

## **TIPS & TRICKS: TOWING**

Caravanning and camping is rated as one of Australia's most popular leisuretime activities. It brings together people from a wide range of backgrounds and vocations with the simple aim of enjoyment, relaxation and having a great time.

Caravanners are sometimes called modern day nomads because of their desire to travel and take along their own accommodation.

Today's motor cars make excellent towing vehicles, while modern caravans have all the creature comforts desired. However caravanners need to be aware that a car and caravan combination can behave in a different manner than when driving the car itself.

To ensure safe journeys, therefore, it is necessary to have a car and caravan that are compatible, use the best towing equipment and practice some of the skills that are needed to enable you to cope with any situation that might arise. Once these matters have been attended to, every journey will be a safe and enjoyable one. Happy caravanning!

## **THE TOW VEHICLE**

Considering the importance of safety, the most suitable towing vehicle is one which is heavier than the caravan or trailer it tows and which has enough power to permit quick and safe passing manoevers.

As long as manufacturer's towing recommendations are not exceeded modern passenger vehicles, including those with front wheel drives, are just as capable of towing a caravan or camper trailer as a four-wheel drive. Four wheel drives are only necessary for venturing off the beaten track or pulling long and heavy trailers.

While a vehicle with a five-speed manual gearbox is often preferred, many vehicle manufacturers recommend an automatic transmission for towing larger trailers or caravans. One advantage is that the driver needs only to concentrate on the prevailing road conditions and not to worry about whether the vehicle is in the correct gear. Reversing is much easier if the vehicle has an automatic transmission. With

automatics it is most important that an auxiliary transmission oil cooler is fitted.

Generally the type of suspension on the towing vehicle is not important as long as it is firm. Leaf springs are often considered more capable of supporting loads than coil springs but a good load distribution hitch will counteract the tendency of the rear of the vehicle to sag.

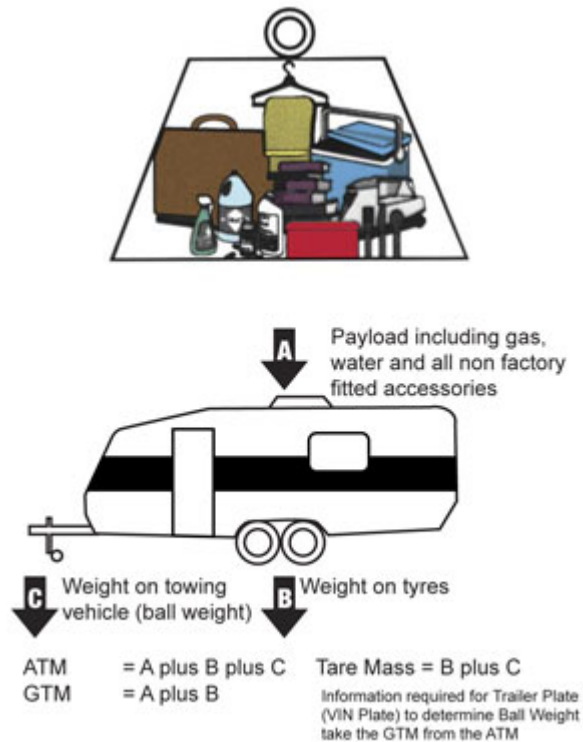
If the vehicle is fitted with self levelling suspension, manufacturers recommendations in regard to hitching up a trailer must be followed. Unless the trailer is very small, a load distribution hitch is essential on vehicles with self levelling suspension. Failing to follow the recommendations or failing to use the correct towing equipment could result in damage to the vehicle's suspension.

## **SIZE AND WEIGHT**

With the trend towards smaller and lighter cars, compatibility of tow vehicle and caravan in regard to weight and size has become more important.

### **Weight:**

Most vehicle manufacturers provide recommendations as to the maximum load that can be safely towed. These should not be exceeded. The recommendations always refer to the loaded weight of the trailer. Contents like water, gas, food, clothing and camping equipment will usually add at least another 300 kg to the weight of an empty van.



Newcomers to caravanning will find it beneficial to not tow more than the empty weight of the towing vehicle.

When a van is towed at a constant speed along a level road, weight is not an important factor. However, even a small, heavily loaded trailer can tax the available engine power when travelling through hilly terrain.

