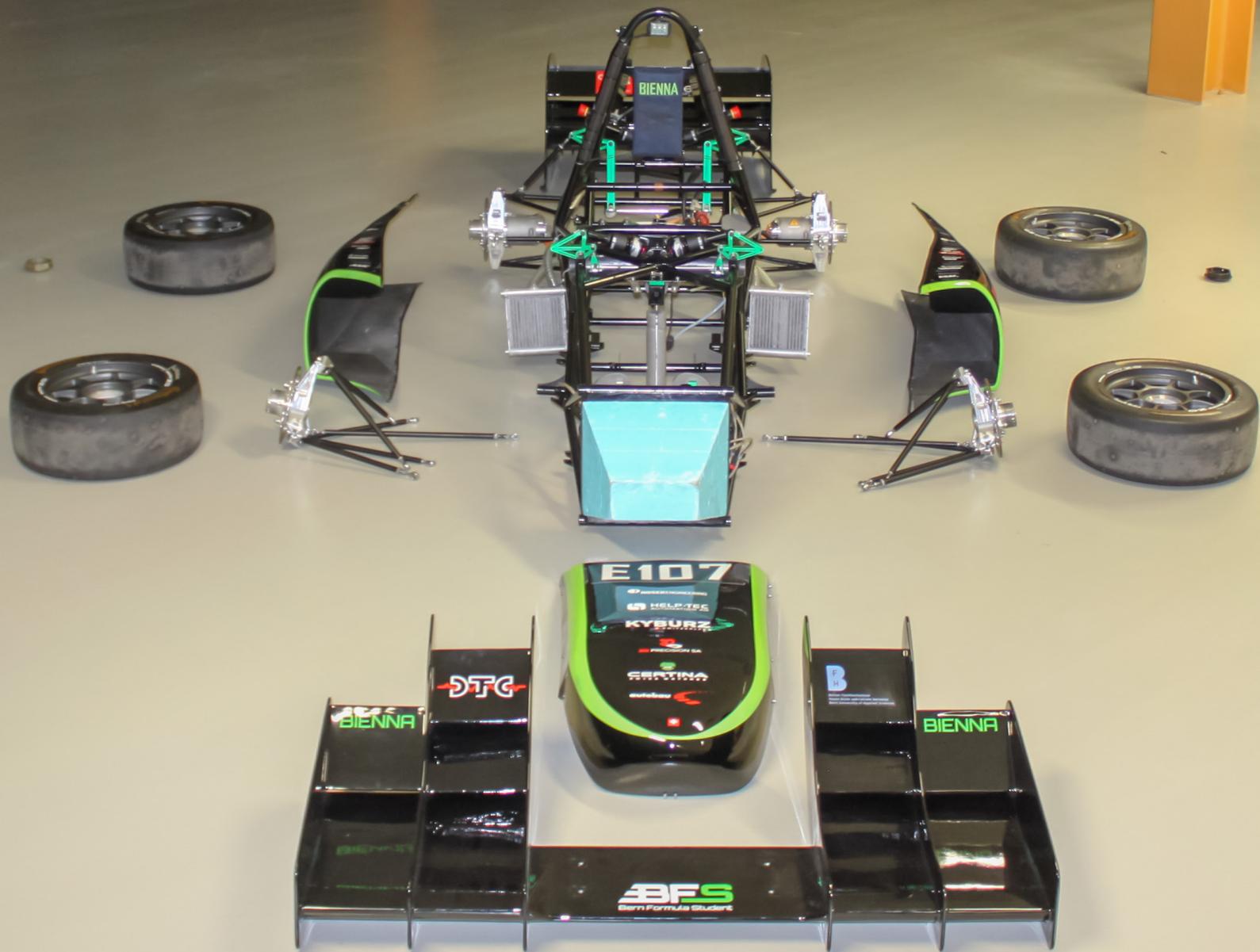


NEWS
LETTER
01/18



Exploded view BIENNA - workshop, Posalux

Dear reader

Our predictions about the new world rankings have been confirmed on time for Christmas! The team was able to make up 43 places with the participation in Austria and Spain! The BIENNA season was therefore extremely successful and confirms our intention to gain further experience with the racing car BIENNA. For this reason, our focus continues to be on the further development of BIENNA. The team also deals intensively with the topic of simulation and knowledge transfer. Despite their work in the industry, the alumni are strongly involved and help the team with a lot of commitment and a close exchange.

