

## Safe towing



### Introduction

Towing is very different from everyday driving - it requires additional driving skills and safety precautions. As a driver, you have a legal responsibility to other road users and yourself when towing a trailer, caravan or another vehicle, to drive to suit the conditions.

Also, the towing vehicle, trailer and its load must meet all legal and safety requirements. This section of the Queensland Transport website provides information on how to:

- ensure the vehicle and trailer are correctly equipped; and
- drive a vehicle and trailer combination safely.

**Note:** The guidelines in this section relate to Queensland regulations. The object of the relevant Queensland regulations is to provide road rules that are substantially uniform with road rules elsewhere in Australia. However, if travelling outside Queensland, check the relevant legislation.

### Towing will affect your vehicle

The first step to safe towing is to ensure the vehicle, trailer and load are suited. While modern vehicles are lighter and provide better service for normal motoring, some do not have the necessary characteristics for towing. Similarly, some trailers are designed to carry certain types of loads and cannot be towed safely when carrying other materials.

Other ways towing will affect your vehicle are:

- decreased acceleration and braking performance;

- reduced vehicle control and manoeuvrability; and
- increased fuel consumption.

These effects become more pronounced on your vehicle as trailer size and the mass of the load increase. By understanding the limitations of your vehicle and trailer, you can help prevent crashes and both structural and mechanical damage to your vehicle.

## **Legal requirements**

To ensure the safety of yourself and other road users, you must abide by the laws governing the towing of trailers. These are:

- the vehicle and trailer must comply with all relevant standards for registration;
- the vehicle and trailer must be in a roadworthy and safe condition;
- all trailers must be fitted with a rear number plate and a registration label fixed to the left side or rear of the body, with the label facing outward;
- towbars and couplings must not obscure the towing vehicle's number plate or rear lights when the trailer is not connected;
- towing more than one trailer is prohibited;
- people are not permitted to ride in trailers or caravans; and
- the speed limit for a vehicle towing a trailer is the same as for a normal vehicle.

## **Definitions**

Aggregate Trailer Mass (ATM) is the total mass of the laden trailer when carrying the maximum load recommended by the manufacturer. This includes any mass imposed onto the drawing vehicle when the combination vehicle is resting on a horizontal supporting plane.

Gross Trailer Mass (GTM) is the mass transmitted to the ground by the axle or axles of the trailer when coupled to a drawing vehicle and carrying its maximum load approximately uniformly distributed over the load bearing area.

If you are unsure about the mass of the trailer and its load, you can have it weighed at a public weighbridge.

## **Safety certificate**

Light trailers and caravans with an ATM over 750 kg and up to and including 3500 kg require a current safety certificate when:

- offered for sale or given away;
- re-registered after being unregistered; or
- transferred from interstate registration.

## **Towing vehicle**

In the interests of reliability and safety, follow these rules and conditions:

- Ensure the vehicle is structurally suitable for towing:
  - if required, manufacturer specifications for structural reinforcement, special suspension and transmission options or load-distributing devices, should be fitted to the vehicle by either the manufacturer, dealer or a firm specialising in towing equipment.
- Ensure the vehicle is properly equipped for the type and size of trailer:
  - towbars and couplings are to be of a suitable type and capacity;
  - electrical sockets for lighting are required;
  - suitable brake connections may be required;
  - extra mirrors are required for towing large trailers.
- Ensure that the lower of the following is not exceeded:
  - the maximum towing capacity of the motor vehicle as specified by the vehicle manufacturer;
  - or
  - the capacity of the towing apparatus fitted to the vehicle.

Note: This information can be obtained from the owner's manual or the manufacturer. If the motor vehicle manufacturer has not specified a maximum towing capacity or it cannot be identified, the following is taken to be the maximum towing capacity for the purposes of the above:

- one and a half times the unladen mass of the motor vehicle if the trailer is fitted with brakes; or
- the unladen mass of the motor vehicle, if the trailer is not fitted with brakes.

Please note that **all** trailers over 750 kg GTM, irrespective of the towing capacities or unladen mass of the vehicles to which they are attached, must have brakes fitted (see **Braking systems**).

