

Paraglider harness incorporates ultra-strong sandwich composite with honeycomb core

Extremely lightweight for an extreme alpine crossing

- **Tepex composite from LANXESS for the footboard**
- **Other major application opportunities in lightweight automotive construction**

Cologne – The composite material Tepex dynalite from LANXESS subsidiary Bond-Laminates is performing excellent even in extreme sports applications. This material is a high-performance, continuous fiber-reinforced and polypropylene-based composite. It is used in the RANGE X-ALPS paraglider reclining harness manufactured by skywalk GmbH & Co. KG during a competition challenging the athletes to cross the Alps by paraglider and on foot. The harness's footboard is made of a sandwich composite just one centimeter thick, comprising thin Tepex facings measuring just 0.5 millimeters and a polypropylene honeycomb core from EconCore N.V.

Just as rigid, but significantly lighter than sheet steel or aluminum

To control a paraglider, the pilot must shift his body weight, while maintaining muscle tension. This is achieved by pushing the feet against the harness's footboard. In extreme situations, such as sudden turning maneuvers when approaching a steep rock face, very high forces are applied to the footboard, comparable to fully depressing the brake pedal in a car to avoid an accident. "The footboard can easily withstand these loads. The flexural rigidity and flexural strength of such sandwich structures can be higher than that of sheet steel or aluminum depending on the thickness of the facings and the honeycomb core – but they have a much lower weight per unit area," explains Harri Dittmar, an applications engineer for Tepex.

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Twenty percent lighter

The tough Alpine course requires pilots to have a high level of physical fitness, but also the lightest possible equipment. “We tested the sandwich sheets extensively and are very pleased with the low weight combined with the high rigidity and strength,” says Manfred Kistler, general manager of skywalk. The sheets are 20 percent lighter than earlier versions made from a carbon fiber-reinforced epoxy resin. The harness therefore weighs just slightly more than one kilogram. Another advantage is the low costs: The new component costs 25 percent less than the epoxy system.

Further applications in automotive engineering

LANXESS also sees major opportunities for sandwich composites of this kind in lightweight automotive construction, particularly in larger parts requiring rigidity, such as trunk floors, fuel tank covers, range extender housings, structural battery housings and seat components. “The composites could serve as an alternative to glass fiber mats or polyurethane spray foams for manufacturing trunk floors in passenger vehicles. One advantage for processors: They would no longer have to deal with reactive chemical systems and could eliminate considerable costs for equipment and safety systems,” explains Martin Klocke, manager for Lightweight Construction Business Development at the LANXESS High Performance Materials business unit. Fuel tank covers, which form part of the trunk space, are another conceivable application. They would be significantly lighter than their counterparts made of sheet steel or aluminum. Furthermore, functions such as slots, guides or mounts can be integrally molded in the covers in a single processing step to further cut costs.

Automated production of honeycomb composites

EconCore N.V. has developed a fully automated production system called ThermHex to manufacture honeycomb sandwich panels with

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Tepex composite skins. “Thanks to this technology, we can produce these ultra-strong sandwich structures cost-efficiently and in high, reproducible quality,” says Tomasz Czarnecki, technology manager of the company, which is based in Leuven, Belgium, but also maintains a production site in Halle/Saale Germany, through its ThermHex Waben GmbH subsidiary.

HiAnt – Tailored customer service

LANXESS provides extensive customer support in the development of components made of sandwich composites with Tepex facings. These services are part of its HiAnt customer service package. The HiAnt brand encompasses all of LANXESS’ engineering expertise concentrated in its High Performance Materials business unit. This know-how extends to thermoplastic materials, composite technologies, component testing, simulation methods and processing. Paraglider manufacturer skywalk likewise benefits from HiAnt. “The sheets are delivered to us already cut by water jet, and that’s a great extra, which saves us a time-consuming finishing step,” says Kistler.

For information on skywalk and its paragliders go to www.skywalk.info. EconCore presents its honeycomb core technology at www.econcore.com.

LANXESS is a leading specialty chemicals company with sales of EUR 8.0 billion in 2014 and about 16,300 employees in 29 countries. The company is currently represented at 52 production sites worldwide. The core business of LANXESS is the development, manufacturing and marketing of plastics, rubber, intermediates and specialty chemicals. LANXESS is a member of the leading sustainability indices Dow Jones Sustainability Index (DJSI World and DJSI Europe) and FTSE4Good.

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Forward-Looking Statements.

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