Meetings and work intensity have not decreased this season. Behind the scenes, we are constantly working hard to build on the successes of recent months. Improving an existing system involves a lot of effort. The often invisible work is very time-consuming and gets lost in a lot of detail work. Nevertheless, the team is highly motivated and ready to tackle the many challenges. I wish you a lot of reading pleasure

CEO

Ivan Walter Jankovics



The team 2017/18, BFH Burgdorf

BIENNA Experience - further development

Several factors played an important role in the planning of this season. Unlike the previous seasons, it is not possible for the team to use BIENNA extensively for events only while working on the new vehicle. At the beginning the team worked out a meticulous planning and defined the objectives for the next four months. Each component was dismantled, inspected, weighed and functionally tested. Particular attention was paid to electrical wiring. Towards the end of last season, the mistake that prevented the team from exploiting the full potential of BIENNA in electrical wiring was suspected. Completely new cable harnesses were put together, the architecture of the grounding cables was redesigned and the

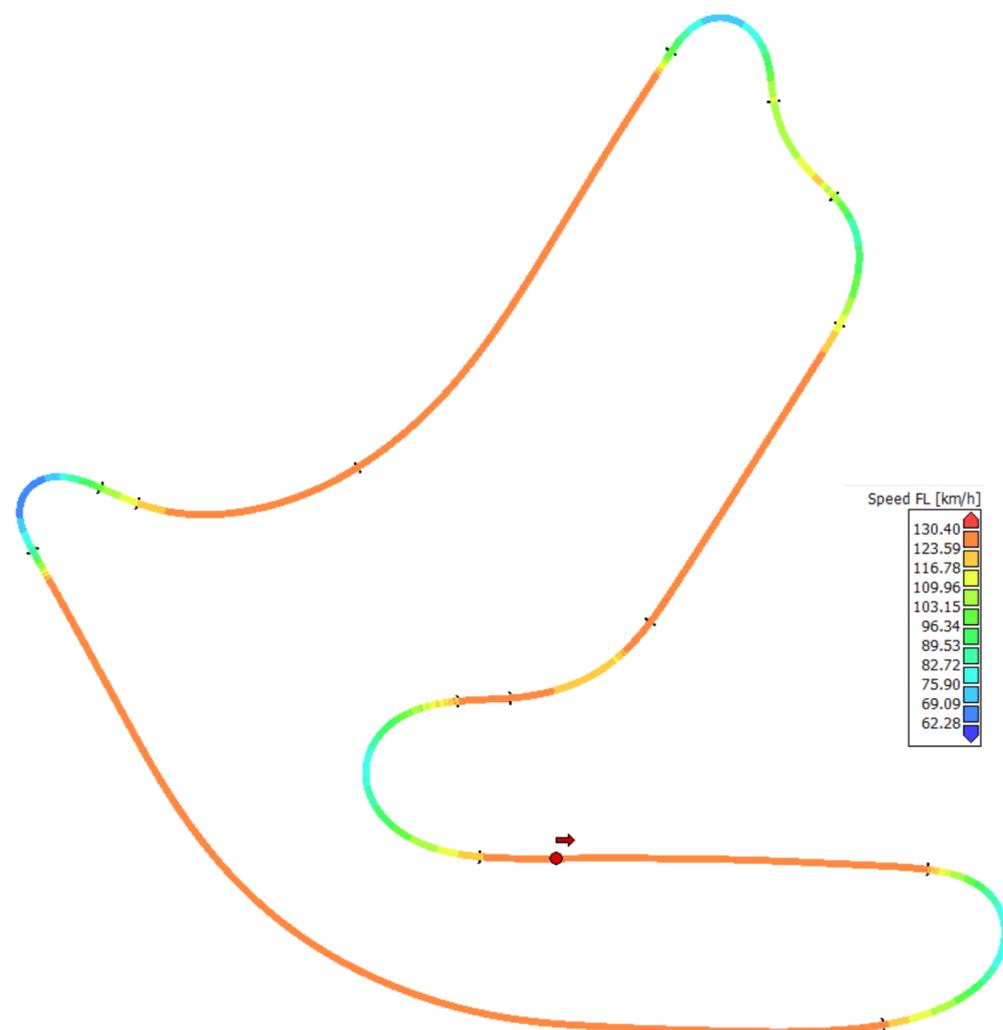
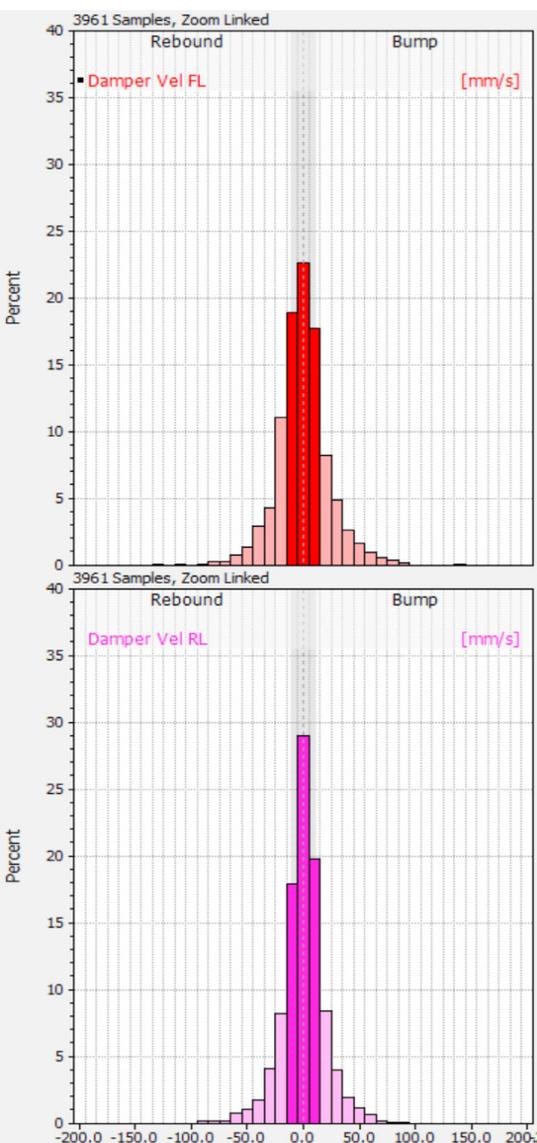
ECUs were further optimized. During the spring semester BIENNA is subjected to various static and driving dynamics tests. The service life and reliability of the modules are to be tested in order to determine the characteristics of the vehicle. The simulations carried out in parallel to this should finally provide the team with information about their calculations and accuracy at the end of the season.