### **Towbars**

A properly designed and fitted towbar is essential for safe towing. The load capacity of the towbar must be at least equal to the loaded mass of the trailer (or towed vehicle and "A" frame coupling). As a guide to assessing this, towbars manufactured after 1 January 1992 for passenger vehicles should be marked with their load capacity and the vehicle model for which they are intended.

The towbar must be fitted with attachments for connecting safety chains capable of withstanding the rated load capacity of the towbar. The safety chain attachments must be mounted adjacent to the tow coupling and arranged so as to maintain the direction of the towed vehicle in the event of coupling failure or disconnection.

Towbars, including towbar tongues, must not protrude dangerously or have sharp corners.

### **Couplings**

Typical approved couplings for light trailers are:

- 50 mm ball couplings for trailers with an ATM up to 2300 kg;
- heavy duty 50 mm ball couplings for trailers with an ATM up to 3500 kg; and
- pintle hook couplings for trailers with an ATM up to 4500 kg.

Couplings should be marked with their load capacity and the manufacturer's name or trademark.

### **Trailers**

Trailers must meet all registration requirements and must be suitable for the load to be carried in terms of:

- type;
- size; and
- structural strength.

### **Braking systems**

Trailers up to and including 750 kg GTM do not require brakes. Minimum trailer brake requirements are as follows:

- trailers not over 2000 kg GTM must have an efficient braking system operating on the wheels on at least one axle;
- trailers up to and including 2000 kg GTM are permitted to have over-ride brakes;
- brakes (other than over-ride) must be able to be operated from the driver's seated position;
- trailers over 2000 kg GTM require a brake system (breakaway brakes) that automatically applies if the trailer becomes detached from the towing vehicle; and
- trailers over 2000 kg GTM must have brakes operating on *all wheels*.

### **Safety chains**

Safety chains are required on trailers that do not have breakaway brakes. The number and type of safety chains required when towing is determined by the trailer's ATM. Trailers with an ATM:

- of 2500 kg or less, must have at least one safety chain that complies with Australian Standard 4177.4-1994 connected to the towing vehicle; and
- greater than 2500 kg and up to 3500 kg, must have two safety chains that comply with Australian Standard 4177.4-1994 connected to the towing vehicle; and
- greater than 3500 kg and up to 4500 kg, must have a safety chain that complies with Australian Standard 2321-1979 connected to the towing vehicle.

The length of the safety chain/s must prevent the trailer's drawbar hitting the ground if the trailer is detached from the towing vehicle. The safety chains must be properly connected to the tow bar with attachments capable of withstanding the specified breaking load of each chain. Do not use padlocks.

## **Driver**

Apart from the added legal responsibilities for drivers, towing requires more knowledge and skills than normal driving. Drivers not experienced in towing need to make sure they understand the general principles of driving with a trailer before attempting to tow in traffic or at highway speeds. When towing, drivers should:

- allow for the extra length and width of a trailer when entering traffic and allow for its tendency to "cut in" on corners and curves;
- apply the accelerator, brakes and steering smoothly and gently to avoid sway, especially in wet or slippery conditions;
- allow for the increased effects of cross-winds, passing vehicles and uneven road surfaces on the vehicle and trailer combination;
- avoid applying the towing vehicle's brakes if the trailer begins to sway or snake. If the trailer is fitted with brakes that can be operated independently, apply them gently. Otherwise, continue at a steady speed or accelerate slightly until the sway stops;
- leave a longer stopping distance to the vehicle ahead, increase the gap for longer, heavier trailers and allow even more distance in poor driving conditions;
- engage a lower gear in both manual and automatic vehicles when travelling downhill to increase vehicle control and reduce strain on brakes;
- allow more time and distance to overtake because of the reduced performance of the towing vehicle and avoid "cutting off" the overtaken vehicle when returning to the left lane;
- reverse, if possible, with a person watching the rear of the trailer - reversing is difficult and takes practice; and
- pull off the road where suitable, to avoid a build-up of traffic unable to overtake.

## **Loading trailers**

It is unsafe and illegal to overload a trailer. Drivers must ensure:

- the ATM specified by the trailer manufacturer is not exceeded;
- lights, number plate and registration labels are not obscured in any way; and
- tyre or tow coupling capacities are not exceeded.

