HEAVY & MULTI COMBINATION HANDBOOK

YUGO DRIVING SCHOOL
We train you... We test you

79-85 Hallam Valley Road,
Dandenong South VIC 3175
PO Box 4435, Dandenong South VIC 3164
TEL: (03) 97940040
WEB: www.yugodrivingschool.com.au
EMAIL: info@yugodrivingschool.com.au

THE EVOLUTION OF B-DOUBLES

B-Doubles originated in Canada about 1973 and have operated in New Zealand since the late 1970's.

In Australia they were introduced into Western Australia in 1983 and Queensland in 1984 with N.S.W following almost immediately.

A study by the University of Saskatchewan in Canada proved conclusively that the crash rate of B-Doubles is only 53% of that of single articulated vehicles. If B-Doubles replaced the conventional single articulated and considering the greater payload of B-Doubles the crash rate can be reduced by 65%. It must also be noted that Canada does not have designated B-Double routes, therefore under Australia's guidelines the crash reduction should be even better.

The first B-Doubles in Victoria were milk tankers operated by Murray Goulburn in the early 1980's. Permit at that stage were $12,000 with very limited access to roads. This operation proved to be not as efficient as expected for Murray Goulburn, however the trials did prove to be beneficial to the transport industry in certain applications.

The "Australian Road Research Board" (ARRB) has results from research that indicate that *the B-Double is more stable than a single articulated vehicle through low speed turns such as those encountered in urban intersections.*

The National Association of Australian State Road Authorities has predicted that 16 lives would be saved and 50 serious accidents would not occur annually when B-Doubles replace single articulated vehicles. To date in Australia, B-doubles are achieving a safety record 10 times better than any other road vehicle.

THE CHAIN OF RESPONSIBILITY

What is the chain of responsibility?

The chain of responsibility means that anybody – not just the driver – who has control in a transport operation can be held responsible for breaches of road laws and may be made legally liable.

In other words, if you use road transport as part of your business, you share responsibility for ensuring breaches of road laws do not occur. So, if a breach of road transport law occurs due to your action, inaction or demands, you may be legally accountable.

Put simply this means:
Control = responsibility = legal liability.

FATIGUE MANAGEMENT

New fatigue laws, implemented in September 2008, set revised work and rest limits for heavy vehicle drivers and require better management of driver fatigue. The reform makes all parties in the supply chain legally responsible for preventing driver fatigue. It includes three work hours options, linked to safety, that you can choose from to suit your business.

The new laws are consistent with current obligations under Occupational Health and Safety (OH&S) laws that also require employers and employees take all reasonably practicable steps to manage driver fatigue.
The reform changes the focus from regulating hours to managing fatigue. Working long hours and fighting your body clock at night is widely recognised as high risk. Operators and drivers who do the right thing by managing those risks through accreditation schemes will have a greater say in when they can work and rest.

Current productivity levels can be maintained simply by planning trips and rest breaks, checking records, and training staff to understand the causes of driver fatigue.
The three scheme options are:

- Standard Hours ('default' 12 working hours a day)
- Basic Fatigue Management (up to 14 hour work with accreditation)
- Advanced Fatigue Management (accredited risk management approach)

The Standard Hours option will suit most businesses as it sets default limits for work and rest. If you need more flexible hours, you can consider applying for Basic Fatigue Management (BFM) or Advanced Fatigue Management (AFM).

THE WORK DIARY

In Victoria if you are working under standard hours you must keep a work diary and record your hours of work for any trip that goes further than 100km from the bus or truck's home base. If you are working under Basic Fatigue Management or Advanced Fatigue Management work and rest option, you are required to carry and complete a work diary at all times.

You can get a work diary from any VicRoads Customer Service Centre.

A work diary must contain a record of the driver's work/rest history as required under the legislation. The work diary contains similar information to the log book and is issued by VicRoads. Drivers must complete daily sheets to record their work/rest history.

Drivers must use a work diary if they are driving a heavy vehicle with a gross vehicle mass of over 12 tonnes or a combination, if the total of the GVM is over 12 tonnes, or a bus with more than 12 seats (including the driver); or driving more than 100 kms from base.

The work diary must be used and carried at all times if the driver is working (Work & Rest time rules apply):

- Standard hours RR and works more than 100 km from work base;
- RR Basic Fatigue Management (BFM); or
- Advanced Fatigue Management (AFM).

Drivers must always keep a work diary in their vehicle that contains current records of work and rest time within the last 28 day period. This includes any supplementary records (e.g. records kept if the work diary is lost – see relevant section below) relevant to the period.

Important: *regardless of whether a driver is required to keep a work diary, he or she is still required to comply with the work/rest hours limits and appropriate records of work/ rest hours must be kept.*
Under the legislation, work includes any time driving your vehicle and doing activities related to your vehicle's operation. Remember work also includes any time you are sitting in the driver's seat while the engine is running – this could include waiting in a queue, loading and unloading, paperwork, refuelling, cleaning or servicing your vehicle etc. If a driver travels in WA or the ACT for less than seven days he or she must continue to use the work diary.

BAC (BLOOD ALCOHOL LIMIT)

The effects of alcohol on driving performance are well known. It is an offence to exceed the legally prescribed limit whilst driving a large vehicle in Victoria.

You must have a zero Blood Alcohol Concentration (BAC) at all times if you are the driver of:

- any bus
- any rigid or articulated truck over 4.5 tonnes GVM
- a heavy vehicle with Driver Under Instruction plates, in a training situation.

The effects of alcohol take a long time to wear off. If you drink alcohol the night before, you may be over the legal limit the next morning. It is best not to drink at all on the night before driving, or have only one or two drinks many hours before driving.

MEDICATION

Some medicines may cause drowsiness. Those that can cause drowsiness have labels on them warning against operating vehicles or machinery. Always ask your chemist about possible effects on driving while on medication, whether the medication is prescribed by your doctor or bought over the counter.

Common medicines that may cause drowsiness include cold tablets, hay fever and allergy medicines.

If you have to drive while you have a cold, hay fever or allergy, it is much safer to drive with these symptoms than to take medicines which will cause drowsiness at the wheel.

MEDICAL CONDITIONS

There is a wide range of medical, hearing and eyesight conditions which will prevent the issue of a heavy vehicle licence. Some common conditions that may affect the issue of a heavy vehicle licence include:

- visual defects, including loss of vision in one eye
- angina, heart disease/surgery/hypertension, having a pacemaker
- psychiatric disorders
- epilepsy
- diabetes
- sleep apnoea
- head injuries, dementia, stroke
- Parkinson's disease, multiple sclerosis
- physical disabilities/partial or complete loss of limbs.

