ORC

Attention to detail

We were asked by the editor to examine differences on how ORC treats Double Handed (DH) ratings compared to IRC, using the latest Sydney Hobart as the example since entries were scored together in both systems. Certainly there are differences in how each system approaches a boat raced by two people, rather than a full crew, but we also found some more fundamental issues on how each system approaches the task.

Firstly, IRC guidance implies a boat that races two-handed does so on an occasional basis, and therefore needs a regular crewed certificate from which a special ShortHanded certificate may be derived. Variances are primarily down to sail data or configuration, use of stored power, moveable and variable ballast; there is, however, no specific reference to crew weight which is not recorded in IRC.

Meanwhile, ORC Double Handed certificates can be issued with or without a corresponding full-crew certificate. As in IRC, variation is allowed in rig, sail and ballasting, but also now in crew weight, for which the default two-handed figure is 170kg.

Moreover, for 2022 ORC DH certificates make further assumptions on how that crew weight is likely to be distributed during racing, for example, not always just hiking on the rail.

Another difference is that ORC offer DH certificates at no extra charge for those boats that already hold a paid-up ORC certificate. This was agreed a few years ago when interest in DH sailing was first building momentum and the policy remains unchanged.

In terms of output, the DH results for the 2021 Sydney Hobart do not show a significant change in rankings when the top eight in each system are rescored using the other. The corrected time differences are smaller under IRC compared to the ORCi results, but this is partly due to IRC's numerically smaller TCC values.

This brings up another important point: how useful is it to have rating and scoring options for different configurations if in the end the results are going to be the same – in offshore races crew skill and strategy very often trump small differences in boat speed.

For a race of four to five days the choice would not seem to be that significant, except when considering ORC's more intricate All Purpose scoring model: based on boat speeds determined from a Gaussian distribution of wind speeds centred at 12kt across an equalised mix of wind angles… Few offshore races replicate this model in their actual weather patterns, yet it is still employed by many ORC offshore race managers.

To improve on this, course models can be developed that give a more realistic expression of the actual race, and therefore more accurate results. Nearly every major offshore race in North America has a course model, in other words a distribution of typical wind speeds and points of sailing – Newport-Bermuda, the Transpac and the Vic-Maui Race have different course models used for scoring. And all but the Bermuda Race publish these ahead of time.

Hobart race managers could also develop course models that reflect historic weather trends – certainly there are enough records over the years to support such model variations.

This quest for fairness using the ORC tools is natural: after all, Polar Curve Scoring is the benchmark for all inshore races at ORC championships, where accurate recording of the wind direction and course lengths is used to calculate corrected times. Course modelling is a similar exercise except to predict rather than measure the conditions, then use both predicted wind direction and wind speed to condense the rating into a single number, something most racers are more comfortable with than a matrix of values.

Using the ORC VPP many other scoring options are available as well – limited only by the knowledge and enthusiasm of the organisers and the acceptance by the sailors of the model assumptions. And maybe – just as at ORC championship events – the customers are OK with a high-level of accuracy expressed in hour-long inshore races, while leaving the distance races more to being clever on the course and not trying to overthink the maths.

As alluded to earlier, for a long offshore nuances of handicaps tend to be swamped by skill, but that is not to say the effects of polar curve scoring are not interesting. The table below shows the percentage speed difference between the DH and Full Crew speeds at combinations of True Wind Speed (TWS) and True Wind Angle (TWA) for the same boat. Negative numbers (in red) mean the fully crewed boat is faster, positive numbers mean the DH boat is faster.

There are two effects in play: the DH boat has a lighter displacement, so is fast downwind. Upwind the fully crewed boat is faster, even in light winds, because she has more righting moment, being heavier and with more crew on the rail. The average speed difference is –1.2% which is a plausible value for a single number comparison. But the table also shows the average for each TWS (rows) and each point of sail (columns). Here in light winds (6kt) the average across all wind angles is –0.3%, while in strong winds (20kt) the average is –2.8%.

Similar differences are seen for the different points of sail: upwind the DH boat is 2.1% slower when averaged over all wind speeds, but it is 0.9 % faster downwind. So we can see that using polar curve scoring, or a predetermined course matrix, it is likely that the handicap delta could be up to 1% different from the single number.

Thus polar curve scoring can address the speed differences across wind speed and point of sail, but only if the course matrix used to score the races bears some resemblance to the race actually sailed! For an inshore race with known conditions polar curve scoring can and does work to improve fairness. For longer offshores pre-constructed courses can do the same job, though the weather gods will always do their best to confound us.

The beauty of ORC is that there are enough options for every taste… the trick is to find a chef skillful enough to create a more palatable meal than the bland single number fare.

Andy Claughton and Dobbs Davis ❑

	TWA											
	BEAT					REACH				RUN		
TWS	UP vmg	52TWA	60°	70°	75°	80°	90°	110°	120°	135°	DN VMG	Average Row
6 kts	0.0%	-0.5%	-1.1%	-1.1%	-1.1%	-0.7%	-0.3%	-0.2%	0.3%	0.4%	0.4%	-0.3%
8 kts	0.0%	-0.2%	-0.5%	-0.5%	-0.6%	-1.4%	-1.0%	-0.1%	0.1%	0.5%	1.1%	-0.2%
10 kts	-1.5%	-0.7%	-0.4%	-0.3%	-0.3%	-0.3%	-1.0%	-0.5%	0.3%	0.6%	0.6%	-0.3%
12 kts	-3.3%	-1.8%	-1.2%	-0.7%	-0.4%	-0.3%	-1.6%	-1.0%	-0.1%	0.9%	0.7%	-0.8%
14 kts	-4.1%	-2.8%	-2.3%	-1.6%	-1.3%	-0.9%	-1.8%	-1.9%	-2.1%	1.2%	0.8%	-1.5%
16 kts	-3.3%	-3.2%	-2.9%	-2.8%	-2.4%	-1.9%	-2.0%	-3.6%	-3.0%	1.7%	1.0%	-2.0%
20 kts	-2.7%	-2.9%	-3.0%	-4.4%	-3.8%	-3.6%	-2.7%	-4.4%	-4.8%	-0.5%	2.0%	-2.8%
Average Column	-2.1%	-1.7%	-1.6%	-1.6%	-1.4%	-1.3%	-1.5%	-1.7%	-1.3%	0.7%	0.9%	**-1.2%**

Using the ORC VPP this table shows percentage differences between the double-handed and full-crew boat speeds at combinations of True Wind Speed (TWS) and True Wind Angle (TWA) for the same boat. Negative numbers (red) mean the fully crewed boat is faster, positive numbers (green) mean the DH boat is faster. The shorthander's small area of superiority is borne out in practice in the more popular offshore races in IRC, when it is usually changeable or light and downwind conditions that see the top two-handers pull off their giant killing act