

Semester Thesis in cooperation with Lucid Motors

Investigation of the materials of modern car body development

The modern automobile is an excellent example of the use of new materials and technologies. A typical modern motor vehicle consists of a mixture of many different materials from all classes of metals, plastics and ceramics, which are processed using a wide variety of manufacturing techniques. In car body development, metals dominate the scene. Over the last few years, various types of steel and aluminum in particular have become established here.

Today, vehicle bodies consist of several hundred formed and joined sheet metal components, and the production of car bodies has become more complicated than ever before. To meet the many different requirements, such as lightweight constructions, occupant safety and cost, different alloys and material grades have to be combined. The electrification of the automobile also requires new ways of thinking about the use of materials. Such a multimaterial system poses considerable technical and economic challenges and requires a very detailed knowledge of the individual material properties. Further challenges arise in the sorting and recycling of steel and aluminum scrap from end-of-life vehicle bodies in the interests of sustainability.

As in many other industries, extensive material testing is therefore carried out in the automotive industry to find out how technical advantages can be achieved without compromising the quality and reliability of the product. In the context of this work, you evaluate in close cooperation with the electric car company Lucid Motors the current materials of the modern car body construction regarding their characteristics and suitability in the car body development. With a benchmark study, you will determine current trends in automotive materials and engineering. Within this thesis it is your task to characterize the materials currently used industrially by Lucid Motors and to classify them in your material overview. For this purpose, you will conduct experimental studies at the Chair of Metal Forming and Casting (utg).



Car body of the Lucid Air