Heavy or bulky items that cannot be stowed in the van should be laid on their side, tied together with strong rope and lashed to suitable anchor points. It is preferable to secure small boats on land by tying down, and for added security, filling with water to prevent them becoming airborne.

If your towing vehicle will not be required for your evacuation, leave it coupled to the caravan for extra stability. Before leaving the site to seek shelter in a place protected from wind-borne objects:

- Tape the van door and all windows.
- Turn off electricity and water supplies at the meters.
- Lower the van jacks to the ground to provide additional stability and tighten all tie-downs. Check the hand brake is on.

Folding caravans with canvas sides would need to be closed down before the roof tie-down is tightened. If alternative shelter is not available, go to one of the designated high wind or cyclone shelters in your area.

ROPE USE IN CARAVAN TIE-DOWN

STAGE 1: Chassis Tie-Down

All rope should be 8 kN* (1800 lb) breaking strain (or stronger) nylon rope (3/8 inch or 9.5 mm diameter), or steel wire cable.

All rope should cover no more than two spans (ie from ground picket, to chassis member, to round picket). Refer to drawing.

Rope should be tied loosely with secure knots to round pickets and chassis members, and then tightened to a 'twanging' tension with 12 mm (1/2 inch) diameter 300 mm (12 inch) long steel rods or timber dowel used as a twitch. Once the rope is tightened, the twitching rod should be tied along the tightened rope with twine to prevent the twitch unwinding. Do not overtighten.

Where rope cannot be passed around a chassis member, provide loops made from 8 mm diameter. m.s. rod secured to chassis with a minimum of 50 mm long x 6 mm fillet weld to each leg of loop.

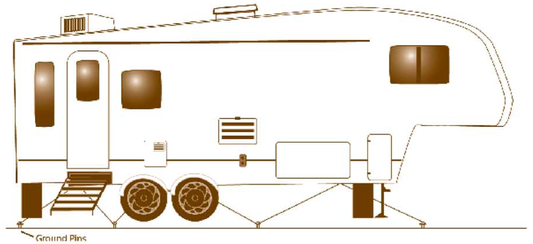
STAGE 2: Roof Tie-Down

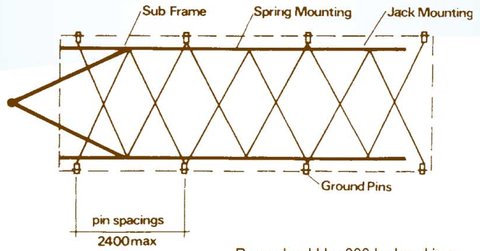
All rope should be 8 kN* (1800 lb) breaking strain nylon or preferably straps or steel wire cable, padded to avoid damage to stress points.

Tie-down caravan with rope in pattern shown on drawing with knots at each ground picket. Hand tighten ropes only - twitching is not required. Do not overtighten.

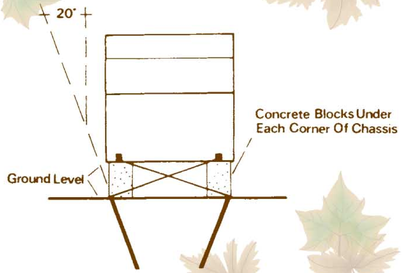
Tie all caravan roof ropes together with ropes running horizontally at the junction of the caravan roof and side wallls, and knotted to each roof rope. This can be used to tighten roof ropes (if loose) but the primary purpose is to keep the roof ropes in position.

CARAVAN TIE-DOWN STAGE I



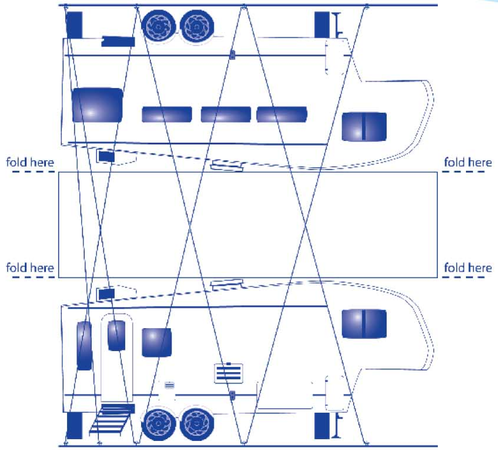


Rope should be 800 kg breaking strain nylon (preferably straps) or steel cable



CARAVAN TIE-DOWN STAGE 2

Rope should be 800 kg breaking strain nylon (preferably straps) or steel cable



**A useful conversion factor when converting from Imperial to metric Breaking Force is 0.1 Ton F= I kN (Kilo Newton) and for converting Breaking Force expressed in kN into Breaking Force expressed in kg is 1 kN = 100 kg.*

These systems were recommended by the Darwin Reconstruction Commission and the currently responsible Australian Government Department. No guarantee can be given for the structural sufficiency of individual caravans.

Ideally this pamphlet should be read in conjunction with the **Cyclone Action Guide** and/or **Storm Action Guide** also produced by Emergency Management Australia and available through State/Territory Emergency Services.

Australian Government
Attorney-General's Department
Emergency Management Australia

Protecting Caravans and LIGHT STRUCTURES from HIGH WINDS

EMA
'safer sustainable communities'

TROPICAL CYCLONES AND OTHER SEVERE STORMS

From November to April each year, the Australian coast north from PERTH through DARWIN and around to northern NSW faces the threat of cyclone, with consequent casualties and destruction of property. Other types of severe storms, including land gales, thunderstorms and even tornadoes, can strike any part of Australia at almost any time of the year. No area can be singled out as being safe from destructive winds. If you live or take holidays in areas prone to cyclones or severe storms, contact the relevant local government office or State/Territory Emergency Service for details of local emergency plans. If travelling , listen to the radio for weather reports and emergency announcements.

