

Extra traction is the attraction

Double drive is usually the non-stick solution for tractor units working off-road. But Kevin Swallow asks whether an independent hydraulically-driven axle could just as easily get your wagon out of the mire

The rule of thumb for most bulk transport hauliers who venture off-road is to specify a 6x2 tractor unit. If a lorry gets stuck, the driver has multiple options. First, autonomous systems might help; the truck will automatically start rocking, moving backwards and forwards to try to free itself. Second, deploying the differential lock to turn both drive wheels in unison might work to get moving. Third, the driver could try readjusting the load so there is more weight over the drive axle, which will also increase traction.

If the off-road environment is known to be arduous, undulating or soft, like quarries, forestry haul roads, waste disposal sites, farmyards or rural infrastructure projects, to name a few, then a savvy fleet engineer might recommend a double-drive bogie on the tractor unit.

However, although this option brings utilisation benefits, it imposes other penalties. Costing several thousand pounds more, it will also be around 1.5 tonnes heavier than a single-drive-axle tractor unit, as well as less frugal on the open road. It could be viewed as a sledgehammer to crack a nut.

Recognising this, most truck manufacturers offer a

double-drive bogie that incorporates a lift axle. When the articulated vehicle is empty, the second drive axle disengages from the driveline and is raised, leaving one drive axle. Once reloaded, the second axle automatically lowers. No weight is saved, but it reduces the fuel and tyre bill.

Another concept of having a second drive axle when needed has been available in Europe since 2003. French company Poclairn Hydraulics' 'on-road' product is known as AddiDrive, explains Yannick Seeleuthner, general manager for its Peterborough subsidiary.

At the touch of a button in the cab,

the standard AddiDrive product uses the power-take-off (PTO) to drive two piston motors, each one fitted to the wheel hubs on a steer or straight-beam axle.

Pistons move into the wheel hub to turn the front wheels (pictured, below) independently of the engine. An electric control unit governs its speed and use, and it can generate up to 108bhp and 12,000Nm of torque per axle. It operates up to 19mph (30kph). Exceed that speed and the system disengages, the pistons withdraw, leaving the axle to free-wheel.

Seeleuthner explains: "When the system is activated, it transfers - in real time and instantaneously - part of the torque on the front axle, according to the road conditions and vehicle behaviour. Traction on the front axle is available at 0kph."

AddiDrive has three basic functions. In creep mode, AddiDrive, powered by the hydrostatic axle, offers very slow but constant drive speed. In boosted traction mode, the system indexes torque on the front axle to the throttle pedal position to provide more traction at start-up. In front wheel angle compensation, the speed of the front wheel is adjusted according to the angle information provided by the



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truck, to ensure optimal traction in turns.

The first OEM to offer Poclairn’s systems, in 2005, was MAN Truck and Bus. It marketed the system as Hydrodrive, and was available for left-hand-drive trucks only. Fellow German truck OEM Daimler offers it as Hydraulic Auxiliary Drive, again in LHD only.

In 2010, Renault Trucks made the system available in left- and right-hand drive, marketing it as Optitrack. Last year, the OEM consolidated its Optitrack offer, rebranding it as Optitrack+. Working with Poclairn, it has introduced new features. First, a new ‘boost’ button raises hydraulic pressure from 420 to 450bar, leading to a 7% increase in the maximum wheel torque. It also runs at higher speeds, from 20kph to 50kph (12-30mph). Finally, disconnection and re-engagement now occur automatically, no longer requiring driver intervention.

IVECO Trucks unveiled its badged version of the system, Hi-Traction (LHD and RHD) at the launch of its X-Way range of construction vehicles in 2017.

FITMENT

Fitting it to a vehicle with an existing hydraulic wetline kit for tippers and moving floor trailers means adding a switch box, as the PTO can only perform one operation at a time. Seeleuthner adds: “A normal tipper truck requires around 150 litres of oil to operate the hydraulic equipment on the truck and/or trailer. AddiDrive uses the same oil.”

Without a wet kit, AddiDrive requires a PTO to the back of the transmission, a header tank with 40 litres in the system,

a coolant and filter system, electric control unit, as well as cabling and pipework. This weighs around 400kg, but Seeleuthner argues that it is much lighter than a double-drive set-up or mechanical AWD, and, because it is only used in certain situations, it saves fuel.

European truck OEM GINAF produces vehicles mainly for heavy-duty off-road transport and construction from its factory in Veenendaal, Holland. It uses a system with a similar design concept produced by Bosch Rexroth, based in Germany, which GINAF brands as the HydroAxle+, introduced in 2010.

Product manager Winfred Hovestad says: “Compared to a mechanical all-wheel drive, the HydroAxle+ system is cheaper, lower to the ground, lighter and uses less fuel. We place the system on a 9.0-tonne standard front axle and it weighs around 450kg.”

He adds: “The big advantage of HydroAxle+ is that maximum power is supplied to the front axle from a standing start, completely independent of the (driven) wheels, so it can work in creep mode, with the truck in neutral.”

TRAILER MOUNTING

Rather than place all the drive axles on the tractor unit, last year axle manufacturer SAF Holland introduced the Poclairn Hydraulics AddiDrive system for tipping semi-trailers. The

hydraulically-driven SAF Intra CD Trak, which uses the truck’s hydraulic wetline kit, is connected to a SAF 9.0-tonne axle on the trailer, explains Ben McEvoy, sales and marketing manager for UK importer IMS (Industrial Machinery Supplies).

The hydraulics are fully housed and are covered by standard service and inspection programmes, requiring no additional maintenance. To carry the hydraulics, SAF Holland has moved from a standard reinforced 11mm-thick beam traditionally used for construction to a 14mm-thick beam. The additional weight to the tractor unit-trailer combination is 149kg. It can only be fitted to trailers with disc brakes, but lifting axles can be accommodated.

The system provides traction from the rear of the articulated vehicle, improving the manoeuvrability of the truck. McEvoy adds: “It is available for fitment, usually on the rear axle. These are for vehicles that work in aggregate quarries, waste and landfill sites. There is interest in the UK, with several going into production this year.” **TE**

