Ansys + Running Snail Racing Team

"Relying on Ansys Discovery for simulation has significantly enhanced our team's ability to develop parts optimized for additive manufacturing, achieving unprecedented quality with remarkable efficiency. The rapid simulation times provided by Discovery have been particularly impressive, enabling us to iterate designs faster than ever. Furthermore, the post-processing capabilities within the Subdivision modeling environment have been exceptionally impressive, offering us a level of flexibility and precision in refining our results that truly exceeded expectations. This combination of short simulation times and advanced post-processing capabilities in subdivision modeling revolutionized our approach to developing optimized parts for additive manufacturing."

— **Markus Hofmann and Luis Atzenhofer**
Mechanical Engineers / Running Snail Racing Team

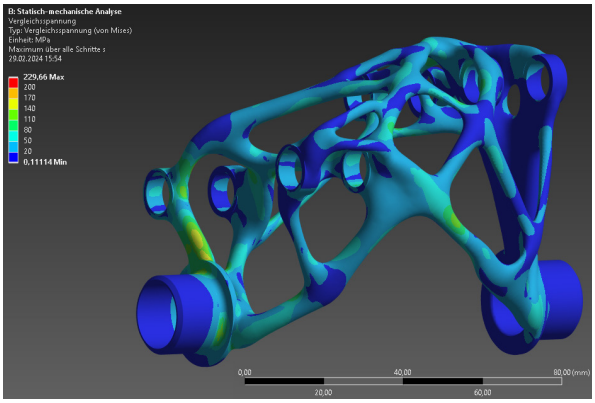
CASE STUDY

Racing Team Develops Suspension Parts for Formula Student Using Ansys Mechanical and Discovery

Optimizing weight is paramount in the high-stakes world of race car performance, in which continuous improvement is not just a goal — it's a necessity. In this quest, topology optimization emerges as the most effective strategy for designing high-performance parts. By leveraging the cutting-edge capabilities of Ansys products, their design process was significantly accelerated. This has not only enhanced the team's competitive edge, but also played a pivotal role in the outstanding performance of their latest race car.

Challenges

Previously, with conventional simulation software, a single simulation could take several days, leading to prolonged design cycles and limited flexibility for modifications. However, the team's shift to Ansys Discovery has revolutionized the Running Snail Racing Team's approach. Thanks to its innovative graphics card-based methodology, they can now conduct up to 20 simulations per day. This remarkable acceleration in the design process not only enhances efficiency, but also allows for greater adaptability and precision in engineering solutions.



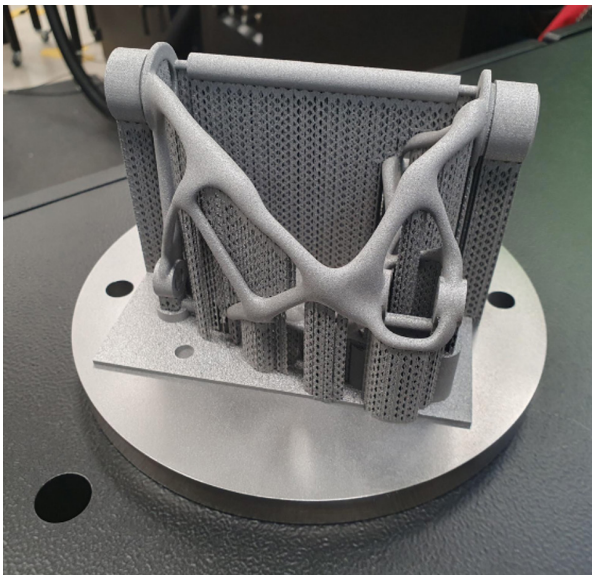
The von Mises stress in the part at cornering.

Technology Used

- Ansys Mechanical
- Ansys Discovery

Engineering Solutions

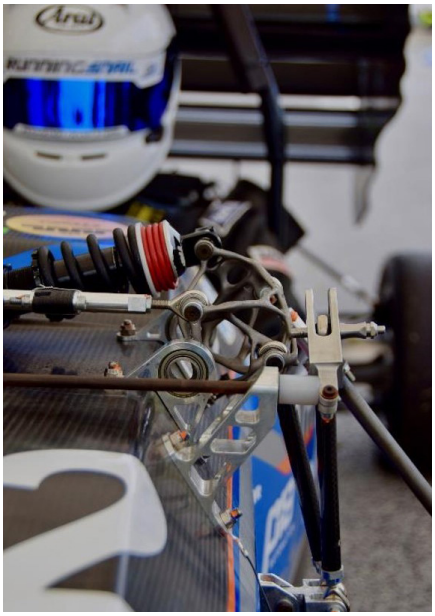
Using the Ansys Discovery topology optimization tool, the Running Snail Racing Team revolutionized their design and simulation process. The tool's rapid simulation times significantly enhanced their ability to adapt and iterate designs swiftly, which added immense value. Furthermore, Discovery's integrated features for converting facets into solids, either directly or through intermediate subdivision (SubD) modeling — while maintaining the integrity of exclusion regions — brought remarkable efficiency and precision to the development workflow.



The titanium bellcrank from the team's race car, the RS23, direct after printing with the milling and print support structures.

Benefits

Discovery was essential for the development of the team's topology-optimized bellcranks and uprights. This powerful tool enabled them to design bellcranks that are 40% lighter and 56% stiffer than their conventional milled counterparts. Moreover, the intuitive interface and rapid simulation times of Discovery cut the project's manpower requirements by half, freeing up valuable resources to drive further performance enhancements across their portfolio.



Titanium bellcrank on the RS23.

The Running Snail Racing Team at the Formula Student Czech event in 2023.

/ Company Description

The Running Snail Racing Team from the University of Applied Sciences Amberg-Weiden is a participant in Formula Student, a competitive engineering challenge in which students build and race small Formula-style cars. The Running Snail Racing Team is renowned for its ingenuity and teamwork and has achieved remarkable success, securing multiple podiums in the last season. As they rev up for the upcoming seasons, their sights are set on extending this success streak.

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