### Size:

The smaller the frontal area of a caravan the less wind resistance is created. Therefore, less power is needed for towing. A camper trailer will be more economical to tow than a conventional caravan. Some well-designed hardtop caravans will be just as easy to pull as a pop-top.

Many experienced caravanners prefer a conventional height van due to the convenience of being able to walk in without having to raise the roof or pull out bed-ends as with a camper trailer. The deciding factors are probably the size of the towing vehicle, how often the van or camper is used, where it is stored and personal taste.

## TOW BARS & HITCHES

A towbar is to a car and caravan what glue is to two pieces of timber. Use the wrong glue and the timber will come apart. Fit the wrong towbar to a car and the caravan may not stay in place.

The capability of a towbar is often over estimated. Generally the only part that is visible is the tongue, lug or ballmount. While sometimes this appears to be quite strong, the actual mountings or thickness of material may leave much to be desired.

In relation to towbars there should be no compromise. Always purchase a recognised product that has a plate attached stating the maximum towing load. If a new vehicle is purchased with a towbar already fitted, do not assume that it matches the towing capabilities of the vehicle. Many towbars are only designed to tow small trailers and not heavily loaded caravans. Before selecting a towbar, first determine the loaded weight of the caravan or camper trailer. This can only be done by placing the unit on a weighbridge or scales. Then purchase a towbar that can adequately cope with that load.

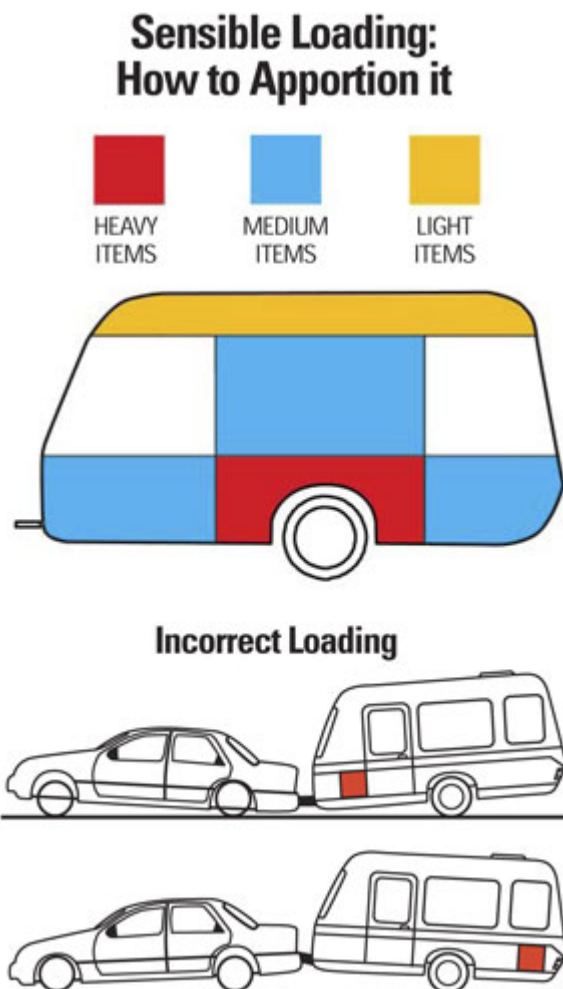


For larger caravans a heavy duty hitch receiver type towbar is usually required. These units mount onto the vehicle in several positions, enabling the load of the trailer to be distributed over a wide area of the vehicle. As a result less stress is placed on any one part of the vehicle body than would be the case with a conventional towbar. This is most important on modern vehicles that do not use a chassis.

If in doubt as to the best towbar for your vehicle and application, discuss your requirements with a towing equipment specialist. You will then be able to go away and have an enjoyable holiday, knowing that the caravan will follow the car wherever it goes.

## WEIGHT DISTRIBUTION

Whenever a vehicle towing a trailer travels along the road with the back down and front up, a problem of weight transfer exists. This means that there is less weight on the front wheels but more on the rear. For maximum safety, stability and vehicle control, both the caravan and towing vehicle should be level. The reasons that one or both may not be level could be due to:



1. Incorrect ball height compared to the trailer coupling height.
2. Uneven loading of the caravan.

### 3. Lack of proper towing equipment.

To determine the correct ball height, measure the distance from the ground to the bottom

of the coupling on the front of the A-frame. Then compare this with the distance from the ground to the base of the tow ball on the rear of the vehicle. These measurements should be nearly the same. If this is not the case, the ball mount or tongue may need to be adjusted or altered.

