

Streamlined operations

Truck fleets are constantly looking to save fuel and boost efficiency, and roof spoilers are one way of achieving this goal.

John Challen looks at what's available and what difference they can make

Recent advances in engine technology, tyres and materials have all contributed to helping to make modern tractor units more efficient when hauling. But aerodynamics has been the moveable feast of benefits, with incremental improvements over time thanks to better design and implementation of components that streamline the truck and trailer combination.

One company that has concentrated on aerodynamic devices for trucks for 40 years is Aerodyne. Typically most of the products are aftermarket because a lot of the solutions are operator dependent, but it has worked with vehicle manufacturers on specific products in the past.

"There are typically two types of roof spoiler," explains Ryan Kingston, managing director at Aerodyne. "For fixed height (or manually adjustable) items, an engineer has to get into the back of the deflector and move the brackets or strut around to get the spoiler in the optimal position. But if an operator is pulling a mix of single- and double-deck trailers, in reality, the bracket is rarely moved because people haven't got time and they don't want their engineers or drivers going up on ladders on their trucks."

What Aerodyne offers is something



different - namely the Aeromatic Auto-Height Adjust Airkit (pictured above in orange). "Our system has a laser that fires when the truck's ignition is turned on. The laser will look for a trailer within a 2m range and once it identifies one, the system sends a confirmation signal to the actuator to tell the air deflector to lift," he explains. "The laser eye travels up the bulkhead of the trailer until it gets to the top, where it can't see anything beyond two metres; it then drops down to an inch or so below the top of the trailer and is fixed. It stays in that position until you de-couple the trailer."

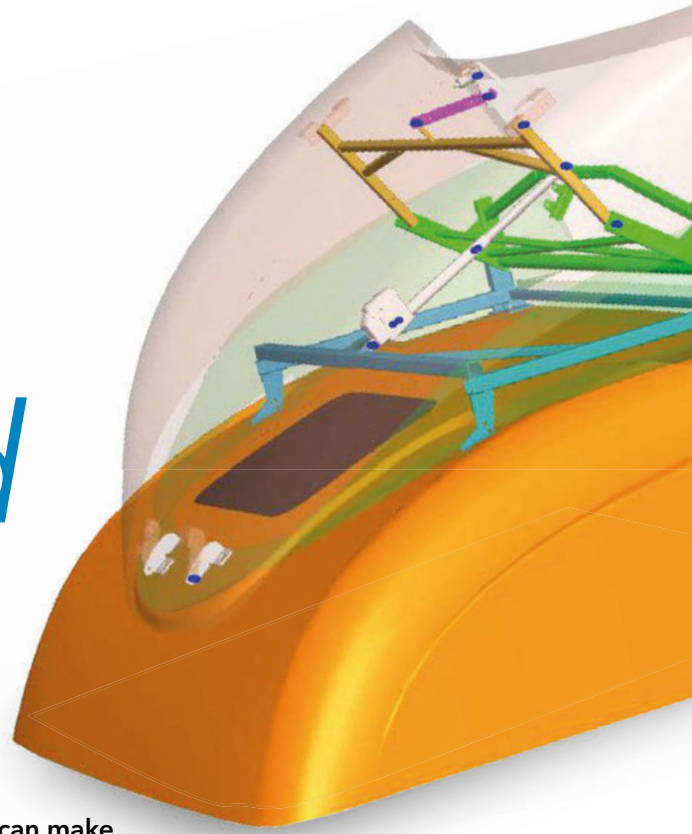
There is no issue with maintenance, according to Kingston, unlike the conventional systems that require more monitoring. "Inside the top deflector there is a leverage frame system, which is very strong, robust and cross-braced.



There is a single actuator, as opposed to a dual actuator, because these can mean you get one out of sync with the other, which can cause twisting."

