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High speed cost efficient honeycomb core process technology bringing innovation in building materials and applications

FEATURE

John Sewell

For some years now many leading companies have used EconCore ThermHex technology for making thermoplastic honeycomb core materials and panels. With licensees on three continents including North America, Europe, and Asia, companies targeting industrial packaging, automotive interiors, commercial transportation, for example, find competitive advantage in the high speed, continuous in line production process that distinguishes the technology. Furthermore, the range of core and skin material combinations with a variety of thermoplastics proven for core production and skin materials ranging from thermoplastics for mono-material sandwich panels, to fiber-reinforced thermoplastic composites, metal skins and more, broaden the field of possibilities across many sectors.

The honeycomb structure has long been appreciated in applications where volumes are relatively low and cost, although a growing concern in all sectors is less so than in higher volume areas. With the high speed cost efficiency of the technology, the material efficient honeycomb structure is being brought to the mass markets (Fig. 1).

More recently, building materials producers and product developers have turned their focus towards the potential of honeycomb core materials. The prospect of optimizing weight to performance is compelling for multiple links in the building value chain (production, logistics, installation, end user, etc.). Now that process innovation provides the opportunity for honeycomb core materials at the high volumes needed in the building sector, new products are already on the market and many more are in the minds of product developers, on the drawing boards and under prototyping for validation for interior and exterior, residential, commercial and industrial building applications.

Steel skinned sandwich materials

Tata Steel, with a strong focus on its Building Envelope business is looking to exploit the innovative honeycomb composite material to expand and enhance its range of metal cladding systems which includes insulated panels, façade systems and built-up roof and wall cladding solutions. Having completed a major investment in a continuous coil fed production line built using the EconCore ThermHex technology and its own steel coil know how, Tata Steel are excited to explore the opportunities that the lightweight, durable Coretinium® steel skinned composite sheet presents for the building sector.

This exceptional rigidity to weight is of particular benefit for façade applications, ensuring the ultimate flatness on a finished panel and facilitating larger facades that are still easy to install. When combined with the outstanding aesthetics and durability of Colorcoat Prisma® Coretinium has the potential to bring a new façade solution to the market, backed up by the Tata Steel Confidex Guarantee® on performance (Fig. 2).

Coretinium's lightweight, rigid, flat and versatile magnetic nature also makes it an ideal material for internal building applications, particularly demountable or movable partition systems where strength and product flatness are required. The Fire resistant Colorcoat® pre-finished steel layer gives Coretinium® a B-s1, d0 classification (as per EN 13823) and also the benefit of outstanding aesthetics, allowing it to be used directly in most applications or digitally printed to produce bespoke designs (Fig. 3).

''We are finding two sectors, transport and building, clearly turning towards the benefits of Coretinium,'' says Edwin Richards Technical Sales Manager at Tata Steel, ''The EconCore ThermHex Technology coupled with our Pre-Finished Colorcoat steel skins combines to create a very effective lightweight material solution. It

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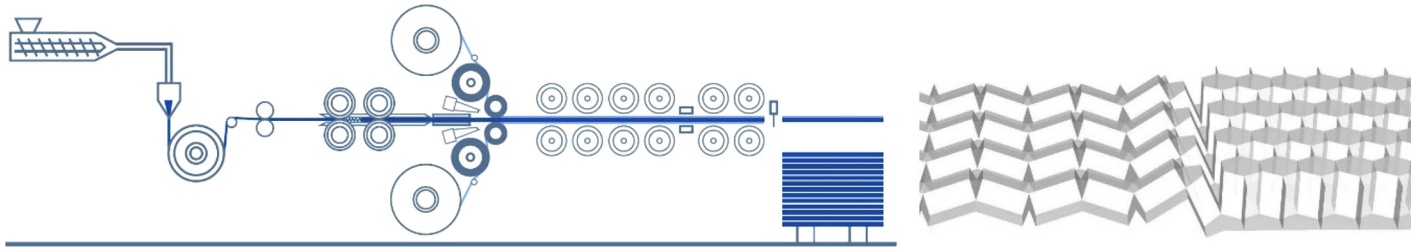

FIG. 1
Process innovation: continuous high speed in line production of honeycomb core materials and panels.