If you are concerned that you may not be eligible, you should speak to your doctor or contact VicRoads on 13 11 71 and ask to speak to the Medical Review area.

Having these conditions does not necessarily prevent the issue of a licence but will require careful evaluation. In some cases a restricted licence may be considered. It is advised that prior to undertaking training or testing you should seek clarification from VicRoads. If you have any medical condition, it is in your own interest to ensure that it is appropriate for you to apply for the category of vehicle in which you are interested.

There is a legal obligation for all drivers to notify VicRoads if they have or develop a medical condition that may impact on their ability to drive safely. In addition to the appropriate licence, you must obtain a Driver Accreditation to drive a vehicle carrying passengers for hire and reward. Strict eyesight requirements apply to Driver Accreditation applicants.

RESTRICTED VEHICLE TYPES

Most vehicles will be suitable for on-road tests, however some have restrictions placed on them as follows and cannot be used for licence testing:

- Armoured vehicles
- Dual control vehicles
- Vehicles displaying trade plates
- Vehicles carrying a placard of dangerous goods
- Special Purpose Vehicles (except emergency service vehicles)
- Cranes, specialised road working vehicles and farm machinery
- Federal Interstate Registered vehicles
- These vehicles may only be used if a special permit has been supplied by the relevant transport authority
- Livestock transport vehicles
- If the load is livestock
- *Buses, coaches and motor homes
- Buses or motor homes will only be permitted to be used as an assessment vehicle for light rigid assessments only as long as the vehicle fits the specification for a light rigid vehicle.

- For all other vehicle categories, buses, coaches and motor homes will only be approved for use as an assessment vehicle in special circumstances as determined by VicRoads. In such circumstances these vehicles are exempt from carrying a load. Assessments must not be conducted in these vehicles when carrying passengers, with the exception of VicRoads auditors.

ASSESSMENT IN A LOADED VEHICLE

To check an applicant's ability to drive a loaded heavy vehicle some tasks, specifically the on-road drive tasks, require the vehicle to be loaded. All loads must be positioned and secured in compliance with the National Transport Commission's guidelines, available at the National Transport Commission website.

The loaded vehicle must have a mass which is at least 75% of the maximum mass allowable for the vehicle to be driven on public roads. This is at least 75% of either the legal mass limit, Gross Vehicle Mass (GVM) for rigid vehicles or Gross Combination Mass (GCM), for articulated or heavy trailer combinations. The vehicle must be able to maintain adequate road speed.

If the applicant is being assessed in their own vehicle (MC is not permitted by VicRoads), it is the applicant's responsibility to check the load requirements beforehand and be prepared to provide documented evidence such as a weighbridge ticket that was issued within the past 24 hours. The accredited heavy vehicle assessment provider must ensure that photographic evidence of the load in the applicant's vehicle is captured and kept on file for auditing purposes.

GRADUATED LICENSING SCHEME

The VicRoads Graduated Licensing Scheme requires you to gain experience driving smaller vehicles before you move on to driving larger, more complex vehicles.

You can only drive vehicles in the category for which you are licensed, or vehicles in lesser categories. For example, when you get your Heavy Rigid (HR) licence you can drive buses and trucks in the Light Rigid (LR), Medium Rigid (MR) and Heavy Rigid (HR) categories, but you cannot drive vehicles in the Heavy Combination (HC) and Multi Combination (MC) categories. When you get your Multi Combination (MC) licence, you can drive any bus or truck.

The categories of Victorian bus and truck licences are national categories. The licence is recognised throughout Australia. However, if you move interstate to live, you will need to get a licence in that state.

PENALTIES FOR UNLICENSED DRIVING

It is an offence to drive a vehicle in a category for which you are not licensed. It is also an offence to employ or allow someone who does not hold the right category of licence to drive that vehicle.

If you have a crash while driving a vehicle you are not licensed to drive, the Transport Accident Commission may not pay all your compensation claim.

DRIVER LICENCES

Driver licences are issued in the categories shown in the diagram on the next page. If you have a licence, you may drive any class of vehicle within or above your licence category as shown in the diagram. Check what you can drive with each category of licence. The letters written in brackets are the code for the licence class. This code will be printed on your new licence in the square labelled Licence Type.

The National Heavy Vehicle licence scheme includes all vehicles above 4.5 tonnes. All states and territories are implementing common rules and categories for heavy vehicles.

LICENCE RESTRICTIONS AND CONDITIONS

You can only drive vehicles in the categories shown on your licence and vehicles in lesser categories. A heavy vehicle licence holder driving or in charge of a vehicle greater than 4.5 tonnes gross vehicle mass (GVM) or a bus must carry their licence card or receipt at all times when driving.

National heavy vehicle licence classification

CAR (C)
A vehicle of 4.5 tonnes GVM or less, seating up to 12 people.

You are eligible for a car licence at 18 years of age.

LIGHT RIGID (LR)
A vehicle greater than 4.5 tonnes but no greater than 8 tonnes GVM or which seats more than 12 people (including driver).

You are eligible for a LIGHT RIGID licence after holding a car licence for 1 year.

MEDIUM RIGID (MR)
Any 2 axle rigid vehicle greater than 8 tonnes GVM.

You are eligible for a MEDIUM RIGID licence after holding a car licence for 1 year.

HEAVY RIGID (HR)
A vehicle 8 tonnes GVM and above, with 3 or more axles.

You are eligible for a HEAVY RIGID licence after holding a car licence for 2 years.

HEAVY COMBINATION (HC)
(a) A prime mover to which is attached a single semi-trailer that has a GVM more than 9 tonnes plus any unladen converter dolly; or (b) A rigid motor vehicle to which is attached a trailer that has a GVM more than 9 tonnes plus any unladen converter dolly.

You are eligible for a HEAVY COMBINATION licence after 2 years of holding a licence, with at least 1 year of holding either a MEDIUM RIGID or HEAVY RIGID vehicle licence.

MULTI COMBINATION (MC)
A Heavy Combination vehicle with more than one trailer.

You are eligible for a MULTI COMBINATION licence after 1 year of holding a HEAVY COMBINATION or a HEAVY RIGID vehicle licence. You must also successfully complete an approved MULTI COMBINATION training course.

