

OPERATING A 4 WHEEL DRIVE VEHICLE: BASIC INFORMATION

Working in the remote regions of the Northern Territory and similar areas of Australia requires the use of a four wheel drive vehicle. With the road conditions you are faced with, this is the most appropriate vehicle to use as it has been designed to cope with the varied range of situations you may be facing when travelling to outer lying communities.

It also presents challenges that require drivers to act safely and responsibly.

This course is designed to give you a basic overview of the knowledge and skills you will need to safely operate a four wheel drive vehicle.

The combination of a 4WD vehicle and unfamiliar circumstances is a whole new world and there is much to learn for drivers only used to normal single-range two wheel drive vehicles.

The course will cover the following topics:

- ✓ ***Vehicle familiarisation – Inspection check lists***
This will involve both a daily check and a more comprehensive check which should be undertaken at least one day prior to undertaking a longer trip. This is an opportunity to get a better knowledge of your vehicle.
- ✓ ***Safety aspects of operating a four wheel drive vehicle.***
This will cover the need for understanding the differences in operating a four wheel drive vehicle to that of a normal vehicle; safe driving attitudes and some basic defensive driving techniques.
- ✓ ***Range and gear selection for road or terrain conditions***
This will cover the appropriate actions and selection of range/gear to safely and effectively traverse a range of situations.
- ✓ ***Capabilities and restrictions – what your vehicle can and can't do.***
This will provide you with a better understanding of exactly what a four wheel drive has been designed to do. You will also be looking at track assessment and your organisations policies and procedures associated with driving in remote and rural regions.

This course is an abridged version of the 2 or 3 day course which is normally provided by Charles Darwin University. Experience will further build on the knowledge and skills provided in the course, however, accidents happen most often through a lack of appropriate preparation and a careless attitude toward the road conditions you will be facing.

What is a four wheel drive?

A relatively simple and slightly technical definition is as follows:

“a four-wheeled vehicle with a drive train that allows all four wheels to receive torque from the engine simultaneously. “

Generally associated with “off-road” driving conditions, the vehicles are designed with heavier suspension and two gear ranges. This allows the vehicle to operate in conditions where there is no tar sealed road and the terrain is rugged and uneven. They can, however; also be operated quite well in normal sealed road driving conditions.

Vehicle familiarisation

It is essential that you get to know how your four wheel drive operates and what basic maintenance checks should be done.

One of the best ways to find out about your vehicle is to read the Operators Manual which is issued by the manufacturer and should be in the vehicle at all times. You will be able to access information about tyres, size and pressure, the type of oil which is recommended for the vehicle, location of gauges, fuel tanks and wheel changing equipment.

Vehicle inspections should be done on a daily basis. This ensures that any minor problems will be identified early and may reduce the risk of further serious damage being done to vehicles. It is also necessary to inspect the vehicle regularly in order to maintain a safe vehicle. Leaks, worn hoses and belts and even electrical problems may be found quickly and subsequently repaired quickly.

Four wheel drive vehicles are tough vehicles and are designed to travel over rough terrain. They are larger and stronger than normal cars and in the off-road conditions; they are subjected to harder driving conditions also. Just like any car, they must be properly maintained. If not, the vehicle will not last and may become unsafe to drive.

Inspections should also be done during your trip. This does not need to be a full mechanical check, but a quick check around your vehicle when you stop to assess a hazard or just to have a break from driving, may save you considerable inconvenience in the long run. Some things to check for are:

- Is the exhaust rattling or is it hanging down more than normal
- Are the tyres all in good condition: pressure is good, no cuts or tread wearing too thin
- Is the roof rack loose, is any luggage which may be on the roof rack still firmly secured or missing
- Are all the vehicle lights in tact
- Can you see any leaks under the car; be sure not to confuse the air-conditioning over flow for a much worse radiator problem

Safety and 4WD Operations

Safety and four wheel driving starts before you get into your vehicle. In order to be a safe driver it is essential that you know your vehicle. So at this point, you should already know a bit about your vehicle following the vehicle familiarisation section.

