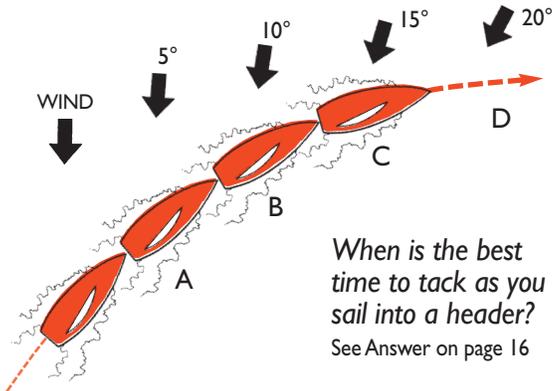


## BRAIN TEASER

### When to tack?

In a one-design race the wind is oscillating about 20° back and forth from left to right. A boat in the middle of the first beat is sailing closehauled on a big port-tack lift. Suddenly, she starts to get headed. She knows that a good rule of thumb to follow in these conditions is to tack on the headers. But when exactly should she make her tack to starboard?

- A) When she is first headed 5°
- B) When she is headed about 10°
- C) When she is headed about 15°
- D) When she is headed the full 20°
- E) You can't tell from the info given



JH Peterson photo

## Using 'rules of thumb'

My online dictionary defines *rule of thumb* as a 'general guideline that is an approximate measure or means of reckoning based on experience or common knowledge.' It's also a 'rule or principle that provides guidance to appropriate behavior or action.'

In sailboat racing, we use rules of thumb all the time to help us with tactics, strategy, boatspeed and many other things. These rules are also called tips, conventional wisdom, principles, good advice or something that's simply 'tried and true.'

A rule of thumb is a guideline that, during many applications over a long period of time, has proven to work most of the time. It describes a course of action where there is a relatively high probability for a successful outcome.

My favorite and most-used rule of thumb is to 'sail the longer tack first' (see pages 8-9). When you are sailing upwind (or downwind) and one tack (or jibe) is significantly longer than the other, it usually pays to get onto the longer tack. This doesn't always work, but in my experience (and in the experience of many other sailors) it will give you the best outcome most of the time.

A sailing rule of thumb is most helpful when you are not totally certain about what to do. For example, if you are sailing up the first beat and you have no clue which way the wind will shift next, you can always get on the tack where your bow is pointed closer to the windward mark. There are many times like this when you're not sure about your next step and you need a reliable guideline.

A rule of thumb is also helpful when you're trying to minimize risk (which is key in sailboat racing). By definition, a rule of thumb is something that has proven to work over and over again, so it's inherently low-risk. This entire issue is filled with rules of thumb that you can use whenever you are racing. •

## ISSUE # 112

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# Risk – a racing sailor's curse

One definition of risk is 'exposure to the possibility of loss.' That basically sums it up for sailboat racers. When you take a risk you are accepting the chance that you will lose something you have – boats, time, your standing in the series, a chance to catch up, etc.

In the perfect world, sailors would not take any risks at all. Ideally, we would always know what the wind is going to do, and therefore we would go the right way on every leg without any risk of losing.

But the race course is not perfect. Since we will never know exactly what's going to happen (and that makes the sport interesting), every move or decision we make on the race course involves a certain level of risk. For example, if you start near the pin end the risk is that the wind will shift right. If you get too far to one side of the beat or run, there may be more pressure on the other side, and so on.

One thing that separates good sailors from average sailors is their ability to manage risk. As a general rule, good sailors don't take much risk. They do a great job of figuring out what the wind will do, and when they're not sure they use rules of

thumb to put themselves into positions that always seem to minimize their exposure to risk.

Rules of thumb are very helpful in reducing risk because they have historically had a high probability of success. They also help you be more consistent by improving the quality of your decision-making. They allow you to choose tactical and strategic options that have a good chance of working, while minimizing risk at the same time.

The reason to reduce risk is so your series score will include good races over and over again. The best way to do this is usually not by trying to win any particular race. In many races, the boat that crosses the finish line first had to take a lot of risk to get there. It's great to win, but not if you had a 50-50 chance of winning or getting 20th!

## How much risk to take

Risk by itself is not necessarily bad or good. Though it's smart to avoid risk much of the time, there are many situations where you might choose to take small, or even big, risks. The key is knowing when and where to do this. Here are some risk-related factors to consider:

**Timing** – Is it early or late in the race/series? Generally you should be less willing to take risks early on since you have the entire race or series to improve your position. As you get closer to the finish, however, and you are running out of time, you might be willing to take bigger risks.

**Happy or not happy?** – Are you satisfied with your position in the race or series? If so, protect what you have and avoid taking risks. If you are not happy, that's when you might consider taking more risk to improve your standing.

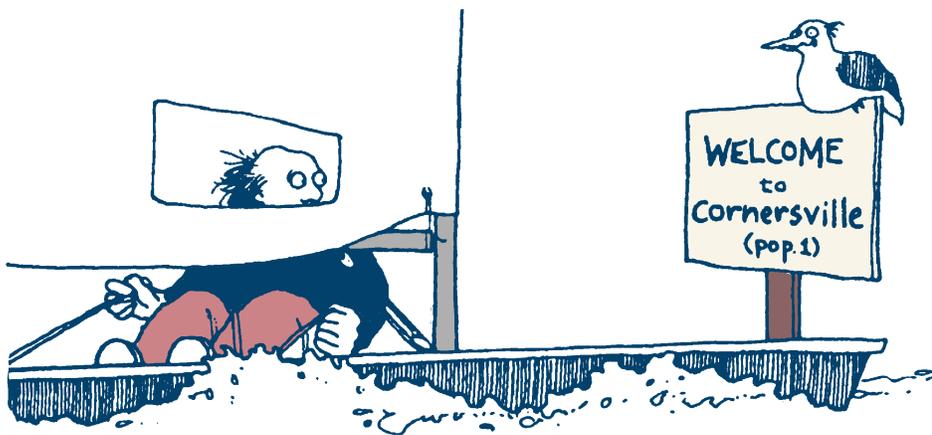
**Strategic confidence** – How comfortable are you with the strategic information you have gathered and the game plan you have made? If your confidence is high, you have little need to take risks. If you're not sure what the wind will do next, you will probably end up having to take a bit more risk.

**Boatspeed** – Are you faster or slower than the other boats in your fleet? If your speed is good, you don't need to take risks to get to the front of the fleet – just stay near the other boats. If you're off the pace, you may need to take some strategic risks in order to compensate.

**Size of the 'reward'** – If you make a risky move, how much could lose or gain? If the gain/loss ratio is pretty high, this might be a risk worth taking. But if you risk losing 20 boats for a possible gain of 5 boats, that is probably not a worthwhile option.

Try to consider all these factors when you are racing and making decisions that involve risk. Taking risks is not so bad when you take them consciously as part of a planned strategy. But many times decisions involving risk are made spontaneously, or subconsciously, without much thought.

For example, you are sailing upwind on port tack, headed to the favored right side. Suddenly one of your competitors tacks on your



There are many ways to take risks in sailboat racing. One classic is to sail off to an edge of the course by yourself. Though this move has the potential for a large payoff, the risk of losing is usually much greater (that's why there aren't any other boats around!). As with most tactical or strategic choices in sailing, the key is making decisions that have a high probability of success.

wind. Instead of footing off to keep going right, you tack to starboard, but it takes several minutes to find another lane of clear air on port tack. A small incident has just grown into a huge, unplanned risk.

If you are going to take a risk, at least do it consciously as part of your overall plan for the race.

### How to minimize risk-taking

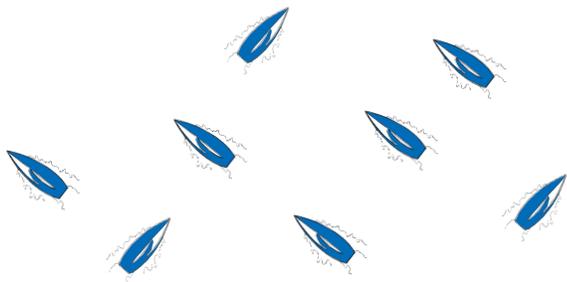
As a rule of thumb, you should generally take as few risks as possible. Focus on things you can do to improve your performance that involve no risk at all. These include working on boatspeed, improving your boathandling and avoiding breakdowns. All of these things are no-brainers because they have an up-side with no down-side.

Unfortunately, there is no free lunch when it comes to strategy and tactics. So if you don't have a clear strategic plan, rely on the rules of thumb in this issue to help you reduce risk, be consistent and improve your chances of success.

