



POWER WITH

RALLYSPEED'S turbo diesel LandCruiser offers kick-in-the-back power boost with reliability, economy and durability. Words by ROB LUCK. Photos by GREG McBEAN.

POWER is everything — that's the word from the street modifiers. When it comes to turbocharging, the tar burners just bolt on the fattest whoofer available and screw up the boost until the engine screams.

By contrast, motor manufacturers who fit turbochargers as original equipment generally keep a low profile on power claims. Instead they finger issues such as reliability, engine longevity, simplicity, operating efficiency and tie these ideas to "balanced performance improvements".

Bernard Brennan is a man who identifies with the motor manufacturers' approach. His company has specialised for many years in after-market equipment for 4WDs and recreational off-roaders, and when he decided to get into the turbocharger business, he lobbied on the "balanced performance" route.

The Rallyspeed TurboCruiser reflects this approach. Brennan's main parameters for the development of a turbocharger system for the Land Cruiser diesel were towing and hill climbing capacity, off-road competence, operating economy, reliability and durability and the utilisation of the minimum number of new components in a simple development.

His conversion was developed over 12 months by Turbocharger Technology, a Sydney-based firm which represents IHI Turbochargers in Australia, and supplies the original equipment market with turbocharger

equipment and developments.

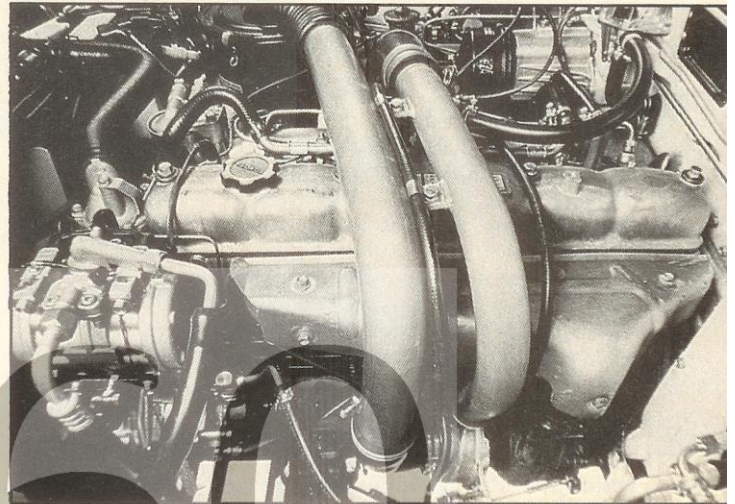
Philosophy is one thing, it's results that count. Brennan took a number of Land Cruisers to an independent Sydney chassis dynamometer operator and ran figures. The power table attached to this story shows the results, but in summary, it demonstrated that the Rallyspeed TurboCruiser was producing a healthy 29-34 percent power improvement at the rear wheels through the critical operating range of the diesel engine.

At every level of the engine's rev range, it also produced more power than the Land Cruiser petrol engine at the back wheels. So the power gains were useful and had a handy yardstick for comparison — since most diesel users would like to combine the advantages of their chosen engine form with the better power output of the petrol engine.

Dynamometer figures, schmfigures. So what, you might say. So did we. So Brennan handed the machine over



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Rallyspeed's TurboCruiser (opposite page) came with lots of extras, including after-market suspension. The badge on the tailgate (left) leaves no doubt about what's under the bonnet (above). Installation is simple, inlet tracts curve smoothly.

WITHOUT PAIN

for an unlimited test program. Which was a fairly brave move since it was his personal transport, and it was heavily modified to the ultimate level. For example — a total Recaro cockpit conversion (Recaro front buckets plus seating and trim re-finished in Recaro cloth), Ultimate Suspension System matched with Cheviot solid-centre alloy wheels and Yokohama Super Diggers, Bar products "export level", bull-bar (alloy), luggage rack, long-range tank, and many other goodies.