Note: The content and duration of the course will depend on the category of licence held.

TRANSMISSION TYPES

Your licence shows what kind of vehicle transmission you can use.

If you get your licence in a vehicle fitted with a synchromesh gearbox, your licence will show code 'B'. This means you can only drive a bus or truck with a synchromesh or automatic transmission.

If you wish to drive non-synchromesh vehicles (commonly known as crash boxes, constant-mesh or 'Road Ranger' gears) and hold a licence with a 'B' code, you will have to be re-tested in a vehicle fitted with that type of transmission.

- If you get your automatic or synchromesh bus and truck licence while still on a probationary automatic car driver licence, the licence will be converted to a synchromesh ('B' code) classification only.
- If you get your automatic bus and truck driver licence while on a manual car driver licence, the synchromesh ('B' code) classification will apply immediately.
- If you have obtained your LR, MR or HR licence in a non-synchromesh gearbox, you will be able to complete the HC or MC category in an automatic vehicle and still keep the non-synchromesh endorsement.

PERMITS

Permits are no longer required on approved routes for B-Doubles up to 62.5 tonne.

If a B-Double moves off an approved road a permit is required. These permits must be obtained from the appropriate council, shire or NHVR. When operating interstate, always check for special requirements.

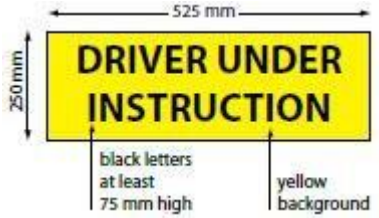
WARNING

Unauthorised use of a non-approved road or failure to comply with any of the requirements in the VicRoads Information Bulletin will leave the driver and operator liable for prosecution.

DRIVER UNDER INSTRUCTION

When you are learning to drive a truck or bus, you must always display **DRIVER UNDER INSTRUCTION** plates at the front and back of the vehicle. These plates must meet the following requirements:

Driver Under Instruction signs are available for purchase from YUGO DRIVING SCHOOL.



IN CABIN TECHNOLOGY

For assessment purposes heavy vehicles will be equipped with cabin technology approved by VicRoads. The practical assessment will now be recorded using audio, video and GPS technology. Both the applicant and assessor will be recorded during the assessment.

POWER REQUIREMENTS FOR B-DOUBLES

Power requirements for a B-Double are as per AUSTROADS requirements.

- Adequate power to start from a rest position on a 10% gradient (One metre rise in ten metres)
  Maintain a speed of 70 km p/h on a 1% grade whilst laden.
- Minimum power requirement for a hauling unit (B Double Prime-mover) is 300 kilowatts.

ABS BRAKING SYSTEM

Anti-Lock Braking Systems are required to be fitted to all Prime-mover vehicles in Victoria. Trailers involved in general freight do not require ABS Braking to be fitted. Dangerous good vehicles must have ABS Braking fitted to all axles of the prime-mover and all trailers (specifically road tankers). ABS Braking is not required to be fitted to road trains.

SPEED LIMITS FOR B-DOUBLES

B-Doubles must be Road Speed limited to maximum of 100 km p/h. In Victoria, B-Doubles must therefore not exceed 100 km p/h or the posted speed limit, whichever is the lesser.

SPRAY SUPPRESSION DEVICES

An ineffective legal requirement to fit spray suppression devices on B-doubles has been removed under the Heavy Vehicle National Law (HVNL).

Spray suppression devices on B-Doubles were a requirement under previous individual state laws, except Western Australia and the Northern Territory.

However, the National Transport Commission (NTC) concluded on the basis of empirical evidence that the devices were not effective in real-world conditions at reducing the spray from B-doubles on wet roads. As a result, their requirement is not included in the HVNL.

AIR HOSE CONNECTORS

All Multi Combinations vehicles require polarised hose connectors (One male fitting and one female fitting).

In Western Australia it is mandatory to have clear bore fittings to allow air to travel the greater distance with less restriction and achieve optimum braking.

AIR TANKS

Air Tanks store compressed air. The tanks will hold enough air to allow the air brakes to be used several times even if the compressor stops working. The truck's supply air tank receives air from the compressor and delivers it to the primary and secondary air tanks. The tank closest to the compressor is commonly referred to as the "wet tank" because that is where most moisture condenses.

If your vehicle has air brakes, you should drain the air tanks daily.

SIGNS

Long Vehicle Sign:

A warning sign shall be affixed in a horizontal position at the rear of the back trailer. The sign must be made of rigid material at least 1020 mm long x 250 mm high. Retro-reflective yellow background with the words **'LONG VEHICLE'.**

This sign must be mounted so that no part of it is higher than 1800 mm or less than 500 mm above the ground.

- This sign must be fitted to all B-Doubles that are 22 metres or longer. When the vehicle is not in a B-Double configuration, 'LONG VEHICLE' sign must not be displayed.

Portable Warning Signs:

Heavy Vehicles over 12 tonnes must carry three portable warning signs.

- If your vehicle breaks down, you must place one sign to the rear and one sign to the front of the vehicle, between 50 and 150 metres from the vehicle.
- The third sign must be placed at the side of the vehicle nearest the centre of the road.

NOTE: If you have broken down in the right hand lane of a multi-lane carriageway, the third sign should be to the left of the vehicle.

Over-Dimensional Signs

O.D. signs show approved routes for 'Over-Dimensional' vehicles (HC & MC vehicles are not Over-Dimensional vehicles).

Do Not Overtake Turning Vehicle Signs:

This sign allows a long vehicle (over 7.5 metres) to occupy space outside an assigned lane when turning so long as:

- You are driving a vehicle over 7.5 metres long with a sign on the rear "Do Not Overtake Turning Vehicle".
- The vehicle is within 50 metres from a corner.
- The move can be made safely.
- Wherever possible you should you set the back of your vehicle so that the traffic behind you cannot overtake your vehicle on the side you are turning to.

Where the vehicle overall length is more than 22 metres, the converter dolly must have a LONG VEHICLE sign fitted to the rear of the dolly.

Road Train Sign:

- A warning sign shall be affixed in a horizontal position to the front of the hauling unit and to the rear of the rear most trailer of all road trains.
- The sign shall consist of retro-reflective yellow background not less than 1200mm wide by 250mm high with the legend **'ROAD TRAIN'** in black letters 180mm high.

