ON-ROAD DRIVING

We take driving for granted, but how many years of practice does it take to develop on-road driving skills, let alone off-road abilities that can cope with widely varying conditions?

Safely driving a loaded 4x4 for days or weeks on end over corrugated dirt roads, dodging skittish kangaroos and suicidal emus, is no mean feat. Add to that the different off-road techniques necessary to conquer slimy clay climbs, steep, rocky descents, giant sand hills, deep mud ruts, icy or croc-infested creeks and incoming beach tides and you have a pretty respectable list of driving skills.

Firstly, we'll concentrate on some on-road driving techniques.

Be Prepared

Before departure it's important to tie up all the loose ends at home. If there's a definite departure date for a big trip then plan as if the departure date were two days prior. The days before departure become inexplicably short and Jobs That Must Be Done take longer than the Best Estimate. Get done with all the city-based work and personal commitments before leaving home.

You can't drive in a relaxed manner if you're not sure that the vehicle, its on-board equipment, necessary spare parts and all camping and recovery gear are in top condition. That way you've done everything possible to guarantee reliability and reduce hold-ups.

Everything needs to be packed securely and safely - preferably behind a cargo barrier - so there's little chance of gear coming adrift. Only then is it time to get behind the wheel.

Allow extra travel time if you're making a rendezvous – have several hours leeway if the meeting point with other travellers is a day's drive away, or a day's extra travel time from the east coast if the meeting point is in Western Australia.

Allowing more time means that you don't have to drive with 'pedal to the metal' to make up time. Cruising along at 100-110km/h in a fully loaded 4x4 isn't too demanding, but hammering along at illegal speeds is not only potentially expensive and dangerous - or even fatal - but certainly doesn't encourage a relaxed state of mind - yours or your passengers'.

Heading off to the bush without a relaxed attitude is a waste of time, money and scarce resources. Up-tight drivers and passengers are the main reasons many dream trips turn into nightmare journeys.

Saving on Fuel

The latest global trends for fuel prices are depressing, with demand continuing to outstrip supply, so prices will almost certainly keep climbing.

Even if alternative fuels come on stream sooner than expected, they'll be priced competitively.
We will never have cheap fuel again.

Since we're all going to have to live with high fuel prices we need to look at ways to reduce the amount of money going out each week.
At our house, this is what we've done: we use our LPG car or the motorcycle for nearly all running around town and for 140-kilometre trips to the city. These machines cost us around half what it would cost to run a petrol-engined car.

The diesel 4x4 doesn't do much short-haul running these days – just enough to keep it in fine fettle for towing the boat and for bush trips. Nevertheless, these measures are only a framework for reducing fuel costs: economy driving techniques are important factors.

Let's assume that you have to use your petrol or diesel 4x4 for regular commuting. We're talking about a vehicle that weighs two tonnes or more.
Up to around 60km/h the largest power demands this machine makes on its engine are sufficient horsepower to overcome the rolling resistance the tyres make with the road surface and enough power and torque combination to get it up hills.
Above this speed zone things change: wind resistance horsepower demand increases and by 100km/h is the major power requirement.

Any item that you've added to the 4x4's exterior has an effect on the wind resistance horsepower: a bar, lights, snorkel and roof rack increase wind resistance and, therefore, the amount of power you need to maintain highway speeds.

All 4x4s have a 'sweet spot' that is a compromise between fuel economy and road speed. In the case of most large diesel 4x4s it's 95-100km/h. If you drive at 115km/h (fudging the freeway speed limit just a little), the fuel demand increases from around 10L/100km to 12.5L/100km. In the NT, at 120km/h, the fuel consumption rises to 14L/100km.

Many modern 4x4s have trip computers that give a read-out of current fuel consumption, making it easy to find the economical 'sweet spot' when touring.

Around town, it's easy to waste fuel with unnecessary acceleration. In all but unforseen emergencies, if you have to jump hard on the brakes you've wasted fuel. By anticipating traffic flow you can use gentler acceleration that requires only a fraction of full-accelerator fuel demand.