There are some general conditions you should follow when loading a trailer. These are:

- for boat trailers, the length of the boat and mast behind the trailer axle must not exceed the length of boat in front of the axle;
- caravans, horse floats and box trailers which have the axle group in the centre of the load space are not permitted to have loads, including spare wheels and bicycles overhanging the rear of the trailer;
- all loads must be correctly secured to trailers;
- loads should be kept as low as possible and positioned as close to the axle as possible with about 60% of the total mass forward of the centre axle or axles;
- about 10% of the total mass of the trailer plus load should be supported by the tow vehicle through the coupling so the trailer drawbar is level or slightly nose down; and
- to avoid trailer sway, do not concentrate the load's mass towards the end of the trailer.

For further information on the size of load and any projection allowed for cars, utilities, trucks and trailers, please refer to the projecting loads page on the Queensland Transport website

- [http://www.transport.qld.gov.au/Home/Safety/Road/Standards/Projecting\\_loads/](http://www.transport.qld.gov.au/Home/Safety/Road/Standards/Projecting_loads/)

## **Load equalisers**

Many people, particularly those towing large caravans, use load equalisers. This device transfers some of the load imposed on the towbar ball to the front and rear suspension of the towing vehicle. This retains vehicle ride height and effective steering control. Heavy duty towbars and attachments should be used with equalisers. Consult the towbar manufacturer or caravan dealer before using this equipment as it may overload the towbar and its components.

Caution: Load equalisers should never be used to compensate for a badly loaded trailer.

## **Maintenance**

Proper, regular maintenance of your vehicle and trailer is vital for safe towing. See your trailer and/or vehicle dealer, the RACQ or other competent service agent in this field to check that:

- both the towing vehicle and the trailer are in a roadworthy and safe condition; and
- the trailer's wheel-bearings, suspension and brakes are in good working condition.

This is particularly important for boat trailers or if the trailer has not been used for some time.

## **Before the trip**

There are a number of safety checks you should make before each trip. These are:

- inspect all tyres carefully. When towing heavily loaded trailers, vehicle tyre pressures should be increased to the level recommended in the owner's handbook or on the tyre placard (usually about 15 kPa above normal). Otherwise, ask your local tyre dealer;
- carry out normal service checks of oil, water, brake fluid, battery and so on., remembering that towing places additional demands on your vehicle;
- ensure the coupling socket and ball are the matching size. If not a ball coupling, check that all parts fit and function properly;
- check the coupling is securely fastened and latched or screwed down when the trailer is connected to the towing vehicle;
- check safety chains are properly connected with attachments capable of withstanding the specified breaking load of each chain. Do not use padlocks. If two chains are fitted, cross them under the drawbar before they are attached to the towing vehicle. This provides better directional control of the trailer and helps prevent the front of the drawbar hitting the road if the coupling disconnects;
- check trailer brake and light connections are secure and all lights work;
- check the initial operating adjustments of electric or vacuum operated brakes fitted to the trailer are in accordance with the manufacturer's instructions;
- disengage any reversing catch fitted to the trailer coupling (as used with over-run brakes);
- make one or two test stops from low speed to confirm the trailer brakes operate properly;
- ensure all doors, hatches, covers and any load or equipment are properly secured; and
- limit the mass of the load carried in the boot or luggage space of the towing vehicle.

## **During the trip**

Soon after beginning each trip, stop in a safe location and make sure:

- couplings and safety chains are still fastened;
- brakes and wheel-bearings are not overheating;
- light connections are secure and lights are still working;
- tyres are still inflated correctly and are not rubbing on the mudguards, suspension, trailer body and so on.; and
- loads, doors, hatches, covers and so on, are still properly secured.

On long trips, repeat these checks every two to three hours when taking a rest stop.

## **Insurance**

Compulsory Third Party insurance for trailers in Queensland is provided by the towing vehicle's insurance cover. If your trailer is being towed by an interstate registered vehicle, contact your insurer to obtain additional cover. A trailer may not be covered by comprehensive insurance if:

- it does not comply with the Queensland legislation;
- its ATM exceeds your vehicle's towing capacity;
- it is not roadworthy or safe; or
- it is overloaded.

## **Towing another vehicle**

When towing another vehicle by means of an "A" frame, rigid drawbar or rope, the drivers of the towing and towed vehicles must hold a current driver's licence that includes the classes of vehicles being utilised. An "A" frame may also be used to tow another vehicle that has no driver if the specific



conditions on the "A" frame towing page are met in addition to the general requirements for drivers and towing vehicles described so far.

