# Starting tactics

They say some races are won and lost before the start – in this extract from coach **Mark Rushall's** new book 'Tactics', we get some winning tips on preparing your pre-start strategy.



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At many regattas a significant part of the winning process is achieved before the start gun, or even before we arrive at the venue. Here we'll discuss various ways to collect and sort the information which will refine our decision making around the race track.

The 'pre-start' period starts on the day that we decide to do the regatta, and continues through to the point we've made all our race decisions, on the water, some time after the preparatory signal, and are committed to a plan of campaign. Tactical objectives for the pre-start period include:

Before race day:

- Learn as much as possible about the venue's characteristics, the likely natural assets, what has worked in the past and what has not;
- Understand the sailing instructions: specifically starting, course, and finishing;

Before going afloat:

- Research weather and tidal forecasts, and use this information to get a picture of what may happen during the day, and how it might affect race strategies;
- Prepare boat, mind, and body for the conditions;

Before the start:

- Check theory against reality: tidal flow and wind patterns
- Course and start line layout
- Sorting strategic priorities
- Strategy for the race, the first beat, and the start
- Preparation for the start: laylines, transits.

## Sorting the priorities

When sailing at a new venue (or in a different weather pattern) it is often difficult to determine just which are going to be the most important 'natural assets': i.e. those external factors which are really going to make a difference to a specific race.

How can we decide which will be the favoured side if there is more wind on the left, but less tide on the right? What if the line has a 20-degree port bias, but there is a wind bend favouring the right-hand side of the course? And if there is nothing obvious, what is the strategy then?

If we race at a venue frequently enough, the pattern often becomes clear. There is then little debate about the strategy: the winner will be the competitor who most successfully executes it. This chapter aims to provide some techniques for sorting the priorities when the strategy is not so clear cut.

COACH: 'Smart sailors don't worry about the little things until they have sorted the big ones. They pick out the most significant influences, decide what's going to make the real difference, and plan their race around them. On a light wind day if there is heaps more wind on one side of the course, why worry about the windshifts? Two knots wind will make far more difference! If the course is so biased you can almost lay the mark on port tack, sailing extra distance to make a small tidal gain will rarely pay. With a heavily skewed beat and a port end biased line, the first person to tack onto port will probably win the leg, irrespective of where they started on the line.'

Once we are on the racecourse, we can check out our off the water assumptions: by visual observation, sailing the course, using the compass, and tuning against other boats. If we can eliminate some of the distractions early we'll have more time to focus on the important things on the water.

Figure 1 lists a range of venue types, and weather conditions, along with the factors most likely to influence strategy for each one. Some venues/conditions include several categories, and there are plenty more which could be added to the list.

## Gains and losses

For those who prefer numbers, figure 2 uses a model which estimates the order of gains available from some major effects: calculating the strategic gain or loss in boat lengths. The model is based on a short beat: just 500m (under five minutes in most conditions). This enables a rough comparison between environmental factors, helping to define the priorities. Though the actual numbers are boat and specific condition dependent, this model demonstrates some pretty clear rules:

- In light (around 4 knots) winds, potential gains/losses through increased/decreased pressure are enormous: more than the difference between being entirely out of phase with a 20-degree windshift oscillation or completely in phase. However in strong winds – depending on the boat's performance profile and the wave conditions – the same increase in wind strength is of no significance

PHOTO MARK RUSHALL

**Below Don't just mill around aimlessly before the start – check the conditions, your sail settings and rig tension.**

**Right** **First beat strategy: even in shifts as small as 5 degrees, a boat in phase with the shifts gains four boat lengths over one tacking at random.**

PHOTOS RICHARD LANGDON/ OCEAN IMAGES

upwind and may even give a disadvantage.

n In shifts as small as 5 degrees, a boat in phase with the shifts gains four boat lengths over one tacking at random, and another four boat lengths over 'Shocking Pink', who gets it all wrong. The difference between 'Outstanding Orange' and 'Shocking Pink' increases through 16 boat lengths in 10-degree shifts to 23 boat lengths in 15-degree shifts. That's a big gain or loss on a 500m beat!

n In light winds, when there is a significant current relief/advantage available, the order of the advantage approaches that of more wind. In light winds, speed over the ground is more important than direction. But unless the tidal differences are extreme, windshifts become more significant as the wind speed increases.


**Left** **In large fleets you need to balance tactical considerations against the need for clear air.**

n On a startline with 10 degrees of port bias, we gain five boat lengths sailing distance over a boat 20 lengths further up the start line. But in shifty conditions this gain may not be realised if there is a boat with an equally good start closer than 10 boat lengths to windward: our start line gain over the 'blocker' is less than two boat lengths: this may be insufficient to be able to tack and cross. A more likely scenario is that the most windward boat, who can tack at will, hooks into the big gains available (see above) while the greedy starters allow the boats to windward to dictate their tactics.