A trip computer can terrify you by showing current fuel consumption readouts of 60L/100km or more if you plant your foot.

Towing is the big fuel consumption bogeyman. Even a low profile camper trailer or pop-top, single-axle caravan will increase your fuel consumption by around 20 percent. In the case of a large trailer behind a petrol 4x4 the fuel ask can almost double.

If you have to tow, you can tow economically (and more safely) by simply lowering your cruising speed and using gentle acceleration in stop-start driving conditions.

It's noticeable that experienced caravanners have ignored the legal speed increases around the country, preferring to tow at the previous 80km/h point. Yes, it's irritating if you get stuck behind one, but the up-side is that you can get past faster when the road opens up a bit.

Whether towing or running solo there are some economy driving practices that can make a noticeable difference to your running costs. I've already talked about wasted acceleration, but there's the related habit of maintaining high speeds up grades.

When your 4x4 has to climb a hill there's a grade resistance horsepower requirement added to rolling resistance and wind resistance horsepower. Let the speed drop off on steep hills and you'll save on fuel, as well as on mechanical stress.

Off road you can reduce fuel consumption by keeping revs to a minimum. Use the highest gear that will get the job done, particularly in soft sand.

The Faster You Go the Less You See

Mercedes-Benz runs a training course for European truck drivers that is said to be the most comprehensive training course available in Europe. The course shows participants that about 85 percent of driving environment information is perceived through the eyes and that their field of view is a generous 180 degrees. But the region of focussed vision is a narrow 10 degrees at most.

Outside that focussed region we're more likely to notice movement than colour. That's why drivers are encouraged to move their eyes constantly.

The entire field of forward vision can be broken up into these 10-degree 'concentration circles' - usually about eight of them in a typical driving situation at low speeds. As road speed increases the brain can't process the incoming information as quickly as it can at low speeds, so the effective size of the circles decreases while the number of circles increases about nine times.

Even within the focussed region the eyes can miss vital information - for instance an amber traffic light can be ‘invisible’ if it blends into background colour, or the brake lights on a car can be disregarded by eyes that have turned their focussed region to look at a person in the back of a parked van.

Eye direction needs to be lower when city driving than when in the country, because hazards are more numerous around town and closer, thanks to lower road speed and higher traffic density.

Living with Trucks

If you drive this nation’s highways you know already about the hazards of speeding heavy trucks.

The police say the laws are inadequate to allow them to ‘ground’ speeding trucks, because, unlike alcohol or drug abuse behind the wheel, speeding isn’t a criminal offence. In addition, CB communications make it easy for truck drivers to share speed trap information.

It would seem that we’re going to have to put up with speeding trucks for the foreseeable future, so what’s needed is a way of co-existing with these giants and keeping as safe as possible.

Back in the olden days of underpowered trucks it was easy to pull away from trucks on grades, but now that truck power to weight ratios are typically 8+kW per laden tonne that’s not so easy. Empty trucks can overtake some 4x4s on hills!

You don’t have to be a rocket scientist to work out that any conflict between a truck and a 4x4 will favour the truck – it’s a simple momentum equals mass times velocity equation (M = mv).
So the best place for your 4x4 to be is out of the truck’s way.

You can try the high-speed approach to this problem, by blasting past any truck you come across, but this method is in itself potentially dangerous and expensive – in fines.

An alternative is the go-slow, no-ego method, where you keep your speed at, say, 100km/h in a 110km/h zone. Given that many of the trucks on the road will be cruising at an illegal 110-120km/h they’ll pass you easily enough – on a four-lane road.
On a two-lane road it’s not so easy and you’re likely to have a rear vision mirror full of truck grille and bull bar.

In these circumstances the go-slow, no-ego truck avoidance driving method requires you to wait for a section of road with a wide shoulder and pull over, letting the ‘Duel’ truck driver get past, after which you can resume your journey.
(There’s a law that’s supposed to prevent truck drivers from tailgating, but the police give that one even less attention than speeding.)

