OFF SOUNDINGS CLUB

April 8, 1995

SUBJECT: Race Penalties Committee Report

COMMITTEE: N. Rabe (Chairman), R.H. Roberts, J. Brooks

OBJECTIVE: Follow up the discussion at the January 20, 1995 Board of Gcvernors meeting, with recommendations as may be appropriate.

Statement of purpose of the penalty system:

a. Counter the advantage to certain yachts of favorable handicaps (primary with Off Soundings ratings, of some issue with PHRF handicaps).

b. Spread the wealth. Make more difficult the dcmination by the few, in order to retain interest.

1. Duration of race penalties and other related conditions:

a. Originally required that three series be raced, with "infinite męmory".

b. Precedent-Setting Decision of January 15, 1971:

In order to work off a penalty, in addition to other conditions, a vessel must start both races in a series. She must finish both races in a series also or submit a written withdrawal notice to the Race Committee.

c. Beginning 1976, penalties were cleared after five race series, sailed or not.

PROPOSAL: Penalties will be worked off in three race series, sailed or not.

Rationale: Minimal record keeping.

Eliminates questions regarding start/finish/ withdrawal/dismasting/etc.

2. Fairness of fixed seconds-per-mile penalties. It is believed that current penalty system is harsher on fast boats (A-1,C-1) than on slow boats (B,C-5) because fast boats have less seconds-per-mile to work off constant time penalty.

An equivalent penalty system using PHRF time-on-time would eliminate this bias, or at least reduce it, by employing a multiplier of the TCF.

2. Continued.

Current method: $TCF = \frac{600}{480 + PHRF - Penalty}$

Alternate method: $TCF = \frac{600 * (1 + Penalty)}{480 + PHRF}$

Current method penalty is 10 sec/mile for each 5% of penalty.

Alternate method penalty is 1.5% for each 5% of penalty.

RECOMMENDATION: Committee review concept further for 1996 implementation.

3. Potential exists for persons engaged in a yachting business that affords access to multiple yachts, or others, to not be effectively subject to the penalty provisions of our race rules.

Review of our race results for a 15-20 year period indicates only one member who has sailed what might be described as "house yachts" and who was thereby seldom subject to race penalties.

