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# HINO'S HIGH FIVE!

HINO HAS INTRODUCED A FIVE-CYLINDER ENGINE VARIANT TO ITS MEDIUM-TRUCK RANGE AS PART OF ADR80/03 EMISSIONS COMPLIANCE. ALLAN WHITING SPENT A FEW DAYS IN TWO LOADED TEST TRUCKS TO CHECK OUT THE NEW POWER PLANT.

Hino isn't new to five-cylinder engines, having had a diesel five cylinder in the FC model some years back.

Its biggest problem wasn't the fact that it had five cylinders, it just didn't have enough grunt.

The latest JO7 five-cylinder unit is an entirely different proposition, with claimed outputs of 162kW (220hp) up to 191kW (260hp) and torque ranging from 647Nm up to 794Nm.

Those figures promised good performance from the latest Hino 500 Series that has GVMs from 10.4 tonnes up to 14 tonnes.

When compared with the outgoing FC-FD range the new five-cylinder replaces the FC's four-cylinder engine and the FD's six.

Outputs are almost exactly the same as from the superseded six, but fuel consumption should be better, while the FC scores a considerable increase in power and torque: 162kW/647Nm, replacing 129kW/500Nm.

Australian truck operators aren't

'guinea pigs' for the JO7 engine, although it's new to this market.

To meet Japan's and the USA's stricter emissions standards this engine, with common-rail injection, diesel particulate filter (DPR) and exhaust gas recirculation was introduced overseas back in 2002, so it's been well and truly tested in the real world.

Developments made to the original US and Japanese market five-cylinder engine include an improved water pump, upgraded common-rail injection, a larger EGR system, new variable-nozzle turbocharger and stronger pistons.

We took loaded FC1022 and FE1426 trucks for extended city and highway driving to check them out in Australian conditions. The trucks were fitted with curtain-side bodies and ballasted with sandbags to three-quarters GVM.

## ON THE ROAD

There's no doubt that the 2011 Hino 500 Series is the best-specified Hino medium-truck range yet launched.

Standard equipment includes cabin strength in compliance with European regulation ECE-R29, ABS brakes and driver's SRS airbag— even on 4x4 models — and manual transmission 4x2 models have hill-start assistance (Hino Easy Start, or ES).

Traction control, cruise control and heated, powered rear vision mirrors are standard. Remote central locking is a good security plus.

Pre-trip checks are easy, thanks to a lift-up front flap and, if required, a cab that tilts easily.

Getting in and out of the medium Hinos has never been a problem and this ease of entry and exit continues with the new models. A tilt-telescope steering column helps with driver comfort, but air-suspended seat adjustment is limited for super-size drivers.

Cab ergonomics and layout are very good, with all controls in easy reach. Powered, flat main mirrors allow easy rear vision adjustment and

the spotters give a wide view down the side of the truck.

The five-cylinder gives no clue to its configuration, idling quietly and smoothly. Drivers who don't tilt the cab will assume it's a six.

Clutch operation is eased by the use of air/hydraulic assistance, so pedal pressure is car-like, with good feel for the clutch take-up point.

Gear action is also car-like, with short throws in a well-defined, six-speed gate. In typical Japanese gearbox tradition first cog is not synchronised, but is needed only for loaded hill starts.

Our first test mount was an FC, which had a short cab and transmission-mounted parking brake, supplemented by lockable hydraulics to all four wheels.

It moved off happily at idle revs in second gear and was happy with short-shifts at around 1800rpm. Only when shifting progressively in hilly terrain was it necessary to run the engine up to 2400rpm before up-shifting.

On the flat it was often possible to skip-shift across the gate, doing 2-3-5-6 shifts, or even 2-4-6 at times. Don't we love variable-nozzle turbochargers!

In traffic, Hino's ES system took the stress out of stop-start driving. With

the truck at a standstill, brake pedal pressure locked the wheel brakes, so there was no need to keep foot pressure on the pedal or use the parking brake.

To lift off without roll-back all we had to do was ease off the clutch and the wheel brakes automatically released as the clutch took up.

ES timing can be adjusted by a dashboard switch, if required, but we found the default setting ideal.

