

RUNNING GEAR

From regenerative braking on trailers to intelligent axles and light weight materials for truck suspensions, serious engineering developments are underway.

Steve Banner investigates

If vans and trucks can be fitted with regenerative braking, why not trailers? It's a novel and, some would say, whacky idea – and it's true that plenty of other running gear developments are closer to market – but trailer axle, suspension and brake specialist BPW believes it's time may be coming. Hence, working with the University of Bremen, in Germany, the firm's new ECO Vision E.

The unit is based on one of BPW's recently-unveiled lightweight GRP (glass fibre reinforced plastic) ECO Vision axle beams, but fitted with 5kWh generators in both hubs. The generators harness energy produced as the trailer and truck combination decelerates, powering the trailer's lights, operating its brakes and driving a 24V compressor with a 200 l/min output. Surplus energy is stored in a 100V lithium-ion battery with an integrated transformer that converts the energy to 24V. Energy can also be supplied to the tractor unit, potentially cutting fuel by 1–2%, according to the company.

Shorn of its hub generators, the standard ECO Vision axle is due to enter production in 9.0-tonne disc-brake guise by 2016. The main benefit: GRP slashes 240kg off a tri-axial trailer. That said, it also adds to the front-end price. "Think in terms of at least a tanner for every kilo you save," suggests BPW's UK sales and marketing director Neill Groves. As yet,

however, there is no indication as to how big a price tag ECO Vision E might bear – or a date for its introduction. And Groves concedes that the battery and generators will wipe out any weight advantage.

Talking of weight, few operators take that more seriously than those shifting fuel or aggregates. That's why German tanker builder Willig has come up with a carbon fibre axle cross beam that it says cuts the unladen weight of a tri-axle trailer by 200kg. Like GRP axles, though, it does not come cheap.

So for those with more modest weight-saving aspirations, how about BPW's new ECO Air Compact trailer running gear? It features an air tank made from GRP, rather than steel, which means a weight reduction of 9kg, if a 60-litre tank is fitted. Then there is Schmitz Cargobull's updated trailer running gear Rotos+, which is said to be lighter than its predecessor, because of design improvements affecting the axle tubes and related equipment.

Weight and space

Meanwhile, in another bid to cut weight, Mercedes-Benz TrailerAxleSystems has altered the hubs and brake disc connections used on its DCA axles. The DCA Airmaster already offers a weight saving, because the brake and suspension air tank is contained within the axle. That means space is saved on the chassis, too, which results in more room for the valves required by tankers.

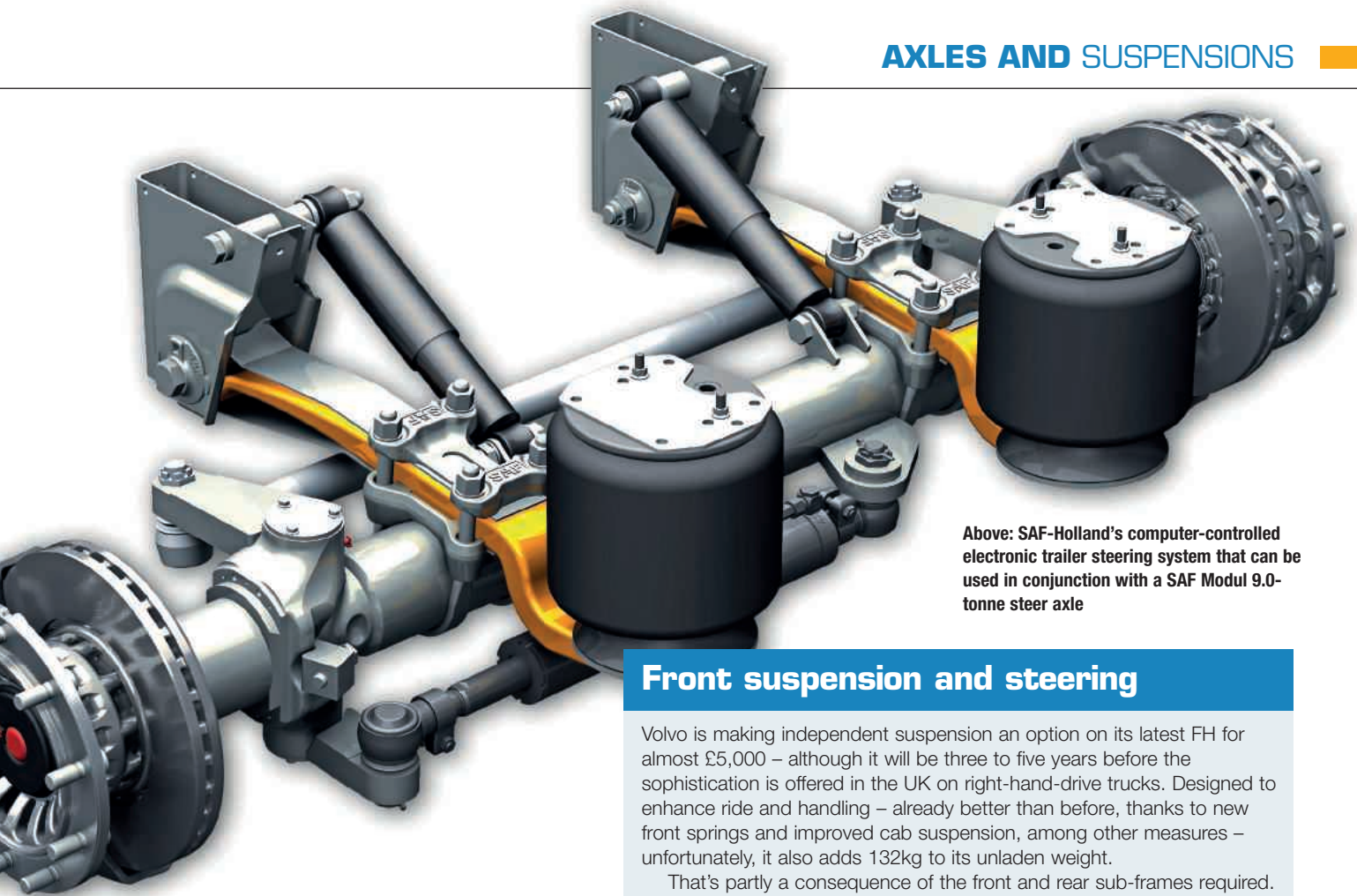
Moving on, development of trailer steer axles is continuing apace. SAF-Holland, for example, recently launched a computer-controlled trailer steering system that can be used with a SAF Modul 9.0-tonne steer axle to improve manoeuvrability.