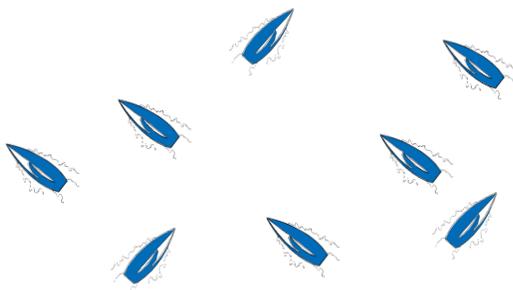


**While you're racing, you should always have a good idea of how much risk you're willing to take. For example, if you have a marginal inside overlap at the leeward mark, will you stick your bow in there even if the outside boat is yelling 'No room!?' If it's early in a race or series, or if you're happy with your position in the race, the general rule of thumb is to minimize risk-taking.**

### SITUATION A



### SITUATION B



### Risk Factors

The amount of risk that's involved with any particular tactical or strategic option is related to two things:

1) **How much you have to lose.** When you are in first place in a race or series, you obviously have a lot more to lose, and therefore a lot more at risk, than when you are in last place. In Situation A, the Red boat is in first place and separates far to the right of the fleet. This is extremely risky because she could potentially lose all the boats behind her (and she has little or nothing to gain). In Situation B, Red also takes a flier, but this time she starts out in last place so she is not risking very much (except perhaps the chance to pass a few boats during the rest of the race).

2) **The soundness of your strategy.** When you are very sure that you are going the 'right way,' then following your game plan involves less risk, even if you split from other boats. If the Red boat in Situation A sees an obvious puff and shift on the right side, she may not actually take much risk by splitting in that direction. However, in sailboat racing there are very few things that are 100% certain, so there's a certain amount of risk even when you are fairly confident about what you're doing.

The key is to be aware of how much you have to lose (or gain) and how sure you are about your strategic gameplan. Then you can adjust the amount of risk you take.



## RULE OF THUMB

# Focus on strategy before tactics

In the big picture of sailboat racing, strategy usually matters a lot more than tactics. It's true that you can improve your position by using smart moves against other boats. You might even gain a bunch of places with a clever maneuver like rounding inside at the leeward mark. But in most races, and over time, the reason why you beat a majority of the boats behind you is because of strategic factors.

In almost every race, you can gain a lot more by going the favored way than by making good tactical moves. If you are on the right side of even one small wind shift, you will likely gain more on other boats than you could gain from all your tactical moves during an entire regatta. That's why, as a rule of thumb, you should focus on strategy first and tactics second.

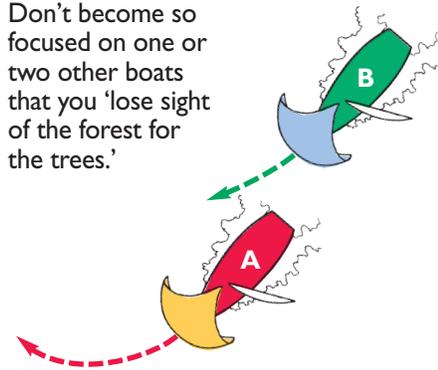
Here's a classic example of how sailors get this mixed up. Boat A rounds the windward mark and sets her spinnaker on the first reach. She is in tenth place but close enough to the leaders that she has a chance to catch them during the

rest of the race. Boat B rounds just behind A and decides that she wants to pass A on the reach.

A doesn't want to get rolled, of course, so when B heads up behind her A luffs hard (*see below*). B's spinnaker eventually collapses and A pulls ahead. However, while A was maneuvering against B, three other boats sailed through them to leeward. Worse yet, A is now far enough behind the leaders that she has little chance of catching them. Boat A may have won this battle, but she lost the war for the race and perhaps the series.

In hindsight, it would have been

Don't become so focused on one or two other boats that you 'lose sight of the forest for the trees.'



better for A to let B roll over her. That's never an easy thing to do, but A must remember her ultimate goal here – to beat as many boats as possible. (Of course, if A's only goal in this race was to beat B then she did a great job.)

There are two times when it may make sense to place tactics ahead of strategy. The first is when a tactical maneuver is necessary to follow your strategic gameplan. For example, if you're sailing upwind on starboard tack and you like the left side a lot, it's very smart to bear off behind a port tacker and let her cross ahead of you. Maintaining your option to go either way is a common reason for tactical moves.

The second time when tactics might be a legitimate priority is later in the race (*see next page*) after the fleet has spread out and you are trying to catch (or stay ahead of) one or a few boats. Other than these two times, the basic rule of thumb is to focus on strategy. Consider tactics a necessary evil that must be employed only when you have no other good option. •

## Strategy

Your strategy is the game plan you make for how to get around the race course as quickly as possible. This plan takes into account variables like wind pressure, wind shifts, current, waves and the location of the next mark. It does not include the way you interact with your competitors.

A strategy is a blueprint or business plan for how to get from start to finish in as little time as possible, without considering other boats. Imagine a time trial where you sail around a course all by yourself – the plan you make for how to win this time trial is your strategy.

Your strategy usually involves an overall plan for the leg you are sailing, not just a short-term outlook. On the race course, the difference between 'good' and 'bad' strategic plans can be huge.

Examples of actions that might be part of a strategic plan:

- Starting at the favored (upwind) end of the line
- Sailing toward better pressure downwind
- Avoiding adverse current on the beat
- Sailing the longer tack or jibe first
- Tacking on a header in an oscillating breeze

playing the shifts, puffs and current





Should you follow your game plan and go left, or tack to split from boats ahead of you? The answer depends a lot on whether it's early or late in the race.

If you're on the first leg and the fleet is close together, stick to your gameplan so you gain on boats that go the 'wrong way.' This is especially important when you have a strong feeling about which way to go.

If you're on the last leg and the fleet is spread apart, you can probably afford some tactical maneuvering to beat the boats around you.

JH Peterson photo

## Corollary: Go for strategy early, tactics late

At the beginning of a race, all the boats in a fleet are usually very close together. Each is trying to move ahead of the pack so they can get clear air and go the 'right way.' At this point, the last thing you want is to lose distance by maneuvering against one other boat.

Tactics are all right if they're essential in order to pursue your strategy off the starting line. For example, you might choose to tack and duck a starboard tacker to get to the right side. Or you might have to pinch a little in order to gain the option to tack.

But any time you maneuver against a few boats, you lose ground to every other boat in the fleet. That is

not a good thing when the fleet is bunched tightly, as they are just after the start. Losing just one boatlength could mean the difference between being at the front of the fleet or near the back.

In these conditions, your number one goal is to follow your strategic gameplan. That's how you will move ahead of the majority of the fleet. Don't worry about individual boats unless they are affecting the implementation of your strategy.

Later in the race the fleet will spread out a lot more. That's when you can afford tactical maneuvers to get ahead of the boats around you.

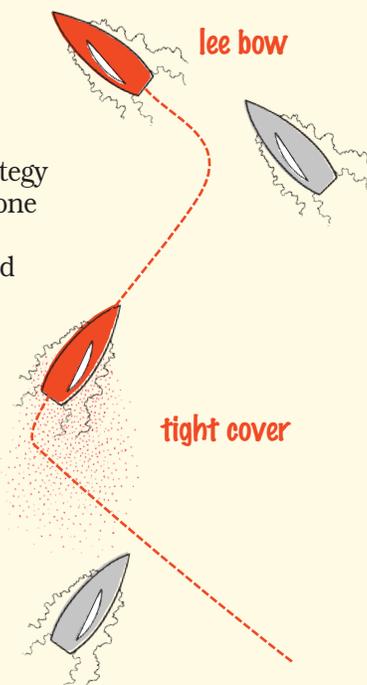
## Tactics

Tactics are the boat-on-boat maneuvers that you make during a race to help follow your strategic gameplan amidst a fleet of boats that are all trying to do the same thing. Tactics allow you to have more control over where you go on the race course and therefore give you a better chance of implementing your strategy successfully. They are also useful occasionally to help you slow and/or beat one or more particular boats.

Effective tactics require sound boatspeed, skilled boathandling and a good knowledge of the right-of-way rules. When you maneuver tactically relative to one or a few other boats, you usually lose distance to every other boat in the fleet, which may or may not be worthwhile in the long run.

