David Dellenbaugh's
SPEED&Smarts™
The newsletter of how-to tips for racing sailors Jan/Feb 2014

PLAYBOOK SERIES #2 **Issue 129**

Upwind Strategy & Tactics

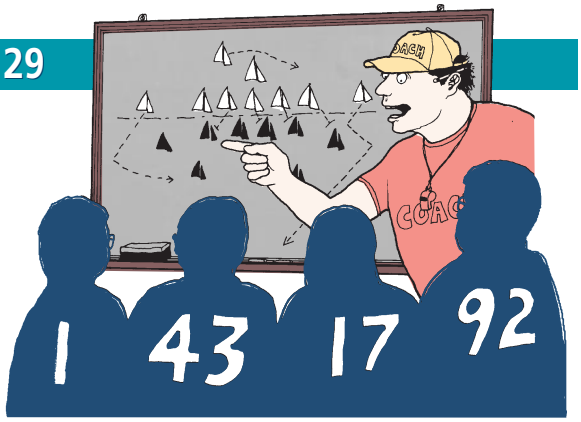
In most races, boats spend a majority of their time going upwind, so success at the finish line means you have to be smart on the windward legs.

Several things make beats uniquely challenging. Because upwind tacking angles are relatively wide (compared to jibing angles downwind), the fleet tends to spread pretty far apart. As a result, boats in one area of the beat are often sailing in different conditions (i.e. wind direction, wind velocity and current) than boats in other areas of the beat.

In addition, the huge amount of separation that often exists between boats on opposite sides of the course means that even small changes in the conditions can lead to large gains and losses among the fleet. That's why it's important to make (and continually update) an upwind strategic plan.

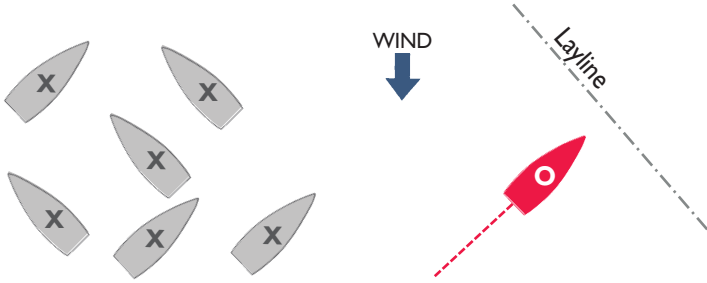
Another unique thing about beats is that boats keep coming together all the time. Because you're often sailing in or near a crowd (especially on the first beat), you must watch out for boats that have the right of way, and you need to avoid the wind shadows of boats ahead of you. With the rest of your fleet all trying to get to the favored side and then to the windward mark, it's not easy to follow your gameplan. You need good boat-on-boat tactical moves, plus the sense to keep looking at the forest and not just the trees.

This second issue in our Playbook Series is full of plays and other ideas to help you be more successful upwind, both strategically and tactically. Good luck with the Xs and Os!



PLAY 1: Consider risk!

Figure out how much risk you are willing to take at any point in a race or series and make sure you include this in your strategic and tactical planning. The Red boat below is not being very conservative. She's taking a strategic risk because she is quite far to one side of the course; she's also taking a tactical risk because she is pretty far away from the rest of her fleet. This risk is not necessarily bad as long as it fits into her gameplan.



JH Peterson photo

SPEED&Smarts
PLAYBOOK 2

Upwind Strategy & Tactics

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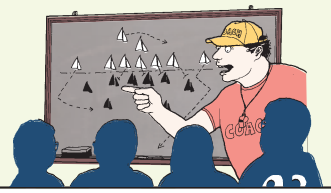


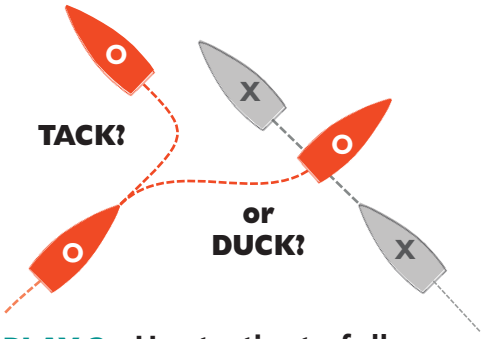
Strategy first, then tactics

Have you ever gone to the train station, gotten on a random train and then made your decision about where to go based on which way the train was heading? This could be a fun adventure once in a while, but it's not the normal way to travel. Most people pick their destination first and then get on the train that will take them there.

The same approach should be the norm in sailboat racing too. Your 'destination' is the favored side of the course, and the 'train' is a collection of tactical moves you can make. To be successful you must choose maneuvers that help you get to the favored side of the beat. It doesn't work well to pick a tactic first and then see where you end up – in most cases that won't help you pursue your race strategy.

Your strategy is the plan you make about how you'd sail around the course (by yourself) in as little time as possible, using the wind shifts, puffs and current to your best advantage. This plan describes the ideal path you'd like to follow around the course, but there is no guarantee you will actually be able to follow this path amidst a fleet of boats. That's why you need tactics.

Tactics are the boat-on-boat maneuvers you make to follow your strategy and stay in control of your race. These include moves such as lee-bow tacks, covering, ducks, finding lanes of clear air and so on. Most of these tactics do not have any inherent value by themselves – they are valuable only to the extent that they help you follow your gameplan.



PLAY 2: Use tactics to follow your strategic gameplan

When you're on port tack converging with a starboard tacker, should you bear off and duck them, or tack on their lee-bow? It all depends on your strategic plan and which side of the course you like.

Too often decisions like this are made on the spur of the moment and/or without regard for strategic factors. Many times the port tacker doesn't even see the other boat until her only option for keeping clear is to tack. That's not good if her strategy is to go right.

In almost all situations, your strategy should come first because that is your plan for using the wind and other factors to get to the windward mark quickly. Tactics are simply a means of following this gameplan, so make sure your tactical moves help you move in the direction you want to go strategically. If your strategy says go right, for example, don't avoid a starboard tacker by tacking!

STRATEGY

is the plan you make for getting to the next mark as quickly as possible in the absence of any other boats. It is the course of action that you would choose if you were sailing around the race course against the clock, taking into account factors such as wind and current.

TACTICS

are the boat-on-boat moves and maneuvers you make to follow your strategic plan. Tactical maneuvers help you stay in control of your race and stick to your gameplan when you are fighting against one or more nearby boats.

Consider these strategic factors

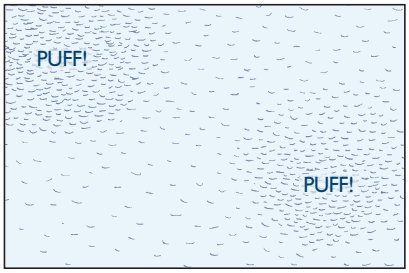
When you are making a strategic gameplan, you must consider all the variables that might influence your ability to sail around the race course as quickly as possible. These include wind, current and the other variables described below. Specifically, you need to understand how each factor varies across the race course, and how each is likely to change during the course of a race. It's also important to figure out which are the top priorities on any particular upwind leg. On a light-air day, for example, wind velocity might be the critical factor, or it could be current. Here's a brief description of five strategic variables to include in your plan.

Wind direction

The wind is almost always changing direction, and even small shifts can lead to huge gains or losses. There are several kinds of shifts: 1) Oscillating, where the wind shifts back and forth; 2) Persistent, where it gradually swings in one direction; or 3) Oscillating persistent, a combination of both. Try to identify the wind pattern as accurately as possible.

Wind velocity

The strength of the wind also usually varies across the course area. Sometimes there are distinct puffs scattered randomly over the windward leg (right); other times there are very subtle changes in velocity from one side to the other. Since more wind is usually better for boatspeed, it's key to identify, get to and stay in areas of better pressure.

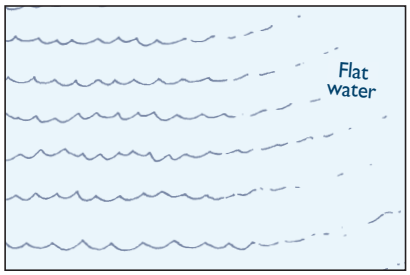


Current speed and direction

Current exists almost everywhere from tidal bays and sounds to rivers and wind-driven lakes. The 'drift' (speed) and 'set' (direction) of the current have a big impact on strategy when the current varies across the course or when it is strong compared to the wind. Current can also have a big effect on the strength and direction of your sailing wind.

Waves

In most cases waves are bad for upwind speed, so try to avoid them. Look around to see if there is a way to sail in flatter water. Be careful, though, because smooth water could be an indication of less wind velocity. Fewer waves might also mean more current flowing with the wind (or less current against it), which is not good for racing upwind.



Relative length of each tack

This is last on the list but it's often the most important factor. If the windward mark is not directly upwind from your position, you will have to spend an uneven time on port and starboard tacks to get there. The greater the disparity between tacks, the more important this becomes as a strategic factor, and the more critical it is to sail the longer tack first.

PLAY 3: Gather wind info

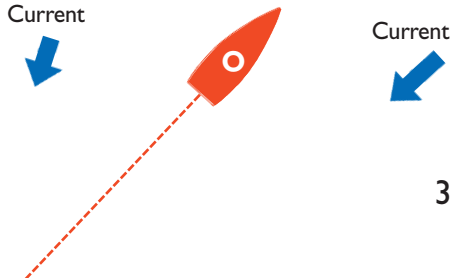
Before (and during) the race collect info about the wind to help you predict the shift pattern. I prefer a system of recording the high, low and median headings on each tack. This is better than getting the actual wind direction by shooting head-to-wind because it can be used while racing (and it will help you hit the first shift off the line).

Before starting the race, you should have a list of numbers (*see below*) that show you the range of compass headings on each tack. These will help you decide whether the shifts are oscillating (as in the example shown) or persistent, and they will help you figure out if you are lifted or headed while racing upwind.

Port	Starb
355	265
345	250
356	262
344	255
358	270
350	256
002	268
348	245
355	260

PLAY 4: Look for *changes*

When you're collecting strategic data from around the race course, look for variables (e.g. wind direction, current, wind velocity) that are different from place to place, or that change over time. If the wind velocity is exactly the same all over the course and remains steady as the day goes on, it won't be much of a strategic factor. But if current strength and direction on the left side of the course are different from those on the right side (below), that's very important! Also, if the wind direction is currently 200° everywhere but in half an hour it will be 220°, that is also very important! Look constantly for these variations that occur in place and/or time.



