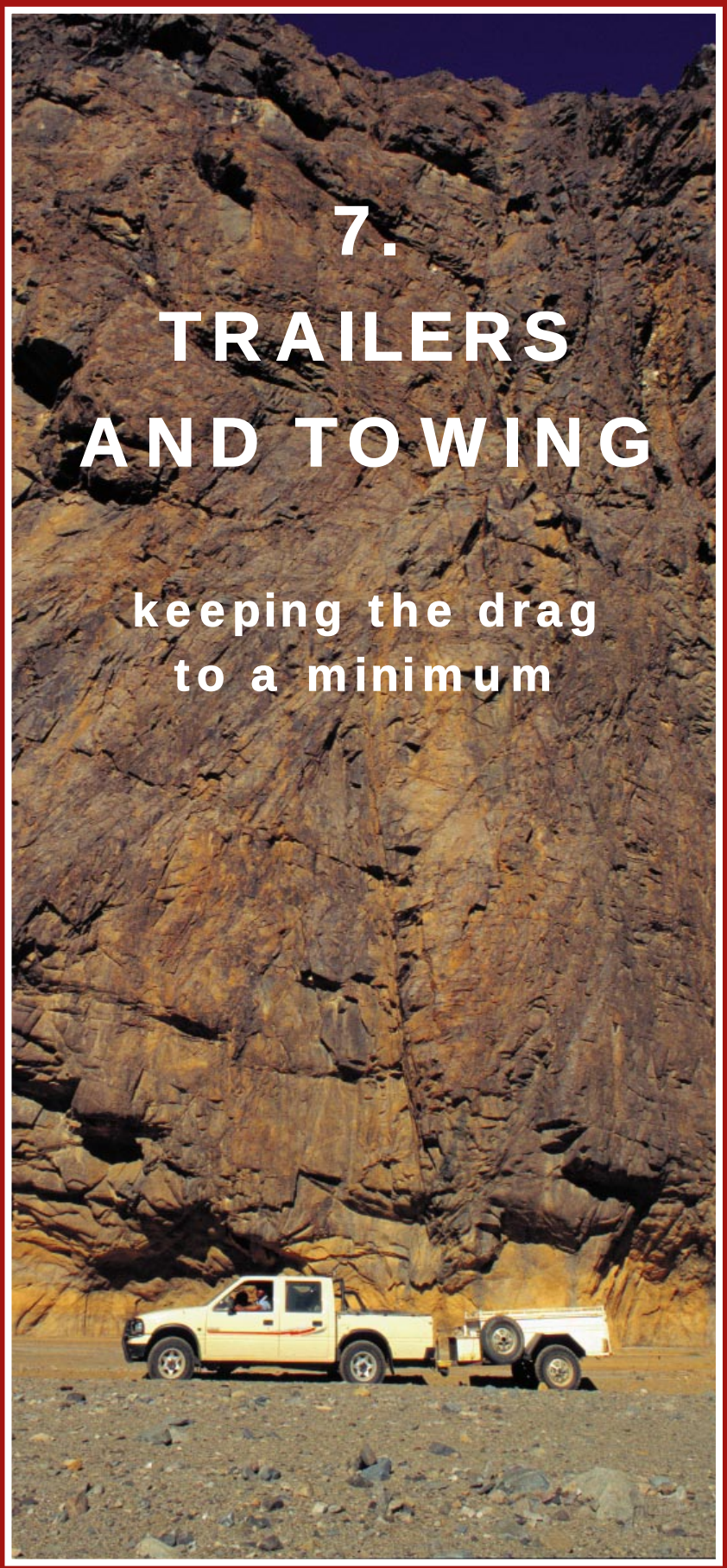

7.
TRAILERS AND TOWING

keeping the drag to a minimum

Off-road trailers are a practical alternative to roof racks for carrying bulky safari equipment on overland trips. They must be designed and built to withstand extended outback travel - sand, mud, rocks, ridges and troughs and axle-cracking corrugations. More off-road trailer models are built in South Africa than any in any other country, most of which are well built and tough enough for such travel.

Trailers - their advantages over roof racks are:

- *Easier to load and unload, especially heavy items such as full jerry cans.*
- *Payload is significantly higher than a roof rack.*
- *They can be used for the permanent location of items such as a fridge.*
- *Trailers do not negatively effect the vehicle's centre of gravity.*
- *Extra equipment can be loaded onto the trailer lid which can also be used as a work surface.*
- *Packing and unpacking is often quicker than a vehicle.*
- *Built-in kitchens help take the chore out of camp cooking.*
- *Heavy stuff carried in the trailer can be left at 'base' while game driving and exploring.*

Their disadvantages over roof racks are:

- *More difficult to tow over loose and uneven surfaces.*
- *Experience required when driving off-road and reversing.*
- *Trailer can be a severe hindrance in any terrain where traction is a problem.*
- *A poorly loaded trailer can cause instability when cornering and braking.*
- *A trailer adds wear and tear to the towing vehicle, exaggerated when the trailer is badly loaded or when towed by inexperienced drivers.*

Off-road trailers are an alternative to roof racks for carrying bulky safari equipment. They do however have a serious effect on a vehicle's ability in difficult conditions

TOWING EQUIPMENT

Tow hitches

Beware of tow bars fitted by independent fitment centres. Four-wheel drive vehicles often stress their tow bars far in excess of what would be considered normal towing operations. Vehicle

manufacturer-approved towing devices are essential - do not fit any old tow bar that is available - you may live to regret it.

