Port Douglas Yacht Club

PERFORMANCE HANDICAP RULES

INTRODUCTION

All boats racing in PDYC events are allocated a performance handicap. By definition this performance handicap indicates either the actual or the expected performance of each boat *relative to each other boat*.
This is based on actual performance when sufficient historical data is available. Where historical data is not available expected performance is based on any available information supplied to, or researched by the Sailing Committee.
This is not to be confused with a measurement rating (such as AMS or IRC). Ratings are calculated from measurements of the boats hull, rig and sails, and once calculated will not change unless changes are made to the boat.
A boats performance handicap however will change after each race other than if that boat is used as the reference boat in that race, or the boat sailed as expected by the handicap.
Performance handicaps are generated and recalculated in accordance with the PDYC Performance Handicap Rules.

APPLICATION

THE USE OF PERFORMANCE BASED HANDICAPS

Performance based handicaps are used to allow boats of different design, type and age to compete together on an equitable basis.

PDYC handicaps are based on analysis of performance in accordance with an agreed set of rules. These rules do not require measurement of boats and can respond to a change of skipper, crew or equipment that can cause significant fluctuation in results. The validity of this system therefore relies on the honesty of skippers to inform the Sailing Committee of any such changes.

There are other races where it is preferred that the result does not affect the performance handicap that a boat has for other events. These races are referred to as Fun Sailing Events and use a separate set of handicaps.

RACE RESULTS AND HANDICAPPING SOFTWARE

PDYC uses a race management software package called Sailsys. This system calculates the results of each race and also recalculates the handicap for each boat for the next race.
It is a simple process that uses the elapsed time and the allocated handicap to calculate a corrected time and an adjusted handicap.

When a boat enters a race it will be allocated a performance handicap for that race, called its Allocated Handicap (AHC). This AHC will be taken from the Sailsys online database or will be determined by the Sailing Committee prior to the race in accordance with the Handicapping Rules.
After the race a boat will have an elapsed time which is the time taken to complete the course. The elapsed time is multiplied by the AHC to produce the corrected time. The software calculates a Time Correction Factor (TCF) for each boat such that the elapsed time of each boat when multiplied by that boat's TCF gives a Corrected Time that would have made every boat equal first.
This TCF is known as a Back Calculated Handicap (BCH). The BCH is then used in the calculations to determine the Corrected Handicap (CHC) which then becomes the AHC the next time a boat races the same event type.

Because Sailsys is cloud based, any yacht club that uses this program will slot straight into their handicapping. Each year prior to the first event the Sailing Committee will review the local fleets database and the relevant series to be raced that year. Initial handicaps for all the boats in the database will be allocated for each event type. Then when a series begins these initial handicaps are entered into Sailsys.

CALCULATIONS

After each race Sailsys, using;

- Elapsed Time(ET) and
- Allocated Handicap (AHC)

will calculate;

- Corrected Time (CT),
- Back Calculated Handicap (BHC), and
- Calculated Handicap (CHC)

Corrected Time

Corrected Time = Elapsed Time x Allocated Handicap or CT = ET x AHC
Example: If a boat takes 100 minutes to complete the race and the allocated handicap is 0.75 then the corrected time will be 75 minutes (100 x 0.75).

Back Calculated Handicap (BCH)
The Back Calculated Handicap is established by taking the corrected time of a Reference Boat then dividing that by the elapsed time of each boat.

Example:
Boat A has an elapsed time of 100 minutes with a handicap of 0.70.
Boat B has an elapsed time of 105 minutes with a handicap of 0.72.
Boat A is the reference boat and her corrected time is 100 x 0.7 = 70 minutes.
The reference time is therefore 70 minutes and to calculate the BCH of Boat B divide 70 by the elapsed time of Boat B, 70/105 = 0.66.

In this example Boat A has a lower handicap than Boat B but crossed the line five minutes in front. This tells us that Boat B needed an AHC of 0.66 to place equal with Boat A on corrected time.
The BCH is the handicap that would have placed all boats equal first in the race.
Boats in the top half of the results list will have BCH values above their AHC and boats at the bottom half below their AHC.

The Reference Boat (RB) can be any boat from the fleet but because that boats next handicap will not change as a result of it being the RB it is selected from the boats finishing in a range that will have a BCH closest to their AHC.
That range is a property that can be manually selected in the system. The most widely used percentile is around 45% of the fleet.