Engine noise was low, but satisfying and it was possible to drive the truck constantly in the economy green zone — 1500-2000rpm.

Legal cruising was done at the top of the economy band and cruise control operation was instinctive.

We were not surprised to find the exhaust brake very effective, and it made hardly any noise. Wheel braking was very powerful.

We found the FC understeered somewhat and this feeling increased on wet roads, so we put it down to the truck's somewhat skinny 9.5R17.5 tyres. However, handling was flat and predictable and ride quality okay for a leaf-sprung truck.

Our next mount was an FE that differed from the FC in having a snooze bunk behind the seats, a spring parking brake, Hendrickson HAS200 rear air suspension, 260hp instead of 220hp, 3.6-tonnes additional GVM, 19.5-inch rubber and different transmission and rear axle gearing.

The mechanical balance was preserved, despite the FE's additional weight, thanks to gearing changes and more engine grunt, so the overall performance was similar to the FC's.

Exhaust brake power was slightly lessened, but still worthwhile in holding back vehicle speed on downgrades.

Like the FC the FE could be driven almost entirely in the green economy zone and skip-shifting was possible in flat terrain.

More weight, fatter rubber and air rear suspension made the FE a softer-riding proposition than the FC and steering feel and accuracy was also improved.

Both trucks have automatic DPR regulation programs and at no stage were we conscious of this filter-cleaning operation occurring.

When the filter loads up with soot the injection system delivers late injection to raise temperature in the filter and combust the carbon.

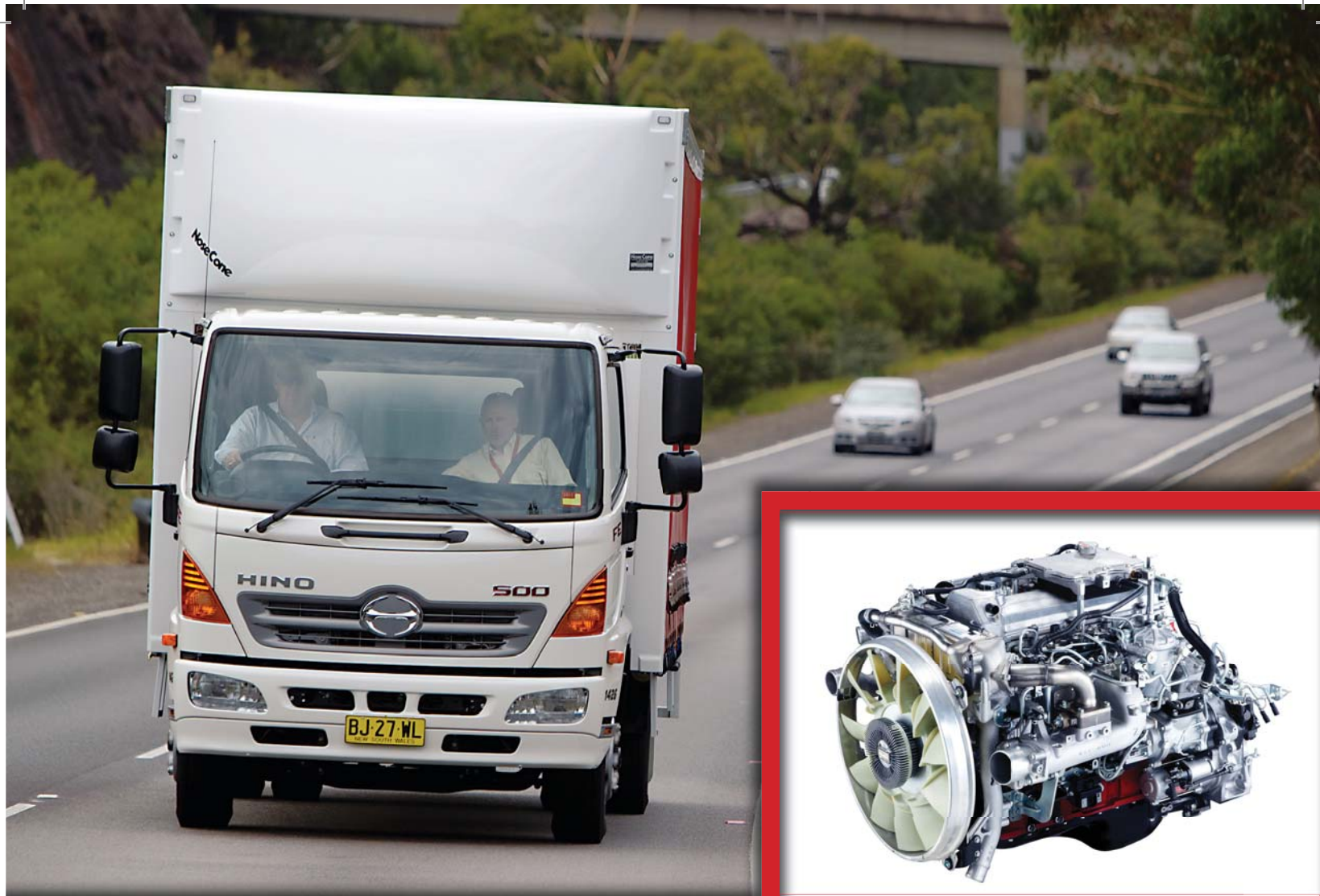
Hino engineers reckon that in typical Australian transport tasks most filters should be cleaned automatically en route without drivers knowing anything is happening.