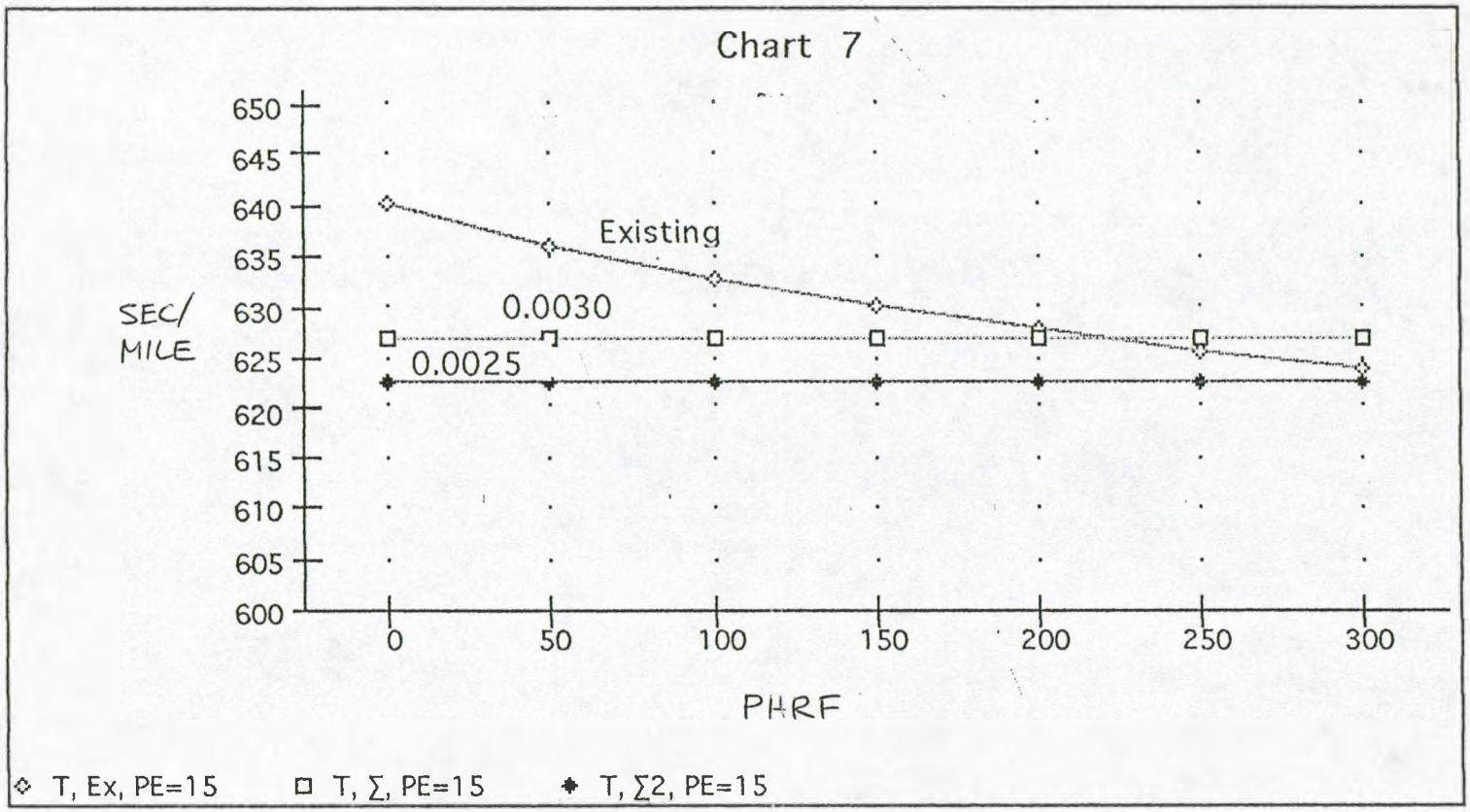
CONCLUSION: There is no committee consensus that a problem exists requiring action. No action is recommended.

Respectfully submitted,

Norman Rabe

Norman Rabe, (Chairman)

If we take the values of TCF and multiply times a standard time for doing a race, namely Standard Elapsed Time per mile = (480 + PHRF), the following results:



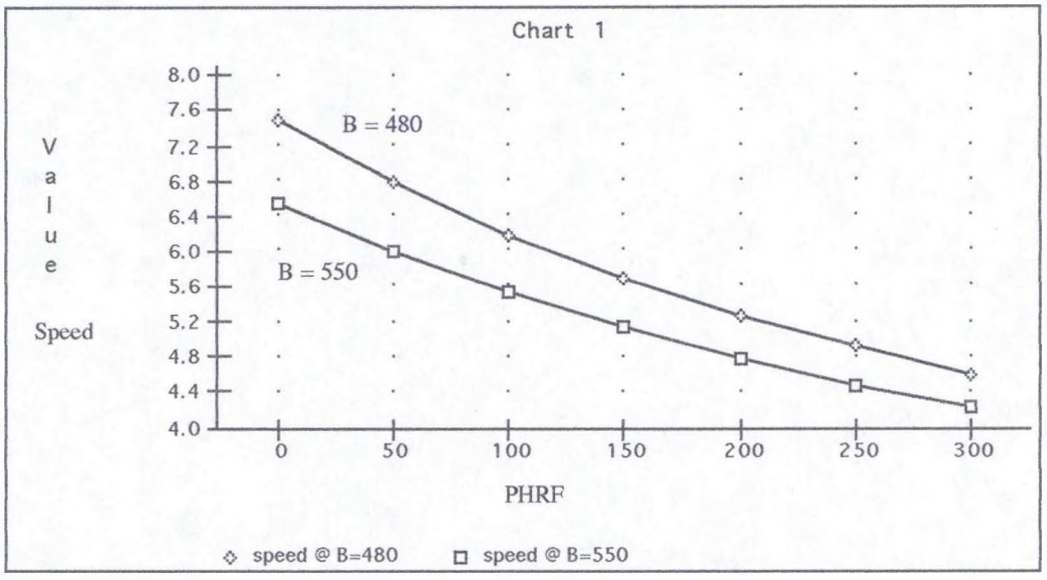
Time-on-Time
Conversion from PHRF

There is a good article by John Collins in the January, 1994 issue of *Sail.*. We may want to review the principles involved and make sure that the conversion process is the one we want.

The basic formula relating PHRF and Time-on-Time is:

$$\text{Time Correction Factor} = TCF = \frac{A}{B + PHRF}$$

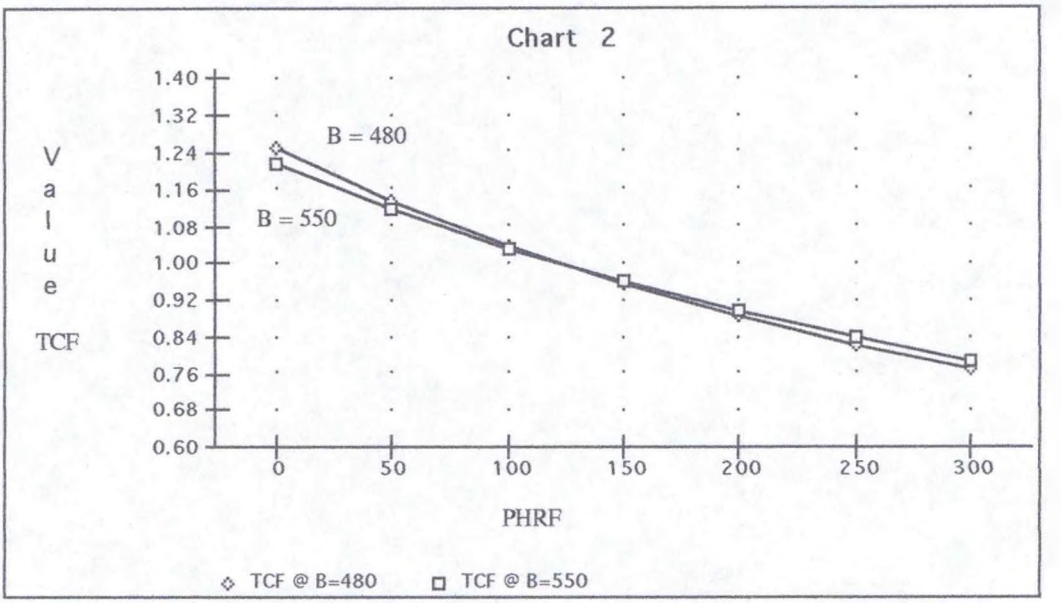
where we have the option to select the constants A and B, each in seconds per mile. Collins notes that "B" is chosen so that the denominator (B + PHRF) will equal the number of seconds it takes a boat with that PHRF to sail a nautical mile. He then converts (B + PHRF) to speed by dividing it into 3600 seconds per hour and provides a graph showing the corresponding boat speeds necessary for the boats to sail that nautical mile, showing the effect of different values of "B" -- going from 480 to 800. The greater the chosen value of "B" is, the slower the corresponding speeds are. I've made the following chart, using B = 480 and B = 550, since he discusses those two in his article.