### **A final word of advice**

When towing, ensure your trip is safer, better planned and more pleasant by:

- scheduling more rest stops and shorter travelling days for long trips because towing is more stressful than normal driving and more likely to cause driver fatigue;
- taking care not to hold up following traffic unnecessarily;
- looking further ahead than usual to anticipate appropriate driving actions for traffic and road conditions; and
- remembering fuel consumption increases for most light vehicles towing caravans and large trailers, particularly at speeds above 90km/h.

For further clarification on performance and safety aspects of your vehicle and trailer combination, consult your vehicle and/or trailer dealer. Information on trailer construction requirements is contained in Information Bulletin VSB1 Revision 4 (June 1999) "Building Small Trailers", available at <http://www.dotars.gov.au/roads/safety/bulletin/vsb1/index.aspx>.

### **Before you drive off...a final safety checklist**

- Is the vehicle suited to the type and size of trailer being towed?
- Are the vehicle and trailer in sound mechanical condition?
- Is the load correctly distributed and properly restrained?
- Are all tyres correctly inflated and lights working?
- Are all fittings, couplings and safety chains correctly fastened?

### **Remember**

- You are driving under different, more difficult conditions when towing a caravan or trailer.
- Give yourself time to adjust to the effects of towing on your vehicle, even more so if weather conditions are bad.
- It is an offence to drive with an incorrectly restrained load.

## "A" frame towing of a motor vehicle with a GVM of up to 4.5t



### Introduction

This section of the Queensland Transport website explains how to undertake "A" frame towing of a motor vehicle with a Gross Vehicle Mass (GVM) of up to 4.5t in Queensland in a manner that satisfies the Australian Road Rules.

"A" frame towing is the term used to refer to towing a motor vehicle which has its front wheels on the road and is connected to the towbar of the towing vehicle by a triangular shaped frame, commonly known as an "A" frame.

The Australian Road Rules state:

*294 (1) The driver of a motor vehicle must not tow another motor vehicle unless:*

- (a) either:*
  - (i) the driver can control the movement of the towed vehicle; or*
  - (ii) the brakes and steering of the towed vehicle are in working order and a person who is licensed to drive the towed vehicle is sitting in the driver's seat of the towed vehicle, and is in control of its brakes and steering; and*
- (b) it is safe to tow the vehicle.*

In addition to the section about safe towing, this section provides a guide for both unbraked and braked "A" frame towing of a light motor vehicle with a GVM of up to 4.5t. Persons wishing to undertake "A" frame towing may need to seek advice from a Registered Professional Engineer to ensure that the "A" frame device that is intended for use meets the following technical requirements. A list of recognised Registered Professional Engineer is available from Queensland Transport customer service centres.

Queensland Transport recommends that a copy of this information, together with any reports, approvals or other documentation, is carried in the vehicle at all times.

Persons wishing to undertake "A" frame towing of a vehicle in excess of 4.5t GVM need to apply to Queensland Transport providing a complete submission addressing all relevant aspects of the proposal for evaluation.

Persons living in other states will need to check with the Road Transport Authority in which their vehicle is registered to determine individual state requirements for the towing of vehicles with "A" frames.

### **Coupling design**

The "A" frame coupling must:

- be designed and constructed with sufficient strength to hold the vehicles together in tow and must comply with the requirements of Australian Design Rule 62/... (Mechanical connections between vehicles) relevant to the GVM of the towed vehicle;
- permit an adequate amount of angular movement between the towing and towed vehicles, to cater for road undulations;
- be secured to a substantial body member of the towed vehicle, such as a sub-frame or chassis member. Connection to the towed vehicle's bumper, suspension or steering components is not permitted, unless approved by the manufacturer of the towed vehicle;
- be marked with the manufacturer's name or trademark and the rated capacity. The "manufacturer" may include the owner in the case of a privately constructed device; and
- maintain a space between the combination not exceeding 2m.