Elsewhere, BPW's new ECO Turn self-steer features a lubrication-free system, thanks to its use of maintenance-free steel-rubber-steel bushes. With an eye to longer semi-trailers currently undergoing trials under licence from the Department for Transport, the firm already offers a self-steer, with a steering angle of up to 27 degrees – which allows 15.65m trailers to meet the mandatory turning circle requirements.

However, concerns over repair and maintenance

Below: BPW's new lightweight GRP ECO Vision axle beams, with 5kWh generators installed in both hubs





Above: SAF-Holland's computer-controlled electronic trailer steering system that can be used in conjunction with a SAF Modul 9.0-tonne steer axle

Front suspension and steering

Volvo is making independent suspension an option on its latest FH for almost £5,000 – although it will be three to five years before the sophistication is offered in the UK on right-hand-drive trucks. Designed to enhance ride and handling – already better than before, thanks to new front springs and improved cab suspension, among other measures – unfortunately, it also adds 132kg to its unladen weight.

That's partly a consequence of the front and rear sub-frames required. Nevertheless, a key reason for the handling improvement is its use of rack-and-pinion steering, instead of a conventional steering box. "It's a lot more precise," comments Volvo Trucks product manager John Comer.

What about stepping up to electric power steering – increasingly common on light commercials? According to Pailton Engineering technical director Kevin Humphrey, that's unlikely on heavy trucks anytime soon. "While the addition of small electric motors can make a truck's hydraulically-assisted steering easier to use when manoeuvring at low speed, the size and weight of the motors required by a completely electric system would be a cause for real concern," he observes.

costs appear to be resulting in fewer operators specifying self-steers on standard-length semi-trailers, despite their ability to cut tyre costs. "Operators are telling me that the extra expenditure can often cancel out any saving," explains Schmitz Cargobull's UK technical director Derek Skinner.

Turning to truck axles, Meritor is busy promoting its redesigned MT-32-610 hub-reduction double-drive bogie, for on- and off-highway use. The firm cites operators running 8x4 tippers that regularly drive onto muddy construction sites as among potential users.

But while hub-reduction axles have the advantage of improved ground clearance, they can cost more, in terms of fuel consumption. That is one reason why early last year DAF launched a single-reduction double-drive bogie. Its SR1360T is claimed to cut diesel usage by more than 5% – and with a weight saving of 375kg, compared to the equivalent hub-reduction tandem. It is not, however, suitable for arduous off-road applications, DAF stresses.

Not to be outdone, the 2012 IAA Hannover Commercial Vehicle Show saw Meritor display the latest version of its 18X single-reduction drive axle, marketed as an alternative to hub reduction. "It improves fuel economy by more than 3% and accommodates higher-horsepower and higher-torque engines," states European managing director Steven Gudel. It's also available in a variety of ratios, including 2.47, claimed to be the fastest in Europe.

Gudel contends that such ratios will benefit Euro 6 trucks, providing the lower rpm required to improve fuel economy. He also points to the fact that 18X is

laser-welded, resulting in an unusually stiff drive ring and differential. As well as imbuing the axle with a higher torque capacity, this enables the gears to mesh better, improving durability by a claimed 30%.

And there's more. Like other functions on trucks and trailers, axles have the potential to benefit from 'intelligence'. Meritor senior director for engineering Marco Bassi points to his company's recently introduced LogixDrive, likely to be available with the 18X in future. "It employs sensors to measure oil temperature, and combines that with torque and speed information to reduce lubrication in high-speed and low-torque conditions, or increase it for low-speed and high-torque conditions," he explains. The result: 0.5–0.8% fuel savings, along with parasitic energy losses reduced by up to 50%.

Trailer suspensions are also becoming more intelligent, according to Wabco. Its new eTASC electronic trailer air suspension control can, for example, automatically maintain the trailer's floor height during loading and unloading. It also gets the chassis to a safe level before the truck departs. **TE**