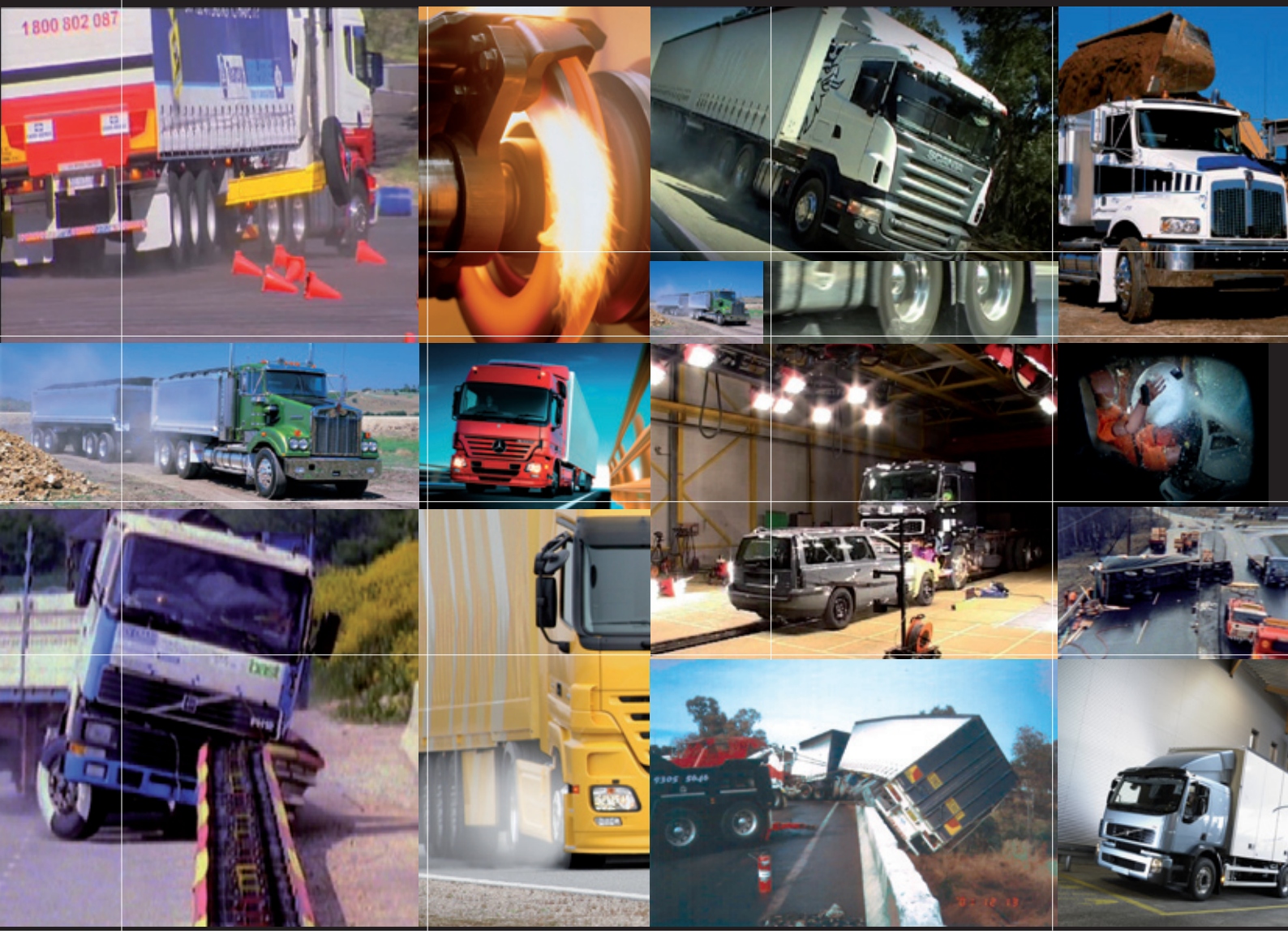
# Buying a safer truck

## LATEST TECHNOLOGY




TRANSPORT SAFETY GROUP

# Buying a safer truck

**The driver is the most valuable asset of companies that operate trucks. Companies that provide safer trucks are investing in the long term safety of their drivers and other road users.**

What's more, you can't earn a living or increase productivity if your truck is in the repair shop or worse still, damaged beyond repair because it didn't have the best available safety features. With competition for business and customers becoming more aggressive each day you can't afford to have a driver injured or your truck off the road.

