

THE SAFETY NEEDS OF HEAVY VEHICLES IN AUSTRALIA

A report prepared by NRMA Motoring & Services

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Heavy Vehicles

Introduction

While it is true that the fatal crash rate/10,000 registered articulated vehicles decreased 28% in the 10 years to 2004, for the same period the rate for all vehicles fell by 35%. This means that heavy vehicles are lagging behind and it is almost universally the light vehicle occupants who are killed or seriously injured in a collision between light and heavy vehicles.

Large trucks have more momentum. Obviously a large truck that collides with a car has a much greater impact than a smaller truck crashing into a car. If the large truck is travelling over the speed limit this impact is more than proportionally increased.

There is a common misconception that it is a long haul truck problem. In fact there is a large difference between metropolitan and non-metro areas as evidenced in the table below.

Heavy vehicle vs light vehicle crash rates per 1 million vehicle kilometres travelled – NSW 2003

	Metropolitan areas	Non-metro
Articulated	5.8	0.9
Rigid	2.0	0.7

Given the predicted substantial increase in heavy vehicle freight movements (set to double by 2020 and triple by 2050), trucks of increasingly higher mass and length and the consequences for the safety of general motorists, it is appropriate that NRMA consider the need for an updated policy position on truck safety.

A national co-ordinated position is required since the issue crosses State boundaries with there being significant truck movements between Victoria, NSW and Queensland as well as on other important routes such as between Victoria, South Australia and Western Australia.

What is required?

In July 2007 NRMA called for the following safety features to become mandatory for trucks:

- Prime movers and trailers must have front, side and rear under-run barriers.
- All axles including trailers should have anti lock brake systems.
- All heavy vehicles should have tamper-proof on-board monitoring to ensure drivers comply with the law and electronic stability control to help protect motorists from truck mass and momentum.

At the time NRMA believed that a process for making these features mandatory should be achieved within five years. However there has been little progress on most of these initiatives.

The following table shows the comparison between current minimum national standards for heavy vehicle safety features and the improved standards on which NRMA believes should be adopted. Each feature is addressed in more detail in the following paragraphs.

Feature	ABS	Under-run barriers	ESC	Tamper-proof on-board monitors	Disc brakes
Is this feature available?	YES	YES	YES (on some brands but the technology is available to all)	YES (either OEM or aftermarket)	YES (usually with advanced braking/stabililty systems)
Required by legislation?	NO	YES - Front Underrun Protection Systems (FUPS) to be fitted nationally to the front of all new models of heavy vehicles (over 12 tonnes) from January 2011 and to all existing models from January 2012 ¹ . Trucks more than 4.5 tonnes and up to 12 tonnes may optionally be certified to the ADR, to take advantage of any state or territory concessional schemes NO - Rear and side underrun protection	NO	NO	NO
Adoption rate	Low	Front common and soon compulsory, rear low but increasing slowly, side almost nil. Older vehicles generally not fitted	Almost zero and no pressure to increase	Common in big company linehaul, very low in urban delivery	Low but slowly increasing with electric brakes becoming more common

As all heavy vehicles are involved in the same range of road safety issues, to a greater or lesser degree, the above safety features should apply to all articulated, B-doubles, B-triples and rigid heavy vehicles above 4.5 tonne from 2012 for new models and from 2014 for all new heavy vehicles except where legislation (ie for FUPS) is already in place.

Special purpose vehicles, such as mobile cranes and low loaders, should be fitted with these features where possible but some will not be appropriate given the unique designs of some of these vehicles.

¹ Media Release Minister for Infrastructure, Transport, Regional Development and Local Government (Albanese) – ‘New Truck Safety Rule to Save Lives’ AA398/2009 16 September 2009
http://www.minister.infrastructure.gov.au/aa/releases/2009/september/aa398_2009.htm

The European Commission has announced that Advanced Emergency Braking System (AEBS) will be required on new models more than 3.5 tonnes from November 2013 and on all new heavy vehicles from 2015. AEBS applies the brakes automatically if the system detects that a collision with a vehicle in front is imminent. These requirements should be adopted for Australia one year after Europe ie new models complying from November 2014 and all vehicles over 4.5 tonne from November 2016.

