

The risk gets smaller



Three hundred boats entered the 2013 Rolex Fastnet Race within 24 hours. Those, like the Seahorse team, still thinking about rejoining the circuitous but splendidly tactical and demanding trip to Plymouth this year are already consigned to the waiting list. Snooze, lose, yes, yes, we know, thank you.

The Fastnet Race has been thriving and surviving rather well since it lost the participation of its 'premier' Admiral's Cup division in 1999. But while returning the Fastnet Race to its core participants (an Admiral's Cup entry nearly always took the top prize) has obviously shown the wider attraction of this great classic, there is something else going on as well.

Since losing the Admiral's Cup from the race 14 years ago there has been no let-up in the number of high-profile, 'top-end' entries drawn to the 605nm Fastnet course. Sailors from around the globe still flock to Cowes for the week before the race start, taking part in some or all of the preceding activity before setting off west in pursuit of the big prize. In fact, within a few hundred metres of the *Seahorse* UK office there is one American maxi that now lives here between Fastnet editions, such is the owner's focus on the greatest of the world's classic ocean races. Not the toughest or the longest, and certainly not the fastest, but the greatest and technically the most challenging.

So, enough of one race, where are we going with this? The Admiral's Cup was born out of the Fastnet Race, with its ability to draw the best sailors from around the world to the UK once every two years. A handful of Cowes Week races were thrown into the mix, then the Channel Race was added and, heh presto, we had a great biannual international team 'event'.

The boats needed are already in town, as will be demonstrated again this July and August. As importantly, valid sub-fleets are starting to emerge from the muddle of the recent years. Former TP52s, mini-maxis, 40ft IRC designs, Class 40s, HPR 40s.

I believe that in 2013 we are getting to the point of being just one more small step away from relaunching the Admiral's Cup – based almost exactly on those early editions. With all the races in place, the need for 'a big sponsor' is reduced, if not eliminated, (sponsor clashes have hindered several previous efforts), and there is a mighty fine gold trophy polished up and ready to be competed for.

This is not a pitch to revisit the 'good old days'. As my old friend Gary Weisman said to me last year, across a superyacht deck (such is the ageing process), without a doubt we were both very fortunate to have had the best of times with huge and intense international IOR events all over the world in the 1980s.

But there are plenty of good boats out there once again today,



HELENA DARVELID/SAIROCKET

If you have wondered how the Sailrocket team could reliably deliver so much good aerial footage, look no further than 'pilot Bern't', plus one high-powered and stable model with a GoPro

and plenty of keen owners who would fancy a tilt at a famous trophy, if it were simply there as a parallel prize to something else in which they are already taking part.

I know that other people are currently thinking along the same lines as I am. But I say strike now; start planning for 2015 today and let's just see where this can take us. Again.

Credit where it's due

Blue Robinson filed his copy for this issue in between sending us surprisingly calm notes about his latest tactic for holding back the forest fires that were burning all around the edge of his woodland property during New South Wales' recent troubles. Gutters plugged and flooded, car loaded and pointed the right way, everything kept soaked. Little or no sleep, obviously. Copy came in bang on schedule, by the way.

A special man

We lost Henry Strzelecki, MBE, on Boxing Day at the age of 87. The co-founder of the eponymous outdoor clothing company that bears his name, 'Mr Henri' fled his native Poland early in the war and went on, to quote, 'to make quite a nuisance of myself with the Nazis', initially with the Polish 2nd Corps which was later absorbed into the British Eighth Army.

He later settled in Manchester, married a fine Yorkshire lady, started his own clothing business and the rest is the stuff of the finest marine industry history.

A keen sailor himself, the family firm has backed some of the world's most-promising sailors, signing on at the very beginning with a 19-year-old Ben Ainslie. Mr Henri never failed to make you laugh but at his heart was, I believe, a serious and enormously determined gentleman. A great loss but a fine life. □

SAFRAN

Analysis confirms that the loads experienced by the keel were far higher than the values used by the design team or the shock loadings in the 2009 TJV

– Team Safran concedes there was no collision

Blimey, I hope they now do release the accelerations they've logged or calculated so that in future everyone can have the benefit of a statutory limit

– Dan Primrose, Light Black Design

So that tomorrow no one is tempted to 'just go with what we have'

– Mike Vanderbilt explains why his crew should take *Ranger's* (huge) main off each evening (thanks, Neil Fraser, Scuttlebutt)

It's said you told the difference between J Class crews when

they grabbed the wire sheets: with the amateur the skin came off his hands, with the professional the galvanising came off the wire

– Don Street

Unfortunately, we just destroyed one of the (Red Bull) youth sailors in the fitness test

– Darren Bundock, Oracle

DON'T BELIEVE YOU I don't know why I am faster

– François Gabart

PRAISE INDEED

Gabart sends three times more media than all his rivals – doesn't seem to slow him down

– Mark Turner, OC Sport

The 'surfers' will come back at us, but by then we'll be through 70kt

– Paul Larsen

Below: at 65 knots you have to trust the local wildlife to keep out of the way. *Right:* Sailrocket co-founder and veteran long-distance ocean racer Helena Darvelid presents a human example of the simple – in theory – concept of force alignment (far right) underpinning the concept of the fastest craft ever to be driven by the wind



QED

Blue Robinson grills Aussie Paul Larsen about sailing into a new dimension...