LIFE'S A DRAG

Another company that has invested a lot of time and effort into aerodynamic improvements is Hatcher Components. Liam King, Hatcher's head of design, agrees with Kingston that optimising airflow can be beneficial to fleet economics. "Fuel is the biggest cost for any fleet and can be as much as 50% of operating costs. A typical tractor on day and night operations can consume £45,000 worth of fuel - 30-50% of which can be lost to drag. With HGVs, the greatest fuel loss is through pressure drag from the front of the vehicle. Research and trials with our customers



THE (SUPER) MARKET VALUE OF AERODYNAMICS

Ryan Kingston says that most of the orders taken for Aerodyne's adjustable airtight are operator specific, but in some cases the manufacturer does get involved. One example of the latter was in the case of IVECO, when specifying Stralis trucks for Ocado, which took delivery of 29 aero kits as part of the deal.

IVECO's engineering division worked with Aerodyne in the development of the air management kits using 3D CAD design software and CNC machining technology, before the final product was manufactured at Aerodyne's Bourne headquarters in Lincolnshire.

Stuart Webster, IVECO UK & ROI business director, says: "Our engineers have worked closely with Aerodyne to equip Stralis with the ultimate cab-to-trailer aerodynamic package when operating very tall trailers."

Calculations carried out with a Stralis plated at 44 tonnes (but typically part-laden) with a 4.6m double-deck trailer showed that aerodynamic drag becomes the number one factor affecting fuel consumption at just 50mph. With the Aerodyne air kit fitted, it is estimated that the aerodynamic drag coefficient could be reduced by as much as 25% - helping to improve fuel efficiency.

In operation, Ocado recorded fuel savings of 7.2% using the Aeromatic auto adjust kit, using data collected over four months from telematics in real-life conditions.

has shown that for every 300mm of trailer or body that is exposed to unmanaged air through wind and vehicle velocity, the increase in fuel use can be 2-5% depending on vehicle and trailer/body," says King. Tests by Hatcher of both gas and diesel vehicles have seen similar fuel savings made through aerodynamic innovations.

"The drag coefficient of an object is directly proportional to aerodynamic drag it experiences, so rather than enhancing it, we aim to reduce it," explains King. "The payback on an effective aerodynamic system is often extremely short - in some cases it can be less than six months. There's also a residual issue - any truck with an effective air kit in place is likely to prove more appealing in the used market."

King points out that there is more to minimising fuel loss than just pushing air up over the body or trailer. "Reducing frontal drag is important, but typical UK weather conditions mean that side and cross winds also have to be seriously considered in air management design," he reasons. "Where effective aerodynamic optimisation is achieved then fuel savings can be as much as 10%."

Although vehicle design is more homogeneous these days, there's still enough model variation to mean that air management design needs to reflect vehicle shape and lines to optimise airflow. A small area of unmanaged air will create drag - which could be caused just through gaps in the vehicle and air kit - so it is important to have as smooth a transition as possible between cab, spoiler and trailer or body.

One of the issues, says King, is the positioning of the spoiler on the cab. "All too often spoilers are fitted too far from the cab leading edge, creating a sharp deviation in airflow, therefore

increasing drag. The practical running of the vehicle has to be considered also, and appropriate clearances maintained for vehicle articulation. There is also a styling issue: truck appearance is important for most brands. Ultimately spoiler design has to encompass all these issues.

"Where we typically see the greatest fuel returns is where double-deck or XL trailers are being towed," says King, something that he believes is exclusive to the UK market. "European legislation imposes height restrictions on trailers but these do not apply in the UK, with the focus on reducing carbon footprint." Double-deck and XL trailers increase cargo capacity, but come with a potential fuel penalty. Often these trailers range between 4.5 - 4.8m high, but OEM spoiler options often have a maximum adjustment of 4.1m high.

Like Aerodyne, Hatcher offers an automatic solution, which looks to be the direction the industry is moving in. "Many logistics brands are trunking between depots at night using such trailers and then reverting to standard trailers for customer deliveries by day," reasons King. "That's why we invented our self-levelling SmartSpoiler." **TE**

