



# Blowing in the

**Aerodynamic interventions come in all shapes and sizes – and not just for tractors and trailers. Steve Banner talks to the experts about what operators can expect**

**E**ven relatively modest aerodynamic improvements can garner useful fuel savings, according to the companies offering what is now a wide range of bodywork interventions. That is certainly the experience of Lisburn, County Antrim-based temperature-controlled distribution specialist McCulla.

Earlier this year the company put a Gray & Adams 13.6m tri-axle semi-trailer into service, fitted with new profiled panel cappings plus a roof-mounted vortex generator, designed to manage airflow over the rear of the body. "In a back-to-back comparison with conventional trailers on the same work, it appears to be cutting diesel consumption by as much as 5%," confirms McCulla operations director Brian Beattie. The decision to fit low rolling resistance Continental Generation 3 tyres is clearly making a contribution to better fuel economy, too, he concedes. But he is confident the improvement would not be as marked without the aerodynamic aids.

In fact, a full streamlining package for a trailer can reduce fuel usage by approximately 12%, insists Anthony Bukowski, research and development manager at the Cartwright Group, who is currently completing a doctorate in commercial vehicle aerodynamics. "Side skirts alone will save you 3–5% because they guide the air that would otherwise be churned up underneath the chassis," he adds.

Hatcher Components has come up with a different

approach to achieving the same end. It has developed an under-trailer fairing that looks like a cab-top fairing turned upside down. This, says the firm, has delivered fuel savings of 3–4% on trials.

"Opt for a sloped rear roof line for your trailer and you'll cut consumption by about 4%," says Bukowski. "Indeed, most of the modifications you can make – rounded cappings, a rounded cant rail and so on – will net you 4–5% apiece. But that is not to say you will achieve 20–25% if you invest in the lot... The combined effect will be more like 12%," he suggests. In the world of aerodynamics, five plus five does not necessarily equal 10, because of the potential for interactions between the fitments.

A pioneering company well-known for its dramatic streamlining is Don-Bur with its distinctive Teardrop trailer. It says that feedback from operational trials of its box van version indicates that, on average, fuel savings of just over 11% are being achieved, while tapering the chassis where necessary ensures that the rear door aperture still has sufficient height.

## **Boat-tails**

Meanwhile, so-called boat-tail fairings – which project from the trailer's rear and can be folded away during loading and unloading – are also worth thinking about Bukowski believes. The longer they are, the more effective they will be, he says. "Even 500mm boat-tails can give you up to 4%," he contends. However, the risk of accidental damage and/or problems for other road users should always be borne in mind.

The benefits of these and related air management kit are clearly not lost on Wabco. Two years ago, the braking systems specialist acquired Ephas, of the Netherlands, which had played a key role in the development of boat-tails. The firm is now marketing the further developed product as OptiFlow Tail –

# wind



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comprising four folding panels mounted on the trailer’s rear doors.

“It helps to increase the fuel economy of tractor-trailer combinations by up to 3.5% at highway speeds,” contends Nick Rens, Wabco’s president for its trailer systems, aftermarket and off-highway division. Opt for OptiFlow SideWings – side skirts that were also originally developed by Ephas – and you will cut diesel bills by up to 5%, he adds. Go for both OptiFlow Tail and OptiFlow SideWings and you could be looking at an mpg improvement of 7%.

Interestingly, track tests carried out by Wabco at the end of 2013 in France – in conjunction with French temperature-controlled distribution specialist STEF, Fraikin, TIP Trailer Services and Norbert Dentressangle – compared trailers with and without SideWings travelling at a steady 53mph. The former delivered a 1.5 litre per 100km saving.

This improvement is clearly at highway speeds, and that is an important qualification, advises Bukowski. Aerodynamic treatments are at their most effective on a truck if you are travelling at 56mph. “Boat-tails, for example, work best if you spend 75–80% of your time on the motorway,” he explains.

So is specifying aerodynamic bodywork a waste of time if you run rigids on stop-start urban and suburban deliveries? Not entirely, contends Bevan Group managing director Anthony Bevan. “Results can be mixed, admittedly, and you may only improve fuel consumption by 1–2%, but that’s worth having and the appearance of the vehicle can bring other benefits, too,” he argues. The smooth curves associated with aerodynamics make rigids look smaller and less-threatening than square-cut trucks, and that can enhance your image.

Much, of course, depends on the detailed nature of the operation – some urban/suburban distribution

routes may include long stretches of fast dual carriageway. Equally, how un-aerodynamic was the vehicle previously? “In some cases, the highly-streamlined ICON Luton body for 3.5-tonners – developed in partnership with aerodynamics experts at Cranfield University and Hatcher Components – has recorded savings of 5–12%,” Bevan reports.

If operators running rigids with flat-fronted box bodies with the aerodynamic attributes of a breeze block do nothing else, they should at least equip the cab with a collar and a cab-top deflector, and – most importantly – ensure that the top of the deflector is in line with the roof, he advises. “That should give you a saving of 8–10%,” he suggests. But again, it all depends on the duty cycle.

Returning to articles, Christine Buck, director of commercial vehicles at ACEA (the European Automobile Manufacturers’ Association) dismisses suggestions that a switch to trucks with rounded nose cones and lower driving positions would result in major fuel savings. Commenting on the assertion by the European Commission and Loughborough University’s Design School, she argues that there are many other, more cost-effective steps that can be taken, particularly the use of boat-tails.

## Cab redesigns

A wholesale redesign of truck cabs would, of course, land truck manufacturers with a huge bill at a time when many have recently launched new cabs that cost them millions to develop and put into production. “If we made more changes now, it would take the industry a further 10–15 years to get the money back,” Buck told delegates at a recent conference in Brussels, organised by Goodyear.

Advocates of change argue that the new cab shape would also make it easier for drivers to spot vulnerable road users. In response, Buck points to the variety of safety devices now being fitted to existing vehicles, including lane departure warning systems and automatic emergency braking.

What everybody agrees on, however, is Bevan’s plea for cab-top deflectors to align with the bodies behind them. This is a requirement that tractor unit operators need to be aware of, given that many haul trailers of radically different heights each week. “Pull a 4.88m-high double-deck trailer behind a tractor unit equipped with a deflector set for a 4m-high trailer and you pay a fuel consumption penalty anywhere from 10% to 25%,” Bukowski warns.

Recognising the penalties such mismatches can impose, Hatcher’s Active Freddie cab top deflector developed with Cranfield University and Mercedes-Benz, is available with manual, electric or automatic adjustment as options. Able to sense changes in wind speed when a truck is in motion, the latter continuously adjusts its position in relation to the vehicle’s yaw angle. This, says Hatcher, allows it to deliver a fuel saving of up to 5%. **TE**