Left or Right?

This may be the most-often-asked question on every boat before the start of (and during) any race. The way each crew answers it often makes the difference between finishing near the front of the fleet or at the back.

The process of developing a strategy for any race begins well before the start and continues until you have finished. Your strategy is a plan for how you will make best advantage of the conditions on the race course, taking into account things like wind direction and strength, current, waves and the position of the windward mark. All these factors are different every time you go on the water. They change constantly while you are racing and often vary across the course.

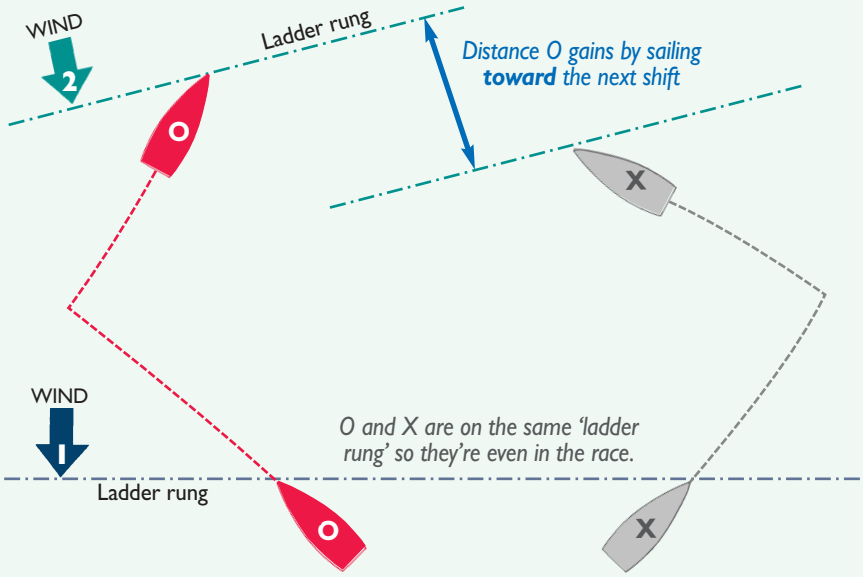
In order to develop a sound strategy, begin gathering data about the wind and current before you leave the dock. Use weather forecasts and current charts, and tap into the local knowledge of other sailors. Then get out to the course area early and start looking around.

Collect a bunch of observations about the wind and current – then start putting together a strategy for the first beat. This should be a plan, or a 'blueprint,' to help you sail as quickly as possible to the windward mark. It could be as simple as "Hit the left side hard." Or it might be more detailed, like "Play the oscillating shifts up the middle right side and watch for better pressure on the far right."

Keep re-evaluating your strategic plan during the race because you'll constantly get more information about the wind and other strategic factors. Watch all the race boats as they sail around the course, and don't assume that the same side that paid off on the first beat will also work on the second beat (but it might!).

Always have your strategy in mind so you can use it as a guide every time you come together with another boat. If your strategy says 'Go right,' for example, don't avoid a starboard tacker by tacking!

There will be times when you'll have no idea whether to go left or right. Unless you're pretty sure one side is favored, don't go there. Stay near the middle of the fleet and keep your eyes open to see what the wind is doing and which side is paying off. Then make your choice. •



PLAY 5: Sail *toward* the next windshift

'Ladder rungs' are imaginary lines drawn on the water surface perpendicular to the wind direction. Whenever the wind direction changes, the angle of the ladder rungs also changes. On a beat, the object is to climb up the ladder to the windward mark. Boats on the same ladder rung are equal in the race (e.g. O and X at position 1); boats on a higher ladder rung are ahead.

When the wind direction is changing, the basic strategic move on a beat is to sail in the direction where you expect the next windshift. If you think the wind will veer (shift clockwise), sail on port tack toward that shift. If you think the wind will back to the right (as in the case above), sail on starboard tack.

By sailing toward the next shift, you will end up on a higher ladder rung when the wind shifts, and therefore you will be more advanced in the race.

From a strategic point of view, you should sail fast toward the next shift. When you are on a lift in an oscillating breeze, or sailing into a persistent header, don't pinch. Put the bow down slightly so you get to the shift sooner. Of course, there are times when you need to pinch for tactical reasons (e.g. to hold a lane of clear air as in this photo).

Identifying windshifts

In many races, changes in wind direction are the most common and significant strategic factor. The wind is almost always shifting, and even small changes in direction can lead to huge gains and losses in the race. Therefore, if you want to get to the first mark in good shape, you must be skilled at recognizing and playing the shifts. This may be the most important ingredient in your gameplan.

In most races, the windshift pattern is either oscillating (i.e. shifting back and forth around a fairly steady average direction) or persistent (shifting steadily in one direction). Once in a while the wind is both oscillating and persistent, and very occasionally it is neither. However, most of the time it works to assume it is one or the other.

As you can see from the examples at right, the best way to handle a persistent shift is exactly opposite to the strategy you would use for a persistent shift. Therefore, it's critically important to ask yourself (before the start and constantly during the race) whether the windshifts are oscillating or persistent.

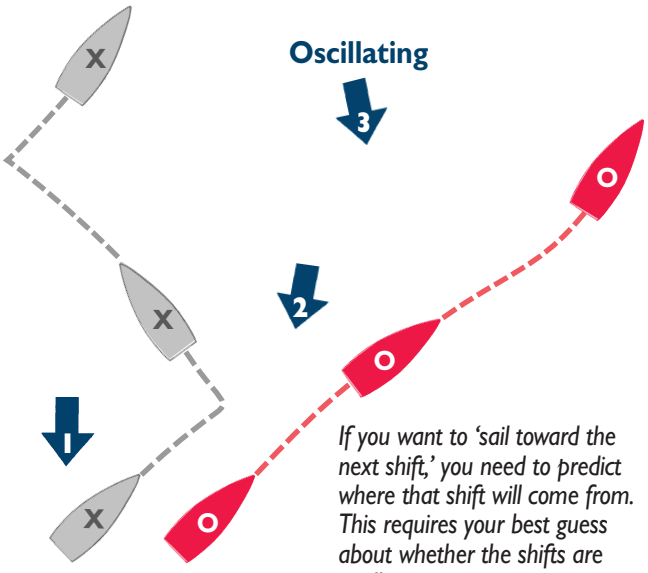
The way you answer this question will affect almost every aspect of your strategy and tactics for racing upwind. And the correctness of your answer will likely have a large impact on your position at the windward mark.

In order to figure out the windshift pattern, keep your head out of the boat. Watch the wind on the water, the angles of other boats and your compass headings. Look for the telltale clues that are listed below.

When you're not sure what the wind is doing, here are a few ideas. First, keep observing since the pattern may not yet be evident. Second, oscillating shifts are usually more common than persistent shifts. So if you're in doubt, assume the wind is oscillating. And third, don't commit too hard to a side of the course. Stay near the middle and keep your eyes open until you figure it out – then go for it!

Oscillating shifts are more likely when:
- The wind is blowing offshore.
- The wind on the water looks patchy or puffy.
- You have a gradient wind after a cold front.
- Boats are lifted and headed on both sides of the beat.
- Boats make gains and losses on both sides of the beat.
- Headings on each tack go up and down within a range.

Persistent shifts are more likely when:
- The wind is blowing onshore.
- The wind on the water looks steady, or there's an area of better pressure on one side.
- You have a thermal seabreeze.
- The farther you go to one side of the course, the more the boats there are lifted or headed.
- Boats on one side of the course always gain or lose.
- Your headings on each tack trend in one direction.
- There is land close to one side of the course.



If you want to 'sail toward the next shift,' you need to predict where that shift will come from. This requires your best guess about whether the shifts are oscillating or persistent.

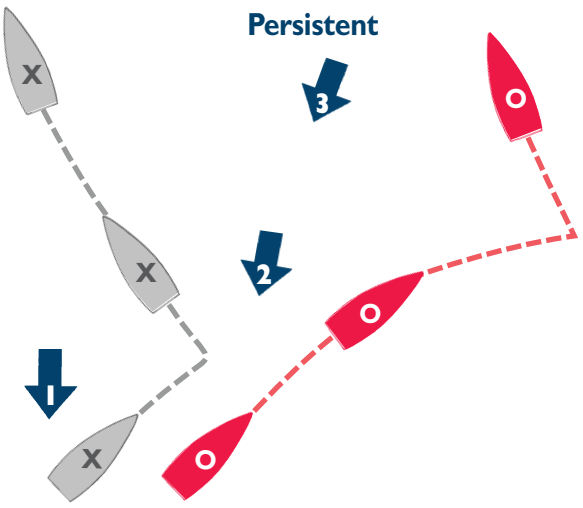
PLAY 6: Choose oscillating or persistent

To illustrate the huge difference in strategic implications for oscillating versus persistent shifts, consider two boats (X and O) that are sailing side by side up a windward leg (above and below) .At Position 1 the wind is due north and the boats are even in the race. Then the wind shifts 10 degrees right (Position 2), so both boats are headed. Boat X tacks onto starboard tack while Boat O keeps sailing on port tack. Which boat will come out ahead?

It all depends on which way the wind shifts next. If the windshift pattern is oscillating (above), the next shift will be to the left. This means X will come out ahead because she sailed a lift toward the next shift while O sailed a header away from that shift.

However, if the wind direction is shifting persistently (below), the next shift (and each shift after that) will be to the right. This means O will come out ahead because she kept sailing into that persistent shift while X sailed away from it.

One simple situation with two completely different outcomes – that's why you must make your best guess about whether to play shifts as oscillating or persistent.