That is just mental... What an unbelievably perfect end!

– Paul Larsen, skipper

All those bloody sums. It does mean something in the end, but you have to do a lot of work to make it mean something. Well, we've done all the work so now the numbers are coming. So I shouldn't be shocked, but I am!

– Malcolm Barnsley, designer

Seahorse Magazine: What have you guys been doing this past year to raise performance to such astonishing levels?

Paul Larsen: We had to go back to school really; but it was all about redesigning the foils. The last time we came to Walvis Bay the boat set-up was perfect. The early stages in a project like this are all about learning how to walk, learning the systems and doing the basics to get it on its feet to

allow us to experiment. A lot of people underestimate the practical side of one of these boats, and so we learned a lot from the first boat in terms of structure and sailability, which of course allows us to then evolve various elements of the design. **SH:** Regarding the foils, you talk often about having to 'unlearn' things...

PL: We did. When we first launched this boat we had ideas on how foils work. So we built it with two conventional foils using conventional theory on high-speed profiles and shapes. Then we had a go at ventilated foils, our first wedge-shaped foils; suddenly we hit our best run here at Walvis Bay. A 54kt peak and 50kt average... using this weird wedge-shaped foil and with a journalist onboard for the ride!

With our conventional foils we never made that sort of breakthrough, so now we had to go back and really learn about these new foil shapes, about ventilation and cavitation and what it all really means.

SH: Can you get your own head around this stuff – or is it best left to guys like Malcolm [Barnsley]?

PL: It's a funny thing. We first had all these hydrodynamicists looking at the problem, and the numbers they gave us couldn't ever explain what we'd achieved. Applying their logic didn't add up, in fact it missed the mark by about 24kt... no small miss!

So then we decided that this theoretical data was simply not in tune with what we were seeing on the water. It is a sore point for those hydrodynamicists, as they want to be associated with this project and be seen

as the guys who cracked the big problem, but in the end we had to just walk away.

This was the one weak area of our team, we really had wanted to bring these guys in. We had great aerodynamicists, we had great structural people and we had great guys to deal with the practical running of the boat. So with our own data and understanding of the problems with the first foils, we attacked it with logic, which showed good results both on the water and in a few other areas of hydrodynamics – all essentially coming from a glass of good red wine and a hot bath – into which we placed a very clever aerodynamicist.

SH: A genuine Archimedes moment. 50kt is known territory but not 60-plus...

PL: We just sat down and looked at the problem and reviewed the data we had, having first listened to all these people telling us why these foils wouldn't work.

Our first boat had a base ventilated rudder; a straight wedge really, with a sharp nose and blunt base plus a base ventilated foil. Once we understood how that worked we saw that base ventilation was a viable way forward. Then we looked at the big picture and realised we also didn't have to work with cavitation, but we could push it way, way back in the speed range.

We expected the foils to be working with the pressure side being active and the suction side of the foil being in a big bubble – either cavitating or ventilating. Then we realised that both sides of the foil were actually wet and it was just the base that was ventilated. That gave us the

HELENA DARVELID/SAIROCKET



knowledge to move forward and design a new foil that had a profile without any pressure peaks, which would in theory create cavitation until around 65kt...

So once we got back to Namibia we then had to create the environment to allow that foil to operate as designed; this meant the first time we sailed we didn't have any of the hydrodynamic add-ons we'd designed. Everyone knows about fences, and to use an old phrase it's not rocket science... So when we first played with the foil without fences fitted, we decided it was either power or drag that was the problem. And by sailing in more wind, with more power, we weren't sailing any faster, which proved it wasn't power; so we had to look at drag.

Now a planing surface simply can't give you a brick wall in terms of drag. The only thing that can give you that brick wall is a massive failure on the foil – either ventilation or cavitation or something else at that speed that causes the foil to fail. So we fitted complex pressure sensors on the foil, then measured the pressure at the bottom of the base ventilated foil to see what was actually happening there; we could soon see that the water was not attached, so that part was working just fine.

SH: Which led to...

PL: We knew that one side of the foil had to be ventilating or cavitating, and so we fitted the fence. Then, in not much wind, maybe 18-22kt, we shot up to speeds around 47kt! The boat had never behaved that well in its life, it had always been sluggish in lighter winds. So now I am sitting there realising we had made a dramatic difference... but with no knowledge of how it would translate with more breeze.

