

FUEL

When it comes to tankers and other vehicles carrying hazardous materials, operations and engineering are very different to general road haulage. Brian Tinham reports

MAN has the lion's share of the ADR market, with 22 dealers in its specialist HAZMAN network

Tankers which transport hazardous bulk goods (liquids, powders or gases, not just fuels) are specialist units, requiring specialist attention. And that applies equally to rigid, semi-trailers and the tractor units used to haul them. From the tanks themselves to the onboard pumping and discharge kit – but specifically also the vehicle inspection, maintenance and operational regimes – operators need to adhere to a wide range of hazard mitigation arrangements.

Most importantly, these include the requirements of ADR (European Agreement concerning the International Carriage of Dangerous Goods by Road), which is due its next biennial revision in January 2015. In the UK, this is enacted as the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (derived from the earlier Pet Regs), which covers aspects ranging from product classification to tanker design, vehicle marking, loading and unloading, and vehicle construction and approval.

But for many in this sector, the legislation is supplemented by industry codes of practice – most notably those developed by the Energy Institute, which provide recommendations for everything from petroleum road tanker design and construction to workshop design and equipment, and technician training for anyone working on tankers in the live state. And there's the influential Safe Loading Pass scheme for petroleum tankers, initiated by the major oil companies back in 1989 and due for another update next year (2014).

So much is well known, certainly by those in



the trade. What may be less well known, however, is that the Energy Institute is planning to publish updated codes of practice in the first quarter of next year – and these may well have some impact on operators and maintainers of commercial vehicles beyond those regulated by ADR.

Also, moves are afoot with the Safe Loading Pass scheme, which will soon see revisions embracing all petroleum distribution terminals, not just those owned by the major oil companies. And Euro 6 heavy-duty vehicle emissions regulations have put the proverbial cat among the pigeons, with the spirit tanker industry concerned about some of the engineering solutions initially rolled out by many of the vehicle manufacturers.

First things first, and Robert Harris – formerly fleet engineering manager at Shell, but long since principal of independent ADR specialist Amber

for THOUGHT

Engineering Consultancy – says new standard inspection methods and pressure testing guidance for petroleum road tankers are planned for publication by the Energy Institute next spring. “It uses the VOSA inspection manual template of ‘requirement, method of inspection, reason for failure’,” he says, explaining that this will extend the approach to every item of tanker equipment. “The document will cover all inspections, from preventive maintenance to ADR tank periodic tests, as well as the petroleum industry’s Safe Loading Pass scheme,” he says. And although unwilling to go into more detail, he adds: “This might well provide a useful pattern for use across other specialist commercial vehicle types, too.” Watch this space.

Safe Loading Pass

Moving on to developments specifically with the Safe Loading Pass scheme, which is mainly about protecting distribution depots’ loading gantries from tankers, details are yet to emerge. Harris says only: “There will be three fundamental changes: one involving unified passes; the second, formalising the scheme’s administration; and the third ushering in a significant update of the inspection requirements for vehicles.” This, too, could be big, with the likelihood, for example,

of more intensive training required for technicians.

So what about Euro 6? Harris cites the bigger SCR (selective catalytic reduction) exhaust systems and DPF (diesel particulate filter) regeneration possibly resulting in unacceptably high exhaust temperatures – particularly around fuel distribution terminals – as among key issues. “It’s going to be impossible to adapt exhaust systems or relocate them on the vehicle chassis, if they’re not fitted where ADR vehicles need them. For example, loading connections are obliged to be on the nearside and it is highly desirable to have the delivery system’s flowmeter on rigid tankers there, too.”

Packaging on 6x2 tractor chassis – even those

Peak Oil’s rigid and articulating tankers, based on DAF LF and CF vehicles



ADR in vehicle maintenance

The Energy Institute codes for tankers include: ‘Petroleum road tanker design and construction 2008’, which adds industry experience to the legal requirements; ‘Design, construction and operation of workshops for petroleum road tanker maintenance 2007’; and ‘A model syllabus for the training of technicians involved in the examination, testing, maintenance and repair of petroleum road tankers 2012’. All are subject to revision in light of changing vehicle technology.

For workshops, the codes demand a massive investment, not only in terms of facilities and equipment, but also technician training. Peter Harris, MAN’s UK operations manager for petroleum and special products, reckons that, on average, each bay costs around £150,000 from scratch. That includes specifying: Ex Zone 2 lighting; pit fume extraction; and double door separation with positive pressurisation between petroleum and non-hazard bays.

