Unusually testing

For Bruce Farr the 2005/6 Volvo Ocean Race has not followed the intended script. However, there is lots to be learnt – and plenty else to stay cheerful about. Rob Mundle visited Farr in Annapolis

The walls of his office in Annapolis are heavy with half models of the yachts that have been the fastest in every Volvo/Whitbread round-the-world race since *UBS Switzerland* won in 1985-86. This time around Bruce Farr is behind the design of four of the seven contenders in the Volvo Ocean Race, but so far things have not gone to plan.

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SH: What is your overall take on this race?

BF: It confirms to me that there really is no replacement for an early start, full funding, a two-boat programme and getting the best people around every part of the campaign. That's what the ABN AMRO campaign have shown: they're a group operating at a level quite a bit higher than any of the others have been able to achieve, either because of a shortage of money or late starts.

SH: And the performance of your designs?

BF: I'm disappointed that we're not further up the table, but at least we are now filling a few good places. It's obvious that there are trade-offs between our boats and the ABN boats [designed by Juan Kouyoumdjian]: the ABN boats are faster hard-reaching and our boats are faster in light airs. We may never know how that really would have played out given that none of our boats have managed the full course without problems – so for me it's disappointing not being able to see how that picture might have played out.

As an extension of that, one interesting aspect of the race that we recognised yet perhaps underestimated was the psychological impact the performance of the yachts would have on the crews. The structure of the race meant that powerful boats would do better in the early part and the more slippery boats would do better later on. From a purely technical point of view that doesn't matter a damn – it's what occurs by the finish that is important – but from a psychological point of view, if one boat is so powerful that it takes off at any part of the race and starts building up points, everybody else can get disenchanted.

SH: How do you compare your designs with Juan K's?

BF: It's difficult to draw hard and fast conclusions because I think there are many differences in aspects of the programmes beyond boat design. It's quite tough to say how much the performance differences are due to hull design, keels, sails, rig and everything else that contributes to the result. And let's not underestimate the value of just learning to sail the boats, something you do much better with a two-boat programme.

There are, however, conclusions you can draw from looking at the boats and observing their performance. The most obvious thing is the difference in beam. When we did our research we saw a two-option scenario when it came to beam: go wide enough to make twin-rudders work well, or narrow enough to make one work well. Between those scenarios there was an area where we weren't sure that either option would work successfully, and that gives you the performance difference between Juan's boats and ours in conditions that are both powered-up and not powered-up.

More than that, I think consequential to the decision on beam, the differences get multiplied because a two-rudder boat will handle better and be faster in hard-reaching conditions as it's got one rudder fully immersed and the other almost out of the water. On the other side of the spectrum, in light airs, the twin-rudder boat has more rudder in the water, so suffers more drag, something that accentuates the differences that would otherwise exist just because of the differences in hull shape.

Overlaying that, there's another step that shows up: Juan's hulls are more oriented to semi-planing – at low to moderate planing speeds – because they have a very straight run aft and are quite full forward. Our boats are more suited to lower speeds, are fine at higher speeds, and probably more suited to going through waves. When you roll all those things together you get one style that's very fast in the semi-planing to mid-planing conditions that you see in hard-reaching, while the other boat is a lot faster in light airs. So it then boils down to what sort of weather mix you get.

SH: But your boats have also been plagued by failures from the outset…

BF: There have been a number of failures due to various causes; interestingly the failures haven't been common throughout our boats, even though the drawings are essentially the same in terms of the structure.

As a consequence it's hard to know with the structural issues whether they are issues of design loadings, assumptions not being sufficient for the conditions, the quality of construction, or in some cases even changes that are far from what we drew. Probably the one area where there is least doubt about the issues is with the boats that had trouble with their hydraulic rams. When you take a close look at the rams they clearly do not meet the specifications we laid down.

The one boat that had rams from an outside source that went close to meeting our specifications, *Brasil 1*, hasn't had a problem. It's hard to know where that problem went off the rails, but something went wrong at the design/manufacture level that produced rams that did not meet our specifications.