The go-slow, no-ego method is cowardly, but it works.

The real-world addition to a given trip time isn't as much as you'd think, because there's no such thing as a perfect journey – towns, road works, rest stops and vehicles even slower than yours conspire to extend trip times anyway.

Setting your cruising speed 10 per cent below the legal limit won't extend your trip time by 10 per cent – real world experience indicates only around four per cent, or less than 20 minutes in an eight-hour driving day.

Look Where You Want To Go

Try this experiment: walk along a crowded street against the flow and try to avoid walking into people. Tricky isn't it. We'll bet that many times, when you make eye contact with an oncoming pedestrian, you both finish up wrong-footing each other, or even coming to a stop, face to face.

Just as when you focus on the eyes of an oncoming pedestrian, if you concentrate your eyes on something when driving, that is what you're most likely to hit. If you stare at an obstacle, your vehicle will seem to be 'drawn' to it.

Just as when walking you should drive in the direction you're looking: stare at a pothole and you're certain to hit it; concentrate on the double lines at the apex of a corner and you're likely to run over the lines. You should note the obstacle you want to avoid, then concentrate on the safe course around it. Your peripheral vision will track the obstacle, but you'll avoid it.
You can also use peripheral vision to monitor your instruments, simply by noting the needle positions when everything is OK. Your peripheral vision will pick up any unusual readings.
If you've done an advanced driving course, you'll have been told about spotting the apex of bends, as an aid to smoother, quicker cornering. You get shown how to select the apex, how to drive through it to the exit point. You select the apex as you approach the corner, then it's time to concentrate on the exit. If you stare at the apex, when you arrive at it, you have no exit focus.
It's easy to spot drivers who have no experience of looking where they want to go because their cornering process is a series of separate events. They usually work out too late that it's a corner, so their approach speed is too high and they're in the wrong gear. They brake too hard, change gear while momentum is being lost, steer too wide, then oversteer and have to wind off some lock.

Anticipation

Good anticipation separates experienced drivers and bush travellers from the pack, who jump behind the wheel first, then think about what they're going to do next.
Our judgment of speeds and distances is generally slightly wrong, according to Mercedes-Benz research. We tend to underestimate our speed and overestimate the distance we are from an object. That can be a deadly combination, particularly when fatigue and speed-acclimatisation are dialled in.

Anticipation is vital to safe and smooth car driving, but is even more important when it comes to steering a 4x4. The best road-mannered 4x4 can't match a sporting car when it comes to response, handling and braking, so planning ahead takes on more importance.

Anticipation properly starts before you get into your 4x4, for any trip - even a short run to the shops and back. You need to think about the likely road conditions and the state of the machine. Extra care is needed if the roads are wet, or heavily trafficked, or if the 4x4 is loaded differently from normal.

However, perception of future problems can sometimes interrupt reaction to more urgent situations: a driver concentrating on a narrow bridge in the middle distance can fail to 'see' a stop sign immediately ahead; or if he's concentrating on a red light a kilometre ahead he can drive through one that's much closer.

The Two-Second Gap

An important contributor to safe driving is leaving sufficient space between your 4x4 and the vehicle in front. If you're right up on the bumper of the vehicle in front, you're not leaving sufficient space to allow for any changes. Your only reaction trigger is the brake light in front of you.

Dropping back and leaving at least a two-second gap may open the way for lunatics to cut in, but that's the occasional price you'll have to pay for much more relaxed motoring for you and your passengers.

At advanced driving schools they often do a little test with professional drivers. When asked what they hate most about city driving, full-time drivers invariably complain about people cutting-in in front of them. To this response the instructor says:

"How much time do you lose every time people cut in - forcing you to brake, downshift and lose momentum?"

The replies vary widely, but the class usually settles into a consensus of about half a minute each occurrence.