- The front warning sign shall be fixed in such a way that it is not below the bumper bar of the hauling unit.
- The rearmost warning sign is to be no more than 3 metres above ground level.
- No reflector sign other than the **'ROAD TRAIN'** warning sign, except as permitted by law shall be affixed to the front of any road train.
- The warning sign shall not obscure any light, registration plate or other safety device.

- A **'ROAD TRAIN'** warning sign shall not be displayed on any vehicle unless such vehicle is operating as a road train.

NOTE: The use of the ROAD TRAIN sign on vehicles other than road trains is prohibited.

FOLLOWING DISTANCE FOR B-DOUBLES

When following a vehicle more than 19 metres long or more than 2.5 metres wide, a minimum distance of 200 metres must be maintained from that vehicle.

Exceptions:

- When driving on a multi-lane carriageway
- When overtaking
- When in a built up area

area. This is also important when crossing bridges to help safeguard against bridge span structure damage.

HANDLING CHARACTERISTICS

Off Tracking:

The maximum allowable tolerance for off-tracking in a B-Double is 100mm. In rural conditions, additional encroachment off the shoulder compared to standard 19 metre semi-trailers is unlikely, as high speed off-tracking is relatively small. B-Doubles are capable of operating wherever semi-trailers up to 19 metres in length are operating.

Manoeuvrability:

The AUSTROADS requirement is that a B-Double be able to turn 180 degrees between two walls 25 metres apart. This means that BDouble prime movers usually have more turning lock available than a lot of regulation vehicles.

NOTE: this requirement does not mean that the vehicle has to be capable of this manoeuvre with trailers connected.

Cut-In

When any vehicle goes around a curve or turn, the rear wheels usually follow a shorter path than the front ones. This is called cut-in. The greater the length of the vehicle and the sharper the turn, the greater the cut-in will be. See the diagram on the right. On your approach to a right bend, steer close to the left side of the lane to reduce interference with oncoming traffic. On your approach to a left bend, steer close to the right side of your lane to make sure that your left wheels stay on the road surface.

On a ninety degree right angle turn, the rear trailer wheels of a 25 metre B-Double would normally cut in more than that of a standard Semi-trailer.

Swept Paths:

Swept paths for a 23 metre B-doubles generally fall inside those for a 19 metre semi-trailer.

Factors Affecting Handling Characteristics:

- Uneven surfaces, change of surface (roundabouts / intersections) Incorrect loading of trailers.
- Overtaking / passing. Must be careful not to drop off the shoulder due to the camber of the road.
- Over braking on one wheel or trailer, (incorrect brake adjustment or poorly maintained brakes).
- Trailer whip (ring feeder versus turntable).

PARKING A COMBINATION VEHICLE

Unless a parking sign says that long vehicles are allowed to park in an area, you must not park in a built-up area for more than one hour if your vehicle has a GVM over 4.5 tonnes or is 7.5 metres long or longer, unless permitted by the local Council, or if you are engaged in dropping off or picking up goods.

If any parking sign limits parking to less than one hour, you must obey that sign. You must always be careful and try to park as far away from the stream of traffic as possible. Where there is parallel kerbside parking, you are not allowed to double-park alongside a parked vehicle.

VEHICLE CONTROL

KNOWING WHEN TO CHANGE GEARS

There are two ways of knowing when to shift gear. You can use either or both:

- Engine speed (RPM). The vehicle manufacturer's handbook will specify maximum and minimum revs and road speed for each gear. Your vehicle may have a tachometer (tacho), which measures engine revs. If so use it.
- Engine sound. After a while you will recognise, from the sound of the engine, when to change gear. **Changing down gears:** There are special times when you should change down gears:

Going up hills: You may have enough speed to make it up the hill without changing. But if you start to slow down you must change down gears to prevent the engine from "labouring".

Slowing or stopping: Use your brakes first. Then select the right gear to change down into.

Before entering a bend: You should brake, then change down to a gear that is safe for the bend. You need to provide slight power through the bend to keep the vehicle stable. You can also accelerate out of the bend.

Before turning: You should brake, then change down to a gear that is safe for the turn. You need to provide slight power for the turn to keep the vehicle stable. You can also accelerate out of the turn.

Before starting down a hill: Always ensure you are in the proper gear before starting down a hill. Once going down the hill, use your brakes if you need to. Be very careful changing gears going downhill as you may get stuck in neutral and lose control of your speed.

BRAKING

You must be familiar with all braking devices and how they work for your vehicle. You should know what sort of braking system your vehicle has: whether it has hydraulic brakes or air brakes. Remember, the heavier a vehicle is, the harder it is to stop and the more time is needed for it to stop. You must know the height, weight and width of your vehicle.

How brakes work: Most heavier vehicles use air brakes rather than the hydraulic type brakes fitted to passenger cars. But some rigid vehicles do use hydraulic brakes.

Reducing brake pedal pressure: As the vehicle slows down, you need less pressure from your foot on the brake pedal to keep slowing down. So you have to ease your foot off the brake pedal, as you slow down. If you do not ease your foot off the brake pedal, the wheels may lock and cause the vehicle to skid.

Effect of load: The heavier your load, the harder it is to stop and the more distance you need to stop. With a heavy load you must brake earlier and harder.

Braking on hills: Continuous heavy braking on a long hill will cause brake linings to heat up. After a while the brakes will no longer slow the vehicle. This is called "brake fade". To help reduce brake fade, shift into a lower gear before starting down a hill and use auxiliary brakes or "retarders". When going down a hill, you should use brakes to prevent speed build-up before it occurs. Do not wait until speed has built up or it may be too late. You must select the proper gear before starting down the hill. You might need to brake going down a hill even when you have selected the correct gear before starting down. Apply the brakes firmly to reduce your speed then release them to prevent brake fade. Repeat this when you need to.

Braking with an empty vehicle: An empty vehicle, or one with a light load, is very different to handle. You notice this most when braking, steering and going up hills. You may need to adjust your braking if your vehicle is empty.

Hydraulic brakes: Hydraulic brakes consist of a master cylinder which works like a pump operated by the brake pedal. The master cylinder may be assisted by a vacuum or air booster unit. When the brake pedal is pushed, the master cylinder pumps hydraulic fluid through a pipe to a wheel cylinder (at least one to each brake drum).

