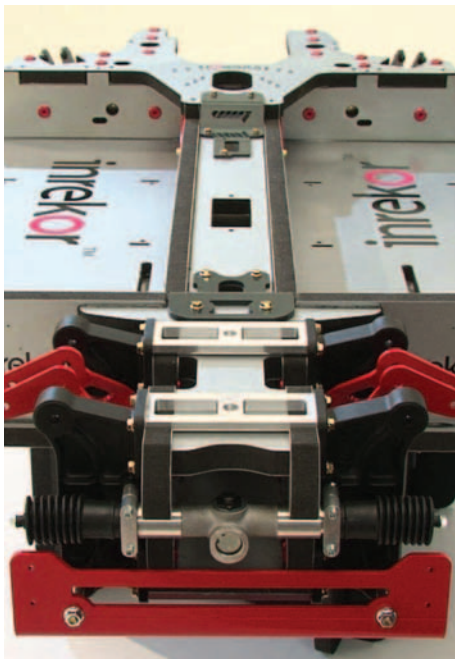
Lightweight panels prove flexible

With the ability to take 300kg away from a car chassis and potential for many applications, Inrekor is making waves. Paul Fanning reports.

The imperative to drive down vehicle weight (and thereby carbon emissions) has been a key goal, particularly within the transportation sector, for many years. The reasons for this are obvious enough, since legislation, environmental concerns, economics and common sense all demand lower carbon usage and, while alterations to engine technologies can achieve lower energy consumption, those alterations are extremely expensive to develop. Much cheaper and easier, therefore, to reduce weight from the vehicle's body.

Naturally, this has led to a great deal of innovation in terms of the materials used within vehicles – not least in chassis manufacture. However, for every advantage, there is often a disadvantage, be it the expense of carbon fibre or high investment in capital equipment or simply unsuitability for high production runs.

Inrekor, however, has been developed to combat these problems. A lightweight structural panel that can be used cost-effectively to build a chassis, Inrekor involves a core of ARPRO expanded polypropylene plastic foam manufactured by JSP coated with adhesive then bonded between two thin sheets of aluminium, after which the adhesive between the two faces is cured. Once these two-dimensional panels have been manufactured, they are then bonded together to form a three-dimensional chassis.



Its inventor Stuart Morley describes Inrekor as "a 2-D panel creating 3-D structures"

Describing the technology, its inventor and Inrekor's technical director Stewart Morley says: "It's a 2-D panel creating 3-D structures. That's the thing with Inrekor: we started with structures rather than from a material point of view. It's a technology, not a material, but the materials involved are critical"

The fact that this is a joint venture with JSP is evidence of quite how critical the materials are. JSP's ARPRO material was chosen for use it the panel because of its cost and the ease by which it can be moulded, as well as its energy absorption and insulation. Says Morley: "When we found ARPRO, it fitted all the aspects of the core that we wanted. We use different densities and thicknesses of ARPRO to create the tensility we want."

This potential for flexibility is something that differentiates Inrekor from alternative

technologies. Not only are the sheets of ARPRO available in different densities, the skins can also be made from different types of metal or even composites. Says Morley: "There's total flexibility there. You can obviously have stainless steel on one skin and aluminium on the other – so it's totally flexible. In essence, it's a bespoke panel. Everything starts with the customer's design criteria. We ask them simple questions: Are they interested in weight reduction, cost reduction or performance? That then develops the style of design."

Freddie Page-Roberts, Inrekor's sales director, says: "We're not trying to control the design in any way. It's an academy approach. Where we're dealing with companies with significant design departments, we're working with them and they're getting used to the technology and will then take it on themselves."

Morley agrees, saying: "When our customers start seeing the benefits, it starts to migrate into other parts because the engineers apply themselves. We are learning as much from our clients as we're teaching them about Inrekor."

Because the cores are created separately, it is possible to design what Page-Roberts calls "intelligence" inside it. This intelligence can take the form of air ducting or, in the case of one of the company's recent products, a lightweight chassis for recreational vehicle that incorporates much more insulated storage space.

Says Page-Roberts: "Obviously, if you do too much of that sort of thing, you're going to weaken the structure. Nevertheless, it gives you the ability to nest in various things. You have to keep checking that the structural integrity remains intact, but providing you don't have a linear break through the whole panel – which is going to create a structural failure. "

One of the patented aspects of Inrekor is the jointing aspect of it, where the glue is injected the glue into the pocket to achieve a really good mechanical bond. Because joints bonded with adhesives are usually stronger in compression, shear and tension than in peeling and tearing, Inrekor has also patented several methods of designing the structures of the tongue and grooves in the panels, including the use of bespoke apertures inside them that it claims create anchor points that prevents peeling and tearing from occurring. Each panel uses tongue-and-groove joints that interlock with one another, a design feature that guarantees a large surface contact area between each panel, ensuring that the panels bond effectively when assembled.

Another benefit offered by Inrekor comes in the fact that it cuts down on Bill of Material costs. In one instance where it is being used for seat backs, it is reducing the bill of materials by over 90%, reducing the number of materials being used from 19 to one. This has serious cost implications, says Morley: "Every part on your Bill of Materials is €10,000 in archiving costs for an automotive OEM, so if you reduce your BOM, that already represents a significant saving."

While the automotive and transportation sectors have been the main focus for Inrekor up to now, they are far from being the only areas the company is looking to exploit. As Morley puts it: "No-one makes any money in automotive apart from the taxman. The biggest earner on any car is the Government."

Currently, Inrekor is being used in applications ranging from packaging and retail to marine and even in a helicopter flight simulator. According to Morley: "Inrekor is non-specific in its application and non-specific in its USPs, because it can adapt to the client's needs. Anywhere where carbon is sensitive or weight is an issue, it has a potential application."

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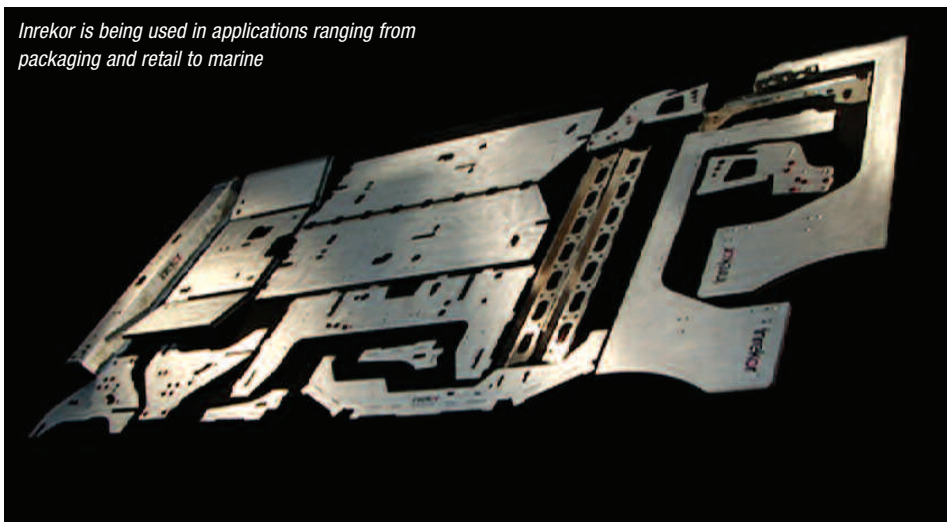

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