Successful 4WD driving is ultimately about traction. Engine power, suspension style & articulation, ground clearance, vehicle load, differential type, tyre size, type and pressure are the most important vehicle characteristics relating to 4WD driving traction. Then there is driver experience and technique to select the best line, the most appropriate gear and correct use of the throttle and momentum. All these issues go into the complicated melting pot when discussing traction. Every situation is different and often the same location requires a different approach depending on weather conditions.

SUSPENSION

The type of suspension system on the vehicle is very significant. The issue is how much and how supple the wheel travel of each system is. There are essentially three main types of suspension systems: Coil and Leaf sprung suspensions with live axles and Independent Suspensions using wishbones with torsion bars or struts.

Long travel 4WD Systems coil kit improves ride on and off-road.

The Independent Front Suspension (IFS) has the most in-built compromise for 4WD traction as it has the least amount of articulative travel. While its independent action results in smooth travelling on road, over corrugations and smaller bumps, when the rocks, wash-outs or bull dust holes get bigger this suspension quickly bottoms out resulting in the vehicle bouncing, hence reducing travelling speed and momentum.

At lower speeds over larger obstacles or if previous travellers have been bogged or at least not let their tyres down and have scooped out diagonally opposite sections of the track, the IFS vehicle cannot drop the wheel to the bottom of the hole and hence has effectively lifted a front wheel. Leaf sprung vehicles suffer from a similar characteristic but not to the same extent.

Leaf springs have less travel than coils but 4WD Systems kits improve comfort substantially, IFS vehicles have less wheel travel than leaf sprung vehicles, which in turn have less wheel travel than coil sprung vehicles. With each step (IFS, Leaf, Coil) 4WD capability improves.

SUSPENSION COMPONENTS

Traction characteristics can be improved by changing suspension components so there is more travel and articulation and the tyres can stay in good contact with the ground at low or high speeds. As a by product, on-road ride and handling is also dramatically improved.

ENGINE POWER AND MOMENTUM

All the power and more importantly torque is useless without any traction. Many times I have seen powerful EFi 6 cylinder or V8 vehicles unsuccessful because they have too much power. Too much power or too low a gear makes the wheels spin, hence traction is lost. Using less throttle or a slightly taller gear often results in a vehicle building up more speed and momentum rather than spinning wheels on the spot.

More momentum carries the vehicle over the obstacle, be it a bouncy mud hole, churned up sand hill or rocky ledge. However the suspension needs to be able to cope with the greater speed. Bottoming the suspension results in the vehicle losing speed, momentum and often direction as it bounces, the driver looses control.

The Landcruiser pictured bounced right off the track due to too much speed with too little suspension travel and suppleness. Look closely at the tracks.

TYRES

Bigger more aggressive tyres do enhance traction. However, tread pattern will be the least important issue in all but sloppy mud situations. Aggressive tyres are more of a compromise on-road due to excessive noise, reduced life, poor braking and poor handling in the wet. There are 1 or 2 exceptions I know, but this is the general rule.

You may be surprised how very useful aggressive tyres are in sand when set at the appropriate pressures. I've even used the Super Swamper Thornbirds in sand and they're great at 8psi. Tyre pressure is critical in all 4WD situations. Refer page 3

DIFFERENTIALS

When 4WD driving, most vehicles have problems going up hills whether they be creek banks, wash-outs, sand hills, rocky scree slopes or muddy forestry tracks. Whenever there is a slope there is a transfer of weight and likewise tractive drive onto the lower wheels. It is always one of the front wheels which loses traction first due to the transfer of weight to the rear wheels. This loss is exacerbated by any lack of travel of the front suspension.

When a vehicle lifts one front wheel or fails to drop it down, then the wheel on the ground with load and traction gets no drive and the wheel in the air with no traction gets all the drive. (This is the normal operation of an open differential to allow one wheel to turn at a different speed to the other.

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FUEL TANKS

4WD Systems manufacture a wide range of high quality replacement, auxiliary and gas conversion tanks for 4WD vehicles. Designed to achieve the largest capacity in the available space without compromising ground clearance, off-road performance or ease of installation. Features include magnetic drain plug for extra cleanliness, fully welded, full sized baffles for greater strength, barbed socket hose connections to eliminate leaks, internal fuel corrals to maintain supply in arduous conditions and much more.