HIGH-TECH

Trailer technologies have come farther than many realise – and not just in terms of

Having covered the important issue of specifying semi-trailers last month (TE, July 2013, page 12), we now turn our attention to detailed technical issues. The goal: establishing practical technologies that can make the difference between adequate and excellent units – and thus save you money, while also improving efficiency and even safety – without breaking the bank.

Some are novel; others have been there for the taking for some time, but – for reasons of cost, complacency or simply 'custom and practice' – just haven't taken off. Either way, times are changing and, as fuel costs escalate, European legislation spreads and the drive for competitiveness continues unabated, it's time for a rethink. And what better way to do so than by examining what trailer manufacturers and enlightened operators are doing – and why?

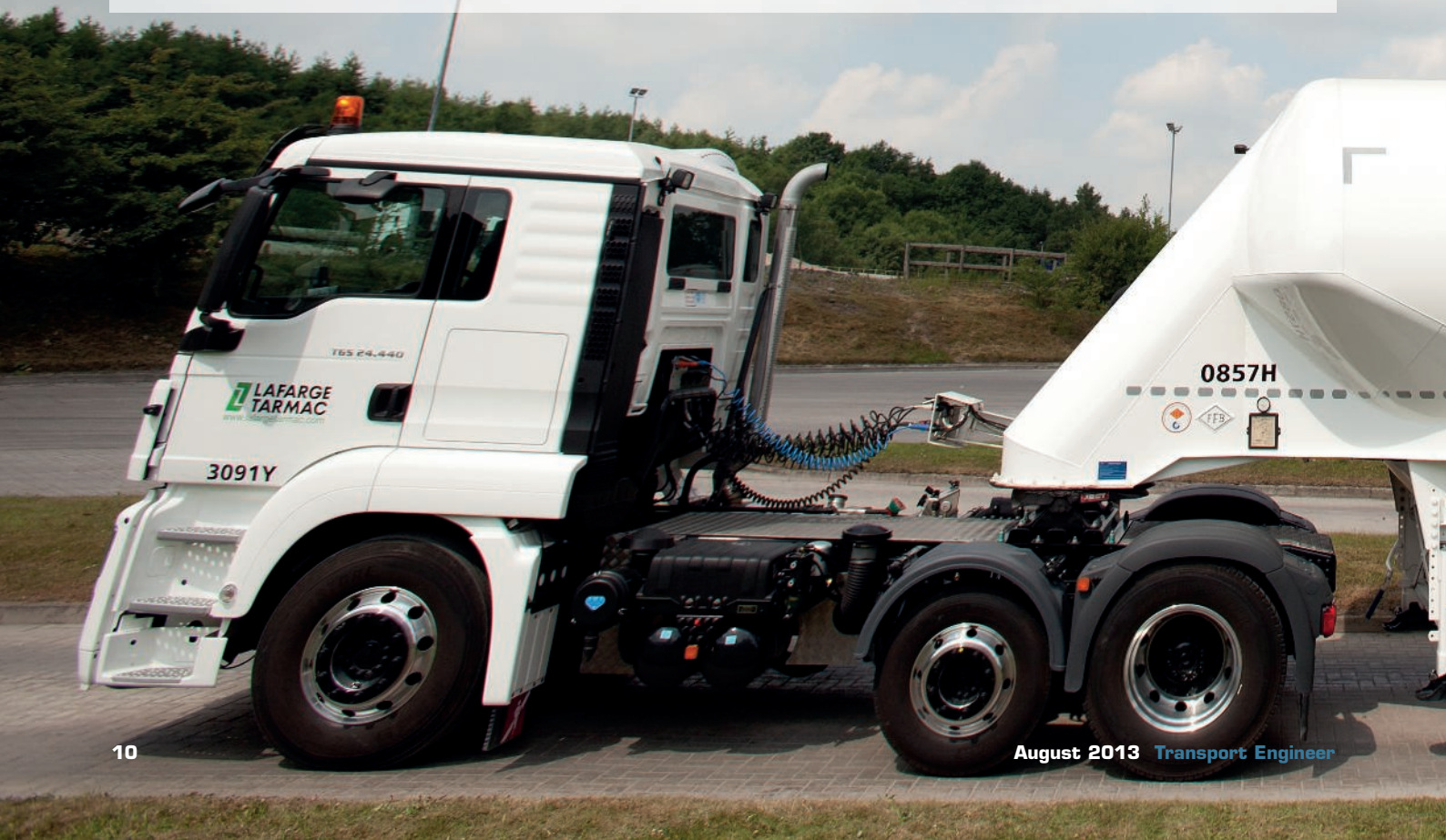
Most interesting to come to my attention lately – beyond the big low-carbon John Lewis double-deck longer semi-trailer and Tesco's aerodynamic unit (both Lawrence David at the CV Show), John T Evans Haulage's double-deck curtainsider (launched by Montracon, also at the CV Show), Asda's Cheetah double-decks (Cartwright) and Arla's innovations (tanker-trailers etc: TE, December 2012, page 8) – has been Lafarge Cement's developments. Admittedly, this operator has specific requirements for its bulk materials, some of which are hazardous and pressurised. But it is the sheer range of improvements – from safety cameras to ground-level coupling devices, automated tyre inflation systems, novel telematics and lightweighting – and their transferability that are impressive.

