

Lightweight Solutions: A revolutionary panel opens new horizons

> An Innovation On the crest of a wave

To be of real value, a lightweight panel must offer its users clear advantages in comparison with earlier materials. Of itself, reduced weight is nice to have, but this must be just one of the other benefits. That is the approach adopted by German company Lightweight Solutions, which develops products giving its customers significant advantages. In this context, Lightweight Solutions often finds itself in new territory, as a logical consequence of which it does not merely find 'product solutions', but also develops its own production machinery. Even better, the company also has the necessary financial backing and is advised by furniture industry professional Walter Schatt.

In contrast with other lightweight panels, 'lisocore' from Lightweight Solutions is much more than the name might suggest. Firstly, it is much less complicated to process than other lightweight panels. Advantages include superb load-bearing characteristics, high bending strength, dimensional and edge stability. In addition, it is currently available in a different range of thickness and -- of great importance to the processor -- in

contrast to other lightweight materials, it will accept a wide range of hardware fittings with no problem at all.

All this has been made possible by the unique structure. The cover layer inner face rests on a double-curved shell core structure. Each inner face has pinpoint-milled detents into which locate bonded tips of the wave-like core shell crests. The final join is created by high-strength adhesive to produce a

form-closed adhesive union. The shell core structure is thus highly resistant to changes in internal load forces, resulting in unusually good structural properties.

Loads are not distributed solely by the adhesive interface between different component materials forming the panel, so each component can accept loads up to the limit of its own specific, physical limitation.

The panel shell core is extremely thin and requires a tiny amount of

adhesive between the crest and milled detent on the cover layer inner face, all of which calls for the minimum use of materials and conserves resources.

The original idea of creating an innovative panel came to Lightweight Solutions company founder and chief executive Michael Schäpers while studying at the Rosenheim wood technology college.

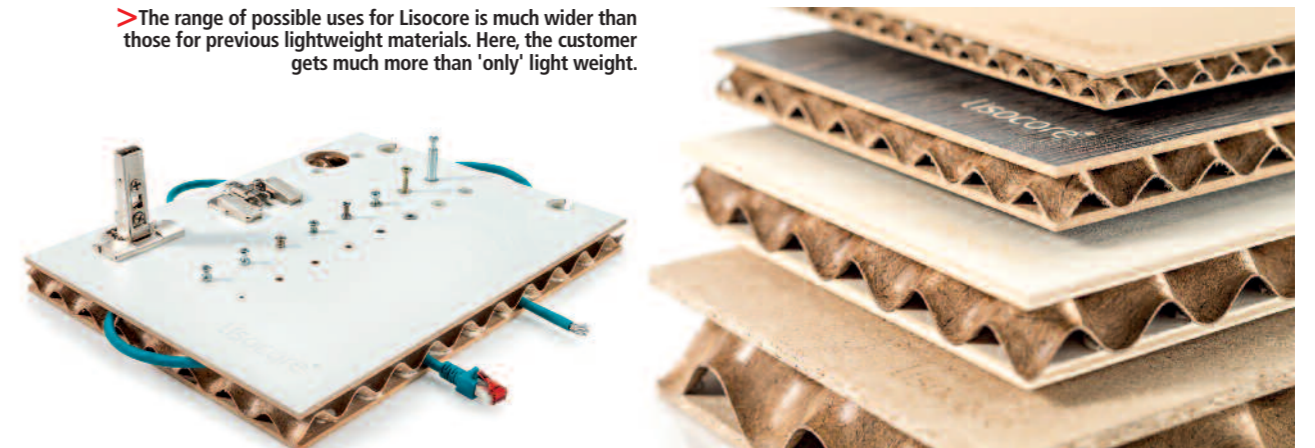
He said: "While preparing my Diploma Thesis I also looked at existing lightweight materials, in

which I identified a number of drawbacks. It was during a lecture on statics that the idea for a different type of panel structure came to me. I thought that my idea was so simple and fairly obvious, that it would have already been done and was nothing new. But I was wrong. So I hand-built a model and testing showed it to be impressively strong. With the support of my teachers and college professors, I decided to take out a patent on this lightweight panel structure.

Michael Schäpers quickly found that he was now in new manufacturing territory and there was no suitable production machinery. Amongst other things, he also needed a machine press system to fabricate the core structure. He added: "However, machinery manufacturers told us it was not possible to build a machine to meet our requirements. As a result, the same year we founded the new firm, we were obliged to start making our own press system. It had to be fully

> Lisocore is made on machinery designed and developed in-house by Lightweight Solutions, in the course of which it has acquired extensive know-how. This was followed by the establishment of a new company, lws Maschinenbau.

> The range of possible uses for Lisocore is much wider than those for previous lightweight materials. Here, the customer gets much more than 'only' light weight.





> Lisocore can be used both in large-dimensioned products and unusual shapes with no difficulty. The range of possible uses has by no means been exhausted.

electronic in order to capture the necessary research data. We succeeded, and since then the press has supplied a lot of vital data."

That enabled us to begin research into the core structure, to which end Lightweight Solutions designed and built a CNC-milling machine. Once again, that was necessary because there was nothing else suitable on the market. We had arrived at the position where our company was able to press the necessary materials for formed parts and this news reached the automotive industry, for which Lightweight Solutions began to manufacture different types of formed components.

Sales manager Marcus Wehner: "We designed and built a universal



tool centre for the manufacture of parts in general use in the automotive industry.

Michael Schäpers: "But there was a problem. Orders from the automotive and caravan industries kept our heads financially above water -- for which we were naturally very grateful -- but we had made insufficient progress towards our

primary objective. This was to put the lisocore panel into series production and establish it firmly." Further, it became clear that the available capital was inadequate to manufacture at the high quality wanted by Michael Schäpers. Also, Lightweight Solutions wanted to establish full process reliability. He said: "In this day and age, the quality standard requirement is not easily reached by a start-up business."