The arrangement distributes the pressure of the system to the different sets of wheels so as to keep the vehicle on course. What this means for the driver is that when the brake pedal is pushed, the piston in each wheel cylinder is pushed out, pressing its brake shoe or pad against the brake drum or disc. The harder you press the brake pedal, the harder the brakes will work to stop your vehicle. Large, hydraulic brake vehicles are equipped with emergency brake systems that mostly work off vacuum or booster units. These are automatic systems similar to those in air brake vehicles. If there is a trailer breakaway or a lack of hydraulic fluid, the Emergency Braking system should stop the vehicle very quickly.

If this happens you will need to be ready to handle a skid, as the emergency brakes will "grab" differently to your standard hydraulic brakes.

Air brakes: Air brakes are often used on heavier and multi-axle vehicles. Pressing the brake pedal opens a valve which releases compressed air from a tank. The air reaches the brakes through air lines and forces the brake shoe or pads against each drum or disc. The harder the pedal is pushed, the more air is released from the tank and the more pressure is applied at each brake, so the harder the brakes will work to stop your vehicle. Like hydraulic brakes, air is supplied to the brakes through a distribution system so that the whole rig will stay on course during braking. In air braking systems on heavy vehicles, a brake ratio valve can sometimes be adjusted. You adjust it according to the weight of different loads. These valves work in different ways so you must check the vehicle manufacturer's handbook before changing the setting.

Warning Note: *Air brakes feel different from hydraulic brakes. There is a delay time of up to one second for air to reach the brakes after you push the pedal. This means that at 60 km/h you will travel 17 metres from when you begin to push the pedal until the brakes start to work and then it will take further time to stop. This means you need to think well ahead and brake much earlier than you would in a passenger car.*

Spring-loaded brakes: Most vehicles with air brakes also have spring-loaded brakes, for emergencies and parking. Springs push the brakes on. The springs are held back by air pressure. When there is a serious air loss, the springs are released and the brakes go on automatically.
Spring brakes act as **emergency brakes**. When there is not enough air pressure to work the air brakes, the spring brakes automatically bring the vehicle to a sudden stop.

Spring brakes stop a fully loaded vehicle, so if your load is light, your wheels may lock up before the vehicle has stopped. If this happens you should be ready to handle a skid situation. Spring brakes also act as parking brakes. When the engine is off, air pressure falls and the spring brakes then work automatically. When you put the park brake on with the engine running, it releases the air supply to the spring brakes, causing them to come on.

Auxiliary brakes or speed retarders: Auxiliary brakes are often fitted to larger vehicles. Auxiliary brakes slow either the engine or the drive train. Auxiliary brakes or speed retarders are often used during long descents. Many auxiliary brakes are noisy. Try not to use them in built-up areas. You may be fined for excessive noise. Check the vehicle manufacturer's handbook for the sort of auxiliary brakes used on your vehicle.

Speed retarders are separate from wheel brakes. They come in a number of forms. Speed retarders will only slow, not stop the vehicle. However, on wet or slippery road surfaces, the use of auxiliary brakes can cause drive wheel lock-up. This can result in a rapid and unrecoverable sideways sliding, and vehicle jack-knifing.

Trailer brakes

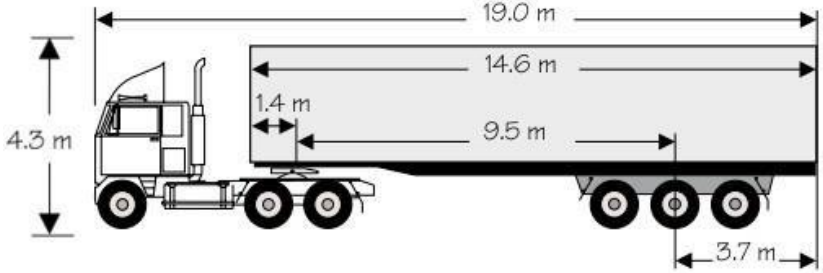
The air brakes on a trailer work every time the foot brake is used. A separate hand control brake allows the trailer brakes to be put on without the prime mover brakes being applied. Trailer brakes may be used when:

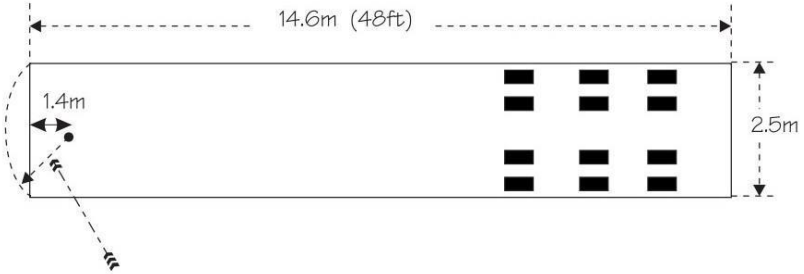
- you are stopped at lights
- when changing down a gear while going down a hill starting on a hill.

Be very careful using trailer brakes by themselves at road speeds. The trailer brakes may be used alone but you should try not to use them often as there is a danger of trailer brakes overheating and fading.

SEMI-TRAILER DIMENSIONS

The maximum dimension limits for semi-trailers are:





The forward projection must be contained within a 1.9 metre radius from the king pin, which equates to 1.4 metres to the front of the trailer.

The overall length of the prime mover and semi-trailer combination remains at the national limit of 19 m. This ensures that general access is maintained throughout Victoria. A choice between cabover, or bonneted prime movers with short wheel bases (5.8 m (19 foot) from king pin to bull bar), is still available.

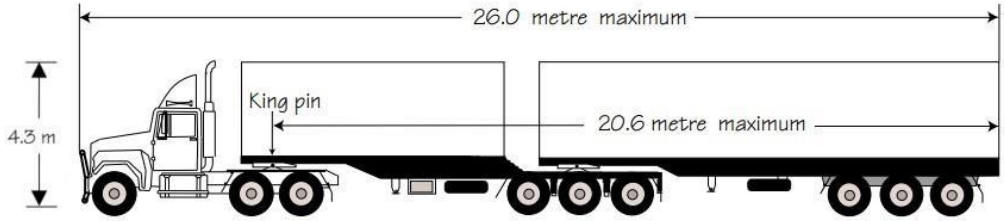
At this time national requirements limit the use of 48 foot (14.6 m) semi-trailers to single trailer combinations. That is, 48 foot semitrailers cannot be used in B-doubles or road trains.

