Specialized is among those leveraging 3D printing to reimagine the way saddles are designed and produced

LETTING IT RIDE

Cycling manufacturers are harnessing 3D printing technology to significantly revamp the design and manufacturing of saddles. **Andrew Sink**, Staff Applications Engineer at Carbon, explains how 3D printing is becoming a cornerstone element of the saddle business...

"3D PRINTING AND ADDITIVE MANUFACTURING IS OFFERING NEW POSSIBILITIES OF CUSTOMISATION, EFFICIENCY AND INNOVATION WHICH WERE NOT PREVIOUSLY ATTAINABLE"

For a long time, when it came to designing saddles for bikes, striking a balance between comfort, performance and durability has been the goal. However, meeting these objectives has come with limitations, mainly insofar as the materials used.

Foam and moulded materials for saddles, such as plastic, were widely used for their durability and affordability but often failed to deliver personalised support and long-term resilience. Poorly designed saddles can lead to discomfort, numbness, poor posture, lower back pain and even potential injury due to bad pressure distribution on sensitive areas, driving the demand for seating that is comfortable, durable and increasingly personalised to the individual.

3D printing/additive manufacturing is disrupting this application area, offering new possibilities of customisation, efficiency and innovation which were not previously attainable. By designing lattice structures that offer precise pressure distribution, brands are demonstrating that the future of saddles includes 3D printing technology.

Leading brands are taking to 3D printing to reimagine their saddle designs. These companies include the likes of US bicycle manufacturer Specialized, whose award-winning S-Works Power with Mirror Technology has received rave reviews from cycling enthusiasts.

Demonstrating the capabilities of Digital Light Synthesis™ (DLS) 3D printing technology, the S-Works Power Saddle with Mirror comprises a complex multi-zonal lattice structure designed for optimal pressure relief and comfort. Proving the scalability of the technology, that particular saddle has since paved the way for the introduction of the S-Works Romin Evo with Mirror, which was specially developed for the performance cycling market. Thanks to the flexibility of the DLS technology deployed to develop this saddle, the project took just six months from prototype to commercialisation.

Similarly, Italian biking accessory brand, Fizik has a solid track record of using technology and data to create revolutionary products that elevate the rider experience.

Having successfully leveraged elastomeric materials, lattice design software and DLS 3D printing technology, the company recently set itself the challenge of harnessing the same technology to develop a fully customised 3D printed saddle topper that would provide maximum support, stability, and comfort, minimising pressure points and enhancing aerodynamic efficiency.

Collaborating with pressure map data experts at gebioMized, Fizik engineered a system for collecting pressure map data (specifically the body force transferred to the saddle as well as how that force is distributed across the saddle's surface) from riders to customise a saddle design with distinctive zonal cushioning tuned to adapt specifically to the rider's body. This data is subsequently translated into the »

"BY CAPITALISING ON THE FLEXIBILITY OF 3D PRINTING, THE COMPANY WAS GRANTED THE MEANS TO VERY QUICKLY AND EFFECTIVELY DEVELOP INDIVIDUALLY DESIGNED ONE-OFF SADDLE PADDINGS"

Selle Italia's Shortfit 2.0 saddle is made from durable, highly elastomeric, energy-returning EPU 41 material that offers cushioning and gripping for the rider

>> 3D printed lattice structure using Carbon Custom Production Software, resulting in a highly personalised supportive saddle optimised for comfort and performance.

