

# Long is beautiful?



**Main picture: Gray & Adams 15.65m trailer for Tesco**  
**Above: Don Bur Bibby double deck**  
**Below: IMS VSE-prepared SAF B19-22S M36-2500EN29 trailer steer axle**

With the DfT's 10-year trial of longer semi-trailers now well underway, Brian Tingham talks to manufacturers, operators and repairers about choices and experiences to date

**W**hy the ongoing interest in longer semi-trailers (LSTs)? After all, licences for the DfT's (Department for Transport) 10-year trial are all accounted for – even taking into account last year's late reshuffle of unused options. So, surely, even if you're a high-cube operation that might profit from the additional volume, you couldn't get an LST until the year 2022?

Not so: although all 1,800 licences across both the 14.6 and 15.65 metre allowed types have been placed, no one believes there are anything like 1,800 LSTs plying UK roads yet. And, since the DfT has made it clear that unused allocations (LSTs not ordered from manufacturers or cleared with the VCA – Vehicle Certification Agency) go back into the pot at six-month intervals, we may well see a lot more becoming available soon.

So let's examine some of the choices and experiences to date. From a technical viewpoint, because only the length and trailer weight – not the gvw – change, primary issues to consider, beyond those appropriate to any semi-trailer, are the disposition of the bogie axles and rear-steer options.

Bogies first, and the weight limit for a single tri-axle bogie (which, in the EU, must span no more than 3,250mm between the centres of the first and third axles) is 24 tonnes. Each axle bears a nominal eight tonnes, with the rest of the trailer gvw and payload born by the tractor kingpin. That's fine for a standard 13.6m semi-trailer and tractor unit combination plated for 44 tonnes. With the centre

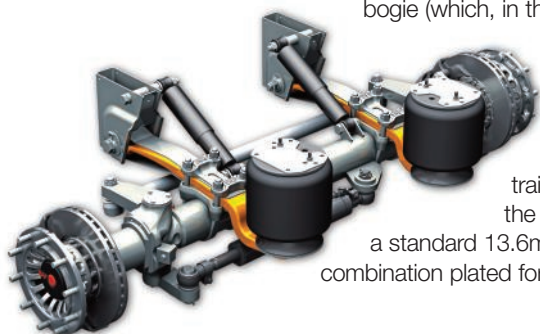
axle situated at around 8.1m from the kingpin and the load evenly distributed, those loading conditions are met and the combination is stable.

However, unless the combination weight is restricted to, say 38–42 tonnes (which may well be fine for supermarket operations, for example), it doesn't always work for LSTs on general haulage, because of the turning moments on the rear overhang. That's not to say all LST developers have forsaken traditional tri-axle bogies. Gray & Adams swears by them, with engineering manager Lionel Curtis arguing that there is merit in keeping to the tried and tested approach. "Others run with a close-coupled tandem and the rear steered axle moved back, which allows more weight. But we chose to stick with the tri-axle bogie, because, if you don't, different weight limits and braking regimes apply."

## Unconventional tri-axes

They're not quite conventional. Although Curtis agrees that it's feasible to build LSTs with near bog-standard bogies and meet the legal 5.3m inner turning circle requirement, it's close. Hence Gray & Adams' four main offerings: one 14.6m with self-steer rear axle, and three 15.65m units – one with a rear self-steer, one with a single- and one with a double-command steer rear axle.

Dimensions will be unusual, too: what amounts to a tandem with a slightly shorter wheelbase of, say, 7.9m (to the centre between the axles) – meaning kingpin to front axle circa 7,245mm and to the rear tandem (mid) axle, 8,555mm. Then, the rear steer axle would be set back around 1.9m at 10,455mm from the kingpin – keeping the overall 'bogie' length within the 3,250mm limit.



But other semi-trailer manufacturers offer fundamentally different three-axle options – notably with the front pair officially classed as a tandem axle bogie, while the rearmost axle is set back and considered a separate unit. That's specifically to uprate the overall load bearing capacity to 28 tonnes, and to improve support for the longer overhang.

This is the option Wincanton moved to for its operational LSTs, which use a BPW self-steer axle capable of 22° steer angle. Wincanton technical services director Dave Rowlands confirms that, whereas the pilot trailer was limited to 42.5 tonnes, the fleet can now run at 44 tonnes. "The position of the axles depends on the trailer builder: they all have their views about optimum position... But it is a real opportunity and all our LSTs, including the double decks [some of which are operated for Argos] use this configuration."

