Fire-retardant Composite Panel for Shipbuilding

Fiber-reinforced composite materials are rarely used in cruise or merchant ships for fire safety reasons. Saertex has now developed a fire-retardant standard panel and worked additionaly with the Meyer Group to incorporate the composite into a sandwich construction for the sun deck and exterior walls of a river cruise ship, achieving a 45 % weight saving.

Persuasive effort

The use of fiber-reinforced plastics (FRP) has been standard in boat building for many years. However, to date, these materials have scarcely been used in large ships such as cruise and merchant vessels, despite the numerous benefits using such composite materials would offer in terms of energy savings, fire safety, design freedom and maintenance. In a research and development project, Saertex, together with the Meyer Group, successfully replaced steel and aluminum in ship construction with composite materials. The entire sun deck and the exterior walls directly below it for the shipyard's newly developed, 110-m river cruise ship were implemented using a sandwich construction that saves 45 % of weight in this case. The biggest development challenges were, firstly, with the mechanical properties of the upper and lower decks and the stringent fire safety requirements for ships. Secondly, a number of people and the authorities had to be persuaded that composite materials would represent a comparable, if not superior, solution to steel. Various fire tests were performed and a mock-up measuring 11.4 × 10.2 m was built to convince the different groups of people, namely traditional steel shipbuilders, shipowners and national and European authorities, of the suitability of the material. Furthermore, various presentations and demonstrations had to be put on for the relevant authorities like the ship classification society DNV GL, the Central Commission for Navigation on the Rhine (CCNR) in Strasbourg and the Federal Ministry of Transport to obtain approval by the CCNR, the supreme authorizing body for inland water vessels in Europe.

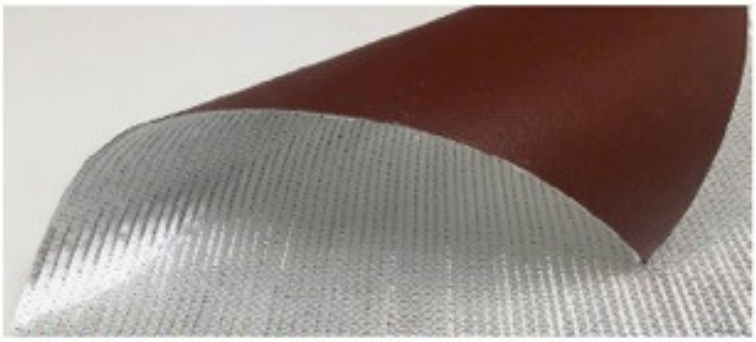

FIGURE 1 Leo-coated fabric is a modified multiaxial glass-layered material using additives to create insulating layers (© Saertex)

Maritime Standard Panel

The materials were designed through close cooperation between the Meyer Group and Saertex. A selection of materials is used from the Saertex product line "Leo," developed to meet exceptionally high fire safety requirements. They comprise multiaxial layers of glass with the Saerfoam product as core material, a vinyl ester resin and an additional protective layer. The new design reduces the draft of the river cruise ship by 5 cm, enabling the shipping company not just to prolong the cruise season, but also open up additional navigable waters for its fleet. It also lowers fuel consumption and thus the vessel's emissions. This project represents a milestone for the future use of composites in support structures for large ships, since both the technical feasibility of the creation of large structures and the certifiability of this completely new materials technology for shipbuilding could be demonstrated.

This development is important, not just for inland waterway vessels but also large, ocean-going ships, since e.g. fire safety

Brandhemmende Verbundwerkstoffplatte für den Schiffbau

Gewicht sparen, Sicherheit erhöhen: Brandhemmende Verbundplatte revolutioniert den Schiffbau

In Kreuzfahrt- oder Handelsschiffen werden faserverstärkte Verbundwerkstoffe aus Brandschutzgründen kaum verwendet. Saertex hat nun eine brandhemmende Standardplatte entwickelt und gemeinsam mit der Meyer Gruppe Sonnendeck und Außenwände eines Flusskreuzfahrtschiffs in einer Sandwichkonstruktion ausgeführt, die 45 % des Gewichts einspart.
Der Einsatz von faserverstärkten Kunststoffen (FVK) ist seit vielen Jahren Standard im Bootsbau. In großen Schiffen wie Kreuzfahrt- oder Handelsschiffen werden diese Werkstoffe bis heute allerdings kaum verwendet, obwohl der Einsatz von Verbundwerkstoffen viele Vorteile in Bezug etwa auf Energieeinsparung, Feuersicherheit, Designfreiheiten und Wartung bieten würde. In einem Forschungs- und Entwicklungsprojekt ist es Saertex zusammen mit der Meyer Gruppe gelungen, Stahl und Aluminium im Schiffsbau durch Verbundwerkstoffe zu ersetzen…