Before you get in behind the wheel you also need to have some basic knowledge about the attitude you, as a driver must adopt if you are to be a safe driver. This is particularly important when you are driving in the urban conditions. You are no longer driving a small, easily maneuvered vehicle. The four wheel drive vehicle will more than likely be a diesel and this contributes to the different ways a four wheel drive handles. The vehicle is also a larger one and can therefore, do more damage if you are involved in an accident with another car.

We will look at a few aspects of safety when operating a four wheel drive vehicle. Not all of these issues are related purely to four wheel drives, and you can use them in your daily driving as well. Some of the safety issues will involve the road conditions, loading a vehicle, passenger safety and environmental safety.

Firstly, let's consider the drivers attitude. In both urban and off-road driving, you must have an appropriate attitude toward your driving. This means that you will need to think more about how you are driving and how you think about other drivers on or off the road.

Four wheel drive vehicles do not handle in the same way as a smaller urban car. They are heavier both in weight and handling. Most often they are slower to move from a standing position and will require extra care when crossing in front of traffic. Allow more time to get across intersections. They are also slower to stop. Heavier vehicles will require longer a distance to come to a complete stop, so commence your braking further from the point you need to stop and use your gears to assist the procedure.

(Read through the Defensive Driving Tips hand out. These apply to both normal and four wheel drive operations)

Some vehicles, Troop Carriers in particular, will lean quite drastically when maneuvering through corners. This is due to the centre of balance on this vehicle. Troop Carriers are tall and narrow vehicles. Excellent for moving people and/or cargo; this does create a need to consider your speed when driving through corners or over sloped ground. The centre of balance will be higher if you have luggage stored on a roof rack. It is important that you take this into consideration when you are driving as these vehicles can be rolled very easily.

Steering a four wheel drive vehicle is a little different to an urban vehicle. The same positions of 10 and 2 or 9 and 3 apply; however, it is important that you remember not to have your thumbs on the inside of the steering wheel. Whilst traversing uneven ground, the steering wheel is directly affected by the wheel movement. This being the case, the steering wheel can turn abruptly and it is possible to break your thumbs if they are not along the rim of the steering wheel. This may feel uncomfortable to begin with, but it is much more comfortable that two broken thumbs.

Fatigue is a silent hazard which is often not considered in four wheel drive operations. Driving in the off road conditions will require the driver to apply greater concentration as there is a lot going on at any one time. You should always allow extra time to reach your destination if you are going to be travelling in remote areas. In particular, if you are driving on unsealed roads and using High Range 4 wheel drive, you should not travel faster than 80 Klm per hour. This will mean that you will need to allow an appropriate time frame to travel the distances and if you are travelling on roads which are in poor condition, you will more than likely need to reduce your speed in more stretches. An example of this is a trip to the community of Gapuwiyak, which is 250 Klm west of Nhulunbuy will take approximately 3 to 3 ½ hours. In some instances, this trip can take up to 5 hours due to the condition of the road.

If you are travelling to some of the smaller outstations, you may need to allow even more time for possible problems such as bogging or wash outs.

Again, this kind of driving is more mentally and physically exhausting and you should make several stops to get out of the vehicle and stretch, revive and check you vehicle.

Cabin Drill is the first step in reducing this problem. Ensure that you are correctly positioned behind the wheel. Begin by resting your wrists on the top of the steering wheel. Your hands flop over the back. Position your seat so that you are not reaching forward to the steering wheel with your wrists in this position. When holding the steering wheel, your arms should be relaxed and slightly bent at the elbow.

When you have your seat in the correct position, ensure that mirrors are adjusted to suit. This is a good time to also make sure you are aware of the blind spots on your vehicle. You should not have to move to clearly see out of your mirrors. Only after completing this procedure should you put your seat belt on.

Starting the vehicle uses the same steps as any normal car. Check that you are in neutral, make sure the hand brake is on and the clutch is depressed.

Driving to the road conditions means that you will need to adjust your attitude and most importantly, speed. Wet, slippery, unsealed roads can easily cause your vehicle to slide and this can lead to a roll over if you act incorrectly. If your vehicle starts to slide, take your foot off the accelerator and do NOT apply the brake. Steer in the direction that the rear of the car is heading trying not to over steer. The vehicle should be slowing enough to reduce the slide, however, you may have to do this in the opposite direction if you have over steered to start with. Try to remain calm and DO NOT apply the brake.

