SCHRS

SMALL CATAMARAN HANDIPAP RATING SYSTEM

WORLD COUNCIL REVIEW 2013

(Published 27th February 2013)

An explanation of the changes to the formula and ratings in 2013

Introduction:

Some minor changes have been made to the 2013 SCHRS formula. This follows a review conducted to take account of developments and changes in the catamaran world, something that should be done from time to time.

SCHRS is a measurement formula. In other words there is no direct link between racing results and the handicap number as in Portsmouth Yardstick or other performance systems. But it is wise to review performance in considering whether changes are needed to the formula.

A member of the SCHRS Technical Committee has done an extensive study of C1 results in major French regattas during 2012, concentrating on classes where significant numbers participate. Although it is acknowledged that there may be different standards of competence in different classes, it is comforting that the 2013 ratings are within 1% of the ratings based on average performance in those regattas.

Summary chart	**AHPC Viper Double**	**Nacra 20 carbon**	**F18**	**A Class**
Ratings on average performance	1.018	0.865	0.986	0.995
SCHRS 2012	1.018	0.850	0.966	0.988
SCHRS 2013	1.022	0.856	0.988	0.990

Crew weight:

In calculating theoretical performance, the formula has to make an assumption about the weight of the crew members.

The 2012 formula assumes that all sailors weigh exactly 75kg. The Texel formula flexes crew weight from 65-75kg according to size and sail area. We need to do the same to align results with experience. This is supported by evidence that smaller boats are often sailed by lighter crews and that will always give them an advantage.

The 2013 formula assumes that weight per crew member varies from 70-85kg using the following formula:

WCM = 70kg + length rated in excess of 5m x 10 capped at 80kg, PLUS An extra 3kg for single-handers for each square meter of rated sail area (A) in excess of 13m², capped at 10kg

Centreboards:

The 2013 formula is as follows:

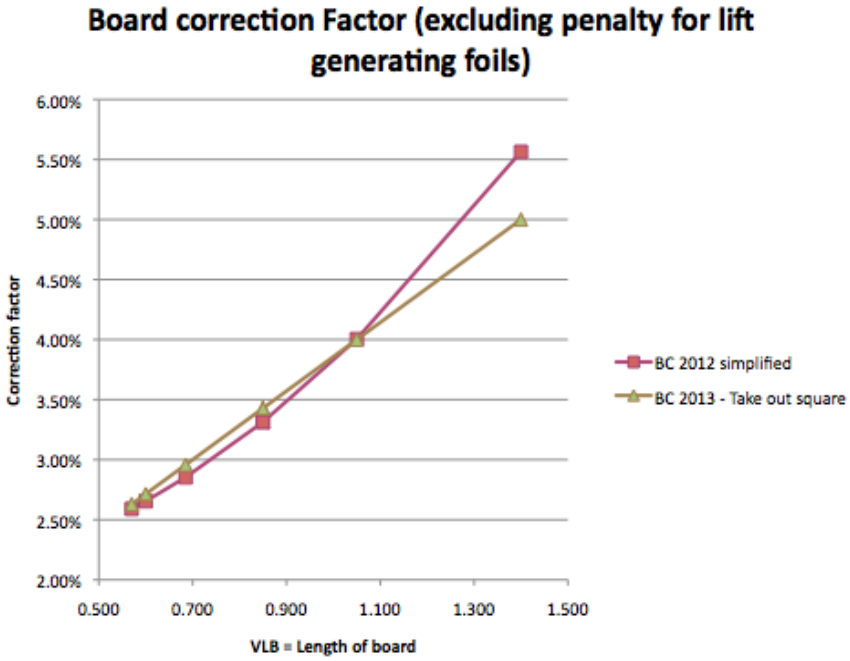
Board Correction (BC) = 1% + LB / 35
PLUS 1.5% if the boards are designed to generate lift.

LB[1] is the length of the board and all other under water appendages. Winglets on the rudders are added in. Curved boards or winglets are assumed to generate lift, as are boards canted at more than 10 degrees.

The BC formula has developed as follows:

2011 formula	Aspect ratio only - size didn't matter
2012 formula	2% + (Area of board x aspect ratio / 55)
2012 simplified	2% + (Length squared / 55)
2012 with square removed	1% + (Length / 35)

Texel uses a flat 4% for any sort of board. SCRHS moved from using aspect ratio only: through to taking account of both aspect ratio and size. However the width and area of the board are irrelevant – they cancel out[2]. Wide boards lose in efficiency what they gain in size. The proposed formula is simple to measure and helps meet complaints about excessive penalties for very long boards. The graph below how it changes from the 2012 version. For this graph the lift generating foil penalty is ignored.



Lift generating boards: the 2012 formula only penalised lift generating boards by measuring 'round the curve'. i.e. instead of measuring the vertical length below the hull, the full length of the board was measured.