- Towing off-road stresses a tow bar far more than ordinary towing.
- Tow bars are sometimes used for vehicle recovery, although this is very unsafe and ill-advised.
- Off-road trailers are bigger and heavier than the average family man's little 'Venter'.
- When considering a tow bar; if the one being offered looks similar in strength to those fitted to a normal road car then it is not strong enough for your 4x4.
- Broken tow hitches occurring in the wilderness are not uncommon and depending where the breakage occurs, it can be difficult to repair without welding equipment.
- The standard 50mm tow ball is rated to a maximum 3500kg trailer weight. This rating is calculated for towing on a paved surface not over rocks or in heavy sand.
- Maximum permissible weight on a standard 50mm tow ball is 150 kgs. This is often exceeded when towing off-road.
- When calculating how much weight the vehicle can carry after the trailer is hitched up, double the tow hitch weight and deduct that from the vehicle's carrying capacity.

Ideal vehicle - trailer combinations

- *Long wheelbase combined with short rear wheel-to-tow ball distance makes for a stable tow vehicle.*
- *Short rear wheel-to-tow ball distance with long trailer tow hitch to axle distance improves stability.*
- *Trailer's vertical C of G must be less than 40% of the trailer's tow hitch to axle distance.*
- *Short vehicle wheelbase or short rear wheel-to-tow ball distance combined with long trailer tow hitch to axle distance make for easier reversing.*
- *Vehicle tow ball height must equal trailer tow hitch height when trailer chassis is horizontal. Essential when towing twin-axle trailers.*
- *Mud flaps must be fitted to the rear of the tow vehicle to prevent damage caused by flying stones.*

Off-road trailer design

Choosing an off-road trailer is not easy because those produced in South Africa are all so similar that no single trailer stands out as the best. Some are advertised as the 'best' purely because the list of auxiliary equipment available is the most elaborate or that the materials used in their construction are the most expensive. Do not let this cloud your vision.

At the risk of incurring the wrath of designers and developers of off-road trailers I will attempt to guide you as to what is important and what is gimmickry when it comes to off-road trailers.

Suspension and chassis

The type of suspension is critical to the success of an off-road trailer. Trailers tend to bounce around a great deal so it must be built to withstand severe punishment. Suspension types range from torsion

bar to leaf spring. Torsion bar suspension is NOT AN OPTION and fails in off-road use. Leaf spring fitted with shock absorbers are the strongest and appear to work the best. Check where the springs mount onto the chassis - this is where breakage occurs and it must be reinforced. The chassis should be a rigid steel frame, preferably using steel tube and not chanelling, extending all the way to the rear spring shackles. Springs mounted directly onto a stiffened loadbox are rarely strong enough. Breakages also occur at the joint between the A-frame and the loadbox and this should be reinforced. The trailers's tow hitch must be attached with high-tensile steel bolts. Mild steel bolts are not strong enough. Check your trailer's bolts and change them if they are mild steel.

There is some contention when it comes to shock absorbers fitted to leaf spring-sprung trailers. I recommend their use for two reasons; shock absorbers reduce bounce and reduce shock loads to the axle. I have witnessed the performance of trailers fitted with high quality shock absorbers and I recommend their use. Vertical wheel travel is of little importance in trailer design but the ability of the axle to absorb shock and not bounce is.

Wheels and tyres

To improve stability on bush tracks the wheel track should closely match the towing vehicle's. To avoid having to carry spares specifically for the trailer and to allow its wheels and tyres to be interchangeable with the vehicle's, they need to have interchangeable wheel rims with identical tyre diameters.

However, trailers with wheels that have a larger diameter than the vehicle's will pull better through sand. If you can carry a spare specifically for your trailer, fit over-sized wheels and tyres on the trailer. These tyres can then be deflated to pressures below that of the vehicle and the trailer will cause far less drag.

Materials used

For the chassis rails and draw bar three or four millimetre steel channel or tube is sufficient. For the body, 1,5 or 2mm mild steel or stainless steel plate is adequate. The lid needs to be well reinforced if made from steel plate as it takes a lot of punishment during the safari. Some manufacturers use 3CR12 which is called stainless although it is not. 3CR12 is a chromium steel with a resistance to corrosion that can be compared to the lowest grades of stainless steel.

Rust protection

Most trailers are stored outdoors and therefore are prone to rapid decay by corrosion and a trailer cover is a good idea. A stainless steel body is only necessary if you intend to use your trailer extensively on the beach. Galvanized mild steel is an excellent alternative and is almost as good, easier to repair and cheaper. For use inland, sealer-protected mild steel is fine if the trailer is stored under cover. Preferably the steel chassis frame should be hot-dipped galvanised. Trailer components that seem to deteriorate first are attachments such as hinges and clamps. These should be stainless steel and attached by stainless bolts. When looking at the

many South African off-road trailers, most manufacturers have placed rust prevention high on their priority list.

Weight

Trailer manufacturers should avoid excess weight in the construction without compromising strength. The weight should be in the chassis and axle. The loadbox can be made of lightweight material as long as the design and engineering is done in such a way as to add strength.

Stability at speed

With all of the well-known off-road trailers built in South Africa, stability depends more on weight distribution in the trailer and in the towing vehicle than on trailer design. There is no simple way of testing a trailer's stability at high speed other than to tow it yourself. Weight distribution is critical to stability.

If you have deflated trailer tyres to assist progress through sand, this will cause instability when you get back on the road. Remember to reinflate your trailer tyres.

Length

The distance from the tow ball to the trailer axle will determine ease of use. The shorter the distance the better it will handle off-road but the penalty comes with reversing and on-road stability.