This booklet provides you with important advice on safety that will help you make an informed decision the next time you buy a truck. It explains the main safety features to be aware of and highlights the important benefits gained from making a buying decision that considers safety as the number one priority.

For your convenience, a check list is located at the back of the booklet containing a list of important safety features for new and used trucks, along with a Q/A section on used trucks. Please use this information the next time you visit a truck dealership to discuss the purchase of your truck with a sales person.

# Your truck is your workplace – make it safer!

**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 your truck 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***

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

*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.*


- ***Higher re-sale value of fleet vehicles***

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

- ***Responsible profile to customers and community***

  When you buy a safer truck you send out a message to your drivers, customers and the community that you're serious about safety and your business has a commitment to road safety. This type of commitment can lead your 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.

## Choosing the right truck is determined by a number of important factors.

The lifecycle cost of a truck includes both direct and indirect costs of operation. Direct costs such as the purchase price, fuel, maintenance, and tyres need to be considered in tandem with indirect costs such as image, maximum load and safety.

It is essential that the truck you want to buy is properly specified to suit the intended task. Not providing the proper equipment reduces the potential commercial and safety benefits.

1. ***Operating Environment and Vehicle Layout*** – knowing what the truck will be used for and any other operational or legal requirements.
2. ***Vehicle Performance*** – choosing the appropriate engine power, torque, gearing, axle ratios, braking system, wheels and tyres, engine cooling, exhaust system, and fuel efficiency.
3. ***Handling*** – select the appropriate truck and/or trailer for the intended loads; take into account 'feedback/feel' from the truck so you know what the truck is doing and where it is positioned on the road.
4. ***Maintenance*** – a significant operating cost especially as the truck gets older.
5. ***Appearance and Functionality*** – your choice can have a significant effect on attracting customers and retaining drivers.
6. ***Health and Safety*** – incorporating Active and Passive safety features.

ruck

# Preventing crashes before they happen – **Active Safety**

**The optimum design and construction of a safe truck should incorporate features that prevent crashes before they happen. Crash prevention features are known as 'active safety'.**

There are two key areas of active safety features to be aware of when you're buying a truck, which will help provide a safer and comfortable environment for the driver. However, it is important to recognise that these features only offer benefits for drivers who drive within the vehicle's operational and environmental limitations and not those who exceed safety limits.

## 1. Braking and Stability Features

- **Anti-lock Braking System (ABS)**
- **Electronic Braking System (EBS)**
- **Electronic Stability Control (ESC)**
- **Disc versus Drum Brakes**
- **Trailer Braking**

## 2. Driving Assistance Features

- **Adaptive Cruise Control (ACC)**
- **Lane Assist**
- **Good Visibility**
- **Comfortable Climate**
- **Comfortable Driving**
- **Low Noise Level**

*European safety experts estimate that approximately half of all single vehicle crashes could be avoided if vehicles had ESC installed.*

## 1. Braking and Stability Features

**Having an efficient braking system in your truck is the best protection you can have to reduce the risk of a crash.**

**Brake technology has advanced greatly in recent years. Three systems – ABS, EBS, and ESC – have evolved to provide improved safety for trucks.**

### Anti-lock Braking System (ABS)

An Anti-lock Braking System (ABS) eliminates brake lock by controlling the braking pressure applied to individual tyres thus allowing the driver to continue steering, making it easier to avoid a crash.

ABS is engaged when braking is so hard that one of the wheels is about to lock. A control unit controls each wheel's brake cylinder via a modulator by releasing and applying the brakes very quickly.

In heavy vehicle combinations in which the trailer is also fitted with ABS, the risk of jackknifing during heavy braking is reduced.

ABS can be integrated with skid control technology and a roll back lock to control the braking and traction functions of the entire truck and trailer unit.

### Electronic Braking System (EBS)

The Electronic Braking System (EBS) was developed to electronically signal the brake system and speed up the reaction time of the brakes.

Electronic sensors fitted to the driver's footbrake register when the driver applies the brake. A signal is instantaneously generated and sent to the EBS control unit which determines the braking pressure for each axle and wheel. Air or hydraulic pressure is then used to apply the brakes at that wheel.