There is increasing evidence that lift generating foils improve performance, and the 2013 board therefore introduces a fixed penalty of 1.5% for any boat with lifting foils, in addition to the "round the curve" measurement penalty. This may have to be refined in future years.

Note [1] LB was previously defined as VLB, or the Vertical Length of the Board. Now that we are measuring round the curves, vertical length is no longer appropriate

Note [2] Area x Aspect ratio = A x VLB^2/A = VLB^2

Gennaker Penalties:

In the 2012 rule any sail measured as a spinnaker must have a mid girth width that is more than 75% of the foot. The rule exists to stop people building very flat spinnakers and using them upwind.

A Spinnaker is very differently rated from a jib. If it is a spinnaker only 10% of area is added, whereas if it is a jib 100% is added.

Faster cats find it difficult to make spinnakers flat enough without breaking the 75% rule. In some cases a compliant spinnaker can't be used for reaching at all, and has to point low downwind if it isn't to collapse due to the apparent wind coming forward.

At present neither Texel nor SCHRS has an agreed formula for Gennakers, other than to classify any non-compliant spinnaker as a jib. This produces such a large penalty that the sail is effectively banned. A formula is needed to soften the discontinuity.

The following formula has been agreed for gennakers where: .
75>SMG/SF>.50:

$$\text{CSPI} = \text{CSPI} \times (1 + (0.75 - \text{SMG}/\text{SF}) \times 2)) \text{ see note } [3]$$

This will result in a 30% increase in rated area for a 60% gennaker. If a Nacra 20 Carbon were to use such a sail it would reduce the rating from .856 to .844, a 1.2% penalty. Note that we have added a clause to the rules to prevent people building spinnakers capable of use upwind.

Note [3] CSPI = area of spinnaker
SMG = mid girth measurement
SF = foot measurement

Power factor:

The 2012 rule caps the power factor at 1.032. This only affects the A class and one or two other over powered cats. We are recommending that the cap be increased from 1.032 to 1.036, a moderate increase.

Jib Measurement:

There has been some comments about jib measurement methods, and there have been some suggestions that they make differences of as much as 6% to the area. We ~~I~~ have checked the arithmetic and are ~~am~~ satisfied that the differences are very much smaller – all below 1%. However we need more clarity. Here's our ~~my~~ understanding of the issues:

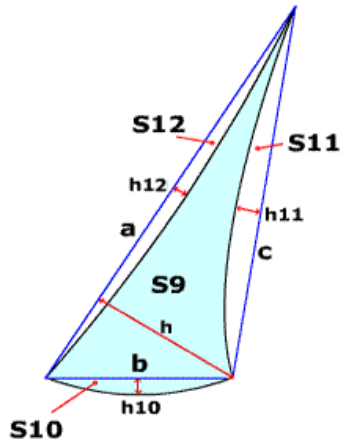
1. Do we add or subtract luff round or hollow? Most jibs have hollow luffs and the area should be subtracted, but we ~~I~~ have seen at least one form where it is added.

2. How do we measure VLJ? This is meant to be the vertical projection of the luff of the jib, but it is difficult to measure in practice and many measurers use a rule of thumb such as VLJ = .92 * Length of luff. Research in France shows that this should be .95, so we alter the rules accordingly.

RATIOS BETWEEN SCHRS MESUREMENTS : VLJ / A

	N° Voile	Luff = A	VLJ	Ratio VLJ / A
SL 15,5	817	4,912	4,650	94,67%
Tyka	271	4,080	3,900	95,59%
2 Win Tyka	470	4,072	3,895	95,65%
SL16	825	5,470	5,231	95,63%
Mattia F17	FRA 118	5,475	5,243	95,76%
Mattia F17	FRA 1104	5,480	5,245	95,71%
HC Pearl	YC	5,710	5,515	96,58%
Mattia Esse 17	FRA 105	5,365	5,070	94,50%
Spitfire	FRA 185	5,738	5,416	94,39%
Cirrus Evolution	FRA 115	5,850	5,495	93,93%
Nacra F16	FRA 22	5,760	5,564	96,60%
Mattia sport	FRA 17	5,850	5,445	93,08%
Nacra F17 Sloop	Nacra	5,788	5,491	94,87%
HC FX Xtrem	Xtrem	5,764	5,556	96,39%
Viper Double	FRA 202	5,534	5,271	95,25%
			Moyenne	**95,15%**