The following table from Monash University research shows estimates of the various types of crashes in Australia annually².

Estimated annual number of potential underrun crashes Australia-wide as a function of injury severity.

Type of protection	Crash severity		
	Fatal	Serious injury	Other injury
ARTICULATED TRUCKS			
Front underrun	73.5	226.0	615.0
Side underrun	16.5	86.0	170.5
Rear underrun	3.0	50.0	82.5
RIGID TRUCKS			
Front underrun	74.7	412.9	1131.2
Side underrun	22.9	175.3	420.0
Rear underrun	8.2	97.6	212.4
ALL TRUCKS			
Front underrun	148.2	638.9	1746.2
Side underrun	39.4	261.3	590.5
Rear underrun	11.2	147.6	294.9

While rear underrun causes a small number of fatalities compared with front underrun, it causes a substantial number of serious and other injuries. This is consistent with other studies.

Summary of required active and passive safety features

(a) Front, side and rear under-run barriers

Each year in Australia around 200 people are killed in 'under-run' crashes, with most of these victims being the occupants of the cars involved. Underrun crashes also result in a large number of serious injuries. For Australia, in the 11 year period from 1994 to 2004, an estimated 2100 people have died as a result of truck-involved crashes, not including truck occupants.³

On 16 September 2009, the Minister for Infrastructure, Transport, Regional Development and Local Government announced a new Australian Design Rule (ADR) requirement for Front Underrun Protection Systems (FUPS).

FUPS prevents a car from becoming trapped under the front of a truck in the event of a collision between the two, thereby ensuring the car's safety features such as seatbelts, airbags and crumple zones remain fully effective.

FUPS must now be fitted to the front of all new models of heavy vehicles (over 12 tonnes) from January 2011 and to all existing models from January 2012⁴.

² Symmonds and Haworth, A Cost-Benefit Analysis of Heavy Vehicle Underrun Protection, 2009

³ Rechnitzer, G. Review and Comment on the: "Draft Regulation Impact Statement for Underrun Protection Devices Report No. DOTARS VSS 01/2005 May 2005"

⁴ Media Release Minister for Infrastructure, Transport, Regional Development and Local Government (Albanese) – 'New Truck Safety Rule to Save Lives' AA398/2009 16 September 2009

http://www.minister.infrastructure.gov.au/aa/releases/2009/september/aa398_2009.htm

Australian Design Rule (ADR) 84/00 will now require FUP systems on new model rigid and articulated heavy goods vehicles (new models of trucks more than 12 tonnes from January 2011 and all remaining models of trucks more than 12 tonnes from January 2012). Trucks more than 4.5 tonnes and up to 12 tonnes may optionally be certified to the ADR, to take advantage of any state or territory concessional schemes for vehicles with front underrun protection.

Rigid trucks are particularly dangerous in regard to rear under-run, as there is generally a long overhang on the tray, which leads to a substantial under-run distance for impacting cars with consequent serious injuries for occupants, including decapitation.

While some rigids are fitted with a form of rear under-run barrier, many are of very light construction which have little effect on preventing an impacting vehicle under-running the tray. Ironically, an insubstantial barrier can exacerbate the problem by, as it deforms, forcing the front of an impacting light vehicle down, raising the relative impact point on the A pillars, thereby increasing intrusion and injury. ECE standards require a substantial structure to withstand the energy of a light vehicle impact, so under-run barriers complying with ECE standards are recommended.