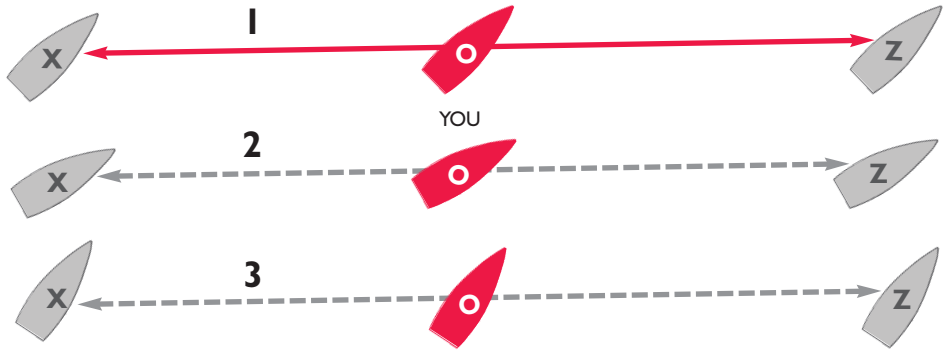


PLAY 7: Use other boats to 'see' the shifts

I once coached a regatta in Gothenberg, Sweden, where the race course was surrounded by windmills (on islands). We could see shifts in the wind direction aloft by watching how the windmills turned – usually this meant a similar shift would soon come at sea level.

Racing in a fleet of boats is a lot like this. Each boat acts like a large wind vane and gives you information about the strength and direction of its wind. With a whole fleet of wind vanes, it's usually easy to see what the wind is doing.

Even if your boat has a compass, you can often see shifts more easily by watching the relative angles of other boats. Since the fleet gets very spread out, you can usually see subtle changes in wind direction that you might not notice on a compass. Here are some ideas of what you should look for.

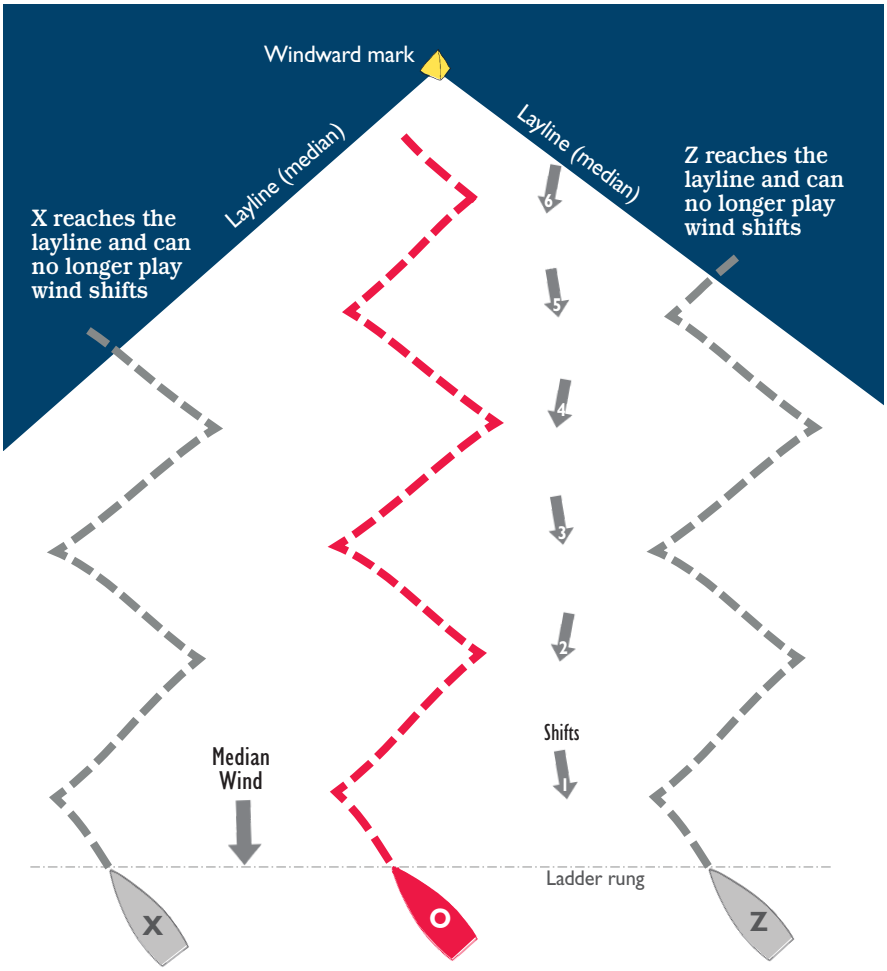


When using the fleet to help you see windshifts, pay attention to boats on the same tack that are aft on your windward hip (X) and forward on your leeward bow (Z). These boats are on roughly the same 'ladder rung' as you. Since they are close with you in the race, it's easier to see the gains and losses that are caused by windshifts.

In the example above, Boats X, O (you) and Z start off roughly even on a windward leg (Situation 1). After a couple minutes, the boats' angles have changed so they now look like 2. When a windward boat (X) points closer to your transom (or when you point closer to the transom of a leeward boat – Z), it means you've been headed (a right shift here). But when the boats look like 3, it means they've been lifted (a left shift here).

You can come to the same conclusion by estimating gain and loss. When the boats start off (1), you are roughly even with the other two boats. But after a couple minutes (2) it looks like you can easily cross X and Z can easily cross you. This means you must have been headed. If you wait a few more minutes (3) and it looks like X has gained on you (and you have gained on Z), then you must have been lifted.

By watching how the boats' relationship changes, you can get a very accurate view of how the wind is shifting, without using a compass or fancy wind instruments.



PLAY 8: In oscillating shifts, play the middle of the beat.

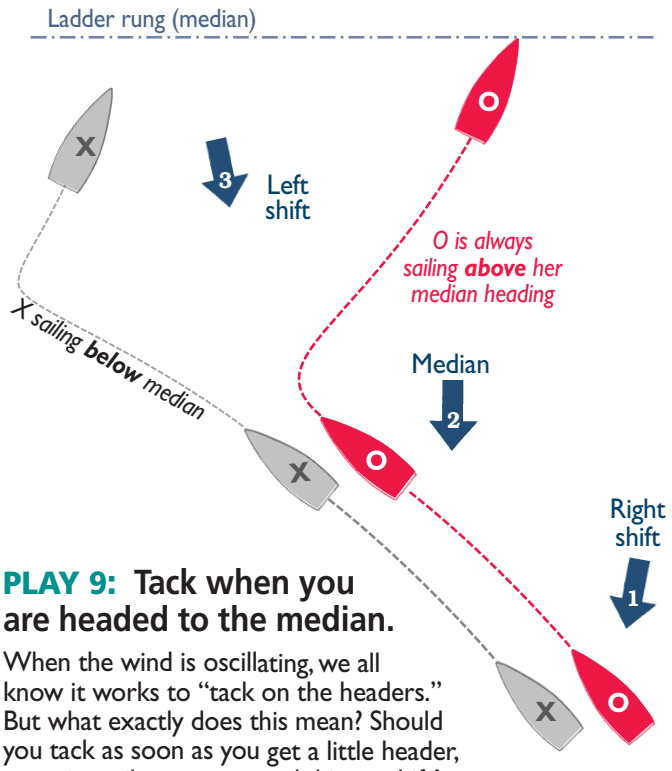
In a normal oscillating breeze, when the wind is shifting back and forth regularly and there is no geographic effect on either side of the course, it usually works well to stay near the middle of the course.

Why is this the best strategy? Consider the hypothetical situation shown at left:

- Three boats (X, O and Z) are on a beat.
- All three boats get the same windshifts, and they get these shifts at the same time.
- Each boat plays the shifts perfectly, so they all tack at the same time and will always be on the same tack.

For most of this beat (the first 4 shifts), these boats are equal in the race because they all make the same progress upwind in the direction of the median breeze (they're all on the same median 'ladder rung'). Before she gets the 5th shift, however, X reaches the port-tack layline to the windward mark. She must either tack off the lift (onto the layline) or continue sailing past the layline. In either case she will lose ground to the other boats.

Z faces the same problem before the 6th shift. Only O, which is in the middle, can continue playing the shifts properly all the way to the mark. That's why she'll come out ahead.

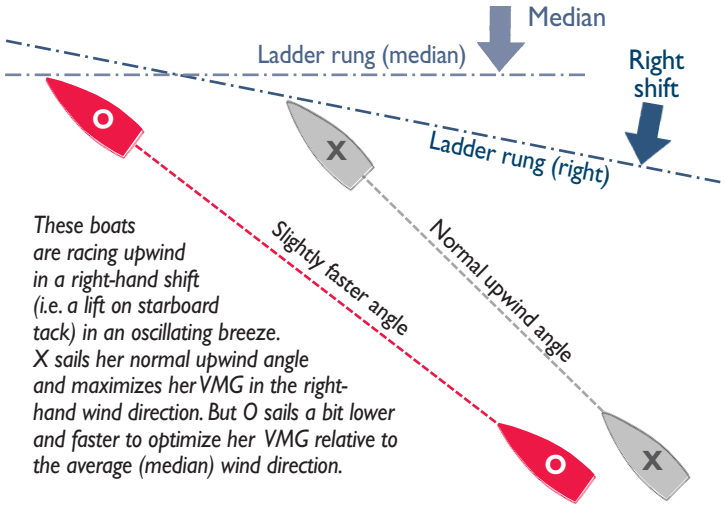


PLAY 9: Tack when you are headed to the median.

When the wind is oscillating, we all know it works to "tack on the headers." But what exactly does this mean? Should you tack as soon as you get a little header, or wait until you get a much bigger shift?

The answer is actually in between. When the wind is shifting back and forth, try to sail on the lifted tack all the time. If you are steering a course below your median (average) heading, tack so you will be sailing above your median on the other tack. This is the fastest way to make progress to windward (i.e. to climb up the median-wind ladder rungs).

The way to sail on a lift all the time is by tacking when you are headed to the median (like O). If you wait until you get the full header (as X does above), you will spend a lot of time sailing below the median. You will look good momentarily, but when the wind shifts again you will be farther behind.



PLAY 10: Sail fast on a lift.

In a steady breeze, your goal is to maximize your performance in the existing wind direction. The wind you feel any moment is the same wind you will have all the way up the beat, so you want to climb the ladder rungs in that direction.

But when the wind direction is oscillating you have a different goal – to maximize your performance for the average wind direction you will have up the entire beat. Your goal, therefore, is to climb up the ladder rungs of the **median** breeze, not the ladder rungs of the left or right oscillations.