### **Safety chains for towed vehicles with a GVM of up to 3500 kg**

Towed vehicles with a GVM of up to 3500 kg must be equipped with safety chains/cables complying with AS 4177.4-1994 of the appropriate size for the towed vehicle GVM as detailed in Table 1 below:



Table 1

Towed Vehicle GVM in kg	Nominal material size in mm	Chain markings
0 to 1000	6.3	4177-10
Up to 1600	8.0	4177-16
Up to 2500	10.0	4177-25
Up to 3500	13.0	4177-35

The number of chains required depends on the towed vehicle's GVM as follows:

- Towed vehicles with a GVM up to 2500 kg must be equipped with at least one safety chain.
- Towed vehicles with a GVM over 2500 kg must be equipped with two safety chains. For towed vehicles with a GVM up to 3500 kg safety chains may be replaced by safety cables with a certified load capacity not less than that of chains complying with Australian Standard 4177.4 – 1994 "Safety Chains up to 3500 kg".

### **Safety chains for towed vehicles with a GVM over 3500 kg**

Towed vehicles with a GVM over 3500 kg must have two chains made from steel of a minimum 800 MPa breaking stress and conforming to the mechanical properties of Grade T chain as specified in AS 2321-1979 'Short-link chain for lifting purposes (non-calibrated)'. (Refer Table 2).

The size of chain must be as follows:

- Towed vehicles with a GVM over 3500 and up to 4300 kg shall have chains of at least 7.1mm in size.
- Towed vehicles with a GVM over 4300 and up to 7500 kg shall have chains of at least 9.5mm in size.

Safety cables (fitted in lieu of safety chains) must comply with and be certified to AS 3569-1989 'Steel wire ropes'. The cable fitted with attachments (i.e. snap hooks and quick link) must be equal to or larger than that specified in Table 2.

Table 2

Towed Vehicle GVM in kg	Nominal material size in mm	Applicable Australian Standard
0 to 4300	7.1	AS 2321-1979
Over 4300 and up to 7500	9.5	AS 2321-1979

### **Towing capacity of towing vehicle**

Where the vehicle used for towing has a GVM not exceeding 4500 kg, the towing limits specified by the vehicle manufacturer must not be exceeded. Please note that most manufacturers specify towing limits for their vehicles in the vehicle handbook.

Where the vehicle used for towing has a GVM over 4500 kg, the manufacturer's Gross Combination Mass (GCM) must not be exceeded.

The loaded mass of the towed vehicle must not exceed the towing capacity of any component in the combination, including the "A" frame, towbar and tow ball.

### **Towed mass ratio**

The tare mass of the towing vehicle divided by the laden mass of the towed vehicle (including the "A" frame) determines the combination's towed mass ratio (TMR).

$$\text{TMR} = \frac{\text{Tare mass of towing vehicle}}{\text{Laden mass of towed vehicle}} : 1$$

## Braking requirements

Where the towed mass ratio of the combination is not more than 3.5 : 1 (the tare mass of the towing vehicle is not more than 3.5 times the laden mass of the towed vehicle), the brakes on at least one axle of the towed vehicle must operate when the driver of the towing vehicle applies the brakes of the towing vehicle. Please note that it is not acceptable to utilise the park brake of the towed vehicle to achieve this.

Where the towed mass ratio of the combination exceeds 3.5 : 1 (the tare mass of the towing vehicle is more than 3.5 times the laden mass of the towed vehicle), there is no requirement for the brakes of the towed vehicle to be operable. The requirement for a towed mass ratio in excess of 3.5 : 1 is designed to give a combination adequate braking without the need for the brakes of the towed vehicle to be operated by the driver of the towing vehicle.

Irrespective of the towed mass ratio, the combination must have a braking performance of at least that detailed in Table 3.

Table 3

	Stopping distance when brakes applied at 35 km/h	Average deceleration rate from any legal speed	Peak deceleration rate from any legal speed
Vehicle combination gross mass under 2.5 tonnes	12.5m	3.8m/s <sup>2</sup>	5.8m/s <sup>2</sup>
Vehicle combination gross mass 2.5 tonnes or over	16.5m	2.8m/s <sup>2</sup>	4.4m/s <sup>2</sup>

The parking brake of the towing vehicle must be able to hold the combination stationary on a 12% gradient.

## Lighting

The following lamps must be fitted to the rear of the towed vehicle and must be operational whilst under tow:

- two turn signal lamps showing yellow light to the rear.
- two stop lamps showing red light to the rear.
- two reverse lamps showing white light to the rear.
- one registration plate lamp at the rear of the towed vehicle to illuminate the registration plate.
- two tail lamps showing red light to the rear.

