

## Interview with Robert Stroj

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*On a recent visit to the Neil Pryde Design Centre on Maui, Neil Pryde Brand Manager Simon Narramore took the opportunity to interview Robert Stroj, NP's Chief Sail Designer and the man who is behind the development of the speed sails for Björn Dunkerbeck. This is what he had to say:*

### **Question: Robert, tell us a little about how the design of the Speedseeker sails came into being?**

**Robert:** Well the project really began last year with Bjorn Dunkerbeck's attempt to break the World Speed Sailing Record in the Canaries. At that time we hadn't done any specific development for a speed sail, Bjorn was simply using his RS Racing sails and was making a few test runs to identify where the weak points were in the sails.

We made some minor modifications right then and there to make the sails a little more "speed friendly", adding a little more material to enlarge the foot area, as speed sails tend to be used in a more upright position than regular slalom sails where you are raking the sails back more. I guess you could say that the Canaries attempts were more of a fact-finding mission to give us some idea where we needed to go with our later designs.

After the Canaries we continued adapting the RS sails, making modifications according to Bjorn's requirements and we definitely saw an improvement in the performance. But this was still basically a modified Racing sail rather than a pure-bred speed sailing rig and we knew that we'd have to make a bigger step, really start again from scratch, if we wanted to make a serious attempt on the World Record.

It's common knowledge that a double surface sail - that's a sail with a thicker profile - has certain aerodynamic advantages. So our first step was to build a fully double surface sail. There were two different avenues that we chose to explore with this. Firstly, Bjorn was in touch with some people at one of the Universities in Barcelona, and they'd come up with kind of a concept / project which used a light foam which was molded into a wing-like shape and then given a laminated coating.

All this particular prototype really demonstrated was that windsurfing sails require a high degree of twist, and this foam wing simply couldn't accommodate this, so we soon realized that it was almost un-sailable. The theory was good, but in practice it just didn't work. So we then took the alternative direction and began exploring twin surface sails based on more conventional, softer, flexible materials.

Our first prototypes were fully double surfaced, but we quickly learned that these too lacked the necessary degree of twist that a windsurfing sail requires. Essentially the two surfaces of the sail began to fight against one another once the sail was in motion and this restricted the natural twist of the sail and began causing drag.

So where we are today is we have a sail that has about 25-30% double surface in the leading edge - you could almost call this an unusually oversized luff pocket - and the remaining area of the sail is a conventional single piece which forms the "twist-zone".

We've found a very special Kevlar reinforced material for the double surfaced leading edge - what's special about the material is that it's very stretch-resistant in one direction, along the direction of the Kevlar threads, and it's a little more elastic and stretchable in the other direction.

We've placed the material in such a way that the Kevlar threads run horizontally, thereby preventing the sail from stretching and getting fuller when under load. But the material can still stretch and flex in a vertical direction up the luff curve enabling the sail to twist freely. So this material was a real breakthrough for us and was the real starting point for the Speedseeker Sail design.

**Question: So take us on a quick walking tour of the Speedseeker sail in its present form, what makes it work?**

**Robert:** The first real difference between the Speedseeker sails and the RS Racing sails is the outline. Right away you can see that the Speedseeker sail has a larger, lower foot, to accommodate the more upright speed sailing stance. You need to remember that Speed boards are shorter and narrower than conventional Slalom boards and that speed events are generally held in fairly flat water, so it's really not a problem to sail in the more upright position, which improves the efficiency of the sails.

If you look at the leech you'll see it's again a little different to the RS sails in that there are none of the Batwing concaves between the battens and because of this we've added more Mini-Battens - there are five in all - and they are a little longer than the regular ones to add more stability and support in the leech area.

Another very unusual aspect of the Speedseeker sail is that the regular sail panels and the double surfaced sleeve have quite a large area of overlap. Unlike a conventional sail where the panels end where they butt-up against the luff sleeve, the Speedseeker sail has quite a large area of overlap (25-30% of the sail area).