Andrew Brodley, UK transport manager for Lafarge (above right), takes up the story. "We've done a lot of work on our trailers to improve safety and efficiency. Historically, for example, we just had a reversing camera on the back of the trailer, but now we've installed cameras on all four elevations and one on the back of the cab, which overviews the fifth wheel. When the driver couples up, he can use that camera to guide himself onto the locking pin. Then, once the Suzie is connected, the display toggles to the rear of the trailer."

Safety and efficiency

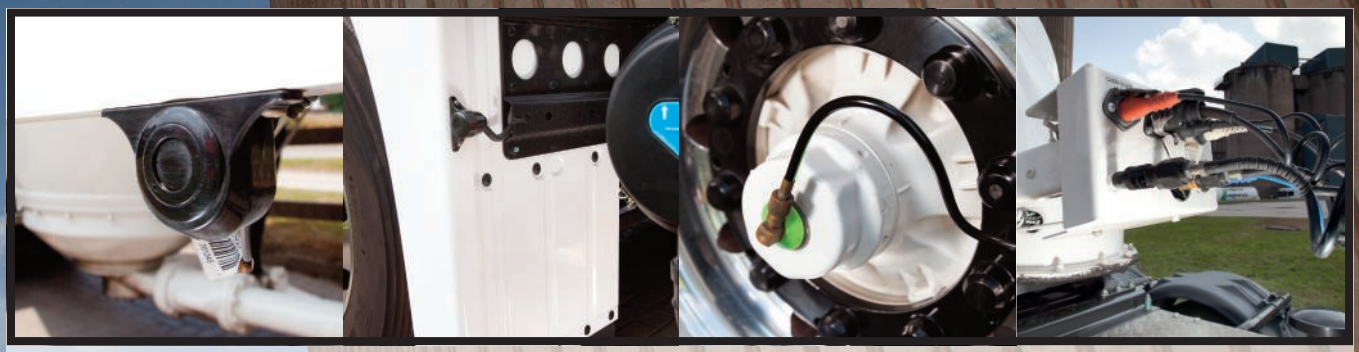
As for the other four – all Brigade Electronics – Brodley says they run continuously, with a recording facility triggered by movement sensors. They also function even when the ignition is off to discourage thieves and vandals. "We started fitting the all-round camera system last year, but the version covering the fifth wheel is the 2013 pack."

And he adds that Brigade is also now fitting additional



TRAILERS

their aerodynamics. Brian Tinham talks to innovators from across the industry



All-round cameras, side movement sensors, wheel security, auto tyre inflation, ground-level coupling, safe-zone barriers, trailer telematics...

sensors on the near side of his tractors and trailers (four on each) to provide warnings for pedestrians or cyclists. "When the driver indicates left below 20kph, there's an audible warning, if there is something in the vicinity. It also bleeps in the cab and flicks up the relevant camera display." At £2,500 for the whole system, that might sound expensive – but not compared to the alternative of a serious injury or death.

Turning to the wheels, Brodley next points to two further developments – Safety Trim locking wheel security indicators, now mandated across the entire fleet, and an auto-tyre inflation system. The latter uses supplementary compressed air stored in the axles' pressure vessels and set to the desired tyre rating via a regulator. "The hub end is drilled, and a non-return valve fitted with a universal joint and a small flexible hose to the tyre valve. If pressure falls, the system re-inflates it and trips a warning light for the driver, so he can investigate."