Richard Owens, marketing manager at Don-Bur, explains that this approach is based on a regulation work-around that allows 18 tonnes on the tandem bogie and a further 10 tonnes on the single-axle rear bogie. Achieving it means moving the rear axle greater than 1,940mm rearward of the mid axle so that it falls outside the tri-axle envelope of 3,250mm. How far back is the engineering trick: too little and load on the rear overhang might leave the tractor kingpin light. Too much and there's the risk of problems running over uneven ground, which could see overloads to the rear axle.

### A good steer

What about those steering axle options? You're looking at much the same technology as has been available for urban trailers for donkey's years. Don-Bur has used most of the mainstream manufacturers' offerings and, for Owens, choosing between self-steer (camber-caster-driven) and the two main types of positive command steer (mechanical rod and turntable versus electro-hydraulic stub-end turning) is about cost, weight, space and required functionality.


"On the plus side, self-steers only weigh about 200kg [more than no-steer], they're low cost, trailer deck height can get much lower [than command steer] and maintenance is low," comments Owens. "The disadvantages come with reversing: not only do they not steer in reverse, which can be a problem if trailers need a lot of shunting, but also, unless the driver can get the combination fairly straight, they don't necessarily self-lock. If they don't, as the trailer moves back, the casters can run out to opposite lock and I've seen tyres practically ripped off the rims."

As for command steer, the obvious advantages are better control, including in reverse – meaning excellent manoeuvrability and very little tyre scrub in both directions. Against these, however, are ranged higher cost, weight (550–600kg), and likely maintenance and repair bills.

Which type to go for? The fixed rear axle on a

turntable arrangement, actuated by a mechanical pushrod, in turn driven by a lug on the kingpin, is fine for straight frame semi-trailers, as long as there's no requirement for low chassis height. However, given the problems with step frames (complex geometry and weight), low runners (space) and LSTs (rod length), the preferred choice is often electro-hydraulic, working on the Ackerman principle. In general, a sensor in the kingpin transmits required steering angle to a control box, which signals a hydraulic pump on the trailer. This drives a hydraulic cylinder parallel to the steering axle beam to swivel the stub ends and hence steer each axle.

"With the advent of huge cube double decks, we've had to go down the electro-hydraulic route because the deck height has to be down at 870mm on 17.5-inch twins," confirms Owens. "There's just no way to get a turntable under the chassis." So you're looking at steering systems from the likes of SAF, VSE (IMS in the UK) and Tridac.

There are other advantages with electro-hydraulics, according to Arran Leatherland, sales and marketing manager with IMS. "For example, steering angles are not fixed: they're programmable through the ECU. So if you want to make changes for a different operation, you can simply reconfigure. And, in terms of safety, they can be set up so that, as speed builds, the steering angle reduces to the point where, at 55kph, trailer steering can be stopped altogether. That solves the problem with evasive action on dual carriageways, where otherwise you can get excessive swing out." 



**VSE's dual command steer system significantly reduces tyre scrub**

## Maintenance matters

Although confirming that there is, in general, little difference between 'standard' and longer semi-trailers (LSTs), in terms of maintenance and repair, Bullwell Trailer Solutions engineering manager Steve Pye (pictured) makes the point that it's early days.

It's not that he's concerned about their technical sophistication ("LSTs are nowhere near as complex as moving double decks," he says). His observation is that, as time passes and LSTs age, problems will be similar to those already seen on urban trailers around command steer (not so much self-steer) systems. "That's the biggest issue. They're all standard parts, but at five or six years the turntable bearing, for example, starts to fail, particularly if it hasn't been properly lubricated. That alone might cost a couple of thousand pounds."

Although operators might justify the cost of an LST on the efficiencies of carrying capacity, they need to consider maintenance implications. The same goes for repair. Damage to the coupling rods, the hydraulic motors, even the wedge behind the fifth wheel, is not uncommon.

"Agency drivers will treat LSTs just like any other trailer and, even though the steer equipment is built into the chassis frame, if they overshoot the kingpin or miss the rubbing plate, they will cause expensive damage."