We measured economy during a cycle of freeway, secondary-road and city driving and found that the FC averaged 5.1 kilometres per litre (19.6L/100km) and the heavier FE, 4.9L/km (20.5L/100km). There are plenty of V8 petrol utes using more fuel than that!

In summary, the new five-cylinder Hino medium range should be successful for the brand.

Performance is very good and the driving experience is rewarding. Drivers moving up from small PU&D trucks into these medium-weights should have no issues with adjustment.





## THE ADVANTAGES OF A FIVE-CYLINDER ENGINE

In power engineering terms there's absolutely no reason why engines have to be designed in the most popular arrangement of in-line four, in-line six, vee-six or vee-eight cylinders.

Five-cylinder engines have been with us since the early 1900s and today many leading performance car makers have five-cylinder engines in their range, including Audi, Ford, Volvo and VW.

Probably the smallest straight-five engine ever built powered Honda's racing motorcycle, the 1966-model 125cc RC149, which put out 34hp at 20,500rpm (270hp/litre).

In contrast, MAN's whopping 50-litre, marine two-stroke diesel, five-cylinder produces a ship-driving 6400kW at a mere 120rpm.

The most common design route employed by truck engine designers in recent years has been to develop a six-cylinder engine to suit a wide range of required outputs and detune the engine for lower-power models.

However, this approach has

compromises, with the most obvious being the additional tare weight at the lower-power end of the model range, which can least afford to have that burden.

Another reason some car and truck designers have adopted a five-cylinder design is packaging: fitting an engine of the desired capacity in a space that's not ideal for a longer, heavier, six-cylinder engine.

In Hino's case, a five slots neatly under the short day-cab fitted to the FC model, making it easy to fit bodywork right up to the cab rear wall and minimising engine noise.

In these days of strict emissions control it also makes sense to develop a cylinder module that results in the best in-engine emissions and fuel economy, then package that module in a four, a six and, in between, a five.

Hino's common-cylinder engine lineup ranges in capacity from 5.30 litres to 7.96 litres with shared bore and stroke dimensions of 112mm x

130mm and a current output range of 150hp to 260hp.

A by-product that benefits owners and service personnel is that many engine parts are common across the entire range: pistons, cylinder liners, connecting rods, timing gear and intake and exhaust valves.

Four-stroke, four-cylinder engines have a power stroke every 180 degrees of crankshaft rotation - from top dead centre to bottom dead centre - so there's no 'overlap' of cylinder firing, which is why modern fours are fitted with balance shafts that minimise inherent vibration.

However, any engine with more than four pots has power strokes at less than 180 degrees, making it inherently smoother running.

A five-cylinder engine gets a power stroke every 144 degrees and a six has power strokes every 120 degrees.

In theory, a five isn't as smooth as a six, but the difference is much less than that between a four and a six. 7