The Racer's Guide to Time on Time Scoring
by Russ Cardoza

Introduction:

Time on Time (TOT) scoring has been in use for several years with good technical success but with varying degrees of understanding and therefore success with the true users, i.e. the sailors. The goal of this article is to provide **HELP**. It will attempt to provide a practical explanation and guide to the sailors who are racing under TOT scoring.

Today, most of our PHRF races are run under Time on Distance (TOD) scoring vs TOT. Our PHRF rating, e.g. 120, is expressed as seconds/mile. Under TOD scoring, the Race Committee typically subtracts from our finishing time our PHRF rating X course distance to arrive at corrected times for all racers. To calculate the time allowance we have to give a competitor, we take the differences in our ratings, multiplied by the distance of the race. For example, if we rate 120, our competitor rates 135, and it is a 6 mile course, we would calculate the time we would have to give the competitor as 135-120= 15sec/mi, 15sec/mi X 6 miles = 90 seconds for that 6 mile course. For an 8 mile course, it would be 15 X 8 = 120 seconds.

Time on Time (TOT) also uses our PHRF ratings but calculates time corrections as follows: Corrected time = Elapsed time X 650/(550 + PHRF). For example, if your PHRF rating was 120 and it took you 63.5 minutes to finish the race, your corrected time would be 63.5 X 650/670 = 61.6 minutes. Distance never enters into the calculation, only time spent on the race course. Why Time on Time? TOT provides fairer scoring if there are large rating differences with in class, i.e. rating differences greater the 20 sec/mile, <u>and</u> a course that does not consist of beat/reach/run, i.e. the course may be all reaching (very fast race), or it may be a light air windward/leeward (very slow race). There is effectively no difference between TOT and TOD for classes with small rating spreads, and for typical beat/reach/run races. What are the cons? TOT unfairly penalizes the fast boats if the wind dies during the race. Also and more importantly, sailors are used to thinking about distance, and they lose their feel for the handicaps under TOT, i.e. they don't know how they're doing in the middle or at the finish of a race. This article will attempt to alleviate this second problem.

Thinking about Time:

With TOT, we have to stop thinking about the course distance, and start thinking about how much time we've been on the race course, and how many seconds we must give our competitor for every hour, or 10 minutes, or minute we've spent on the course. To do this, we must convert our PHRF rating deltas, which are expressed as seconds per mile, to seconds per time on the course. The formula is not complex, but the change in thinking does not come easy, so a few examples will be given.

First the formulas: Under TOT, the race committee corrects everyone's elapsed time by the formula noted above: Corrected Time = Elapsed Time X Time Correction Factor (TCF), where TCF = 650/ (550+PHRF). You can use this formula at any time on the course providing you had the elapsed times for yourself, and your competitors. However, what we really want to know at a mark, or at the finish, is how much time we need to give to a competitor so we can compare it to the actual time difference. For example, we have just finished ahead of our competitor by 45 seconds and we have to give him 56 seconds: Yuk…we just lost by 11 seconds! Therefore, a much more practical approach to convert our PHRF seconds/mile deltas to TOT/10 minute deltas, i.e. how many seconds do we have to give a competitor for every ten minutes of racing? The formula for this is as follows:

TOT sec/10m = 600 X PHRF Delta /(550 + PHRF), where:
TOT sec/10m is the seconds you must give a competitor for every 10 minute of racing. PHRF Delta is the difference between your rating and a competitors
PHRF is your PHRF rating.

Also, for calculation purposes, we will also use TOT sec/lm, i.e. the seconds you must give your competitor for every 1 minute of racing. (TOTsec/lm +.1 X TOTsec/10m = 60 X PHRF Delta/ (550 +PHRF).

Now let's look at a few examples: If you are a C&C 35 with a rating of 120 and your competitors are a J30 @ 134 and a J35 @ 72, your calculations would look as follows:

Boat:	C&C 35	J30	J35
Rating:	120	134	72
Sec/mile Delta	-	14	48
TOTsec/lm	-	1.252	4.299
TOTsec/20mi	-	12.54	42.99

If you just finished a 6.6 mile race with an elapsed time of 70 minutes, under TOD you would give the J30 6.6 x 14 +92 seconds and the J35 would give you 6.6 x 48 = 317 seconds. Under TOT, Time Allowance = TOT sec/lm x Elapsed time (minutes). Therefore with your elapsed time of 70 minutes, you would give the J30 1.254 x 70 = 88 seconds and the J35 would give you 4.299 x 70 = 301 seconds. Once you have TOT sec/10m or TOT sec/lm, the calculations are very similar to TOD except that you need to think and use "time" and not distance. Also TOT sec/10m is very similar in value to seconds/mile and provides a real feel as to how you are doing on the race course.

On the Race Course:

Now for the practical application: At any place in a race, estimate your approximate elapsed time and multiply by TOT sec/10. For example after rounding a mark, you can look at your watch and see, for example, that approximately 20 minutes has gone by. The J35 needs to have rounded that mark 2 x 42.99 or 86 seconds ahead of you and you need to be ahead of

the J30 by 2 x 12.54 or 25 seconds.   At the finish, determine your elapsed time in minutes, e.g. 82 minutes, and multiply by TOTsec/lm to calculate exact time allowances: 82 x 4.299 = 353 seconds for the J35 and 82 x 1.254 = 103 seconds for the J30. Also it is very useful to prepare a chart (like what most of us have done under TOD), so you don't have to perform any multiplications (see Table 1).   With the table, you can quickly estimate your time allowances. For example, for an 82 minute elapsed time race go to the chart and add 100 + 3 = 103 seconds for the time allowance you must give the J30 and 344 + 9 = 353 seconds for the J35. If your elapsed time was 74 minutes, the time allowances would be 88 + 5 = 93 and 301 + 17 = 318 respectively.

Is Time on Time different?   Yes.. More difficult?   Maybe.   But if you can change your mind and start thinking time instead of distance you can do it!

TABLE I

TOT Time Allowances
For C&C 35 @ 120

Vs Boat	J30	J35
Rating	134	72
Rating Delta	14	48
TOTsec/lm	1.254	4.299
TOTsec/10m	12.54	42.99

Elapsed Time (minutes):	Time Allowances (seconds):	
1	1	4
2	3	9
3	4	13
4	5	17
5	6	21
6	8	26
7	9	30
8	10	34
9	11	39
10	13	43
40	50	172
50	63	215
60	75	258
70	88	301
80	100	344
90	113	387