

SUPER LIGHT CAR



Section of a car floor structure in a multi-material design. Different lightweight metal materials in sheet and cast form serve the aim of designing a safe and light vehicle which is suitable for series production.

A lightweight, economical car is the goal. The 38 renowned partners from the automotive industry, the automotive supply industry and research are unanimous on this point, which is why they are working together on a project funded by the European Union. The DLR Institute of Vehicle Concepts in Stuttgart is also one of the partners involved. All of the partners are united by the idea of a Super Light Car. New types of lightweight construction and material solutions in the vehicle structure should enable the concept to become reality.

At the end of this major four-year long project, multi-material lightweight constructions for vehicle structures suitable for large-scale series production will have been developed. With this development, a car from the so-called C-class segment (reference VW Golf V) should be able to save 30 percent weight on the vehicle structure. As a result, up to ten grams of carbon dioxide emissions could be saved for a medium-sized vehicle. As the weight saving needs to be achieved

with guaranteed production figures of 1,000 vehicles per day as well as high crash safety and rigidity, the requirements placed on the available technologies for materials, assembly, joining and production are extremely high. Environmentally-specific aspects such as recycling are being considered and evaluated parallel to the conceptual design of the new lightweight constructions. It is the ambition of those involved in the project to present and validate these lightweight construction concepts with a front-end vehicle construction.

DLR is working in the area of vehicle concepts and design. It is researching structures for the front-end vehicle in a lightweight metal construction design made from materials such as magnesium and aluminum. This includes a suspension strut mount made from magnesium which is combined with an aluminum side rail structure. The first results are structures with a weight saving of up to 56 percent. The crash simulations show cowl intrusion reduced by up to 20 milli-

meters compared with the reference structure. With regard to the aluminum side rail, the scientists and engineers are currently working on replacing the expensive aluminum casting process with more cost-effective aluminum sheet solutions.

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Crash simulation and illustration of the plastic strain of the DLR front-end concept with a suspension strut mount made from magnesium

