



## STRUCTeam assists with the optimisation of Dimond's triathlon bike

Dimond design and manufacture an array of radical bikes. Their high performance products are favoured by amateur and professional cyclists alike and can be ridden on the open road or on the triathlon world circuit.

Dimond approached STRUCTeam to support them with the

evolution of their 'Brilliant' model through a structural optimisation study. The result is the Marquise - a stunning, robust and highly efficient bike.

Triathlon bikes striking aesthetics are the result of their

aerodynamic frames that are designed to cut through the air. The steering column is usually steeper, giving a stiffer feel to the front of the bike and therefore more responsive with out-of-the-saddle surges and around corners.

To accommodate these high-performance design traits and subsequent loads, both Dimond and STRUCTeam understood a full appraisal of the manufacture method and material selection was critical to the bike's success.

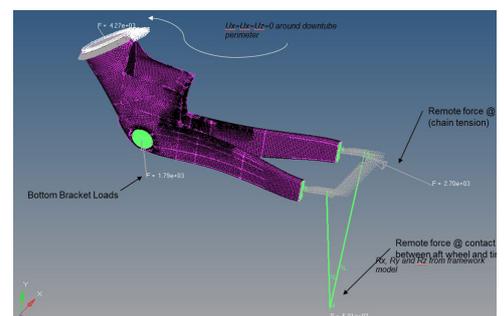
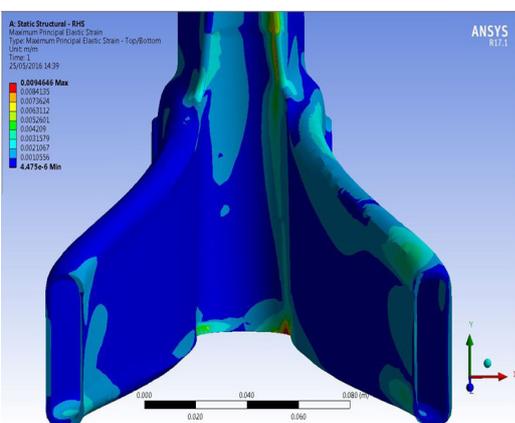
STRUCTeam's objectives in the development of the Marquise were therefore twofold; firstly,

to provide the customer with an understanding of complex load paths within the critical chainstay crotch area of the bike and to make

recommendations with regards to local reinforcement. Secondly, STRUCTeam's engineers would conduct a

full validation of the new bike's final laminates.

Between these two phases, Dimond conducted their own series of independent checks to ensure STRUCTeam's recommendations were achievable in terms of the laminates, considering the geometrical constraints in this area, along with the practicalities of the complex closed mould RTM process.





Taking these factors into account, Dimond was able to produce a practical and structurally effective, final laminate specification. This was subsequently validated by STRUCTeam's engineers using appropriate safety margins for composite structures.

STRUCTeam's approach consisted of developing design load cases to be implemented in a global beam finite element model of the frame. Chainstay loads were extracted from this global model and applied to a local shell finite element sub model of the frame chainstay thus enabling detailed analysis of load paths within the critical crotch area. The layup schedule and frame geometry based on the results of the analysis build procedure for the Marquise was also significantly optimised.

Frederic Louarn, STRUCTeam's Principle Engineer, remarks, "We relish projects with partners like Dimond. The team is passionate and totally committed to producing outstanding products. It is very rewarding for us to help them enhance the bikes ride quality and overall performance."

CEO of Dimond Bikes and professional triathlete, TJ Tollakson, praises the innovation of the new frame.

**"The partnership with STRUCTeam allowed Dimond to consider new carbon layup methods. They are world-class composite experts and their role in this project has resulted in the fastest, best performing bike on the market".**

