



The Context

The development of automotive industry, increased requirements for passengers safety, reducing the weight of vehicles and, consequently, reduced emissions and consumption, makes the project about a shock absorber and a bumper bracket from composites attractive for this segment of production. The bumper is a safety system used to absorb the forces in collision. Main purposes of front/rear bumper system is to absorb the energy at the start of a crash, to transfer the remaining forces on to the other parts of a car, to minimize the damage of a vehicle, to prevent injuries and to ensure the survival of occupants.

In the automotive industry things are aimed to a weight loss in car parts, so they have started substituting metal parts with composite materials. Composite materials are not just lighter, they also absorb more collision energy than steel bumper and give attractive combinations of mechanical and durability characteristics.

Technologies, that are used in this production became commercially interesting due to reducing the costs of starting materials (carbon, aramid, resin, aluminium), as well as an innovative joining process.

Manufacturing processes of traditional bumpers require high inputs of machinery, expensive forming tools, a large number of technological processes, and finally, additional corrosion protection for longer life of the product.

Our Solution

In our concept we used two materials that are difficult to merge in an ordinary process. For the body of the absorber, we used two composites, carbon and aramid, the epoxy binder and the elements of aluminium. Composites have good absorption properties at pressing at a low weight. To improve the pressure characteristics of absorber it can be filled even with Al chunk (honeycomb).

For the production of a body of the absorber, the method of the RTM (resin transfer moulding) in a mould of aluminium could be used. The mould is loaded layers of carbon and aramid, the mould is closed and heated up to 60 °. The mould is pressurized to 3 bar pushing the epoxy resin, as long as the output does not displace all the air from the mould. After several minutes, the mould opens and it is prepared for the new cycle. Due to the closed system the release of harmful emissions into the environment is minimal. An intermediate element between the absorber and the bumper itself is a piece of milled or cast aluminium.

This not only increases safety but also simplifies many production operations, enhancing cost efficiency, gives more stability and less fragility. The weight of the entire product is at least 50 % lower than at the conventional product. Main advantage of our system is that the same absorber with different mounting plate can be used for different types of cars.

REGENERACIJA d.o.o.

Alpska cesta 43
4248 Lesce
Slovenia
Phone: +386 4 5379490
info@regeneracija.si
www.regeneracija.si

Contact person

Marjana Požanel
Phone: +386 51 388738
marjana.pozenel@regeneracija.si

