

# TRI-DRIVE

## DON'T

believe all you read about the financial woes of Western Australia. Yes, iron ore prices have dropped through to the basement, closely followed in some areas by house prices. But, in other industries such as gold extraction and high-grade copper, there's distinct optimism that 2015 is going to be an OK year.

*PowerTorque* travelled to Geraldton in West Australia to discuss the benefits of running tri-drive prime movers when hauling petroleum products in fuel distribution, where a typical working week would be based around a minimum 3,000 km round trip north to the mines.

Lionel Ward is responsible for the fleet at Geraldton Fuel, distributing fuel as transport manager of a fleet of 22 prime movers, 50 trailers and around 20 dollies.

"We recently secured two new cartage contracts so things are travelling along nicely at the moment. Also, with the price of fuel dropping and lower labour costs we have seen a lot of action around the goldfields regions of WA with more drilling taking place," said Lionel.

"We cart fuel and bulk lubricants from Perth to Port Hedland, running through the wheat farming area of Three Springs on the Midland Road, the old gold rush town of Mount Magnet on the Great Northern Highway, Carnarvon on the mouth of the Gascoyne River and on to Newman in the Pilbara Region," said Lionel.

"Our fleet comprises mainly of Kenworth prime movers in 6x4 configuration with a mixture of T909s, T908s, T609s, T408s and others such as an 8x4 Kenworth K200 that's an eight-wheel prime mover, plus a Volvo FH16 running at 600 hp and with an I-Shift transmission.

"The only reason we run an 8x4 as a prime mover is because of a trip we cover from Geraldton to Exmouth, a direct round trip of 1,700 km. If that truck is hauling three trailers it has to return via the inland route, bypassing Carnarvon because of size restrictions.

GERALTON FUEL PROVES THAT THREE HEADS ARE BETTER THAN TWO, AS DANA'S NEW TRI-DRIVE PROVIDES THE ANSWER FOR HEAVY HAUL

PHOTOGRAPHY BY SNAPACTION AND POWERTORQUE

"All our trucks are based at Geraldton. The Port Hedland trip is particularly challenging considering we run at regular gross weights of 170 tonnes and carry 138,500 litres of fuel coupled up with an A-trailer and three standard semitrailer tankers coupled up with dollies. Other trailers are 12 metres in length and quads are just under a combined length of 53.5 metres.

"We looked at introducing the tri-drive-axled Kenworth for the safety point of view rather than productivity.

"There is a definite stability benefit by operating a tri-drive as opposed to a tandem-drive unit. We run 23 tonnes on all our drive groups. Coming down off the hills you can feel the weight influencing the balance of the tandem-drive as the combination pushes forwards. My view is that it should be a tri-drive," said Lionel.

Shane Carey is the regional sales and technical support engineer for DANA Australia and has been overseeing the introduction of the first of the tri-drive units to join the Geraldton Fuel fleet.

"Basically it's a tri-drive DANA T78-190 unit made up of two D52-190 drive axles for the front and centre diff assemblies, driving through to a third D52-190 unit. The middle and the rear are like a tandem, all we've done is add a front drive axle," said Shane.





"It's a case of horses for courses. We're convinced we're hooked about the DANA tri-drive,"  
Lionel Ward of  
Geraldton Fuel.

"The DANA tri-drive unit was originally developed for the US and Canadian markets where it is used in small numbers in the logging and heavy haul industries. We knew there was a market here and developed it locally with Kenworth. The strength is that it did not have to be greatly re-engineered for our market," said Shane.

"The torque is split evenly across the three axles. It is not a hub reduction axle and therefore we are not restricted from attaining higher speeds when used on highway. Servicing is also easier because we are using common drive heads.

It's common practice in heavy haul applications for drive axles to be fitted with oil coolers, but current testing of the DANA tri-drive units is showing this extra expense and equipment is not necessary. The tri-drive unit experiences less stress through the driveline, and, consequently, less heat build-up than would be experienced by a tandem-drive unit.

Monitoring of the drive heads of the tri-drive has shown a reduction in operating temperatures when compared to tandem-drive units.

"The Volvos we are running at 15,000 km engine oil drains for the engines and 100,000 km for the diffs. In this application the hub reduction tandem-drive of the Volvo is running at temperatures up to 150 degrees. Volvo insists on the use of their own oil," said Lionel Ward.

“It’s a different scenario with the DANA tri-drive units. Using the DANA MGuard synthetic lubricants the tri-drive is peaking at 113 degrees, compared to the tandems, which are not running overly hot at 120 degrees.

“Oil drain intervals with four-trailer operations are completed in our own workshops at 15,000 km for the trucks, with diffs again at 100,000 km intervals and gearboxes at 200,000 km using synthetic lubricants,” said Lionel.

As Shane Carey explained, Dana is currently monitoring diff temperatures remotely and conducting oil sampling as part of a continuing evaluation of operating conditions. “As we gain more data of real-time use we can then investigate extending oil drain intervals further by using synthetic lubricants,” said Shane.

“Drain intervals with some fleets using mineral oils are currently at 80-100,000 km. We have fleets running synthetics in diffs with drain intervals extended to 150,000 plus. From the data we receive on the tri-drive units we can then suggest a well-informed replacement schedule,” added Shane.

“We’ve got 4.78:1 ratios in a lot of the tandem drives but the new tri-drive unit is running with diff ratios of 5.25:1, relating to an engine speed of 1700 rpm at 92-93 km/h. That engine and driveline match is just right. The road speed and the engine rpm is just beautiful, with other ratios you are always slitting up or down half a gear. We have experienced operators, and limit the tri-drive to two or three specific drivers,” said Geraldton Fuel’s Lionel Ward.

With the exception of the Volvos, the predominant engine in the fleet is that of the Cummins ISX.

“We have four ISX EGR-only engines and three ISXe5 SCR engines with AdBlue. The difference is amazing. I hate the EGR engines. The engines are all right; it’s ancillary gear that hangs off them.

“We had only one problem with an e5 at 350,000 km with a slight oil leak. The fuel economy is very good. Our triples are running 1.1 km/litre with the EGRs, and 1.3 km/litre with the e5s. Yes, you have to buy AdBlue, but it’s not very much expense at around three percent of fuel burn. There’s a hell of a difference in the AdBlue use between the Volvos and the Kenworths.

“Because we are using the e5 engine in the tri-drive the fuel consumption is about the same as it was with the tandem with the ISX EGR. It runs a hell of a lot cooler with a lot less fan-on time.

“With EBS on the entire rig, when you do a download in the tandem-drive you noticed the interventions on the EBS system. We are not getting the interventions on the tri-drive and that means improved brake life,” said Lionel.



The Geraldton Fuel fleet comprises 22 prime movers, 50 trailers and around 20 dollies.

The majority of trailers in the fleet are supplied by Marshall Lethlean, running on air suspension with BPW axles and air suspension throughout, and using WABCO EBS. Some of the dollies and all the turntables are supplied by K-Hitch.

“We are convinced on the tri-drive option,” said Lionel.

“It’s a case of horses for courses. We’re convinced we’re hooked. That truck runs from Port Hedland, north of Meekatharra, and a further 700 km from Hedland to the mine site that uses 100,000 litres of fuel per day. Caltex has a new terminal at Hedland and the truck works out of there for six or seven days before heading for home. If we got another big job we would definitely buy another tri-drive,” added Lionel.