Examples of common tactical actions on the race course:

- Start in a part of the line where there aren't many boats
- Cover another boat or slow them with your wind shadow
- Luff or lee-bow another boat
- Tack to clear your air
- Position yourself so you will be inside at the next mark
- Round the leeward mark by swinging wide and then cutting close
- Approach the finish line on starboard tack so you have right of way





## RULE OF THUMB

# Sail *toward* the next windshift

This may be the most basic and useful of all rules of thumb: When you are sailing to windward, sail in the direction from which you expect the next shift. In other words, if you think the wind will shift to the right (clockwise), you should sail on port tack (because this takes you toward the right). If you expect the wind to shift left, sail on starboard tack.

The goal on beats is to get upwind as quickly as possible. When you know that the wind is going to change direction, you want to be closer to the new direction because this automatically means you will be farther upwind. (See discussion about 'ladder rungs' at right.)

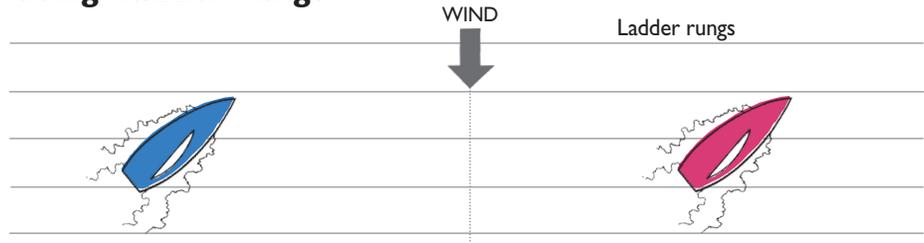
This rule of thumb works for any kind of wind pattern. When the shifts are oscillating, for example, you always want to sail on the lifted tack because this takes you toward the next windshift (which will be a header). When the wind is shifting persistently in one direction, keep digging into that side because the next shift will come from there.

Sailing toward the upcoming shift is important since there is a lot to be gained (and lost) in shifts. The amount that one boat gains is proportional to two things: 1) the size of the windshift; and 2) the amount of lateral separation she has from other boats.

In a 10° shift, for example, you will gain roughly 25% of the distance between you and other boats. If you are 20 lengths apart when you get this shift, you will gain five lengths. That's a lot! And if it's a 20° windshift you will gain about 10 boatlengths! So sail toward bigger shifts and get as much separation as possible in that direction.

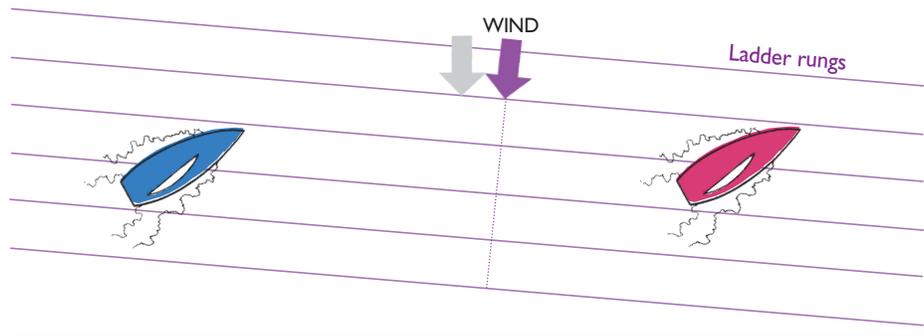
Though it seems fairly simple to sail toward the next shift, it is not always simple to predict the direction of that shift. This requires a lot of study (both before and during the race) about windshift patterns in the course area during that day. 🍷

### Using 'ladder rungs'

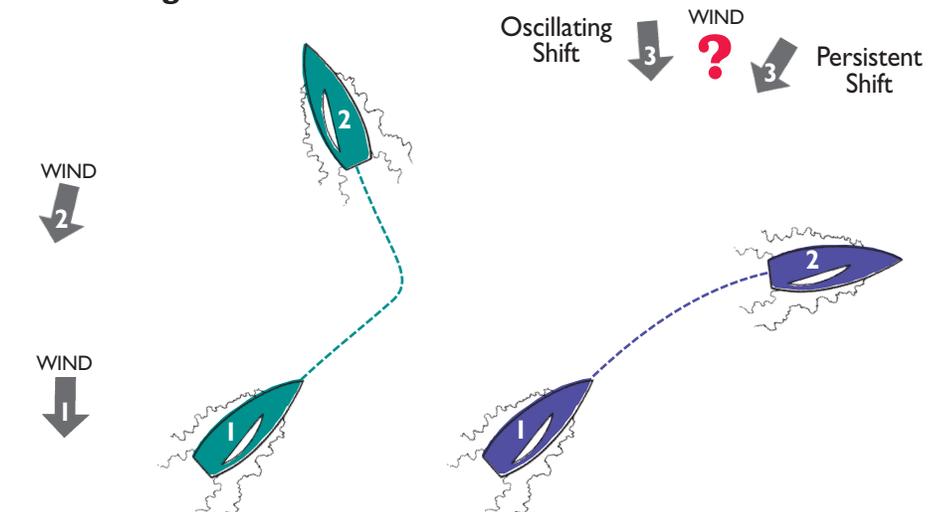


An easy way to understand why you should sail toward the next shift upwind is by using the concept of 'ladder rungs.' Ladder rungs are imaginary lines on the water drawn perpendicular to the wind direction (above). Each rung represents a line of equal position, so two boats on the same ladder rung are equal in the race (because they have both made equal progress to windward).

Whenever the wind shifts, it also changes the angle of the ladder rungs. If the wind goes right (below), the new ladder rungs rotate in that direction. As a result, the boat that is closer to the shift (the Red boat) ends up on the higher ladder rung and is therefore ahead in the race. That's why you should sail toward the next shift.



### Oscillating or Persistent?



Because it's important to sail in the direction of the next shift upwind, it's critical to know whether the windshift pattern is oscillating or persistent. Here two boats on port tack sail into a header. Should they tack or keep going? It depends on whether they think the wind will keep shifting right or go back to the left. The Green boat thinks the wind is oscillating so she tacks (because she thinks the next shift will come from the left). The Blue boat thinks the windshift is persistent so she keeps going straight (because she thinks the next shift will come from the right). This choice will make a huge difference when they get the next shift.

Perhaps the most important question to answer is whether you think the windshifts are oscillating or persistent (*see left*). This factor is critical because each requires a totally opposite strategy on the race course (since the next shift will come from a different direction).

### **Sail fast toward the next shift**

When you are sailing toward the next shift (and you're pretty confident that you are going the right way), you should actually sail a little faster than you would sail in a perfectly steady breeze (assuming you don't have overriding tactical concerns such as pinching to keep a lane of clear air).

There are several reasons for this. First, you want to get to that next shift as quickly as possible. Second, you want to go as far as possible in the direction of the new shift before it comes. And third, by sailing a little faster you will actually make better progress up (or down) the 'ladder rungs' toward the windward (or leeward) mark.

How much should you foot toward a shift? One thing for sure is that you shouldn't pinch, since it will not help you to go high and slow. You also don't want to start reaching off. But the bigger the impending shift, the more you should consider easing sails slightly to go in fast-forward mode.

## **Corollary: On runs, sail away from the next windshift.**

When you're sailing upwind you should sail *toward* the next wind shift, but downwind you want to sail *away from* it. That's because when you are sailing to a leeward mark your goal is always to get to a *lower* 'ladder rung.' Therefore, if you think the next shift will be to the left (as you look upwind), you should sail downwind on port tack (so you go away from that next shift). If you think the next shift will be to the right, sail on starboard tack. This will put you farther down the ladder when the shift comes.

One tricky thing about sailing downwind is figuring out the right balance between playing the shifts and going for better pressure. Often a windshift comes with a little more pressure. When you're going upwind this is not a problem because you should be sailing toward the shift (and therefore toward the pressure). Downwind you also want to sail toward the pressure but away from the shift. You may not be able to do both so you have to figure out which is more important. The lighter the wind, the more likely it is that better pressure will pay off (*see pages 12-13*).

## **Conventional wisdom**

There are several common maxims in sailing that are all based on the principle of "sailing toward the next shift." These include:

### **'Tack on the headers.'**

When you are sailing upwind in an oscillating breeze, the age-old advice is to 'tack on the headers.' The reason why you should tack when you get headed is because this will aim you toward the next shift (which will be a header on the other tack). By sailing on the lifted tack you will always be sailing toward the next shift, and this will get you up the ladder rungs as quickly as possible.

In an oscillating breeze, however, you don't actually sail toward the next shift all the time. Say you are lifted on port tack and you get headed to the median. You know the wind will continue to head you a little more on port tack, so should you keep going that way? No, because if you continue into that header you'll be sailing below your median course on port tack. If you tack when you are headed to the median you will always sail above the median and you'll be ahead when you get the next shift.