Cornering or travelling through a bend in the road should be done at a reduced speed. You should reduce your speed well before entering the bend and do not apply the brake whilst maneuvering through the bend. This can lead to a number of problems including roll over. On unsealed roads, you will encounter corrugations which are more severe in the corners. This can cause your vehicle to bounce across the road and you will loose both traction and steering control.

Emergency braking using the pulse braking technique will allow you to retain control over the steering of your vehicle. When braking on unsealed or gravel roads, you will lose traction on your vehicle and if you simply stomp on the brake and hold it, your wheels will lock leaving you unable to maneuver the vehicle away from the hazard you are trying not to hit.

When braking in an emergency situation, do not engage the clutch. This will cause the vehicle to stall and when the vehicle stalls, you will not continue to move forward, but will come to a stop. You will also be able to concentrate on correct pulse braking and steering of the vehicle.

Appropriate clothing should be worn when undertaking four wheel drive operations. Of course, if you are only operating the vehicle in urban situations this will not be necessary, however; if you are travelling in the remote regions, it is advisable to wear appropriate clothing which is as follows:

- Comfortable and fully enclosed footwear – this can be runners or boots depending on what you are most comfortable with
- Long pants and long sleeved shirt – if you need to exit the vehicle, you will find that this clothing will provide you with protection from the sun and the environment. Changing a wheel will require that you get down on the ground and this clothing will protect you.
- Wide brimmed hat

Safety equipment should include water, some basic recovery equipment and a first aid kit. When travelling in remote regions, you should have an appropriate first aid kit. This can be obtained from St. Johns Ambulance or the Red Cross. See the attached hand out on recommended first aid kit contents.

Water is an essential item to be carrying when travelling in remote areas. Recommended quantities can be worked out at 10L per person per day. It is also a good idea to carry an extra 10L in case you come across anyone who has broken down and does not have a water supply. You will be able to supply them with water until help arrives.

Basic recovery equipment should include a snatch strap, shackles (bow and D), shovel and axe. See the hand out – Four Wheel Driving – Complete checklist.

It is important to assess the situation you are facing before you attempt any hazard. This includes any muddy or sandy tracks. The first question you should ask yourself is; **do I have to take this track/road or is there an alternative way.** You should also be aware of your organisations policies regarding such things as water crossings and driving conditions.

Water crossings can be dangerous regardless of the depth of the water. Undercurrents can be deceiving and if your vehicle is not equipped with a properly fitted snorkel can cause damage.

Bogging can be difficult to get out of if you are not traveling with another vehicle and do not have appropriate recovery equipment on hand.

Gear Selection

Selection and use of gears in a 4WD can be critical in off-road driving. It also shows up differences in driver ability and experience. With a low and powerful gear a sharp increase in engine acceleration produces wheel spin. In slippery going, use as high a gear as practical, with minimum engine revs, just sufficient to maintain headway. The higher gear gives slower vehicle response to the throttle, thus less chance of the wheels and ground breaking traction contact.

Hub locks will allow the front wheels to be driven. You should ensure you know if your vehicle has manual or automatic hub locking. If you have a manual hub locking system, you must physically exit the vehicle and turn each hub lock to the locked position on both of the front wheels.

We recommend that you do not drive your four wheel drive on bitumen with the hubs locked in and in 4WD range. This can cause damage to your vehicle and this is very expensive to repair.

Low Range 2nd gear should be selected when attempting to ascend a steep or rugged incline. This will give you enough power to maintain the momentum needed to address the incline. Do not engage the clutch while traversing any slope.

Low Range 1st gear should be selected when descending a steep or rugged incline. This will allow your vehicle to “walk” the track under controlled speed allowing you enough time to direct your vehicle across the best path.

Assessing every situation will allow you to inspect the track for any hidden hazards and identify the best and safest path to take. Always allow for vehicle clearance height and traction loss.

Vehicle capabilities and restrictions apply in a range of situations. Your four wheel drive is designed to take you through hard and rough road/track conditions. It is also designed to undertake rugged ascents and declines using the vehicles gearing system to support a safe driving speed. You will learn more about this in the practical activities.