It's made a significant difference. "In the first six months of 2012, before this system was established across the fleet, we had nine motorway blowouts. We completed installation in April this year, and in the same period for 2013 we've had none." Brodley says he runs weekly random checks on the trailer fleet and last week was the same as every other – two

PHOTOGRAPHS: DEAN SMITH, CAMERA CREW

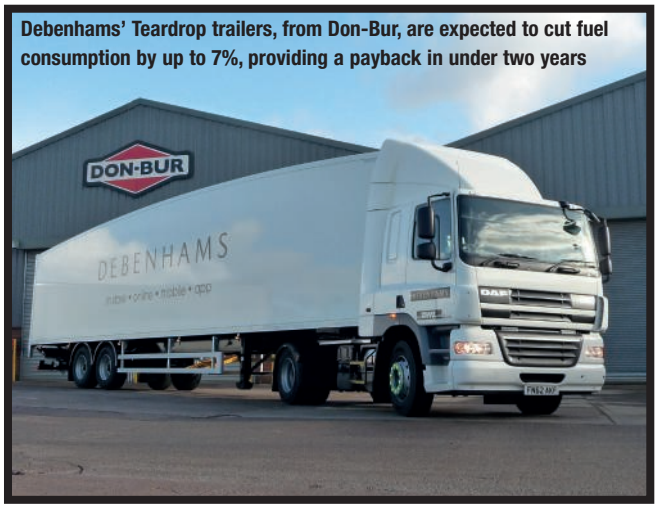
Left: John T Evans' Montracon double-deck trailer. Right: the new Schmitz tipping trailer

trailers with all tyres at maximum pressure. "How many hauliers even monitor their pressures? Yet that has a big impact on tyre life, safety and fuel efficiency." And the cost: £40 per axle per year. As Brodley says, that's more than saved in fuel economy and drivers completing their deliveries on-time before getting repairs done, if necessary, on the return leg.

What about ground-level trailer coupling? Brodley concedes it's not a new idea – Don-Bur launched a pneumatic telescopic system several years ago, as adopted by DHL and B&Q, and recently launched a lower-cost mechanical version. However, working with service agent WG Tankers – and subsequently specialist tanker builders Feldbinder and Spitzer – Lafarge developed its own.

"I wanted to eliminate slips and trips, with drivers climbing onto the back of the cab to couple up, so we now have two Suzie arm systems, one that rotates vertically, the other horizontally, but both bringing the connections down to the side." What about cost? "It's saving us money. No more expensive platforms and ladders on the tractors, which also means a saving in payload and servicing time. It's a win-win."

Lafarge's list goes on: safe-zone barriers that articulate out of the side under-run bars when parked (and an electronic version, using the side scan sensors, in development) to prevent pedestrians and vehicles from getting too close; a raised bulk pump discharge coupling system; and telematics that detect when drivers aren't using the (mostly MAN) truck intarders – by sensing over-temperature on the trailer disc brakes. Lafarge has also worked hard to strip weight out of its trailers, by adopting aluminium almost everywhere, including the landing legs, installing high efficiency discharge compressors in place of the usual PTO kit and removing rear-steers.



Debenhams' Teardrop trailers, from Don-Bur, are expected to cut fuel consumption by up to 7%, providing a payback in under two years

"If we were delivering to RDCs and running on motorways, then I would have kept the steering axle to prolong tyre life. But we get a lot of tyre wear anyway from construction sites, so our focus is on payload. We're now achieving 32 tonnes on a Feldbinder trailer weighing only 4,200kg. So our trailers now carry eight times the tare weight."

Will his ideas spread beyond trailers? You bet: "I'm about to unveil a new generation of curtainsider with new load-restraining technology, very lightweight construction – and the tyre inflation and side scan systems from our tankers." Watch this space.

Aerodynamics

Changing tack, let's hear what some of the manufacturers are doing – and why they believe they're worth attention. Richard Owens, marketing manager at Don-Bur, is good value, particularly on aerodynamics. He agrees that making semi-trailers slippery has become an advanced science, with the roofline, front, side and rear airflows well understood – and even the latter catered for, with air diffusers and the emerging generation of 'boat tails', now allowed under Contraction & Use Regulations (an extra 500mm on the length and 50mm width for such interventions). However, he points to a few remaining challenges.

