



The search for **space**

Two separate trends, both aimed at increasing trailer volume - greater length in the longer semi-trailer trial, newly extended to 2027, and greater height in new double-deck trailer models - are providing ways to improve haulage efficiencies. Will Dalrymple reports

After extending its longer semi-trailer trial by five years to 2027, the DfT released the first of 1,000 new permits in March.

(Note: first-round triallists need to renew their LST trailers' VSO authorisation now, if they haven't already). As a result, sales enquiries for new trailers either 14.6m or 15.65m long are starting to reach trailer manufacturers.

The trial was originally begun as an environmental protection measure offering hauliers a way to reduce the quantity of their trucks' emissions by enabling them to carry more on each journey; for example, two or four more pallets for the 14.6m and 15.6m trailers, respectively. LSTs are more appropriate for relatively larger, lighter loads, since the 44-tonne gvw maximum weight limit remains the same. As it was not raised proportionately, average per-pallet weight limits drop by 7.5% and 15% respectively for a single deck at each length extension.

So far, the 15.6m LST model has proven about twice as popular as the 14.6m across the 1,500 trailers operated

by 150 companies on the road at the end of 2015, according to the latest data published in August 2016. But a voice from the minority is Nagel Langdons, which saw an opportunity to benefit from the two extra pallet spaces afforded by a longer trailer, particularly on two trunking routes between depots in southern England (Dover and Somerset) and Scotland. The food distribution specialist offers next-day delivery through regional consolidation and overnight haulage between its eight UK distribution depots; it has no central hub. The company currently operates four 14.6m refrigerated trailers (above) built by Gray & Adams.

It opted for the shorter-length trailer partly because the rear-steer third trailer axle required by the LST trial can be a relatively light kingpin-based camber steering mechanism. This works like a skateboard; as the vehicle starts a turn, the trailer tilts, and the mechanism forces the axle to pivot relative to the direction of travel. Although the turning motion is limited to 20°, its geometry enables the axles to trace out an Ackermann steering path, making

a compact turning circle. The Gray & Adams trailers are fitted with SAF Intra self-steering axles; other suppliers to the wider market include axle-makers BPW, Daimler Chrysler and Jost.

On the 15.6m LST trailers a so-called command-steer system is required; it pivots the rear axle using either a physical or hydraulic connection to the fifth wheel turntable. Physical connections include a box section rod, measuring 100mm by 50mm in cross-section, that runs diagonally between them to create an opposite lock effect. Another physical system uses wire rope to accomplish the same thing; an alternative hydraulic implementation deploys two sets of opposed hydraulic cylinders at the fifth wheel and rear axle so that a turn in the former pushes oil down pipework to the latter where it presses on the corresponding cylinder to pivot the axle. Dutch axle manufacturer Tridex, also part of Jost, seems to be a particularly popular brand here; it provides complete command steering systems, including the axle.

As command-steer modules have more moving parts than self-steers, they

DOUBLE-DECKERS' GREEN CREDENTIALS

Cartwright's Lionel Curtis argues that despite aerodynamical penalties due to their height and boxy contour, double-deck straight-frame wedge trailers conserve fuel, and hence reduce CO₂ burn, to a greater extent than a standard single-deck trailer. If a tractor unit pulling a standard 26-pallet single-deck trailer runs at fuel efficiency of 9.5 mpg, generating 3g CO₂ per pallet-km (assuming combustion of 11 of diesel creates 2,650g CO₂), a standard double-deck trailer with 44 pallets would require more energy to pull it, reducing tractor engine fuel economy by 1 mpg, but because the number of pallets is so much greater, generates only 2g CO₂ per pallet-km. On the same basis, a 52-palleter would generate only 1.7g per pallet-km, although Curtis cautions that the exact figures depend on tyre age, pressure, the road surface and other factors.

require greater maintenance. And the weight of the assemblies, some 1,500kg, imposes a penalty on every load carried. On the other hand, they have an operational advantage: command-steer units work while reversing, unlike self-steer axles that must be locked straight before they can be backed into a bay.

This requirement could create some difficulties for the driver in smaller loading areas. Before backing up, the driver needs to align the rear axle perfectly straight relative to the other two trailer axles, get out of the cab, and press a button to actuate the locking bar. Failure to align the wheels before actuating the locking mechanism can damage it; therefore it is important that this requirement is fully explained during familiarisation training for drivers. Nagel Langdons' own JAUPPT-approved internal driver training team carries out full training on the operation of longer trailers before they are assigned to operational depots.

Rear-steer LST trailers have proven popular with Nagel Langdons drivers, not least because of their manoeuvrability, particularly at roundabouts, reports engineering manager Tyrone Lanaway. He says: "We've found that the extra metre has not hindered us whatsoever."