DAF technical support manager Martin Hathaway also points to the requirement for: Ex Zone 1 lighting (glanded

and sealed, with all cables in conduits) in inspection pits; and Zone 1 inspection torches. And he reminds us that electrical motors are not generally allowed for anything, while metal-to-metal contact is prohibited – meaning that, for example, hammers and drifts must be made from brass or copper, and that care has to be taken around aluminium and steel.

MAN has the lion’s share of the ADR market, with 22 dealers in its specialist HAZMAN nationwide network and an associated service fleet as part of its Mobile 24 emergency breakdown service. For Harris, this is as important as the workshops. “Our people are trained to do a roadside risk assessment, using roadside cameras or by phoning the driver. We do that because, if the vehicle is in a hazardous position or it can’t be worked on, we’ll send a recovery vehicle to move it straight away,” he explains. Beyond that, and the standard requirement for technicians to hold PAS 43 breakdown qualifications, it’s back to workshop precautions.



Midland Fuel Oil, running on Volvo rigid tankers with rear-lift tag axle

with tanker industry favourite small mid-lifts – may also be problematic, he fears. “There’s little enough room at Euro 5 to accommodate equipment such as air reservoirs, the fuel tank, battery boxes and hydraulic drive systems,” he comments. And he points to problems with some OEMs’ currently preferred battery location – at the rear of the tractor chassis between the chassis rails ahead of the rear cross-member – despite the fact that ADR requires ‘unprotected electrical circuits’ (feeding, for example, the starter motor, alternator, and main fuse box, usually at the front of the cab) to be as short as possible.

“This location is unlikely to delight maintenance technicians who, when carrying out preventive maintenance inspections, will need to straddle the pit while bending under the attached semi-trailer,” observes Harris. “Petroleum fuel distribution has refused to accept the arrangement, because it would also result in batteries being located directly below the tank outlet valve [foot valve] of the semi-trailer’s front compartment.” His view: typical fuel consumption per shift only requires a 250-litre fuel tank, so there ought to be space for conventional battery accommodation.

That said, there are few other vehicle issues likely to surprise anyone. While aerodynamics have received some attention, the main concerns remain minimising weight and maximising payload,

alongside ensuring durability and reliability for these hard-working vehicles. Most in the industry believe that developments have largely plateaued, to a degree because of ADR, with its tough design and inspection regimes.

Looking at tractor units, there’s precious little variance among those plated at 44 tonnes for tri-axle fuel tanker operation. Axle weights are well known and invariable – with typically 13.5 tonnes through the kingpin, meaning a simple apportioning of weight between the tractor’s front axle and its rear bogie. However, as ever, the devil is in the detail. Depending on the class of vehicle under ADR, chassis cabs and tractors units require features such as: fire screens on the rear of the cab that also shield engine components; exhaust heat shielding; battery isolator switches fitted either side of the cab rear and inside; associated cab-top warning lights; insulated ADR wiring harnesses; Ex-approved tachos with circuits independent of the master switch; fire-retardant wings; and sealed glazing in the roof and rear of the cab.

Tight specification

DAF marketing manager Phil Moon also points to the requirement for secondary retardation, which must engage in the event of primary brake failure. “If you think about a CF 6x2 tractor, that could be the MX engine brake or a ZF intarder, although the latter carries a substantial weight penalty. On lighter vehicles and rigid, though, the standard exhaust brake will usually do the job.” And most vehicles are also specified with hydraulic wet packs, driven by the engine PTO.

Moving on to the semi-trailer side, though, while construction and kitting are down to a handful of specialist bodybuilders, they draw upon the same running gear suppliers as everyone else. Only the tank design itself, the manifold and the choice of valves and fittings (metering systems, hoses, pumps, etc) set them apart. But that’s enough, given the range of products (from pressurised gases to fluids) to be safely loaded, contained and unloaded – and the common requirement for tankers to carry a mix of fluids, from petroleum spirit to diesel, red diesel and heating oil.

Sounds onerous? It is. And DAF’s Moon also observes that the law requires engagement of a dangerous goods safety advisor to oversee operations. “Operators need to be aware that, even if they are only transporting small quantities of hazardous goods – say, in barrels – they must check whether those are subject to ADR requirements... They need to take complete care, in terms of the administration of that transport, so that people understand what the products are, the driver has the right level of training, etc.” 