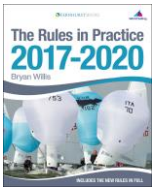
Rounding a Leeward Mark



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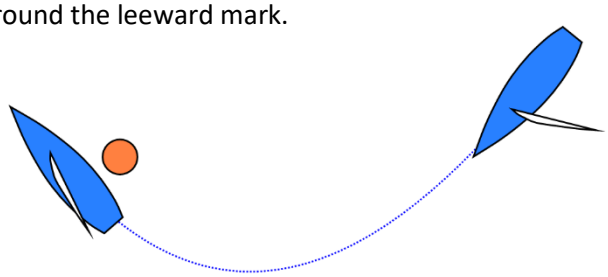
An intriguing term I learnt from the Measurers during my long involvement with the America's Cup, is 'counter-intuitive'. It encouraged me to take a second look at many things.

In 1982 I joined (without pay!) the British Victory Challenge as 'Rules and Tactics adviser'. Peter de Savary had his team training in the Bahamas and I joined them for a week. I didn't think there was much I could teach the skippers Harold Cudmore, Lawrie Smith and Phil Crebbin, but feeling confident about a new idea, I laid it out before the three famous sailors. It was Phil Crebbin (a maths expert) who immediately saw the sense in it, and announced I had just earned my fare to Nassau.

Dinghy racing in the 60s and 70s, when coaching was only for the elite, we all rounded a leeward mark with a 'wide entry and close exit'. It felt good to do a smooth rounding, aiming to get the mark to be closest as our boat came up to close-hauled.

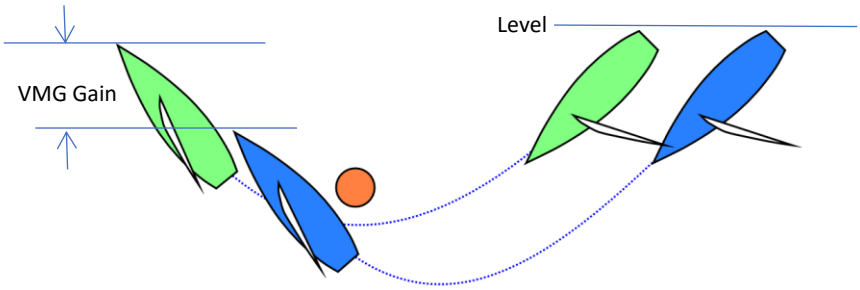
Nowadays most young sailors are coached, and coaches are still teaching their sailors to 'approach a leeward mark wide, exit close'. But if you draw a diagram, it is obvious that this cannot be the most efficient way to round the leeward mark.



The red blob is the leeward mark. The track represents an efficient rounding for some particular class of dinghy; in this case a smooth luff from a broad reach to close hauled, with as little loss of speed as possible. Each class of dinghy or keelboat will have its own 'most efficient rounding'; for example, most spinnaker-carrying dinghies will reach down their layline, then bear off to a run to douse the spinnaker, then luff to round the mark. Non-performance boats might approach on a run. High performance dinghies will sail their downwind VMG course. I am not questioning the shape of the track to round the mark; it will be whatever is the most efficient way of getting from downwind to upwind.

But where should the track be in relation to the mark? That's the question. The diagram above shows a conventional track in relation to the mark. You can see how, without moving the track, the mark can be moved further downwind (towards the bottom right of the page) making the leg longer. So the boat has sailed further downwind than she needed. And that extra half boat length sailed downwind has then to be sailed upwind, so the extra distance might total as much as a boat length.

Now let's look at an efficient rounding, on top of the traditional rounding. These two boats, green and blue, represent one boat, with two different approaches.

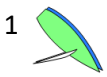


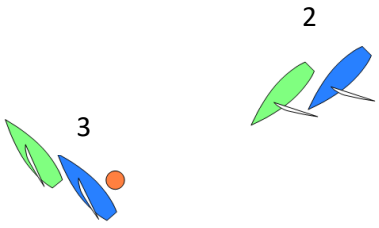
You can see how much can be gained by not sailing downwind any more than is necessary to round the mark.

An additional advantage of this efficient rounding for dinghies is that after passing close to the mark the crew has an opportunity to trapeze - or sit out fully - before being close hauled, with no danger of hitting the mark with their body.

And it can be seen from the following diagram that boats that gybe downwind - typically those with asymmetric kites – don't need to sail so far to get to their layline if they are going to round in this efficient way.

Now the whole manoeuvre starting with the approach. They both start in the same downwind position (position 1).





They sail to their respective layline and gybe (position 2). Blue has to sail further to get to her layline, to allow for the wide rounding, so she has already lost distance compared to Green. They both follow their most efficient shaped track to get from downwind to upwind, but Blue's track is further downwind to enable her to be closest to the mark when close hauled at the end of her rounding;

Green, on the other hand, is closest to the mark when she is on a beam reach in the middle of her rounding. At the end of the manoeuvre, at position 3, with no other boats around, would you rather be the green boat or the blue boat?

You will see that if you are the green boat, you come away from the mark further upwind than the blue boat. And further upwind is where you want to be. It is true that your track leaving the mark is to leeward of what it would have been had you been the blue boat, but that is of no consequence if there is no other boat involved. Upwind is everything.

There are occasions when there will be a rival close on your tail and you might choose to give up that advantage to put him in your dirty wind and possibly even trapped under your leeward hip, unable to tack into clear air for as long as it takes you, in clear air, to draw ahead. In these circumstances, you might choose to do the conventional, inefficient, rounding and come out close to the mark. It might pay to lose even more, by being slow to sheet in, so that the boat following will be forced outside you and have the double indignity of suffering in your dirty wind (sailing slower and lower) and not able to tack off into clean air until you have drawn ahead. In these circumstances, the inefficient rounding might be a price worth paying if the two of you are battling for first place. But you will both lose in relation to the rest of the fleet; or at least, those in the fleet that round efficiently.

There will be occasions when you are closely following a boat and will want to tack into clear air after rounding; then you will be more concerned with coming up tight on the mark so as to not be prevented from tacking away.

So a decision to round in the traditional, inefficient, way, should be one you make consciously, sometimes, when a rival is very close behind or in front. Your natural, normal, way of rounding should be such that you are closest to the downwind edge of the buoy, so you don't sail downwind any further than you need. This is true whatever boat you sail, big or small, slow or fast.

In dinghy racing a boat length per leg might be the difference between winning and losing a championship. In professional yacht racing like the America's Cup, a team would value gaining half a boat length per windward leg in the many thousands of dollars.

VMG: Velocity made good, - the speed towards (or from) the direction of the wind.