### **'Jibe on the lifts.'**

On runs in an oscillating breeze you should sail away from the next shift. The easiest way to think of this is to 'jibe on the lifts.' For example, if you are running on port tack and you get lifted, you know the wind has shifted left (looking upwind). The next shift, therefore, will come from the right, so you should jibe to sail away from that shift. Staying on the headed jibe is the best way to get to lower ladder rungs and make fast progress toward the leeward mark.

### **'Bite the bullet.'**

When the wind is shifting persistently in one direction, you should keep sailing into that header (because that is the direction of the next shift). However, when other boats tack ahead of you it's tempting to tack early so they can't actually cross in front of you. But that would be a bad strategy. When you expect a persistent windshift, 'bite the bullet' by sailing behind the other boats toward the next shift. This may not feel good when you're doing it, but it will be the best strategy in the long run.



JH Peterson photo



## RULE OF THUMB

# Sail the longer tack first

My favorite rule of thumb, and one that I have used with great success many times, is to 'sail the longer tack first.' This is a simple, nearly foolproof guideline that is easy to use and often comes with great results.

When you're racing upwind, the 'longer tack' is the one on which you must spend more time to get from where you are to the windward mark. There are many reasons why one tack may be longer than the other. Most often, this happens because you have sailed away from the middle of the course.

For example, if you sail toward the left side of the beat you might have 4 minutes left on starboard tack and 8 minutes left on port tack before reaching the windward mark. In that case, port is obviously the longer tack. Other reasons for unequal tacks include windshifts, a cross-current and a windward mark that was not set to windward.

The longer tack is the one on which your bow is pointing closer to the windward mark. Sometimes it is easy to judge this by looking at where other boats are pointing on each tack. If you have instruments, or even a compass, you can calculate the longer tack mathematically.

Besides figuring out which tack is longer, it's important to know roughly how much longer it is than the other tack. For example, will you have to spend 10 minutes on one tack and 2 minutes on the other? Or just 7 minutes on one tack and 6 on the other?

The more skewed the tacks, the more critical it becomes to sail on the tack that is longer. If one tack is much longer, there is a high probability that it will be better to get on that tack right away. But if the tacks are very close in length (which is probably the case if you have a hard time figuring out which tack is longer), there may be no advantage in sailing one tack just because it's a little longer.



JH Peterson photo

**When you're sailing on the longer tack, it's usually better to position yourself to leeward and ahead of other boats rather than to windward and behind (on their windward 'hip'). This way you have more options to play the next shift.**

### When and why this works

'Sailing the longer tack first' is a rule of thumb that works most of the time. However, like all such guidelines, it is not meant to be a replacement for figuring out what the wind is doing and making your own strategic plan to handle the particular wind conditions you are facing. For example, if it's light air and you see more pressure to the left, you should probably sail that direction on starboard tack even if port tack is a lot longer.

However, when you are not so sure about what the wind will do next (and this is the case even for top sailors much of the time), then you can rely on rules of thumb like 'sail the longer tack first.' This principle works because when the wind might shift in either direction it's better to stay away from the layline. By sailing the longer tack first, you head toward the middle of the beat rather than the closer layline.

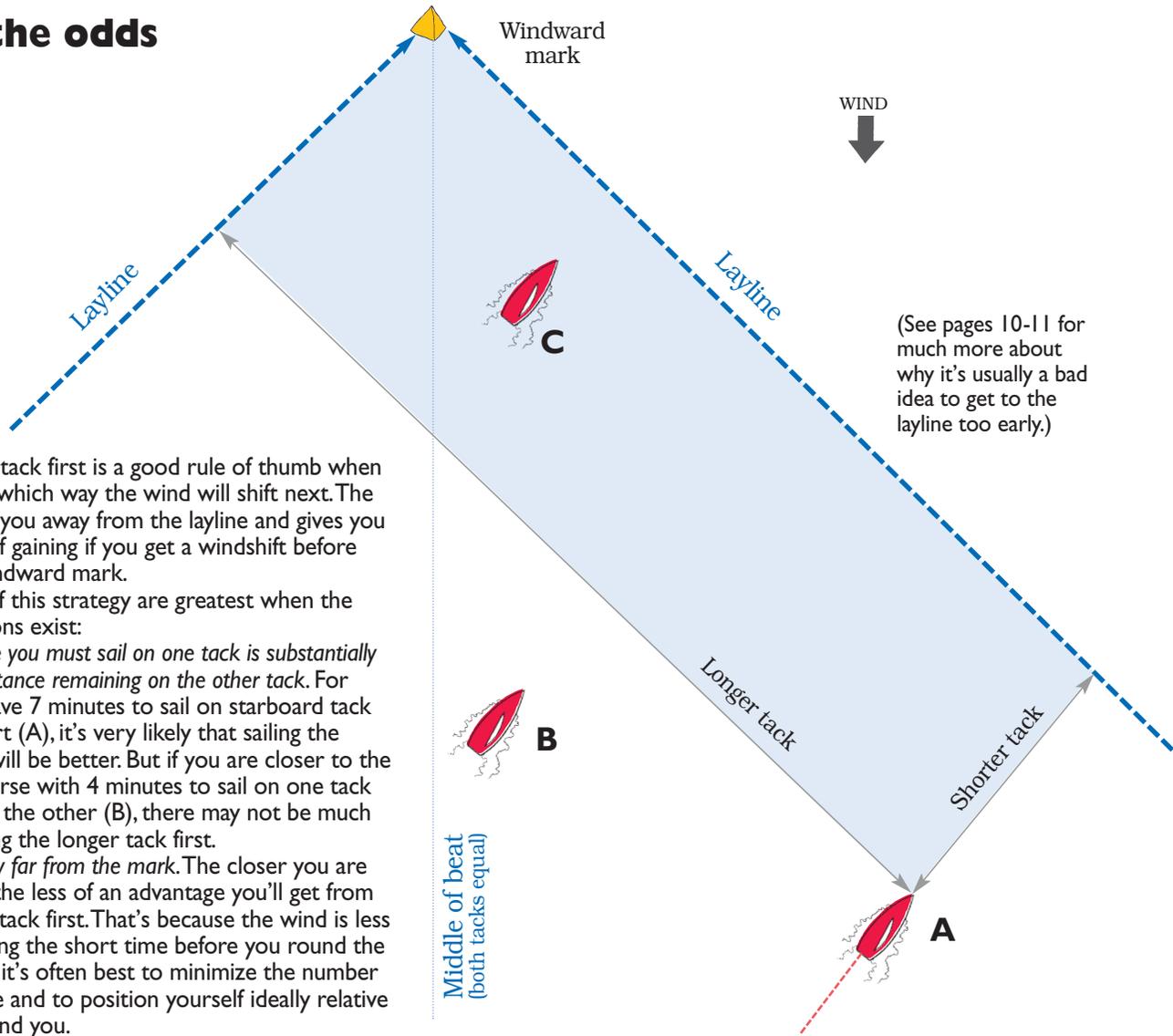
Over the course of many races

in the past, this strategy has proven to work more often than not. In other words, it gives you a higher probability of success, which is very important when you are trying to minimize your exposure to risk.

The probability that this rule of thumb will work goes up as: a) the tacks become more uneven; and b) you are farther from the mark (*see next page*). If you are quite far from the windward mark and the tacks are quite skewed, it is very urgent to sail on the longer tack.

Note that if you have a cross-current (a current that runs perpendicular to the wind), this will often make one tack longer than the other, sometimes by quite a bit. In that case, it may be better to sail the up-current tack first. This is not because there is any inherent advantage to being up-current – it just keeps you closer to the middle of the course, which is better when you're not sure what will happen next with the wind. •

# Playing the odds



Sailing the longer tack first is a good rule of thumb when you are not sure which way the wind will shift next. The longer tack takes you away from the layline and gives you a better chance of gaining if you get a windshift before you reach the windward mark.

The benefits of this strategy are greatest when the following conditions exist:

1) *The distance you must sail on one tack is substantially longer than the distance remaining on the other tack.* For example, if you have 7 minutes to sail on starboard tack and only 2 on port (A), it's very likely that sailing the longer tack first will be better. But if you are closer to the middle of the course with 4 minutes to sail on one tack and 3 minutes on the other (B), there may not be much advantage in sailing the longer tack first.

2) *You are fairly far from the mark.* The closer you are to the mark (C), the less of an advantage you'll get from sailing the longer tack first. 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 ideally relative to the boats around you.