"And how many times a day does this happen?" the instructor asks.
Again the replies vary, but the consensus is a maximum of 20 times each day.
"So, in a typical trip of 10 hours, you lose at most 10 minutes? If this is the biggest problem you're facing, life's not so tough after all!"

Handling Intersections

The best way to motor smoothly in traffic in your 4x4 is to judge traffic flow and blend in. There's no skill in rushing up to a red light and braking heavily, but there is in trimming speed early and judging the right approach speed and gear so that you are still moving when the light turns green.
Traffic lights should always be approached with the idea that a red light is a potential green one, but - more importantly - a green one is a potential red one. If you're looking sufficiently far ahead - and a 4x4 perch allows you to do that quite effectively in heavy traffic - then you'll know how long the light has been illuminated.
Traffic light sequences have been worked out so that a vehicle can stop safely within the amber light period, but that calculation is blown out the window if you're 20 km/h above the speed limit when you spot the change to orange. Try getting off a red light camera charge by saying that the orange light didn't last long enough!
You can 'read' intersections and roundabouts. When approaching a roundabout, for example, it's best to reduce speed before the intersection to the speed you estimate you'll be able to use through the intersection. After you've cut speed to that level select the gear you can use through the intersection. By approaching a roundabout in this manner you'll need only to steer and look as you drive through, instead of braking and gear changing while steering with one hand.

Read the Road

'On-road' is a generic term that describes surfaces from corrugated, formed-earth grader tracks to concrete multi-lane freeways.

Obviously there are different techniques needed to handle these two surfaces and the myriad types in between. Reading the road is vital and this 'reading' takes into account not only the road but also the vehicle you're driving.
Obviously, a rally car will travel over rough roads much faster than a fully-loaded 4x4 with a camping trailer trundling along behind.

There's a comfortable speed at which you can run over corrugations with the least amount of vibration feedback, but that 'sweet spot' cannot be too fast, or you risk losing control.

Generally, around 60-80km/h is as quick as you'd want to travel on corrugated surfaces and severely corrugated roads may knock your speed well below that. High speeds result in shock absorber 'fade' and when the shockers give up so does your steering and braking control.

How fast you can travel on good surfaces is usually down to factors other than road quality. A loaded 4x4 will handle differently from an unladen one and speed should be trimmed to suit. Your braking distances will also be affected and that's another reason for slowing down.

Vision is critical for safe cruising, yet it's surprising how few drivers slow down at night time or when the road is wet. Night driving in the bush is fraught with danger and dusk is even worse – a good time to make camp until the morrow.

Control Fatigue

Fatigue is a killer on our roads. The authorities blame speed for being the number one killer, but fatigue or lack of driver attention is much more significant. The best driver in the world isn't much use in an emergency if he or she is nodding off behind the wheel.

Taken together 84 percent of the events triggering accidents are attributable to the driver, says Mercedes-Benz. Accident statistics accumulated by the company prove that 45 percent of all accidents could have been avoided if the drivers involved noted critical events prior to the accident, then acted without distraction and with correct driving technique.

Ensuring driver attention is best done by having regular breaks and two-hour stints are a good habit, especially if they're punctuated by a driver change.

One aspect of fatigue that doesn't seem to get much focus in road safety campaigns is dehydration. Sitting in a heated or air-conditioned 4x4 is a recipe for fluid loss, but because there's no physical exertion involved it's easy to miss the onset of dehydration. Water is the best cure and coffee is one of the worst.

It's essential to carry plenty of water inside the car and everyone should drink regularly.

Make Allowances for Your 4x4

Many people new to the 4x4 world take off-road driving courses and that's a very good idea: it's important that on-roaders appreciate the capabilities and limitations of their new off-road charges. However, given the fact that most 4x4s rarely or never go off-road, it's just as important that new 4x4 owners appreciate the on-road limitations of these off-road capable machines.

The starting point is with the ‘free lunch’ concept: there’s no such thing. Even in the case of the best available on-road/off-road machines that have exemplary highway and cross country abilities there are inevitable compromises.