LIGHT STRUCTURES PROTECTION

Structures such as carports, wooden, fibro, or metal garages, garden sheds, covered pergolas and gazebos are all more subject to wind damage (or even destruction) than houses due to their light and often open construction. It is therefore essential that relevant local building standards be adhered to during their construction. Where standards are not mandatory (for example, for some sheds and other garden structures), care should be taken to secure frames or wall bases by either bolting to, or setting in concrete floors. Alternatively use long, steel pegs driven into the ground so that angled heads overlap wall-sills, or so that frame sections are securely bolted to pegs. Additionally, heavy fittings such as work benches, cupboards, and shelving should be firmly attached to walls to provide further anchoring and stability. Roofing materials should be secured with screw or clip-locks.

CARAVAN PROTECTION

The following notes are for the guidance of caravan users in making-safe vans and equipment during times of high winds. They apply especially in established caravan parks, but should also be followed as closely as possible in other situations. If it is impossible to provide the recommended ground anchors, or you cannot carry at least the basic equipment detailed below, lesser protection may be obtained by making anchors of buried logs, steel, concrete, or rocks.

The Danger to Caravans

Caravans are necessarily of lightweight construction with generally flat sides, and will be endangered in high winds unless special precautions are taken to reinforce their structure to protect them from damage from flying debris, and to prevent them from being blown over or off their supports.

Positioning

Placement with a narrow end facing the prevailing wind will provide some degree of protection for your van. However, proper positioning alone cannot assure safety. Your van should be tied down securely, the parking brake applied and the wheels chocked.

Natural barriers (such as embankments or groups of sound trees) provide worthwhile windbreaks, but stay clear of trees by a distance greater than their height. Even if your caravan is securely tied down, you should seek other shelter when warned of approaching high winds. In some areas river or sea flooding is associated with storms, and you should also consider this when positioning your van.

Make Safe in Stages

The precautions suggested in these guidelines should be taken in three stages. However, it is important to realise that even if the suggested precautions are taken, it is not possible to totally protect a caravan to make it a severe storm or cyclone shelter. Consequently, any broadcast instructions for the public to occupy shelters should be heeded immediately.

The first stage is chassis tie-down, which should be done as a matter of normal course even when temporarily located in high wind areas (principally cyclone areas). This is to save time later. Stage one and Stage two must both be carried out to make the van safe. One stage without the other is not sufficient.

The second and third stages, which are roof tie-down and equipment make-safe, should be done when a high wind warning or tropical cyclone warning is issued by the Bureau of Meteorology.

Stage 1 - Chassis Tie-Down

The chassis tie-down is designed to prevent the van from being blown off its supports.

Established caravan parks in high wind areas usually provide ground anchor points for chassis tie-down.

In these cases use either short lengths of strong chain and turnbuckles or sound rope (preferably steel cable) of at least 9.5 mm (3/8 inch) diameter to secure the chassis to the ground anchor points. When these points are not provided, the suggested tie-down system is shown in the drawings on the reverse side of this pamphlet. It comprises a nylon rope or steel cable anchored at ground level and attached to the van chassis. Before starting work on the tie-down, ensure that the van supports are sound and stable. The effectiveness of the tie-down will be lost if the van supports fail during high winds.

The steel pin type anchor shown in the drawings is suitable for most installations. The pin should be angled to the vertical as shown and driven into position, preferably by a jack-hammer with an adaptor on the driving ram. After driving the pin, weld to top of pin a bar or loop made from 8 mm m.s. rod. Where rock is encountered, pre-drill a 25 mm (1 inch) diameter hole 600 mm (24 inch) (plus any earth cover) into the rock and drive a star picket to full depth of hole. Enquiries should be made and care taken to avoid damaging underground pipes or cables or other facilities when driving pickets into the ground.

When completed, the chassis tie-down will not interfere with use of the annex, but in most cases the annex will need to be removed during the tie-down installation.

Stage 2- Roof Tie-Down

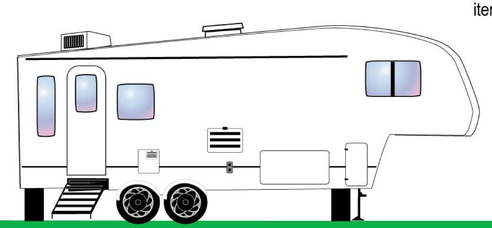
The roof tie-down keeps the van from overturning or swaying off its chassis. Because of the interference caused to the use of an annex, installation of the roof tie-down can be left until a high wind or tropical cyclone warning is issued.

The first step in roof tie-down is to remove and roll up the annex for stowage. This should be done immediately a high wind or a tropical cyclone warning is broadcast

The most effective roof tie-down is a strong net firmly fixed at ground level and passing over the van roof for the full length of the van. This also affords protection against flying debris.

The roof tie-down shown on the drawings is an approximation of this concept and is simply a continuous nylon rope or steel cable anchored at ground level using the same anchors installed during Stage 1 and passed over the van roof as indicated. The rope or cable should be tensioned as much as possible by hand. The corners of the caravan and the ropes should be protected from damage from each other by the use of metal angle pieces or some other form of padding. An alternative is to use strong nylon or webbing straps to avoid damage to the van (ensure strength ratings of straps are similar to those given for ropes below).

Stage 3 - Equipment Make-Safe

After a high wind or tropical cyclone warning has been broadcast and the Stage 1 and Stage 2 tie-down of the van has been completed, as much equipment as possible should be stowed inside the van.

This includes the annex, awnings and other items such as lawnmowers, bicycles, toys, chairs, garbage bins, and the countless small household articles which seem to accumulate.