

4WD NEWS

TOKYO MOTOR SHOW

4X4 DEVELOPMENTS 2011

There's not much call for true 4x4s in the Japanese marketplace, but Japan exports heavy duty 4x4s around the world and builds them in offshore markets. As well, many companies involved the Asia-Pacific markets use the huge Tokyo Show to display their wares.



There were some interesting 4x4-related exhibits at the late-2011 Tokyo Motor Show. We visited to catch up on the latest developments, among which downsized and hybrid powertrains dominated. Automotive wisdom asserts that 'there's no substitute for cubic inches' but that old saw was written before the advent of electronic engine controls and reliable, cheap, forced induction, via supercharging or turbocharging, or both. Most new internal combustion engines on display at Tokyo 2011 were turbo- or super-charged, whether diesel or petrol fuelled.

What's driving the forced-induction engine is emissions reduction and now that CO₂ is officially an emissions gas – even in the USA, which fought its recognition for years – engine makers are seeking ways of reducing CO₂ production. Other emissions can be eliminated or reduced by exhaust after-treatment, but CO₂ can't be 'scrubbed'.

The simplest way to reduce CO₂ is by cutting the amount of hydrocarbon fuel that's burnt in an engine and engineers have long known that cramming a lot of air into a small capacity engine produces the power and torque of a large engine, but with lower fuel consumption.

Innovation for cars



The world's number two auto maker is well advanced in downsized powertrain componentry and displayed two small, yet powerful petrol and diesel engines. Both featured turbocharging and direct injection.

A further refinement of the efficient small engine principle is to use an internal combustion (IC) engine in concert with a hybrid electric drive system so that the engine can rely on additional power and torque supplied by battery/electric propulsion, to supplement the restricted IC engine performance. Although most hybrids have petrol IC engines Peugeot displayed its new 3008 AWD hybrid with HDi FAP 120kW *diesel* engine, 27kW electric motor and stop-start technology. Peugeot claims a car-world first for this diesel hybrid, but there are already thousands of diesel truck hybrids on the world's roads.

Existing hybrids have proved that electrical power can be used to drive vehicles mechanically and next-generation hybrids demonstrate that mechanical links between motor and wheels aren't necessary. The next logical step is obviously to question the need for hydraulic brakes and mechanical, power-assisted steering.

NTN CORPORATION

NTN Corporation's electric steering had a steering wheel operating an actuator motor that connected electrically to servo cylinders that pulled and pushed left and right steering arms independently – no steering column, no more location difficulties with right hand or left hand drive steering systems and no more Ackermann geometry compromise.



Several exhibits at Tokyo displayed the possibility of all-electric chassis layouts, with electric steering and electro-mechanical brakes.

Electro-mechanical brakes have been suggested for many years, but there were several production-ready exhibits at Tokyo. All-electric brake signalling eliminates the need for a hydraulic medium and allows much faster reaction times for ABS/EBD/ESC and TC programs. In addition, electric motor resistance can aid braking effort and allow regenerative power to recharge the hybrid battery pack.

Although several makers exhibited conventional IC-powered vehicles with fuel-saving 'stop-start' features and regenerative braking systems the most efficient way to employ these desirable functions is with a hybrid system.

AISIN



Aisin is a producer of transmissions and hybrid modules for Japanese and foreign vehicle makers. The company showed its latest hybrid/automatic transmission module for the current Lexus as well as a heavy duty unit suitable for true 4x4s.

ISUZU UTE D-MAX

Isuzu previewed its 2012 D-Max Ute, in the form of an extended-cab model, powered by a 2.5-litre diesel, with 100kW and 320Nm. It's likely the Australian models will have an upgrade of the current three-litre diesel when the new vehicle is launched here in mid to late 2012.



Like its recently-released ute competitors the 2012 D-Max has expanded in size and has noticeably more interior room for front and 'dicky seat' occupants. 'Suicide' rear doors allow pillar-less entry and exit to the rear seats.



MAHLE

German-based engine components manufacturer Mahle was one of the instigators of downsizing and showed off a three-cylinder, 1.2-litre direct-injection, turbocharged petrol engine at Tokyo 2011. This engine was jointly developed with Bosch and has been powering a demonstration VW Passat for the past three years. Despite prodigious outputs of 120kW and 260Nm, fuel consumption is reportedly averaging 5.8L/100km.



MERCEDES-BENZ

'Benz displayed the GLK-Class 4x4 wagon that hasn't been produced in right hand drive at this stage. However, inside info from Mercedes-Benz indicated that when the GLK is redesigned next year a right hand drive model will be included in the range and it will be sold in Australia. The current LHD model looks just right for Down Under, so the revamped model should have at least the same appeal.

The Tokyo Motor Show model was powered by a three-litre petrol V6, but M-B has a wide choice of turbo-diesels it could slot into the new GLK.



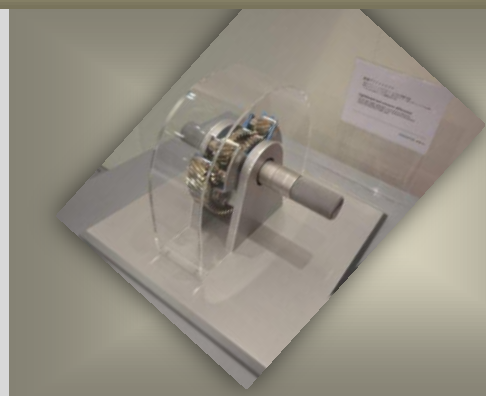
MITSUBISHI

Mitsubishi displayed a Pajero with a new 'clean diesel' engine, but there was no information about this product on the stand or on the company's website. The engine looked the same as the existing 3.2-litre diesel four, so our guess is that the 'clean' aspect is down to exhaust gas clean-up.



SCHAEFFLER

The German vehicle components maker showed a new self-locking differential that's said to be much lighter, simpler and more compact than traditional designs.



Airless Tyre The first airless tyre we saw was Michelin's Tweel, back in 2007, then Yokohama had a go and Goodyear has made airless tyres for space exploration vehicles, but not much of a more practical nature has been announced on that front since.

Bridgestone is having a crack now, with an airless tyre that seems designed similarly, but using a mesh of thermoplastic resin spokes that support the tyre's rubber tread band, instead of simple radiating 'spokes'. Also, the Bridgestone tyre has a high aspect ratio, giving it considerable flex.

All tread and spoke components are produced using recyclable materials, Bridgestone claims.

The Tokyo Show airless tire concept was a nine-inch diameter version, fitted to a one-seat electric vehicle. If the other tyre makers' experiences are anything to go by it will be a long time before we'll be able to buy one for automotive use.