Even loading of the caravan can be checked by weighing the caravan on and off the vehicle. The difference between the two is the ball or nose weight. This should be between 10%–15% of the total weight of the loaded caravan. Some of the heavier items normally carried in the caravan may need to be moved around to achieve this.

For a four to five metre touring caravan the vertical ball load could be between 100kg and 150kg. Although this may be only 10% of the overall weight, it is certainly enough to push down the back of most vehicles. If due to stiff springs the back goes down very little, some weight will still be transferred from the vehicle's front wheels onto the back wheels. With a ball weight of 100kg the rear wheels may actually be carrying an additional 130kg–140kg. The extra weight has been removed from the front wheels due to a simple leverage factor.

Whenever the weight on the front wheels of a vehicle is reduced the steering and braking is affected. To prevent this occurring weight has to be moved from the back to the front wheels. This can only be achieved by using a weight distribution hitch (sometimes these are called stabilisers, torsion, anti-sway bars or level-rides).

The effect of the weight distributing bars can be compared to handles on a wheelbarrow. The higher the handles are lifted the more weight is moved onto the wheel and the easier it becomes to hold it up. Similarly, the more tension that is placed on the weight distribution bars, the more weight is transferred forward onto the front wheels of the vehicle.

These weight distributing bars are necessary on all but the lightest camper trailers. When correctly fitted the bars will ensure that some of the ball weight is carried by the front wheels. As a result the complete outfit will be level but slightly lower.

It is unwise to set off on a trip if the caravan and tow vehicle are not level. If you are in doubt as to the best way to cope with the weight of the trailer, consult someone specialising in towing equipment. People who boast that they do not need or use weight distributing bars are either not aware of the implications or do not have safety as their utmost concern.

And after all, the safety of your family as well as that of the car and caravan are paramount.

## **SWAY CONTROLS**

Sway is the side to side movement of the rear of the caravan or camper trailer. This movement is sometimes referred to as snaking and can result in complete loss of control. Because prevention is better than a cure, sway controls should only be considered when all other factors contributing to the instability have been eliminated. Some of the causes of sway are:

Poorly designed caravan.

Axle located too far forward.

Incorrect ball height.

Unsuitable tow-vehicle & caravan combination

Under inflated tyres

Incorrect weight distribution

As a rule sway control equipment should only be fitted to larger caravans that may occasionally be affected by strong gusty winds.

Before purchasing any sway control equipment, discuss your problems with people experienced in caravan towing. In some cases particular types of equipment may be unsuitable.

For example, some types are not recommended if override brakes are fitted.

Remember that even the best sway control equipment cannot be expected to, and should not, compensate for a towing vehicle that is too light, an unbalanced caravan or lack of a weight distribution hitch.

## **DRIVING TECHNIQUES**

Many newcomers to caravanning are concerned with the prospect of towing or manoeuvring a car and caravan combination. The problems that are sometimes encountered may be due to incompatible vehicle combination, incorrect loading, lack of proper towing equipment or simply a lack of skills. Once the above points have been fixed and a little common sense is used, towing a caravan or camper trailer need not be any more difficult than driving a car by itself.

Some areas where extra awareness may be required are:

**Moving Off** With a load behind, the acceleration rate of a vehicle is significantly reduced. With a manual transmission it is usually necessary to stay a little longer in each gear before shifting into a higher gear. If an automatic transmission is fitted the use of the selector level to control up changes, especially when going uphill, is sometimes desirable.

**Cruising** Because of the extra length and weight fast speeds are not recommended.

In some States the speed limits are lower when a caravan or trailer is pulled. Never drive too close behind other vehicles. Leave at least a 60 metre space unless actually overtaking. This allows others to pass you safely. When approaching a hill and provided it is safe to do so, increase your speed slightly so it is easier to go up the hill.

Always select a lower gear early if the vehicle speed drops off noticeably. Once engine speed is lost, it is difficult to regain. As a result additional stresses may be placed on the engine.

**Overtaking** Overtaking other vehicles, particularly long trucks or other caravans, must be done with extreme caution. Not only is the acceleration considerably reduced but due to the extra length a greater distance has to be covered before moving back into the left-hand lane. Remember to check mirrors to ensure it is safe to overtake. Never overtake a slower vehicle when going down hill.