Calculated Handicap (CHC)
This is the handicap for each boat in its next race of this event type.
Sailsys uses the BCH and a set of parameters for calculating the CHC which are manually input by the Sailing Committee based on the PDYC HC Rules. These include but are not limited to:

- A choice of twelve mathematical formulas for the BCH.
- A choice of the quantity of race results used in calculations
- Upper and lower BCH clamps
- Quick adjustment of initial handicaps
- Upper and lower BCH limits
- Maximum and minimum CHC step size

Mathematical Formulas
The formulas used are methods of averaging a number of BCH's and includes weighted running, exponential, fixed, trend biased etc. The most widely used method and that recommended by Sailsys is the weighted running average.

Quantity of Race Results
This is the number of BCH's used to calculate the next handicap. Sailsys recommends four as a greater number will produce a slower reaction and a smaller number can create larger swings.

Upper and Lower Clamps
Historical data shows that the vast majority of boats stay within a small percentage window of their average performance. It is therefore logical to apply clamps on all BCHs of +/-x% to iron out any one off or unusual variations in performance. The percentage applied is based on the historical evidence of the fleet and is usually in a range less than 5%.

Quick Adjustment of Initial Handicaps
When a boat races for the first time the handicap allocated to that boat may not reflect the first observed performance. Sailsys has the option to enforce a quicker adjustment to bring the handicap in line with performance. For example if a boat has been allocated a low handicap and wins its first race by a large margin or is allocated a high handicap and comes last by a large margin.

Upper and Lower Limits
Limits can be set whereby if a boat either outperforms or under performs relative to its AHC the BCH generated by that result can be ignored in calculating the CHC.

Maximum and Minimum Step Size
The amount by which a handicap goes up or down (the difference between the AHC and the CHC) can be controlled by the step size. By setting maximum and minimum step sizes an above or below average performance will not result in a large adjustment to the handicap that might not reflect the overall performance of that competitor. This can occur when the weather conditions are particularly suited to a certain type of boat. Large adjustments up or down can have an adverse affect on the result of the next race even if that competitor has sailed to the best of their ability.

PDYC HANDICAPPING RULES

1 AUTHORITY

1.1 PDYC Sailing Committee is the responsible authority for the issue of all club handicaps.

2 HANDICAP TYPE

2.1 All events organised by PDYC shall use performance based handicaps unless specified otherwise in the notice of race.

3 RACE MANAGEMENT SOFTWARE

1.1 Sailsys is used for all events unless specified otherwise in the notice of race.

4 SAILING EVENTS

4.1 Event Types

4.1.1 PDYC conducts three (3) types of sailing events that each have their own set of handicaps, refer to Club Programme for details of each event type.

- Port Douglas Race Week
- Port Douglas championship series
- Fun Sailing Events

4.2 Port Douglas Race Week

4.2.1 Handicaps for PDRW are determined by the Race Officer in conjunction with the Sailing Committee.

4.3 PDYC Club Championship

4.3.1 Handicaps for PDYC Club Championship are used from Sailsys database and can/may be reviewed by the Sailing Committee at any time.

4.3.2 Vessels new to PDYC or not yet in the Sailsys database will have an initial handicap created by the sailing committee and will be reviewed after the first seasonal racing

4.3.3 Any change of sails, using sails not normally used, change of skipper/crew, recent slippage; The vessel owner/skipper is responsible to report this to the sailing committee so handicaps can be reviewed.

4.4 Fun Sailing Events

4.4.1 Handicaps for the fun sailing events, are determined by PDYC Sailing Committee prior to each event.

4.4.2 Handicaps generated by these races will not be used for races the club championship series

4.5 Ladies skippers Events

4.5.1 Handicaps for the fun sailing events, are determined by PDYC Sailing Committee prior to each event.

4.4.2 Handicaps generated by these races will not be used for races the club championship series

5 CONDITIONS FOR THE ISSUE AND MAINTENANCE OF A PDYC HANDICAP

5.1 Each PDYC Handicap is the measure of performance achieved by a boat, skipper and crew combination.

5.2 Any substantial change in hull, rig or crew combination, which is likely to change performance, must be notified to the Sailing Committee prior to the race.

