The Extent of Backover Collisions Internationally

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Abstract

This study reports good consistency in international comparisons of the number and severity of backover crashes. More than half occurred to pedestrians aged 60 years and older. Children less than 9 years comprised 5% of these crashes with a similar percent aged 10 to 19 years. A significant 41% reduction in real-world backover crashes was found for Australian vehicles with reversing cameras. A range of driver and pedestrian manoeuvres were found and 11 crash scenarios identified in backover collisions. Mandating the fitment of reversing cameras in all vehicles and enhancements would likely enhance the safety of pedestrians in reversing manoeuvres.

Introduction

Reports from the USA have highlighted the extent and severity of backover in this country (NHTSA 2008). Of particular interest is how widespread these collisions are across other international regions (including from the States New South Wales, Queensland, South Australia, and Victoria in Australia as well as New Zealand. The study also examined what can be done to help prevent these injurious events.

Method

An analysis was undertaken using data from several regions to gauge the extent of these collisions, their crash characteristics, and potential solutions. National data were provided from UK, Germany, Europe (CARE database) and Australasia to address this question. In addition, several in-depth and police cases were made available to examine the extent and crash causation circumstances.

Results

The findings (Fildes *et al*, 2016) revealed consistency in the national statistics across the regions analysed. Most reversing crashes occurred in low speed urban areas, involving predominantly passenger cars and light utilities. Sport Utility Vehicle involvement was higher in USA and Australia, possibly because a high proportion of these vehicle types are registered in these two countries.

Most pedestrians injured (50%) were aged 60 years or older in all countries apart from the USA and were predominantly female in most, except for Europe. Fatal outcomes were associated with 7.5% of collisions while 90% involved severe injury outcomes in these data.

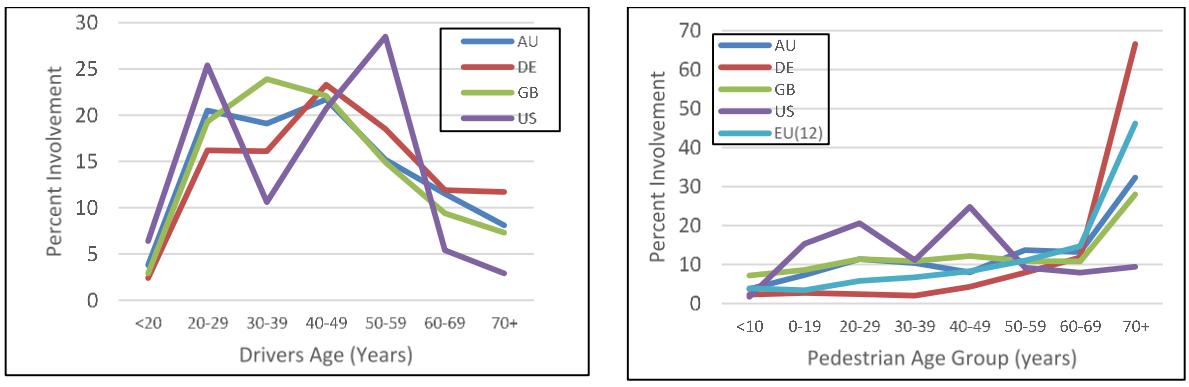


Figure 1. Drivers age by percent involvement (Left) and Pedestrian's age by percent involvement (Right)

Fatal backover collisions involving children aged 0-9 years comprised only 7% of these police-reported crashes, many reported in drive-ways (Fildes *et al*, 2014). However, the degree of under-reporting of these collisions, in an off-road environment could not be assessed in this analysis because of the lack of suitable data. Findings by Austin (2008) suggested that this could be substantial for all crashes and ages.

Crash Scenarios

An analysis of an extended set of police causal assessments data in the UK revealed interesting trends. The top six of these included the driver (25.3%) and/or pedestrian (16.7%) failed to look properly, pedestrian failed to judge vehicle's path or speed (8.2%), driver failed to see pedestrian in vehicle blind spot (6.9%), driver and/or pedestrian was careless, reckless or in a hurry (6.5%), and the driver made a poor turn or manoeuvre (6.3%).

Table 1: The 20 most common contributory factors coded from backover crashes (UK data, 2010-2012)

Contributory factor (up to 6 per crash)	Frequency	Percent
Driver failed to look properly	3956	25.28
Pedestrian failed to look properly	2619	16.74
Pedestrian failed to judge vehicle's path or speed	1288	8.23
Vehicle blind spot	1083	6.92
Driver and/or pedestrian was careless, reckless or in a hurry	1021	6.53
Poor turn or maneuver	989	6.32
Pedestrian careless, reckless or in a hurry	491	3.14
Failed to judge other person's path or speed	364	2.33
Pedestrian dangerous action in carriageway	307	1.96
Pedestrian crossing road masked by stationary or parked vehicle	302	1.93
Driver loss of control	300	1.92
Pedestrian impaired by alcohol	275	1.76
Aggressive driving	271	1.73
Pedestrian disability or illness, mental or physical	229	1.46
Stationary or parked vehicle(s)	150	0.96
Impaired by alcohol	143	0.91
Nervous, uncertain or panic	143	0.91
Pedestrian wearing dark clothing at night	140	0.89
Too close to cyclist, horse rider or pedestrian	120	0.77
Illegal turn or direction of travel	93	0.59

In addition, the in-depth crash data of backover collisions made available by BASt (Germany) and DfT (UK) revealed eleven typical crash scenarios in backover collisions. These findings are useful in pin-pointing areas where technology may be required to help prevent these collisions.