Most EBS systems include ABS; an electronically controlled braking system is designed to ensure that the braking power is distributed efficiently between the wheels depending on the load on the axle.

### Electronic Stability Control (ESC)

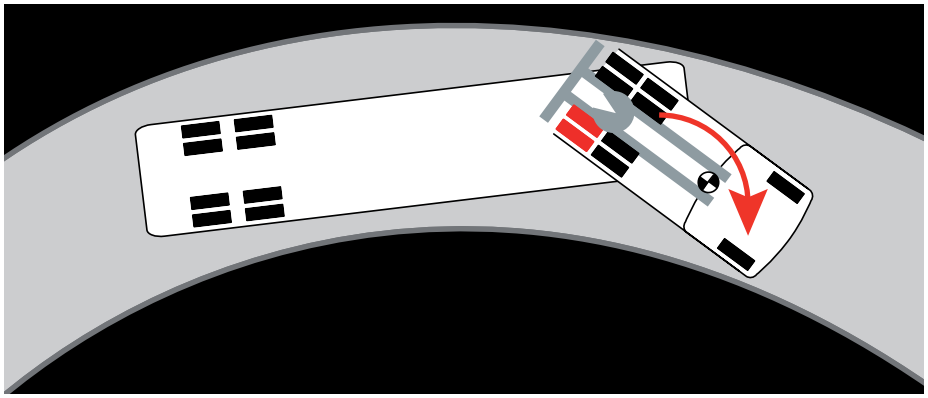
Electronic Stability Control (ESC) has many different names including Electronic Stability Program. It builds on ABS and EBS to provide advanced braking and stability control.

European safety experts estimate that approximately half of all single vehicle crashes could be avoided if vehicles had ESC installed.

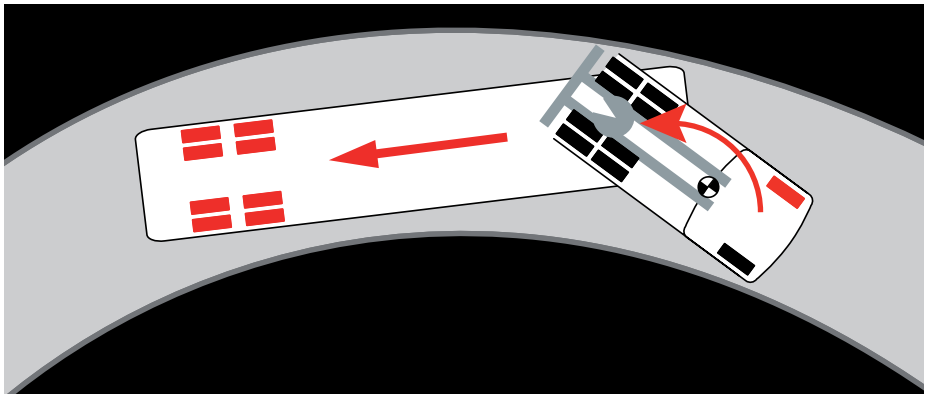
Widely used in Europe, this technology is also available for trucks in Australia. ESC helps prevent jackknifes, rollovers and other loss of control crashes.

ESC helps you remain in control of your vehicle by:

- Correcting impending oversteering or understeering
- Stabilising the vehicle during sudden evasive maneuvers e.g. swerving
- Improving handling on gravel roads e.g. road shoulders
- Improving traction on slippery or icy roads.
- Providing balanced braking depending on the load



*ESC slows the inner rear wheel and turns the prime mover into the bend and the front wheels regain their grip.*



*ESC brakes the outer front wheel to turn the prime mover back and give the back wheels grip. The trailer brakes to avoid jackknifing.*

**How?**

ESC actively monitors and brakes the wheels individually. Using a number of sensors that measure steering angle and lateral acceleration, the system detects when the truck is about to skid, is in danger of turning over on a bend, or when the trailer tilts as the result of a sudden evasive maneuver.