The most obvious compromise is weight: making a large vehicle that can carry up to seven adults over virtually any surface at speeds from crawl to a speed-limited 250km/h means building-in distortion-resistant bodywork and chassis; rugged, independent suspensions; traction control; powerful powertrains; strong gearing and big brakes.
All that adds up to a 2.5 tonnes-plus vehicle and even the less-sophisticated marketplace offerings weigh-in around two tonnes.

When you’re driving a heavy vehicle around town you need to be aware of the momentum that builds up. Drive it like you could an MX5 and you’ll wear out tyres and brakes in short order. On the positive side, the weight can be an advantage, levelling out bumps that have lightweight machines jumping about.

The correct way to drive a heavy vehicle is to build up speed gradually and anticipate where you’ll have to slow down, backing off the gas pedal well in advance. Used wisely, a 4x4’s weight can help produce smooth, jerk-free progress in traffic. This smooth driving style has measurable fuel economy savings as well. Fuel consumption is related to the rate at which the engine is worked: accelerate hard and drive at high speed and your 4x4 will drink fuel faster – much faster.

You can easily gauge whether you’re driving smoothly and with anticipation by checking how often you have to brake. Braking should be necessary only when something unforseen happens, such as someone cutting in front of you, or when bringing your slowing vehicle to complete stop.

It’s obvious that a 4x4 is taller than conventional vehicles and that’s a major appeal for 4x4 wagon buyers. The Catch 22 is that if we all do it then there’ll be no relative advantage.
The downside of a tall vehicle is a higher centre of gravity, so the roll-over threshold comes at lower speeds and cornering forces than happens with an MX5.
Where a light, low vehicle tends to slide if cornered too enthusiastically, a taller, heavier vehicle tends to trip over.

Most new 4x4 wagons have ABS brakes and dynamic stability systems that depower the engine and apply selective braking if the 4x4 gets ‘out of shape’. Those systems are a great safety benefit, but some drivers use them as cornering aids, relying on the vehicle’s control systems to correct over-enthusiastic driving behaviour.
What these drivers forget is that dynamic stability control systems rely on tyre grip, at least on some wheels. If pushed too hard, a heavy 4x4 may well lose all grip on loose or slippery surfaces and a short, sharp shock is bound to follow.

A smooth driving style is essential when it comes to towing caravans or boats. A 4x4 plus single-axled trailing load is likely to weigh at least 3.5 tonnes and a four-axle combination may tip the scales at more than seven tonnes.

If you try to accelerate hard, corner fiercely and brake suddenly with a trailer behind your 4x4 you’re headed for expensive running costs and, sooner or later, a serious accident.

Trailer brakes, whether they are override mechanical, hydraulic or electric, need to be set up to come on progressively. Any 4x4 that's doing substantial towing work should have ABS brakes, to preserve steerability in the event of an emergency stop.

The high-set nature of 4x4 seating can lead many drivers into driving or stopping too close to the vehicle in front, when in traffic. It's a parallax thing that is seen at its worst when large trucks or buses pull up right on your back bumper.

Given the longer braking distance needed to pull up a heavy 4x4 when compared with a light car this tailgating process often precedes an accident.

The two-second traffic gap rule applies to 4x4s at least as much as it does to cars.

Reversing a big 4x4, or anything with a rear blind spot, for that matter, is a potentially dangerous manoeuvre. If you can't see everything behind your vehicle get out and have a look. Another option is to fit a reversing camera.

Beware the 'Renter'

When you spot a camper van take special precautions.
We came across one Britz 'renter' on the wrong side of the Strzelecki Track corner – probably because he couldn't remember what side of the road he should be driving on. The incident 'only' cost us a tyre, when we were forced into the gibber pile at the road's edge and we cheered ourselves with the knowledge that it could have been much worse.

We had a second instance of this behaviour when we stopped for a feed at Stuart's Well, south of The Alice (great hamburgers, too).