5.2.1 Substantial change will include but is not limited to:

- change of helmsman
- change of regular crew
- hull or rig changes
- new or different sails
- Change in condition of hull

5.2.2 Failure to notify of such changes may be considered to be "unfair practice" and may result in protest and subsequent remedial action.

5.2.3 Alteration of the AHC of a boat that provides information in accordance with rule 5.2 is at the discretion of the Sailing Committee.

6 ALLOCATED HANDICAP

6.1 Initial Handicap

6.1.1 At the beginning of the year the Sailing Committee will review handicaps for each boat that might enter a Club Championship event.

6.1.2 The initial handicap shall be the Calculated Handicap from the most recent race of the same type in the preceding year using the Sailsys database unless vessel is new to Sailsys.

6.1.3 The Sailing Committee may amend the most recent CHC in accordance with provisions of Rule 6.3.

6.1.4 A vessel that races in a club championship season that is not included in the Sailsys cloud database shall be allocated an initial handicap by the Sailing Committee in accordance with Rule 6.1.5.

6.1.5 The Sailing Committee will allocate an initial handicap to a boat based on the following criteria:

a)	Design:	i)	Class Mark or Rating if known
		ii)	Water line length
		iii)	Expected performance
		iv)	Sail inventory
b)	Boat		Known historic performance
c)	Skipper:		Known historic performance
d)	Crew:		Known historic performance
e)	Event Type:		Course to be sailed

f) A boat not previously entered in a PDYC event may be allocated an initial handicap that is likely to prevent that boat from attaining a more favourable score than boats already entered in a series.

6.2 Publication of Handicaps

6.2.1 Initial Handicaps will be posted on PDYC Sailsys portal before each race.

6.2.2 A yachts next handicap for each event type will be available with the most recent race results of that event type.

6.3 Alterations to Handicaps

6.3.1 The Sailing Committee may amend a computer calculated handicap if:

a) The initial handicap allocated to a competitor is deemed to be incorrect.

b) The computer generated handicap correction is deemed to be insufficient or excessive.

6.3.2 The Sailing Committee shall rely on a computer calculated handicap wherever possible and shall only use Rule 6.3.1(b) if absolutely necessary.

7 CALCULATION PARAMETERS

7.1 Mathematical Formula

7.1.1 The weighted running average handicap system is to be used.

7.2 Quick Adjustment of AHC

7.2.1 The method to quickly adjust initial handicaps is to be used.

7.3 Back Calculated Handicaps (BCH)

7.3.1 Clamps are to be applied to a BCH as follows:

7.3.2 Upper Clamp = 4%

7.3.3 Lower Clamp = 4%

7.3.4 Upper and Lower Limits are to be applied to a BCH as follows:

7.3.5 Upper limit = 15%

7.3.6 Lower limit = 15%

7.4 Calculated Handicap (CHC)

7.4.1 The CHC is the average of the weighted, back calculated handicaps for each of the last four races.

7.4.2 The CHC formula is: CHC = (BCH1 + BCH2 + BCH3 + BCH4)/4.

7.4.3 Where there is insufficient BCH data the method of calculation is:

Race 1: CHC = 3/4 AHC1 + 1/4 BCH1;

Race 2: CHC = 2/4 AHC1 + 1/4 BCH1 + 1/4 BCH2

Race 3: CHC = 1/4 AHC1 + 1/4 BCH1 + 1/4 BCH2 +1/4 BCH3

7.4.4 Step Sizes are to be applied to a CHC as follows:

7.4.5 Maximum step size = 6%

7.4.6 Minimum step size = 0.01%

8 CLASS MARKS AND RATINGS

8.1 Class Marks allocated to a specific class (such as J24) and Ratings given to a specific boat shall not apply.

8.2 Class Marks and Ratings may be taken into consideration when using Rule 6.1.5.

9 QUERY ON PDYC HANDICAP

9.1 If a handicap is queried by a competitor then it is to be resolved by the Sailing Committee.

9.2 A ruling by the Sailing Committee in respect of Rule 9.1 shall be final and not subject to appeal.

10 ABBREVIATIONS

AHC Allocated Handicap (Handicap allocated for a race)
BCH Back Calculated Handicap (Handicap that would make all scores equal)
CHC Calculated Handicap (Handicap applied to next start of same event type)
RB Reference Boat (Also known as Benchmark)
TCF Time Correction Factor
ET Elapsed Time
CT Corrected Time