

THINKING IN THE TIME DOMAIN

by Russ Cardoza

One of the basic problems with Time on Time (TOT) scoring is that it requires thinking in the “Time Domain” vs the “Distance Domain”. With Time on Distance (TOD) Scoring, our PHRF handicaps are in seconds per mile, and we routinely estimate the time allowance we give to a competitor by $(\text{PHRF DELTA}) \times \text{DIST}$. For example, if we are racing a J35 at a PHRF of 75 against a C&C 353 at 117, over a six mile course, we immediately figure we have to give the C&C 353 $(117-75) \times 6 = 252$ seconds. TOT, on the other hand, requires that we forget about distance and only think of elapsed time, as Corrected Time = Elapsed Time TCF. (TCF, the Time Correction Factor, = $650 / (440 + \text{PHRF})$; distance does not enter into the calculation). But how do we estimate how we are doing when we are on the race course? There are three ways for us to assess our handicap vs our competitors with TOT:

- 1) Intuitive
- 2) Corrected Time Formula
- 3) Time Allowance Delta Formula

We will assume that there are 4 boats racing, and they pass the same mark on the course as follows:

<u>BOAT</u>	<u>PHRF</u>	<u>TCF</u>	<u>Elapsed Time at Mark</u>
J-35	75	1.0400	60 min
C&C 353	117	.9745	65 min
J-24	171	.9015	70 min
Psn 26	216	.8486	75 min

INTUITIVE

The differences between the PHRF ratings for the above boats represent time allowances in seconds/mile. In the TOT world, we should think of these as time allowances per unit of elapsed time. The “elapsed time unit”, however, is different for each boat, and varies according to the speed (PHRF) of each boat approximately as follows:

<u>Boats's PHRF Rating</u>	<u>Elapsed Time Unit (minutes)</u>
35	10
105	11
180	12
235	13

For example, if you are racing the C&S 353 (PHRF 117), the J35 has to give you 42 sec/mi in TOD, or 42 sec for approximately each 11 minutes of elapsed time in TOT. Similarly, the C&C 353 has to give 54 sec and 99 sec to the J24 and Psn 26 respectively, for each 11 minutes of the C&C 353's elapsed time. For the J24 who has a PHRF rating of 171, this Elapsed Time Unit is approximately 12 minutes. For example, when the J24 rounds the mark at 70 minutes, he estimates that approximately six 12 minute units have elapsed, and that his time allowances vs his competitors are $6 \times 96 = 576$ sec (J35); $6 \times 54 = 324$ sec

(C&C353); and $6 \times 45 = 270$ sec (Psn26). The trick is to think about elapsed time units and not about miles !!!

CORRECTED TIME FORMULA

The second method is to record everyone’s Elapsed Time, and multiply it by the TCF to arrive at Corrected Time. (This is exactly how the Race Committee does TOT Scoring):

<u>TCF</u>	<u>Elapsed Time(min)</u>	<u>Corrected Time (min)</u>
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Therefore, at the mark, the J35 is in first, followed by the J24 .71min behind and the C&C353 .94min behind, and finally the Psn 26 at 1.25min behind. This method works at any point in the race, including at the finish, and is exact and accurate; however, it does not provide a feel for the time allowance.

TIME ALLOWANCE DELTA FORMULA

This third method is a derivation of the Corrected Time Formula, and provides an exact formula for time allowance for each of your competitors as follows:

$$TA = ET \times KTD$$

$$KTD = (TCF/TCFo) - 1 \text{ or } = (PHRF \text{ DELTA}) / (550 + PHRF)$$

where, TCF = your Time Correction Factor

TCFo = TCF for other boat

ET = your elapsed time

TA = time allowance vs the other boat

PHRF DELTA = difference in PHRF ratings between you and the other boat

PHRF = your PHRF rating

This method would work best when you can compute the KTD for each of your competitors before the race, and then calculate time allowances at any point in the race only by knowing your elapsed time, and the KTD for each of your competitors. For example, if you are the J24, you would compute the following KTD’s before the race, and at the mark (70min of elapsed time) you would quickly calculate time allowances by $70\text{min} \times \text{KTD}$:

<u>Boat</u>	<u>TCF</u>	<u>KTD</u>	<u>Time Allowance</u>
J-35	1.0400	-.1332	-9.32min
C&C353	.9745	-.0749	-5.24min
J24	.9015	-----	-----
Psn26	.8486	.0623	-4.36min

Is Time on Time different? YES ! Is it more difficult? Not Really. The intuitive approach at least gives you a feel for the handicap time allowances, and the other two approaches are fairly easy calculations....Now all you have to do is to stop thinking about distance to start thinking in the “Time Domain”.