



# Best practice example

for lightweighting in Germany

Bionic lightweight structures



Bionically optimised chassis stabiliser frame

## Bionic lightweight structures in technical applications

### Fields of application



Automotives

In this example, lightweighting allowed for the following reductions compared to a conventional model made of milled aluminium:



Weight approx. -25%



Rigidity approx. +4.7 fold

### Application

In motor racing, every gram of vehicle weight saved helps to raise overall sporting success. Using bionic lightweight structures, a novel design was developed for the four-part chassis stabiliser frame. This generated enormous weight savings whilst also increasing rigidity.

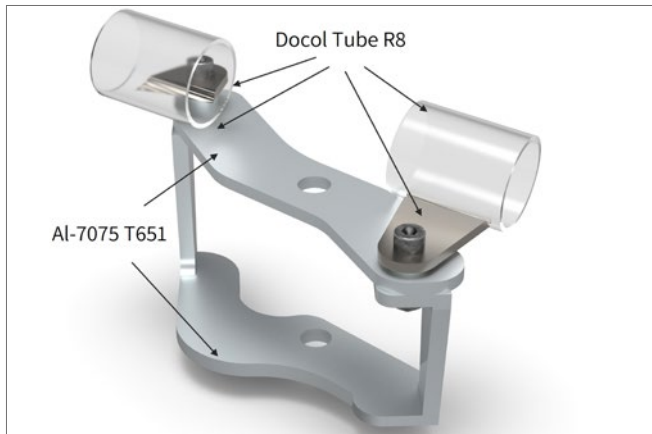
### Challenge

When designing these structures, it was important to determine suitable representative load cases and the right numerical optimisation model in order to ensure the quality of the calculations. In addition, adequate account also had to be taken of production-specific requirements within the process to optimise the design.

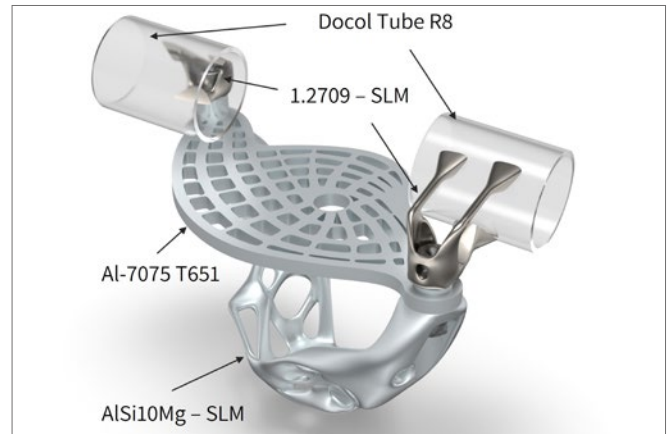
### Solution

Based on special calculation algorithms, a variety of tools and methods, and a tried and tested development process, the user was offered comprehensive support in the utilisation of bionic lightweight structures for their specific application. The design calculated in this example was not only conceptionally sound, but was also convincing when applied in practice.

## Best-Practice-Beispiel | Bionic lightweight structures



Reference assembly



Bionically optimised assembly

## Other potential applications



Energy technology



Machinery and plant construction



Commercial vehicle manufacturing



Construction of rolling stock



Sports and leisure equipment



Aircraft construction



Medical technology



Optical equipment



Shipbuilding



Furniture making



Spacecraft construction

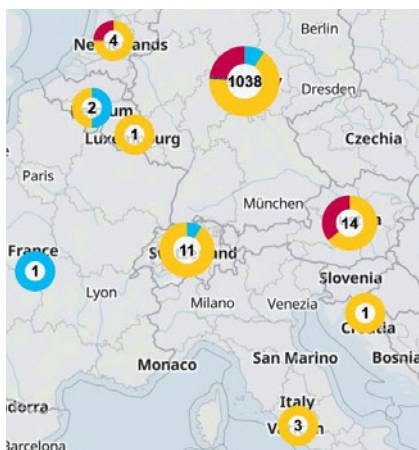


Manufacture of other vehicles

With the help of bionic lightweight structures, innovative component designs can be developed that offer enormous weight savings and performance increases compared to conventional component designs. Additive manufacturing technologies in particular, which enable the constructional design to be adapted, offer significant potential

for producing power-flow-optimised structures of this kind in a way that allows additional functions to be integrated, all in an economically viable manner. At the same time, there are also extensive possibilities for applying these technologies in conventional forming and machining processes across a range of industries.

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](http://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.

### Contacting the Lightweighting Initiative Coordination Office

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