"We're looking at the possibility of retractable landing legs to help eliminate the effects of turbulence from behind the tractor wheels. That would allow the side- and under-skirts to be sharpened up," he says. "We're also working on a Mk III Teardrop, with an air diffuser on the back – and a system that legally eliminates the tractor-trailer gap, which accounts for a full third of the drag. I think VOSA [the Vehicle and Operator Services Agency] will allow it... The only potential difficulty is the

swing radius. But we're hoping to have the go-ahead in a couple of months. This will have a massive impact on an artic's CV value [airflow coefficient]."

Beyond those, Owens advises operators to watch out for: new boat tails ("We're developing our own, with a company in the US, that retract into the trailer bodywork below a certain speed, so there's nothing to damage at the dock"); Swedish translucent hub cap discs ("They reduce air flow problems around hubs and tyres"); and front bulkhead domes, particularly for double-deck trailers. "We've always said, if you can fill a trailer, then it's more efficient operationally not to use a sloped roof, but to use aerodynamics on the bulkhead. However, the vast majority of domes are only designed for 4.2m trailers, so they stick above the cab deflector on double decks and are no use at all."

Don-Bur's Deckstreamer was, he says, developed with CFD (computational fluid dynamics) partner TotalSim, and uses air diffusers and vortex generators to do the job. "It's been available for a couple of years, but it's not taken off much yet – even though Next's trials show a 9% fuel saving," comments Owens, conceding that this figure exceeds Don-Bur's expectations. "With sloping roofs, you can get 10–15% saving, but not with domes. We would have quoted 4–5%, but Next's data is convincing."

Construction choices

But it's not only about trailer aerodynamics. Owens cites stability systems, telematics, automatic parking brake systems and panel materials as technologies to watch. Conceding that the former are not new, he comments only that EBS systems should by now be standard on trailers. "They're not massively expensive and, as an intervention on a trailer, they make a real contribution." And these systems are also the gateway to getting seriously useful data on driver performance. "Excessive corning, braking, acceleration – all that data is there, but operators don't seem to realise [it]. For example, if stage-one roll stability is kicking in because drivers are taking roundabouts too fast, that's an important training issue."

As for panels, Don-Bur's development of Blade 18 months ago is one among several relatively recent offerings from trailer makers, all aimed at reducing weight, while increasing impact resistance and available cube, compared with GRP. Blade itself is a 7.5mm thick steel-faced sandwich, with a high density polyethylene foam core. But there are others, such as Omnia thermoplastic panels (polypropylene honeycomb, with fibreglass reinforced polypropylene facing), aluminium honeycomb etc – as well as the ranges aimed at reefers.

The choice of material matters, says Owens. "Blade enabled us to build the first true 52-pallet lifting deck trailer. It meant we could achieve 2,420mm width on the upper deck, instead of the usual 2,372mm, which had meant loading pallets one sideways and the next lengthways, limiting the operator to 49 or 50 pallets."

Schmitz Cargobull technical director Derek Skinner agrees. "Our [refrigerated] trailers are made with Feroplast, which is a foam-injected panel, faced in steel. That means a 45mm panel has 43.8mm of insulation, making it the highest percentage in the industry." And he goes on to explain that, since these panels are used on the roof, as well as the sides, both cargo space and cold air circulation are maximised.

Add to that Schmitz's choice of a monocoque chassis, and Skinner claims that the firm's reefers are 500–700kg lighter than those of UK competitors – and that they stay that way. "A lot of GRP panels absorb water over time, so reducing the trailer insulation and increasing its weight. That means running costs for the fridge increase, because it's working harder, and the same applies to the tractor, because the trailer is getting progressively heavier to pull."