The best way to do this is to sail a little faster than normal when you're lifted. It's hard to say how much faster – maybe you want your windward telltales flowing straight back rather than lifting. Certainly you don't want to pinch! The more you are lifted (relative to the median), the faster you should sail.

Sailing faster achieves two goals: First, you will maximize your performance relative to the average wind direction (as opposed to the wind direction in which you are temporarily sailing). Second, you will make faster progress toward the next shift you expect, so you'll be in good shape when it comes.

PLAY 11: Be smart in Oscillating shifts

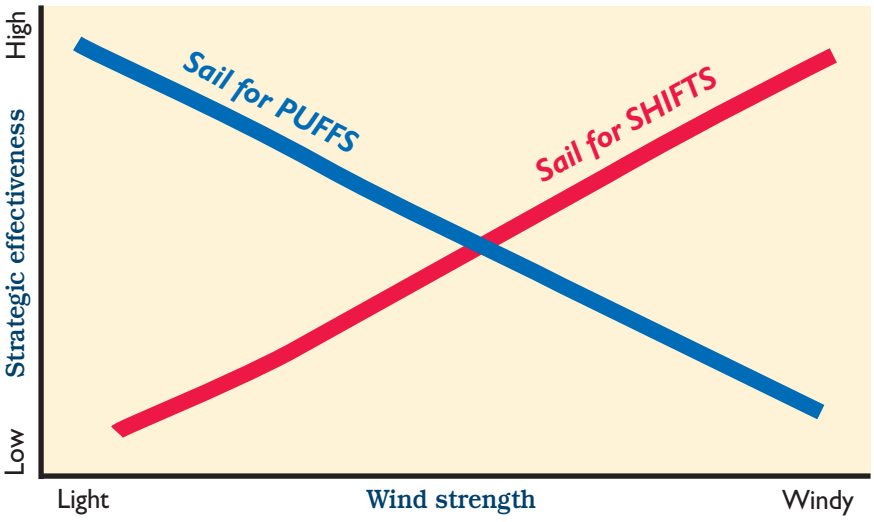
Here are some rules of thumb that work most of the time when the wind direction shifts back and forth:

- ***Tack on the headers***. Tack when you are headed to the median (*see above*) so you will always be sailing on the lifted tack.
- ***Sail the longer tack first***. When in doubt about the wind phase, get on the tack where your bow points closer to the windward mark. Best-ever rule of thumb!
- ***Sail toward other boats that look bad***. Tack and cross other boats when they are 'falling into' you.
- ***Don't let other boats cross you***. Tack to leeward and ahead of them so you will be first to the next shift.
- ***Avoid laylines as long as possible***. The laylines are strategic dead-ends because you can no longer play shifts. Sail the longer tack to stay closer to the middle; as you approach the layline, tack on smaller headers.
- ***Treat the last shift as persistent***. When there's only one more shift on the beat, sail all the way into it.

PLAY 12: Be smart in Persistent shifts

Here are some rules of thumb that usually work when the wind direction is shifting slowly in one direction:

- ***Sail into the headers***. A persistently shifting breeze keeps going one way, so don't tack on a header – continue sailing toward the next shift(s).
- ***Sail the shorter tack first***. Smart sailors usually sail the longer tack first, but this will take you away from a persistent shift. Instead, head for the corner.
- ***Sail toward other boats that look good***. Identify the favored side of the course, and sail that way fast.
- ***'Bite the bullet.'*** Don't be afraid to let other boats cross ahead of you. By going behind you will be sailing toward the next shift and will make gains on them.
- ***Sail toward one side of the course***. It's hard to make the middle work in a persistent shift, so don't be afraid to commit to the favored side.
- ***Be careful not to overstand the mark***. Tack short of the layline so you'll be OK as the wind keeps shifting.



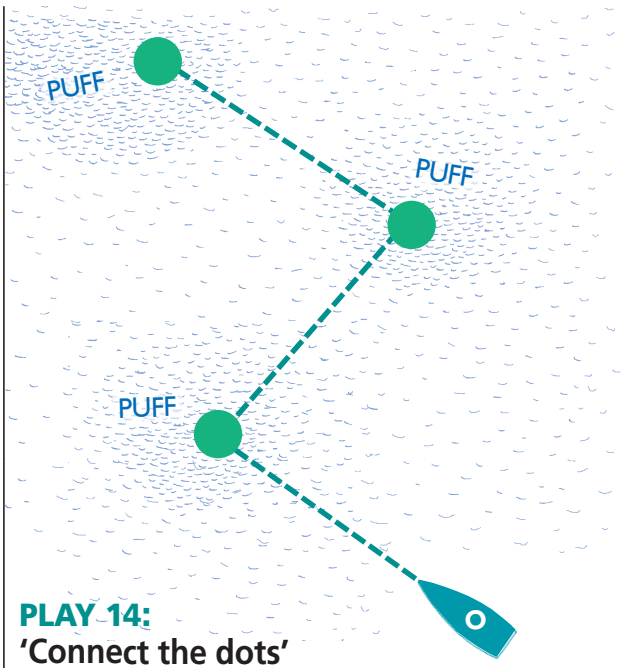
PLAY 13: Go for puffs in light air, shifts in breeze

When you're racing upwind, sometimes you have a choice of sailing toward the next windshift or tacking to head for an area with more wind pressure. The better choice often depends on how much breeze you have overall.

In heavy air, most boats are overpowered – they have plenty of wind pressure and need to depower so the boat doesn't carry too much heel or windward helm. Boats in this situation are already traveling close to their hull speed, so getting more wind will not increase their speed very much, if at all. This means there is not much benefit in getting to a puff. So when it's windy, playing the shifts is much more valuable, and therefore the priority.

In contrast, boats are always underpowered in light air. A puff might increase the strength of your sailing wind by a huge percentage, and this would make a large difference in your speed through the water. In addition, the extra wind velocity allows you to point higher (because your tacking angle in stronger wind is narrower than in lighter wind). This "lift" can be as much as several degrees.

For these reasons, in light air you should search for better pressure first and windshifts second. Conversely, as the wind gets stronger and more wind will no longer help your speed much, change your priority to looking for shifts.

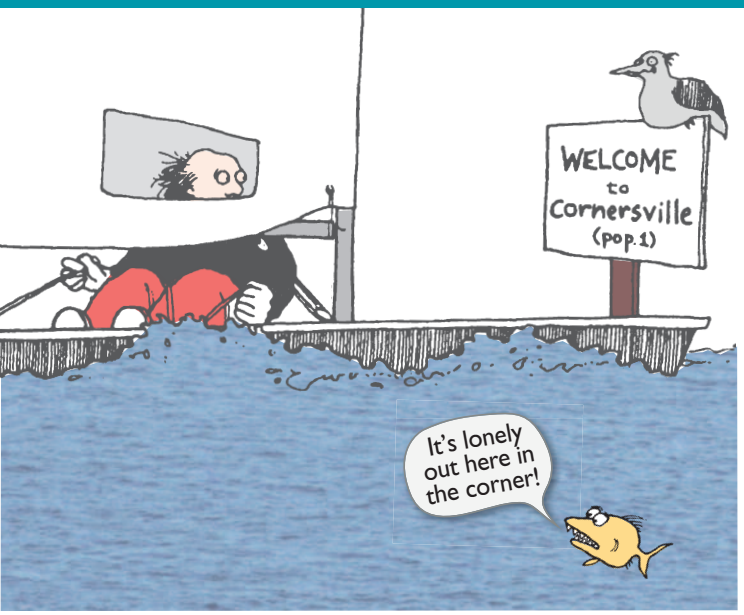


PLAY 14: 'Connect the dots'

In puffy conditions, when there is a relatively large difference in velocity between gusts and lulls, it's critical to stay in better pressure as much as possible. The best strategy is often some version of the old "draw by numbers" game where you sail a course from puff to puff. To stay in the best pressure, look up the beat at the wind that is coming to you. Then try to "connect the dots" between puffs (this is a lot harder than simply looking for the dot with the next higher number!). Though it's not usually a good idea to go chasing after windshifts, sailing toward puffs often works well.

JH Peterson photo

The geometry of your race course is one factor you must consider in any strategic plan. As a rule of thumb, spend most of your time sailing on the tack where your bow is pointed closer to the windward mark (*starboard tack above*). By sailing the longer tack first, you avoid getting to a layline too early, and you increase your odds of success if you're not sure what the wind will do next. When you want to sail the longer tack, a good lane of clear air is critical.



PLAY 16: Avoid laylines and corners

As a general rule of thumb, it's smart to avoid getting to laylines too early. The more time you spend on a layline, the more likely you are to face one or more of these problems that will slow you down:

• **Losing in a windshift**. The laylines are a strategic dead-end because once you get there you can no longer play windshifts. If you get a header, you will lose to all the boats that didn't go to the layline since they can play (i.e. tack on) that header. If you get lifted, you will overstand the mark and boats below you will get lifted up to it.

• **Bad air**. The laylines (especially the starboard layline) attract a lot of company. Unless you are leading the race, if you get to a layline early there's a good chance that another boat will tack on your wind. If that happens, you either have to sail in bad air all the way to the mark or do two tacks to clear your wind. Either option is slow.

• **Overstanding the mark**. It's hard to judge the layline when you are far from the mark, so it's easy to overstand. Each boatlength you sail past the layline is wasted distance that is lost to every other boat in the fleet. Even if you pick the layline exactly, you will overstand if you get lifted, or if you have to tack to clear your air.

