DQBD leverages Stratasys H350 3D printer to revolutionize the cycling saddle

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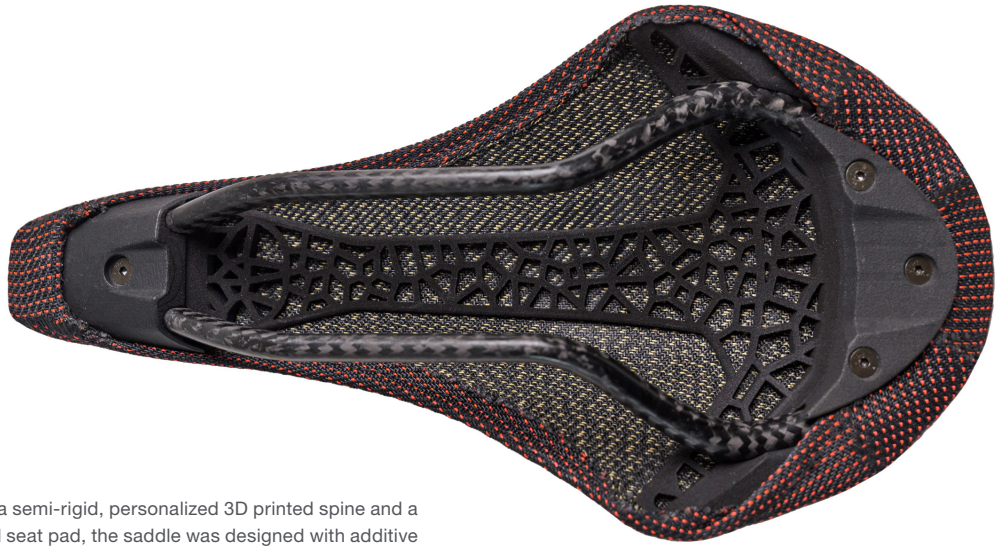
Sebastian Hess
CEO at DQBD

stratasys

Case Study



Consisting of a semi-rigid, personalized 3D printed spine and a thermoformed seat pad, the saddle was designed with additive manufacturing in mind.

Based in Stuttgart, Germany, innovation driven design & development company DQBD GmbH specializes in the field of sport products, technical protection, wearable technologies, footwear, bike components and light e-vehicles. As an established design partner for brands around the world, the team at DQBD works on every step of the development process - from initial concepts to final part production. The company credits its success, in part, to a wide range of expertise under one roof allowing for better efficiency and innovative solutions. To make those solutions faster and more accurate, the company embraces new technology in a variety of areas, including 3D printing and generative design.

DQBD has extensive experience in the bicycle industry and has worked closely with leading brands to develop innovative cycling products. Through discussions with these partners, it was apparent that the sport is constantly striving to optimize the comfort and fit of the saddle for riders. Armed with this feedback, DQBD set itself the task of developing a personalized state-of-the-art saddle that would literally take the riding experience to a new dimension.

“For us, this project was about creating a saddle that encompasses comfort, support and performance without compromise,” comments Sebastian Hess, CEO at DQBD. “We knew that the only way to achieve this would be to design a saddle that could be tailormade to each user individually.”

However, the innovative concept was difficult to produce accurately. In order to manufacture a saddle that is customizable to each user individually, the team needed to be able to adjust and manipulate the geometric structure of the saddle’s load-bearing parts quickly and efficiently. Yet, the level of precision and geometry needed for the project could not be achieved with traditional manufacturing methods. Additionally, with the plan to produce a personalized product at scale, the high costs and long lead-times associated with injection molding proved unviable.

Design flexibility and precision throughout product development

Having previously leveraged 3D printing for occasional projects, DQBD was aware of the technology’s benefits and as such, explored the options available that would meet the specific criteria for its latest endeavor.

“We had always planned for AM to play a pivotal role in the creation and eventual production of SAM - our cycling saddle,” says Hess. “In fact, we designed the saddle with additive manufacturing in mind.”