These lamps may be arranged on a portable lamp bar providing it is securely fastened to the rear of the towed vehicle.

## Steering

The "A" frame towing system must provide safe and adequate steering control for both vehicles whilst being towed in combination. The stability of the combination, the steer-ability of the towed vehicle and the tracking of the combination must be satisfactorily addressed.

Please note that the steering wheel locking mechanism of the towed vehicle must be placed in the unlock position when the vehicle is being towed by an "A" frame.

Additionally:

- The combination must be capable of turning within a 25m diameter circle, measured at the outer wheel track.
- When travelling in a straight line on a level, smooth surface the towed vehicle must track (follow) in the path of the towing vehicle without deviating off-line by more than 100mm.
- Reversing an "A" frame coupled combination is not recommended due to lack of directional control over the towed vehicle.

## **Vehicle and towing componentry manufacturer's requirements**

The vehicle manufacturer's recommendations must be complied with whilst carrying out "A" frame towing. This applies equally to both the towing and towed vehicle.

Vehicle owners are advised to check with the manufacturer/dealer to determine whether their towed vehicle is suitable for "A" frame towing. Advice given in the "Owner's Manual" for the towing of the vehicle should always be followed.

Queensland Transport recommends obtaining the assistance of a Registered Professional Engineer to confirm that an "A" frame towing combination and "A" frame coupling apparatus meet the technical requirements.

## **Loads in towed vehicle**

Carrying a load in the towed vehicle is not forbidden. However, when carrying such a load it is important to consider the following points:

- The loaded mass of the towed vehicle must not exceed the capacity of any component in the combination.
- The loaded mass of the vehicle must not conflict with the Towed Mass Ratio (TMR) calculation as originally determined when assessing braking requirements of the combination.
- Any load carried in the towed vehicle should be placed as low and as centrally as possible. Large, heavy items (for example, outboard motors) carried high up and behind the rear axle of the towed vehicle will adversely affect the handling of the combination and may render towing unsafe.

## **Other requirements**

- The overall length of the combination must not exceed 19.0m.
- The "A" frame, and any attachment which could constitute a dangerous projection, must be removed from the towed vehicle before it is driven on public roads.
- Both the towing and the towed vehicle must be legally registered.
- Both vehicles in the combination must meet registration requirements and be roadworthy.
- The coupling and towbar must not obscure the number plate or lights on the rear of the towing vehicle when the towed vehicle is not attached.
- Regulations prohibit towing more than one vehicle or trailer at once.
- Nobody is allowed to ride in the towed vehicle.
- The maximum speed at which towing is permitted is the posted speed limit.
- Following distances outside built-up areas - On roads outside a built up area that do not have more than one lane in the direction you are driving, there are specific minimum following distances for long vehicles. If your vehicle or combination is 7.5m long or longer (including any load), you may not follow closer than 200m to another vehicle or combination 7.5m long or longer in front of you. The exception is when you are overtaking.
- Stopping on carriageways - If your vehicle or combination is longer than 7.5m or has a total mass of more than 4.5t you may not:
  - stop on a carriageway in a built up area for longer than one hour unless engaged in picking up or setting down goods; or
  - stop on a carriageway outside a built up area except on a hard shoulder or in a truck bay or other area set aside for parking of goods vehicles.

**"DO NOT OVERTAKE TURNING VEHICLE" signs**

If the vehicle or combination is 7.5m long or longer, you may display the sign "DO NOT OVERTAKE TURNING VEHICLE" at the rear. This can be either a separate sign or incorporated on one of a pair of rear marker plates.

If this sign is attached to the rear, other vehicles must give way whilst the vehicle or combination uses part or all of an adjacent second lane for turning. The vehicle or combination has the right of way to complete such turns.

It is an offence to straddle lanes when turning if this sign is not displayed.

It is an offence to display this sign on a vehicle or combination less than 7.5m long. However, it is not illegal to use standard rear marker plates without the words 'DO NOT OVERTAKE A TURNING VEHICLE' on such a vehicle.

**"VEHICLE UNDER TOW" signs**

It is not required to display any sign indicating a vehicle is under tow. However, drivers may do so if they wish.