

Refurbishing the Old Diesel

Older diesel powered 4x4s have a great deal of appeal for serious bush travellers. Pre-emissions engines have no electronics, no computers and no exhaust gas recirculation.

All new turbo-diesels are electronically controlled and most have sophisticated unit-injection systems that can't be bush repaired. However, the electronic diesel revolution has brought many benefits: better performance, improved economy, accurate fault diagnosis and engine protection from abuse being among them.



In the truck world, engine makers are well aware of the sensitive nature of most road freight and have 24-hour call-out availability for truck customers. A 'vehicle broken down' call prompts instant response from most engine makers. That's not how it is in the 4x4 world. Call your friendly 4x4 dealer and suggest that he send out a breakdown vehicle to attend to a fuel system problem and see what sort of service you get.

To be fair, it's not possible to have a service network that can cover all the places off-landers go. Even it were a possibility the costs would probably exceed most travellers' budgets. When you go seriously bush, you're pretty much on your own.

Hence the appeal of the uncomplicated diesel.

Modernising an Oldie

Whether you have an older, naturally aspirated diesel 4x4, or you're considering buying one, the refurbishing exercise is the same.

A well-serviced diesel – that's an oil drain every 5000 kilometres and filters every 10,000 since new - should last around 500,000 kilometres before needing rebuilding. A naturally aspirated diesel in good nick should have strong oil pressure and little oil consumption.

If the subject of your attentions doesn't meet these conditions it'll need a rebuild before you do anything adventurous with it – see 'rebuild or replace' box.

We followed a late-90s HiLux through an updating process, carried out by ARB Elizabeth, SA. The HiLux in question had travelled 250,000 mainly on-road kilometres and had been regularly serviced. Oil pressure was on the high side of normal and the owner reported no oil use between 5000-km drains.

The engine had been turbo-charged after its original warranty expired, but the owner reported recent poor performance, increasing fuel consumption and obvious black smoke from the exhaust. Brad Newham, ARB Elizabeth's principal, inspected the HiLux and had his boys do a health check on the 2.8-litre. Compression was good and the tappets needed only slight adjustment. There was no sign of oil sludge in the overhead area.

The owner knew that the old turbo had not been ideal, right from the start, and Brad explained to him that it looked too large for correct matching to the Toyota four – more like a turbo for a four-litre. The old turbo was also showing signs of bearing wear, with traces of oil in the turbine section.

The decision was made to fit a new DTS turbo, correctly sized for the 2.8-litre diesel and offering water cooling, which the previous one did not.



Brad also suggested that the recent poor performance indicated some trouble with the pump and the injectors.

The obvious way to get an older vehicle up with today's traffic flow is by turbo-charging it, but even if you don't want to go that far a complete overhaul of the injection pump and the injectors is a good idea.

The refurbishing process began with a trip to a local chassis dynamometer, where the rear wheel power figure showed only 40KW. The pump and injectors were dispatched overnight to Rankin Diesel Injection Services, in Melbourne, where it was discovered that the injection system had ingested some bad fuel, causing excessive wear and seizing of some components. The pump and injectors were completely overhauled and the pump was fitted with a boost compensator.

Boost compensators are necessary, Geoff Rankin insisted, to ensure that the fuel supply from the mechanical pump matched the boost from the turbo. Without a compensator the air: fuel ratio can stray far from the ideal 20-23:1 – as rich as 17:1 and as lean as 30:1.

The rebuilt pump and boost compensator were bench tested for accurate fuel metering before going back to ARB Elizabeth.

While the injection system was being rebuilt the boys bolted on the new DTS turbo. With the pump and squirters back in the HiLux it was time for a trip back to the dyno.

The results justified the time and expense: rear wheel power went to 53.9 kW and rear axle torque increased from a previous almost constant 2000N to a peak of 3000N. The new power and torque curves across the entire rev range were much 'fatter' than before, indicating much more performance and flexibility.

Turbo performance sometimes comes at the expense of engine durability, so the dyno equipment was used to measure boost pressure – limited to 10 psi – and exhaust gas temperature at the manifold. The dyno showed a top exhaust gas reading of just under 500C⁰.

The dyno figures were borne out on the highway, where the owner reported greatly improved acceleration and flexibility in top gear. Oil pressure and coolant temperature readings remained at previous levels.

Fuel consumption benefits are possible with a turbo conversion, but in this case consumption has remained at previous levels – around 11L/100 km - probably because the owner was using and enjoying the HiLux's considerable extra urge!

Cooling System Upgrade

The extra urge provided by the correctly matched turbo soon showed a weakness in the HiLux's cooling package. The gauge climbed on steep grades, particularly if the engine was left to lug around peak torque revs.

The cure was simple enough: rebuild the cooling system. The water pump was replaced, along with the 10-year-old radiator and all the hoses and belts. The thermostat was replaced by a full-flow design.

The viscous fan lacked resistance when turned by hand, so a new hub was fitted.

Rebuild or Replace

If your older diesel isn't in great shape it can be rebuilt, or you can replace it with a new or used engine.

Engine rebuild prices depend on how buggered your old donk is, but a four-cylinder diesel reconditioning job won't leave you much change out of five grand.

A second-hand engine is another option and prices start as low as \$2500 for a four-cylinder diesel. The question mark hanging over a second-hand engine is its condition, but reputable sellers provide at least some warranty.

Genuine long motors used to be prohibitively expensive, but Toyota has dropped the price of some of its replacement engines by around 50 percent.

The Toyota scheme involves replacing a worn engine with a brand new long motor and the final price depends on the condition of the trade-in.

All the factory-built Toyota engines come with a 12-month, unlimited kilometres warranty.

Non-Toyota repair shops can access the exchange scheme, by sourcing the replacement engine through a participating dealer.

AJ Automotive of Bowral, NSW, recently fitted a long diesel motor to a HiLux and proprietor Tony Woods said that the current Toyota replacement engine pricing was very competitive:



“We gave the owner the choice of an engine rebuild for a little under \$5000, or around six grand for a factory-built long motor and he went for the new donk, without hesitation,” said Tony Wood.

“The engine arrived without flywheel or oil cooler housing, but with a water pump.

“We dressed it in no time and had the vehicle back on the road, without the delay of waiting for a recon job,” said Tony Woods.