DQBD's research ultimately led to discussions with Stratasys, who recommended that its H350™ 3D printer provided the design flexibility and production quality needed to realize DQBD's vision of a completely customized cycling saddle that could be produced at volume quantities.

High Yield PA11 polymer powder's high ductility and impact resistance allow for the production of parts that meet industry standards and surpassed DQBD's own expectations.

Powered by SAF™ technology, the H350 is part of the H Series Production Platform of powder bed fusion-based 3D printers and has been engineered for production-level throughput of end-use parts. Ensuring high levels of accuracy and quality, the 3D printer's counter-rotating roller coats powder layers onto the print bed and prints absorber fluid to image the part layers. A passing IR lamp fuses the imaged layers over the entire span of the print bed, providing uniform thermal conditions to ensure part consistency for all build parts on the print tray.

"As well as delivering consistently accurate, production-grade parts at volume quickly and affordably, the H350 offers a unique opportunity to personalize products in a way that cannot be replicated with traditional methods," comments Hess. "We can now create a saddle that maximizes performance on a per-rider scale while also enhancing comfort."

The saddle consists of a semi-rigid, personalized 3D printed spine and a thermoformed seat pad.

Software mapping of pressure points and weight distribution is used to match the geometry of the saddle with the rider's body to create the perfect fit, while the composition of rigid and flexible zones of the saddle's spine offer support and adaption precisely where needed. This unique combination offers more flex than other performance orientated saddles, translating to a higher level of comfort and less rider fatigue.

Essential for the design was a material that offered high ductility, high impact and high fatigue resistance. The PA11 material of the H350 delivers production-grade plastic parts for large volume demands and enables a high nesting density while maintaining part consistency.

Stratasys' H350 3D printer provides the design flexibility and production quality needed to produce a completely customized cycling saddle at scale.

"We put the saddle through rigorous testing including impact strength, pressure and fatigue resistance to ensure that it met industry standards and our own expectations," says Hess.

Another key consideration of the design was sustainability. The Stratasys High Yield PA11 material is a bio-based plastic made of a renewable raw material derived from sustainably grown castor oil. The entire saddle assembly is glue-less, and at the end of the product's life, components can easily be separated and reintroduced into production.

Overcoming time and cost barriers

Crucially, by additively manufacturing several of the saddle's load-bearing parts at scale, DQBD is also saving thousands of euros in costs and cutting lead times from months to just several days compared to traditional molding methods.

"When using the H350, we have seen cost savings across the entire product development process of up to £22,000 against those of injection molding methods, as we are eliminating tooling costs completely," explains Hess. "We have also shortened our lead times to around 10 days compared to the 3-6 months it can take with traditional manufacturing."

Looking ahead

As DQBD integrates additive manufacturing further within its operations, the company hopes to leverage new opportunities from it.

"The consistency and high-quality precision of the H350 3D printer has made the idea of custom personalization at scale a reality and allows us to take cycling to a new level," adds Hess. "The progression of AM is a never-ending revolutionary story. As we look towards the future, we hope to push the envelope of possibilities even further by producing an entirely 3D printed personalized saddle," he concludes.

To watch the full video of the SAM saddle project with 3D printed SAF technology components, click here.

- Leveraging the Stratasys H350 3D printer, DQBD has seen cost savings across the entire product development process of up to £22,000 against those of injection molding methods as tooling costs are completely eliminated.
- The H350 3D printer, which is powered by SAF technology, has enabled DQBD to shorten lead times to around 10 days compared to 3-6 months with traditional manufacturing.
- The Stratasys High Yield PA11 polymer is derived from a 100 percent renewable bio-source from sustainably grown castor beans, contributing to the sustainability of the project, which was a key consideration.
- The H350 delivers consistently accurate, production-grade parts at volume quickly and affordably. Additionally, the H350 offers DQBD a unique opportunity to personalize products in a way that cannot be replicated with traditional methods. The design flexibility and production quality of SAF technology allows the DQBD team to create a saddle that maximizes performance on a per-rider scale while also enhancing comfort.

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