PLAY 15: Sail the longer tack first

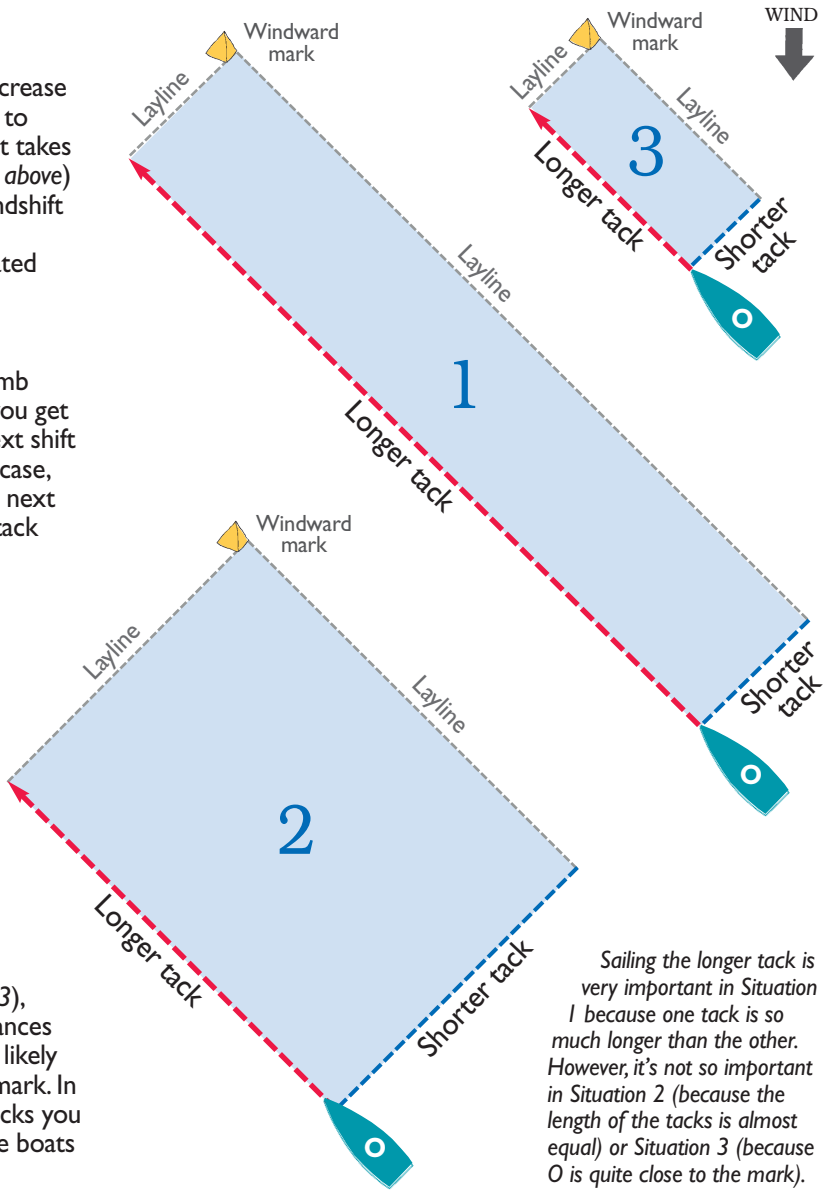
This could be the most important play in this book! When you're not sure what the wind will do next, increase your chances of success by sailing on the longer tack to the windward mark. The longer tack works because it takes you away from the layline (a strategic dead-end – *see above*) and thereby gives you better odds for playing any windshift you might get before you reach the windward mark.

The benefits of using this strategy are directly related to the following variables:

1) ***Uncertainty about the wind***.
Sailing the longer tack first is a very good rule of thumb when you're not sure what the wind will do before you get to the mark. But when you're confident about the next shift and/or puff, forget about which tack is longer. In that case, follow other rules of thumb such as, "Sail toward the next shift." Sometimes it will be faster to sail the shorter tack first, but the general odds don't favor this.

2) ***Difference in length between the longer and shorter tacks.***
The advantages of 'sailing the longer tack first' are roughly proportional to the difference in length between the two tacks (from where you are to the windward mark). For example, if one tack is eight times longer than the other (*Diagram 1*), it will almost always pay off to sail the longer tack first. But if one tack is only slightly longer than the other (*Diagram 2*), there is not such a strong reason to sail the longer tack first.

3) ***Distance from the mark***.
When you are relatively close to the mark (*Diagram 3*), sailing the longer tack first may not increase your chances of success very much. That's because the wind is less likely to shift during the short time before you round the mark. In this case it's often best to minimize the number of tacks you make and to position yourself tactically relative to the boats around you (e.g. keep your wind clear).

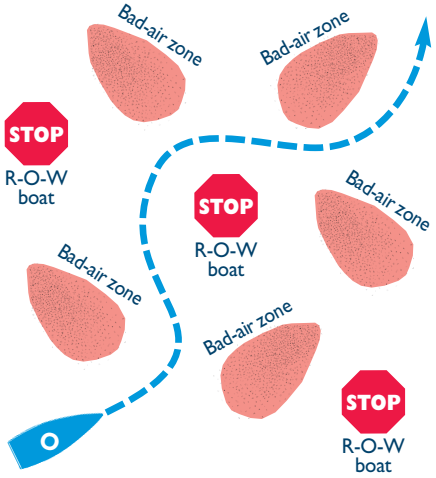


Sailing the longer tack is very important in Situation 1 because one tack is so much longer than the other. However, it's not so important in Situation 2 (because the length of the tacks is almost equal) or Situation 3 (because O is quite close to the mark).

Use tactics as a 'last resort'

Tactics are the boat-on-boat maneuvers you make to follow your strategy amidst a fleet of boats that are trying to do the same thing. These moves are critical to stay in control of your race and maintain strategic options. However, every time you make a tactical maneuver against one other boat (e.g. a tack to cover or to clear your air), you lose time and distance to every other boat in the fleet. Therefore, use tactical moves only as a last resort when they are necessary.

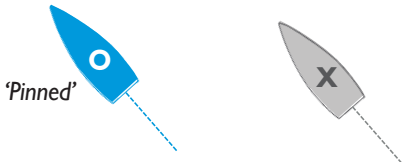
Of course, it's usually difficult to sail any race without making at least some tactical moves. If you didn't, you would likely end up doing penalty turns, sailing slow in bad air or heading the wrong way. Just remember that strategy comes first and tactics are used for supporting that plan. This is especially true when it's early in a race or series. As you get closer to the finish, the boats are usually farther apart, so you can afford to give up strategic distance to make tactical gains.



There are two ways that other boats can interfere with your strategic gameplan. First, those boats cast wind shadows that will slow you down. And second, boats that hold the right of way can block you from going where you want. You need smart tactics to navigate through this obstacle course.

PLAY 14: Steer clear of other boats

When you're racing upwind, the most important thing is to follow your strategic plan – by playing the shifts, finding the best pressure and so on. Being near other boats will almost never help this. Your competitors get in the way by casting wind shadows and blocking your path, so an important tactical rule of thumb is simply to avoid the rest of the fleet as much as possible. One boat sailing alone will almost always have better strategic options than boats sailing in a nearby group. Of course, it can be risky to sail too far away from other boats, so consider this in your gameplan.

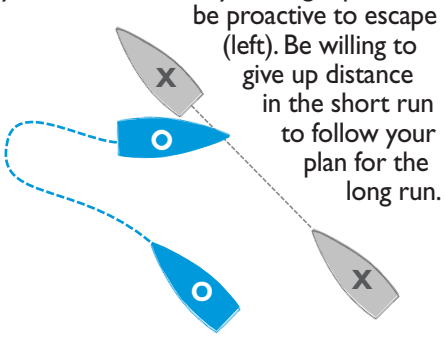


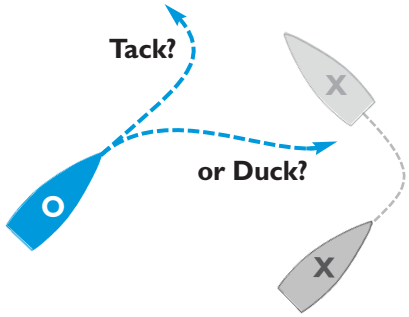
PLAY 17: Don't get pinned

It's great to have a strategic gameplan, but if other boats prevent you from following that plan it is useless. The main purpose of tactics, therefore, is to help you stick to your strategy when you're amidst a fleet of boats.

It's important to keep your options open and stay in control of your race. Don't let other boats dictate where you go. It's amazing how many racing sailors blame bad races on being 'pushed to the wrong side' by other boats. But you can only be pushed if you let the other boat do the pushing.

Try to avoid getting into situations (above) where other boats are blocking you. But even when you do get pinned, be proactive to escape (left). Be willing to give up distance in the short run to follow your plan for the long run.





PLAY 18: Make 'contingency plans'

When you are racing near other boats, try not to let them disrupt your strategic plan. This is not always easy to do. For example, let's say you are sailing upwind on port tack and a boat close to leeward (X) tacks to starboard. All of a sudden you have a choice – you can either tack to leeward of L or bear off behind her. And usually you have about two seconds to make this decision.

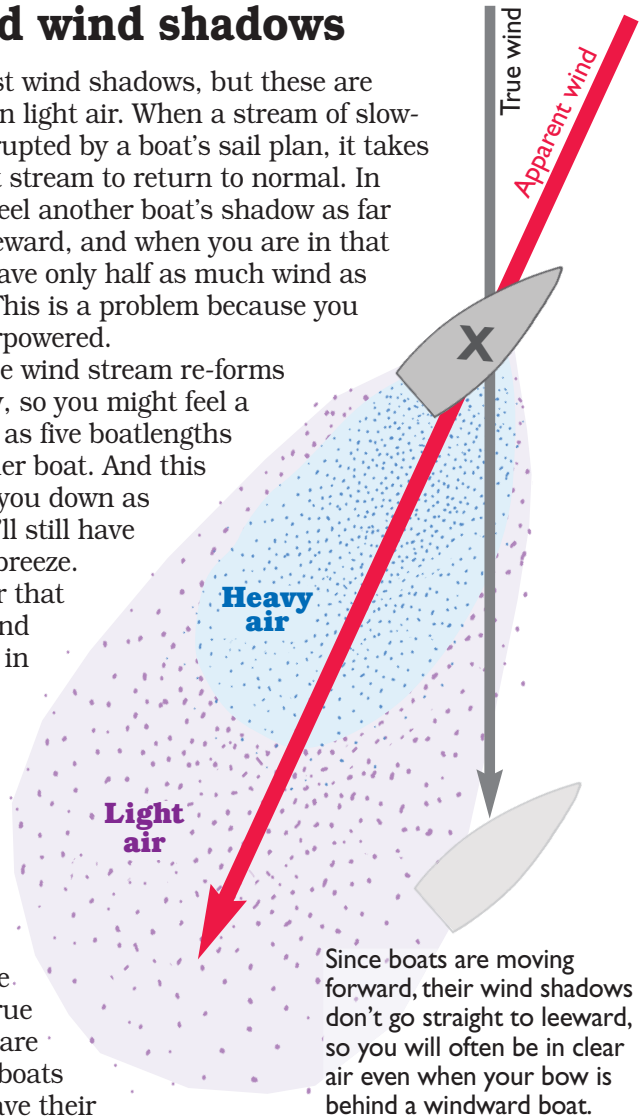
If you haven't thought about this possibility before it happens, your odds of making the right decision are roughly 50-50. So think ahead! Watch the boats around you and try to imagine what they will do next. For each possibility, make a simple 'contingency plan' for what you will do to follow your game plan. In the situation above, for example, your best move depends on which side of the course you favor. If you like the right, plan to bear off behind X if she tacks.