**Being Overtaken** By constantly monitoring the rear vision mirrors, a faster travelling vehicle can be readily spotted. If the vehicle intending to pass is a truck or bus make sure that this can be achieved quickly and safely. If road conditions permit, move as far to the left as possible. The greater the distance between the two vehicles, the safer the situation becomes. Never take the foot off the accelerator or brake when another vehicle is going past.

**Going Downhill** Always slow down and engage a lower gear before actually reaching the downhill section of the road. This is particularly important if the hill is a steep one. By adopting this procedure the need for heavy braking while going downhill is reduced. Excessive speed or sudden braking while travelling downhill could create an unstable situation.

**Fuel Consumption** Assuming that the caravan and towing vehicle are compatible, excessive fuel consumption can usually be attributed to either fast speeds, poor engine tune or bad driving habits.

More economical driving techniques can easily be mastered by anyone and will result in a noticeable reduction in fuel consumption. When moving off or passing another vehicle always move the accelerator smoothly. Any rapid or excessive movement will waste petrol.

Judging traffic flow is another useful technique. By observing the traffic some distance ahead it is often possible to avoid unnecessary braking and delays.

It has been stated that every time the brakes are used fuel is wasted. This implies that the brakes needed to be applied because vehicle speed was kept up longer than necessary.

If you see a hill coming up, and safety permits, increase vehicle speed slightly to make it easier for the engine to pull the vehicle up the incline.

It is worth noting that to enable a vehicle to pull a given load, it must produce a certain amount of power. The power will be approximately the same whether the engine has four, six or eight cylinders. This means that when towing a caravan or camper trailer with a four-cylinder engine the fuel consumption may be nearly as great as if a six cylinder engine was fitted.

## **WIND DEFLECTORS**

A wind deflector on a car can possibly arouse more discussion than any other caravanning accessory. It is difficult to find someone who has tried a deflector to state other than that it is beneficial. Yet the simple truth is that some deflectors do more harm than good.

It should be remembered that anything which is attached to the roof of a vehicle, whether a pack rack or wind deflector, increases the fuel consumption. If, for example, a wind deflector increases the wind resistance created by a car by 10% then the corresponding resistance on the caravan must be reduced by at least 10% before any advantages can be expected.

Aerodynamics is a very complex science and the way that people think air behaves is reflected in the various deflector designs. Because of many different caravan and tow vehicle combinations there is unfortunately no readily available formula for calculating deflector dimensions.

Experience has shown, however, that if some basic requirements are met, wind deflectors do work.

**Size:** The effective frontal area of a deflector should be approximately 65–70% of the area of the front of the caravan which is above the roof of the car roof. It should be appreciated that the effective frontal area depends on the angle. A piece of material 1 m x 1 m has an effective

frontal area of 1 m<sup>2</sup> when standing up straight but only 0.5m<sup>2</sup> if positioned at 45°.

**Shape:** A straight deflector will only lift the air that actually comes in contact with it. The air passing along each side will still flow back against the front of the caravan. To overcome this the shape must be such that it not only lifts the air but also spreads it so that it will flow either side of the caravan. This means it should be either curved or "V" shaped.

**Angle:** This should be at least 45° to supply enough lift for the air to flow over the top of the caravan roof. If the angle is obtained by the 'line of sight' method, then the air stream will not reach sufficient height to clear the roof.

**Mounting Position:** A deflector should be mounted as far back as possible on a vehicle roof. The greatest and most uncontrollable factor reducing efficiency of a deflector is the gap between the deflector and the caravan. The smaller this distance the more efficient a deflector is likely to be.

**Method of Mounting:** Because of the high wind pressures a deflector is subjected to, it must be securely positioned on at least four places on a vehicle roof. Any deflector mounted on only one bar or two mountings will place excessive loads on the mounting points.

From the previous points it can be appreciated that some deflectors are obviously more effective than others. One way that a deflector's effectiveness can be judged is to observe if it keeps the front of the caravan clear of insects. Besides a decrease in petrol consumption, a well designed and positioned deflector will also provide more stable towing, less buffeting from passing vehicle and lower engine operating temperatures. Many vehicle owners feel that it is necessary to fit

## **BRAKING SYSTEMS**

For many years now, caravans and camper trailers have been fitted with electric brakes. These braking systems are efficient and easy to maintain.

However, to enable the electric trailer brakes to function an electric brake controller must be installed in the towing vehicle. This is a job that should be left to an auto electrician or someone experienced with electrical systems in modern cars.

