



MATERIAL DIFFERENCES

Although Euro 6 emissions regulations meant heavier engines like-for-like, bus and coach builders have been finding ways to shed the pounds and hence save on fuel. Steve Banner reports

At the unladen weight of a bus, and you open its doors to better fuel economy and more passengers. And it can be done, according to Wrightbus managing director Ian Downie, who states that, despite Euro 6, the organisation has taken fully 750kg out of its single-deckers in the last three years.

That exercise included reviewing the thickness of materials used and assessing where less might be employed without compromising strength. "We've also made more use of composites in the floor and the sides of the body, and we've gone into details such as whether each cable needs to be secured on its own set of brackets," he explains. "It might be a kilo here and a kilo there, but it all helps."

Some of the work was done with Queens University Belfast and Bombardier, and much of it has been influenced by what Wrightbus has learned from building the New Bus for London, the Borismaster double-decker.

How about aluminium? "We already use plenty of it because we rely on

Aluisse construction for the body's frame," says Downie. "We don't use so much high-strength steel because it would be a bit over-engineered."

Buses have certainly slimmed down in recent years, agrees Optare engineering director Alastair Munro. "People are moving away from single-deckers that weigh 16 tonnes," he asserts. "Our Metrocity only weighs 13 tonnes and we don't want to go above that... Aside from the fact that sub-14-tonne single-deckers are more fuel-efficient, they're also easier to manoeuvre, ride on smaller wheels, yet are just as durable as heavier models."

ACCESS RIGHTS

Smaller wheels are good news for accessibility. Since 1 January all buses have had to meet new requirements, with new double-deckers having to comply in 2017 and coaches 2020.

Wrightbus has put its double-deckers on a similar diet to that of its single-deckers - with a significant saving coming from smaller engines. Says Downie: "Over the years

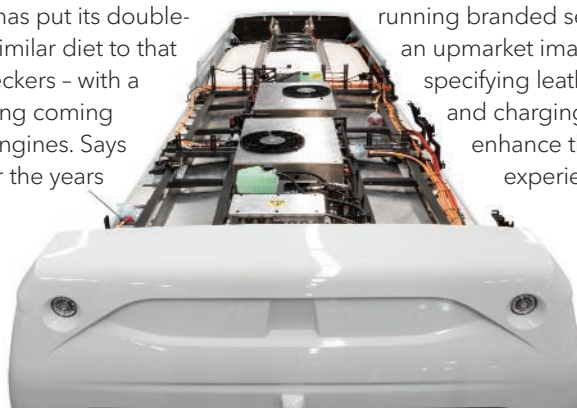
we've seen them go from 7.0 litres to 9.0 litres but things have recently gone in the opposite direction. We're now down to a 5.0-litre."

Meanwhile, in a bid to further reduce vehicle weight, Optare is using monocoque constructions and investigating composites for its roof panel and double-deckers' upper floors.

"We're already using composite front and rear panels on our double-decker, with foam and carbon fibre inserts," observes Munro. "But with all these things a balance has to be struck between performance and cost. We could put an entire carbon fibre deck in, but nobody would pay for it."

That said, he agrees bigger body panels present opportunities. "That way you can reduce the number of fixings."

However, as Wrightbus and Optare fight to take out weight, some operators put it back in - especially those running branded services wanting an upmarket image. "They're specifying leather seats, wi-fi and charging points to enhance the customer experience and, of



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Alastair Munro

course, we’ve already seen CCTV and driver’s air-conditioning fitted,” Downie says. But it all adds kilos.

What about fuel saving? Wrightbus employs diesels sourced from Daimler and Cummins, and will be introducing Stop/Start later this year. “That should give us a 2–3% fuel saving so far as Daimler engines are concerned,” says Downie. “In recent years we’ve electrified everything we can to drive down fuel usage and we’ll soon be introducing an electric air compressor, which should bring 3–5%.”

Optare has adopted a similar philosophy. “I’m talking about electric cooling packs and smart alternator control,” says Munro.

Meanwhile, Wrightbus has been working with Arriva, trialling a Torotrak Flybrid KERS (kinetic energy recovery system) flywheel on a StreetLite single-decker. It also has plenty of experience with diesel-electric hybrids and electric buses. “We’ve trialled them in Milton Keynes and the experience has been good,” comments Downie. “The drawback is the infrastructure.”

POWER INFRASTRUCTURE

Part of the solution is ensuring that access to charging infrastructures is standardised – and that is happening. In March, Volvo, VDL, Irizar and Solaris got together with ABB, Helioc and Siemens with the aim of ensuring an open

interface between battery-powered buses and the systems that support them. The goal: all electric buses should be compatible with all charging points.

Their initiative precedes official Europe-wide standards in 2019, under the auspices of CEN/CENELEC, and international standards in 2020 under ISO/IEC. Manufacturers involved say their work should be viewed as a contribution to the standards bodies’ activities, and that they will share their experiences with both organisations. They are acting now, they explain, because cities are already introducing electric buses and they want to ensure compatibility across brands and systems.

Watch this space. [TE](#)

Electric versus gas power

Last October’s Busworld show in Kortrijk, Belgium, witnessed the launch by BYD of a fully-electric 10.2-metre, 81-passenger aluminium-bodied double-decker for London. Quoted range between recharges is up to 300km.

BYD is now working with ADL (Alexander-Dennis) in electric bus production, under a £660 million joint-venture deal to produce 200 12-metre single-deckers a year over the next 10 years. The deal was signed during last autumn’s state visit to the UK by Chinese president Xi Jinping and the alliance was almost immediately extended to include double-deckers.

Nor is BYD neglecting coaches. Aware of the criticisms of diesel voiced by Paris mayor Anne Hidalgo earlier this year, the firm presented a stainless steel bodied electric coach in the French capital with a claimed range of 200km and a recharge time of 2.5 hours. While deploying it on extended tours might be impractical, it could be used for commuter work, on an airport/city shuttle service or urban sightseeing.

So does all this mean that the gas-powered bus is dead? Not according to Scania. Working with ADL and mi Vehicle Integration, the firm has developed a Euro 6 gas-powered double-decker – a world first. That is now undergoing tests prior to going into UK service later this year. The newcomer is being assembled in Britain, and Reading Buses has already ordered the first five. It also operates 34 gas-powered Scania single-deckers.

The latter usually have their fuel tanks mounted on the roof but that would be impractical for a double-decker. As a result, the new Scania has some of its fuel stored beneath the stairs behind the driver, with the rest in a new compartment behind the upper passenger area. Scania has also taken steps to deal with the gas engine’s heat output, which is greater than typical diesels.

Says Scania Great Britain bus and coach fleet sales manager Mark Oliver: “We’re pleased that we’ve got both single- and double-deckers that use fuel from a low-carbon, sustainable source.”