3. How do we measure the top corner cut off on the jib? The current diagram is ambiguous:

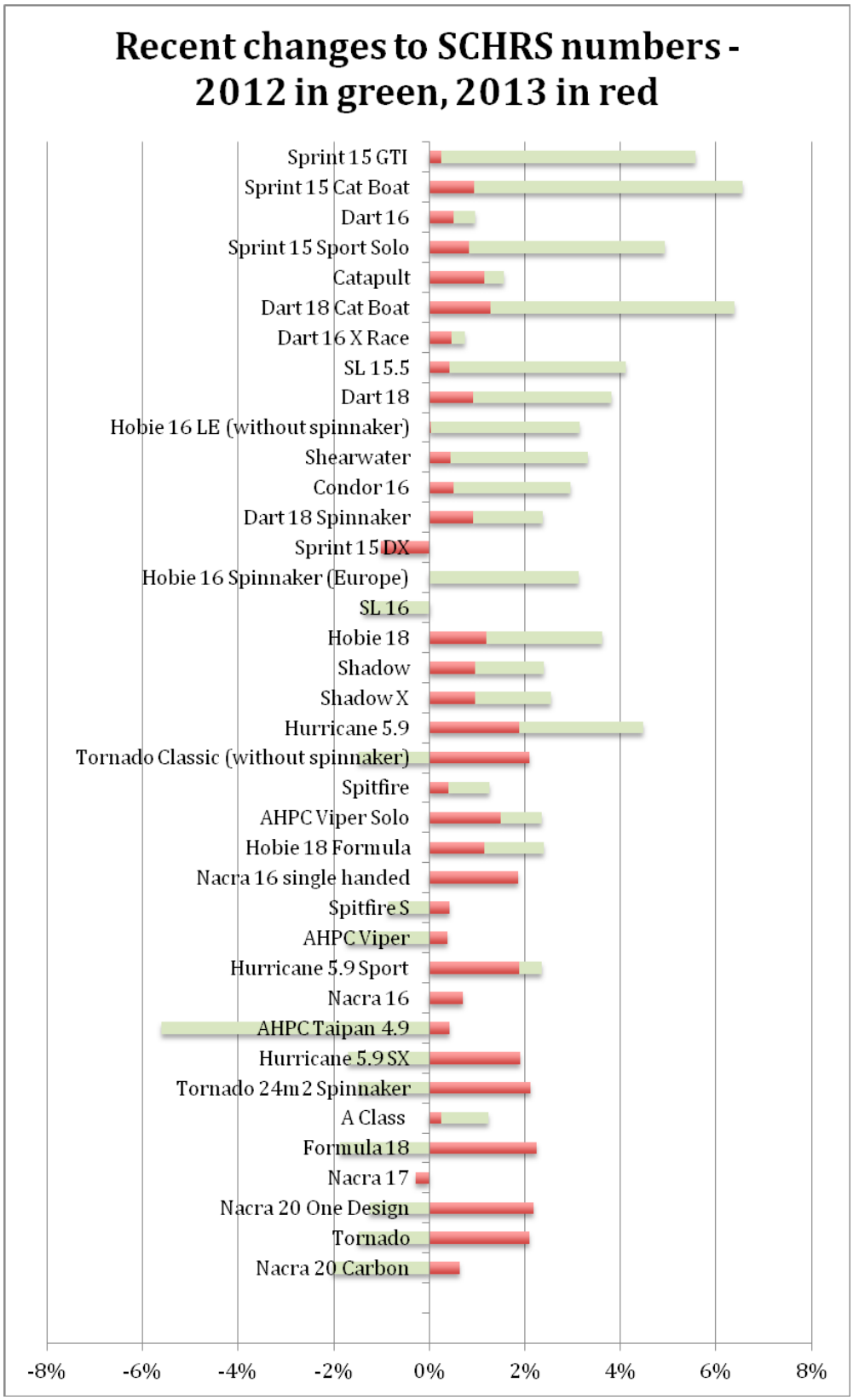


Jib Measurements

CJ - Area of Jib

S9 = a x h / 2
S10 = 2/3 b x h10
S11 = 2/3 c x h11
S12 = 2/3 a x h12
CJ = (S9 +or- S10 +or- S11 +or- S12) m²

It has been agreed redo the diagram as per Texel, which makes it clear that luff and leech measurements go to the actual top of the sail, not the theoretical point. Area is calculated from the big triangle, less the tiny triangle at the top.



Please see the chart above showing the changes in ratings for key classes, 2012 in green, 2013 in red.

Declaration of interests:

The people who have influenced these changes are also competitive cat sailors. They are using their knowledge to improve cat racing as a whole, not to benefit their own classes. In the interest of openness the main contributors and classes sailed are listed below:

Person	Classes Sailed
Nick Dewhirst	Sprint 15, F18
William Sunnucks	F18, M20 Vampire
Jean-Claude Rouves	Viper
Olly Harris	Shadow

Conclusion:

These changes are intended to recognise the comments we received during 2012. We have tried to introduce moderate changes to the formula and to allow as many different catamaran variants to race together in as fair a way as is possible.

Note that catamaran race results typically show a 20% time difference between the first and last regular sailors – more including tail enders. Please remember that small changes to the rating numbers are of little consequence compared to the skill of the sailors.

SCHRS World Council
February 2013