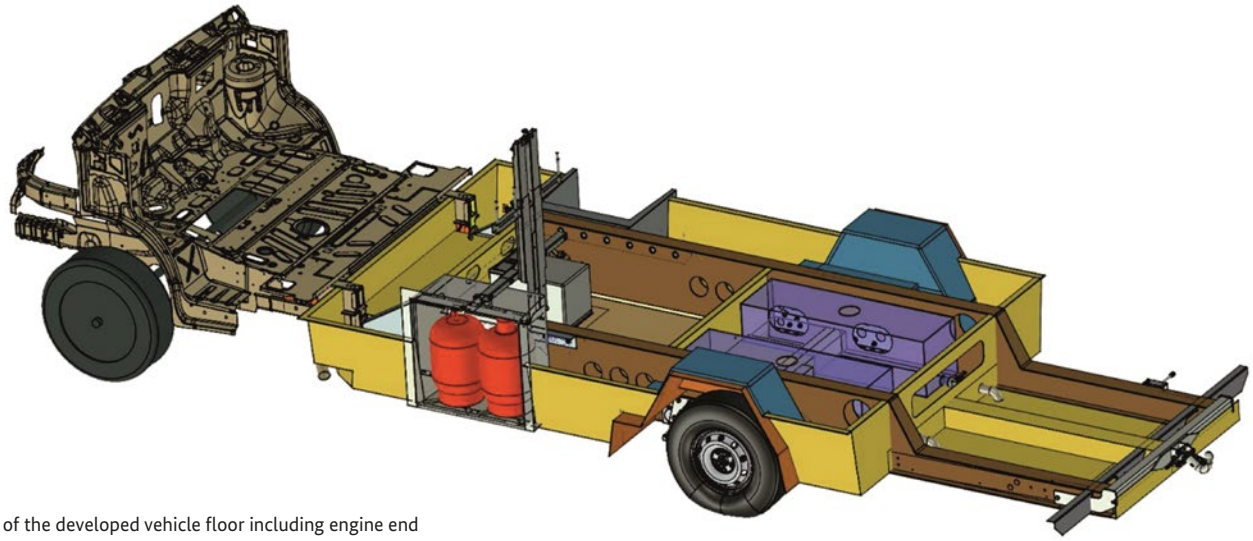
Federal Ministry
for Economic Affairs
and Climate Action

Best practice example

for lightweighting in Germany

Lightweight vehicle floor



CAD model of the developed vehicle floor including engine end

Development of a lightweight vehicle floor for motorhomes

Fields of application

Automotives

Commercial vehicle manufacturing

In this example, lightweighting allowed for the following reductions compared to a conventional model made of metallic lattice tube frame:

Weight approx. -100 kg

Application

The aim of the project was to design and manufacture new models of highly stressed mechanical structural components used in motor vehicles using fibre composite hybrids, and to test them in an application-related manner. The focus was on developing a floor assembly for a motorhome as a demonstrator.

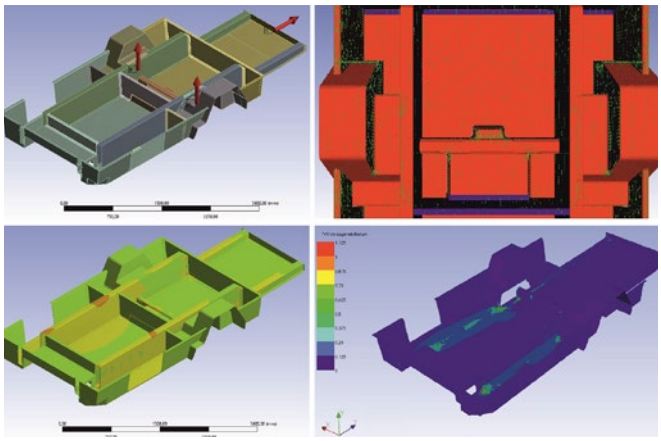
Challenge

To reduce the weight of the vehicle by 100 kg and its height by 150 mm, a fibre composite floor assembly was used as a substitute for a conventional metal lattice tube frame.

Solution

This was based on a mechanical design of the floor assembly developed using numerical simulations and produced in a way that enabled fibre composites to be used. Particular focus was placed on the areas for connecting the engine end, axle, trailer hitch and belt support. Thanks to the modular design of the moulding tool developed for this project, several versions of the floor assembly were able to be produced.

Best-Practice-Beispiel | Lightweight vehicle floor



Numerical simulation of mechanical loads

Conventional lattice tube frame and FRP floor assembly

Other potential applications

Aircraft construction

Construction of rolling stock

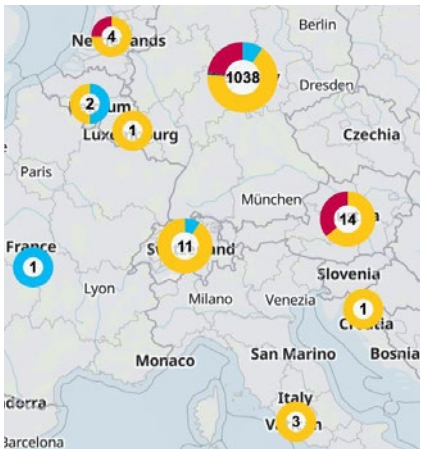
Shipbuilding

Manufacture of other vehicles

By designing and constructing the vehicle floor in accordance with the load and determining suitable processing conditions, the project was able to exploit the lightweighting potential of the materials used in an efficient way.

Based on the final designs, a demonstrator was produced which was then subjected to various static and dynamic load tests, as well as to on-road tests.

Compliance with all requirements relevant for the sector is ensured. Research activities are being conducted so as to further improve health and safety, environmental protection and recycling.



Der LIGHTWEIGHTING ATLAS

The LIGHTWEIGHTING ATLAS is an interactive web portal that pools information on those active in lightweighting and their skills across different industries and materials. The atlas is free to use and entries into the atlas are also free. You can find the LIGHTWEIGHTING ATLAS at www.leichtbauatlas.de

The Lightweighting Initiative

Modern lightweighting is of pivotal importance for German industry and its competitiveness. The Federal Ministry for Economic Affairs and Climate Action has established the Lightweighting Initiative to support lightweighting in Germany. The Lightweighting Initiative Coordination Office in Berlin, which is financed as part of the initiative, pools all activities relevant to lightweighting and supports German companies, especially SMEs, as they implement lightweighting.

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