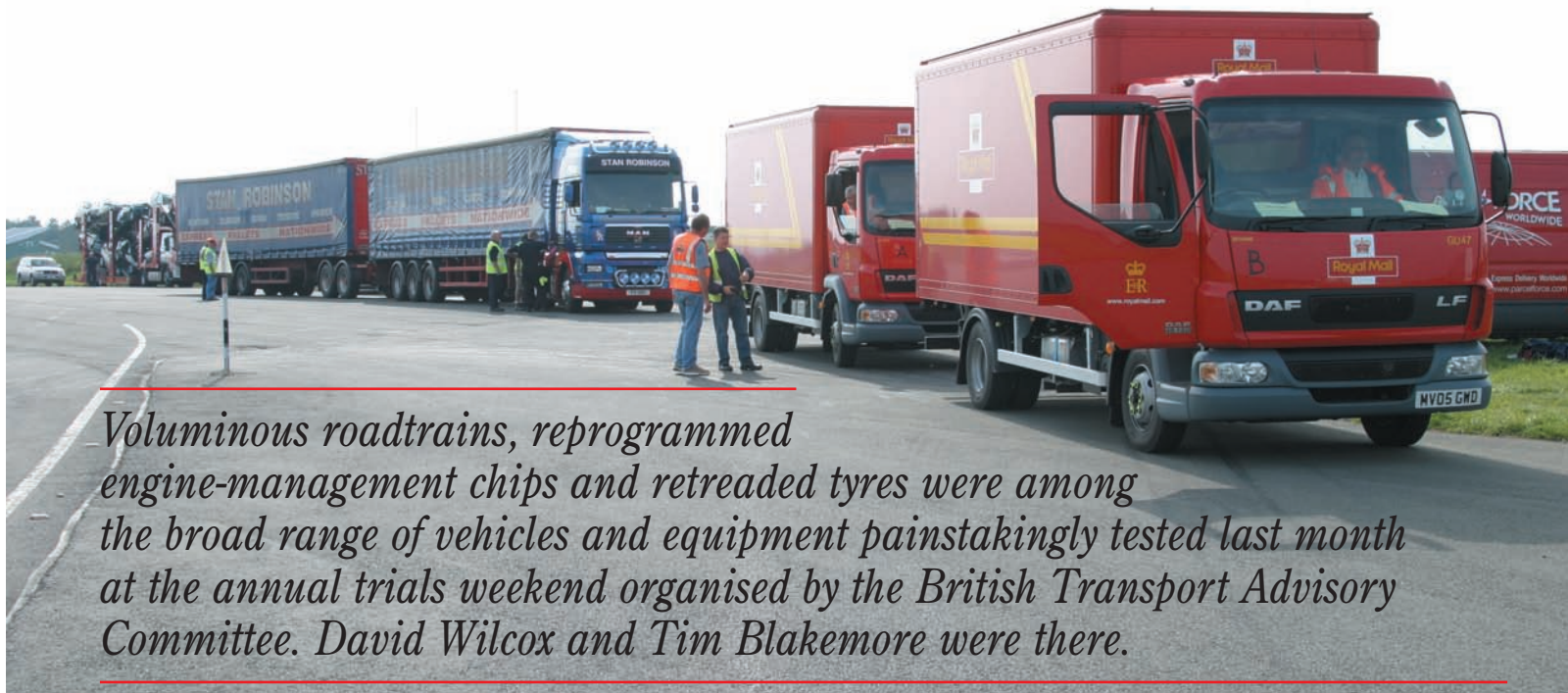


## BTAC TRIALS



*Voluminous roadtrains, reprogrammed engine-management chips and retreaded tyres were among the broad range of vehicles and equipment painstakingly tested last month at the annual trials weekend organised by the British Transport Advisory Committee. David Wilcox and Tim Blakemore were there.*

# The power of three

**T**hree trucks exceeding normal UK length and weight limits appeared side by side for the first time at last month's trials weekend. The fuel economy and productivity of each of the trio were soon to be closely examined, but first they were brought together on Mira's steering pad under the watchful eye of former *Transport Engineer* editor John Dickson-Simpson, now publisher and editor of *Transport News Digest*, the monthly newsletter which picked up the bill for Mira track-hire at this year's trials. BP provided the fuel.

The main point of the steering-pad tests was to confirm whether any or all of these big rigs can comply with European Union turning-corridor rules. Straying within the corridor's inner 5.3-metre radius would demonstrate an unacceptable degree of cut-in and suggest a combination reluctant to stay in its lane.