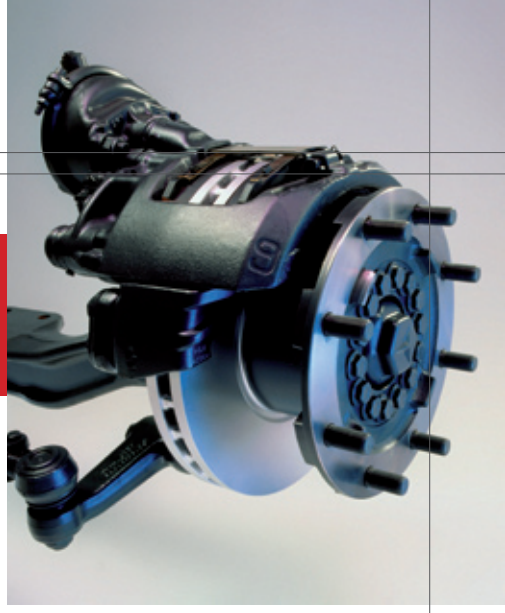
As soon as the impending skid or tilt is registered, ESC selectively brakes individual wheels and reduces engine torque to bring the vehicle back on the course the driver is steering.

Unlike ABS and Traction Control that only operate in the driving direction (longitudinal), ESC also helps the driver control sideways (lateral) movements that create a skid or tilt.

In simple terms, ESC is an in-built, active safety system that assists the driver to maintain control of their vehicle by slowing one or more wheels.


# Active Safety

*Brake technology has advanced greatly in recent years. Three systems – ABS, EBS, and ESC – have evolved to provide improved safety for trucks.*



## Disc Brakes versus Drum Brakes

Disc brakes provide better "hot" performance and do not fade under heavy, prolonged braking as well as reducing braking distance. Disc brakes are now available with many of the more advanced braking systems.

## Mixing Different Brake Systems

When purchasing a truck and/or trailer it is critical to be aware of mixing brake systems on vehicles and trailers. Some aspects of the mix problem are:

- mixing disc and drum brakes on different vehicles
- EBS on the truck without having load proportioning brakes on the trailer
- small diameter tyres being used on trailers without taking account of the brake performance implications (brake retardation force is increased as the wheel diameter is decreased, other factors being equal)
- ABS on trailers not working because ABS trailer connections are not fitted on motor vehicles
- excessive brake power on some vehicles in a combination.

Check with your manufacturer if unsure about the compatibility of the truck/trailer braking systems.

## European Vs American Vs Japanese

There can be a mismatch of different braking systems in Australia that can cause significant braking compatibility issues.

For example, In Europe it is more common to find features such as EBS, ABS, Load Sensing and Disc Brakes while American based prime movers often have no EBS, ABS (optional), no Load Sensing and Drum Brakes (Disc Brakes optional).

Check with your vehicle supplier to see what modern technology is now available in Australia.

## Trailers

Australian manufactured trailers often have conventional pneumatic brakes with few fitted with ABS and EBS, and Disc Brakes have started to become more common on trailers in the last couple of years.

The potential incompatibility of the brake systems between the truck and trailer can cause serious braking issues.

Trailers are sometimes poorly maintained. If buying a second hand heavy trailer make sure it comes with a current Roadworthiness Certificate.

## 2. Driving Assistance Features

Driver fatigue and distractions pose a serious risk to drivers. Active Safety features that increase the comfort and awareness levels for drivers will reduce the potential of a crash.

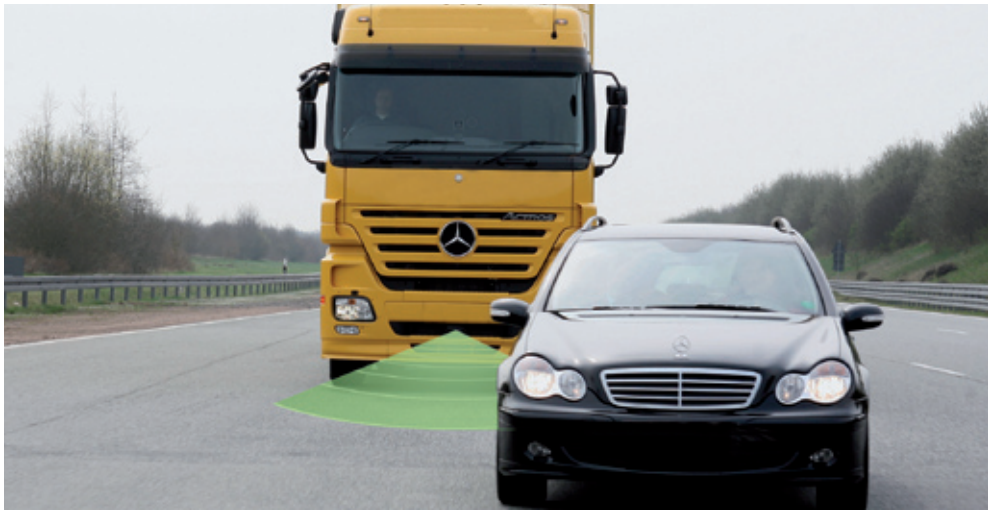
### Adaptive Cruise Control – selecting a safe distance between vehicles

