

A *slippery* business

The VECTO standard, due for introduction from 2019, will see official fuel consumption figures for heavy trucks published for the first time. But will they truly reflect the efficiency of today's trucks and trailers?

Richard Simpson investigates

Fuel consumption has always been a key factor for transport engineers, if only because fuel and labour are the two biggest variable costs that operators face. Recent years have seen the focus on fuel redouble, not just for cost reasons, but also because there is an increasing focus on carbon emissions, and large companies (and consequently their subcontractors) are under increasing legislative and moral pressure to 'decarbonise' their activities (see also pp15-16).

But obtaining robust data about the relative fuel efficiency of different vehicles has always been difficult. Magazine road tests purporting to provide comparative figures for competing vehicle types have always been of questionable value, as external factors such as weather and traffic congestion are likely to produce greater variations in consumption than the differences between competing trucks.

Some manufacturers, including the now-defunct ERF and, more recently, IVECO, have formally invited operators to trial their own vehicles against a demonstrator, with the fuel consumption being independently monitored, but these initiatives have had little discernible impact on the truck market.

However, the prospect of transport emissions being brought into the European Union's Emissions Trading Scheme has made an objective measure of carbon emissions, and hence fuel

consumption, a pressing need. As long ago as 2014, the European Commission set out a so-called HDV Strategy, which aimed to certify CO₂ emissions from new goods vehicles of over 7.5 tonnes gross weight using VECTO (Vehicle Energy Consumption Calculation Tool), a simulation designed to assess the carbon output of vehicles, which would become part of the type-approval process.

HOW VECTO WORKS

Nigel Base, commercial vehicle manager at the Society of Motor Manufacturers and Traders, reports that draft legislation covering VECTO is on schedule, and that the data will become public at the start of January 2019.

Truck manufacturers are now preparing their ranges for VECTO assessment. DAF marketing manager Phil Moon says: "The processes and protocols have not yet been ratified, but the baseline will be a 'default' model which will be 'driven' over a simulated route typical of the work that the vehicle is likely to undertake: for example, an 18-tonne rigid truck with a box body will run on a simulated distribution route.

"The manufacturers will then input their own data into that model: defining the engine, gearbox, axles, tyres and the cab aerodynamics, together with the vehicle's weight. Bodybuilders will also be able to input their data if, for example, they have an aerodynamic body which they think could lead to a quantifiable improvement in fuel consumption. If not,

there's a nominal weight and C_d value for a standard box body."

This in turn could be used as an enforcement tool to make truck manufacturers work harder towards further reductions in carbon output and to develop a new Eurovignette road-use charging infrastructure based on carbon emissions. Besides encouraging the development and use of more economical diesel vehicles, this charge would incentivise the switch-over to alternative fuels such as LNG.

The EC argues that such incentives would not only reduce Europe's carbon emissions and transport costs, but also encourage the EU's truck manufacturers to innovate for the benefit of export.

These measures also have to be seen against a background where the EU is seeking a reduction of at least 40% in total greenhouse gas (GHG) emissions by 2030 from a 1990 baseline. Also, it estimates that, without intervention, CO₂ emissions from heavy-duty diesel vehicles will rise by up to 10% between 2010 and 2030. Third, it predicts that the share of GHG emissions emitted by trucks will rise to around 30% of the total GHG emission from road transport in 2050 (up from 25% in 2015), as cars and vans switch away from conventional fossil fuels.

There is, however, a problem. Consumers no longer trust 'official' fuel consumption figures being published for passenger cars, the current methodology for which was developed as far back as 1970.



"Running one double-deck trailer to the hub and back each night is a lot more fuel efficient in terms of litres burned per pallet transported than sending two conventional trailers"

Richard Owens

So, will VECTO be any more accurate for trucks? While it's comparatively easy to achieve fuel figures for passenger cars where there are relatively few body, engine and transmission variants for each model, how can they possibly be calculated for trucks, where the combinations of cabs, engines, gearboxes and axles are almost endless, and body types range from simple flatbeds to Lutons?

The water is further muddied by the matching of tractor cab profiles to trailers. To take an extreme example, a double-deck trailer coupled to a Scania P-Cab with no air kit will perform considerably worse than one matched to a Scania S-Cab, or indeed a G-Cab with a suitable air kit.

Then, there's the question of trailers: a particularly vexing one for the UK where we do not face continental constraints on height (4.0m), meaning that there is far more variance in our trailer parc.

And, last but not least, there's capacity, as Richard Owens, group marketing manager of UK trailer maker Don-Bur, points out. His company makes curving-roof teardrop trailers that maximise fuel efficiency in terms of

miles travelled per litre, but also offers towering double-deck trailers that can't be beaten when it comes to the number of pallets carried per litre/km.

Appearances can be deceptive: Don-Bur's 15.650m double-deck longer semi-trailer (LST) will use about 30% more fuel than its aerodynamic teardrop trailer design, but it carries 60 pallets, while the teardrop's capacity is 26. Which one is best? The teardrop is intended to carry heavier products that would weigh out if its volume was increased, while the LST double-deck carries lighter products and needs to maximise volume for the best efficiency. The 30% fuel penalty is more than compensated for by the 52% increase in volume in the customer's specific application. So both trailers save fuel.

"If we take trunk runs for pallet networks for instance," he says, "then running one double-deck trailer to the hub and back each night is a lot more fuel efficient in terms of litres burned per pallet transported than sending two conventional trailers, even though the double-deck will have a massive impact on fuel consumption. However, this performance depends upon the individual pallets being light enough to

fill the trailer to capacity without making it overweight."

Owens' point is that the industry needs true efficiency information obtained by comparing energy consumption against volume or weight carried, particularly where semi-trailers are concerned.


THE SOLUTION?

The marketing manager has a proposal for a way to implement VECTO information into the truck and trailer market (see box).

Owens points out that such a system would not be cheap or easy to introduce into the relatively diverse and low-volume industry that is trailer manufacture.

He cautions: "Each one would have to be conducted side-by-side against the standard control vehicle on a test track and we estimate costs being between £15,000 and £20,000 per test. If an agreement could be reached on measuring energy efficiency per cubic metre or per tonne carried, and for that independent standard to be recognised by bodies such as the FTA, SMMT or RHA, Don-Bur would welcome the opportunity."

But Owens cautions operators not to get too obsessed with aerodynamics in the search for fuel economy. "With rigid trucks, it is often better to focus on unladen weight. They tend to do more stop-starts and reach lower speeds than artics, which makes weight a more important factor. Stop-start is the real killer of fuel economy, and it can be a mistake to focus on aerodynamics, particularly if they add weight to a distribution vehicle.

"The added bonus of reduced weight is that it allows the operator to carry more, and so possibly cover fewer miles. The biggest fuel saving of all comes from reducing delivery cycle frequency." 

WHAT IT SAYS ON THE TIN

Don-Bur is postulating a labelling system for trailers. Group marketing manager Richard Owens explains: "Ideally, we'd like to see a baseline vehicle standard that we could then derive a comparison rating from." This would allow vehicles to be classified in much the same way as tyres are by the EU label, which indicates their performance against a reference tyre in relevant parameters such as rolling resistance. Don-Bur's version would indicate payload, capacity, fuel efficiency in terms of payload, fuel efficiency in terms of volume, fuel consumption in terms of litre/km, fuel efficiency in terms of both pallet and tonne litre/km, and drive-by noise, in a similar graphic style.