## How much is the gain?

Building the strategy involves prioritising a

## Figure one

| | STRENGTH | OSCILLATION | WIND BEND | PERSISTENT | TIDE | WAVES | LINE BIAS | COURSE BIAS |
|---|---|---|---|---|---|---|---|---|
| **Venue** | | | | | | | | |
| **River** | ☺ | | | | ☺ | | | ☺ |
| Obviously current may be significant. Look for trees and obstructions causing wind shadows, and beware skewed beats. | | | | | | | | |
| **Small lake** | ☺ | ☺ | | | | | | ☺ |
| Land based obstructions cause wind shadows and irregular shifts. Lake size may compromise course symmetry. | | | | | | | | |
| **Large lake** | | ☺ | ☺ | | | | | |
| We are hopefully sailing far enough from the edges to avoid wind shadows! But big lakes are usually surrounded by hills: look for wind bends. | | | | | | | | |
| **Estuary** | ☺ | | | | ☺ | | | ☺ |
| Similar to river conditions, tidal situation could be complicated: need a tidal atlas! Estuary may be wide enough to experience significant convergence/divergence. | | | | | | | | |
| **Coastal** | | | | | | | | |
| Each coastal venue has its environmental signature. But oscillating shifts are always present! | | | | | | | | |
| **High headlands** | | | | | | | | |
| Look for a wind bend, acceleration around the head, and a shadow behind. Could be significant in any of the above venues. (see photo 1.2) page 15. | | | | | | | | |
| **Conditions** | | | | | | | | |
| **Light winds, underpowered** | ☺ | | | | ☺ | | | |
| In light/underpowered conditions, factors affecting speed over the ground are more significant than direction. Look for tide variations and areas of higher/lower pressure on different parts of the course. | | | | | | | | |
| **Max power** | ☺ | | | | | | | |
| An extra 2 knots breeze makes relatively small difference to vmg: factors affecting direction (windshifts) become more important. | | | | | | | | |
| **Overpowered** | ☺ | ☺ | | | | ☺ | | |
| Ensure oscillations are more significant than distance lost through tacking. Are there any areas of flatter water? | | | | | | | | |
| **Offshore wind** | ☺ | ☺ | ☺ | | | | | |
| Large less predictable shifts and light patches caused by inland obstructions. | | | | | | | | |
| **Along shore wind** | ☺ | | | | ☺ | | | |
| Classic convergent/divergent conditions. Expect more wind on the left (N. Hemisphere). Tide may be significant as flowing upwind/downwind, and shallower water inshore. | | | | | | | | |

| | STRENGTH | OSCILLATION | WIND BEND | PERSISTENT | TIDE | WAVES | LINE BIAS | COURSE BIAS |
|---|---|---|---|---|---|---|---|---|
| **Conditions** | | | | | | | | |
| **Filling sea breeze/ thermal effect** | ☺ | | | ☺ | | | | |
| As the sea breeze develops, look for a persistent shift as well as bands of increasing pressure. (see photo page 14) | | | | | | | | |
| **Full sea breeze** | | ☺ | | | | | | |
| Classic sea breeze conditions produce regular oscillating shifts. | | | | | | | | |
| **Patchy cloud** | ☺ | ☺ | | | | | | |
| In the summer, clear skies between the clouds may allow more thermal mixing, giving increased pressure and possibly a right shift (N. Hemisphere). | | | | | | | | |
| **Rain clouds** | ☺ | | ☺ | | | | | |
| Raining clouds suggest a period of wind spreading outwards: increased pressure plus temporary wind bend. | | | | | | | | |
| **Frontal system** | ☺ | | | ☺ | | | | |
| Expect change! Persistent shift as front passes through leading to skewed beat. | | | | | | | | |
| **Tide across course** | | | | | | | | |
| Cross wind tide will cause course skew. (see photo 1.4) page 22. | | | | | | | | |
| **Tide along course** | | | | | ☺ | | | |
| Shallower water inshore may cause a significant tidal difference across the course. Look for the tide turning early inshore. | | | | | | | | |
| **Depth varies over course** | | | | | ☺ | | | |
| If depth varies, current strength and direction will too. | | | | | | | | |
| **Other** | | | | | | | | |
| **Short beat** | | | | | | | ☺ | |
| The line bias may be the only significant effect over a short beat. | | | | | | | | |
| **Long start line** | | | | | | | ☺ | |
| The longer the start line, the bigger the gain through bias. | | | | | | | | |
| **Bad race management** | | | | | | | ☺ | ☺ |
| ☹! | | | | | | | | |

number of (possibly conflicting) effects. Though we rarely have the time or resources to calculate these priorities mathematically, it is interesting to compare the impact of these effects through a range of conditions.