Understand wind shadows

Boats always cast wind shadows, but these are more harmful in light air. When a stream of slow-moving air is interrupted by a boat's sail plan, it takes a long time for that stream to return to normal. In light air, you may feel another boat's shadow as far as 10 lengths to leeward, and when you are in that shadow you may have only half as much wind as boats in clear air. This is a problem because you were already underpowered.

In heavy air, the wind stream re-forms much more quickly, so you might feel a shadow only as far as five boatlengths to leeward of another boat. And this bad air won't slow you down as much because you'll still have a relatively strong breeze.

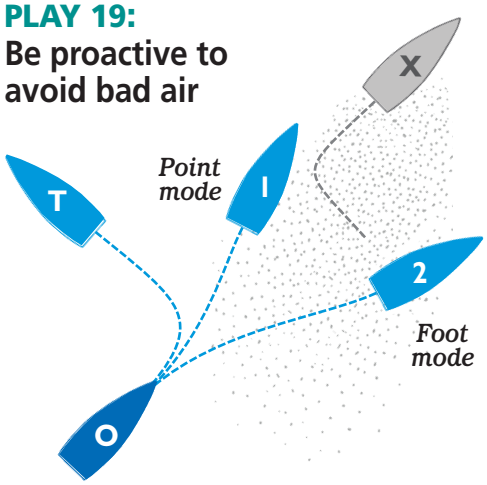
Also, remember that wind shadows extend to leeward of boats in a direction that is opposite to their *apparent* wind. A common error is thinking that wind shadows exist directly to leeward of boats, (i.e. opposite the direction of the true wind), but this is true only for boats that are not moving. When boats are sailing, they leave their wind shadows behind.



Since boats are moving forward, their wind shadows don't go straight to leeward, so you will often be in clear air even when your bow is behind a windward boat.

If you aren't sure about whether you're in bad air or not, look up at the masthead wind pennants on your boat and the other boat to see which direction the wind shadows are going.

PLAY 19: Be proactive to avoid bad air



Sailing in bad air is slow because it means you are losing time and distance to almost every other boat in your fleet. Though there are some times when you might choose to stay in bad air (e.g. when you are on a huge lift with lots of breeze), usually you should take immediate steps to clear your wind.

The easiest, and most common, way to escape a wind shadow is by tacking (T). But sometimes this is not a great option (e.g. when it takes you in the unfavored direction). If you want to stay on the same tack, there are two ways to get clear air:

1. Pinch up above bad air – Shift into 'point mode' to keep your air clear to windward of a boat that tacks ahead. You won't be able to maintain this height for long, so do this only when you have a short way to go on this tack (e.g. you're near the layline).

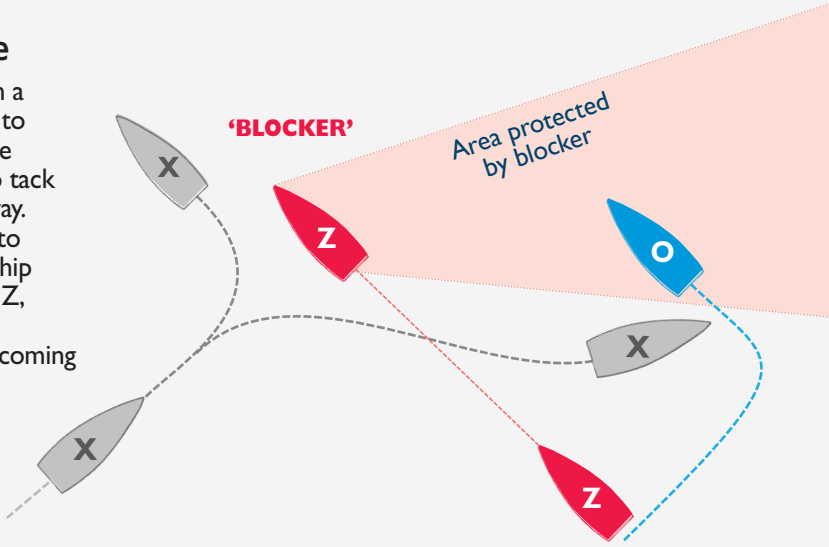
2. Foot off below bad air – Shift into 'foot mode' to get a lane of clear air to leeward of a boat that tacks to windward of you. You often have to give up a lot of height in this process, so don't pursue this option unless you plan to stay on this same tack long enough to gain back what you lose.

PLAY 20: Use a 'blocker' to protect your lane

When you (O) want to go left and you're looking to maintain a lane of clear air on starboard tack, one of the biggest threats to your plan is a port tacker (X) who can't quite cross you. If she decides to tack on your lee bow, her bad air will force you to tack away. You will lose your lane and you'll be going the wrong way.

Prevent this by positioning your boat several boatlengths to windward of another starboard tacker (Z) on her windward hip (see *diagram*). One way to get into this position is by ducking Z, going two or three lengths and then tacking.

This boat is now your 'blocker' because she will deflect incoming port tackers. A boat on port tack that would have been in a position to lee-bow you (if Z wasn't there) will now have only two choices – she can either a) lee-bow the blocker, or b) bear off behind the blocker, in which case she will no longer be in a position where she can lee-bow you.



Converging tactics

The simplest and most common tactical situation on a beat happens when two boats converge on port and starboard tacks. This occurs often and has a lot to do with the successful implementation of any boat's strategic gameplan. The key for each boat is knowing which way they want to end up going before they meet the other boat. With a strategic plan in mind, they can use the tactical moves on these pages to pursue it.

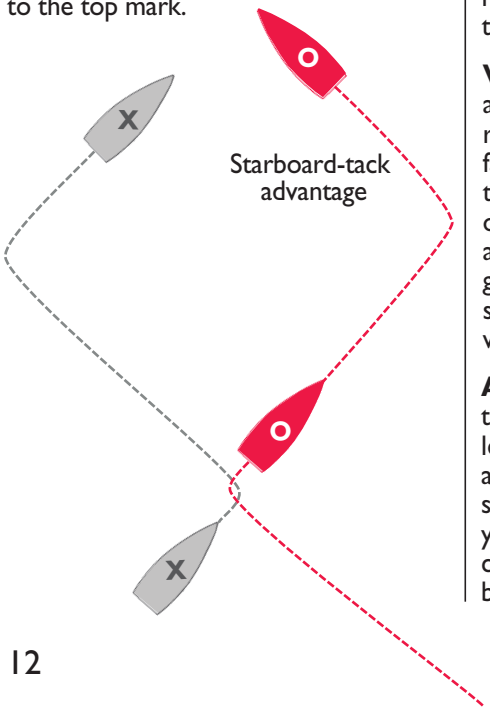
JH Peterson photo

PLAY 21: When in doubt, protect the right side

When two boats converge on opposite tacks upwind, the boat to the right has a distinct advantage – she is on starboard tack with the right of way, and the port tacker must keep clear.

If everything else is equal, it's good to be to the right of other boats because you'll have the right of way whenever you come together with them. So if you see a port tacker planning to duck close behind you, consider tacking in front of them to protect your advantage.

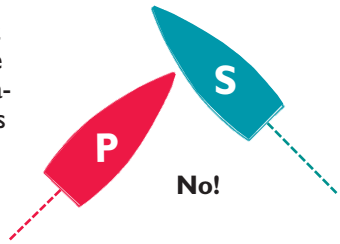
Of course, seldom are all other things equal. Having the starboard-tack advantage is nice, but it is insignificant compared to the gains (or losses) you can make by going the right way. So use this play with caution. It works best in very steady wind, on short beats and/or when you're close to the top mark.



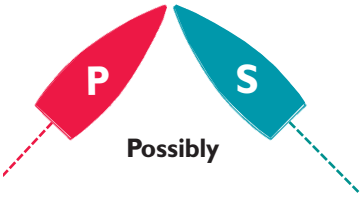
PLAY 22: Can you make a successful lee-bow tack?

When you converge with another boat on a beat, it's very helpful to know the possible options for each boat. Specifically, can the port-tack boat (P) tack into a solid lee-bow position on the starboard tacker (S)? A 'solid lee-bow' means P is able to tack close enough in front or to leeward of S (without breaking a rule) that she will force S to tack away for clear air after a very short time (i.e. S cannot 'live' in a windward position and pin P). P's ability or inability to apply a lee-bow tack will have a large influence on what the boats do as they approach each other. Here are some notes on predicting the possibility of a lee-bow tack.

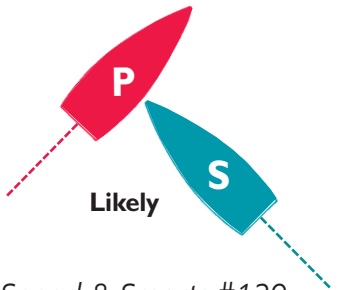
Estimate the contact point: One good way to predict whether P can do a lee-bow tack is to consider where the two boats would hit if both kept going straight. In the situation shown here, P would make contact somewhere on S's leeward side. This means P was on a lower 'ladder rung' than S (i.e. P was slightly behind S in the race). When it comes to lee-bowing, one sure thing is that it will almost never work when P is behind S at all. This applies to most types of boats in almost all wind and sea conditions.



When the boats are bow to bow: When the boats are even in the race (i.e. they're on the same 'ladder rung'), they will hit bow to bow. P has to be at least this far advanced in the race to even think about a lee-bow tack. Whether she can pull it off depends on a number of factors including boat type, crew skill, wind velocity and wave conditions. In flat water and medium breeze, good sailors in a light dinghy may be able to execute a successful lee-bow tack when they are just bow-even with S – but usually P needs to be a little farther ahead.