As expected, top marks in this test went to the 16-metre semi-trailer with a clever self-steering axle right at the back: the brainchild of Carl Henderson from Silvertip Design of Richmond, North Yorkshire. When this trailer (built by Don-Bur) made its public debut over five years ago (*Transport Engineer* February 2000) it had a tri-axle bogie with non-steering leading axle. The other two self-steered, following Ackermann geometry, courtesy of complex linkages between the trailer chassis and its bogie. The centre axle was removed for this year's BTAC trial, leaving a wide-spread bogie with an unsteered leading axle and steered rear axle. This tandem-axle configuration suits Morrisons, the big supermarket which was involved in bringing the over-length Silvertip trailer to the event to test its potential as a way of improving vehicle productivity.

Why not simply specify double-deckers instead? "Loading one deck is so much easier and faster," explains Garth Braithwaite, Morrisons' south-east region engineering

controller. "Double-deckers pose problems in terms of turn-round time at stores. We also believe there are health and safety issues."

Coupled to a Morrisons Daf CF85.430 6x2 tractor to form an 18.75-metre rig, the Silvertip trailer stayed comfortably within the turning corridor, with trailer axles at least 2.4m outside the inner radius. The sideguard got a little closer but there was still 1.3m in hand. With 18 per cent greater deck-length than a conventional trailer and such good manoeuvrability, the single-deck Silvertip trailer looks a highly-productive proposition. Yet Mr Henderson plays down the trailer's potential as a distribution tool. The driver's restricted field of vision when a truck like this articulates is his main worry. The same steering mechanism could be used at the rear of a rigid three-axle delivery vehicle, points out Mr Henderson, maybe up to 16m long. The legal limit at present is 12 metres.

At this year's trials the 25-metre B-double roadtrain of Lincoln-based Denby Transport (*Transport Engineer* June and July 2004) had around 0.5m to spare on the inner circle in the

**Got it taped: the Silvertip/Don-Bur trailer came through the manoeuvrability test with flying colours.**



turning-corridor test, slightly better than it managed last year (*Transport Engineer* July 2004). This is the result of adjustment of the leading trailer's positively-steered axles which pick up their angle from the tractor's fifth-wheel coupling.

At around 31m long and without sophisticated steering axles on either trailer, the outfit assembled by Stafford haulier Stan Robinson could not hope to compete in the manoeuvrability stakes. It encroached into the 5.3m inner radius by about 2m. Mr Robinson's previous versions of this roadtrain at earlier BTAC events have been pulled by various tractive units at different gross weights: a 453hp MAN at

outfit, also running at just over 33 tonnes gcw with an 18-tonne payload, did even better with 9.75mpg.

Carl Henderson believes the key here is that with 16m of deck length and 107 cubic metres of volume the Silvertip artic is not only smaller than the Denby B-double, but also has the front and back of only one trailer to spoil air-flow. This theory was substantiated when the load on both vehicles was reduced so that both were running at around 22 tonnes gcw, with the Denby unit pulling a single 13.6-metre tri-axle trailer. This time the Denby vehicle averaged 11.75mpg, compared with 11.03mpg from the longer Silvertip outfit.

Mr Henderson makes the point that his trailer's wide-spread tandem bogie with steered rear axle is a mirror image of a two-axle tractor at the front, hence its stability and general good manners. Trailer



**Longing for greater transport efficiency: Denby Transport, Stan Robinson and Morrisons.**

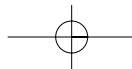
72 tonnes; a 523hp Scania at 80 tonnes; and a 445hp Caterpillar-engined Foden Alpha at 82 tonnes. This year it was the turn of an MAN TGA 26.530 6x2 tractor, offering 523hp and the highest peak torque yet, 2,400Nm. At a shade under 82 tonnes gross, this truck returned 4.92mpg on the high-speed section of the BTAC test procedure, narrowly pipping the fuel economy of the Scania 144.530 at 80.3 tonnes gross four years ago.

The Scania-powered Denby rig this year was focused on dimensions and cube rather than weight, running at only 33 tonnes gross with a payload of about nine tonnes. A fuel consumption of 8.85mpg on the high-speed section looks creditable for a vehicle offering 21 metres of deck length and over 140 cubic metres of cargo volume. But the Morrisons Daf CF85/Silvertip

wheels right at the back eliminate the pendulum effect of an overhang.

Stan Robinson's big MAN TGA 26.530 tractor also completed the high-speed section pulling one trailer instead of two, at 43.2 tonnes gcw. Though payload was roughly halved, from around 58 to 28 tonnes, there was only a 35 per cent reduction in the volume of fuel used. This ratio between payload and fuel use is a central plank in the argument for bigger and heavier trucks in the UK. The timing of this year's BTAC trials, a couple of months later than normal, could hardly have been better from the point of view of those making such points, with a Department for Transport decision on whether to allow road trials of longer trucks expected within a few weeks.