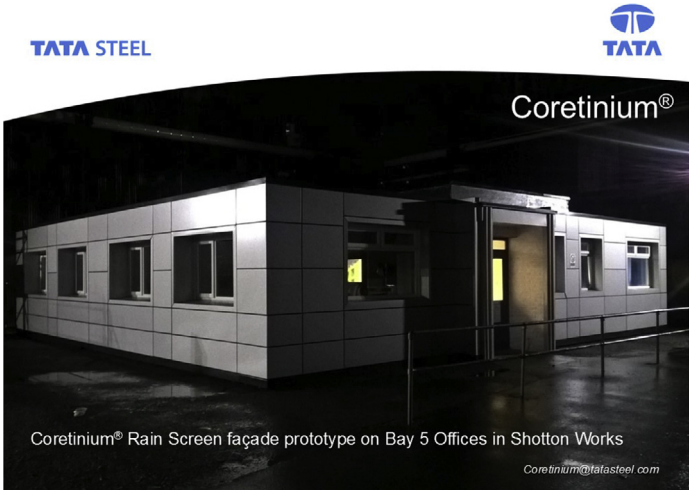

FIG. 2
Rain screen façade made from Coretinium®.

FIG. 3
Internal partition wall made from Coretinium®.

really fits with our objective of delivering innovate, sustainable solutions to our customers.

Aluminum skinned sandwich materials

The long established area of aluminum composite materials for building applications is also finding room for innovation involving light weight honeycomb core made using ThermHex technology. ''By replacing existing heavier thermoplastic cores with thermoplastic honeycomb cores, having a core weight reduction

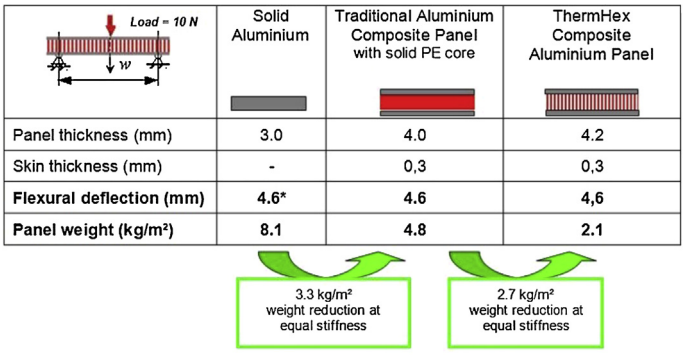

FIG. 4
Weight reduction potential: benefits in cost, material use and energy consumption.

up to 80%, lightweight composite solutions are coming for this building application,'' says John Sewell, business development EconCore. ''In many cases the performance requirements may be met using much less material and using less material also means using less energy'' (Fig. 4).

Surface quality is critical for aluminum composite panels. By optimizing the honeycomb structure and the application of aluminum skins to the core, surface quality is high even when using rather thin gauge aluminum skins. Signage and Display, both cost sensitive high volume applications for aluminum composite materials, may benefit from the combination of minimal gauge skins and minimal weight core, also low production cost, bringing a competitive advantage in this area. For building interiors honeycomb core aluminum composites are also of interest for building material producers. Again, performance requirements may be met with much less material/energy, and that is good as well concerning responsible utilization of natural resources for both building materials functional needs and aesthetics.

Innovation possibilities in flooring

Considering the size of the market and rapid growth in resilient, in particular LVT (luxury vinyl tile), any technology applied must have the capability to meet the volume requirements. Applications of honeycomb core structures in flooring will benefit from the optimized performance per weight synonymous with the hexagonal geometry. With the process innovation of EconCore ThermHex being high speed, high volume, continuous production of thermoplastic honeycomb core materials the door is open to bring the benefits of honeycomb structure to the world of flooring. The potential to integrate such process technology into existing

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