We started by driving the thing straight to Melbourne and back. This test was an unashamed measure of open road blacktop touring capability. It produced some shock results. On one leg of the trip, the TurboCruiser covered 872 km in 7 hours 30 minutes for an average speed of 116 km/h and a fuel consumption of 18.49 l/100 km (15.2 mpg). Speeds achieved were as high as 150-160 km/h and the vehicle could be cruised up and down hill at

a consistent 125-135 km/h. None of these figures are achievable by a standard diesel, and even the petrol Land Cruiser would be scratching.

In a 460-km leg comprised of 60 percent peak hour traffic and 40 percent high-speed highway touring, we put 15.58 litres into 100 km (18.12 mpg).

The return trip to Sydney was tackled with the car loaded to the "gunnels". It returned identical fuel consumption at the same cruising speed — a pretty convincing test of the turbocharger's pulling power since load weight was well over 600 kg. The message is clear for people towing.

Some other off-the-wall observations . . . Overtaking manoeuvres were tackled with the confidence of a high-power sports car. And hill-climbing ability was excellent. A good example was the notorious run up out of Jugiong, approached from a 60 km/h limit. We kicked-off at the bottom of the hill at 50 km/h and flew

over the top at 110 km/h in fourth gear.

It was another two weeks before Brennan recovered his machine from us. We used the time to find out some more pretty interesting facts.

In a head-to-head consumption test with a standard Land Cruiser diesel, the TurboCruiser put 24 mpg into a gallon of diesel (11.8 l/100 km) at the same time as a standard diesel recorded 20 mpg (14 l/100 km). We got as high as 26 mpg (10.9 l/100 km) around town and recorded 28 mpg (10 l/100 km) frequently when touring in the high gears on the open road near the posted limits.

In a trailer test over 800 km with three passengers, 100 kg of luggage, 300 kg of fuel and a 600 kg trailer out the back we averaged 100 km/h for a fuel consumption better than 20 l/100 km (around 15 mpg).

A feature of the Rallyspeed conversion is the refined under-bonnet work. Turbocharger

Technology's Dan Harder, Senior Technician, located the turbine unit low down on the near-side of the engine block, out of the way of all heat-sensitive under-bonnet equipment. This location also facilitated the use of smooth, direct curves from turbine to manifolds in the simple, effective blow-through installation which uses the standard induction system (original airbox and injection systems are retained). The turbine unit is placed high enough to be out of the way of stone damage, etc.

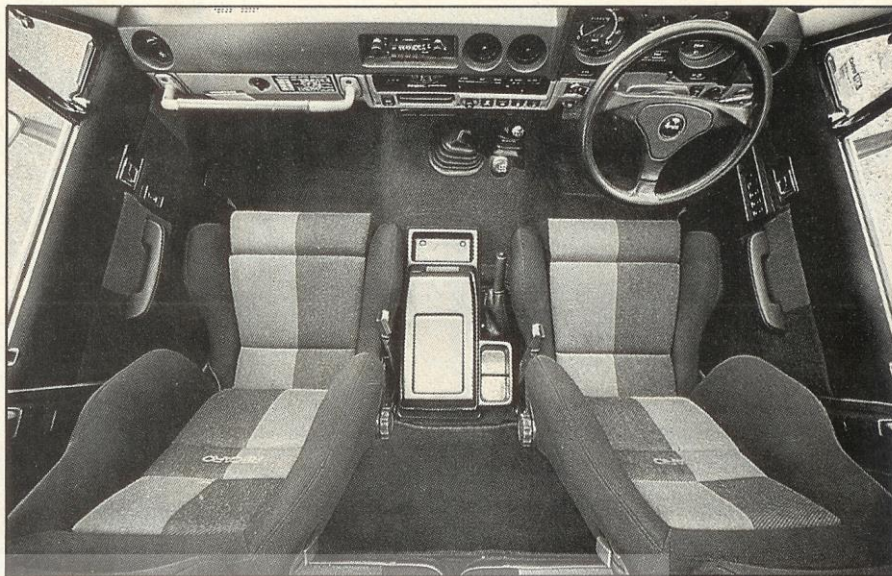
An important feature is a boost-enrichment device developed by IHI and Turbocharger Technology. Basically, this produces fuel "on demand" and eliminates fuel wastage. Fuel economy can thus be improved in low-throttle applications (turbochargers can be quite efficient fuel metering devices), and a cosmetic advantage is the minimising of smoke emission under acceleration.