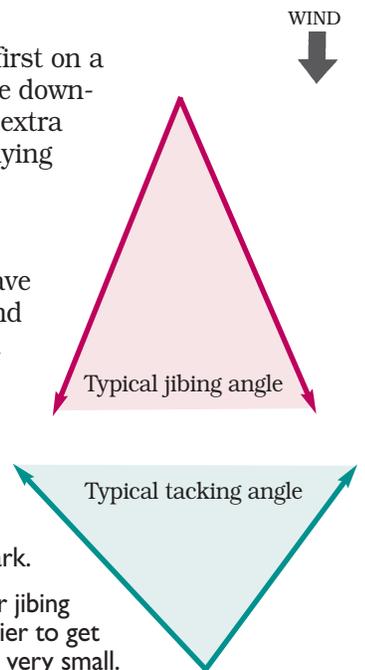
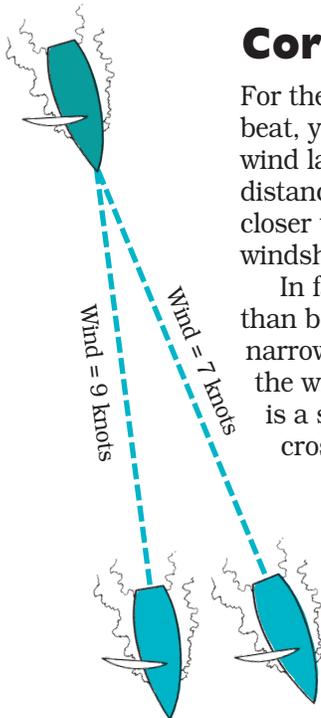
## Corollary: Sail the longer jibe first

For the same reasons that you should normally sail the longer tack first on a beat, you should also sail the longer jibe first on a run. Getting to the downwind layline too early has all the same problems – the risk of sailing extra distance, possible bad air and the inability to play windshifts. By staying closer to the middle of the run you have more options to play future windshifts (when you're not sure what the wind will do).

In fact, this rule of thumb may be even more important on runs than beats because it's easier to overstand downwind. Most boats have narrower jibing angles than tacking angles (right), so when you round the windward mark you are already closer to a layline. All you need is a slight skew in the course, a windshift, pressure increase or a cross-current and you'll be at a layline before you know it.

LEFT: Even a small increase in wind velocity can have a large impact on your downwind angles. Therefore, you have to allow for this when positioning yourself on the run. If you get too close to a layline and get a puff, you will be overstanding the leeward mark.

RIGHT: Boats with symmetrical spinnakers typically have narrower jibing angles than tacking angles in almost every wind velocity. So it's easier to get to a downwind layline, especially in breeze when the jibing angle is very small.





## RULE OF THUMB

# Avoid laylines and corners

It's impossible to round any mark without getting to the layline first. But the big question, both tactically and strategically, is how far you should be from the mark when you reach that layline. There's a huge difference between making your final approach from three lengths versus 30 lengths.

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 problems that will slow you down:

- **You may overstand the mark and sail extra distance.** 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.

- **You will lose to other boats if the wind shifts.** The layline is a strategic dead-end because once you get there you can no longer play windshifts. If you get headed, you will lose to all the boats that didn't go to the layline (because they can tack on the header). If you get lifted, you will overstand and many boats that were below you will get lifted up to the mark.

- **Other boats may give you bad air.** The layline (especially the starboard layline upwind) attracts a lot

of company. Unless you are leading the race, if you get to the 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.

It's hard to define the ideal time to reach the layline. But if you are in the 'corner' of a beat or run (see below), that's probably too early. There are very few times when you will gain by getting to the layline early. In fact, once you get to the layline the best you can usually do is to hold even with other boats – and that happens only if the wind stays perfectly steady and no boats tack on you.

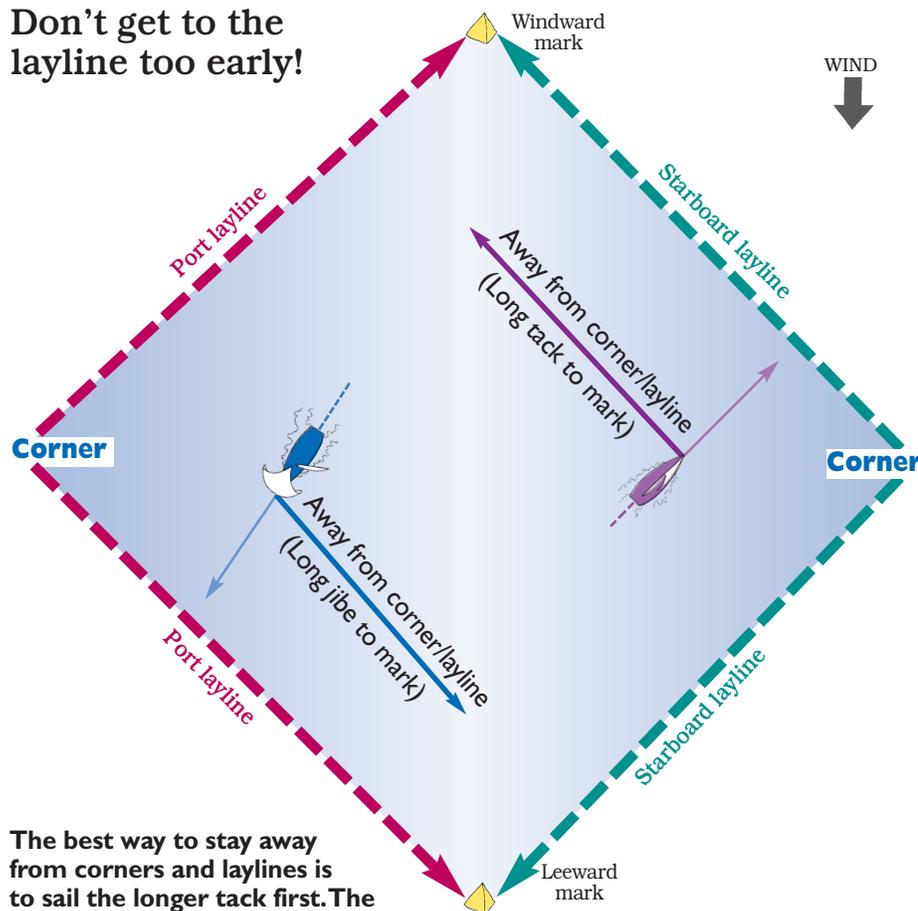
So it's generally good to avoid laylines, especially on runs where it's easy to overstand (see page 9). Here are some ideas on doing this:

- **Sail the longer tack first.** The 'longer tack' is the one where your bow is pointed closer to the windward (or leeward) mark. If you sail on this tack you will automatically be going away from the close layline (see diagram left and pages 8-9).

- **Look for a lane of clear air below the layline.** If you are playing the right side of the beat and there are at least several boats ahead of you, don't go all the way to layline (because they will probably tack on you). Instead, look for a nice lane of clear air below the layline (maybe 8 to 10 boatlengths) and tack to starboard there (see photo). Now when boats cross you on port tack they are more likely to keep sailing to the starboard layline than to tack on you. If they do tack, at least you have room for two tacks to clear your air without overstanding.

- **Take smaller headers as you get closer to the layline.** In a shifty breeze, tack on the headers to sail on the lifts. Typically you wait until you are knocked to your median heading, and then you tack. But the closer you are to the layline, the

## Don't get to the layline too early!



The best way to stay away from corners and laylines is to sail the longer tack first. The longer tack is the one that takes you toward the middle and closer to the next mark (windward or leeward). The shorter tack is the quick way to get to the closer layline, so that's what you want to avoid as a general rule of thumb.

more willing you should be to tack on smaller shifts (to sail toward the middle, away from the layline).

Of course, it's not always a total disaster to get to the layline early. There are a few times when this might actually be helpful such as when you're near the front of the fleet and one side is very favored, or you're near the back of the fleet and need to roll the dice. But more often than not, your chances are better if you avoid laylines and corners.