Standard cruise controls lock the speed of the vehicle, but the Adaptive Cruise Control (ACC) system also has the option of locking the distance from the vehicle you are following.

ACC uses a form of radar to determine the speed and distance of the vehicle ahead.

ACC enables you to select the time and distance gap to the vehicle in front. The system maintains this gap by automatically controlling the throttle and brakes.

ACC can be deactivated by simply pressing a button on the ACC control or by depressing the brake pedal or clutch.



*ACC sends out a beam that detects the speed and distance of the vehicle ahead.*

### Lane Assist

Some manufacturers incorporate 'lane-assist' technology into their trucks. This is an image-processing system that involves a digital camera behind the windscreen detecting the vehicle's position with respect to the left-hand and right-hand road or lane markings. If the vehicle touches or moves over the lane markings, a warning signal sounds. This system helps the driver to keep to their lane and warns the driver in good time if the vehicle leaves the lane.

## Good Visibility

Making the driver's view of the surrounding traffic as good as possible lowers the risk of the unexpected. Ensure the cabin design has adequate visibility.

## Comfortable Climate

Excellent ventilation and high standards of air conditioning and climate control make driving safer.

## Comfortable Driving

To minimise the risk of misjudgment, instruments that are clearly legible, easy to understand and within reach will enable the driver to drive more effectively.

Fatigue is a truck driver's greatest enemy. A third of all fatal truck crashes are due to fatigue. A comfortable seat in the correct driving position will help avoid the onset of tiredness and sleepiness on long distance hauls. A good quality seat will also ease back problems.

## Low Noise Level

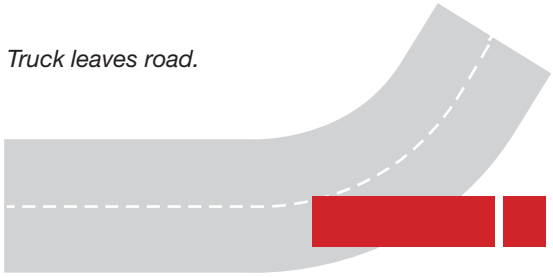
Noise and vibration affect both the driver's endurance and concentration, so appropriate soundproofing and a well-balanced cab suspension reduce the risk of crashes. However, the driver must be able to retain a sense of their surrounding road conditions. It's critically important that the design of the cab is sensitive to noise levels, but at the same time permits the driver to hear and monitor conditions inside and outside of their truck.

# When a crash happens – **Passive Safety**

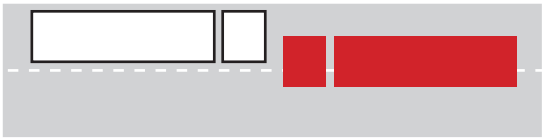
**It's an unfortunate fact but crashes do happen. When they do, the truck's 'passive safety' features help protect the driver, passengers and other road users from the consequences of a crash.**

*There are three common types of crashes where the truck driver is killed.*

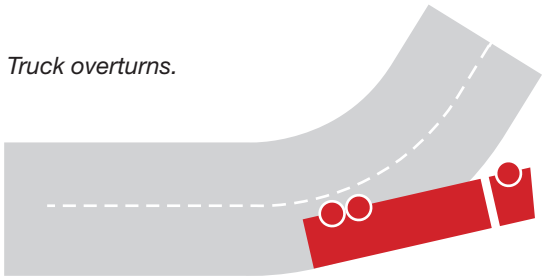
*Truck leaves road.*



*Truck to truck collision, front impacts front.*



*Truck overturns.*



There is a range of safety features that will protect the driver and other road users when a crash happens.