Example of collision with truck without under-run protection

(b) Electronic Stability Control (ESC) on all new prime movers and trailers

- ESC is generally becoming standard on new heavy vehicles in the EU. ESC has similar advantages in heavy as in light vehicles, detecting when the vehicle is beginning to slide and assisting the driver to recover control.
- ESC includes features such as Traction Control and Antilock Brake Systems (ABS). In heavy vehicles these provide the additional benefit of avoiding flat-spotting of tyres during hard stops, which on a heavy vehicle can involve the replacement of upwards of 30 tyres.
- ESC helps prevent jack-knifing, rollovers and other loss of control crashes and the technology is available for trucks sold in Australia.

- The Victorian Transport Safety Group states that European safety experts estimate that approximately half of all single vehicle crashes could be avoided if vehicles have ESC installed and, in the US, two thirds of all heavy vehicle fatalities come from rollover crashes, which could be reduced by fitting ESC.

(c) Disc brakes on prime mover and trailer

- Disc brakes provide more consistent performance and do not fade under heavy, prolonged braking, as well as reducing braking distances compared with drum brakes.
- Disc brakes are now available on a wide range of heavy vehicles, often with many of the more advanced braking/stability control systems. While disc brakes are not essential to the operation of modern brake systems, their consistency and ultimate performance means they are preferred.

(d) Tamper-proof Electronic On-Board Monitors

- The manual log-book system for monitoring driving hours and driver behaviour has long since lost any vestige of credibility. Widespread abuse of the system and difficulties in enforcing requirements, along with high levels of fatigue related crashes mean that urgent action must be taken. For example, the NSW Roads & Traffic Authority recently reported that fatigue is the major factor amongst casualties on the Newell Highway with around 26% of casualties involving speed (the Newell runs between Victoria and SE Queensland through western NSW)⁵.
- Mechanical tachographs, now very outdated technology, suffer similarly from widespread allegations of tampering and abuse. Tamper-proof electronic on-board monitors should be required across the heavy vehicle fleet as noted above.

NRMA Motoring & Services commissioned a review of the 2005 Regulatory Impact Statement (RIS) on under-run devices from heavy vehicle safety consultants.

The review noted that ‘The RIS Report’s terminology that “*there are no net benefits*” in the fitment of underrun protection systems on rigid trucks, or for rear underrun barrier systems, and only a marginal case for front underrun, is misleading and false.’ It demonstrates that the benefits of the introduction of front, side and rear under-run barriers have been substantially underestimated. This changes the economics and therefore the conclusions of the RIS, which should be recast.

NRMA welcomes the recent commitment to front under-run protection and believes that, as a minimum, Australia must adopt United Nations Economic Commission for Europe requirements for side and rear under-run protection for heavy vehicles as noted above.

This position is logical and supportable in view of Australia’s policy of harmonising with ECE vehicle regulations unless there are better regulations already existing in Australia, which in this case there are not.

⁵ RTA Newell Highway Safety review August 2009
http://www.rta.nsw.gov.au/roadsafety/downloads/200908_newell_highway_safety_review.pdf

Why are safety features needed?

It is expected that Australia's freight task in 2020 will be double that in 2006 and by 2050 it will be triple its current size⁶. Given that the rail system cannot cater, or is unsuitable, for accommodating this increase, it is the road system that will bear the brunt.

In some sectors, the doubling of freight by 2020 is misleading – for example, the Port of Melbourne is experiencing 14% growth per annum – leading to a potential quadrupling of the freight task in 15 years. Port Botany in Sydney is being expanded to cater for high levels of predicted growth.

In short there will continue to be bigger trucks on the road and more of them, evidenced through:

- Increasing trend towards using articulated vehicles with multiple trailers;
- 4% decrease in number of rigid trucks between 4.5 tonne and 8 tonne;
- In 1999 there were 5 rigid trucks for every 1 articulated;
- In 2004 there were 4 rigid trucks for every 1 articulated;
- By 2020 one in four vehicles in major cities will be carrying freight.

2004 versus 1999

	Increase in no.	Increase in highest mass category	Increase in total kms	Increase in total tonne / km
Rigid truck	5%	24% (Over 20 tonne)	18%	25%
Articulated truck	11%	64% (Over 20 tonne)	8%	17%

These figures mean there will be a significant increase in the:

- volume of trucks on our roads
- length/weight of trucks
- number of kilometres travelled
- number of crashes.