While there are several different types of electric brake controllers available, the most efficient ones have a feature known as motion sensing. This involves a pendulum that can determine exactly the amount of braking that the trailer has to do to ensure a smooth safe stop.

Once a brake controller is adjusted correctly the driver will be able to slow the car and caravan combination with the same force on the brake pedal as that needed to stop the car by itself.

Older caravans with over-ride hydraulic or mechanical brakes can be successfully converted to an electric system. The cost can be easily justified on the basis of more efficient braking and improved resale value.

## **SUSPENSION MODIFICATIONS**

Many vehicle owners feel that it is necessary to fit stronger springs to the back of their car or 4WD in order to tow a caravan. The justification is that the back of the car goes down when the caravan is lowered on the towball. If the vehicle is a few year old and the springs have sagged a little then replacing the springs may be a worthwhile modification.

However if the only reason the suspension height alters is the weight of the van, then a weigh distribution hitch is needed to take care of this, not stronger springs.

There are two cases where suspension modifications may be desirable or necessary. These involve additional loads in the vehicle that cause the vehicle height to reduce before the van is hitched on. If there is a constant additional load as, for example, in the case of an after-market LP gas conversion, then stronger springs may be needed to bring the vehicle back to its normal unladen height. In the case of

occasional extra loads like camping gear then air-adjustable shock absorbers or air bags are most suitable. After the vehicle is loaded, air pressure can be adjusted to restore the original height. Air adjustable shock absorbers or airbags should not be used to compensate for weak springs or to support the weight of the caravan.

All shock absorbers on the towing vehicle should be in good condition to help prevent pitching or instability while towing. Good shock absorbers not only improve the handling of a vehicle but also increase tyre life.

## **TYRE CARE**

The part that tyres play in providing car and caravan safety is more important than any other single component. A vehicle can only accelerate, brake or steer if the correct contact exists between the tyre and the road. Also if the tyres are not inflated correctly, or are the wrong type, the stability and ride of the vehicle can be affected. Considering that at 80 km/h the average tyre rotates 40,000 times per hour, it can be appreciated that proper care is very important in ensuring a trouble-free journey.

Tyres can deteriorate just as much when a vehicle stands for long periods as when it is being used. When a caravan is stored it is a good idea to remove some of the weight off the tyres and cover them to prevent deterioration by the sun.

When determining the suitability of the van's tyres, it is important that the laden weight of the van or trailer is known. A trip to a weighbridge will soon establish this. Do not use the unladen or registered weight. Add 10–20% as a safety margin to allow for additional loads caused by uneven road conditions, uneven loading or other unknown factors. To find the individual tyre loads, divide the weight by the number of tyres on the caravan.

Next examine the sidewall of the tyre where it may state the maximum load the tyre is designed to carry. Alternatively write down the tyre size and check with a tyre specialist. The load rating of the tyre must

exceed the van's weight as previously determined. If this is not the case, a bigger tyre will have to be selected.

What is usually not realised is that a tyre has to be inflated to its maximum pressure before the load rating of the tyre can be achieved. The maximum pressure for radial passenger or P'tyres are 250kPa (36 psi) for a 4-ply or standard load' and 280 kPa (40 psi) for a 6-ply rated or extra load' tyre. Light truck or LT' tyres have a maximum inflation pressure of 350 kPa (50 psi) if it has a 6ply rating and 450 kPa (65 psi) if it is an 8-ply. Should the inflation pressure of the tyre be less than stated above, the load carrying capacity will be lower.

It is considered unwise to inflate caravan tyres above 315 kPa (45 psi) as it may affect the ride of the caravan. The rear tyres on the towing vehicles, because they are subjected to much greater loads when towing, should be inflated to near their maximum. Front tyres will need an extra 25 kPa (4 PSI) above normal. Always be careful to check tyre pressures when the tyres are cold. Early in the morning is best. During a trip heat build-up will increase pressure, giving an incorrect reading. Never let air out of a tyre when it has been on the move or standing in the sun.

Premature or uneven tyre wear can usually be attributed to under-inflation, overloading, unstable caravan or a mechanical defect like a bent axle. If your tyres appear to be wearing quicker than anticipated, consult a tyre specialist who should be able to pin-point the reason. Do not expect tyres on a caravan to last as long as on a car. The loadings caravan tyres are subjected to are always well in excess of those of the car tyres.

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