- **Integrated seat belt/suspension seat**
- **Airbags**
- **Cab strength**
- **FUP (Front Underrun Protection)**
- **Side and Rear Underrun Protection**

*It's an unfortunate fact but crashes do happen. When they do, the truck's 'passive safety' features help protect the driver, passengers and other road users from the consequences.*

## Seat belts save lives

Seat belts save lives in both cars and trucks. Crash statistics show that:

- An estimated 40 unbelted heavy vehicle drivers lose their life in Australia every year.
- Seat belts would have prevented or reduced the injuries suffered by truck drivers in at least 60 per cent of the crashes studied.
- If heavy vehicle seat belt wearing rates matched the rate achieved by car drivers, it would reduce unbelted truck driver deaths by about half.

Using a seat belt assists drivers to remain in their seat, thereby maintaining better control of the truck in the event of a crash situation.

**Buying an Older Truck? Retro-fitting is easy**

Most B-Pillar anchored seat belts can be retro-fitted with an integrated seat belt/suspension seat replacement; however, some vehicles require engineering and cab modification. In this case, a reputable seat supplier will inspect your vehicle to ensure the structural integrity of the cab and report any deficiencies.

*Retro-fitting a seat belt/suspension is simple and cost-effective.*

## Airbags

An airbag reduces injuries to the driver's chest and head.

Analysis of the actual crash sequence in 94 real-life crashes has shown clearly that an airbag reduces injuries in frontal collisions. The use of a seat belt in combination with the airbag is the most effective protection a driver can have in most crashes.

## Cabin strength

*ECE29 Cab testing*

For maximum safety, the cab frame itself should be made of high-strength materials and is reinforced at the doors and the front. In a collision, energy is transferred backward through the cab and a survival space is created. The cab mountings can be designed to yield to a certain extent, enabling the cab to be pushed backward to minimise penetration and likely injury to the driver.

The dashboard should be energy-absorbent, as should the items of trim at knee height. The steering column should likewise be designed to absorb energy and to yield on impact by the driver. Upholstery fabrics should be made of flameproof materials.

Look for cabs with ECE29 Cab Strength standard - or better.

## Front Underrun Protection (FUP)

*FUP prevents cars being trapped underneath.*

Each year across Australia around 300 road users are killed in collisions with trucks. In many situations the vehicle goes underneath the front of the truck, damaging the relatively soft roof of the car and exposing the vehicle's occupants to serious or fatal injury.

A Front Underrun Protection (FUP) device is a structure at the front of the truck to prevent a car from becoming trapped underneath, and will ensure that the safety features of passenger cars (such as air bags and crumple zones) are activated during a collision.

The FUP also ensures that the crash forces are distributed evenly across the front of the car as well as helping to prevent damage to the truck's steering – enabling the truck driver to remain in control.

Some trucks have both the FUP and an added bullbar. In this case the truck will need a specifically designed bullbar that does not interfere with or compromise the energy absorbing Front Underrun Protective device.

The fitment of FUP is one of the requirements to operate a 26 metre B-Double.

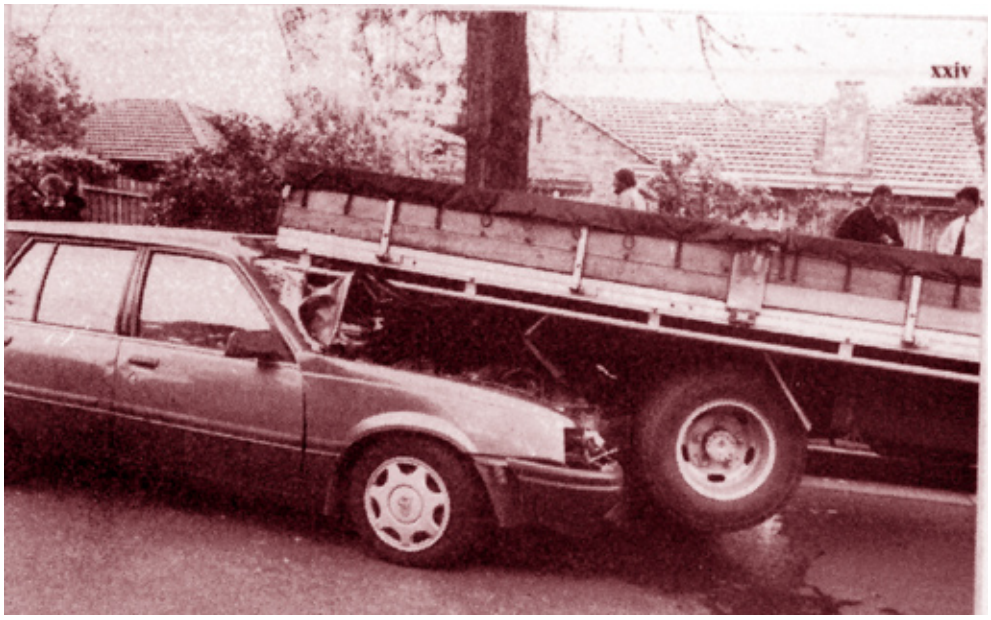
*Front Underrun Protection (FUP) device is a steel structure mounted under the front of the truck to prevent a car from becoming trapped underneath, and will ensure that the safety features of passenger cars (such as air bags and crumple zones) are activated during a collision.*