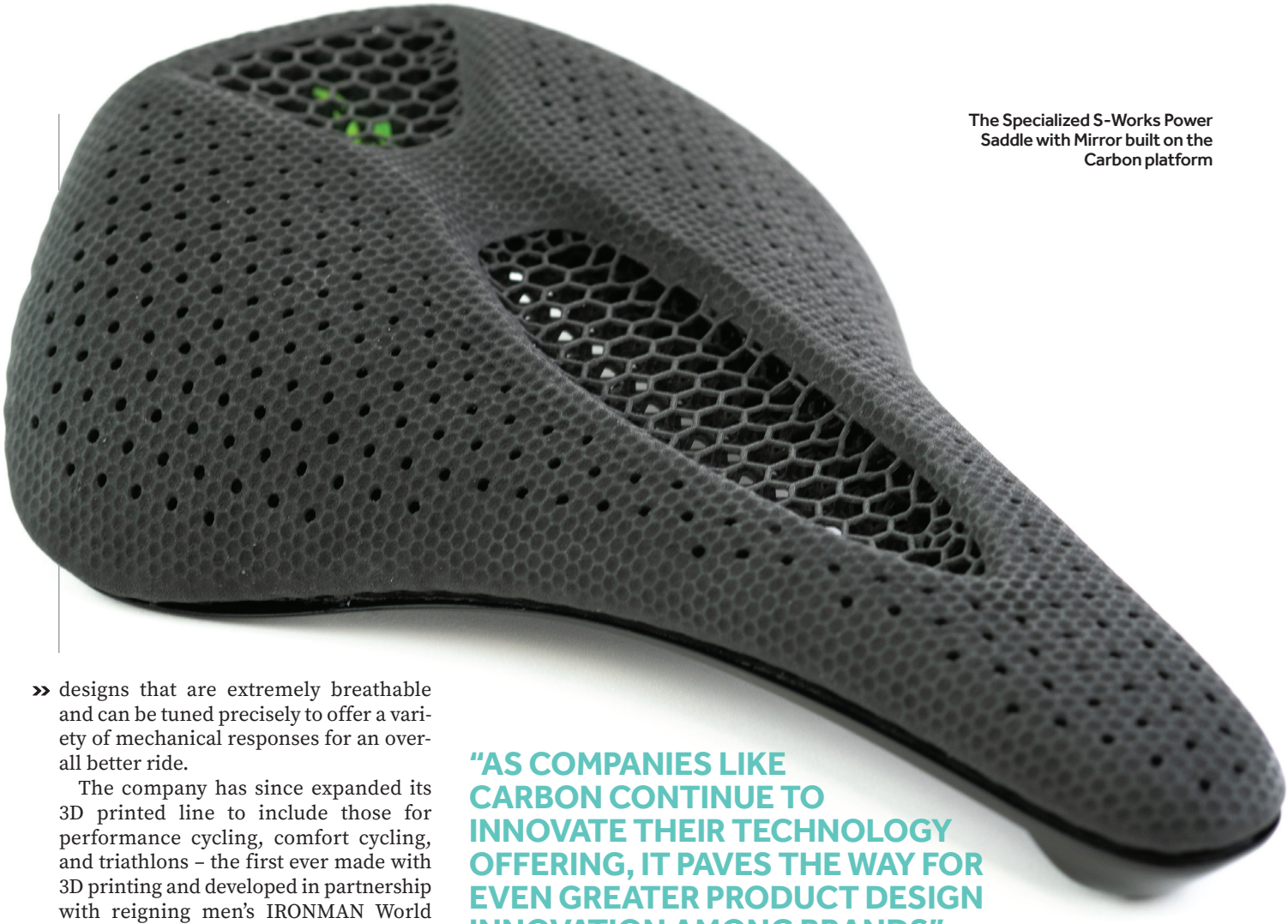
Champion saddle

By capitalising on the flexibility of 3D printing, the company was granted the means to very quickly and cost-effectively develop individually designed one-off saddle paddings. The result is Fizik's recently launched, fully customised, 3D printed One-to-One saddle, now in use by professional riders like Tadej Pogačar who, in February this year, rode his personalised Aeris LD One-to-One saddle as he sealed victory on the 2025 UAE Tour.

Another brand to have firmly embraced 3D printing technology to revolutionise its design to production workflow is saddle manufacturer Selle Italia. To meet the highest levels of performance that its elite cyclists required, Selle Italia wanted to find a material that was not only supportive for riders but was also breathable and ultimately provided a more comfortable ride. Requirements included:

- **Multiple zones within the saddle space to optimise performance and comfort**
- **Energy-returning elastomeric material that was both soft and grippy**
- **High breathability**
- **Increased comfort for the rider**
- **Ease of printability with difficult shapes**

Working closely with Carbon production partner, Prototek, Selle Italia was recommended EPU 41 material – a durable, highly elastomeric, energy-returning material that offers cushioning and gripping for the rider. This particular material also lends itself to multi-zonal lattice >>



The Specialized S-Works Power Saddle with Mirror built on the Carbon platform

» designs that are extremely breathable and can be tuned precisely to offer a variety of mechanical responses for an overall better ride.

The company has since expanded its 3D printed line to include those for performance cycling, comfort cycling, and triathlons – the first ever made with 3D printing and developed in partnership with reigning men's IRONMAN World Champion Patrick Lange.

The utilisation of 3D printing by brands such as Specialized, Fizik and Selle Italia, and the revolutionary saddle designs that they are able to realise, is indicative of the transformative nature of this technology. Not only does it successfully address long-standing challenges in rider comfort but also sets the standard for future innovations and increased customisation to suit the individual. As companies like Carbon continue to innovate their technology offering, it paves the way for even greater product design innovation among brands like these and many others.

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ANDREW SINK:
A Staff Applications Engineer at **Carbon**, a product development and manufacturing technology company whose technologies portfolio enable brands to design, develop, and manufacture data-driven, high-performance comfort and protection products that are breezy, aesthetic and custom.

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Selle Italia Watt 3D saddle