### How not to approach the mark

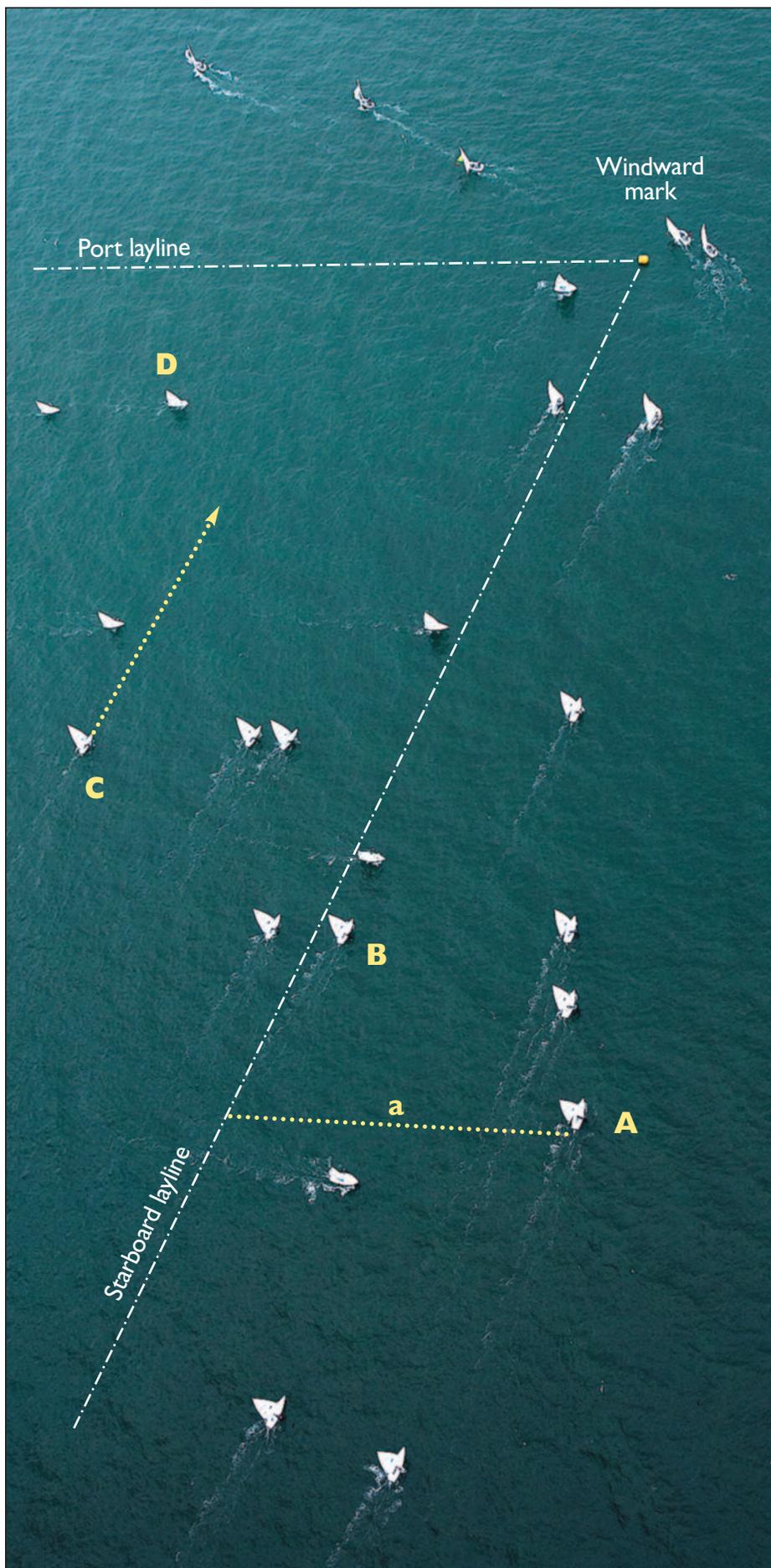
Here's a great aerial view of a one-design fleet approaching the windward mark. The most striking thing about this photo is how many boats have overstood the windward mark on starboard tack, and how far they have overstood!

- **Boat A** – This boat is part of the typical starboard layline stack-up. She got to the starboard layline at least 25 lengths away from the mark and had to go 7 or 8 boatlengths beyond the layline to get clear air! This means she will lose at least 10 lengths to boats that don't overstand, not including additional losses that will happen if the wind shifts (since she can no longer play any shifts).

- **Boat B** – This boat got to the layline at least 20 lengths before the mark. She hasn't overstood the mark (yet), but the boat that's crossing her on port tack will likely tack on her wind. Then B will face the ugly choice that must be made by many boats that get to the layline this early: sail slow in bad air all the way to the mark, or tack and get clear air by sailing all the way out past A.

- **Boat C** – This boat has a much better plan than getting to the layline early. By staying 5 to 10 lengths below the starboard layline she has found a lane of clear air, and most boats that cross her on port tack will go all the way to the layline. Though Boat C is on a much lower ladder rung than Boat A, C will probably get to the mark first because A has overstood so much.

- **Boat D** – Another great approach is coming on port tack from the left side. While so many boats are overstanding the starboard layline and sailing in bad air, this boat will have clear air almost all the way to the mark. To be safe, she just needs to make sure that when she completes her tack to starboard she is still outside the windward mark zone.



Jacqueline Schmitz photo



## RULE OF THUMB

# Go for puffs in light air, shifts in breeze

You're sailing upwind on port tack on the first beat of a race, and it feels like you are on a pretty good lift. However, when you look toward the left side of the course, you see a small increase in wind pressure. Should you keep sailing on the lift, or tack to head for a little more breeze?

In many situations like this, the answer depends on how much wind you have. In heavy air, it is likely that you are already overpowered and sailing almost as fast as the boat will go upwind. In this case, another knot or two of wind will not make you point higher or go much faster through the water. However, sailing the lifted tack will be very helpful in getting to the windward mark. Therefore, when it's breezy, a general rule of thumb is to play the shifts first and not worry so much about going for the puffs.

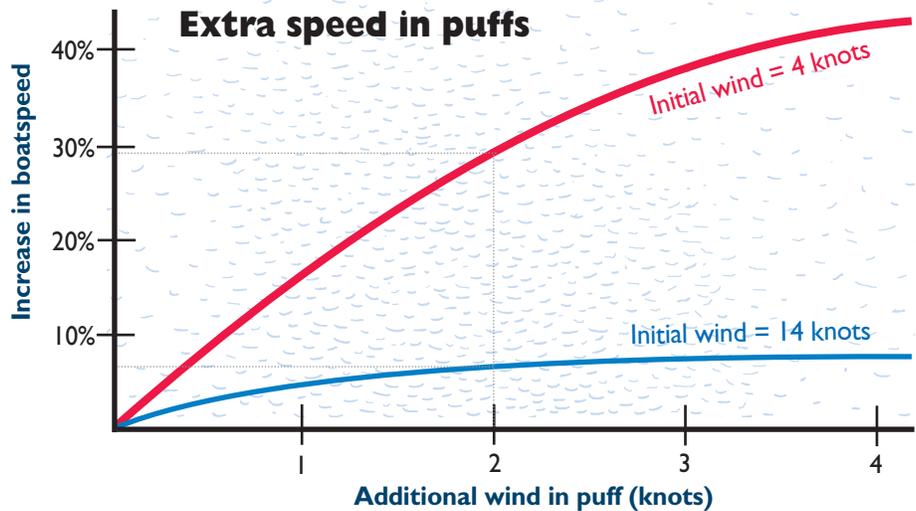
In light air, however, the total opposite is true. When you are slow, even a small increase in pressure can have a substantial impact on your speed. If the mean wind speed is five knots, a two-knot puff represents a 40% increase in available power. That is significant!

In addition to giving you better

speed through the water, a puff is like a lift because it usually allows you to point higher upwind (even when the puff comes from the same wind direction). Since a puff can give you both better speed and pointing in light air, going for extra velocity should be your top priority in these conditions. Shifts are also

very important, but a lift without pressure has limited value.

The rule of thumb that suggests you sail for puffs in light air and shifts in breeze is especially true on runs. When you're going downwind in light air, changes in velocity have a much greater impact on your sailing angles than they do upwind. A



In light air, getting to a puff will help your speed a lot more than it will in heavy air. This (very approximate) graph shows how much your speed may increase with each knot of extra wind you get. When you start off with four knots of wind (red line), for example, a two-knot puff may increase your speed 30%. But if you initially have 14 knots of wind, the same increase in pressure will probably increase your speed less than 10%. That's why puffs are so critical when it's light.



JH Peterson photo

Should you keep sailing on a lift, or tack and sail toward a puff? The answer often depends on the wind velocity in which you are sailing. If it's windy, a few more knots of wind won't usually make too much difference, so it's probably better to play the shifts. In light air, however, even a little more wind can greatly impact your speed and pointing.

puff, therefore, not only makes you go faster through the water, but may allow you to sail significantly lower (as much as 10° or 20°!). And because you are sailing with the puff (instead of into it as you do upwind), the extra breeze will stay with you longer. That's why in light air on runs you should look carefully for increases in pressure.