With truck telemetry in the news as the HBOS/VOSA trial proceeds (*Transport Engineer* September) it was fitting that at least one vehicle at the BTAC event should be monitored this way. The Stan Robinson MAN was wired-up by Derbyshire-based telematics software supplier RTL, one of the companies involved in the HBOS/VOSA trial. RTL's fuel figures for the MAN (taken from the engine's management system) turned out to be five per cent better than those calculated by subtracting the weight of the fuel after the run from the opening weight and converting the result into a fuel volume. This sort of discrepancy is not unusual, according to RTL director James Fletcher. "Providing it is a



## BTAC TRIALS

constant off-set, as in this case, it can normally be explained," he says. One source of variation was immediately obvious: the MAN's system uses the tachograph feed for distance calculation and this indicated that the trial distance was 1.5 per cent longer than the BTAC standard figure.

A more surprising fact to emerge from RTL's initial analysis of the Stan Robinson runs was that the average load on the MAN's engine was only 53 per cent, even when running at 82 tonnes. It averaged 44 per cent load with one trailer at 43 tonnes gcw. When a vehicle is rolling at constant speed on the flat Mira track, its weight has little effect on torque demand. "But the fuel needed increases exponentially with the rise in torque," points out Mr Fletcher.

vehicle	configuration and gross weight (tonnes)	average fuel consumption (mpg)	average speed (mph)
Stan Robinson MAN TGA 26.530 roadtrain	two trailers, 81.92	4.92	40.69
Stan Robinson MAN TGA 26.530 roadtrain	one trailer, 43.20	7.55	42.60
Denby Transport Scania 124.420 roadtrain	two trailers, 33.24	8.85	41.95
Denby Transport Scania 124.420 roadtrain	one trailer, 22.00	11.75	41.95
Morrisons Daf CF85.430 Silvertip 16-metre semi-trailer	33.52	9.75	41.95
Morrisons Daf CF85.430 Silvertip 16-metre semi-trailer	22.76	11.03	40.09



## What role for retreads in fuel economy?

**T**he 2005 BTAC trials weekend came at just the right time for Ivybridge, Devon-based retreader

Bandvulc Tyres. Against a backdrop of proposed European standards for truck tyre noise and rolling resistance, Bandvulc has been looking at retread rolling resistance. Power-consumption tests on a two-metre-diameter drum in a laboratory are claimed to show that the first Bandvulc low-rolling-resistance wide-single (385/65 R22.5) trailer tyre has fully 17 per cent less rolling resistance than a comparable Michelin Energy Remix tyre.

It is reckoned that tyre rolling resistance accounts for 25-30 per cent of the energy needed to keep a laden five-axle artic rolling at 80km/h (50mph). So if the Bandvulc lab-test results were repeated across all axles we should be looking at fuel savings of around five per cent.

Running only on the high-speed section of the BTAC test procedure, a Renault Premium 420dCi 4x2 tractor from the Bandvulc fleet was tested first with Michelin Remix (retread) Energy tyres (XDA2 on the drive axle, XTA2 on the trailer). Then it was the turn of the under-

development Bandvulc tyres. The tractor's steer-axle tyres (not remoulds) were unchanged throughout. Steer-axle tyres contribute around 15 per cent of a five-axle artic's rolling resistance, so Bandvulc's theoretical target in this Mira test was a fuel economy gain of around four per cent.

Bandvulc engineer Peter Pritchard took care to make the test as fair and reliable as possible. All casings came from Michelin Energy tyres, and the Bandvulc retreads were buffed to match the shallower tread of the Michelin Energy tyres.

Bandvulc director Richard O'Connell is delighted with the trial result: a 4.96 per cent fuel-saving. The fact that this exceeds the theoretical gain is probably the result of the driver needing to become accustomed to the procedure (as most do) and of a slightly lower average speed on the second run.

Mr O'Connell and Mr Pritchard point out that their trailer retreads were noticeably cooler than the Michelins after the track tests, as they had been after the lab tests. "Heat is a major enemy of tyres," says Mr O'Connell. "So this is another very positive result." He emphasises, however, that it will take at least another six months to bring these new low rolling-resistance tyres to market. "We need to do more trials to confirm we have a roadworthy compound," he explains. "We have to check that we are not going get tread-chunking on the drive-axle, which is something that some low-rolling-resistance tyres are prone to. Because our compound seems to have a fuel advantage over Michelin Energy Remixes, we will probably use that to increase tread depth up to our usual figure and we should still be able to match the Michelins on rolling-resistance."

Like with like: the Bandvulc retreads were buffed so that tread depth matched that of Michelin Energy tyres.

Low-roller: Bandvulc seems to be on to a winner with its first low-rolling-resistance wide-single retread for trailers, but it will be six months at least before it goes on sale.



Vehicle: Renault Premium 420dCi 4x2 tractor with tri-axle curtain-sided trailer  
Running weight: 26.0 tonnes gcw  
Trial: High-speed section only (60, 80 and 90km/h, total 15 laps)

	average fuel consumption (mpg)	average speed (mph)
with Michelin Energy Remix tyres	8.99	41.95
with Bandvulc low rolling-resistance remould tyres	9.45	40.69