Over-run brakes

Many off-road trailer manufacturers omit over-run brakes or offer them as an option. This is because in very heavy dust conditions brake drums tend to fill up with sand which wears out the shoes and can cause seizure. This only occurs in excessive dust conditions. If the wheels are as large as the vehicle's, which they should be, the same dust problems occur to the vehicle brakes as well. If dust does become a problem simply remove the shoes from the drums and lock the brakes open at the tow arm, an hour's job for both wheels. As for me, I would rather take the safe route and the unlikely risk of troublesome brakes than drive at 120kph with a ton of unbraked load behind me. Another argument against the fitting of brakes is that when driving over uneven terrain the brakes engage and disengage as the trailer bumps around. All over-run brake systems are fitted with a locking device on the tow arm. This is a hinged piece of steel that wraps around the arm to prevent the brakes from activating when reversing. This must be engaged when driving over uneven ground where speeds are low and over-run brakes are no longer required.

Trailer manufacturers may place a weight restriction plate stating 750-kgs on a trailer capable of carrying a ton or more, because with a stated payload of over 750 kilograms the trailer must, by law, be equipped with a braking system. The choice is yours; are you prepared to take a risk and tow such a large mass without a braking system? Under normal driving conditions you may not realise the risk, but do an emergency stop and it could mean the difference between stopping clean or rolling your vehicle. In my opinion, if a loaded trailer with a gross weight of more than 500 kilograms is not fitted with over-run brakes, don't even consider it.

Jockey wheel

This wheel supports the nose of the trailer when standing alone. Because off-road trailers are often left parked on uneven ground, the longer the jockey wheel the better. It must be able to be removed completely and stored on the trailer when driving off-road. If it is simply raised, it is vulnerable to damage off-road.

Trailer-top racks and tents

If you intend to place a roof-top tent on your trailer then a rack is required. If you do not then the rack raises the trailer's centre of gravity and it must not be loaded with anything but the lightest equipment, such as the camp table and a couple of chairs. Trailer racks raised high above the loadbox look great and are very practical when at the campsite, but they add to the trailers instability, especially off-road, even without a load.

Auxiliary equipment

A vast range of equipment can be specified when ordering a trailer as most manufacturers build to order. Articles fitted range from built-in water tanks with camp showers, dual battery systems linked to the vehicle, fridge/freezer units and simpler items like jerry can and gas tank racks. Each manufacturer has its own list of preferences. The only guideline here is that the more you fit into your trailer, the heavier it will become and the more difficult it will be to handle off-road. A series of power points and a fluorescent light fitted inside the lid and connected to the vehicle electrics is very handy, especially if it can be removed and double as an extra lamp around the camp. Fridges fitted into trailers tend to get damaged because of the severe vibrations on rough or corrugated roads.

Storage systems

Weight distribution in a trailer is very important. Some trailer designs have all the jerry can brackets and water tanks fitted behind the axle which can cause low trailer hitch to total weight ratio. This in turn can cause severe instability, especially when climbing steep hills, where the trailer lifts the rear of the towing vehicle. I have seen a Pajero battling to get up Sani Pass, which is normally effortless for a 4x4, because its traction was seriously compromised by the badly packed trailer it was towing. Consider carefully where the optional extras you choose for your trailer are fitted. Nose-cones storage boxes and boxes on the mudguards are

Equipment on the draw bar must not be too far forward. Check that the tailgate can be opened with the trailer hitched on.

very handy and must be dust-proof and lockable. Jerry can mounts on a trailer must be low down to keep C of G low. Trailers are ideal for carrying spare fuel.

If your vehicle carries its spare wheel on the tailgate make sure that it can be swung free with the trailer hitched on. Spare wheels carried here can make hitching awkward and any boxes, clamps or other attachments above the tow arm can make matters worse. Another reason for limiting attachments on the towing arm is that anything that could obstruct the wheel carrier from being opened can also hit the spare wheel when driving through a dip, when the trailer lifts and the vehicle drops. The option of removing the spare wheel carrier and placing it on the trailer is an alternative, but remember that the vehicle needs to carry a spare when the trailer is left at 'base camp'.

Practicality

When judging if a trailer is suitable, open and close all of the boxes and the lid. Pretend you are at your camping site and you need to find something in the trailer. Many trailers are fitted with a tailgate - a very useful feature as you can pack travelling items such as the day's lunch or a tool box at the back which can be easily accessed when travelling. Other features include cubby holes, exterior boxes or interior compartments, some of which are cleverly designed and some impractical for reasons such as a narrow aperture which become frustrating when packing and unpacking. Some trailers fitted with tailgates require that the roof be opened in order to open the tailgate. That is bad enough but some go even further in poor design - to open the tailgate the lid must first be opened. But in order to support the open lid the tailgate must be closed. Draw your own conclusions!

Summary

Assuming that you have decided that a trailer is the way to go, look for a lightweight trailer with a good sturdy chassis frame, a heavy axle (2,5-ton) on leaf springs and a minumum of weighty gadgetry. Remember, if you tow a big trailers you will always find a way to fill it, so keep it small and sensible.

TOWING - ON-ROAD

The most important safety considerations when it comes to towing on-road is straight-line stability, oscillation or weave and stability in a turn. Factors which affect these are as obvious as trailer hitch weight and trailer weight to vehicle weight ratio as well as items which are seemingly inconsequential such as the spring rates of the towing vehicle and trailer centre of gravity.

In this section we illustrate causes and effects of vehicles and trailers in an attempt to improve safety. I give credit here to Tom Sheppard's outstanding book, 'The Land Rover Experience', published by Land Rover, from where much of this information and many of his analogies are taken.

Straight-line stability

Consider a trailer being towed on an undeviating course by a vehicle moving in a straight line. Here the only force acting on the trailer is via the tow hitch and as a result the trailer moves in a straight line. Now consider a gust of wind or undulations in the road surface (supposing that the vehicle is unaffected), the trailer now acts under a new force - sideways. The trailer's tyres will as a result be at an angle, albeit small, to the direction of motion. As a result an opposite side force is excerpted by the tyres bringing the trailer behind the vehicle again. Understanding this simple principal is required as we go further.