And, as might be expected, the rear-steer axle has proven gentler on the

LST's tyres than a fixed axle, as its slewing action causes less scrub. Indeed, the rear tyres of one particular LST bought five years ago by Nagel Langdons have been changed only once, compared to twice for a non-LST trailer bought at the same time. Despite their popularity, however, rear-steer trailer axles aren't going to make their way into the general Nagel Langdons fleet, because tyre savings over a typical seven-year life don't compensate for the extra outlay and loss of payload, Lanaway adds. That said, the LSTs themselves have proven so useful that the company is now starting to use them during the daytime for general freight operations. In particular, it has found a route to an RDC (regional distribution centre) in Scotland that will fill the trailer. So, having won a further allocation of up to six more LST trailers in March, Nagel Langdons is planning to place another order with Gray & Adams.

EXPANDING UPWARD

Meanwhile, interest is also rising in 15.6m LSTs, particularly in double-deck configuration, reports Steven Cartwright, managing director of manufacturer Tiger Trailers. A few years ago this company provided 15.6m double-deck LSTs for textiles manufacturer WE Rawson (though only 25% of operating LST trailers in 2015 were double-deckers). He

says: "What we're seeing more and more is a swing to double-deck trailers. We're just making more and more," he says. So far, double-decker orders make up more than 30% of its total production, but their share is rising fast, he adds.

A significant new type of double-decker (of standard 13.4m length) was presented at the CV Show last month by trailer manufacturers Tiger (left), Don-Bur (pictured p22) and Cartwright: straight-frame wedge trailers with a moving double deck running the entire length of the trailer, enabling them to carry 52 pallets while maintaining a standard 1,250mm fifth wheel height, so they can be pulled by a standard tractor unit.

The upper deck on these trailers, powered by hydraulic jacks, raises half of the load into the top half of the trailer, so the trailer does not require the loading equipment necessary for a fixed-deck model, such as a two-station tail-lift or loading bay scissor lift. A large carrying capacity, compatibility with standard UK tractors and relative speed and ease of loading suggest a swift payback.

These wedge trailers are also said to offer better use of space than another double-deck trailer architecture that uses a step-frame around the fifth wheel area, as the wedge trailer's moving deck makes full use of head height in the



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Lionel Curtis

swanneck, packing in around eight more pallets there compared to a double-deck step-frame design. Although inevitably head height remains limited at that point, a benefit of the wedge design is that height on the lower deck increases toward the rear of the trailer, while total running height remains below the maximum 5m (16ft 5in) UK motorway bridge clearance.

Two technology developments in particular are involved in these trailers: new deck designs and refinements to the lifting mechanism. The deck of Cartwright’s new 52-palleter, for example, relies on what technical director Lionel Curtis calls the clever use of sandwich panel technology to provide stiffness over its 13.5m length, particularly because it is supported only in the corners by its hydraulic ram lifting system. He says: “It’s very long; we needed a bit of science in the way that we put it together. It’s like lifting a ruler on its end; it bends in the middle, particularly when loaded with 10 tonnes.”

Tiger Trailers’ Steven Cartwright says that his company took inspiration from bridge design in making the deck for its new 52-palleter; important factors in its design include the use of high-tensile steel, weight minimisation and the choice of the optimal steel profiles to use.

To raise the deck, both Cartwright and

Tiger Trailers employ corner-mounted hydraulic cylinders, powered by electrical motors that require relatively little maintenance. In normal circumstances, regular work might include topping up oil and perhaps replacing seals after seven years or so; an annual service is recommended.

DECK SUPPORT

The Don-Bur system also uses a hydraulic ram as the prime mover, but one that is mounted flat underneath the trailer, and pulls on a network of wire ropes and pulleys from which the deck hangs (Cartwright also offers a similar mechanism).

In the Don-Bur system, the ropes attach to the fore part of the deck and at lateral sides of the deck around two-thirds of the way back, above the axles. Consequently, its deck is better supported in its middle, so provides 12-tonne load capacity. However, it is also slightly narrower to allow space for the cables and sheaves, making its 2,440mm deck width slightly narrower than Cartwright’s (2,450mm).

Richard Owens of Don-Bur argues that using a rope

system provides better accuracy in the tight confines of a double deck than an all-hydraulic system (which it also offers). A six-monthly lubrication of wire ropes will provide a lifetime of 10 or more years; rope stretch, said to be negligible, can nevertheless be compensated by adjustment lugs if required.

Though a hydraulic flow diverter provides the same pressure to each of the rams, equal flow to each corner does not necessarily result in a level deck, says Curtis. Consequently, Cartwright now also includes a height measurement feedback system on its new 52-palleter. This system consists of four lasers deployed vertically, one above each hydraulic ram, to monitor their actual height, sending feedback to a PLC to allow, for example, a lagging cylinder extra time to catch up with the others.

Whatever its mechanism, the deck needs electricity to rise, and again there are several ways of doing so. An aftermarket Anderson electrical connection to the tractor unit is one option, though that commits the tractor to loading duty for a period. Or users could install a transformer on the loading bay to generate DC power.

Others use rechargeable batteries to power the lift, placing them on the loading bay or in the trailer – and this is what Royal Mail does, according to Cartwright at Tiger, though of course that adds weight and the complication of additional maintenance requirements. Don-Bur is even building a trailer with roof-mounted solar panels to recharge the batteries; they are lightweight, and their upfront cost can pay off in the long run, says Owens. [ITE](#)

