



Designing Offshore sails

Emergence of new technology in naval industry provides more and more high-performance racing boat. Using carbon, Nomex, developing kating keels, centreboard and hull shape new ships are lighter, with a high righting moment. They are today capable to cross Atlantic at 28.65 knots average.

Jointly to boat structure, sails knows big improvement. In classical racing sails are optimized for up and down wind. Offshore sailing bring sail loft to develop new shapes and geometries to cover the whole spectrum of sailing ranges, from up to downwind and from 0 to 50 knots.

To do such, Quantum sail design group develop two CFD model. The first one, also used in inshore sailing has been optimized to determine flying shapes and yarn layout. This work brings Quantum to a new stringing concept: Isostrain and a new product: Fusion M. Loads

are multi axis at every points and depend upon trim and sailing conditions such as wind speed and angle. Isostrain structures address fibres not only on primary loads but on all the others. So doing Fusion M provides more adaptable structure and easier membranes to trim.

The second CFD model developed by Quantum Sail Design Group has for objective to improve reaching and downwind sails. Experimental Fluid Dynamics (EFD) of reaching and offwind sails allow Quantum to develop an advanced shape database of new reaching asymmetrical sail designs minimizing driving force while minimizing heeling moment.

Then all this data has been used to enhance aerodynamic models including depowering effects, i.e. reducing heeling moment by modifying trim effect. Driving Force versus Heeling Moment depowering polar for each sail combination are plotted and then integrated in



are one or double handed. So Quantum Sail Design Group developed new sail concepts able to ease sailor task without compromise to performance.

For the next Barcelona World Race two new products will be tested all around the world: furling spinnakers and inflatable battens furling full size genoas. Both of them bring the boat more performance and easier manoeuvrability.

Doing such sails imply a strong sail making knowledge and a full integrated process. Membranes need a specific development to carry inflatable battens, battens pockets have to be customized and spinnaker finishing adapted.

This art of sail making is the first requirement to provide good shape and long lasting offshore sails. And maybe it is it which gives Yves Le Blevec a plus to race to the Mini Transat victory.