Oscillation - decaying or increasing

Let us distinguish between decaying or increasing oscillation and how it relates to towing. Consider an ordinary school ruler with a hole in one end. With the ruler swinging on a pencil pushed through the hole, properties governing oscillation can be demonstrated. With the pencil stationary, the ruler hangs straight down by the force of gravity or in our scenario a vehicle moving on an undeviating course. Take the bottom of the ruler and pull it sideways and release it, keeping the pencil stationary. The ruler exhibits decaying oscillation at it swings back a few times quickly coming to rest, demonstrating straight line stability as described above. Now, take the pencil and simulate a vehicle moving over an uneven road surface by moving it sideways as the ruler is pulled sideways and released. If the frequency of the movement of the pencil matches the frequency of the swing, increasing oscillation takes place. This will happen as you instinctively try to match the phase of the ruler swing, trying to make the ruler swing as high as possible.

COURTESY BUSHMAN TRAILERS

A heavy trailer nose weight combined with a vehicle heavily loaded on the rear axle will cause instability. Note the jerry cans on the trailer draw bar and more on the back of the roof-rack. Concentrating heavy articles forward of the rear axle will improve things.

Whiplash effect

Again let us use the school ruler to demonstrate whiplash. This time hold the ruler in a horizontal plane with your forefinger and thumb over the hole. Flick your wrist to the right and left. As you do so, the ruler trails the wrist movement and then overshoots.

Applying what we have learnt

With all these analogies it can be seen that an incorrect combination of hand and wrist action, ruler weight and thumb grip can produce varying effects. Getting these combinations right, the

action of the ruler is very much as described. This in turn demonstrates that the varied actions of the ruler (trailer) and the wrist (towing vehicle) result is varying degrees of decaying oscillation, increasing oscillation and whiplash. Understanding these principles will assist in improving performance and safety.

Centre of gravity (C of G)

A trailer's C of G exists in the horizontal and vertical plane. Both have an effect on the trailer's stability. To demonstrate C of G in the horizontal plane consider a round bottle (trailer) laid on its side and spun. It will spin around its centre of gravity. Grab the bottle by one end while it is spinning. Instead of spinning around its C of G it will now spin around the end where it is held (trailer hitch). Energy is transferred to this end and will exert a reactive lateral force (the bottle will attempt to rotate and spin simultaneously) on your hand (tow hitch). It is necessary therefore to consider the position on the trailer's C of G and its associated lateral force acting on the vehicle thereby affecting stability. An operator can control this C of G by packing sensibly and making sure that the trailer's C of G is at an optimum - which lies 10 - 20 cms in front of the axle.

C of G in front of the axle

With the trailer's C of G ahead of the axle, as the towing vehicle swings the trailer exerts a force on the vehicle that reduces yaw and as a result the oscillation begins to decay. On the other hand, trailer C of G in front of the axle degrades cornering stability. When the C of G is too far forward it can provoke a slide and roll-over in a turn as a result of the same forces in place in our rotating bottle example.

C of G behind axle

With the trailer's C of G behind the axle the result of vehicle swing creates a force that amplifies yaw and begins what can become increasing oscillation.

Towing on-road - Summary

All stability problems are amplified as the trailer gets heavier. Once the trailer's weight exceeds 70% of that of the towing vehicle you are entering the critical zone with regard to stability and safety. The onus is on you to take extra care.

Try and estimate the trailer's C of G at 10 - 20 cms ahead of the axle.

Concentrate heavier articles over the axle thereby reducing inertia and improving stability.

Remember to keep the tow ball greased and replace the grease in very dusty conditions because grease + dust = grinding paste.

Take extra care in tight bends - the forward trailer C of G tries to push the vehicle's tail around the corner faster. A break-away can result.

TOWING OFF-ROAD

A vehicle's ability on slippery ground is degraded significantly when pulling a trailer. The forces exerted by a trailer off-road are similar to those on-road but are amplified. Instability and control problems can manifest themselves at very low speeds.

Off-road towing points to be considered

- *Disconnect the jockey wheel and stow it before the ground gets rough.*
- *Disengage the over-run brakes by sliding the lock over the towing arm, preventing it from retracting and engaging the brakes. When driving, allowance rarely need be made for the trailer's ground clearance as in most cases it exceeds the vehicle's. However, a trailer will reduce manoeuvrability off-road and off-road trailers are frequently damaged by trees, stumps and bushes that the tow vehicle runs past.*
- *Make allowances for the additional weight when braking and descending steep slopes by braking gently and changing to low gears timeously.*

Descending steep slippery slopes with a heavy trailer behind you is one of the most difficult off-road manoeuvres and should be done with extreme caution. The loss of steering control experienced in such conditions is exacerbated by the trailer. As the driver tries to direct the vehicle from the front, the trailer acts on the tail, steering it anyway it feels. In this predicament jack-knifing can occur and no amount of expert action on the part of the driver seems to be able to stop it. If gentle acceleration fails to pull the trailer straight or if acceleration is too risky in terms of losing control of the vehicle, then the only way out may be to disconnect the trailer and to manhandle it down the slope on the end of a winch cable.

ELECTRICS

The diagram below illustrates the standard tow-hitch socket wiring. It should be protected with a fuse of no more than 30 amps and the cables should not have a core diameter of less than 3mm.