The Australian Government's response is to ensure greater productivity of road freight transport vehicles by allowing bigger trucks (for example B-triple trucks - prime mover plus 3 trailers) on the National Network. (COAG agreement Oct 2006).

This means at some time in the future we will see more trucks, including B-triples, using high

⁶ Infrastructure Partnerships Australia – Meeting the 2050 Freight Challenge – Report by Price Waterhouse Coopers, 2009
www.infrastructure.org.au/DisplayFile.aspx?FileID=262

traffic routes such as the Pacific and Hume Highways and potentially on urban routes to allow travel to and from urban destinations without the need to transfer to smaller trucks or split up the trailers.

Just as the Australasian New Car Assessment Program has helped to raise the profile of safety and the introduction of standard safety features in cars, there is an opportunity to influence the level of safety features in trucks, to obtain commitments on timelines for mandatory implementation of such features and for these to filter through the heavy vehicle fleet.

The approach to trucks is essentially similar to the approach adopted for cars - safer vehicles, safer roads and safer road users.

- Safer trucks on the roads – as noted above, vehicles with front, side and rear under-run barriers, stability control on prime movers and trailers, improved brakes, tamper-proof electronic on-board monitors, Advanced Emergency Braking System and a timeline for their implementation.
- Safer roads - Designated freight corridors specifically designed for trucks, with particular focus on lane numbers and width, passing lanes, appropriate gradients and crash barriers. Continued upgrades of regional and rural roads, better design of roads to cater for trucks including in urban areas.
- Safer road users - A national 'share the road' campaign in cooperation with truck associations and the Australian Government.

Rest Areas

Heavy vehicle driver fatigue reforms were introduced in 2008 specifically designed to improve safety by forcing drivers to take breaks or face fines.

According to NSW Roads and Traffic Authority Figures, 16% of all fatal crashes in 2008 involved fatigue.

There is a serious lack of rest areas suitable for truck drivers along most of the state's highways. Fatigue laws are welcome, however adequate infrastructure isn't in place for truck drivers to stop and rest.

More 'major rest areas' are required.

The Australian and New Zealand Road Transport and Traffic Authorities (Austroads) specify that a 'major rest area' must contain at least 15 parking spaces, separate parking for heavy and light vehicles and cater for long rest breaks.

The only 'major rest areas' in NSW are along the Hume Highway.

Currently, the Princes (530km), New England (570km) and Newell (1040km) Highways do not have one 'major rest area' along their entire NSW routes that complies with the Austroads requirements.

NRMA would like to see better facilities at rest areas. A 2008 NRMA audit of the Newell Highway found that only 20 per cent of rest areas had toilet facilities. NRMA believes better signposting of facilities and distances between rest areas is also needed.

The Australian Government has taken some action to improve rest area as part of its \$70 million *Heavy Vehicle Safety and Productivity Program*.

Last year the Australian Government announced the construction of six new rest areas and the upgrade of 22 more in NSW.

NRMA welcomes this investment and believes that all levels of Government must remain committed to providing adequate rest areas for truck drivers.

Resources available to the heavy vehicle Industry

The Victorian Transport Safety Group has produced two brochures to help inform and advise those purchasing trucks and/or trailers:

- Buying a Safer Truck⁷
- Buying a Safer Heavy Trailer⁸

These brochures contain good background safety information such as the following:
On Australian roads each year:

- Road crashes account for about half of all work-related deaths
- Crashes involving heavy vehicles are estimated to cost businesses and the community around \$2 billion a year
- Over 300 people are killed in crashes involving trucks
- In Victoria alone there are approximately 1000 crashes involving heavy vehicles where someone is killed or injured.