Once again, his contacts with Rosenheim proved their value, to which Walter Schatt has close

links. Amongst other posts, for many years Walter Schatt had been chairman of the Rosenheim University council and was alerted by the then vice president Prof. Heinrich Köster of the visionary new product that could not make headway without additional financial support.

This situation reminded decor

specialist Walter Schatt very much of his own start in business: "At the time I founded Süddekor I needed five partners to put up some money; it was not always easy to get agreement between us all." But Schatt was convinced of the merits of the Lightweight Solutions product and company philosophy, so Schatt's holding company decided to invest. He emphasises that Schattdecor as such has no involvement in Lightweight Solutions.

The new company received a boost when in 2009 lisocore gained the prestigious Schweighofer Innovation Prize, chosen from the European Forest and Timber Industries, confirming that Lightweight Solutions was on the right track. Said Schäpers; "At that point, it became clear the next step was to set up a professional panel manufacturing operation. If we were to be considered as serious suppliers to leading industrial customers, we would need both the necessary production capacity and process reliability." The consequence was that Lightweight Solutions had to move from its start-up base in Stephanskirchen and the decision was also space for future expansion.

Says Herr Schäpers, "We need a lot of space for the machinery. For panel production alone we need 500 square metres." Simultaneously the logical next step was to set up a new company, lws Maschinbau.

Michael Schäpers' reasons were follows: "We are only able to provide a satisfactory service to customers because we have full knowledge of the machinery, processes and product, and this also ensures systematic development of lisocore."

Marcus Wehner: "Particularly in this context, there were previous mistakes with respect to lightweight materials. The furniture industry was offered lightweight products, but without the necessary solutions thought through to their final conclusion. Customers were left more or less to their own devices."

Says Michael Schäpers: "And that is exactly what not to do, and is the reason why for a number of years we told would-be customers quite directly that we were not yet ready to supply. Now, we have a well equipped test laboratory which puts us in a much better position to give measured responses to their questions about strength properties, processing characteristics, hardware fittings and so on. The lab is also able to keep its finger on the pulse of product development."

This became of great importance when at the ZOW trade fair, where the lisocore lab information generated enormous positive feedback. Said Herr Schäpers: "This really is a new product into which we have put much engineering development. It is simply not sufficient to have a lightweight product. The customer needs and wants new

choices or options." Herr Wehner added: "And because we offer exactly that, since ZOW we have received a host of serious enquiries."

It is when a customer wants to make something unusual that lisocore comes into its own; for example, a very large tabletop standing on a delicate-looking frame. Here, lisocore scores not only with its light weight, but also with bending strength that is vastly better than that of many other wood-based materials.

Michael Schäpers is certain: "Of course, you could build a bog-standard furniture carcass with lisocore. But unless it is destined for a mobile application, there is insufficient advantage either for the furniture manufacturer or the end-user to justify its use. The panel must be used for applications in which it can provide a tangible advantage." The new panel is now available in a wide range of thickness, opening up a wide range of potential applications. For example, thickness can be regulated down to tenths of a millimetre, while other lightweight products are only available in pre-defined thickness. At present, it can be supplied in thickness from 15 to 120 millimetres.

Another advantage is that the composite strength is considerably greater than that of conventional honeycomb panel, which greatly enhances the simplicity of anchoring hardware fittings. At present Lightweight Solutions is in discussion with a large manufacturer of furniture fittings, which is subjecting the material to extensive testing. Adds Herr Schäpers: "It would also be possible to use lisocore in take-home flat-pack furniture assembled with clamp fittings. That has been demonstrated in tests." Additionally, it would be possible to incorporate electric wiring within the panel voids, once again opening up a new range of possible choices."

"Because our product can be very individual, we don't see ourselves as being in a niche, but this bears a certain risk", says Walter Schatt. "Lightweight Solutions has been flooded with so many enquiries that it runs the risk of having to working on 500 different ideas all at the same time. But then we

would never get further than the experimental workshop stage. We need to focus and then progress. The time for more experimentation is when the financial situation allows. However, this filtration process can be very difficult. It is important that the business continues at a certain base load and keeps production going."

Says Schäpers: "That's why we are so pleased to have Walter Schatt with us. We have no shortage of ideas, but we must be pragmatic and stay on track. His enormous industrial experience is of great help." Herr Schatt adds: "But I am staying in the second line." Even so, Lightweight Solutions has received a number of business introductions via Schatt, such as from the Cleaf company. Says Herr Schäfers: "We are cooperating with Cleaf with the aim of positioning lisocore in the Italian market. They know how customers can best profit from specialist lightweight solutions, and how these can be positioned. Cleaf is and will remain a pioneer in this sector."

At present Lightweight Solutions is supplying lisocore to a number of caravan manufacturers and has a special project in the lightweight Travelino from KnausTabbert. Marcus Wehner: "This caravan has a revolutionary body, quite new in this sector. Projects of this nature open up the chance for us to be accepted as a partner in design and development and commence series production. That will be a major step forward."

Michael Schäpers has a medium-term vision for his company: "We want to become accepted by industry and medium-sized manufacturers as a partner offering optimised solutions for their problems. With respect to our production systems, we are now fully and professionally ready and in addition we will continually develop and improve lisocore, because this panel uses the building block system, the options are nowhere near exhausted. If for no other reason than that the system is not limited to wood based materials, even though this is currently our focus. It is my belief that in future this panel will find many new applications."



> (From left) Marcus Wehner, Walter Schatt and Michael Schäpers relate the exciting history and Lightweight Solutions company philosophy to möbelfertigung staff writer Stefan Müller