BACK VIEW OF A 7-PIN TOWING SOCKET WITH THE HINGE AT THE TOP

1. *Left-hand indicator*
2. *Power point (fridge etc.)*
3. *Earth*
4. *Right-hand indicator*
5. *Right-hand tail light*
6. *Stop lights*
7. *Left-hand tail light and number plate*

PACKING A TRAILER

Trailers should be well packed and items secured as the amount of vibration and bumping far exceeds that inside the towing vehicle. It is a bad idea to mount a compressor fridge into a trailer - the excessive vibration damages them. The main cause of failure is fracture of the copper tubes. For this reason compressor fridges are less robust than heat-transfer types which can be mounted in a trailer and in some respects this is preferable to mounting inside a vehicle. In this case the trailer must be secured by steel straps of cables with turnbuckles and have ventilation apertures which must be opened when the fridge is powered by gas in camp at night when the trailer lid will be closed. Heat generated above a gas fridge can damage the trailer lid, so an aperture must be fitted above the vent pipe as well as at the base near the burner. These apertures must be dust-tight and closed when on the road, when the fridge must be run on electricity.

TRAILER COVERS

Trailers tend to suffer more wear and tear in storage than on the road because more often than not they are left under a carport or parked under a tree in the garden, where exposure to the elements rapidly erodes corrosion resistance and damages tyres.

Coverite now manufacture a range of trailer covers customised to specifications set by Mr Conradie to suit our Southern African climate. The covers carry SA patents and the range fits most South African-made trailers, with and without nosecones. All covers are backed by a two year factory warranty.

Coverite covers are made from a fabric called Silvertech. It's light, soft and durable, and UV and water repellent. Clever design, incorporating a double-stitched elastic hem around the complete bottom edge, ensures that the cover is pulled around the shape of the trailer with ease. Once fitted, there is sufficient ventilation to prevent condensation under the cover.

The cover can be easily fitted by one person and a major advantage of the soft fabric is that it will not scratch paintwork. Big emphasis has been placed on security. To deter thieves, the cover comes with a heavy duty plastic grommet on both sides, where an optional lock and cable can be attached, securing the cover to the trailer. While the trailer is on the road, the cover can be easily stowed in the carrier bag made of the same fabric as the cover.

Coverite is available from selected dealers of Venter Trailers, Speedy Exhaust centres and Midas auto spares centres. For further trade or customer enquiries, contact Retief Conradie on phone (018) 462-5338.

HIRING A TRAILER

An alternative to buying and equipping an off-road trailer is to hire one first. Better still, if you are thinking of buying a trailer but are not sure how you will enjoy it or handle it off-road, hire one for a trip and see how you like it. Doing this will not only give you an idea of a trailer's viability as a piece of safari equipment but will also help you to make a good choice when it comes to choosing one for yourself.

One of the most successful trailer hire companies is Bundu Rent and their safari product is called Campa. Campa is a fully equipped off-road trailer which comes with a standard range of equipment and options from jerrycans to portable showers. Trailers are handed over with a comprehensive instruction manual covering items from erecting the tent and shower to loading advice and tyre pressure guides.

Because the electrics depend on correct tow hitch wiring, the applicable wiring for Bundu Rent trailers is on page 231.

OFF-ROAD TRAILER BUYERS' GUIDE

An astonishing number of off-road trailer models are available in South Africa and I would be prepared to bet that we lead the world. At one point no fewer than 14 manufacturers built at least 29 models. Off-road trailer manufacturers seem to come and go, so only the major players are listed here and 'work from home' operations deliberately excluded. The best trailers are designed and built by people who go off-roading and tend to continually alter designs and improve the range of options. At time of going to print, the information listed here is correct, but many changes are likely during the long shelf-life of this publication. If there are options you require that are not listed here, contact the manufacturer for clarification.

ARMOUR STEEL

Ian Armour of Armour Steel in Hout Bay (tel 021 790 1980) has developed a number of off-road trailers, all with an unusual method of construction where the cage and chassis are integral, which stiffens the structure. Suspension is by leaf springs and shock absorbers and the body options include the 'Safari' and the 'Kitchen'. There is also a 1,8 metre trailer suited to light 4x4s. Many optional accessories are available for clients customise their own trailer.

Armour Steel Kitchen trailer

Armour Safari Trailer

This is a conventional single loadbox trailer (illustrated on previous page) fitted with extra boxes on the wheel arches and draw bar. Accessories are attached as per clients requirements including a carrier and roof top tent.

ARMOUR STEEL SAFARI TRAILER	
Loadbox height, width, length:	500 x 1100 x 2000. (optional lengths 1,8 and 1,6 metres)
Payload:	350 kgs
Body:	Galvanised sheet
Chassis:	Galvanised steel channel
Unladen weight	n/a
Wheels & Tyres:	Specify when ordering
Suspension:	Leaf spring with optional shock absorbers
Brakes:	none
Jockey wheel:	Removable
Colour:	silver, white or beige. Other colours on request.
Standard features:	Gas-strut supported lid with integral carrier of steel with wood slats. Carrier suitable for roof-top tent. Single com partment with partitions, 2 jerrycan brackets. All seals are silicone dust-proofed.
Optional features:	Roof top tent, over-run brakes

ARMOUR STEEL 'KITCHEN' TRAILER	
AS ARMOUR SAFARI TRAILER WITH THE FOLLOWING CHANGES AND ADDITIONS:	
Loadbox height, width, length: 500 x 1100 x 2000	
Payload:	1000 kgs
Brakes:	Over-run drums
Standard features:	Three doors into 3 divisions - back, storage and side kitchen 3 electrical power points, over-run brakes, 50-litre s/steel water tank.

Armour Kitchen Trailer

Armour Steel's Kitchen trailer is a kitchen on wheels. All kitchen utensils are accessible from the three dust proofed containers, the left side being the main kitchen unit with the other two as storage bins. The trailer also has a roof top carrier suitable for a tent.

