

Handicapping : Some Less Desirable Handicapping Methods.

A discussion paper from TopYacht software.

Over the last 3 or more years we have spoken to a large number of clubs and in particular to handicappers.

Two things stand out.

Everyone seems to handicap differently.

And there are at least two handicapping systems that provide a very poor basis for sensible handicapping. Consequently neither of these methods are directly supported in TopYacht.

Not So good Method One.

The “Knock Back” method.

This method has been around a long time. It is very easy to apply and that has undoubtedly been its big appeal, particularly before the days of computers to do the calculations.

In this system the handicap winning boat has their handicap increased by say 5% or 10 points, the second place getting has their handicap increased by say 3% or 8 points and third place getter has their handicap increased by say 2% or 1 point and all other handicaps are left untouched. There are many variants of this form of handicapping.

So where is the problem ??

I see at least two significant problems.

First problem.

Observations of lots of performance graphs from lots of boats in lots of races across many clubs has clearly shown that all competitors performances vary from race to race. But most competitors performances fluctuate around an “average” performance value. Sometimes a competitor will perform just above (or just below) their average value and just occasionally they perform considerably above their average. For most races they will perform within better that +/- 5% of their average value. Under the knock back system they can have their HC knocked back just because they had one particularly good race. This seems rather unfair. A better HC system considers the performance *trend* of the competitors rather than just the outcome of each race on its own.

Second problem with knock back handicapping.

Consider the following two examples.

Example 1.

In a tiny fleet there are three boats (all of the same class) called Alpha, Beta and Charlie. These boats are sailed by three sailors who are all reasonably competent. At the start of the season they are all put on a handicap of 0.950. In this tiny fleet we will just up the HC of the winner.

In race 1 they all perform rather well and Alpha beats Beta by 1 second over the line, Beta in turn beats Charlie by a further 3 seconds. This was in a 100 minute race.

So Alpha has his HC increased by 10 points to 0.960.

In the next race they all perform very similarly again. And this time Beta just beats Alpha across the line by 2 seconds then came Alpha then came Charlie a further 3 seconds behind in this 100 minute race.

Now on handicap time what has occurred.??

Beta has a HC corrected time of $100 * 0.950 = 95$ minutes.

Alpha has a HC corrected time of $100.05 * 0.960 = 96.05$ minutes

Charlie has a HC corrected time of $100.1 * 0.950 = 95.095$ minutes.

So for winning the first race by 1 second Alpha now has to sail the course better than a minute faster than his friends if he wants to win!!

Example 2

In this tiny fleet there are three boats (all of the same class) called Alpha, Beta and Charlie. These boats are sailed by three sailors who are all reasonably competent but the boats are quite different in weight with Alpha being the lightest by far, the Beta then heavy weight Charlie. At the start of the season they are all put on a handicap of 0.950. In this tiny fleet we will just up the HC of the winner.

In race 1 they all perform rather well (limited only by their boat weight) and Alpha beats Beta by 6 minutes across the finish line, Beta in turn beats Charlie by a further 4 minutes . This was in a 100 minute race.

So Alpha has his HC increased by 10 points to 0.960, the other remain at 0.950.

In the next race they all perform well again. Not surprisingly Alpha again comes in first then Beta then finally Charlie.

What are their HC corrected times?

Alpha took 100.0 minutes, Beta took 105.0 minutes and Charlie took 109.5 minutes.

Alpha has a HC corrected time of $100.0 * 0.960 = 96.00$ minutes

Beta has a HC corrected time of $105 * 0.950 = 99.75$ minutes.

Charlie has a HC corrected time of $109.5 * 0.950 = 104.00$ minutes.

Again this seems quite unfair. Alpha won by 6 minutes in the first race (and will do so in most races) but his HC has only been adjusted down a tiny amount and so he will win many of the future races even on HC. Eventually the HC will catch up with him not before he has won the HC Series.

These examples are obviously extreme, but they do illustrate the point that a HC system that adjusts for a place rather than adjusts by an amount related to relative times is not a fair HC system.

Further by only adjusting a first few boats it will take a long time for the HC system to stabilize.

So what is a better system?

After testing many systems it appears that a simple running average provides the fairest HCs. This can be improved with various weighting which have been discussed in other TopYacht papers.

Not So good Method Two.

Another older HC system provides each boat with a handicap in the form of a “handicap time”.

This system has validity if it relates to a know race duration but has little validity if the one HC time values is expected to provide fair HCing for races of any length.

Can it be made to work??
The answer is a qualified “yes”.

Without doubt it is much easier for sailors to think "I must cross the line 27 seconds in front of Fred to win" rather than to think "My handicap is 0.890 and Fred's handicap is 0.899 so must get over the line a bit before Fred to beat him". So this system has a definite appeal.

BUT!

Handicaps are a **relative** measure of the performance to two competitors.
Put another way, the relative performance of two competitors can **ONLY** be directly compared as a *ratio* **not** as a *difference*.

Note: The following refers to Time on Time handicapping and **not** to Time on Distance handicapping which automatically provides the second parameter necessary to allow a Handicap time to be specified.

Example 3

Jim is just a bit quicker than Fred around the race course.

If Jim has a handicap (TCF) of 1.000 then Fred may have a handicap of 0.990. This means that Fred is 99% as fast as Jim.

So if Jim takes 120 mins to go round the course then Fred (who is just a little slower) will take $120 * 100/99 = 121.21$ minutes. The numbers "100/99" reflects the fact that Fred is only 99% as fast as Jim.

In this case Fred is 1.21 minutes slower than Jim.

Now if the race lasted just 60 minutes for Jim, then for Fred it would last $60 * 100/99 = 60.61$ minutes.

In this case the time difference is 0.61 minutes.

So clearly you can **not** say that in general Jim must beat Fred by 1.21 minutes.

Mathematically valid handicaps are usually expressed as a “Time Correction Factor”. If you wish to translate a TCF handicap into a Handicap time then you must specify the length of time the fastest boat will take. Then you can specify how much longer each of the slower boats is likely take. See the example 3 immediately above.

If you specify that a race is intended to last 120 minutes for the fastest boat i.e. for Jim, then you can predict that Fred will probably be 1.21 minutes later in crossing the line. So both Jim and Fred now know the time difference that is required for Jim to beat Fred.

BUT number 2!!

If the race is planned for 120 minutes for the fastest boat **BUT** the expected wind strength does not eventuate and consequently Jim takes 200 minutes to finish the course then the 1.21 minutes separation **is no longer valid**.

So while this Handicap time is a useful guide for the competitors it is not a completely valid

expression of their relative performances whereas using the TCF will still provide that Fred is going to be only 99% as fast as Jim and therefore take $100/99 = 1.01$ times as long to complete the course. In this case 202.02 minutes.

I.e. handicaps can provide a relative measure not an absolute measure.

Given that competitors understand that this form of expressing a Handicap **can only be a guide**, then TopYacht can provide the facilities to calculate these Handicap times and to print them out but a race duration *must* also be provided to produce this HC time as a rough guide for the competitors.

Unfortunately some Club even combine both these “not so good” systems to provide a Handicap Time adjustment based on place. And some do this just for the first few competitors on HC corrected time. Then they try to use the handicap times for races of variable length.