B-DOUBLE DIMENSIONS

The introduction of 26 metre B-doubles provides the transport industry with greater flexibility and equipment utilisation, by allowing prime movers with longer wheelbases. This facilitates longer capacity fuel tanks and larger sleep cabins and may also improve driver ride, comfort and vehicle handling.

Prime movers as part of a 26 metre B-double are required to have a front underrun protective device fitted. This will benefit other road users by reducing the severity of some crashes involving a B-double.

Vehicles manufactured after 2005 must also have stronger crash-worthy cabins, which will better protect B-double drivers in the event of a crash.



	Dimension in Metres	Weight in Tonnes	Trailer Configuration
LENGTH	26.0		All B-Doubles
WIDTH	2.5		
HEIGHT	4.3 4.6		General, including load Livestock, car carriers & cubic
WEIGHT		40.5 55.5 59.0 62.5	Bogie – Single Bogie – Bogie Bogie – Tri Tri - Tri

From 25 November 2005, B-doubles over 25 metres long and up to 26 metres long may travel on the existing approved B-double road network in Victoria. This is subject to:

1. The prime mover being fitted with a UN ECE Regulation 93 compliant Front Underrun Protective Device (FUPD);
2. The prime-mover's cabin complying with UN ECE Regulation 29 if it has a date of manufacture after 2005;
3. An approval plate is fitted to the prime mover showing that the FUPD is compliant;
4. Any protrusion such as 'Bull-bars', 'Roo-Bars', etc. fitted to the front of the prime mover has an approval plate attached which indicates that the fitted protrusion is compatible with the prime mover's compliance with UN ECE Regulation 93.
5. The distance between the point of articulation at the front of the leading semi-trailer and the rear of the vehicle combination does not exceed 20.6 metres; and

6. The prime mover does not have a load carrying area.

DRIVING AT NIGHT

Driving at dusk, dawn or night requires a fundamentally different approach. At night the distance you can see ahead and to the side is severely reduced. This means you will be closer to any hazard when you see it resulting in a shorter stopping distance.
Visibility is particularly poor at dusk and dawn because natural light is reduced and it isn't dark enough for your headlights to be 100% effective. However, headlights help other road users to see you - so turn them on (low beam) at dusk and dawn.

At dusk your eyes must adapt to the changing level of brightness and it becomes more difficult to recognise potential dangers. Although the sky is still light, the road will be darker with deep shadows and there is less contrast in colours (e.g. the colour of oncoming cars). With complete darkness many of the 'cues' you may depend on during the day disappear and your vision is limited to a relatively small area illuminated by your headlights. About one-third of serious crashes occur after dark, so slow down and give yourself plenty of time to spot hazards and avoid them. When driving in the country, watch out for livestock and wildlife, particularly around and after sunset. When driving at night you should always leave a longer gap (than you normally would during day-time driving) behind the vehicle in front.

Use your headlights:
Drive with your headlights on between dusk and sunrise or at other times when visibility is poor. Remember that while you need good visibility to drive safely, it is equally important for other drivers to be able to see you.

If the streetlights are on - put your headlights on. Drive at a speed that allows you to stop within the area lit by your headlights. The fastest reflexes and the most effective brakes won't do any good if you overdrive your headlights and can't see danger in time. Your headlights don't show you any potential dangers lurking around corners or curves in the road - so slow down. Use your high beam to improve visibility, but don't dazzle oncoming drivers. Dip your headlights:
- As soon as an approaching vehicle's lights are dipped; • When you are within 200 metres of an approaching vehicle; or • When you are less than 200 metres behind another vehicle.

If a vehicle comes towards you with lights on high beam:
- Dip your lights;
- Slow down;
- Look to the left of the road;

- Keep to the left of the road; and
- If you cannot see, stop.

When driving at night use the headlight range of any traffic you're following to extend your own visual field. Only overtake if the lighted distance ahead is clear and if in doubt - wait until you are certain it is safe.

DRIVING IN FOG OR SMOKE

Fog or smoke can drastically reduce visibility.

In such conditions:

- Keep your lights on low beam. (High beam only lights up the fog or smoke, which makes it even more difficult to see where you are going or any hazard ahead.)
- Drive slowly; and
- Increase the distance between you and the vehicle in front.

Using fog lights

It is an offence to use fog lights incorrectly. If your vehicle is fitted with fog lights (either on the front or rear) you must:

- Only have them on in fog or other hazardous weather conditions causing reduced visibility; and
- Not have front fog lamps on if any other white light over 7 watts is also on (i.e. not have headlights and fog lights simultaneously).

DRIVING IN WET WEATHER

To improve safety when driving in wet weather:

- Ensure your windscreen is clean and your wiper blades are in good condition;
- Turn your headlights on (low beam);
- Use your air conditioner to prevent your windscreen from misting up; and
- If you do not have an air conditioner, use the heater demister. If necessary open the windows.

When the road is wet it takes longer to stop your vehicle therefore you need to double the distance between you and the vehicle in front. When driving in the rain you need to be especially observant because pedestrians and cyclists can be particularly hard to see. They are among the most vulnerable of all road users because they have no protection if hit by a vehicle.

DRIVING ON FREEWAYS

Trucks over 4.5 tonnes GVM are restricted from the right lane on certain freeways. Restricting trucks from the right lane on multilane freeways is aimed at improving safety and encouraging better road sharing, while also creating a more efficient driving environment.

When driving on a multi-lane freeway in an 80 km/h zone, Heavy & Multi-Combination vehicles should always stay in the left lane unless overtaking.

SECURING YOUR LOAD

All loads must be positioned and secured in compliance with the National Transport Commission's guidelines, available at ntc.gov.au The first step in making sure you can safely carry any load is to select the appropriate vehicle and correctly position the load.

Loads must not be placed in a way that makes the vehicle unstable or unsafe. To avoid loss of control of your vehicle, you should spread the load close to the centre line of the vehicle. Vehicles carrying high centre of mass loads (e.g. bulk liquids) are more likely to overturn on corners.

Loads must be secured on a vehicle using an appropriate load restraint method:

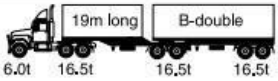
- to prevent any part of the load hanging or projecting from the vehicle in such a way that it could injure a person, damage property or cause a hazard to other road users
- to prevent any part of the load being dislodged or falling from the vehicle.

