

Going ultralight: -150 Kg

The introduction of carbon fiber and other composite materials in the RV industry is a real revolution: Filippi 1971 claims that working on furniture and structural elements could lead to a saving of at least 150 kg on each motorhome, with acceptable costs.

Words Andrea Cattaneo

The new composite materials are Filippi 1971's new challenge: great changes are expected in the RV sector. The goal is to reduce the weight of many construction and furnishing elements with sustainable costs, by carefully using various types of composite materials. The company, who has been known in the RV industry for the lightweight wood-based laminated panels, has been investing in new different technologies for some years, including composite materials such as recycled PET, glass and carbon fibers. Engineers from different industrial sectors work in the R&D department of Filippi 1971, with the aim of introducing various advanced solutions, widely in use in other industrial sectors such as the aerospace, naval, railway and automotive, into the current production of recreational vehicles.

"At the Düsseldorf Caravan Salon we proposed solutions for a weight reduction of around 100 kg" says Francesca Filippi, Export Sales and Marketing Manager at Filippi 1971 "but we have now set out goal even further: our target is to lighten a medium-sized camper by at least 150 kg. We can get there by working analytically on many constructive elements, between the furniture components and also the structural parts of the vehicle. Ultralight tables and kitchen worktops are already a reality for us as we have passed the experimental phase thanks to the excellent applications of our VittEr® Lite product. Now we are focusing on structural applications, such as the anchoring elements of the rear seat belts and the chassis elongation rails of the garage compartment".

Overcoming traditional patterns

The composite department of Filippi 1971 has been active for a year: it works closely together with the R&D division and can count on an autoclave of significant dimensions, 4.00x1.60 meters, with which it is possible to manufacture fiber elements of various shapes and sizes. The VittEr® Lite, for example, is a thin, light and extremely resistant in-house digitally-printed laminate which has been developed from the original VittEr®, not only to be a lighter version especially conceived



Carbon fiber rear seat belt structure

for the RV market, but also to withstand different degrees of curve. "Carbon fiber has a very high mechanical strength" explains Ivo Bolis, Sales Manager of Filippi 1971 "but the construction technique is very expensive. If we plan to build, for example, the longitudinal elongation rails of the garage compartment, the cost of a carbon fiber beam can even be ten times the cost of a traditional steel spar. But if we overcome the current design and construction schemes, with carbon fiber we can also create totally different structures, for example a supporting structure completely integrated in the garage compartment". By adopting a Reverse Engineering process, the element to be modified is extrapolated from its original context, it is analyzed and then reconstructed with an innovative material. It is often not convenient to manufacture the element in the forms of the traditional one, as it is



Save weight, keep costs down

Maximizing the design and production processes, how much mass can be reduced and at what costs? “To make a medium-sized motorhome, about 500-600 kg of wood is used” explains Francesca Filippi “wood that we could replace at least 60% with innovative materials that weigh half, so we can hypothesize that the total mass saving could reach 30%. Certainly, we can save at least 150 kg working on the following elements: structure of the garage space, bed system, rear seat belt structure, as well as benchtops, tables and cupboard doors. The additional cost percentage is linked to the volumes. The composite production process, although industrialized, includes a manual part that represents an important segment of the costs yet a careful planning carried out with the RV manufacturer allows us to find customized solutions based on the planned budget. The costs can vary depending on the size of the supply”.



VittEr® Lite kitchen top

far more useful to think of new solutions that go beyond the single element. A carbon fiber beam weighs about a third of a metal beam, but has very high costs. With carbon fiber combined with other composite materials, however, it is possible to play with shapes, so it is not necessary to rebuild the original structure of the metal pieces. The element can be redesigned, it can change shape and place, and a carrier element can be integrated into other elements of the vehicle.

The wide design variety offered by the composite materials is only one of the advantages offered by the new technologies that Filippi 1971 has brought to the RV industry. The finite element method (FEM) guides Filippi 1971 to the best outcomes in terms of weight, dimensions and costs saving. The optimization of the results is reached mixing different composite materials, so carbon fiber is used where there are maximum stresses, while in less stressed areas other types of fibers are planned.

“With composite materials we can achieve the same resistance of metallic elements yet with much thinner thicknesses” says Ivo Bolis, “and this opens up new exciting scenarios to designers. A different way of approaching the project of an RV is required in order to rethink elements. First of all, with composite materials we do not have a traditional sandwich of various materials glued together: the construction element is made with one or more materials mixed together in one passage in the autoclave. We have carried out tensile tests with self-tapping screws, obtaining excellent results, without the need for any

inserts. We are also developing new hinges: the doors are lighter, we certainly can't think of using traditional hinges that would be heavier than the doors that they should lift”.

«Our aim” concludes Francesca Filippi “is to offer ultra-light solutions both for components with aesthetic value and for structural applications. Not only do we supply ultralight composite components, but we deliver our customers an innovative, complete solution package”.



VittEr® Lite kitchen top with integrated ultralight fiber water sink

Company Profile

Founded almost 50 years ago and active in the furniture industry ever since, FILIPPI 1971 firmly fits into the recreational vehicle world in 2000, starting to supply laminated lightweight panels to motorhome and caravan manufacturers around the world. In 2013, the partnership with the entrepreneur Giorgio Levoni opens to a new phase of consolidation and expansion that sees, among other initiatives, the launch of a new production line using the digital printing for the customization of the panel surface. At the end of 2016, the relentless activity of FILIPPI 1971 R&D delivers VittEr®, the new generation compact laminate which is highly customizable in the design and texture, is scratch-, fire-, and water-resistant and 100% formaldehyde-free. At the beginning of 2017 a new building is set up exclusively for the manufacturing of complete furniture kits; the cabinet making has then been completed with the production of curved doors and any kind of special components, taking the range of action even broader than ever. The RV industry is the core business for FILIPPI 1971 but its activity is extended also to alternative niche markets which always push them to innovate, thanks also to the “FILIPPI Lab” R&D department recently enlarged and equipped with an autoclave featured in the composite products area. Today FILIPPI 1971 delivers to more than 20 countries worldwide.

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