As we left, a 'renter' came in the driveway. We steered left, he steered right, we steered further left, he steered further right, until we were facing each other and it dawned on him that maybe he should steer left. He grinned in apology and we grinned back.

The problem of European drivers jumping into right hand drive vans is getting worse, so the educational steps the vehicle rental companies are taking are obviously insufficient. We're told that rental customers get a thorough run-through on vehicle systems and driving techniques, but it's not working.

What to Do When Things Get Out of Shape

We do 4x4 driver training and it's surprising to see that virtually none of the drivers we've inducted into the art of off-road driving take the correct action when their vehicles started to slide sideways on a loose or slippery grade. Invariably they steered up the grade, instead of turning into the slide, downhill.

Many other instinctive reactions untrained drivers have are also wrong. For example, most people thrust out a hand to 'save' themselves when they fall and the sorry trail of plaster casts heading home from The Snow is testimony to the fact that this action is obviously wrong.

‘Steering into the skid’ is such a maxim of advanced driving that we who steer vehicles on and off road all the time assume that everybody knows it.

However, driver training experience and the roll-over wrecks in virtually every bush town are proof positive that the procedure is poorly understood by the driving public.

Most 4x4 bush roll-overs we’ve come across start with inexperience or inattention. It’s easy to become distracted by scenery, fatigue or antics going on inside the 4x4 and then discover that the vehicle has departed from the straight and narrow.

Drivers react in a way that they think will get the vehicle back in the groove, but the high failure rate of these manoeuvres suggests that most are doing the wrong thing - instinctive though it may be.

Let’s look at a common scene: a loaded 4x4 is travelling on the crown of a slippery dirt road, flanked by table drains that have been cut deep by a grader. For some reason the vehicle wanders off the crown.

Action: the driver pulls against the steering wheel in an effort to get the vehicle back up on the crown, but it continues to run down the camber of the road, so the driver applies more and more steering effort.
By the time the front wheels hit the table drain they’re cranked over, trying to turn the vehicle to the right, but instead they dig into the soft stuff, the vehicle trips over its own front wheels and rolls to the left. It’s simple physics.

Sometimes the steering action works before the 4x4 gets into the soft sand in the drain, but the driver uses more steering effort than is necessary, in the belief that it’s important to get back on the crown as soon as possible.
In this case, when the steer tyres ‘bite’, they’re angled tightly and the vehicle heads off across the crown and into the drain on the other side of the road. This time the vehicle rolls over on the right side – or ‘heads on’ an oncoming vehicle before it gets to the drain.

Another common reaction when the vehicle wanders off the crown is to jam on the brakes. With ABS the rig will probably come to a standstill in the table drain, but without the braking stability of ABS, it’s likely to lock one or more wheels, reducing road grip, and a roll-over is likely.
In low-speed manoeuvres, such as trail or sand driving, it’s easy to get into a downhill sideways-slide situation, when the tyres lose grip on muddy or loose surfaces. The instinct to stay in the middle of the track no matter what causes many drivers to turn the front wheels up the hill and a side slope-induced roll-over follows.

The correct procedure in all these side-slide situations is to ‘steer into the skid’. This action preserves vehicle direction and, to a large extent, its degree of heel. A 4x4 that runs straight-on into a table drain or down a steep hill is much less likely to roll-over than one which meets the bottom at an angle. Sure, you might find yourself bogged, but that’s better than being on your lid.

Your loaded 4x4’s weight acts through its centre of gravity – that point which is the centre of balance of the machine, its occupants and the freight. The aim is to keep an imaginary pendulum hanging from the centre of gravity within the width of the vehicle. If it swings outside the tyres a roll-over is imminent.

Picture a Successful Trip

We're told that if you 'see' yourself in a future situation - on top of the dais at an Olympic medal presentation, for example - then you can plan how to get there. If you can 'see' yourself and your family back home safe and sound after a long bush trip that vision can be constructive while you're planning and doing the journey.