GENERAL MASS LIMITS

Access to the Victorian road network depends upon the vehicle type and mass limits. Most (about 99 percent) of the arterial road network is approved for both B-doubles and Higher Mass Limits trucks. Many other municipal roads throughout Victoria are accessible to B-doubles and HML trucks or B-doubles only. These are listed in the July 2012 information bulletin Local roads approved for B-doubles and Higher Mass Limits Trucks.

Table 1A shows typical vehicle types eligible to operate in Victoria at general mass limits. For each vehicle type the approved routes are colour coded and displayed in the following maps. Vehicles (shown in the unshaded area in Table 1A) can travel on all roads in Victoria.

General Mass Limits							
Vehicle Type	General Mass Limits (tonnes)	Green Roads	Orange Roads	Red Roads	Blue Bridges	Red Bridges	Local Roads
 6.0t 9.0t	15.0	Yes	Yes	Yes	Yes	Yes	Yes *
 6.0t 16.5t	22.5	Yes	Yes	Yes	Yes	Yes	Yes *
 6.0t 9.0t 16.5t	31.5	Yes	Yes	Yes	Yes	Yes	Yes *
 6.0t 16.5t 16.5t	39.0	Yes	Yes	Yes	Yes	Yes	Yes *
 6.0t 16.5t 20.0t	42.5	Yes	Yes	Yes	Yes	Yes	Yes *

	50.0	Yes	Yes	Yes	Yes	Yes	Yes *
	55.5	Yes	No	Yes	No	Yes	By permit **
	55.5	Yes	No	Yes	No	Yes	By permit **
	59.0	Yes	No	Yes	No	Yes	By permit **
	62.5	Yes	No	Yes	No	Yes	By permit **

Note: * Travel on all local roads is approved, provided there is not a 'no truck' sign or a sign displaying a load limit that is less than the mass of your vehicle and load.

** Travel on local roads is by either of two permits:

B-DOUBLE LOAD DISTRIBUTION CHARACTERISTICS

The load distribution characteristics of a B-Double are significantly different to standard articulated vehicles. **NOTE:** The weights shown in the following are an example only.

Figure 1 shows a typical B-Double configuration with axle tare weights.

Figure 1

Figure 2 shows the same vehicle with a 19.30 tonne load on the first trailer.

Figure 2

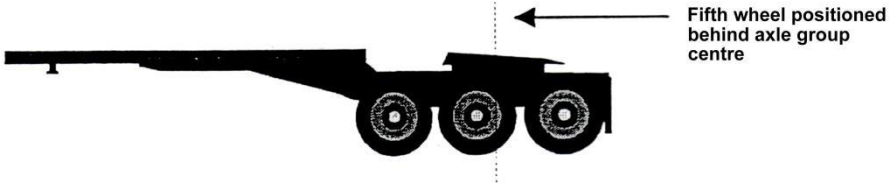
Figure 3 shows the B-Double with an additional 19.30 tonne load placed on the second trailer.

Figure 3

Notice that the prime mover axle loads in figure 3 are less than those in figure 2.

This characteristic is the result of the fifth wheel on the first trailer being positioned behind the centre of the first trailers axle group. Load applied to the fifth wheel produces movement of weight about the axle group centre which tends to lift the front of the trailer therefore reducing the weight on the prime mover, as shown in figure 3.

Figure 4



It is also important to understand the effects that the positioning of the load on each trailer will have on the individual axle loads.

ROAD TRAIN INFORMATION

Length of Combinations:

- 2 Trailers - 36.5 metres (VIC PBS approved, WA, SA, QLD, NT, NSW)
- 3 Trailers - 53.5 metres (WA, SA, QLD, NT)

NOTE: Trailers must not differ more than **3 metres** in length from each other.
The maximum allowable off tracking is not to exceed 100mm either side of the hauling unit, while travelling in a straight line on a level, smooth surface.

Weights:

- 2 Trailers - 79 tonne all states (VIC PBS Approved Vehicles)

- 3 Trailers - 115.5 tonne all states, unless special Permission is granted by a permit. (Except Victoria & NSW)

	Dimensions in Meters	Weight in Tonnes	Trailer Configuration
LENGTH	36.5 53.5		**2 Trailers (**WA,SA,NSW,QLD,NT) **3 Trailers** (WA,SA,QLD,NT)
WIDTH	2.5		
HEIGHT	4.3 4.6		General Stock, Car Carriers & Cubic
WEIGHT		79 115.5	**2 Trailers** **3 Trailers**

Converter Dollies:

- The converter dolly towing eye is to be permanently marked to be legal.
- Length of lead between the towing eye and the pivot point of the axles on the converter dolly is: **Minimum of 3 metres Maximum of 5 metres**
- The towing 'A' frame must not differ more than **5 degrees** from Dolly to Ringfeeder.
- It is important to check the bushes at the end of 'A' frame of the converter dolly for wear and movement.
- Before coupling ensure the turntable is clean (free from sand etc.).

Ringfeeder:

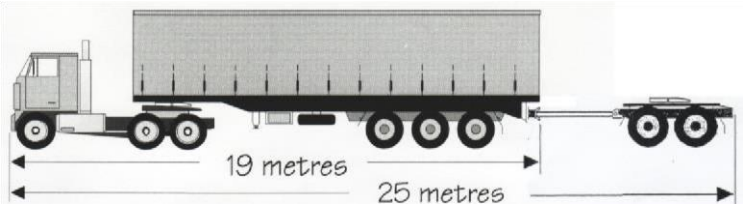
- The Ringfeeder must have a 'D' rated pin AS 2213-1984
- The Ringfeeder must be 50mm diameter and this must be matched with a 50mm ring. (A 40mm pin is not allowed in a 50mm eye).

- Sizing collars are no longer permissible.
- There is to be no more than 4mm wear between the ring and the pin.
- The Ringfeeder must have a safety locking pin and this pin must be visible in the locked position.

Converter Dollies – Brakes:
When towing a trailer with a converter dolly attached only connect the supply line to release the maxi-brakes (spring brakes), **do not** connect the control line as this may cause the brakes to lock up, even under normal braking.

Licence Requirements:
The driver of a prime-mover and semi-trailer which tows an unladen converter dolly must hold a multi combination licence.

NOTE: the converter dolly must not carry a load. Refer to VicRoads information Bulletin: Towing an Unladen Converter Dolly behind a Semi-Trailer.