B'RAKHAH SAFARI TRAILER

The B'rakhah Safari Trailer concept claims to be the most advanced safari trailer available in South Africa - and judging by the features and optional extras this may very well be true. It is designed to be maintenance free, it has a hot-dipped galvanized chassis, heavy duty tail-light clusters, aluminum lid-top rack, all bolts are cadmium plated or galvanized and the build quality is excellent. It comes standard with an over-run braking system. As a testament to the reliability of leaf springs and shock absorbers, B'rakhah have now replaced their original torsion axle to leaf springs suspension. B'rakhah will modify trailers with torsion bar suspension to the new axle at very reasonable rates. This I would say is not an option as the torsion bar axles break with repeated off-road use. The B'rakhah Trailer is a Land Rover-approved accessory.

Contact Hein Engelbrecht at 012 663 4501, 082 565 0467.

B'RAKHAH SAFARI TRAILER	
Loadbox height, width, length:	450, 600 or 800 x 1100 x 2100
Payload	1550 kgs.
Body:	Mild steel plate and alloy.
Chassis:	Galvanised steel tube with high-lift jacking points.
Unladen weight:	480 kgs
Wheels & Tyres:	'Prowhite' rims. 215 R15 off-road tyres. Alternatives can be specified.
Suspension:	Leaf springs and shock absorbers
Brakes:	Over-run drums
Jockey wheel:	Heavy duty extendable and removable
Axle rating:	2500kg
Colour:	White
Standard features:	Left and right mudguard lockers with auxiliary battery compartment, belly-mounted tent pole compartment, opening tailgate. Belly - mounted fuel or water tanks, lockable spare wheel bracket, aluminium jerry and water can brackets with internal tie-down rings.Side access for freezer.
Optional features:	A broad variety of optional equipment can be fitted

BUZZARD INDUSTRIES

Buzzard industries build three trailers, the Overlander, Bushpig and the Buzzard, all suitable for camping and heavy off-road use. Construction is a combination of steel channel chassis and tubular space frame with lightweight panelling resulting in a strong, below average dry weight trailer. Each product carries a lifetime guarantee against faulty workmanship or materials.

Buzzard Industries, 13 Northgate Park, 116 Malacca Road, Durban North, tel. 082 455 7092

Left: Buzzard Bushpig
Right: Buzzard Overlander

BUZZARD OVERLANDER AND BUSHPIG	
Loadbox height, width, length:	820 X 1200 X 1800 mm (Overlander) 820 X 1100 X 1500 mm (Bushpig)
Payload:	750kg (unbraked), 1250kg (braked)
Body:	tubular frame and 1mm chromadek panelling
Chassis:	Galvanised steel channel
Unladen weight:	340 kgs (Overlander), 305kg (Bushpig)
Wheels & Tyres:	'Prowhite' rims, Conti RV180 or General SAG radials
Suspension:	Leaf springs. Shocks optional
Brakes:	None standard. Over-run brakes available on request
Track:	Specified when ordering to match towing vehicle.
Axle:	Rated at 1800 kgs.
Colours:	White
Standard features:	Removable jockey wheel, solid hinged lid with rack and gas helper struts. Two jerrycans and 2 water tanks with taps stabilisers, spare wheel, roof rack, hinged tailgate, two side doors.
Optional features:	Roof-top tent, cutlery set, Side toolbox, front toolbox, spare battery system with light, extra rear-mounted spare wheel carrier as well as other customised configu rations.

BUZZARD	
This is a basic , no frills, four sided box trailer with gas-assisted lid	
Loadbox height, width, length:	650 X 1100 X 1500 mm (Overlander)
Payload:	750 kgs
Unladen weight:	238 kgs

CONQUEROR TRAILER

Mega Manufacturers, a company with years of experience building military trailers, builds a top-of-the-range safari trailer. Each trailer is an individual design built on a proven miltary chassis. The concept is a good one, build quality excellent and some of the ideas ingenious. If you are looking at a top trailer with all the frills take a look at the Conqueror. Mega Manufacturers, 62 Schoeman Street, Heidelberg, tel. 0151 96 533.

CONQUEROR SAFARI TRAILER	
Loadbox height, width, length:	600 x 1200 x 1880
Payload	1180 kgs. depending on fittings
Body:	Mild steel plate.
Chassis:	Channel and steel tube
Unladen weight:	315 kgs
Wheels & Tyres:	'Prowhite' rims.15" rims. 16" rims can be specified.
Suspension:	Leaf springs and shock absorbers
Brakes:	Over-run drums with auto reverse coupler
Jockey wheel:	Heavy duty extendable and removable
Axle rating:	2 500 kgs
Colour:	White
Standard features:	Lashing rails, three lockable access doors, nose cone.
Optional features:	Just about everything you can think of is purpose designed and installed at the factory.

CUTS SAFARI TRAILER

Cuts Manufacturing of Port Shepstone, which began building trailers is 1978, custom-build off-road trailers to order as well as specialist trailers for the mining and agricultural industries. They built two models of conventional single loadbox off-road trailer - The Eco Safari Trailer and the Bundu Safari Trailer, the larger of the two. Build quality is maintained by MIG welding, chassis rust proofing by filling with Tectyle anti-rust and all electrical wiring is run inside the chassis tube. The large nose cone is a standard feature and all hinges are 316 stainless steel, all bolts are galvanised,

the bin interior is rubberised and the chassis and trailer bin are sandblasted and then immediately coated with primer and 2-pack

CUTS BUNDU AND ECO	
Loadbox height, width, length:	600 X 1050 X 2000 mm (Bundu braked)
Loadbox height, width, length:	600 X 1050 X 1800 mm (Bundu unbraked)
Loadbox height, width, length:	600 X 1050 X 1800 mm (Eco)
Payload	n/a
Body:	2mm steel plate. 1,6mm (Eco) 2mm plate nosecone and front impact area
Chassis:	Full-length rectangular tube
Unladen weight:	n/a
Wheels & Tyres:	Must be specified to match vehicle
Suspension:	Leaf spring and shock absorbers (Bundu) or rubber torsion (Eco)
Brakes:	none
Track:	Specified when ordering to precisely match towing vehicle.
Axle:	Rated at 2500kgs (Bundu) and 1800kgs (Eco)
Colour:	White.
Standard features:	Removable jockey wheel, removable lid, gas struts, lid rack, removable bins.
Optional features:	Many basic features but few 'motorhome' type luxury accessories.

car paint. Cuts Manufacturing tel. 039 682 0693/3000, fax. 039 682 1923.