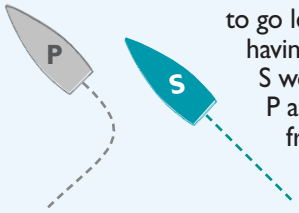


A confident lee-bow: In most boats and most conditions, you have a good chance of tacking into a strong lee-bow position when you are at least half a length ahead of the starboard tacker (i.e. S would hit P amidships). Of course, this doesn't work for all boats. If you're sailing a heavy keelboat in light wind and big chop, you may actually need to be crossing the other boat before you can tack into a safe leeward position!

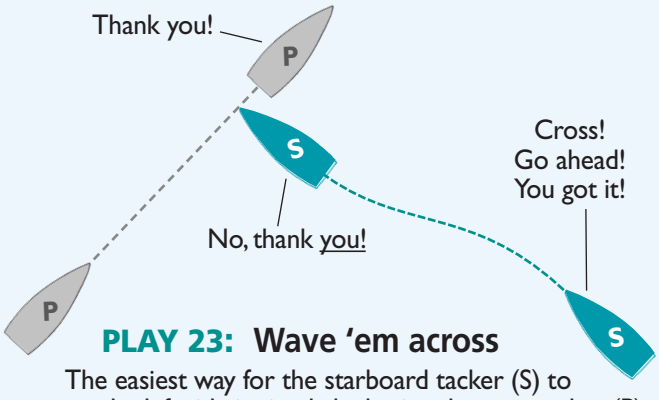


Moves for going left

When the port tacker wants to go right, or when the starboard tacker wants to go left, they have to figure out how to maneuver around the other boat in a way that allows them to remain on their tack in clear air. Here are some tactical moves that each boat can make.



Worst-case scenario: When S wants to go left, the worst outcome would be having P tack right under her lee bow. S would then be getting bad air from P and she would have to tack away from the favored left side of the course. Below are two ways S might keep this from happening.



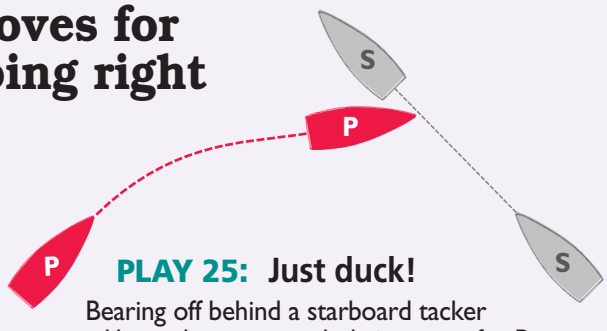
PLAY 23: Wave 'em across

The easiest way for the starboard tacker (S) to get to the left side is simply by letting the port tacker (P) cross ahead of her. She shouldn't just yell 'Starboard' to every boat she meets. Instead, S should bear off, say something like "Go ahead" and wave her hand to make it clear that she will let P continue on port tack. This works best when P is almost crossing S and, of course, when P wants to keep going toward the right side of the course.

PLAY 24: Aim at the port tacker

Here's a more aggressive tactic to help S get to the left side when P is not crossing ahead but is still far enough advanced that she could tack into a safe leeward position. When S is several boatlengths away, she should bear off (1) and aim right at P's bow (S can't do this too close to P or she may break rule 16 - Changing Course). This will force P to tack sooner (to keep clear) and will also increase S's speed. As soon as P begins to turn, S should luff up above closehauled (2) and use her extra speed to gain separation from P. If S does this right, she may be able to survive on P's windward hip long enough to get sufficiently far left.

Moves for going right



PLAY 25: Just duck!

Bearing off behind a starboard tacker seems like such an easy and obvious way for P to get the right side, but in order to do this she must be aware of S before it's too late. It's amazing how many port tackers don't keep a good lookout and end up tacking (to keep clear of S) when they should have ducked.

One risk for P when ducking is that S may tack right in front of her. P can reduce the chance of this by aiming at S until the last second (to make it harder for S to tack) and/or by making a hail such as 'Hold your course' (to make sure S is aware of P and doesn't tack too close in front of her).

PLAY 26: Ask to cross in front

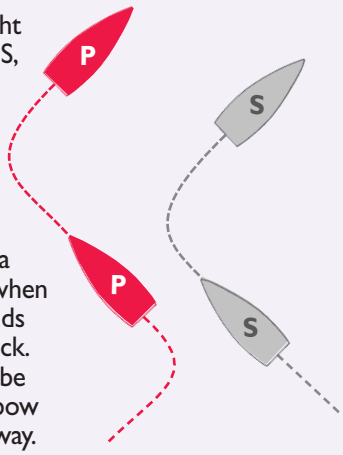
When P is almost clear ahead of S, she may be able to convince S to let her cross in front and continue toward the right side. This will work if S wants to go left and is worried about P tacking on her leebow (which would force S to tack to the right).

To find out if this will work, P should yell (loudly and clearly) something like 'Cross or tack?' and wait for S's response. Unless P is sure that S will let her cross, she should assume that she cannot cross and must keep clear.

This tactic works best in lighter wind when it's easiest for two boats to hear each other on the water (there's too much noise when it's windy). Also, in lighter air P can hail far enough away so that if S says 'Tack,' P still has the option to bear off behind S (and keep going to the right).

PLAY 27: Make two tacks

Another way for P to get to the right is to make a close lee-bow tack on S, force S to tack away and then tack again. The down side of this tactic is that P has to make two extra tacks, which is slow. But this may be worth it in tacking-friendly conditions when P couldn't quite cross and would have had to make a huge duck. It's also a back-up plan when P hails 'Cross or tack' and S responds 'Tack' when it's too late for P to duck. Of course, this play requires that P be able to tack into a very strong lee-bow position and force S to tack right away.



Don't give 'leverage' to boats behind

Covering is a defensive tactic used to stay ahead of one or more boats that are behind you. When you 'cover' a competitor, you position your boat between them and the wind or the next mark. The idea is to minimize the leverage, or separation, that other boats can get on you. Basically, you are trying to ensure that the boat you're covering is not in any different or better strategic conditions than you are. This reduces the chances they will pass you.

Like almost every other tactical maneuver, covering has a built-in cost. Whenever you stray from your strategic plan due to the position of another boat(s), you are bound to lose distance or time relative to the fleet. That's why covering is used primarily when:

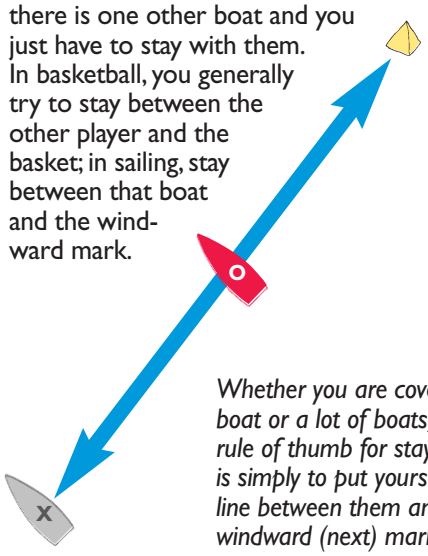
1) *It's late in a race or series.* As you get closer to the finish, the boats are spread out more and the tactic of covering is not nearly as costly as it would be earlier in the race when the boats are very close.

2) *You're happy with your position.* Covering is not a tactic for catching boats ahead, so use it only to protect your current position in the race.

PLAY 28:
Play 'man-to-man' defense

Sometimes there is only one boat that threatens your position. This often happens late in a race when you have little chance of catching any boats ahead but you could lose a boat that's just behind. Or, late in a series, there might be one boat close to you in the standings and you have to beat them.

When you're worried about only one boat, your goal is clear – just stay ahead of that boat, as you would if you were match racing. The best tactical approach is what, in basketball, would be called 'man-to-man' defense – there is one other boat and you just have to stay with them. In basketball, you generally try to stay between the other player and the basket; in sailing, stay between that boat and the windward mark.

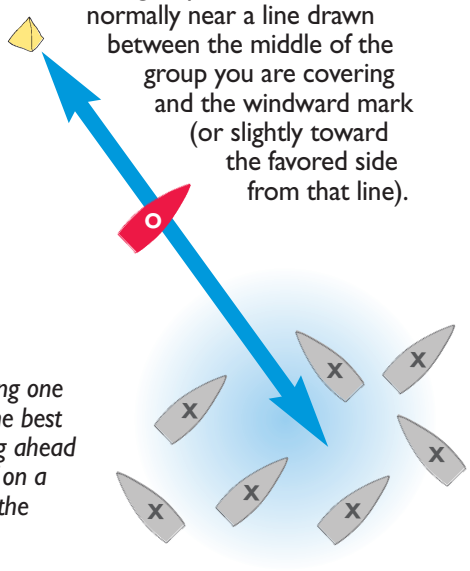


Whether you are covering one boat or a lot of boats, the best rule of thumb for staying ahead is simply to put yourself on a line between them and the windward (next) mark.

PLAY 29:
Play 'zone' defense

It is much more likely that you'll need to cover a bunch of boats rather than just one. This might happen any time between the start and finish when you're doing well and you're worried about staying ahead of a group.

To defend against more than one boat, you need to switch from man-to-man defense to zone defense. It's impossible to put yourself in the best position to cover each of those boats individually, so you have to find the spot that will minimize your exposure to the group as a whole. This is normally near a line drawn between the middle of the group you are covering and the windward mark (or slightly toward the favored side from that line).