Coupling and Inspection of Trailers:

- Ensure that you check with the State authority in which you intend to operate as to the requirements for coupling of trailers.
- Trailers must not vary in length more than **3 meters**.
- The **lightest** trailer must be at the rear.
- Some may require the trailers to be tagged 1. 2. 3. And may also include an 'L' which indicates that this trailer must be at the rear.
- Always check as to whether a yearly roadworthy is required.
- When coupling B-Doubles, make sure that your prime mover and semi-trailer are in a straight line

Speed Limits:

- 2 Trailers - 100kph unless otherwise stipulated on the gazette or permit. 3 Trailers – 100kph the truck must be gear and speed limited.

Air Hose Connectors:

- Road train vehicles are required to have ***polarised*** hose connectors.
- In WA it is mandatory to have ***clear bore*** fittings to allow air to travel the greater distance with less restrictions and achieve optimum braking.

Words that heavy vehicle drivers need to know

Anchor points
Strong devices for attaching lashings to mainframe or chassis to restrain the load.

Articulated truck A vehicle consisting of a prime mover and a semi-trailer.

Baffles
Barriers erected crossways and sometimes lengthways in tanks used for transporting fluids. Baffles are used to limit surging of tank contents when there are changes in acceleration.

Balking or baulking
Large timber at least 4" x 4" (100 mm x 100 mm) used to prevent lengthways movement of the load under deceleration or acceleration. This applies mainly when the load cannot be placed against a gate.

B-double or Multi Combination
An articulated vehicle with more than one trailer attached.

Bolster
That part of a machine or mechanism which forms a hard support or base.

Blocks or blocking Suitable material used as baulking or packing against a load.

Bulkhead
See *Gates*.

Cantling A support frame used under an object shaped like a cylinder.

Cap tarp
Tarpaulins fitted across the top of the load and tarpaulins fitted to cap the others.

Chocks
Suitable blocks used to restrain loads which could move during transit. Also called cleats or scotches or gluts.

Claw
A device with springs for grappling or holding.

Coaming
A raised frame border or edge around the load platform of a vehicle.

Cribbing A reliable method of supporting loads. Alternate layers of packing are placed at 90 degrees to one another to form a stable column.

Crossbearer
A support placed transversely across the loading platform.

Dog trailer A trailer with a moveable front axle.

Edge protectors Material used to protect the exposed edges of soft sheet and similar materials from the lashings used.

Flush deck
A flat tray deck without coaming.

Gates
Vertical frames used at the front, sides and rear of load carrying platform to contain the load. The front gate is also known as a loading rack, bulkhead or headboard. The front rack must be strong enough to stop the load shifting, such as in a crash or when you brake very hard.

Gross Train Mass or Gross Combination Mass (GCM) The maximum of the sum (as named by the manufacturer) of the loaded mass of the vehicle plus the axle loads of any vehicle being towed as a semitrailer or trailer. It can also mean the measured weighbridge mass or the road regulation limit.

Gross Vehicle Mass (GVM) The maximum loaded mass specified by the manufacturer and given on the vehicle's registration certificate. The total mass must never exceed the GVM.

Headboard
See *Gates*.

Lading protectors Material used to prevent the load being damaged through contact with restraining chains or lashings.

Lashings
Fastening devices, chains, cables, ropes or webbing used to restrain loads.

Lifts Dressed timber or steel which has been stacked in layers. Load anchor points Strong devices for attaching lashings to the mainframe or chassis to restrain the load.

Load binder
A device fitted to each chain or lashing used to tighten the lashing. Follow the manufacturer's instructions.

Load capacity The maximum load that can be carried in or on a vehicle on the road. This is fixed by VicRoads. It is equivalent to GVM minus the tare mass.

Loading stake, peg or pin A metal fixture used for load control when set in pockets.

Outrigger A horizontal beam, spar of framework projecting from the loading platform on the vehicle. Some may be retracted or extended.

Pallet A portable platform or tray onto which loads are placed to facilitate mechanical handling.

Pig trailer
A trailer with a fixed front axle.

Pockets
Housings fixed to the vehicle to locate gates, stakes or loading pegs.

Prime mover A motor vehicle which is constructed, designed or adapted for connecting to a semi-trailer.

Rave
A rail or framework around the platform to increase load capacity.

Road train A Multi Combination vehicle, i.e. a prime mover with more than one trailer attached.

Rope hooks Hooks around the load platform to help hold the tarpaulin down. They must not be used to restrain loads.

Rope rail A rail that goes round the load platform under the coaming, which is the raised edge at the side of a trailer/ tray. Used to tie rope to. Support points may be used for limited load restraint.

Round timber
Felled trees, logs.

Scotch A wedge block or chock used to restrain a wheel.

Semi-trailer An unpowered vehicle which is attached to a prime mover by a turntable, forward of the prime mover's rear axle, for the purpose of being towed by that vehicle.

Shackle
A metal coupling link closed by a bolt. Used for connecting chains to anchor points. The two principal shapes are "D" and "bow".

Shooks
Broken down cases.

Shoring bar Metal or wooden loadcarrying beam or fabricated truss section used to restrain or transmit a load from one frame column post, wall or bearing

point to another. They may be adjustable.
Also known as shoring pole.

Sling A length of hemp core rope or steel wire rope with eyes formed by splicing at each end. Used to hoist or restrain loads. May be webbing.

Spreader
A transverse spar of frame used to support tarpaulins, or for load control.

Spigot
The cylindrical end of a fitting which mates with a hole in another component forming a joint (connection, support).

Strop A cradle made from flexible material to make it easy to load with a hoist or pulley.
Also known as a snotter.

Strut A rigid support intended to bear loads along its length.

Tarpaulin (tarp) A waterproof sheet used to cover and protect goods from the weather.

Thimble
A metal liner usually pearshaped and concave on the outside. It is fitted into the eye of a rope to prevent chafing and to distribute the load.

Tie-down fittings An anchor point designed to fasten or restrain a load.

Transverse beam (spar) A beam aligned across the minor span of an area rather than lengthways along the major span.

Turnbuckle
A type of coupling fitted between the ends of a lashing or between two lashings. Used mainly for adjusting or regulating the tension in lashings. It consists of a loop or sleeve with a screw thread on one end and a swivel at the other. Sometimes it has an internal screw thread at each end.
Twist lock A locking device designed to fasten containers to the vehicle on which they are being transported. Australian Standard E45 applies.

Wedge
A piece of wood or metal, thick at one end and tapering to a thin edge at the other.

Winch
Load control device which uses chains, ropes or webbing lashes.

For a list of current VicRoads Customer Service centres, please see their website.