What makes this particularly tricky is that the sail panels are designed with shaping in them and the challenge was getting the shaping to continue smoothly as the panels transition underneath the double surfaced area of the sail. Fortunately, the material in the double surface areas stretches in the vertical direction and this enables the double surface to accurately follow the curves formed by the panel shaping.

As I mentioned earlier, double surfaces don't really accommodate twist in the sail. So we've varied the width of the double surface to facilitate twist where it's needed. So you'll see that the double surface is appreciably less wide in the head area to leave a large, loose "twist area" in the top part of the sail and it's at its widest at the boom, where the panel tension goes furthest back in the sail almost to the leech.

Another point of interest on the Speedseeker sail is the profile. I think people will be surprised to see how "full" the Speedseeker sail is, even quite high in the sail. The fact is that unlike Slalom courses, where you have upwind and downwind legs, Speed courses are pointed way further downwind and you only travel in the one direction. So Speedseeker sails can stay relatively full because we're not worried about the upwind angle, we're only looking for maximum efficiency. Because of this fullness up top, both the 2nd and 3rd battens in the Speedseeker sails have Cams, unlike the RS Racing sails where we only have Cams from batten 4 downwards.

With little need to jibe and sail-back upwind, the cams on the Speedseeker sails are set to provide maximum stability, in particular the bottom two cams are loaded with a lot of pressure, which helps lock the sail in one direction. The sail can only be rotated by pushing the lower part of the sail pretty firmly with your foot.

With speed sailing you tend to be using sails that are about two sizes bigger than you'd normally use, and the aim is to get the sails locked into position. What you don't want are the cams rotating back on themselves when you make slight adjustments, like sheeting out a little.

Another issue with the Speedseeker sail was the oversized, twin surfaced luff area. Because of the extreme width it was difficult to maintain tension in the sleeve area, so we've placed an additional tension strap at the bottom of the sleeve that straps onto the extension. You basically downhaul the sail like you would do a conventional sail, but then you do a further, downward adjustment just on the sleeve area, to equalize the tension that's created from the main body of the sail. This added tension helps give us a nice clean, stable, leading edge.

**Question: As far as rig parts go, you've basically stayed with the standard X9 mast and boom and with conventional battens too, is that right? –**

**Robert:** Yes, the rig parts and battens are the same as those we use in the RS Racing sails.

**Question: Having done all this experimental work with the Speedseeker where you've really been pushing the performance and structural boundaries of conventional sails - were there any lessons that you've learned that you'll put into the next generation of RS Racing sails?**

**Robert:** Yes, to be honest we had no idea how this new oversized sleeve construction would work out, but we've been pleasantly surprised at how well it's been working. With the first real Speedseeker sail we made it looked really odd when it was rigged, but after a few minor adjustments back at the loft suddenly it turned into this totally kick-ass sail. Quite honestly I thought we'd be messing around for a lot longer before we got it to be as good as the RS sails, but in fact we seem to have got it right very early on.

**Question: But does this only apply to sailing in one direction, you mentioned this before, speed sailing is pretty much one-way traffic, whereas Slalom courses have upwind and downwind legs?**

**Robert:** No not at all, this was one of the nice surprises we got. We were expecting the Speedseeker to be all about the upper end of the performance spectrum, a specialist sail that thrived in overpowered conditions or for sailing downwind. But quite unexpectedly both Bjorn and Jimmy [Diaz] reported that the sails were going through the lulls better and actually pointing better.

Now these aspects of performance were like unexpected bonuses, because actually a speed sail doesn't really need any of this and we weren't actually interested in these aspects of performance for the Speedseeker sail. But now we're obviously very interested in seeing how we can make use of this, we want to see how we can make our more conventional sails benefit from these kind of breakthroughs.

As soon as there's time we'll be building an 11sq/m racing sail as a benchmark and we'll see how far we can go with that too. We probably won't have the same outline at the foot and the sails most likely won't be as full at the top, but the essential construction looks very promising.

**Question: How much time do you have before the first record attempt?**

**Robert:** We're looking at being fully ready for the first week of July, so we still have a month left to keep pushing the performance of the Speedseeker sails and I'd have to say that on its present showing, we're feeling pretty optimistic about the Speedseeker sail program.