DESERT WOLF

Two trailers are built, both heavy duty and both with good reputations for strength and durability. The chassis is full-length rectangular steel tube and the modular design permits the user to select a configuration according to needs, from a single-bin to a multiple-bin kitchen outfit. The body is made of 316 and 304 stain-

DESERT WOLF WOLF AND CUB	
Loadbox height, width, length:	610 X 1100 X 2100 mm (Wolf) 610 X 1100 X 1430 mm (Cub)
Payload	325 kgs (Wolf) or 625 (Cub)
Body:	316 and 304 stainless steel plate
Chassis:	3CR12 corrosion-resistant steel
Unladen weight:	475 kgs (Wolf) or 375 (Cub)
Wheels & Tyres:	Must be specified to match vehicle
Suspension:	Leaf springs, axle stabiliser arms with adjustable or Old Man Emu gas shocks absorbers
Brakes:	Over-run drums with auto reverse
Track:	Specified when ordering to match towing vehicle.
Axle:	Rated at 1800 kgs.
Colour:	Natural stainless steel. Other colours may be ordered
Standard features:	Removable jockey wheel, stabiliser feet, hi-lift jack points, water and fuel tank brackets, roof frame brack ets, wheel-arch containers, 3 removable containers
Optional features:	A very broad range - too many to list here


Desert Wolf trailers

less steel and the chassis, 3CR12 corrosion-resistant steel. Call 012 811 1168, 082 450 5921.

HI-TECH BUSHMAN TRAILERS

Hi-Tech Bushman build a range of trailers to suit every requirement, their range being the broadest in the business. Their designs are non-conventional and they are among the most attractive trailers on the market. There is a very large list of accessories custom built into their trailers, including tents, cookers, tables, crockery, braai tools and spice racks.

Little Bushman

Lightweight trailer but strong enough for off-road use. Standard equipment is a roof-top tent, load-box doors which fold out into useful working spaces and four plastic utility boxes Options include the usual jerry can brackets and storage boxes.

Bushman Camper

A medium to heavy-duty trailer designed for the family camper. There are three large storage areas accessible from the sides and from the rear. A roof-top tent is standard and children can even sleep between the tent and the load area with mosquito net windows. A complete fitted kitchen is featured at the rear.

Bushman Tracker 1

A heavy-duty trailer with three large storage areas accessible from the sides and from the rear. All doors open out to form three large working surfaces. Standard equipment includes a roof-top tent, a fully equipped kitchen, tarpaulin covering the working area, a fold-out gas braai, water on-tap and many more. This sophisticated trailer is a complete kitchen

on wheels and is finished in the Bushman's familiar green colour scheme.

LITTLE BUSHMAN	
Loadbox height, width, length:	550 X 550 X 1500 mm
Payload	350 kgs
Body:	2mm mild steel plate, acid etch prime and two coats 2K epoxy
Chassis:	Galvanised steel channel (rubberised)
Unladen weight:	350 kgs
Wheels & Tyres:	185x14 with Continental tyres
Suspension:	Leaf springs
Brakes:	none
Track:	1400
Axle:	Rated at 1500kgs.
Colours:	Green (standard) Colour can be specified (excluding metallics)
Standard features:	Removable jockey wheel, solid hinged with rack and gas helper struts.
Optional features:	many

BUSHMAN TRACKER 1 / CAMPER	
Total height, width, length:	2000 X 1800 X 2900 mm (Tracker 1) 2050 X 1800 X 3500 mm (Camper)
Payload	750 kgs
Body:	2mm Mild steel plate, acid etch prime and two coats 2K epoxy
Chassis:	Galvanised steel channel (rubberised)
Unladen weight:	650kgs
Wheels & Tyres:	'Prowhite' rims. Wrangler 251 R15 off-road tyres. Alterntives can be specified.
Suspension:	Leaf springs with Old Man Emu gas shocks
Brakes:	Over-run drums
Track:	Specified when ordering to match towing vehicle.
Axle:	Rated at 1500kgs.
Colours:	Green (standard) Other colour can be specified
Standard features:	Removable jockey wheel, solid hinged with rack and gas helper struts.
Optional features:	A very broad range

Bushman Tracker 2

Similar to the Tracker 1 but designed for a double roof-top tent. There are additional load racks and jerrycan mounts as well as the features of its smaller brother. All specs as per Tracker 1 but with a length of 3,5 metres.

JURGENS XPLORER

Africa's first off-road caravan is the Jurgens Xplorer. It fills me with dread to imagine the Central Kalahari turned into a caravan park, but, progress must go on. The Xplorer is a medium sized caravan with a steep departure angle and steel protective frame, fairly heavy duty chassis attached to a light duty, 1,6 ton axle.
It sleeps two adults and two children and is well equipped with kitchen goodies and is available with many extras.