Simulation - an important step

When designing a new racing car for the Formula Student competition, various simulations play a not inconsiderable role. For the aspiring engineers of the Bern University of Applied Sciences, it is important to „exploit“ the regulations of Formula Student Germany as far as possible without violating the rules or making losses in performance. Considering the different disciplines of the events, it becomes clear that a short wheelbase (up to the limit of the regulations), a light vehicle (regulations do not prescribe a minimum weight) are important parameters for the development of a racing car. However, a compact design requires compromises in individual designs. Today's simulation possibilities give the future engineers the possibility to „play through“ different scenarios. More than 1000 individual

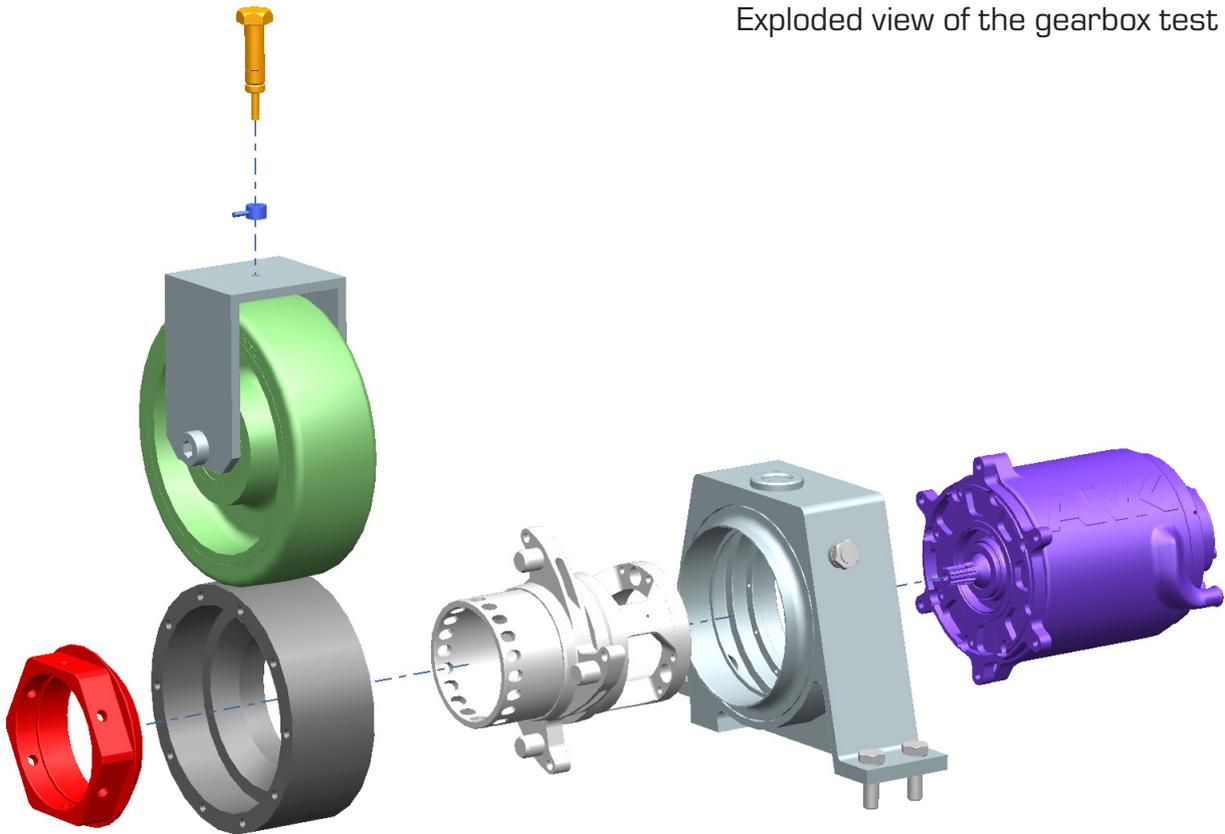
parts give the Bern Formula Student developers the opportunity to simulate the characteristics of the new racing car. As an example, a strongly worked out underbody (diffuser) allows a much higher downforce. However, the required space on the underbody requires a „higher“ vehicle, which has negative effects on the centre of gravity and therefore on lap times with a heavy battery pack. The optimum ratio is determined by simulations. This is where the creativity of the young aspiring engineers is called for.



Laptime simulation with evaluation of the results

Gearbox testing bench - The evolution

Exploded view of the gearbox test bench



Extended testing of components is of great importance. A clear advantage of such tests is that mechanical properties can be tested under operational loads even before the complete vehicle is tested. This results in great advantages when optimizing components and valuable findings for new developments can be collected. Within the scope of a project work of two BFS team members and mechanical engineering students of the Bern University of Applied Sciences, a gearbox test bench for the gearbox of BIENNA was designed and built. In this case, the greatest attention was paid to the behaviour of the gear oil temperature. The top priority in the construction of the test bench was to reproduce the drive system as realistically as possible.

Test cycles

The outer contour of the gearbox housing was adapted to ensure that it could be mounted on the table. Further modifications included, among other things, an insertable sight glass and an adapted oil drain hole for a temperature sensor.

The AMK engine can be controlled either revolutions or torque. In this case, the load is determined by the revolutions. First of all, the gearbox is subjected to a running-in test. Only then will further tests be carried out. On the basis of laptime simulations, a very precise speed or torque profile can be generated and run on the test bench. This means that the transmission can be tested before the complete vehicle is built and optimized in advance.

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