

A s hydraulics manufacturer Edbro puts it, “a hydraulic wet kit is the partially-completed system consisting of an oil tank, pump, valve, air actuation system, screw connectors, couplings and assembly materials. This hydraulic system only becomes functional when connected to a hydraulic slave (tipper, walking floor, ejector or tanker discharge equipment)”. In practice, this distinction between the wet kit and the slave equipment is only relevant when a hydraulic-equipped tractor is not connected to a trailer, and it is best to think of them as a complete system.

This is especially true in tightly integrated vehicles such as refuse collection vehicles and car transporters, which are completely reliant on their hydraulic systems.

Martyn Wood is product support and technical director at the car transporter builder Transporter Engineering, based at Gosfield in Essex (pictured). The firm puts together its own wet kits, using a combination of off-the-shelf and custom components. The lift gear itself is also quite sophisticated: like a hydraulic crane, it uses double-acting rams fed via check valves (so they remain in place when the controls are not being used), while a specially machined rotary flow divider balances each side of the lift gear without the need for position sensors.

The complexity of Transporter Engineering’s system is “why we do maintenance training for people,” says Wood. The firm has a network of service agents around the country, and also trains dealers and the operators’ own technicians: “It’s generally the lads in the workshops who are doing the servicing on HGVs anyway. It’s normally coupled with the maintenance course, because the lubrication of the slideways and other parts is very important.” During the COVID crisis, much of the training has been online.



WET KIT SERVICING

Hydraulic circuits provide motive force for all manner of truck-mounted accessories, and they are generally well-behaved, provided they are cared for regularly, reports Toby Clark

The force available to a hydraulic ram is directly proportional to the pressure, so a higher pressure system can produce greater power or (perhaps more usefully) use smaller diameter rams. A tipper pump is typically rated at 300bar MWP (maximum working pressure) - this is what Edbro calls ‘medium pressure’ - while a crane pump could be 400bar. There is a trend towards higher pressures, so 450bar systems are being proposed for vehicles; hydraulic workshop tools such as nut splitters operate at 700bar.

Hydraulic circuits can be ‘open loop’ - with a low-pressure hydraulic reservoir or tank which feeds the pump - or ‘closed loop’. The latter is typically used where the pump is driving a hydraulic motor, and the outlet of the motor returns to the pump.

Tank capacity is important, in that the fluid heats up as the system is used - the tank must provide enough of a

reservoir to allow the fluid to maintain an appropriate temperature. Transporter Engineering typically specifies a 45-litre mild steel tank, although some operators will choose an aluminium tank to save weight.

There is usually an oil filter attached to the return line into the tank; Hyva recommends that its filter element be replaced every six months for single-shift working, and more frequently for higher duty cycles. The oil tank also has an air breather on the filler cap, usually equipped with an air filter and a strainer basket to prevent solids getting in when the tank is filled. The strainer should be checked periodically, while the filter element should be replaced periodically: again, Hyva recommends every six months.

Specialist kit may have different schedules: for instance, Hiab specifies that the filter on its loader cranes is changed after the first 50 hours of



“Hydraulic pumps seem to be bulletproof nowadays as long as you keep the oil clean – especially the bent-axis piston pumps we use.” It’s important, though, to prime the pump with oil before it’s first used.

Valves seem to be reliable, too, says Wood: “Just pull a lever and that’s it. The only problem with valve banks is if somebody disconnects the trailer and doesn’t get one of the couplings back on properly – especially the return line. The valve blocks don’t like a big back pressure through them, as that can cause problems with the spool O-rings. That’s when you see oil leaks.”

Hydraulic lines are usually equipped with quick-disconnect couplings, which can be the older poppet type or flat-face ISO 16028 couplings; these have a central ‘plug’ which keeps debris and contaminants out when the hose is disconnected, and a ‘no-spill’ design reduces the chance of oil loss. Some flat-face couplings are ‘connect under pressure’ types, which can be connected with minimal effort even when the contents are at full pressure.

Hydraulic hoses do deteriorate: BS 2444 specifies that hoses over three years old should be tested, and should be scrapped after eight. In operation, the issues are “mainly rubbing,” says Wood. “A lot of pipes have to go into very awkward places. We use better hydraulic hoses than we used to, and hydraulic hose failures are quite a rare event.”

Should the PTO pump fail, there’s a manual hydraulic pump (pictured, middle inset above); but like anything used rarely, it is prone to seizing. “Every six weeks [the period of the statutory safety inspections] you should check the hand pump, and disconnect the quick-release couplings,” says Wood. **TE**

use, and then at every 1,000 hours or annually. Transporter Engineering recommends a filter change twice yearly, and annual oil replacement.

OIL GRADES

Hydraulic oil is straightforwardly rated at a single viscosity grade – typically ISO 32. Viscosity has an effect on the overall efficiency of a hydraulic pump, and this changes with temperature, but the operating temperature range of ISO 32 oil is pretty broad, from about -8°C to +60°C. Those operating in very low temperatures might want a thinner oil. Edbro recommends ISO 15 for wet kits at external temperatures down to -25°C. Higher weights (ISO 46 or 68) are available for very high temperatures that are unlikely in the UK.

As with lubricating oils, hydraulic oil can benefit from periodic oil analysis; the most important tests are for particle contamination and water content. Particulate contamination should be measured to the latest ISO 4406:2021 standard.

Pump specification is critical: “You

need a big enough pump to work at tickover,” says Wood. The differing idle speeds and PTO gearing of different trucks make it important to match the pump capacity. “We work quite carefully with gearbox ratios to make sure things work at the right speed.” For a Transporter Engineering vehicle, DAF trucks require a 47lpm pump, whereas a Scania needs 34lpm and a Volvo just 25lpm, “because a pressure switch tells the engine to rev up while you’re pulling a lever – as soon as you let go, the revs drop back down to tickover”.

“Nowadays 95% of the vehicles have idle shutdown, so if you don’t pull a hydraulic lever, within three minutes or so it automatically stops. We put a pressure-sensing valve in, so if a driver operates a lever within that time it resets the idle shutdown. If the engine does stop, we have three external engine start buttons around the vehicle.” Some customers even stipulate a 90-second idle shutdown to save fuel, says Wood. But, he adds, “one of the side-effects is that it doesn’t give the hydraulic oil much time to warm up”.