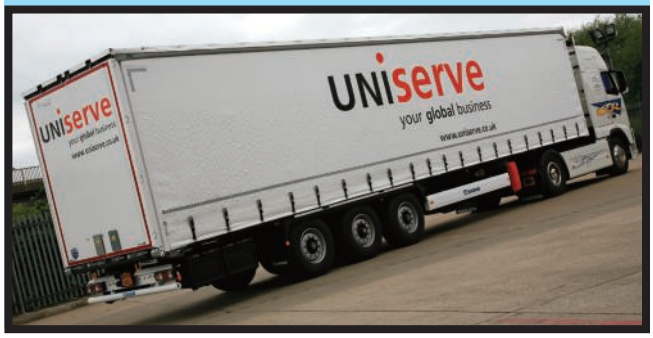
For him, though, there's another important issue: Skinner urges operators to consider chassis construction, running gear and residuals – all of which, he says, have a bearing on total costs. "Our construction method is based on designing the chassis and body as a whole, with the former – which is hot-dip galvanised – machine-spline-bolted directly to the body. Also, our floor provides increased strength, effectively [replacing] conventional chassis. And the kingpin plate is bolted directly to the underside."

A&R International's choice

A&R International Haulage has added three new 4.0m-high sliding-roof Krone Profi Liner tri-axle curtainsiders to its fleet, each with EN 12642 XL certification. Rob Scriven, A&R's founder director, says that strength, loading flexibility and load security were key to his choice – but so also was Krone's ability to match his requirements at a good price. He cites, for example, front lifting and rear-steer axles.

"The lift axles engage automatically over 16 tonnes, which saves on tyre wear and fuel, and the rear steers help with manoeuvrability and take out a huge amount of tyre scrub," he says, although conceding they wouldn't work for everyone. "My combinations each have one well-trained driver – it's not drop-and-swap. Most of [the equipment] is automated, but we've learnt, for example, that, with the axle lifted, the trailer cuts in slightly. So, if necessary, the driver can hold a switch to keep the axle on the ground."

Scriven says he likes the fact that everything on Krone semi-trailers is bolt-on and accessible, making running repairs cheaper and faster. And he likes Krone's multi-lock load security. "Take a typical load, comprising 9-tonne Eurostar transformers. These are crane-loaded through the roof and then lashed into position, using the multi-lock side rave, which has strapping points every few inches, each with a two-tonne rating. We secure fore and aft of each transformer, which gives us 16 tonnes."



Why does that matter? Skinner makes several points: the structure is strong; it runs 80mm lower than some trailers (so reducing drag); and everything is quick and easy to repair ("No welding, redressing or painting; just unbolt and replace."). He also singles out the firm's ROTOS axles and suspension, with their claimed innovations, in terms of ease of maintenance (discs can be removed without opening the bearing), the unusually long heat path from disc to bearing (said to extend bearing life) and the automatic ride height device – good for trailers unaccompanied on ferries.

Load restraints

There's much more to consider (including heavy plant and longer semi-trailers – coming soon), but for now we must look at load restraints and EN 12462 Code XL. Word is that VOSA inspectors now believe no operator should be relying on straps attached to a curtainsider's roof. Load restraints must be bed-to-bed and ideally trailers should be approved to Code XL.

Schmitz Cargobull believes its Speed Curtain, introduced last year, passes muster because of its independent testing for load containment in the cage formed by the curtain's micro-posts when closed. Lawrence David similarly says it meets the standard, having been the first to be accredited for a pillar-less curtainsider, thanks to the strength of its front bulkhead, rear doors and roof beams

Meanwhile, Krone suggests that its long-standing trailer design has been vindicated now that the mooted European requirement is a restraint capacity of two tonnes per strap. Jason Chipchase, Krone key accounts manager, points to Krone's multi-lock side raves, which are certified to that magic number per securing point, plus offer six tonnes per running chassis metre. That, he says, is due to their sheer strength, achieved without weight penalty as a result of Krone's chassis design, which springs from the firm's focus on a European market wedded to sliding roof trailers.

"Our semi-trailers have been designed with thin necks, partly because of the overall 4.0m height limit in Europe, but also because the vast majority of operators there want sliding roofs. As a result, our chassis are designed to flex slightly to benefit the running gear and load handling – unlike most UK-made trailers, which have stiff chassis to support fixed roofs."

Hence the lighter weight and hence also the uncompromising strength in the side raves – and, until now, the 7–8% higher price. "We've had to build the front bulkhead to retain 40% of a load moving forward [tested to 31 tonnes], and the rear frames and doors to retain 25% going rearwards," says Chipchase, adding that operators might expect price increases from UK trailer makers building to that standard.

His bottom line: "In an age of corporate responsibility, this is more important than ever. Operators need to know that their trailers will retain loads, not only to meet their legal obligations, but also those of their customers." TE