



## PERFORMANCE HANDICAPPING EXPLAINED

*In response to questions from racing ACYC members, ACYC member Adam Tepper, who devised the performance handicap system we use, explains...*

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I am often asked how a boat's handicap is calculated for racing on Sunday, and why it is calculated that way. The ACYC uses a *performance handicap*. This is distinctly different from the more familiar IRC or OMR handicap.

### **What is handicapping**

Let me begin with the Wikipedia definition of what handicapping is:

"Handicapping, in sport and games, is the practice of assigning advantage through scoring compensation or other advantage given to different contestants to equalize the chances of winning. The word also applies to the various methods by which the advantage is calculated. In principle, a more experienced player is disadvantaged in order to make it possible for a less experienced player to participate in the game or sport whilst maintaining fairness."

### **A Review of IRC handicapping – and why it's unsuitable for the ACYC**

An IRC handicap is calculated using the measurements of the boat; the length, weight, draft, sail area etc. This system is well suited to highly competitive events where boats are fitted out for the sole purpose of racing, crew are specifically selected for their skill and boats are scrutineered to ensure compliance with their IRC rating.

The IRC handicap is unsuitable for the ACYC for the following two main reasons:

- Many of our members are not professional sailors. A handicap system must offer an advantage to lesser skilled sailors, and the IRC handicap does not achieve this.
- Many of the boats within our club are not fitted out for the sole purpose of racing, but serve multiple purposes such as live-aboard boats and day sailers. The IRC handicap disadvantages these boats.

*[NOTE: The above applies equally to the OMR handicap]*

### **Why we use performance handicapping**

The ACYC uses a *performance handicap*. This is the same principle as a golfing handicap. A performance handicap is based upon past performance, and attempts to equalise the chance of winning for all competitors. It is fair to all boats and skill levels, and is inherently different from an IRC handicap. Due to this fact, IRC handicap values are not the same as performance handicap values and should not be compared with one another.

### **Performance handicapping makes no assumptions**

Performance handicapping makes no assumptions about a boat, its captain or its crew. It doesn't know whether a boat is being captained by a world champion sailor. It doesn't know whether the hull hasn't been anti-fouled for ten years. It doesn't know whether the sails are decades old, or the most expensive available. It doesn't know if a boat is carrying tons of fuel for an upcoming voyage. It doesn't know if the crew are a bunch of tourists who have never sailed before. And even if the system did know, what handicap would that warrant? What advantage should be given to a heavily laden boat compared with an otherwise identical boat stripped bare? The fairest way is to assume nothing, and this is why each boat starts with a handicap of 1 (which, as you will see, is no handicap at all).

## The mathematics (some may want to skip this section)

For the mathematically inclined, here are the formulae used to calculate a boat's handicap and adjusted time:

$$[\text{Handicap}] = \frac{([\text{Previous Handicap}] * [\text{Number of Starts}] + ([\text{Fastest Actual Time in Previous Race}] / [\text{Boat's Actual Time in Previous Race}]))}{([\text{Number of Starts}] + 1)}$$

$$[\text{Adjusted Time}] = [\text{Actual Time}] * [\text{Handicap}]$$

Note that these formulae were not created arbitrarily, but mathematically derived. For those interested in understanding why the formulae are the way they are, I'll happily explain this as part of another article, but for now let's take them for granted.

### An example

Take your time with this section, it can be tricky to follow. Let's take two boats starting the season with a handicap of 1. Boat A finishes in 60 minutes and Boat B finishes in 30 minutes. In other words, Boat B completed the race in half (0.5) of the time it took Boat A.

Their adjusted time is:

$$\text{Boat A: } 60 * 1 = 60 \text{ min}$$

$$\text{Boat B: } 30 * 1 = 30 \text{ min}$$

You can see now why a handicap of 1 is no handicap at all. As both boats started with a handicap of 1, their adjusted times are equal to their actual times.

Let's now see how their handicap is adjusted for the next race:

$$\text{Boat A: } \frac{((1 * 1) + (30/60))}{(1 + 1)} = 0.75$$

$$\text{Boat B: } \frac{((1 * 1) + (30/30))}{(1 + 1)} = 1$$

Note the fastest boat's handicap does not change, and the slower boat's handicap is now half-way between its previous handicap (1) and its relative performance this race - half (0.5) the performance of the winning boat.

Let's now move to race 2. Boat A finishes in 45 minutes, and Boat B finishes in 30 minutes. This time, Boat A still took longer, but Boat B completed the race in 66% (0.66) of the time it took Boat A. So either Boat A has improved or the conditions suited Boat A better, or Boat B's performance worsened; perhaps a combination of all three. Did Boat A improve enough to win on adjusted time? Let's find out:

$$\text{Boat A: } 45 * 0.75 = 33.75 \text{ min}$$

$$\text{Boat B: } 30 * 1 = 30 \text{ min}$$

It seems not. Boat A's performance relative to Boat B improved, but not quite enough to win on adjusted time. This time it was only a few minutes behind though, rather than 30 minutes as was the case in race 1. Let's adjust the handicap again for race 3:

$$\text{Boat A: } \frac{((0.75 * 2) + (30/45))}{(2 + 1)} = 0.72$$

$$\text{Boat B: } \frac{((1 * 2) + (30/30))}{(2 + 1)} = 1$$

Note that after race 1, Boat A's handicap moved by 25 percentage points. After race 2, it only moved by 3 percentage points. This is because each time the handicap is adjusted, the cumulative performance of all races for the season are factored into the calculation. As the season progresses, the handicap values become more stable than in the earlier races.

For more details and explanations of the formula, click [here](#)

## **Implications**

One could be disheartened to know that in the first 1-2 races of a season it may be difficult for a slower boat to win a race as they have no handicap (or a handicap of 1). This is true with new golfers as well. However, like golfers, once a handicap is established over a few races, every boat has a good chance of winning races against more experienced competitors as their performance improves. Handicaps are carried forward between seasons as well, so boats do not need to re-establish their handicap each season.

## **Why don't better performing boats have a handicap greater than 1?**

I'd like to answer a frequently fielded question as to why better performing boats don't have a handicap greater than 1. Firstly, as I wrote in an earlier section, there is no fair way to arbitrarily make up any handicap for a boat. Secondly, it's mathematically not required: there are an infinite amount of numbers between 0 and 1. Performance handicapping accommodates boats that perform well by lowering the handicap of lesser performing boats.

## **Cheating**

As a final note, someone suggested that it might be possible for a boat to cheat, by throwing a single race and deliberately running a slow race in order to bring their handicap down to ensure a better result in subsequent races. Obviously, cheating of any form is not acceptable in sport, particularly at a club level amongst friends.

## **Closing words...**

I hope this article has lifted the shroud of mysticism surrounding handicapping... and may it improve your performance next Sunday!

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