We can summarize this rule of thumb by saying that the less wind you have to start with, the more important it is to find and get into the puffs quickly. When it is windy enough that more wind doesn't help your speed or pointing very much, then shifts are especially critical.

### **More rules of thumb related to wind velocity**

There are a number of things in sailboat racing that vary according to whether you are sailing in light or heavy air. Here are two of them:

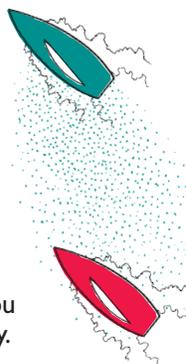
- **The importance of clear air.**

Wind shadows extend farther and are more hurtful in light air, so when you don't have much wind it's often more important to get clear air than to go the right way (*see below*).

- **Turning the boat.** You should always steer your boat as much as possible with sail trim and crew weight so you minimize the drag caused by turning the rudder. But in light air when there is not much wind pressure on the sails, your priority should be on using weight to turn. Conversely, in heavy air when weight has less impact, focus on steering with sails.

### **Wind shadows and wind velocity**

In light air, wind shadows are killers. Since you are already so underpowered and slow, another boat's bad air will really hurt you. Therefore, the rule of thumb is to sail in clear air – you would almost never keep sailing in the Red boat's position here. In heavy air, however, the difference between sailing in clear air and bad air is not as great. So you would definitely consider sailing in this position if you were headed the right way.



## **Boatspeed guidelines**

There are rules of thumb to help you in almost every aspect of sailboat racing. Here are some of my favorite guides for going fast, which is the most critical skill for success (in my opinion). Like other rules of thumb, these are especially important when you're in the middle of a race and become a bit lost speed-wise. That's when you have to go back to the things that have proven to work most of the time.

### **Go for speed first, then pointing.**

Many sailors try to point higher by aiming their boat closer to the wind. That usually doesn't work. The best remedy for pointing problems is to get the boat going faster first; then better pointing will follow.

### **Don't maneuver in lulls.**

When you are going to perform a maneuver (like a tack or a jibe), it's usually much better to do it in a puff when it's easier to maintain speed.

### **If you're slow, change something.**

When your boatspeed is not good, try changing one or more speed variables. There is almost always a simple explanation for why you're not fast, but you won't figure it out without trying some changes.

### **Trim your main with the top batten parallel to the boom.**

This is a good all-around starting point for most boats in most winds. Of course, if it's light and bumpy you need a little more twist, and if it's flat water and medium breeze, you can trim harder.

### **Set up your boat and sails for the lulls (rather than the puffs).**

This is a good rule of thumb when the wind velocity is up and down. It's much easier to get/keep the boat going fast in puffs; therefore, you should set up for the lulls to make sure you have enough power.

### **Measure speed relative to other boats.**

The only way you can get an accurate measure of your boat's performance (speed and pointing) is with a close comparison to other boats.

### **Minimize rudder by using sails and weight to steer.**

Rudder angle is generally slow, so a basic rule of thumb is that whenever you turn you should use sail trim and weight as much as possible.



JH Peterson photo



## RULE OF THUMB

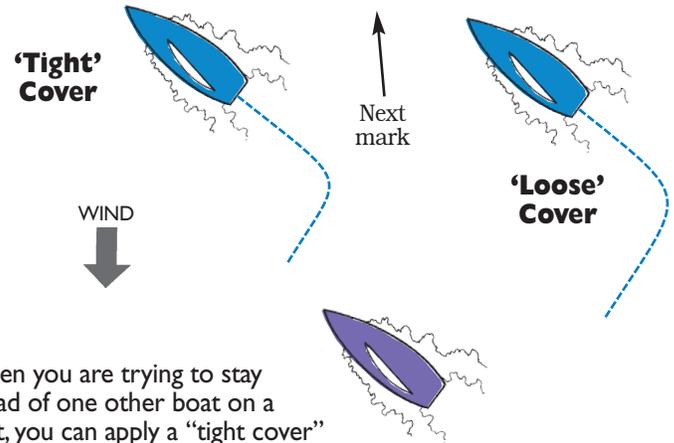
# Stay between other boats and the next mark

When you are ahead of other boats and you're happy with your position in the race, defend what you have. In other words, focus on staying ahead of the boats behind you and don't worry about passing the boats ahead of you. What's the best way to do this?

The most common way for boats to pass you is by getting 'leverage' (lateral separation) and then getting a favorable windshift. The farther a boat is able to separate from you, the smaller a windshift she needs to get ahead. For example, if a boat is 5 lengths to one side of you, she may need a 20° shift to pass you. But if she is 20 boatlengths away from you, she may need only a 5° shift to get past. Obviously, she is much more likely to get a 5° shift than a 20° shift.

The lesson for the boat ahead is not to let the boats behind get very much leverage to either side. The basic rule of thumb is to stay between the boats behind and the next mark (this works both upwind and downwind). If you are covering one other boat, draw an imaginary line between that boat and the mark, and stay close to that line. If you are defending against more than one boat, draw the line between the center of the pack and the mark (see photo).

By staying between other boats and the mark, you minimize their leverage and reduce the chances that

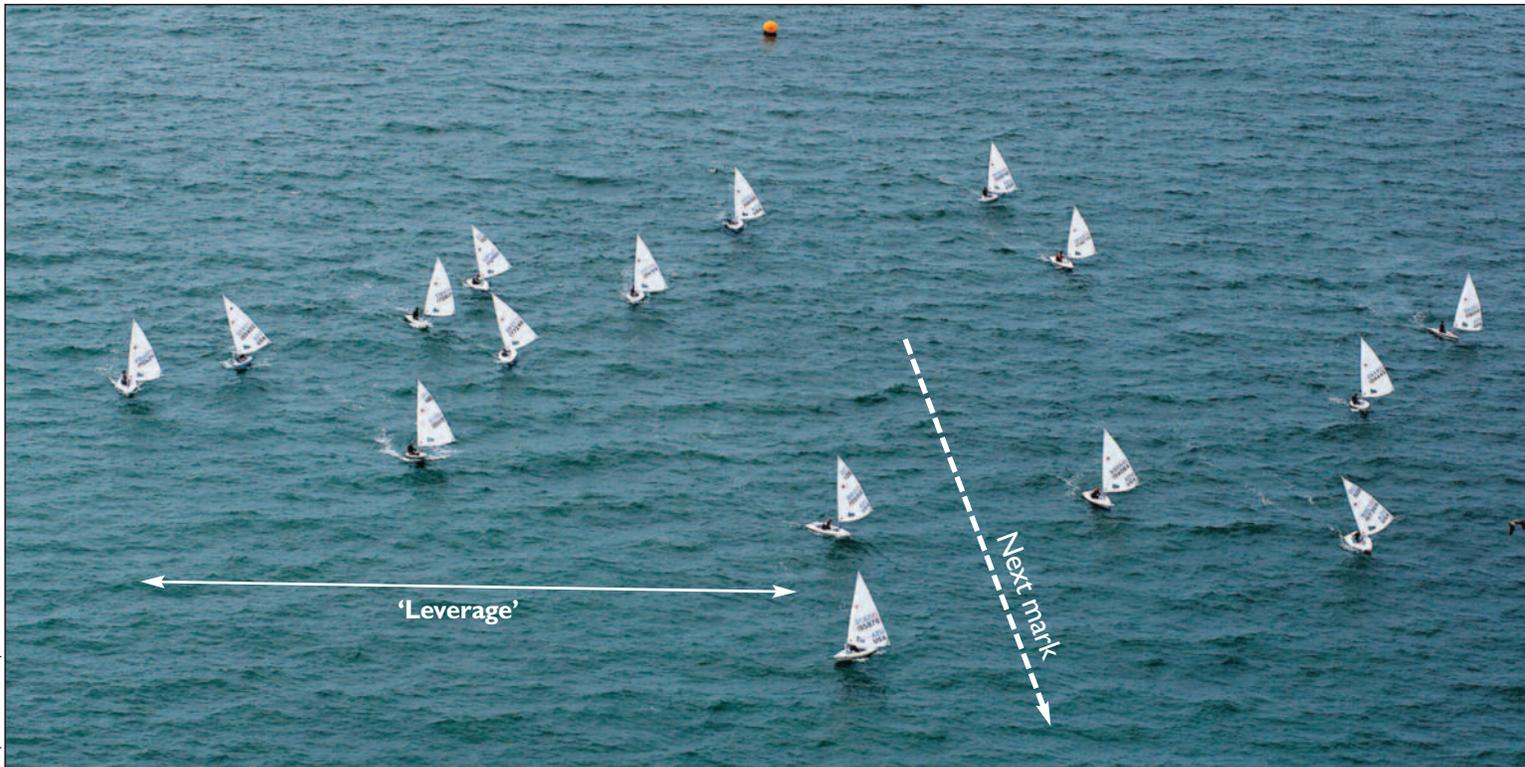


When you are trying to stay ahead of one other boat on a beat, you can apply a "tight cover" by tacking to windward and ahead of them.