Over two weeks and around 3000 km of on-road driving, we tended to forget we were driving a diesel, and hunted the car along just like a petrol-powered machine. But off-road there was no mistaking the diesel origins — or the substantial performance improvement.

The particularly pleasing aspect of the power improvements came when negotiating very nasty rocky inclines, and other dead-slow applications. The TurboCruiser could be inched along with amazing reserves of power on tap when required.

In mud, slush and sand, head-to-head comparos with a standard diesel Cruiser highlighted this machine's ability to power through faster and harder, or when the going called for slow speed, with far greater confidence.

Of course, there were substantial gains from the suspension system which contributed to this improved off-road ability. But there was no mistaking the engine's willing performance.



Matching Recaro seats and cloth trim added an opulent air to the TurboCruiser's interior.

A lot of other items showed Brennan's attention to detail in the TurboCruiser modification program. The auxiliary fuel tank was an important one. The Rallyspeed installation places the tank under the floor and ahead of the rear axle for optimum weight distribution. This eliminated rear-end drag when fully fuelled, and ensured the headlights didn't turn into searchlights.

The Recaro seats were notably effective for both long touring and firm location during extreme off-roading. We frequently employed the substantially alloy roof rack, and fortunately avoided testing the bull-bar, although its weight advantage didn't go unnoticed.

All the demerit points attached to the vehicle's original equipment. The worst is the standard issue sidestep. It might have been designed by a legless moron, but regardless, it is a piece of junk. Lateral ribbing means that in any kind of slippery situation (ie, rain, mud, snow, etc), it's designed to make your feet slide off the step. One hapless staff member ended up lying

on the road, foot jammed between door and step.

The Rallyspeed TurboCruiser goes a long way to meeting the ideal for diesel-powered on and off-road performance.

It is cheap to buy at \$1850 installed, and the modifier has put his money where his mouth is with a substantial warranty. For new vehicles a 12 month warranty covers all turbocharger, engine and driveline componentry (proportionate discounting during warranty period).

For second-hand vehicles, turbocharger componentry is warranted for 12 months.

As a guarantee of coverage for the purchaser, the warranty is underwritten.

Installation of the neat and simple turbocharger kit can be effected in four hours on a same-day drive-in drive-out basis.

And like the forthcoming Toyota factory turbo (probably more than 12 months away yet), it is a safe, conservative but impressive installation.

COMPARO CHART

| RPM | POWER OUTPUT* (Standard Diesel) | POWER OUTPUT* (Standard Petrol) | POWER OUTPUT* (TurboCruiser) | EQUIVALENT† ROADSPEED | PERCENTAGE‡ IMPROVEMENT |
|------|------------------------------------|------------------------------------|---------------------------------|--------------------------|----------------------------|
| 2000 | 31 | 37 | 40 | 71 km/h | 29 |
| 2500 | 38 | 41 | 51 | 88 km/h | 34 |
| 3000 | 43 | 44 | 54 | 108 km/h | 26 |
| 3500 | 42 | 50 | 54 | 121 km/h | 28 |

*Power output shown in kW measured at the back wheels on a load chassis dynamometer to simulate actual road driving conditions.

†In fifth gear.

‡Percentage improvement of TurboCruiser compared with standard diesel model.

0-100 km/h times: Standard Cruiser diesel 27.52 s, TurboCruiser 18.65 s.