

Integrated solution for design and manufacturing of composite components for transportation applications

IMAST members involved:

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The aim of the project was to develop integrated (real as well as virtual) tools for the design and manufacturing of composite components for applications in the area of transportation, with particular emphasis to the automotive and naval fields. Methodology and tools optimization have been pursued by synergy interactions between a virtual and a real laboratory. Design and manufacturing technologies for the composite components have been developed in these two laboratories, once the performance characteristics and the production volumes of the given component have been defined. The well-known successful scheme of the "building-block approach" has been implemented.

According to such scheme, the component design was based upon the study of experimental response its sub-parts. In this way prediction for interactions between sub-parts and for their effects on the behaviour of the global structure were identified. The validity of the developed technologies was confirmed through the manufacturing of "Technological Demonstrators":

1. a car rear door for the automotive field;
2. on flame resistant diving wall and one antiballistic dividing wall for the naval field.

Achievements

Tools for integrated design and production of composite materials for automotive and naval applications have been developed. A car door all-composite (fiberglass / carbon) was realized. It meets all the requirements in terms of weight reduction (30%), structural performance (improvement of torsional stiffness of 30%) and number of molds needed. A naval add-on panels with fire retardant properties and antiballistic properties were realized. The naval demonstrators have meet the requirements of fire resistance (B30) and ballistic (ballistic resistance to armor-piercing). They also show a weight reduction of 20% compared to conventional solutions.