There are several approximations and assumptions involved in the model used here (see Figure 2) to calculate the typical gains available through variations in wind speed and direction, tide, and line bias. The actual figures will depend on the type of boat and the day's conditions: for this model we have used the performance profile for a 21ft Sportsboat which does not plane upwind.

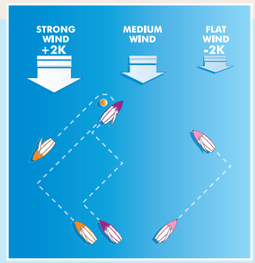
In very light winds, a wide tacking angle is needed to keep the boat moving. Boat speed increases with wind speed, and tacking angle decreases. Best upwind angle is achieved in 16 knots wind speed, and though boat speed increases slightly up to 20 knots wind speed the actual velocity made good towards the wind decreases, as the boat makes more leeway. We can see that for this boat there is no upwind benefit if the wind exceeds 20 knots. Boats which plane upwind – particularly those with responsive rigs – do not see this 'tailing off' effect until higher wind speeds, but the overall pattern and scale of gains is similar for most racing boats.

In future issues we'll look at some case studies to see which strategies paid off when. n

## Figure two

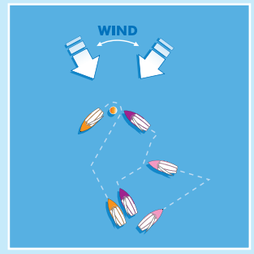
Gain/loss through more or less wind, measured in boats' lengths sailing distance over a short (500m) beat

| Windspeed (k) for "Mediocre Mauve" | Position when Mauve reaches windward mark: Boat sailing in 2k more wind | Boat sailing in 2k less wind |
|---|---|---|
| 4 | 31 boat lengths ahead of Mauve | 57 boat lengths behind Mauve |
| 8 | 9 boat lengths ahead of Mauve | 16 boat lengths behind Mauve |
| 12 | 3 boat lengths ahead of Mauve | 10 boat lengths behind Mauve |
| 16 | No loss/gain | 3 boat lengths behind Mauve |
| 20 | No loss/gain | No loss/gain |
| 24 | 1 boat length behind Mauve | No loss/gain |



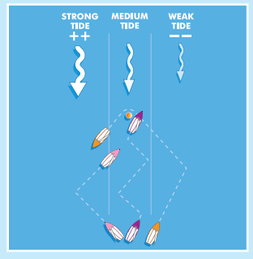

Gain/loss through oscillating shifts, measured in boats' lengths over a short (500m) beat
Assumed 80 degree tacking angle: Mediocre Mauve tacks at random and makes no overall gain or loss from the shifts

| Wind shift (max left to max right) (degrees) | Position when Mauve reaches windward mark: Orange (fully in phase) | Pink (fully out of phase) |
|---|---|---|
| 5 | 4 boat lengths ahead of Mauve | 4 boat lengths behind Mauve |
| 10 | 7 boat lengths ahead | 9 boat lengths behind |
| 15 | 9 boat lengths ahead | 14 boat lengths behind |
| 20 | 12 boat lengths ahead | 20 boat lengths behind |




Gain/loss through sailing half of the 500m beat in more/less current

| Windspeed (k) | Gain/loss in boats' lengths: .25 k current difference | .5 k current difference | 1 k current difference |
|---|---|---|---|
| 4 | 5 | 12 | 34 |
| 8 | 3 | 6 | 15 |
| 12 | 3 | 5 | 11 |
| 16 | 2 | 5 | 10 |
| 20 | 2 | 5 | 10 |
| 24 | 2 | 5 | 11 |




Gain/loss from start line bias. Measured in boats' lengths actual sailing distance, assuming 80 degree tacking angle
Gain measured over a boat starting at the unfavoured end.

| Line length (boats' lengths) | Line bias (degrees): 5 | 10 | 15 | 20 |
|---|---|---|---|---|
| 5 | 1 | 1 | 2 | 2 |
| 10 | 1 | 2 | 4 | 5 |
| 20 | 2 | 5 | 7 | 10 |
| 30 | 3 | 7 | 11 | 14 |
| 40 | 5 | 9 | 14 | 19 |


The same gain/loss would apply to the given separation from another boat in question: e.g. a 15 degree line bias would give a 2 boat length gain over a boat making an equally good start, 5 boats' lengths down the line.

Highly significant: 10 boats' lengths plus | Significant: 5-9 boats' lengths | Less significant: under 5 boats' lengths