The fact that the Xplorer has a 1,6 ton rubber torsion axle is a serious mistake in its design. Several local off-road trailer manufacturers have used rubber torsion axles on their trailers and all have regretted it. These axles fail in off-road use and

all who have used them, have suffered the same fate. Some Xplorers have been used successfully but it is only a matter of time before their axles fail. In my opinion, without an axle of at least a 2,5 ton rating with leaf springs, I would not take if off a tar road.
Few specifications were available from the manufacturer at time of printing. They are available from Jurgens, Gypsy and Sprint dealers.

FRONT RUNNER TRAILER

Front Runner design and build an off-road trailer in two styles - standard and Sherpa. From a distance the standard trailer is uninteresting to look at but far more interesting when looked at close up. What I like about it is its simplicity. Strong, light with a full-length chassis with leaf springs and shock absorbers. The tailgate opens and a slide which carries the entire trailer's load can be extracted allowing easy access to everything.
This was one of South Africa's first off-road trailers and is used by a number of professional safari operators, including the Afrika

FRONT RUNNER	
Loadbox height, width, length:	500 X 1200 X 1800 mm
Payload	±500kgs
Body:	Mild steel plate - 1.6mm. Body height can be lifted by 200mm
Chassis:	Steel channel
Unladen weight:	±250kgs
Wheels & Tyres:	'Prowhite' rims. RV180 215 R15. Wheel rims and tyres can be specified to suit vehicle.
Suspension:	Leaf springs and shock absorbers
Brakes:	optional
Track:	1520 mm
Axle rating:	2500kgs
Colours:	White standard. (duco or metallics can be specified)
Standard features:	Removable jockey wheel, solid hinged lid with rack suitable for roof top tent, gas helper struts, slide out rack.
Optional features:	Jerry and water cans and brackets. 50-ltre plastic water tank Roof-top tent and gas bottle brackets can be attached on lid.

Odyssey Cape to Cairo expedition. The trailer is rubberised underneath for rust and abrasion protection.
The Sherpa is similar but more fancy; more boxes, equipment, features are added to the standard trailer and with a yellow paint job it looks very good.

They are available from many off-road centres including most Safari Centre branches across the country. SsangYong dealers sell the Sherpa trailer from many of their big dealerships.

VENTER

South Africa's household name 'Venter' developed its first off-road trailer in 1996. I know of one operator using a sponsored Venter and his reports are favourable, although when looking at its design and construction I am doubtful as to its strength. There are three models to choose from, Bush Baby, Off-Roader and the Botswana Special.

Venter Bush Baby

This is a lightweight trailer of single box design without external boxes. The lid has a wood-slatted rack and the draw bar has a nose-cone.

Venter Off Road

The Venter Off-Road Trailer is a medium sized single loadbox trailer with a standard light-duty steel rack and leaf spring suspension but no shock absorbers It is simple and inexpensive.

JOHANN DU TOIT

Venter Botswana Special

The Botswana special, as its name suggests, is a heavy duty trailer designed for rugged trips. I am confused by the specifications as it appears to have a payload less than the Venter Bush Baby, though it is larger size. The loadbox has full-length lashings and the trailer comes retractable with rear stays. Jerrycan brackets, a nose-cone and roof rack are standard. Options include a spare wheel bracket as well as others to be specified when ordering. The chassis and suspension fittings appear to be under-engineered for off-road use.

Venter Savuti

The report I wrote on the Venter Savuti trailer in the previous edition of this book caused an explosive reaction from the manufacturers. I was told on four separate occasions by four different people about one successful trip through Botswana by a Pajero diesel pulling a Venter Savuti. So, I will add no colourful adjectives to alter your perception as I decribe this trailer.

The Venter Savuti is the biggest civilian off-road trailer on the market. It weighs approximately 975 kilograms empty. Its chassis rails appear lightweight when compared to the load box's rigidity and strength. Wheels size is similar to vehicles like the Land Rover Forward control and a double jockey wheel is an indication of its size and weight. No expense has been spared in its construction. For example, the load box doors are secured closed by a one-inch solid steel locking bar and the doors are double-skinned steel plate. The designer changed from the original rubber torsion bar suspension to leaf spring which is not surprising considering rubber torsion axle's reputation off-road.

How heavy is it for a 4x4 to tow? Let's do some calculations: Consider its emply weight: 970kgs. Add a modest 400kgs of gear. That means the trailer weight is 1370kgs. Lets pull it with a Pajero diesel, at 2720kgs at maximum gross vehicle weight (fully loaded). Once the trailer's weight exceeds 70% of that of the towing vehicle the setup is entering the critical zone with regard to stability and safety. In this example 70% of the vehicle weight is 2079kgs - another 709 kgs and the trailer has become too dangerous to tow. The maximum trailer payload is therefore 759 kgs. When these calculations are made it doesn't look that bad.

The design in terms of ergonomics is odd. I don't know anyone who would want to hang shirts up in the bush, but then the Savuti fills a gap in the market for those who are a little eccentric or have spouses that don't know how to stop packing.

VENTER BUSH BABY / OFF ROADER	
Loadbox height, width, length:	500 X 1100 X 1800 mm (Bush Baby) 600 X 1100 X 2100 mm (Off Roader)
Payload:	490kg (Bush Baby), 1000kg (Off Roader)
Axle:	1400kg (Bush Baby), 2500kg (Off Roader)
Body:	1,6mm steel plate electro-galvanised
Chassis:	rectangular steel tube, draw bar: steel channel
Unladen weight:	n/a
Wheels & Tyres:	6.00x14" 8-ply tyres
Suspension:	8-blade leaf spring without shock absorbers
Brakes:	none
Track:	to match towing vehicle
Axle rating:	n/a
Standard features:	Non-removable jockey wheel, tailgate which can be used as a small table. Solid lid with gas helper struts, jerrycan brackets and nose-cone, stabilisers. Interior lashing rails
Optional features:	Jerry and water cans and brackets are among a range of extras.