Interventions

Vehicles fitted with reversing cameras were 41% less involved in backover collisions (Keall *et al*, 2017). While the rate for Sports and Utility Vehicles (SUVs) appeared to be greater, this finding was not statistically significant due to relatively small numbers.

Enhancements in reversing technologies (radar units and more sensitive bumper-mounted sensors with full 250deg vision) have the potential to further reduce these harmful reversing collisions (Fildes *et al*, 2016). Estimates of the costs of fitting these technologies were quite expensive and unlikely to be cost effective.

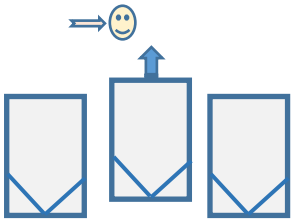
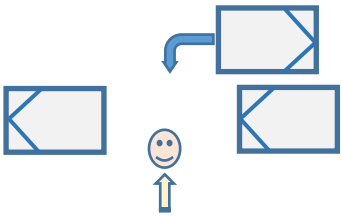
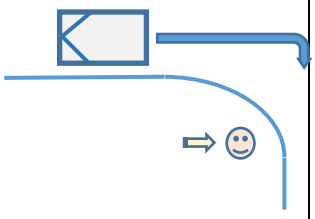
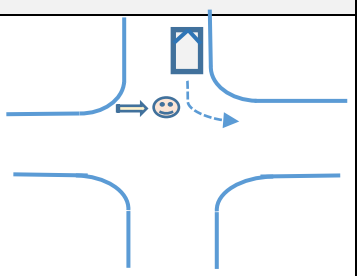
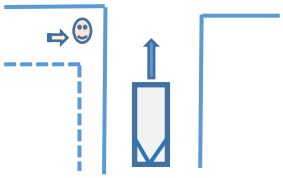
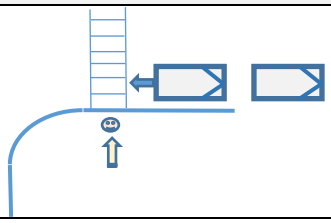
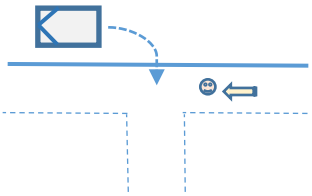
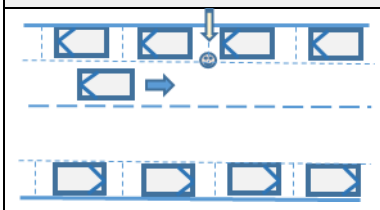
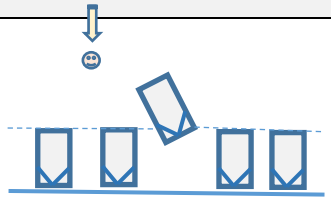
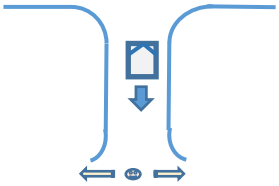
Scenario 1	Scenario 2	Scenario 3	Scenario 4
			
Car reversing from a Parking spot with pedestrian approaching from behind	Car attempting to parallel park with a pedestrian crossing through the spot	Car reversing around a corner with a pedestrian about to cross the road	Car reversing around a corner with a pedestrian already crossing the road
Scenario 5	**Scenario 6**	**Scenario 7**	**Scenario 8**
			
Car backing out of a side street, lane or driveway with a pedestrian crossing behind	Car reversing to leave parking spot as pedestrian enters the pedestrian crossing	Car backing into a laneway as a pedestrians crosses the lane	Car reversing down a narrow street or lane with pedestrian walking towards the vehicle
Scenario 9	**Scenario 10**	**Scenario 11**	
			
Car reversing when a pedestrian walks out from behind a parked car	Car reversing out of a parking spot while a pedestrian is crossing the road behind	Car reversing into a driveway with pedestrians in the driveway	

Figure 2 The 11 most frequent crash scenarios from the total sample of 26 in-depth crashes provided

Conclusions

This is the first study found that examined the full extent of the backover problem in several international regions and has confirmed findings from a previous study of backover crashes in the USA. While the number of crashes were relatively small (even allowing for under-reporting), nevertheless, associated injury severity was high and young children were involved. Several potential solutions were identified to address this unnecessary and severe trauma. In particular, mandating the fitment of reversing cameras in all vehicles and enhancements would likely enhance the safety of pedestrians in reversing manoeuvres.

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