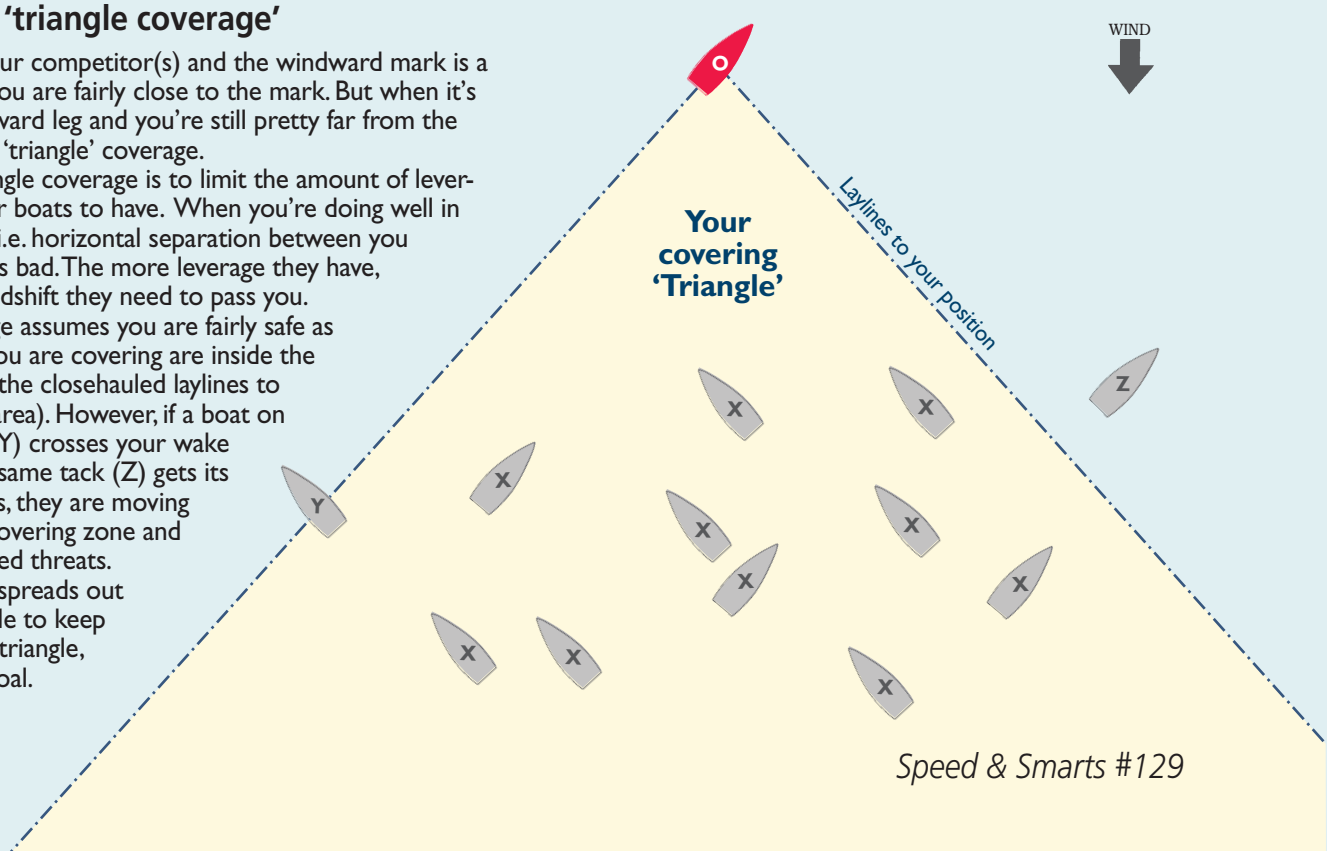
PLAY 30: Use 'triangle coverage'

Staying between your competitor(s) and the windward mark is a great tactic when you are fairly close to the mark. But when it's earlier in the windward leg and you're still pretty far from the top mark, try using 'triangle' coverage.

The goal of triangle coverage is to limit the amount of leverage you allow other boats to have. When you're doing well in the race, leverage (i.e. horizontal separation between you and boats behind) is bad. The more leverage they have, the smaller the windshift they need to pass you.

Triangle coverage assumes you are fairly safe as long as the boats you are covering are inside the triangle formed by the closehauled laylines to your boat (yellow area). However, if a boat on the opposite tack (Y) crosses your wake or if a boat on the same tack (Z) gets its bow ahead of yours, they are moving outside your safe covering zone and should be considered threats.

When the fleet spreads out a lot it's not possible to keep every boat in your triangle, but this is a good goal.



Why leverage matters

Size of wind shift	Distance gained or lost
2°	5% of x
5°	12% of x
10°	24% of x
15°	36% of x

Changes in wind direction can have a huge impact on the relative positions of boats that are racing upwind. The bigger the shift and the farther apart the boats, the greater the gain and loss that occurs. For example, if two boats are 20 lengths apart and the wind shifts 10° (which is not uncommon), each boat will gain or lose approximately five boatlengths!

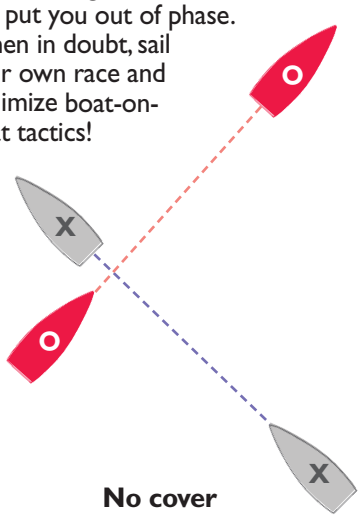
JH Peterson photo

In this photo the windward boat (99) has a 'loose cover' on the leeward boat (49). Unlike a 'tight cover,' which usually forces the other boat to tack away to clear her air, a loose cover keeps the boats close and thereby minimizes the leverage (*see left*) that the trailing boat needs to make a pass.

If 99 is worried about covering only 49, she should give 49 clear air to sail away from the favored side (in this photo 99 is protecting the right side). If 99 is also concerned about covering other boats in the fleet, she should give 49 clear air on the tack that takes this pair toward those boats.

PLAY 31: Don't cover!

There are many times when your best tactic is **not** to cover the boat(s) behind. Follow your strategic plan and ignore other boats when: a) the fleet is close together and it's impossible to cover all the boats just behind you; b) you are not doing well in the race and you need to catch boats ahead rather than worry about boats behind; c) you are very confident about your strategic plan; or d) the wind direction is oscillating, and covering other boats will put you out of phase. When in doubt, sail your own race and minimize boat-on-boat tactics!

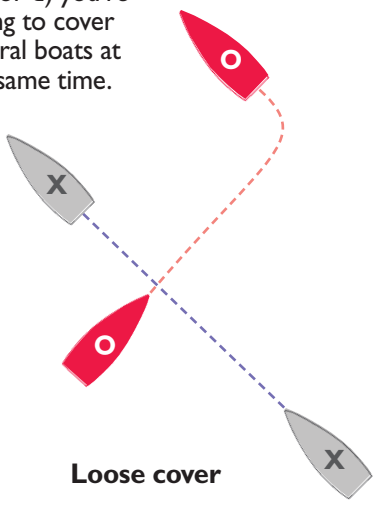


No cover

PLAY 32: Use a 'Loose' cover

Apply a **loose cover** by positioning your boat generally upwind of your competitor without giving them bad air. This means you are on the same tack as the other boat and your bow is close to even with their bow.

Use a loose cover when: a) you want to minimize how much leverage the other boat gets; b) the other boat is sailing toward the 'unfavored' side of the course; c) the boat behind is sailing toward other boats you need to cover; and/or d) you're trying to cover several boats at the same time.



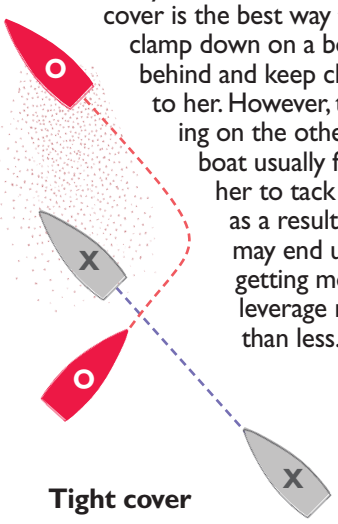
Loose cover

PLAY 33: Use a 'Tight' cover

Apply a **tight cover** by positioning your boat upwind of another boat so they are in your wind shadow. To do this you normally tack to windward and well ahead of the other boat.

Use a tight cover when: a) you need to beat a boat that is close behind you; b) the boat behind is sailing toward the 'favored' side of the course; and/or c) the boat behind does not have the option to tack (e.g. she's on the layline).

Many sailors think a tight cover is the best way to clamp down on a boat behind and keep close to her. However, tacking on the other boat usually forces her to tack away; as a result, she may end up getting more leverage rather than less.



Tight cover

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Tactics for handicap racing

In a handicap fleet, tactics depend a lot on the relative size of your boat. It usually pays to sail fast and not get tangled up with other boats. Here are a bunch of tactical ideas:

☛ ***Know your fleet*** Before you start the first beat, look at the rating of every boat in your class and how it compares to yours. Tactically, it's helpful to know which boats are supposed to be faster and slower.

☛ ***Risk*** Take fewer tactical risks than in one-designs. There are several reasons for this. First, the consequences of hitting and/or fouling another boat are more severe. Damage is more likely and the cost of taking a penalty is greater. And second, the fleet will eventually spread out no matter what you do, so the rewards of close tactical maneuvers are not usually huge.

☛ ***Small boats*** When your boat is small, it's harder to find clear air in the middle of the first beat, so favor one side of the course at least a little (and value lanes of clear air!). Bigger boats usually have the option to go anywhere on the first beat, including the middle.

☛ ***Faster and higher*** Boats that go faster also tend to point higher (and/or make less leeway), so be careful of ending up too close on the windward hip of a larger boat.

☛ ***Anticipate*** As boats get bigger and heavier and carry more crew, you need to look farther ahead for upcoming tactical situations (e.g. converging starboard tackers) because it takes longer to maneuver.

☛ ***Lee-bow tacks*** When boats are different sizes, this affects the position from which they can lee-bow. If the port tacker is smaller, she may have to be almost crossing the other boat in order to make a lee bow work (or she may want to avoid a lee-bow completely!). If the port tacker is bigger, she may be able to make a lee-bow tack stick when she is just bow-to-bow with S.

☛ ***Wind shadows*** Bigger boats can usually sail through the wind shadows of smaller boats. Be careful, though, because trying this could backfire when the boats are: a) very close together; b) racing in light air and/or bumpy seas; or c) not so different in size or speed.

☛ ***Covering*** Don't worry too much about covering individual boats. A loose cover on several boats or the fleet can be a good idea to stay in touch with your competition, but remember you are worried about time, so focus more on your strategic plan than you might in a one-design fleet. This is especially true when it's still early in the race. •

JH Peterson photo