

Development and design of the drivetrain for a Formula Student vehicle

Graduate



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Definition of Task: The team Racing Ost, consisting of students from FH OST, is currently developing a race car intended to participate in Formula Student events. The aim of this thesis is to develop a suitable gearbox solution for the vehicle. To ensure successful participation in the events, the following performance targets were defined:

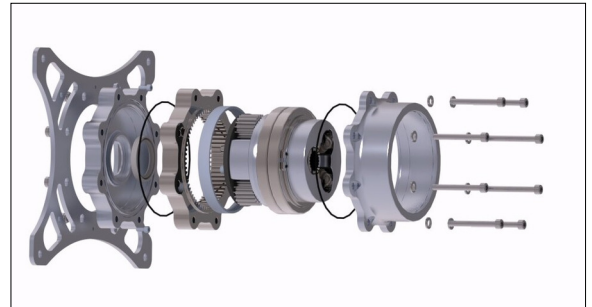
- Acceleration from 0 to 100 km/h in under 3 seconds
- A top speed exceeding 100 km/h

Approach: To determine the appropriate gearbox technology, various drivetrain concepts were developed and evaluated against each other. Due to its high power density, the decision was made in favour of a planetary gearbox, for which all components were designed and dimensioned. Key tasks included the design and simulation of all load-bearing components, as well as the optimisation of their weight. In addition, assembly instructions and manufacturing documentation were created to enable production and integration of the gearbox into the vehicle.

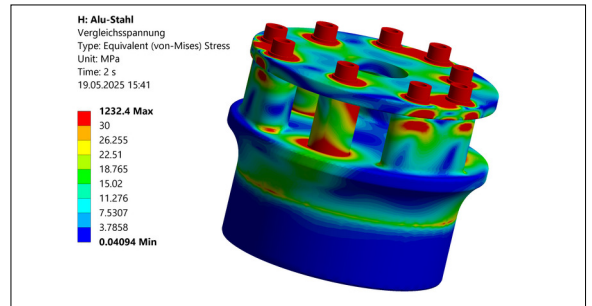
Result: The result of the thesis is a single-stage planetary gearbox with a weight of 4.5 kg. The gearbox can handle a power output of 60 kW at a rotational speed of 6500 revolutions per minute and achieves a service life of over 50 hours under racing conditions.

It combines and integrates all necessary interfaces with the surrounding components in a single system, allowing for a minimal installation space. The modular design enables quick replacement of components and facilitates assembly during racing operations.

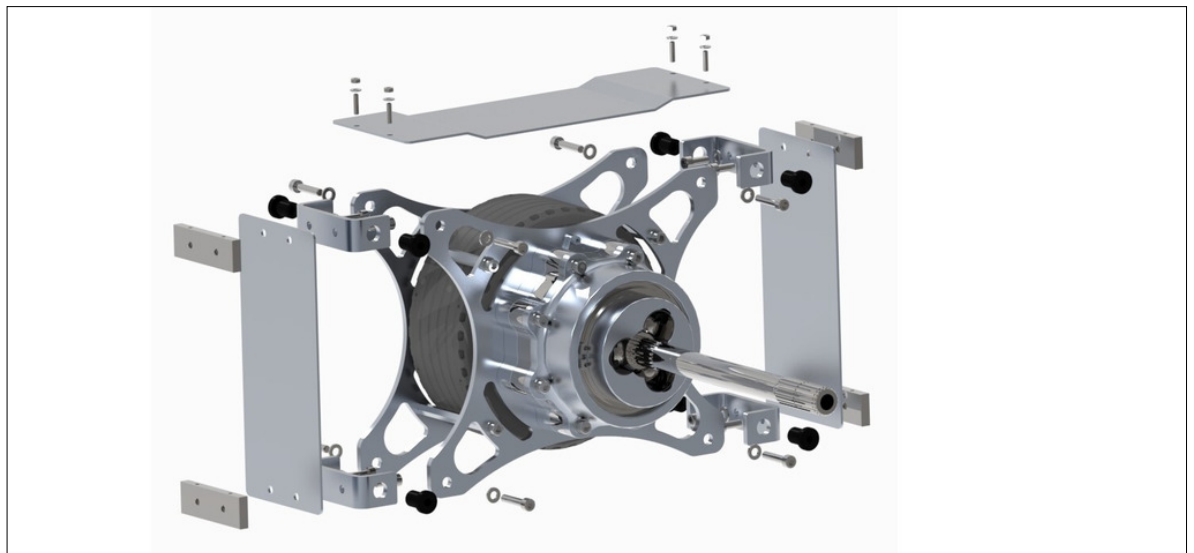
CAD Rendering Gearbox
Own presentation



FEM simulation carrier from Ansys Workbench
Own presentation



CAD rendering of the gearbox including the surrounding components
Own presentation



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Subject Area

Mechanical
Engineering