Now there was nothing for it but to book a spot in Walvis and, with very little practice time, when exposed to more wind we just kept punching out numbers. First big peak speeds, then the outright record, then the nautical mile, then the 65kt run. Oh, and by the way, if people think it is going to stop here, they are missing the point completely! This is the start.

We've been sailing with this boat configured for a conservative estimate of 60kt and we do 65; now we're setting our sights much higher as clearly the drag doesn't present a brick wall at 65 or even 67kt.

Actually, after a couple more runs we did see our immaculate, shiny foil go a little chalky in places so we thought, 'Ahh, that means cavitation, now we are close to hitting the wall.' Then we go out again and sail even faster. It's a little crazy really.

We still don't know why that staining showed up. That is one thing we don't yet understand and will have to revisit; but what we have now are massive jumps forward, beating the previous record set by a kitesurfer by a very substantial margin.

We reckon this is like the first jet to go supersonic, the increase after that initial success was huge and we feel we are in that same position. Even on that last record-breaking run our rudder dropped down; I felt a massive kick and it stayed down for the whole run. Now we are thinking how if we hadn't had that rudder drag we could have maybe pushed on through 70kt...

SH: Still confident with your engineering?

PL: This is the boat we'd sat down and designed and the first thing was to work out the limits. What are we structuring for? So these sorts of speeds are not a surprise to those of us in the team. We built the boat limited by hydrodynamics – and then dragged its rudder through the water at 65kt! So it had to be strong enough to deal with things like that happening – and still be a good boat and a good aeroplane.

The first boat was a good boat but a lousy aeroplane... All the first boat wanted to do was to end-for-end itself; driving it was like flying an arrow backwards; even in this boat I still have a deep paranoia after our experiences in the first boat. That crash on the first boat when we flipped, I could sense it was coming, but on this boat all those issues have been designed out and we simply haven't had a problem.

I was walking past the boat last week and said, 'What's that?' It was a small scratch in the paintwork. Our first boat was more like a 3D album of major smash-ups. Actually this whole journey has been a series of pretty traumatic experiences.

SH: That big crash where you took off and landed upside down was spectacular.

PL: We had much worse than that. That somersault was actually pretty graceful. But when you nosedive and get the sudden stop from 47kt to zero... and are lying unconscious upside down among a heap of carbon fibre with guys shouting 'Can you hear me!' that's when it gets scary.

We knew if we had any sort of repetition of those failures on this new boat, at the speeds we were predicting it could well be lethal. That influenced our thinking about do we want a normal car or Formula One-type seating? In a road car you can get out, but with a Formula One-type safety cell you are strapped in and enclosed which means you need

oxygen bottles in there. People also ask why we don't have any sort of canopy or small windscreen... well, that's the first thing that's going to smash right into the middle of my face if there is a problem.

SH: When sailing at these sorts of speeds how can you check the boat is maintaining its structural integrity?

PL: When we designed this boat we obviously opted for everything light and aerodynamic. But when sailing at those speeds, if you suddenly gave me the choice of all this super-light string and thin panels, or a chunky bit of wire cable, right there I'd be tempted to take the wire!

But the boat is designed well and we have put strain gauges in the right places to give us the information we need. After each big run we 'illuminate' the boat and check the wing sheet angles, the rudder loads, the pressure in the cavities, and we look at what's happening with the data. For example, a rudder load peaking at 170kg in turn means the forward beam load is at a certain level that hopefully our earlier destructive testing that has confirmed is fine. But we may still move the beam back a little for the next run and then check that we do get a corresponding drop-off in rudder load.

SH: How is the boat to steer with such a small wheel?

PL: We took a gearing box out of a lathe, so it has no play, is very strong and has a steering ratio of 37:1. Your normal car has about 14:1 and over about 25:1 you get no force feedback, so I can let the wheel go at any time and it will carry on and steer. But the whole package does have enough grunt for me to make some big course changes at low speed, yet still track at high speed if I have to let go.

On the first boat we had to be super sensitive when steering; this steering system was a big advance. The smallest amount of oversteering on the first boat, you lost control and it would spin out. Now everything is so well behaved. It really is a joy to steer this thing.

As I am going down the course I can cleat off the wing when I am on a safe trajectory then take my hands off the wheel and the boat runs itself. On the last 65kt run everything was happening really, really fast... It is pretty amazing. But I am no longer counting off the seconds saying, 'This is good, this is quick, this one is in the bank...' I am just saying, 'This is % fast!'

But at the end of the run I am still always careful to quickly calm down so as not to be disappointed by the actual data – I've been down that road too often.

SH: So how physical was that last run?

PL: When I'm driving there's very little actual trimming, the boat does it itself. I'm like a passenger who's got to keep his foot on the throttle and see what happens. I am constantly monitoring the response of the boat to see if something is failing, but she was saying, 'Just let me at it! Sit back, son, and hang on!' And, mate, I can tell you it was a beautiful and spectacular thing.

Next month... those details □