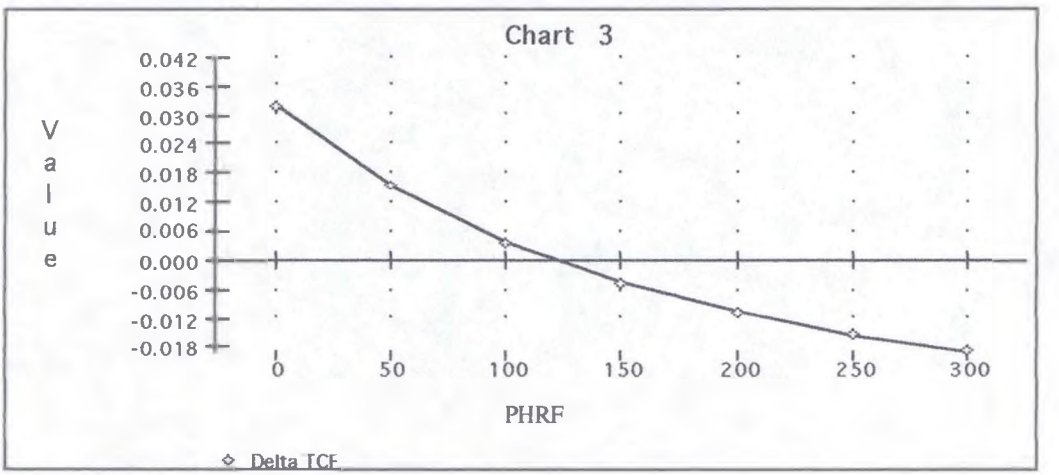
Collins notes that the "B" value of 550, if subtracted from the IMS General Purpose speed estimate, happens to yield a rough approximation of the PHRF. And, that corresponds to a race sailed in about 10 knots of wind with about one-third being sailed to windward. The "B" value should be greater for conditions which result in a slower race.

On the other hand, Collins notes that the PHRF of Pacific Northwest uses B = 480, as we have proposed to do. That would indicate a race held in stronger conditions so that higher speeds would have to be achieved to make time-on-time scoring be equivalent to time-on-distance. As we would expect our races to be slower than presumed by a factor of B = 480, the slower boats will have a slight advantage.

Perhaps another way to look at this is to calculate and plot the TCFs. To do this, the Factor "A" must be selected. As Collins points out, "A" does not affect the relative results -- so we can pick it so that about half our fleet will have a TCF greater than 1.0 and the other half lesser than 1.0. So, arbitrarily selecting the cross-over point at a PHRF of 120, "A" will equal 600 for B = 480, and "A" will equal 670 for B = 550. See Chart 2.



The change in TCF as "B" goes from 550 to 480 is small but provides a slight disadvantage to the lower-rated (faster) boats and a slight advantage to the higher-rated (slower) boats. Chart 3 shows the difference between the two values for TCF (The extreme values are only about 2.5% of TCF)



Remember that each yacht's Elapsed Time is multiplied by its Time Correction Factor to obtain its Corrected Time, and that the smallest Corrected Time wins. Thus, a smaller TCF indicates an advantage.

After all of this, I'm happy to stay with the conversion formula we've been talking about, where B = 480 and A = 600 seconds per mile.

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November 20, 1995

TO: Peter Brinckerhoff
FROM: Dick Roberts

In response to your note of October 16th, I have enclosed a table of the results you requested for the 1995 races. The Elapsed Times are absolute; the Corrected Times are without penalty.

The PHRF number is the same number, whether used in a Time-On-Distance or Time-on-Time race. It is just applied differently for the two kinds scoring systems, as follows:

Time-On-Distance

A Time Allowance (in Minutes) is determined from: $TA = \frac{\{\text{Course Length}\} * \{\text{PHRF} - (2*\text{PE})\}}{60}$

The Time Allowance is then subtracted from the Elapsed Time to give the Corrected Time:

Elapsed Time
\- Time Allowance
Corrected Time

Time-On-Time

A Time Correction Factor (TCF) is determined from: $TCF = \frac{A}{B + \text{PHRF}} * (1 + 0.003*\text{PE})$

Off Soundings uses A = 600 and B = 480, as described below.