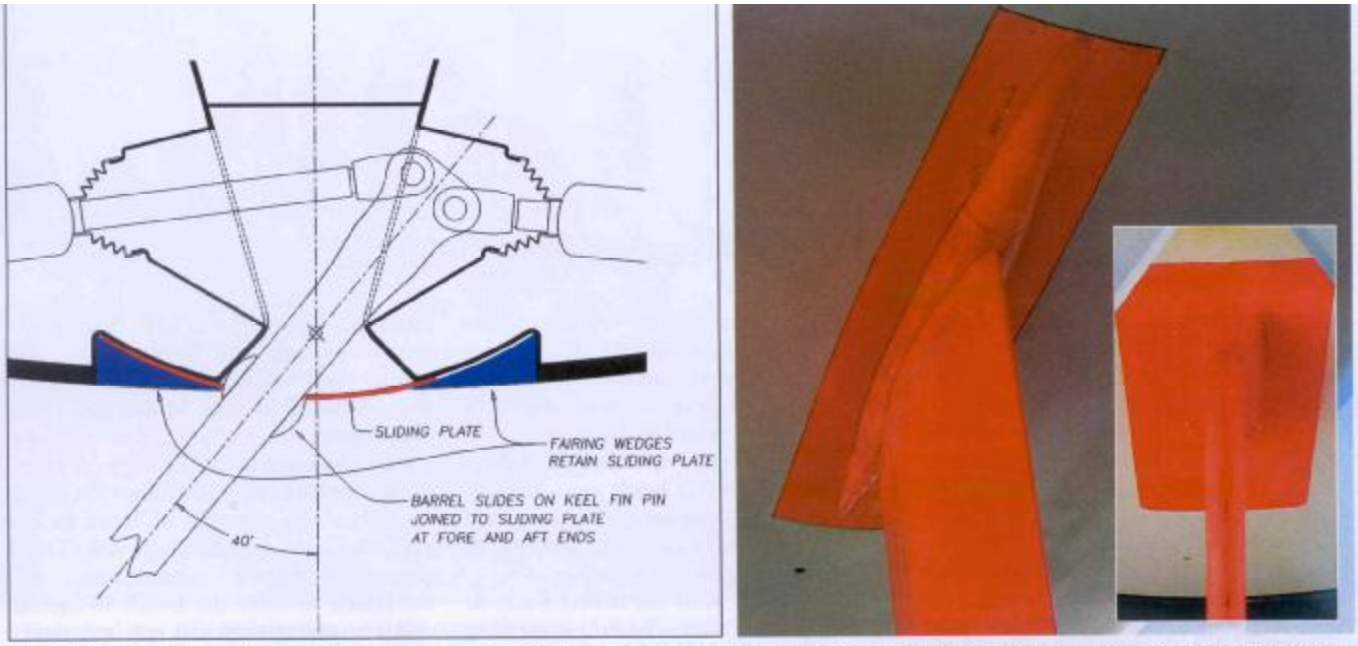
It must be said that Pirates paid a price for being a late programme. To save time they sourced stuff from the same places as Ericsson and didn't really stop to think about it. And MoviStar, which originally had nice solid stainless-steel rams, decided that they'd better have some of the lightweight titanium rams as well! Since those issues have been sorted out we've seen a degree of improvement. Even so, I think some of those rams probably still don't meet the specifications we set out in the beginning.

SH: Are you saying that some of the boats haven't been built to your specifications?

BF: In some cases that is true. I'm not saying that's what caused all the problems, but because we are in the middle of a race, when we've seen a problem that might be from our side we've just gone out and beefed up all the boats because in the time available it's near impossible to make accurate assessments of what the loads are. Our policy from early on was that if there was a failure then we would assume that it needed beefing up, so get on with it. One thing about carbon is that you can do a lot with a little bit of weight.

But there's the other side of that equation to consider: it's also difficult to figure out exactly how the boats have been put together. I know that some of the boats consciously departed from the details that we drew up; went their own way and did things differently; changed the structure, changed the way they did things. Some followed our drawings, but there are a couple of instances where I think that the way the structures went together contributed to failures.

