out, and this was not the focus of this study.

Unless a decisive direction is provided, followed by action by all stakeholders, particularly the government, the high incidence of HCV accidents and the related losses are likely to continue into the future.

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