The Elapsed Time is then multiplied by the TCF to give the Corrected Time:

(Elapsed Time)*(TCF) = Corrected Time

Comments:

1. PE is the Penalty and can only have the values 0, 5, 10, 15, 20, 25, 30, 35, 40, or 45.

2. When PE is set to zero, its portion of the equation disappears.

3. Course Length is a term in the equation for Time-On-Distance, but not for Time-On-Time. Thus, there was no "rated distance" for any of the 1995 courses. However, for purposes of calculating Time Allowances and Time-On-Distance results for comparison, nominal course lengths are given in the enclosed table.

4. In Time-On-Time, 480 and 550 are the most common values selected for B. The smaller of those slightly favors the smaller boats.

5. In Time-On-Time, the value for A is chosen so that the TCF = 1.0000 for a PHRF number of 120, for convenience. This means that for PHRF numbers smaller than 120, the TCF will be greater than 1.0000 and for PHRF numbers larger than 120 the TCF will be less than 1.0000. Thus, where B is selected as 480, A becomes 600, and where B is selected as 550, A is 570.

6. The PHRF numbers are determined by boat speed, on several points of sail, and have been established by the ECSA (PHRF of LIS) Handicappers' Council or, in the case of Off Soundings, by the OSC Chief Measurer. Boat speed analysis is based on "average" conditions, and may include IMS-General Purpose ratings and Time-On-Distance results. The number that is thus established is then used in determining the Time Allowance (in Time-On-Distance), or the Time Correction Factor (in Time-On-Time), as outlined above.

7. Nationally, there is some thought being given to the possible difference in PHRF numbers for racing on windward - leeward courses, as opposed to the more traditional, more-or-less triangular courses -- as some boats reach more poorly than others. We may hear more about this in a year or so.

8. Using Time-On-Distance, a boat's Time Allowance for a given course length will be the same, no matter how fast or slowly she completes the race. However, in Time-On-Time the Time Correction Factor is similar to a percentage -- in your case, your Corrected Time is always 117.65% of your Elapsed Time, no matter how long it takes you to complete the course. And, SEDONA's Corrected Time will be 119.76% of her Elapsed Time, etc. (The numbers given here are taken from the enclosed table and are without penalty. I note that your percentage would become 122.94% with a 15% penalty, as given in the Spring Race Series booklet.)

For background information, I have enclosed a copy of an analysis I did in early 1994, when we were just starting out with Time-On-Time. John Collins is currently the Chairman of US SAILING's PHRF Committee.

I hope that this answers your questions. Write again if something is not clear.

Sail No	Boat	RAT	TCF	S 1 Elaps	S 1 Co	S 2 Elaps	S 2 Co	F 1 Elaps	F 1 Corr	F 2 Elapse	F 2 Corr	F 3 Elapsed	F 3 Corr
	RACE, 1995			Spr -- Fri		Spr -- Sat		Fall -- Fri		Fall -- Sat 1		Fall -- Sat 2	
	SETTLER	69	1.0929	253.95	277.54	205.72	224.83	286.46	313.07	77.30	84.48	155.32	169.75
	HOT NUMBERS	54	1.1236	257.20	288.99	199.71	224.39	261.98	294.36	71.99	80.89	146.79	164.93
	SEDONA	21	1.1976	242.37	290.26	188.65	225.93	290.83	348.30	73.26	87.74	144.55	173.11
	HOOLIGAN	30	1.1765	250.06	294.19	189.97	223.49	253.43	298.15	72.49	85.28	145.47	171.14
	Nominal Distance			24.91		22.9		24.6		7.0		16.2	

Sail No	Boat	RAT	TCF	S 1 Elaps	S 1 Co	S 2 Elaps	S 2 Co	F 1 Elapt	F 1 Cor	F 2 Elapse	F 2 Cor	F 3 Elapsed	F 3 Cor
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