## Side and Rear Underrun Protection

In crashes involving other road users, side and rear underrun protection helps prevent serious injuries. Research shows that 40% of unprotected road users (pedestrians, cyclists, motorcyclists) are killed as a result of impact with the side of a truck.



*Results of a side underrun crash.*




*Results of a rear underrun crash.*

The rear of the truck is impacted in 9% of vehicle occupant deaths and 12% of unprotected road user deaths.

# Health & Safety Checklists

**The next time you go to buy a truck, check for these important safety features:**

## Safety Feature

| | Yes | No |
|---|---|---|
| Electronic Stability Control | | |
| Electronic Braking System | | |
| ABS | | |
| Cab strength to ECE29 standard or better | | |
| Adaptive Cruise Control | | |
| Front Underrun Protection | | |
| Side Underrun Protection | | |
| Rear Underrun Protection | | |
| Integrated seat belt/suspension seat | | |
| Seat adjustment | | |
| Audible reversing device | | |
| Load securing devices | | |
| Airbag | | |
| Noise level, comfort, ventilation and visibility | | |
| Collapsible steering wheel | | |
| Safe access to and from the vehicle | | |
| Cabin layout / Instrument layout | | |

## Used Trucks Q/A

**When purchasing a used truck you need to ask yourself:**

| Question | Answer |
|---|---|
| How many kilometres has the truck travelled? | |
| What is the service history? | |
| Where are the maintenance records? | |
| Are the parts used to service the truck to the manufacturer's specifications? | |
| What type of work was undertaken by the truck? | |
| What are the active and passive safety features aboard this truck? | |

# What is a Roadworthy Certificate?

**When you purchase a used truck a Roadworthy Certificate is required, which is a check of the vehicle to ensure that key components have not worn or deteriorated and that the vehicle is safe for normal road use.**

A roadworthy inspection only covers the major safety related items, including:

- wheels and tyres
- steering, suspension and braking systems
- seats and seat belts
- lamps and reflectors
- windscreen and windows, including front windscreen wipers and washers
- the structure of the vehicle itself
- safety related items on the body, chassis or engine.

The roadworthiness test is not a check of the mechanical reliability or general condition of the vehicle.

The certificate does not mean:

- the vehicle is in top condition without any wear or deterioration
- non-safety related accessories such as the air conditioner and radio are working
- items checked during the roadworthy inspection will continue to function after the inspection e.g. a brake light can stop functioning at any time after the inspection

The Roadworthy Certificate will also not reveal if the truck is fitted with parts not supplied by the original manufacture of the truck.

# More information

If you want to know more about vehicle safety, please visit:

**www.vicroads.vic.gov.au**

**www.ntc.gov.au**

**www.dotars.gov.au**

**www.vta.com.au**

**www.tac.vic.gov.au**

# Buying a safer truck

The Victorian Transport Industry Safety Group acknowledges the following organisations for providing their support of this road safety initiative

**Daimler Benz**
**Kenworth**
**Knorr-Bremse**
**Scania**
**Transpec**
**Volvo Trucks**

For more information visit their websites

The Victorian Transport Industry Safety Group includes senior representatives from WorkSafe, the Coroners office, Transport Workers Union, Victorian Transport Association, VicRoads, Victoria Police, the Transport Accident Commission, the Bus Association of Victoria, Victorian Waste Management Association and Monash University Accident Research Centre.

To order this publication please contact the VicRoads Bookshop 60 Denmark Street Kew 3101 Te: (03) 9854 2782