

Future of Lightweighting Entry



Magneti Marelli

Front Suspension Composite Cross-Member

Automakers are under pressure to meet government-mandated fuel economy and carbon dioxide targets, which can be achieved by reducing vehicle weight. One of the most promising ways to achieve these targets is to substitute lighter materials in place of steel or aluminum. While it sounds simple, suppliers must develop components that are not only light weight, but also affordable, able to achieve performance requirements and suitable for mass production.

A cross-member, or subframe, is one of the largest parts of a vehicle's suspension system, making it a likely target to reduce vehicle weight and energy consumption. Magneti Marelli's cross-member prototype is made of carbon fiber reinforced plastic, which is 50% lighter than steel and 30-40% lighter than aluminum. Performance requirements for the component are high; it must support the lower control arm and steering rack, be stiff enough to provide adequate handling, and damp engine noise so as not to disturb passengers. The component must have strong mechanical properties, which is difficult to achieve through traditional composite manufacturing techniques. The manufacturing process must also be highly automated to support automotive volumes.

Magneti Marelli uses Advanced Sheet Molding Compression (ASMC) to produce its composite cross-member, to achieve performance and manufacturability requirements.

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