All that does is demonstrate that you



The sliding door fin-sealing solution chosen by Farr Yacht Design looks clean and tidy (*right*) when all is well. However, it is a relatively complex system with some large moving parts (*left*) that have caused no end of grief in this race. By contrast, the elegant and simple solution adopted for the ABN boats (*inset*) involves no extraneous moving parts, just a recess (not a hollow...) in the bottom of the hull

can't look at the problems and say, 'It's all the fault of the designer.' There are other factors involved. It's probably more accurate to say that some of it is the fault of the designer; some is the fault of builders; some of it is the component suppliers, and some is the group managing a project that has made changes because they think they've got a better way of doing it.

SH: Without consulting your office...

BF: Not in every case. Some have spoken to us. But one of the disappointments for us in this particular race has been that although we tried really hard to establish close relationships with the groups, by and large they've tended to keep us at arm's length. I think this has been because of a paranoia that we might share information with the others, though our track record shows otherwise. It's a clear shift that's coming in with these events, probably because the races are becoming more commercialised. In a lot of cases we haven't been involved in the decision-making process that has changed things.

The classic example for us is with the titanium rams. No one would directly give us the information we wanted to satisfy ourselves that they were OK. We finally found some information on a website and realised they were under what we had spec'd. So we contacted the team and said, 'Hey, if these numbers on the website are right then there's a problem here.' The answer we got was 'no, no, no – they're OK. We know the numbers are OK. Don't worry about it. We've got it right.'

This just demonstrates that there needs to be a closer relationship between the syndicates and the designers. I'm not saying that we could have solved all the problems, but I think we could have probably caught a few of them early and made it less painful for the teams.

SH: Did any alarm bells ring for you when the first ABN Amro boat had its problems prior to the race?

BF: We heard a full array of stories about what went wrong with that boat so it's hard to know what really was the issue. I don't think the problems were related to the loads being higher than what was assumed. For us, our boats haven't had any issues with the hull shell, and they've only had, I think, one small issue with respect to the supporting structure for the hull shell as a result of the pounding load. That suggests that our basic assumptions about the loadings on the Volvo Open 70 hull going through waves at speed have been right.

In contrast the ABN boats had trouble on Leg 1 that they kept pretty secret – they had a potentially serious problem with skin damage. We did have a number of different issues on different boats with the structure surrounding the keel; Pirates had some bearing rotation problems and MoviStar had difficulties with the ram shelf, but that was caused by a defective bond within the bulkhead that it was hanging off.

SH: How about the Volvo 70 in general?

BF: It's a brutal machine, but the concept is good. It's an exciting offshore boat with incredible performance qualities. You can argue all you like about whether it's too extreme – and there are people on both sides of that argument because they like to see their names in print – but it's hard to argue with the fact that they are bloody fast, exciting boats that really do sail.

When you see the miles they can do in a day alongside what any other monohull has ever done you can only be impressed. You might question that it's a bit overdone for this type of race, but I think its shortcomings are relatively minor: more law-making mistakes rather than a conceptual failure. For example, when they limited the height of the rig I don't think they sensibly reduced the spinnaker area to match that mast height, so the boats have almost more spinnaker area than they can manage within their rig dimensions, and that leads to boats that don't handle as well as they should with spinnakers set and also to some pretty odd-shaped sails.

My thought is that the boats should have a slightly taller rig with the same spinnaker area, or they should have a smaller spinnaker area with the rig they've got. The other aspect, which I think has probably had a much bigger impact, is the crew size/sail-handling issue. You've ended up with a boat that's a bit of a beast to manage for the number of crew allowed. They should have either had more people or restrictions on the way the sails are used. It would have been better if there had been restrictions on how you use the headsails, like making them all furling. What they need to do is clean up the boats to make them more hospitable to the crew. That means either more people or sail-handling measures that make them easier to operate.

SH: What will Bruce Farr's second-generation Volvo 70 look like?

BF: It's a bit early to say, but I can say now that I was always pretty keen on a personal level to go with twin-rudders, because I felt it was a good solution for high-speed reaching. However, our research suggested the characteristics of the boat made wide enough to have two rudders made it almost too wide. Looking back now I'm not sure I wouldn't go wider with two rudders and try to do a nicer job of making one of those boats more slippery in light airs.

SH: And the 'bomb bay doors'...

BF: Again, we're not saying that all the problems relating to the sliding plates are ours. We went down that route because we believed that the rule did not allow hollows in the hull. All I can say now is that if at all possible we would avoid using them in the future... ❐