

LIGHT TOUCH



While much of today's conversation about reducing trailer weight centres around the use of high-strength steel, aluminium still has a key role to play, says Don-Bur group marketing manager Richard Owens. The Stoke-on-Trent trailer and bodybuilder has come up with a new version of its 7.5mm-thick Blade sandwich panel. This time, the high-density polyethylene (HDPE) foam core is faced on both sides with aluminium, rather than galvanised steel.

"If we use it instead of a steel skin, then we can reduce the weight of a double-deck semi-trailer by 900kg," he says. Aluminium does not require painting, does not corrode and, like steel, can be recycled.

Don-Bur has made extensive use of aluminium in other ways in recent years, including in the construction of a 5.82-tonne tri-axle curtainsider semi-trailer designed to carry 29 tonnes of bagged aggregates.

While the weight advantage may not be so great, operators who prefer to stick with panels with a steel skin because they view it as more robust can enjoy payload advantages, too, contends Schmitz Cargobull's UK technical consultant Derek Skinner. "Our three-element Ferroplast panel

Current strategies for vehicle lightweighting take in many kinds of technologies, from materials to fastenings to the supporting structure, reports Steve Banner

uses a liquid polyurethane foam core with galvanised steel facings either side. It is 5% to 10% lighter than a five-element panel that uses GRP (glass-reinforced plastic) and plywood," he contends. The panel, used in the trailer pictured above, is repairable as well, he adds, and is resistant to moisture ingress.

On the other hand, "galvanising can add a lot of weight", observes Cartwright Group technical director Lionel Curtis. "We make a lot of use of Magnelis steel in, for example, the construction of side raves." Magnelis is a corrosion-resistant zinc-aluminium-magnesium alloy coating that can be applied to flat carbon steels. It is from two to four times lighter than galvanising, according to Italian firm Zamet, which uses Magnelis on the trunking for electric cables that it manufactures. (Another example is profiled on pp32-35.)

PANEL DISCUSSION

Other types of sandwich panels available have clear weight advantages. At a 4.8kg/m² at a thickness of 30mm, Omnia consists of a polypropylene

honeycomb core faced with fibreglass-reinforced polypropylene sheets. Somewhat heavier, 7.4kg/m² at a thickness of 20mm, Technolite is made of an aluminium honeycomb core faced with aluminium sheets and can be recycled in its entirety. Panel Systems has come up with ThermHex (pictured, p38), a polypropylene honeycomb that can be specified with a variety of facings including GRP, powder-coated aluminium and anodised aluminium. It is up to 2.5 times lighter when compared with plywood core panels faced with 2mm GRP, says the company.

All panels have drawbacks as well as advantages, however. High-performance panels often attract a substantial price premium. Aluminium invariably boosts the price tag, depending on how much is used. Also, light commercial bodybuilder Ingimex makes the point that opting for a panel – or any other component – available from only one source could result in difficulties for both the bodybuilder and the operator if the item suddenly becomes unobtainable or the price rises steeply.

No matter what type of panel is specified, significant weight savings can be achieved by using strong liquid adhesive to help hold the trailer together instead of mechanical fixings. The weight reduction can be worth having, so far as both trailer and rigid-chassis bodies are concerned. Up to 15kg can be saved by employing glue rather than bolts, rivets and screws to put together a box body on a 3.5-tonne chassis, points out West Midlands bodybuilder Bevan Group.

And Curtis at Cartwright also speaks favourably of glued, rather than bolted, connections: "There are some excellent adhesives available," he says.

Users are cautioned that some adhesives may pose their own constraints on manufacture. Owens warns bodybuilders to take care during the assembly process because using adhesive might not allow repositioning of the components concerned. But Schmitz Cargobull argues that some adhesives now available allow bodybuilders enough time to move parts around and put them where they should be before the glue sets.

Using adhesives can enable the use of lighter, slimmer body panels that would be compressed or torn by mechanical fixings. If they are able to withstand the burden, however, then one option for a fastening adhesive is high-strength double-sided adhesive tape, according to supplier tesa. For example, its 1mm-thick ACXplus 7074 acrylic tape offers 25N/cm of adhesion on aluminium after three days.

Aside from the strength of the bond offered, its advantages include speed and precision of application, tesa says.



CHASSIS CONCERNS

Temperature-controlled trailer supplier Chereau is using a combination of high-strength steel in the chassis and aluminium rather than steel inserts in the body to cut the weight of a tri-axle semi-trailer by up to 400kg.

But why bother with a chassis in the first place? Chassis-less refrigerated trailers have been around for the last 20 years, after all. "Remember that curtainsiders have got to have a chassis because there is no strength in the body," points out Skinner at Schmitz Cargobull. "Something we are looking at though is a chassis-less dry freight box-bodied trailer. We reckon we could make it 5% lighter than existing trailers, and because it is chassis-less, you could get more internal volume."

There is of course the question of how important achieving the maximum possible payload is to operators anyway. If you are hauling steel, glass, paper or aggregates, then it clearly is. The Centre for Sustainable Road Freight has come up with a combination of measures for a 13.6m single-deck box-bodied semi-trailer that includes glass fibre running gear

(a 250kg saving) and carbon fibre fibre wheels (a 150kg saving). The Trailer Lightweighting project, it says, could result in an overall weight saving of from 1,000kg to 2,000kg.

If you are transporting parcels, crisps and other snacks, or hanging garments then payload capacity is not such a pressing concern, because such loads bulk out before they weigh out; and parcels haulage has become increasingly important in recent years given the boom in home delivery. "There are not that many operations that are absolutely weight critical," Owens observes.

No matter the extent of its burden, a lighter trailer can still offer fuel and CO₂ savings. However, those benefits have to be balanced against the cost premium and environmental consequences caused by a replacing a trailer that has a shorter usable lifetime, argues Ian Smith, group engineering manager at Gray & Adams. "Longevity is undoubtedly connected with the amount and quality of the material used in manufacture," he states. Reduce either, he contends, and you lower life expectancy - to your trailer's detriment. [TE](#)