The brochures outline a number of reasons why it is important that truck safety is considered by anyone purchasing a truck or trailer:

Existing Occupational Health and Safety (OH&S) laws demand that all working environments must be safe, including vehicles. This means employers and fleet managers have legal obligations to choose trucks that provide a safe working environment. By making heavy vehicles as safe as practicable, the benefits are significant:

- Reduction of deaths and injuries

In the event of a crash, a safer truck will reduce the likelihood of death and injury to the driver and other road users.

- Lowering of WorkCover premium

A reduction in OH&S risk and claims can result in lower WorkCover premiums.

- Lower vehicle repair and replacement costs

⁷ Buying a Safer Truck – Latest Technology, 2007
<http://www.vta.com.au/Safety/TISG/tabid/1077/ItemId/609/Default.aspx>

⁸ Buying a Safer Heavy Trailer
<http://www.vta.com.au/Safety/TISG/tabid/1077/ItemId/609/Default.aspx>

With less likelihood of a crash, a safer truck can mean less down time spent on vehicle repairs, lower replacement costs and insurance premiums.

- Higher re-sale value of fleet vehicles

The re-sale value of a truck will increase if it hasn't been involved in a crash.

- Responsible profile to customers and community

Operators that buy safer trucks send out a message to drivers, customers and the community that they are serious about safety and the business has a commitment to road safety. This type of commitment can lead the business to be seen as an 'employer of choice'.

- Everyone benefits

Having a safer truck on the road benefits all road users including car occupants, motorcyclists, cyclists and pedestrians by reducing the potential for a crash or the impact of a crash.

What is needed?

Various Australian Design Rules (ADRs) will need to be changed (numbers 35, 38, 65 and possibly 64) to incorporate new safety requirements for heavy vehicles.

The ADRs are national standards for vehicle safety, anti-theft and emissions that apply to vehicles newly manufactured in Australia or imported as new or second hand vehicles, and supplied to the Australian market.

ADRs are signed into law by the responsible Commonwealth Minister following a consultative process involving government, industry, employee and consumer representatives as well as allowing opportunities for the public to provide comment.

The new ADR (84) mandating FUPS was the result of a Regulatory Impact Statement process which canvassed the views of interested parties, including state and territory governments as well as the heavy vehicle industry.

Sharing the road with trucks

NRMA recommends:

Be aware of blind spots – Trucks have large blind spots on both sides of the vehicle and beside the left door. The safest place to drive near a truck is well in front or well behind it where the driver can see you.

Keep to the left – Trucks use the entire lane so try to avoid travelling close to the centre-line on a road. When a truck overtakes you, the air turbulence could create a buffeting effect, especially if you are towing anything.

Keep your distance – tailgating any vehicle is dangerous, but even more so when travelling close to the rear of a large vehicle. If you can't see the side mirrors of the truck

in front of you, the driver can't see you. Truck drivers also need to make sure they don't drive too close to any vehicle in front of them.

Indicate your intentions – Truck drivers need extra space to clear intersections, change lanes and overtake. Keeping a safe distance from trucks means the driver can manoeuvre safely and minimise the risk of a crash. All drivers need to give plenty of notice before changing lanes or turning.

Give space to brake – Trucks are bigger and heavier than cars and take longer to stop safely. At 90km/h it can take a truck up to twice as far to stop as a car. Sudden braking by other drivers in front of trucks can put them at a high risk of collision.

Take care when overtaking – Ensure there is enough space for you to overtake safely. Make sure you overtake quickly within the speed limit and merge back into the lane only when you see both the truck's headlights in your rear-vision mirror.

Lights at night – Trucks have large mirrors without an anti-glare position so using high beams behind a truck can dazzle the driver and contribute to driver fatigue. Make sure you dim your lights when approaching any vehicle.

Be patient – Many trucks need to enter or leave driveways, roads or loading docks. Because of the size of some trucks, the road may be blocked for a short period when reversing. Never try to go around the back of a reversing vehicle as the truck driver may not be able to see you or the truck may be concealing a hazard.