CREAT3D
ADDITIVE MANUFACTURING SOLUTIONS PROVIDER

UNIVERSITY OF BATH TEAMBATH™ RACING ELECTRIC

CUSTOMER	TBRe – Team Bath Racing Electric
PART	Tripod Retainer
APPLICATION	Light-weighting end-use components
AM TECHNOLOGY	Continuous Fibre Fabrication (CFF), Markforged Mark Two

THE PROBLEM

The Tripod Retainer is one of four components fitted to the rear axle, forming part of the drivetrain system. The function of the retainer is two-fold: to retain the tripod joint within its housing, and to provide a clamping surface for the sealing boot. Previously machined in Aluminium, with a lead time of 1-2 weeks per part, the part weighed 88g. There are four retainers required on the rear axle, at a total weight of 352g.

The Tripod Retainer was highlighted as a design consideration as part of the redesign and development of the 2020 track car. The challenge was to reduce the weight of the part. To perform correctly, the part needs to fit accurately and be structurally sound.

THE AM SOLUTION

Using the Markforged, 3D printing in Onyx with the reinforcement of Carbon Fibre, the design team 3D printed the Tripod Retainers and saw two immediate benefits:

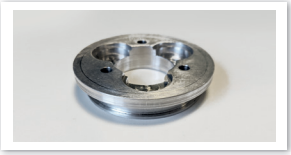
1) Light-weighting – 3D printing reduces the part's weight to just 8.8g versus the original 88g machined part, whilst still fulfilling all performance criteria.

2) Improved design – With the design freedom of 3D printing, the part was re-designed to produce a better fit. Having the printer in-house also allowed faster design iteration and testing.

Since incorporating Markforged Additive Manufacturing equipment in-house, TBRe have been able to move away from basic prototyping towards producing end-use components for the race car and also functional tooling, at a faster pace than traditional manufacturing methods. These improvements result in TBRe manufacturing a high-performing race car, continuing their winning streak on track and in design awards.

RETURN ON INVESTMENT

TRADITIONAL FABRICATION	MACHINED IN ALUMINIUM
3D PRINTING	COST OF £1.70 PER PART
WEIGHT SAVING	88G TO 8.8G (90% WEIGHT SAVING)
TIME SAVING	LEAD TIME REDUCED FROM 1-2 WEEKS TO 3.5 HOURS (98.5% REDUCTION)



ABOUT TBRe

Team Bath Racing Electric is an award-winning student motorsport team based at the University of Bath, founded in 2015. TBRe has a core team of 40 final and penultimate year students in Electrical and Mechanical Engineering, Management and Computer Science. The team's goal is to successfully design, build, and race an electric formula style car. CREAT3D is a sponsor of TBRe providing AM guidance, support and knowledge transfer.

www.teambathracingelectric.com

"The capability of the Mark Two means that we can give every element on the car a design consideration from the start. AM has enabled us to be risk takers, with more and better designs, but at lower risk. If the design is not right first time, the only loss is a few grams of material and a couple of hours. Without our AM equipment, minimising risk would have to be a big focus for the team. Designers would have to be certain of their designs before machining, including allowing for the long lead times for production, so the team philosophy would have to shift to more avoiding risk, which would naturally remove our competitive advantage and speed of advancement."

Bassel Ghazali,
TBRe Business Manager

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