This positions you between that boat and the next (windward) mark, plus it often puts the other boat in your bad air.

However, a tight cover does not always work the way the leading boat intends. If you tack on the other boat, they will usually tack to clear their air and get away from you. The result is that they split tacks and get more leverage.

A good compromise may be a "loose cover" where you tack to windward of the other boat so your bow is roughly even with theirs. Though you are not exactly between them and the next mark, you are still relatively close to them and they don't have as strong a reason to tack and separate.



Jacqueline Schmitz photo

When you are defending against a bunch of boats behind you, stay roughly between that pack and the next mark. I draw a mental line on the water between the center of that pack and the mark, and I try to stay on or close to that line. This works for both beats and runs, except that downwind you have the added challenge of avoiding wind shadows from the boats you are covering.

they will get by you on a windshift. This is classic covering strategy and is very effective when the wind is steady. In shifty breeze it's not so simple because you have to find the right balance between playing the shifts and staying between other boats and the mark.

Here are two other tactics you can use for covering:

- "Spend your lead" – Sometimes it's worth giving up some of your lead in order to be in a stronger covering position. For example, if you round the leeward mark with a good lead, you might want to do two tacks so you will be directly upwind of the next boat (and on the same tack) when they round the mark. This strong position may be worth the distance you lose by doing two extra tacks.

- "Herd" other boats – It's tough when you are covering several boats on a beat and they split in different directions. Sometimes you can use your wind shadow to 'herd' these boats by tacking on the wind of any boat that tries to split. If you can make all the boats go the same way, they will be a lot easier to cover.

## More tactical guidelines

Here are some other rules of thumb that apply to your positioning relative to other boats.

### In Oscillating Shifts:

- **Cross other boats when you can.**

When you get a shift that puts you ahead of other boats (at least temporarily), consolidate this lead by tacking and crossing them (so you lead those boats to the next shift). The time to do this is when the boats on your windward hip look like they are falling into you.

- **Don't let other boats cross you.**

The corollary to the rule above is that you should not let other boats consolidate their lead by crossing ahead of you. Instead, tack to leeward of them with your bow out so you can lead them toward the next shift.

### Pass one or two boats at a time.

When you are trying to play catch-up, don't go for all the marbles at once. If you try to make one gain that is big enough to pass many boats, you are probably taking too large a risk. Instead, look to make a number of smaller gains so you pass one or two boats at a time. Your odds of making small gains like this are much better. As you get closer to the end of the race, it's OK to reconsider this strategy. That's when you may decide to take bigger risks if you are not yet satisfied with your position.

### Defend or Attack?

This is not so much a rule of thumb as a few words of wisdom. At every point during a race, you should know in your mind whether you are primarily attacking the boats ahead of you or defending against boats behind. This choice depends on whether you are happy with your position, and it greatly influences your tactics.

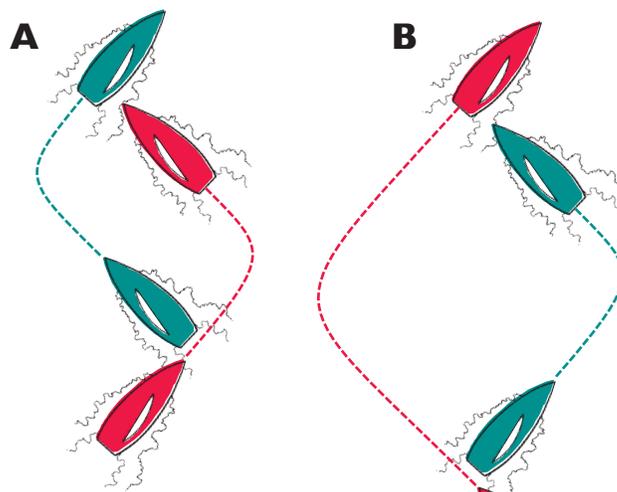


## RULE OF THUMB

# Protect the right

When all other strategic and tactical factors are equal, it's a good idea to 'protect' the right side of a beat (looking upwind). In other words, stay to the right of nearby boats so when you converge near the windward mark you'll be on starboard tack with the right of way.

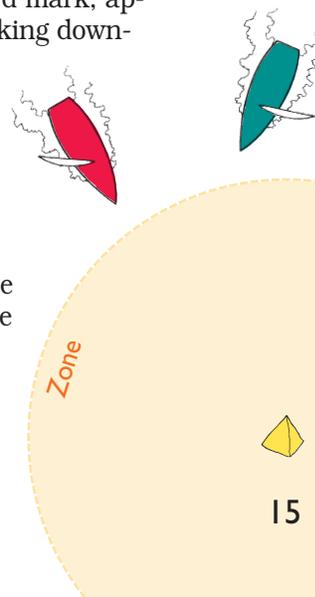
This rule of thumb is most important when the wind is fairly steady (because that makes it hard to gain enough distance to pass another boat on their left) and when you are getting close to the windward mark (because the boat on the left has less time and space to pass on the left). This can also be a valuable tactic in short-course racing, but it's not so helpful when courses are long or the wind is changing a lot.



When Green does not protect the right (A), Red has to gain only a few feet in order to prevent Green from crossing her when they converge again. But when Green protects the right side (B), Red has to gain more than two boatlengths in order to cross ahead of Green when they converge again.

## Corollary: On runs, protect left.

When you're sailing to a leeward mark, approach it from the left side (looking downwind). By making your final approach on starboard tack, you will have right of way over all boats that are to your right. You will also be positioned on the inside of other boats when you reach the zone (assuming you are rounding the mark to port), and will therefore be entitled to mark-room. This rule of thumb is especially important the closer you are to the mark and the more boats



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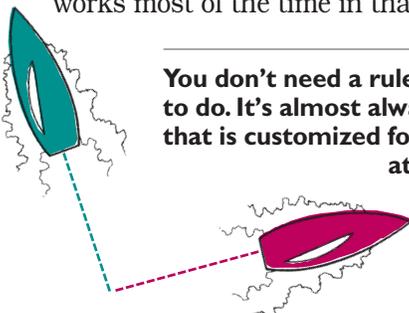
## Final note on rules of thumb

In an ideal world, you would never use a rule of thumb in a sailboat race. Instead, you would look at each unique situation and come up with a custom plan or response to take advantage of the existing conditions. For example, if there was more wind pressure to the right you would go right (on port tack), even if that was the shorter tack. If you were leading the race and all the boats behind you went left, you would go left even if you knew the next shift was coming from the right.

Rules of thumb do not always work because they are basically general solutions for common situations. However, when you're not sure what to do next, it can be very helpful to know some moves that have a history of success in similar situations.

In every race you have to make hundreds of choices about how to get to the finish line as quickly as possible. Your goal should be to make all of these decisions in such a way that each one has a high probability of success. If your success rate is only 50%, for example, then half your decisions will be 'wrong,' and you won't do very well in the race.

The good sailors all try to get this percentage as close to 100% as possible, which means they avoid taking too many risks. One way they increase their odds of success is by using rules of thumb. In situations where they might otherwise have to make a 50-50 guess about the right thing to do, they can increase their percentage to 80 or 90% by using a guideline that works most of the time in that situation.



**You don't need a rule of thumb when you know what to do. It's almost always better to follow your own plan that is customized for the conditions you experience at any point in the race. But when you're not sure of your next step, then it's helpful to have some general guidelines (rules of thumb) that usually work.**

## TEASER ANSWER

The answer is B) When she is headed about 10°. When the wind is oscillating, you should sail on the lifted tack all the way to the windward mark, and you never need to sail below your median (average) heading on either tack. Therefore, the ideal time to tack on a header is just when you have been headed to your median heading for that tack.

In this case, the wind was shifting through a range of 20°. So if you are sailing on a big lift and you get headed 10°, you should be at your average heading. Up until this point you have been sailing above the median. If you don't tack you will be sailing below the median – the best option is to tack and sail above the median on the other tack.

